

# SONY

DIGITAL BETACAM CAMCORDER

## DVW-707/707P

## DVW-709WS/709WSP

## DVW-790WS/790WSP

**Digital** **BETACAM**

## Power HAD

OPERATION MANUAL  
1st Edition (Revised 2)

English

## **WARNING**

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

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

### **For the customers in the USA**

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

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

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

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

### **For the customers in the USA and Canada**

### **RECYCLING NICKEL-CADMIUM BATTERIES**

Nickel-Cadmium batteries are recyclable. You can help preserve our environment by returning your unwanted batteries to your nearest point for collection, recycling or proper disposal.



Note: In some areas the disposal of nickel-cadmium batteries in household or business trash may be prohibited.

RBRC(Rechargeable Battery Recycling Corporation) advises you about spent battery collection by the following phone number.

**Call toll free number: 1-800-822-8837 (United States and Canada only)**

Caution: Do not handle damaged or leaking nickel cadmium batteries.

## **For the customers in Europe**

This product with the CE marking complies with the EMC Directive(89/336/EEC) issued by the Commission of the European Community.

Compliance with this directive implies conformity to the following European standards:

- EN55103-1: Electromagnetic Interference(Emission)
- EN55103-2: Electromagnetic Susceptibility(Immunity)

This product is intended for use in the following Electromagnetic Environment(s):

E1 (residential), E2 (commercial and light industrial), E3 (urban outdoors) and E4 (controlled EMC environment, ex. TV studio)

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# 1-1 Features

The DVW-707/707P series <sup>1)</sup> Digital Camcorder combines a color video camera, which uses IT <sup>2)</sup> type Power HAD<sup>TM</sup> <sup>3)</sup> sensor CCDs <sup>4)</sup>, with a Digital BETACAM series portable videocassette recorder. Its excellent image quality, sensitivity, portability, and dust- and water-proof construction make it ideal as a camcorder for ENG <sup>5)</sup> and EFP <sup>6)</sup> in the same way the earlier DVW-700/700P. The introduction of a new method of processing digital signals improves the image quality even further and makes the camcorder far easier to use.

The DVW-790WS/790WSP employs FIT <sup>7)</sup> type Power HAD sensor CCDs featuring a lower smear level and the ability to switch between the conventional aspect ratio of 4:3 and a wide screen aspect ratio of 16:9. The DVW-709WS/709WSP is identical with the DVW-790WS/790WSP except for its use of IT type Power HAD sensor CCDs and its lack of an ECS (extended clear scan) mode.

.....  
1) The DVW-707/709WS/790WS is for the NTSC broadcast system. The DVW-707P/709WSP/790WSP is for the PAL broadcast system. The descriptions given in this manual apply to both models, any differences being clearly noted in the text.

2) IT: Interline Transfer

3) Power HAD: Power Hole-Accumulated Diode

“Power HAD” is a registered trademark of Sony Corporation.

4) CCD: Charge-Coupled Device

5) ENG: Electronic News Gathering

6) EFP: Electronic Field Production

7) FIT: Frame Interline Transfer

# 1

## 1-1-1 Camera Features

The features of the DVW-707/707P/709WS/709WSP/790WS/790WSP series camera are described below.

- Power HAD sensor CCDs ensure high sensitivity and high image quality.
- The 12 bit AD converter has improved picture quality, stability, and reliability.
- A setup menu enables you to control features such as status displays, messages, and markers; to select values or functions; and to operate a setup card.
- The settable items in the CAMERAMAN menu allow you to create your own custom menu.
- A setup card (not supplied) makes it easy to replicate the recorder setup data appropriate to the shooting conditions, and ensures uniform shooting <sup>1)</sup>.
- Use of a built-in sophisticated electronic shutter, which has selectable modes, Clear Scan<sup>TM</sup> <sup>2)</sup>, Extended Clear Scan (for DVW-790WS/790WSP only) and Super Enhanced Vertical Definition, ensures shooting with little or no blurring.
- Selectable video gain ensures a noise-free image.
- A simple switch operation enables automatic adjustment of the black set, black balance, and white balance. Memory functions make it easy to replicate the settings appropriate for the lighting conditions.
- The ATW <sup>3)</sup> function automatically adjusts the white balance for the varying lighting conditions during shooting.

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1) The data saved in the setup card for the DVW-707/707P/709WS/709WSP/790WS/790WSP is not interchangeable with the data saved in setup cards for other camcorders.

2) Clear Scan: "Clear Scan" is a trademark of Sony Corporation.

3) ATW: Auto Tracing White balance

- The “TruEye™”<sup>1)</sup> process is used to ensure naturally colored pictures even when shooting very bright subjects.
- The video gain can be boosted to 48dB instantly using the TURBO GAIN button (factory setting: 42dB).
- A high-performance viewfinder is adjustable forward, backward and sideways, and has full auxiliary equipment.
- Character display functions on the viewfinder indicate switch settings, black and white balance adjustment, and warnings.
- Warning indicators and sound inform you of VTR faults, end of tape, low battery, etc.
- The camcorder is provided with a filter disk for adjusting the filter setting to the shooting conditions.
- Fine adjustment of the reference value for automatic iris control is provided.
- A built-in circuit produces a SMPTE type color bar signal for easy adjustment of the color monitor. An SNG<sup>2)</sup> bar signal is also provided for SNG uplink purposes.
- A super-cardioid directional microphone with an external power supply system is supplied. Other types of microphones can also be connected.
- By connecting the BVF-VC10W Color Viewfinder (not supplied), you can check both the camera image and a playback image in color.
- The RM-B150 Remote Control Unit (8 pin, not supplied) controls some of the camera functions and the VTR functions. You can use the RM-P9 (6 pin, not supplied) by connecting it through the CCA-86-0.4 conversion cable (not supplied).
- By connecting the CA-701 Camera Adaptor (not supplied), you can input CH-3 and CH-4 audio signals and output SDI signals.
- By connecting the CA-702 Camera Adaptor (not supplied), the camcorder can be connected to a portable VTR with a CCZ (26 pin) cable, allowing you to record external analog video signals or serial digital interface (SDI) signals (including an embedded audio signal).

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1) “TruEye”: TruEye is a trademark of Sony Corporation.

2) SNG: Satellite News Gathering

- You can add extra functions to the camcorder by attaching the following extension boards (not supplied).

**BKDW-702:** This board allows you to output an SDI signal (corresponding to EDH <sup>1)</sup>) from the VIDEO OUT connector. The setup menu is used to select either composite video signal output or SDI signal output.

**BKDW-704:** When a cinema lens is attached to the camcorder, this board allows you to reverse the picture orientation (vertically and horizontally) through a setup menu operation (DVW-709WS/709WSP/790WS/790WSP only).

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## 1-1-2 VTR Features

The VTR features of this camcorder are described below.

- Digital BETACAM format gives improved signal-to-noise ratio, frequency bandwidth, waveform characteristics, and detail playback characteristics to ensure higher video and audio quality.
- The shooting date and time, camera ID, cassette number and other information can be recorded on the tape as shot data.
- It is possible to record recording start markers and good shot markers on the tape while shooting, and search automatically for required cuts when editing.
- It is possible to automatically rewind and review the last few seconds of the recording on the tape for a quick check immediately after shooting.
- No playback adaptor is needed to see the color playback image.
- The five times normal speed search function provides quick positioning of the tape.

---

1) EDH: Error Detection and Handling

- Both LTC <sup>1)</sup> and VITC <sup>2)</sup> recordings can be made, as can LTC playback.
- The built-in time code generator is synchronized with an external generator.
- A lithium battery is the back-up power supply for the time code generator enabling the time code to be held for about 5 years without charging the camcorder power supply.
- Optional long-life battery packs are available.
- Pressing the VTR START button on the camcorder or the VTR button on the lens ensures recording continuity from the very next frame.
- By connecting the VA-DN1 Camcorder Interface Adaptor (not supplied) to the 8-pin REMOTE connector, you can control some of the VTR functions from a 9-pin remote control device.  
(A CCA-86-0.4 conversion cable is needed for the connection.)
- The time code is displayed in the LCD window screen even when the power is off. Automatic power shut-off function with five time code indication settings.
- This board continuously stores a few seconds of the most recent picture data. Recording is started with this data when the REC button is pressed to prevent the loss of picture data (Loop Rec function) (when the BKDW-703 is attached).

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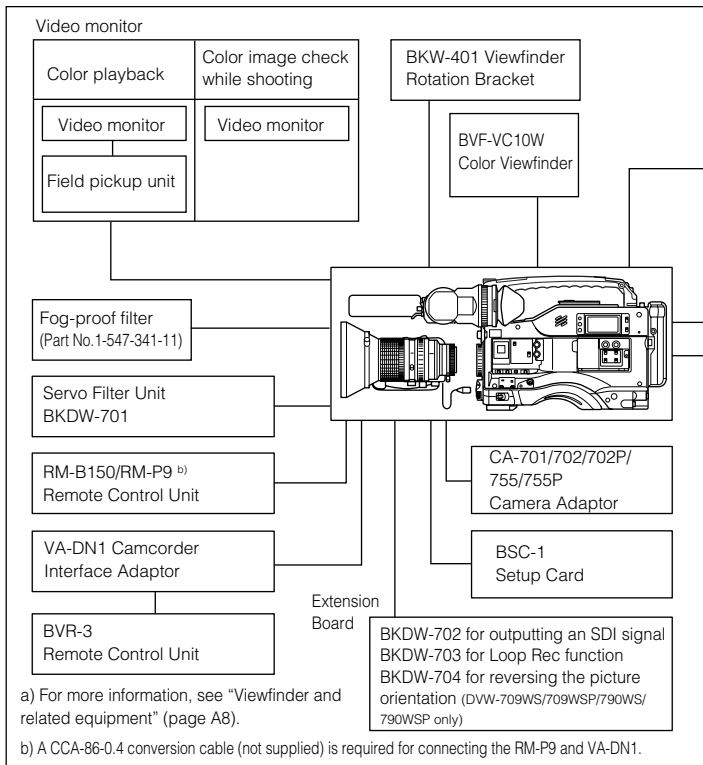
1) LTC: Longitudinal Time Code

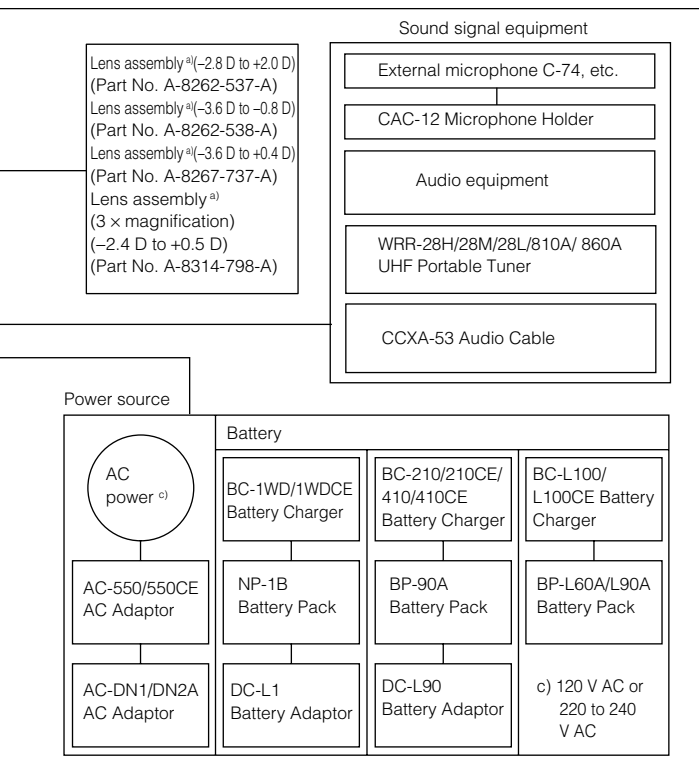
2) VITC: Vertical Interval Time Code

# 1-2 Example of System Configuration

The diagram below shows a typical configuration of the camcorder for ENG and EFP.

For more information about connections of the additional equipment and accessories, see Chapter 5, as well as the operation manuals for the connected equipment.





# 1-3 Precautions

---

## 1

### Use and Storage

#### **Do not subject the camcorder to severe shocks**

The internal mechanism may be damaged or the body warped.

#### **After use**

Always turn off the power.

#### **Before storing the camcorder for a long period**

Remove the battery pack.

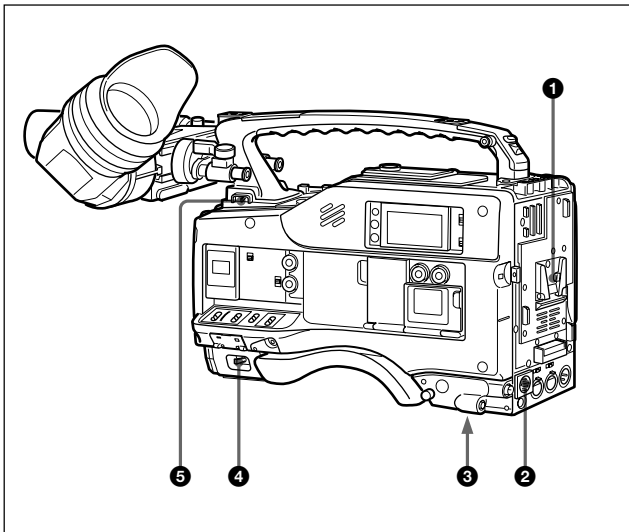
#### **Use and storage locations**

Store in a ventilated place. Avoid using or storing the camcorder in the following places.

- Places subject to temperature extremes
- Damp places
- Places subject to severe vibration
- Near strong magnetic fields
- In direct sunlight or close to heaters for extended periods



## 2-1 Power Supply



Power supply functions

### ❶ Battery attachment

Attach a BP-L60A/L90A Battery Pack, a DC-L1 Battery Adaptor for loading an NP-1B Battery Pack, or a DC-L90 Battery Adaptor for loading a BP-90A Battery Pack.

Furthermore, by attaching an AC-DN1/DN2A AC Adaptor you can operate the camcorder from AC power.

### ❷ DC IN (external power input) connector (XLR type, 4-pin, male)

Connect an AC-550/550CE AC Adaptor with the DC output cable supplied with the adaptor.

To use an external battery, connect its DC output cable to the DC IN connector.

---

### ③ BREAKER button

Excessive current in the internal circuitry, whatever the cause, will trip the internal circuit breaker, automatically cutting off the power. If the breaker trips, consult your Sony service personnel.

### ④ POWER switch

This switch turns the main power supply on and off.

### ⑤ LIGHT switch

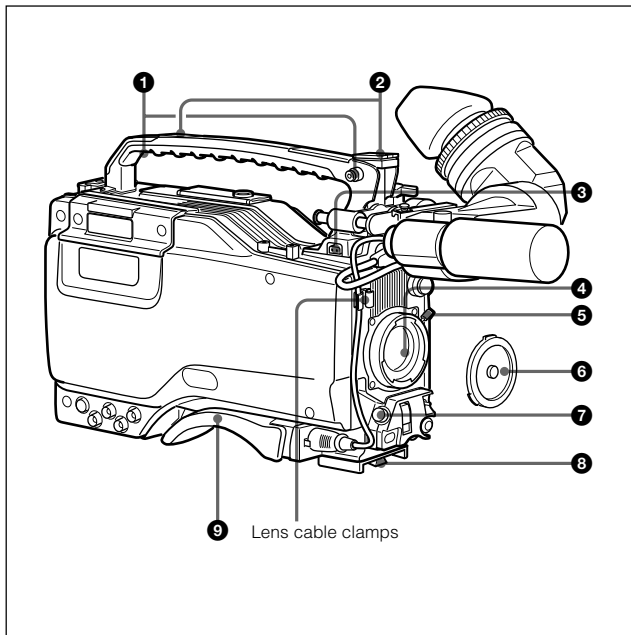
This selects the way in which a video light connected to the LIGHT connector is switched on and off.

**AUTO:** When the video light switch is turned on, starting recording with the VTR turns on the light.

**MANUAL:** The video light switch controls the light, turning it on and off manually.

## 2-2 Accessory Attachments

2



Accessory attachments

### 1 Shoulder strap posts

Attach the supplied shoulder strap to these posts.

### 2 Light shoe

Attach a video light, etc. to this shoe.

---

### **3 LIGHT connector**

Connect the cable of a video light attached to the light shoe. The maximum power consumption allowable for the video light is 50 W.

### **4 Lens mount**

This is a special bayonet type lens mount.

### **5 Lens locking lever**

After inserting the lens in the lens mount, rotate the lens mount ring with this lever to lock the lens in position.

### **6 Lens mount cap**

Remove this cap by pushing up on the lens locking lever. For protection from dust, always insert this cap when no lens is mounted.

### **7 LENS connector (12-pin)**

Fit the lens cable to this connector. Contact your Sony representative for more information about the lens you are using.

### **8 Tripod mount**

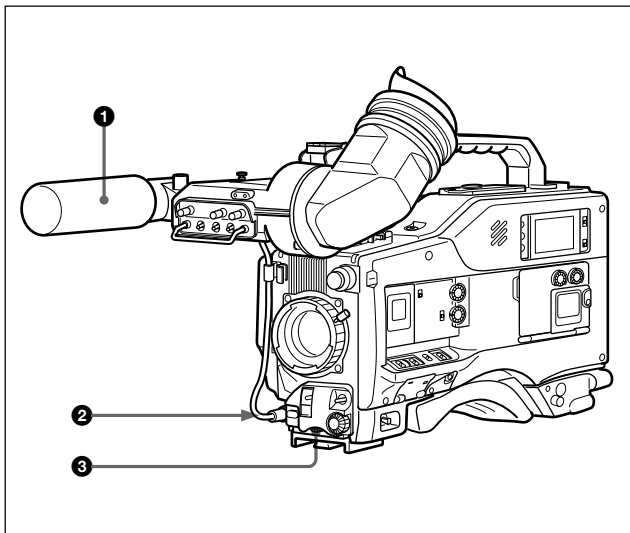
Fit the supplied tripod adaptor to mount the camcorder on a tripod.

### **9 Shoulder pad**

You can move the shoulder pad forwards or backwards by loosening the two screws. Do this to ensure the best balance when shooting with the camcorder on your shoulder.

## 2-3 Audio Functions

2



Audio functions (1)

### 1 Microphone

This is a super-cardioid directional microphone with an external power supply system. You can use it as an interview microphone by connecting it to an extension cable (not supplied).

### 2 MIC IN (microphone input) connector (XLR type, 3-pin, female)

The supplied microphone connects to this connector. By using an extension cable (not supplied), you can connect a microphone other than the supplied one as long as it is provided with an external power supply system. The connector supplies power (+48 V) to the microphone.

---

### ③ MIC (microphone) AUDIO LEVEL control

If one or both of the AUDIO IN switches are set to FRONT, you can adjust the recording level of the microphone.

2

When AUDIO is set to ON in the VF DISP 2/2 page of the setup menu, the viewfinder DISPLAY switch is set to ON, MONITOR switch is set to CH1, you can adjust the channel-1 audio level while watching the indication in the viewfinder.

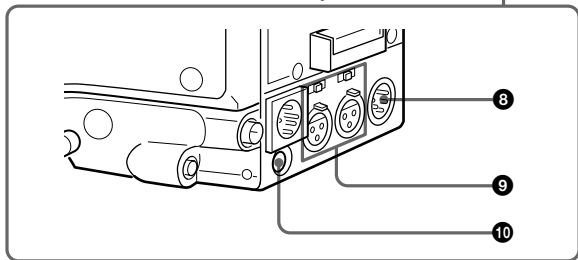
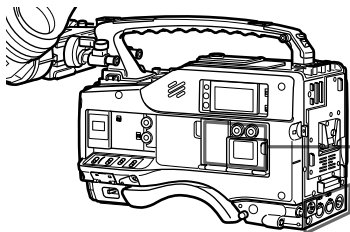
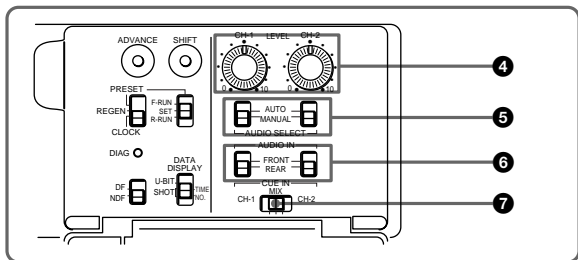


Illustration: DVW-707/709WS/790WS (for the NTSC broadcast system)

### Audio functions (2)

#### **4 AUDIO LEVEL CH-1/CH-2 (audio channel 1 and channel 2 recording level) controls**

These controls adjust the audio level of channels 1 and 2 when you set the AUDIO SELECT CH-1/CH-2 switches to MANUAL.

#### **5 AUDIO SELECT CH-1/CH-2 (audio channel-1 and channel-2 select) switches**

These switches set the audio level adjustment for channels 1 and 2 to MANUAL or AUTO.

**AUTO:** Select this setting for automatic adjustment.

**MANUAL:** Select this setting for manual adjustment.

#### **6 AUDIO IN (audio input) switches**

These switches select the audio input signals for audio channels 1 and 2. The input signal source is one of:

**FRONT:** The input signal source is the MIC IN connector.

**REAR:** The input signal source is the AUDIO IN CH-1/CH-2 connectors.

The audio input signals from the MIC IN connector are always recorded on audio channels 3 and 4, respectively, whether or not they are recorded on audio channels 1 and 2 in accordance with the setting of this switch. With the CA-701 (not supplied) connected to the camcorder, you can record separate sounds to audio channels 3 and 4.

*For more information, refer to "maintenance manual."*

#### **7 CUE IN (cue track input) switch**

This switch selects the input signals for recording the cue track.

**CH-1 :** Channel 1 input signal

**MIX :** Mixed input signal of channels 1 and 2

**CH-2 :** Channel 2 input signal



**8 AUDIO OUT (audio output) connector (XLR type, 5-pin, male)**

This connector outputs the stereo sound.

Using a CCXA-53 Audio Cable (not supplied), you can convert from a 5-pin connection to two 3-pin connections.

**9 AUDIO IN CH-1/CH-2 (audio channel 1 and channel 2 input) connectors (XLR type, 3-pin, female) and LINE/MIC/+48 V ON (line input/microphone input/external power supply +48 V on) selectors**

These are the audio input connectors for channels 1 and 2, to which you can connect a microphone or other audio sources.

The LINE/MIC/+48 V ON selectors select the audio input signal source connected to these connectors, as follows:

**LINE:** Line input from an audio component

**MIC:** A microphone with internal batteries

**+48 V ON:** A microphone with an external power supply system

**10 DC OUT (DC power output) connector**

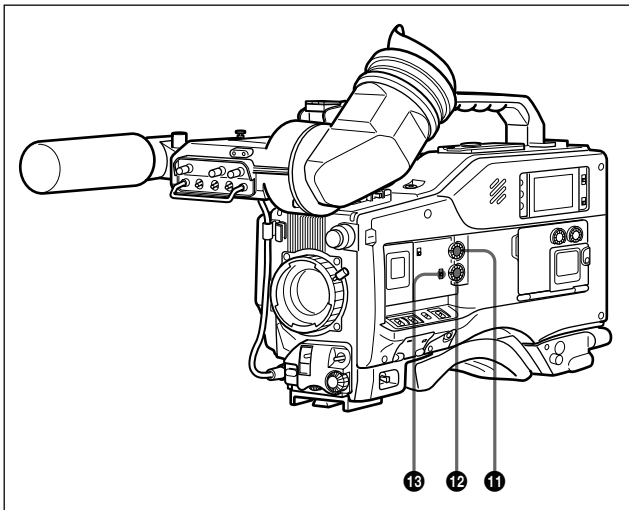
This connector supplies power for a WRR-28H/28M/28L/810/860A UHF Portable Tuner (not supplied).

Alternatively, it can supply power for a BVR-3 Remote Control Unit combined with a VA-DN1 Camcorder Interface Adaptor.

**Note**

The type of UHF portable tuner which can be connected depends on the country where the camcorder is used.

*For more information, consult your Sony representative.*



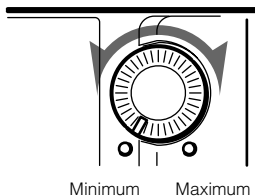
Audio functions (3)

**11 ALARM volume control**

This control adjusts the speaker or earphone alarm volume. At the minimum position, no sound can be heard.

You can adjust the internal volume control so that the alarm is audible even at the minimum setting of the ALARM volume control.

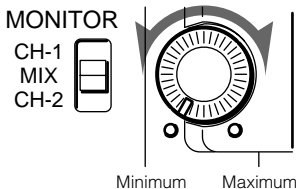
*For more information, refer to "maintenance manual."*



ALARM volume control

**12 MONITOR volume control**

This control adjusts the speaker or earphone sound volume, excluding the alarm sound. At the minimum position, no sound can be heard.



MONITOR volume control

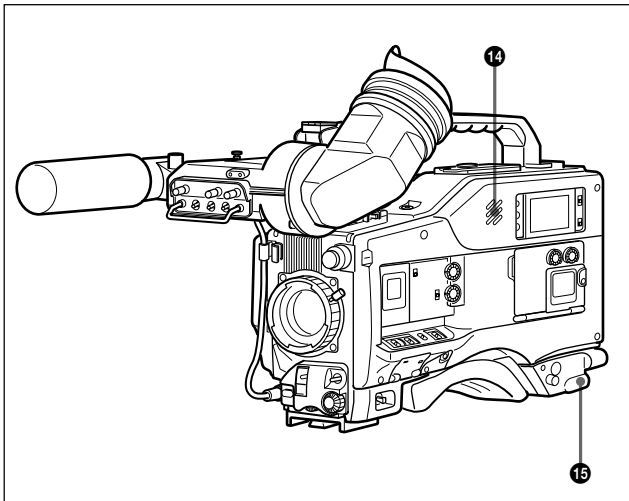
**13 MONITOR (audio channels select) switch**

This switch selects the audio output to the speaker or earphone. The audio level indication in the viewfinder screen switches automatically according to the selection.

**CH-1:** Audio channel 1

**MIX:** Mixed sound of channels 1 and 2

**CH-2:** Audio channel 2



Audio functions (4)

---

#### 14 Built-in speaker

During recording, the speaker can be used for monitoring the E-E sound <sup>1)</sup>, and during playback for monitoring one or both audio channels. The speaker also sounds alarms to reinforce visual warnings.

If an earphone is plugged into the EARPHONE jack, the speaker sound is automatically cut off.

*See Section 6-3 "Operation Warnings" (page 6-12) for information about alarms.*

#### 15 EARPHONE jack

Plugging an earphone into the jack automatically cuts off the built-in speaker, and you hear the alarms about the camcorder's operation and status through the earphone.

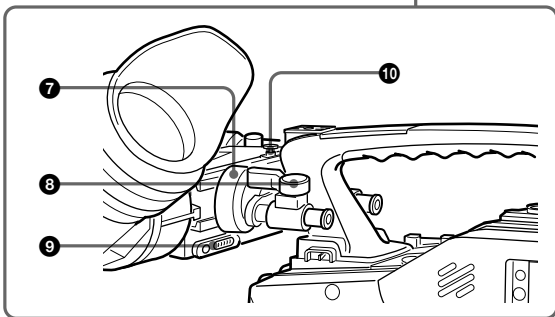
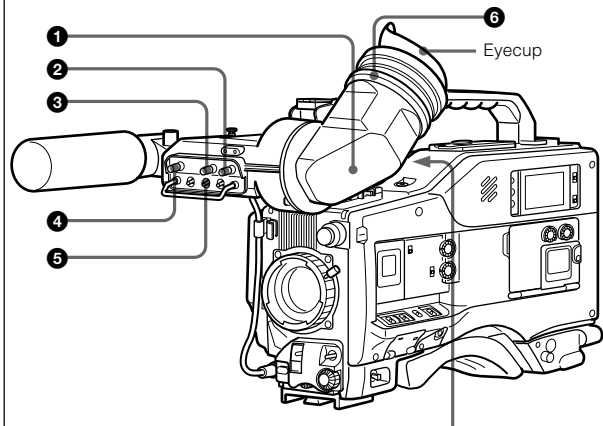
---

1) E-E sound (Electric to Electric sound)

The term E-E sound refers to an audio signal that has passed through the amplifier, but has not been recorded on the tape. In other words, you can directly monitor the recording input signal, as opposed to the simultaneous playback (output) signal.

## 2-4 Shooting and Recording/Playback Functions

2



Shooting and recording/playback functions (1)

## 1 Viewfinder

The viewfinder lets you view the camera image in black and white while shooting the picture and also see the playback picture from the VTR. It also displays various warnings and other information, a zebra pattern <sup>1)</sup>, safety zone marker <sup>2)</sup>, and center marker <sup>3)</sup>.

## 2 BRIGHT (brightness) control

This control adjusts the picture brightness on the viewfinder screen. It has no effect on the camera output signal.

## 3 CONTRAST control

This control adjusts the picture contrast on the viewfinder screen. It has no effect on the camera output signal.

## 4 PEAKING control

This control adjusts the sharpness of the picture on the viewfinder screen to make focusing easier. It has no effect on the camera output signal.

---

### 1) Zebra pattern

The zebra pattern aids in manual iris adjustment by indicating areas of the picture where the video level is approximately 70% IRE (for the DVW-707/709WS/790WS) or 490 mV (for the DVW-707P/709WSP/790WSP).

### 2) Safety zone marker

The safety zone marker is a rectangle indicating the effective picture area which is equivalent to 80%, 90% (the factory setting) or 100% of the entire viewfinder screen area. A setup menu lets you change the effective picture area from 90% to 80% or 100%.

*For more information, see Section 4-8-4 "Setting the Marker Display" (page 4-64).*

### 3) Center marker

The center marker indicates the center of the picture with a crosshair.

---

### 5 ZEBRA (zebra pattern) switch

This switch controls the zebra pattern on the viewfinder screen.

**ON:** The zebra pattern is displayed and stays.

**OFF:** No zebra pattern is displayed.

**MOMENT:** The zebra pattern is displayed and stays for a few seconds.

The zebra pattern display is factory set to indicate picture areas where the video level is approximately 70 IRE (for the DVW-707/709WS/790WS) or 490 mV (for the DVW-707P/709WSP/790WSP).

It is possible to display an additional pattern, indicating areas of 100 IRE (for the DVW-707/709WS/790WS) and above, or 700 mV (for the DVW-707P/709WSP/790WSP) and above. The video levels to be indicated with these patterns can be changed.

*For more information, refer to “maintenance manual.”*

### 6 Diopter adjustment ring

Use this ring to adjust the viewfinder image for your vision.

### 7 Viewfinder left-right positioning ring

Use this ring to move the viewfinder sideways.

### 8 Viewfinder front-rear positioning lever

Use this lever to move the viewfinder forward or backward.

### 9 Cameraman tally indicator

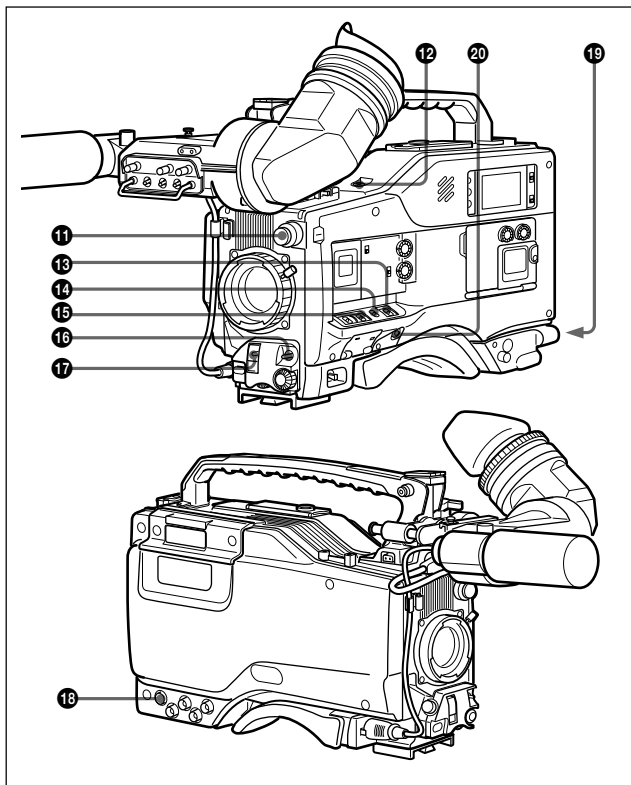
This indicator lights while the camcorder is operating.

Slide the window open when you shoot, keeping your eye away from the viewfinder.

### 10 Viewfinder stopper

Pull this stopper up to detach the viewfinder from the camera.





Shooting and record/playback functions (2)

### 11 FILTER selector

This selector is a knob that selects the most appropriate filter to match the light source. Note that if the display mode (see 4-8-3) is set to 3 when this selector is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g.: FILTER: 3 ).

The relationships between the selector settings and filter selections as well as examples of filters for different shooting conditions are given below.

#### DVW-707/707P

FILTER knob setting and filter

FILTER knob setting	Filter
1	3200K
2	5600K + $\frac{1}{8}$ ND
3	5600K
4	5600K + $\frac{1}{64}$ ND

Examples of shooting conditions and appropriate filters

Shooting condition	Filter
Sunrise and sunset; inside studio	1
Clear skies	2
Cloudy or raining	3
Very bright conditions, such as on snow, at high altitudes, or at the seashore	4

## DVW-709WS/709WSP/790WS/790WSP

### FILTER knob (outer) setting and CC filter types

<b>FILTER knob (outer) setting</b>	<b>CC filter selection</b>
A <sup>1)</sup>	Cross filter <sup>2)</sup>
B	3200K
C	4300 K
D	6300K

### FILTER (Inner knob) setting and ND filter

<b>FILTER knob (inner) setting</b>	<b>ND filter</b>
1 <sup>1)</sup>	Straight through
2	1/4 ND
3	1/16 ND
4	1/64 ND

### Examples of shooting conditions and appropriate filters

<b>Shooting condition</b>	<b>CC filter</b>	<b>ND filter</b>
Sunrise and sunset; inside studio	B	1
Clear skies	C or D	2 or 3
Cloudy or raining	D	1 or 2
Very bright conditions, such as on snow, at high altitudes, or at the seashore	C or D	3 or 4

1) The filter for FILTER settings A and 1 are fixed and cannot be changed.

2) Cross filter

This is a special effects filter which generates a cross-hair light pattern in highlighted portions.

---

## 12 TURBO GAIN button

When shooting under extremely poor lighting conditions, press the button once to boost the video gain to the value preset with the menu (up to 48dB, factory setting: 42dB). To stop boosting the gain, press the button once more or use the GAIN switch.

## 13 WHITE BAL (white balance memory) switch

This switch determines the source of white balance settings.

**PRST (preset):** Adjusts the color temperature corresponding to the position of the filter ring.

**A or B:** When the AUTO W/B BAL switch is pushed to WHT, the white balance is automatically adjusted according to the current position of the filter ring, and the adjusted value is stored in either memory A or memory B. (There are two memories for each filter, so a total of eight adjustments can be stored.) When the two-part FILTER selector is in the same position as at when the WHITE BAL switch was adjusted, the stored value is called from memory, and the camcorder automatically adjusts itself to that value.

**B (ATW):** When this switch is set to B whereas, in the setup menu OPERATION 1 page, B is set to ATW <sup>1)</sup>, the ATW is activated. You can use the AUTO W/B BAL switch even when the ATW is in use.

Note that if the display mode (see 4-8-3) is set to 3 when this switch is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g. WHITE : A CH).

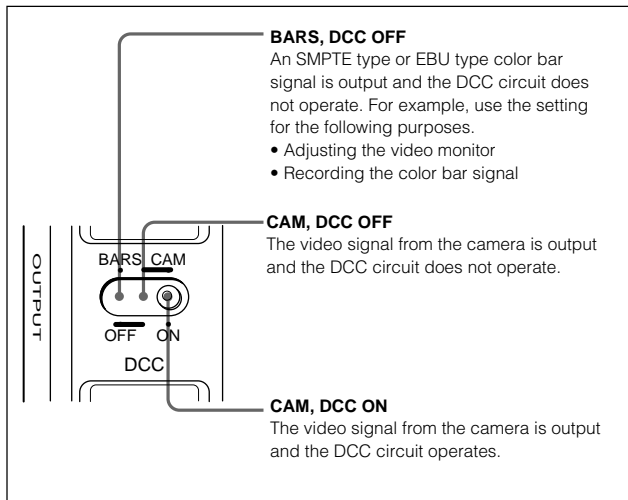
---

1) ATW (Auto Tracing White balance)

The white balance of the picture being shot is adjusted automatically for the varying lighting conditions.

#### 14 OUTPUT/DCC (output signal/dynamic contrast control) selector

This selector switches the video signal that is output to the VTR, viewfinder, and video monitor, between the color bar signal and the camera output. It also switches DCC <sup>1)</sup> on and off when output from the camera is selected.



OUTPUT/DCC selector

#### 1) DCC (Dynamic Contrast Control)

Against a very bright background with the iris opening adjusted to the subject, objects in the background will be lost in the glare. The DCC function will restore much of the lost detail and is particularly effective in the following cases.

- Shooting a subject against a bright sky
- Shooting a subject indoors, against a background through a window
- Any high contrast scenes

### 15 GAIN selector

This selector switches the gain of the video amplifier to match the lighting conditions during shooting. The gains corresponding to the L, M, and H settings are selected from the setup menu before use. The factory settings are L = 0 dB, M = 9 dB, and H = 18 dB.

Note that if the display mode (see 4-8-3) is set to 3 when this selector is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g. GAIN: 12 dB).

*For information about setting the gain values, see Section 4-9-1 “Setting the GAIN Selector Values” (page 4-77).*

### 16 AUTO W/B BAL (automatic white/black balance adjustment) switch

This switch activates the adjustment functions of the white balance and black balance.

**WHT:** Automatic adjustment of the white balance. If the WHITE BAL switch is set to A or B, the white balance setting is stored in the corresponding memory. When the ATW setting is selected in the setup menu, the white balance setting adjusted with this switch is not stored in memory. The Auto White balance is deactivated while the WHITE BAL switch is set to PRST.

**BLK:** Automatic adjustment of the black set and the black balance. The setting is stored in a separate memory.

### 17 SHUTTER selector

Set this selector to ON to use the electronic shutter. Set it to SEL to switch the shutter speed or mode setting within the range that has been previously set from the setup menu.

Note that if the display mode (see 4-8-3) is set to 2 or 3 when this selector is adjusted, the new setting will be indicated on the setting change/adjustment progress message display area of the viewfinder screen for about 3 seconds (e.g.:SS: 1/250 or :CLS: 60.6 Hz).

---

For more information about the shutter speed and mode settings, see Section 4-2 “Setting the Electronic Shutter” (page 4-13).

### **18 REMOTE (remote control) connector (8-pin)**

Connect the RM-B150 remote control unit (not supplied) to this connector.

Connect the RM-P9 Remote Control Unit (not supplied) with conversion cable or VA-DN1 Camcorder Interface Adaptor (not supplied) to this connector.

By connecting a camcorder interface adaptor, you can control the VTR from a 9-pin remote control device.

#### **Note**

If the REMOTE and TEST OUT connectors are used at the same time, it may not be possible to generate video signals at standard levels.

### **19 VIDEO OUT (video output) connector (BNC type)**

This connector outputs a composite signal (standard level, 75-ohm terminated) to the video monitor. If the video monitor is connected here, you can monitor the picture being shot by the camcorder as well as the picture recorded by the VTR. When synchronizing the time code of an external VTR with that of the camcorder, connect this connector to the video input connector of the external VTR.

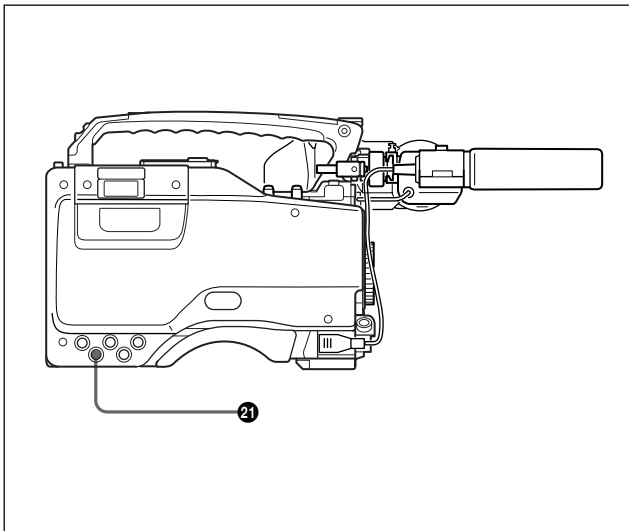
By attaching the BKDW-702 extension board (not supplied), you can output an SDI signal (corresponding to EDH) from the VIDEO OUT connector. Select composite video signal output or SDI signal output through the setup menu.

See Section 4-9-2 “Selecting the Functions” (page 4-79) for details on selecting the signal output from the VIDEO OUT connector.

### **20 ASSIGNABLE (assigning function) button**

You can assign ATW, RET, REC and other functions to this switch.

See Section 4-9-2 “Selecting the Functions” (page 4-79) for details on the functions that can be assigned and settings.



Shooting and playback/record functions (3)

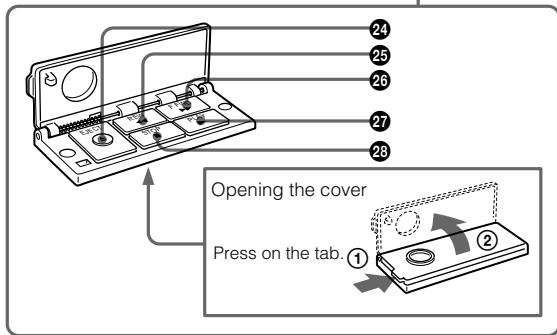
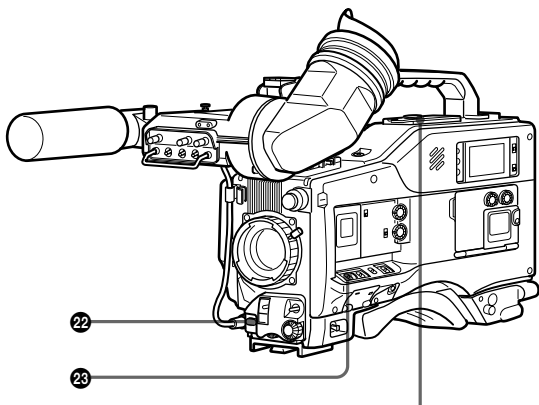
### **21 TEST OUT (test output) connector (BNC type)**

This connector outputs the video signal (standard level, 75-ohm terminated) for the video monitor. The output signal can be selected to be a composite, R, G, or B. The factory setting is composite, and the setting returns to composite whenever the power is switched on.

Depending on the internal board and setup menu settings, the setup menu, the time code and the shot data can be displayed over the image on the monitor. As for the VIDEO OUT connector, you can use this connector for synchronizing the time code of an external VTR to the time code of the camcorder.

*For information about the setting for test output, see Section 4-9-3 “Selecting the Test Output” (page 4-83).*





Shooting and record/playback functions (4)

### 22 VTR START (VTR record start) button

Press this button to start recording. Press it again to stop recording. The effect is exactly the same as that of the VTR button on the lens.

**23 VTR SAVE/STBY (VTR power saving/standby) switch**

This switch controls the VTR power mode during pauses in recording (REC PAUSE).

**SAVE:** Power saving mode. When you press the VTR START button, there is a short delay before recording starts, but power consumption is less than in standby mode, and battery life is extended. When the switch is set to SAVE, the VTR SAVE indicator in the viewfinder lights.

**STBY:** Standby mode. Recording starts as soon as you press the VTR START button.

*See Section 4-7-1 "Layout of Indicators in the Viewfinder" (page 4-48).*

**24 EJECT (cassette eject) button**

Press this button to eject or load a cassette.

**25 REW (rewind) button and indicator**

Press this button to rewind the tape. The indicator lights during rewinding.

**26 F FWD (fast forward) button and indicator**

Press this button to fast forward the tape. The indicator lights during fast forward.

**27 PLAY (playback) button and indicator**

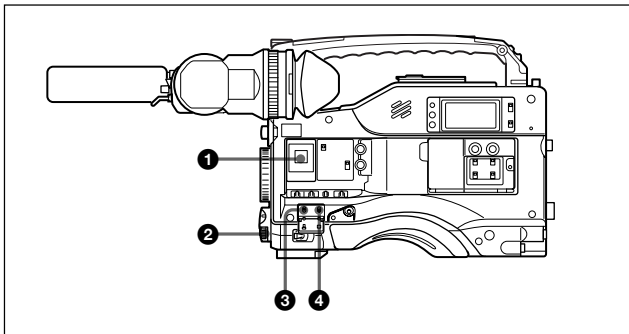
Press this button to view the recorded picture in the viewfinder or on a color video monitor. The indicator lights during playback. The 5 times normal speed search function is provided to make it far quicker to find a desired location of the tape. Press the REW button or F FWD button during playback to view the 5 times normal speed search picture. Pressing the REW button or F FWD button again causes play to stop and the camcorder to change to REW mode or F FWD mode, respectively.

**28 STOP button**

Press this button to stop the tape.

## 2-5 Setup Menu Operating Section

2



Setup menu operating section

### ❶ Setup card compartment

Open the cover and insert the BSC-1 Setup Card (not supplied) into the slot with the “SONY” logo facing you, then close the lid.

### ❷ Rotary encoder

When the cursor is aligned with the page title of a setup menu, pressing the rotary encoder changes to the page switching mode. When the cursor is other than on the page title, pressing the rotary encoder switches to the mode in which you can change the value of the current menu setting. To change the page or vary a setting value, turn the rotary encoder.

### ❸ MENU ON/OFF/PAGE (menu display/paging) switch

This switch is used to display the setup menu on the viewfinder screen or the test signal screen and to page through the menu items. When you close the cover, this switch is automatically set to OFF.

**ON:** Displays the setup menu on the viewfinder screen or the test signal screen, at the page which was on the screen when the previous menu access ended. (When the menu is first used, the first page is displayed.)

To enable the MENU CANCEL/PRST/ITEM switch, select this position.

**OFF:** Removes the setup menu from the viewfinder screen or the test signal screen.

**PAGE:** Every time this switch is pushed down from the ON position, the next page of the setup menu is displayed.

#### **4 MENU CANCEL/PRST/ITEM (menu setting cancellation/menu presetting/item selection) switch**

When the MENU ON/OFF/PAGE switch is set to ON, this switch is used to select an item on the setup menu or erase shot ID characters.

**CANCEL/PRST:** Pushing the switch up to this position allows you to cancel the previous settings, to reset the settings to their initial values, or to erase shot ID characters.

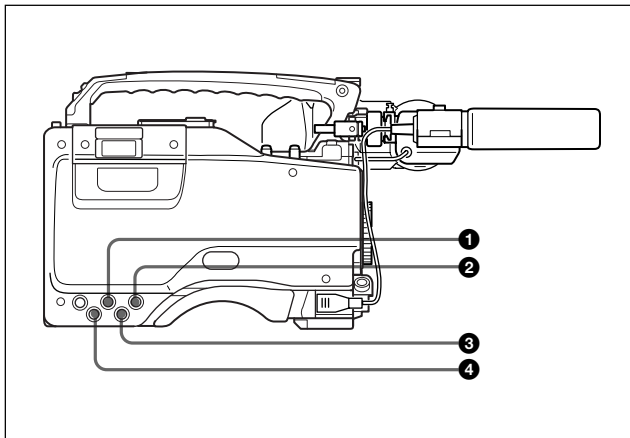
**ITEM:** Every time the switch is pushed down to this position, the cursor (arrow mark) in the page moves to the next item.

#### **Note**

Operation depends on the items displayed. Check the menu operation that corresponds to the current item for details.

## 2-6 Time Code System

2



Time code functions (1)

### ❶ GENLOCK IN (genlock input) connector (BNC type)

- This connector inputs a reference signal when the camera is to be genlocked, or when the time code is to be synchronized with external equipment.
- This connector also inputs a return video signal. You can display the image in the viewfinder screen by setting CAM RET. of FUNCTION 2/2 page to ON.

*For more information, see Section 4-9-2 "Selecting the Functions." (Page 4-79)*

### ❷ TC IN (time code input) connector (BNC type)

To synchronize the time code with an external time code, connect the reference time code input here.

---

**3 TC OUT (time code output) connector (BNC type)**

To synchronize the time code of an external VTR with that of the camcorder, connect this connector to the time code input lock connector of the external VTR.

**4 TEST OUT (output) connector (BNC type)**

To synchronize the time code of an external VTR with that of the camcorder, set the test output signal to composite video and connect this connector to the video input connector of the external VTR.

*For information about setting the test output, see page 2-24.*

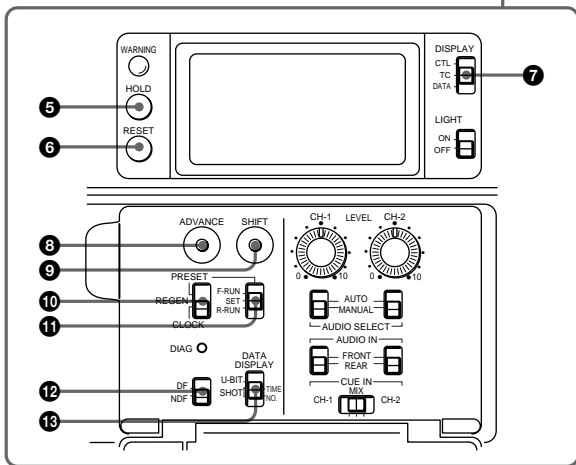
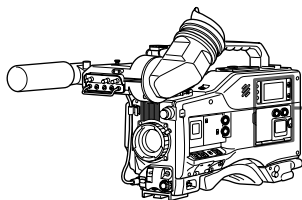


Illustration: DVW-707/709WS/790WS (for the NTSC broadcast system)

### Time code functions (2)

### 5 HOLD (display hold) button

Pressing this button instantly freezes the time data displayed in the counter display section. (The time code generator continues normal operation.) Pressing this button again releases the hold. One use of this feature is to determine the exact time of a particular shot.

*See Section 2-8 “Warnings and Indications on the Display Panel” (page 2-38) for more information about the counter display.*

### 6 RESET (counter reset) button

This button resets the time data displayed on the counter display section to “00 : 00 : 00 : 00” and the user bit data to “00000000”.

### 7 DISPLAY switch

Depending on the settings of the F-RUN/SET/R-RUN switch and the REAL TIME switch, this switch selects data to display in the counter display section, as follows:

**CTL:** CTL

**TC:** Time code

**DATA:** The item selected by the DATA DISPLAY switch

*For more information, see “Time code displays” (page 2-40).*

### 8 ADVANCE button

For setting the time code or user bits, each press of this button increments the flashing digit selected by the SHIFT button. Pressing this button while holding down the HOLD button decrements the flashing digit.

Hold down this button and press the SHIFT button to enter the VTR menu mode.

*For details about the VTR menu, see Section 4-10 “VTR Menu Display in the Display Panel” (page 4-99).*

### 9 SHIFT button

For setting the time code or user bits, this button selects the digit to be changed. The selected digit flashes.

*For more information, see Section 4-5-2 “Setting the Time Code” (page 4-29).*



**10 PRESET/REGEN (regeneration)/CLOCK switch**

This switch determines the source of time code values.

**PRESET:** Starts recording time code values on the tape from the currently set value. This enables the F-RUN/SET/R-RUN switch.

**REGEN:** Reads the existing time code on the tape, and sets the time code starting value accordingly. Thus, even when there is an indefinite break in recording, this setting ensures that time codes on the tape will be continuous. Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in R-RUN mode.

**CLOCK:** Makes the time code value coincide with the built-in clock. Regardless of the F-RUN/SET/R-RUN switch setting, the camcorder always operates in F-RUN mode.

**11 F-RUN/SET/R-RUN (free run/set/recording run) switch**

This switch selects the operating mode of the internal time code generator.

**F-RUN:** The time code advances regardless of whether the VTR is operating. Use this position for synchronizing the time code with an external time code.

**SET:** Set the switch to this position to set the time code or user bits.

**R-RUN:** The time code advances only during recording, making the time code on the tape continuous.

*For more information, see Section 4-5-1 “Setting the User Bits” (page 4-27), and Section 4-5-2 “Setting the Time Code” (page 4-29).*

**12 DF/NDF (drop frame/non-drop frame) switch (DVW-707/709WS/790WS only)**

This switch selects whether the time code advances in drop frame mode or non-drop frame mode.

**DF:** Drop frame mode

**NDF:** Non-drop frame mode

---

### 13 DATA DISPLAY switch

**U-BIT:** Display the user bit value.

**SHOT-TIME:** Display the date and time from the shot data.

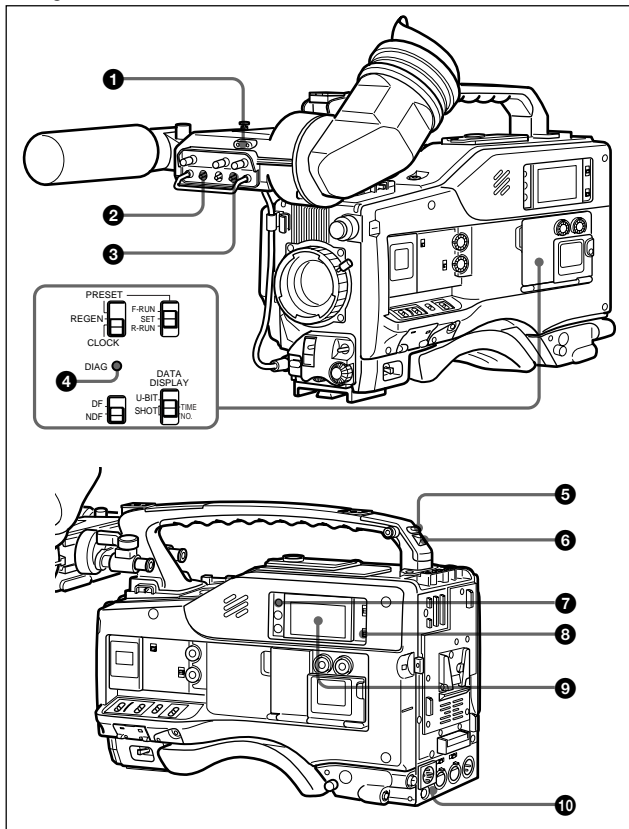
**SHOT-NO.:** Display the shot number from the shot data.

*Using the VTR menu, it is possible to set the unit to display the real time in the LTC user bits, or to record shot data in the VITC user bits. For details, see Section 4-10 “VTR Menu Display in the Display Panel” (page 4-99).*

## 2-7 Warnings and Indications

The camcorder gives visual information and warnings without your having to look in the viewfinder.

2



Warning and indication functions

### ❶ Tally indicator

Setting the TALLY switch to HIGH or LOW activates this indicator. The indicator lights during recording on the VTR. It also provides the same information as the REC indicator in the viewfinder: it comes on during recording and flashes to indicate a problem.

### ❷ DISPLAY switch

This switches the indications on the viewfinder screen on or off.

**ON:** The indications appear on the viewfinder screen.

**OFF:** The indications do not appear on the viewfinder screen.

### Note

When you turn the MENU ON/OFF/PAGE switch to ON, the menu will appear on the viewfinder screen even if the DISPLAY switch is off.

### ❸ TALLY switch

This switch controls the tally indicator, setting its brightness (HIGH or LOW) or turning it off.

### ❹ DIAG (diagnosis) button

Pressing this button when the VTR is stopped switches the camcorder to the self-diagnosis mode. In the self-diagnosis mode, it is possible to carry out a display panel test, a VTR test, or a camera test, and to display the test result.

To exit from the self-diagnosis mode, press this button once more.

*Refer to "maintenance manual" for more information.*

### Caution

Do not press the DIAG button when a remote control unit is connected to the REMOTE connector (8-pin). Pressing the button with a remote control unit connected will disturb both the self-diagnostic and remote control functions. The only remedy for this disturbance is to disconnect the remote control unit and turn off the camcorder POWER switch.

---

### 5 Back tally indicator

This indicator functions exactly the same way as the front tally indicator when the back tally switch is set to ON.

### 6 Back tally switch

This switch turns the back tally and the rear tally indicators on and off.

**ON:** Turns on the back tally and the rear tally indicators.

**OFF:** Turns off the back tally and the rear tally indicators.

### 7 WARNING indicator

This indicator lights up or flashes when there is a fault in the VTR.

*See Section 6-3 “Operation Warnings” (page 6-12) for more information about the relationships between the operation of the indicator and the meanings of the indications.*

### 8 LCD LIGHT switch

This switch turns the display panel illumination on and off.

### 9 Display panel

VTR error messages, battery status, tape status, audio level, time data, and so forth are displayed on this panel.

*For more information, see Section 2-8 “Warnings and Indications on the Display Panel” (page 2-38).*

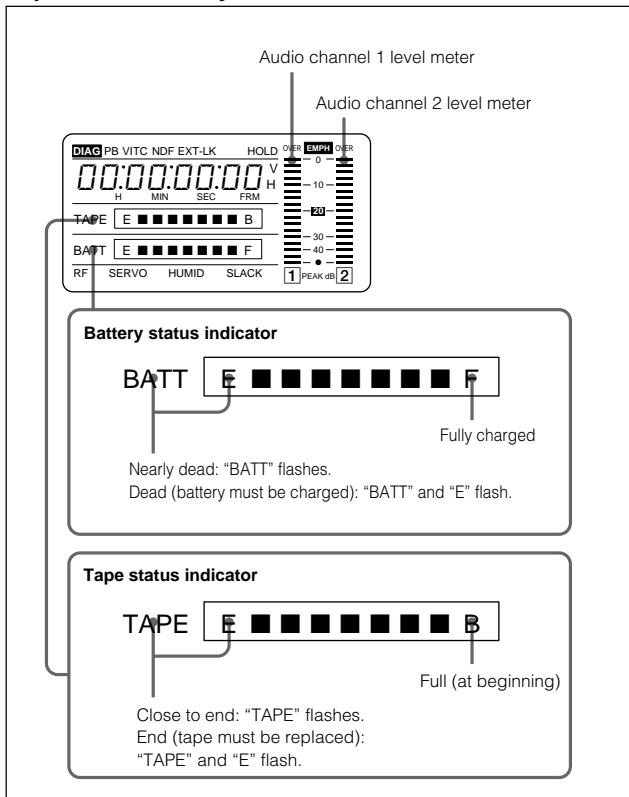
### 10 Rear tally indicator

This indicator functions exactly the same way as the back tally indicator when the back tally switch is set to ON.

## 2-8 Warnings and Indications on the Display Panel

2

### Tape status, battery status and level indicators



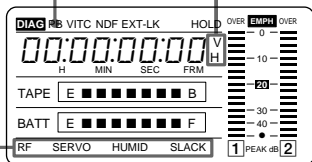
Tape status, battery status and level indicators

## VTR operation and status indicators

Lights in the self-diagnostic mode (testing display panel, camera, and VTR).

For more information, see Section 6-3 "Operation Warnings" (page 6-12).

Lights during playback.



### Warning indicators

**RF:** Lights if the recording heads are clogged.

**SERVO:** Lights if the servo motor fails.

**HUMID:** Lights if condensation is on the drum.

**SLACK:** Lights if the tape is not winding properly.

For more information, see Section 6-3 "Operation Warnings" (page 6-12).

VTR operation and status indicators

### Note

If the tape in the VTR is slacked, an error code appears in the display section of the display panel.

For more information, refer to "maintenance manual."

## Time code displays

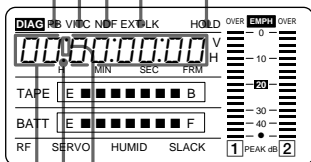
Lights in playback mode.

Lights when VITC is selected for the time code.

Lights in non-drop frame mode (DVW-707/709WS/790WS only).

Lights when the camcorder is synchronized with an external time code.

Lights when the time code generator is on hold.



Lights when the time code, CTL, or real time is displayed.

Lights when the HOLD button is pressed.

Time counter display: Shows the time code, CTL, user bits, and real time.

The table on the next page lists the details of the displayed items and switch settings.

Time code displays



## Relationships between the DISPLAY switch and DATA DISPLAY switch settings and the time counter displays

Except during setting of the time code, the time counter display is determined by the positions of the DISPLAY switch and DATA DISPLAY switch.

*For details of setting the time code menu operation, see Section 4-5-2 “Setting the Time Code” (page 4-29).*

Switch settings relating to time code and displayed information

DISPLAY switch position	DATA DISPLAY switch position	Displayed information
CTL	Any position	CTL
TC	Any position	Time code
DATA	U-BIT	User bits
	SHOT-TIME	Date and time from shot data
	SHOT-NO.	Shot number from shot data



# 3-1 About Cassettes

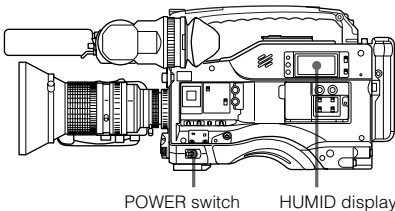
This section describes the procedure for loading and unloading a cassette.

See “Specifications” (page A-1) for information about the cassettes you can use in the camcorder.

## 3-1-1 Loading and Unloading a Cassette

### Loading a cassette

- 1 Turn on the POWER switch.



If the interior of the VTR section is damp, the HUMID indicator will light. If this happens, wait until the indicator goes off before going on to step 2.

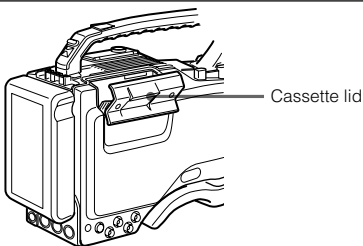
(Continued)

---

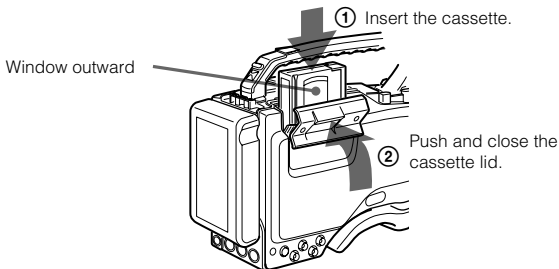
**2** Press the EJECT button.

The cassette lid will open.

**3**

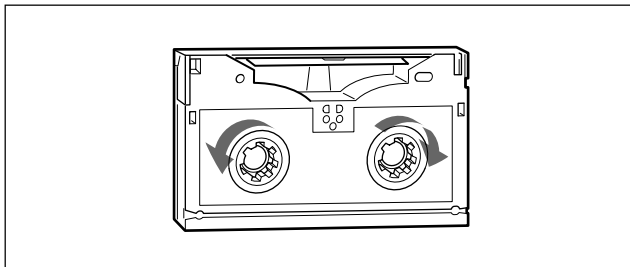


**3** Check that there is no slack in the tape, then slide in the cassette until it clicks into position, and close the cassette lid completely by pressing near the engraved "PUSH".



### Checking the tape for slack

Pressing in the reels lightly, turn them gently with your fingers in the directions shown below. If the reels will not move, there is no slack.



Checking the tape for slack

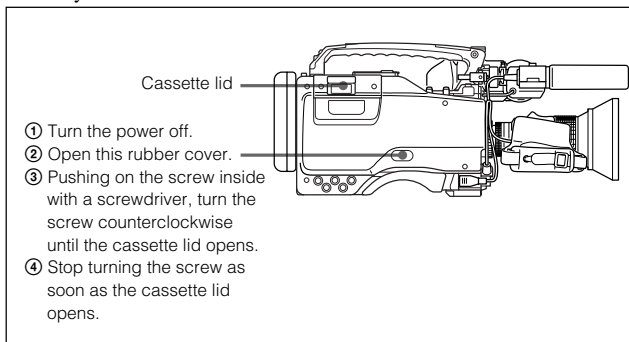
### Unloading a cassette

With the power supply on, press the EJECT button to open the cassette lid, then take out the cassette. If you are not going to insert another cassette, close the cassette lid.

It is possible to take out the cassette and close the cassette lid unless the battery voltage drops below about 9 V.

## Unloading a cassette manually

If the battery voltage drops below about 9V, take out the cassette manually as illustrated below.

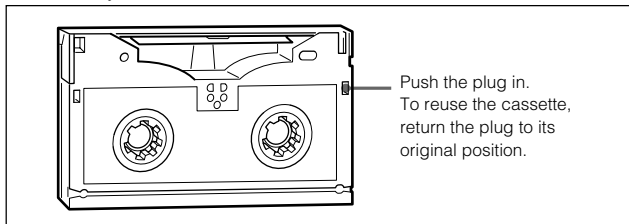


Unloading a cassette manually

You cannot lock the cassette lid after taking out the cassette, but turning on the power makes the cassette lid operable again.

## 3-1-2 Preventing Accidental Erasure

The following procedure prevents cassettes from being recorded inadvertently.



Preventing accidental erasure

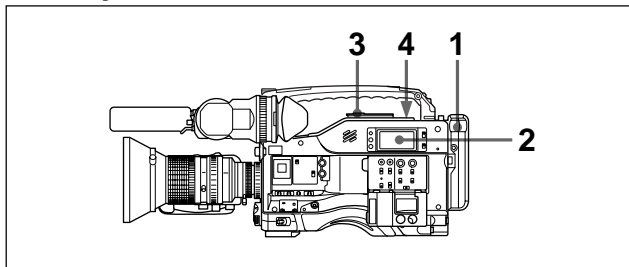
# 3-2 Recording

## 3-2-1 Basic Procedure

This section describes the basic procedure for shooting and recording. Before a shooting session, make the checks listed in Section 6-1 “Testing the Camcorder Before Shooting” (page 6-1) to ensure that the camcorder is functioning properly.

### Turning on the camcorder and loading a cassette

Follow the procedure below.



Basic procedure for shooting : from power supply to cassette loading

- 1 Load a fully charged battery pack.
- 2 Set the POWER switch to ON. Check that the HUMID indicator does not appear and that the BATT indicator shows at least five segments. When using a BP-L60A/L90A battery pack, check that the four LED indicator segments on the battery pack are lit.
  - If the HUMID indicator appears, wait until it disappears.
  - If the BATT indicator does not show at least five segments, replace the battery pack with a fully charged one.

#### Note

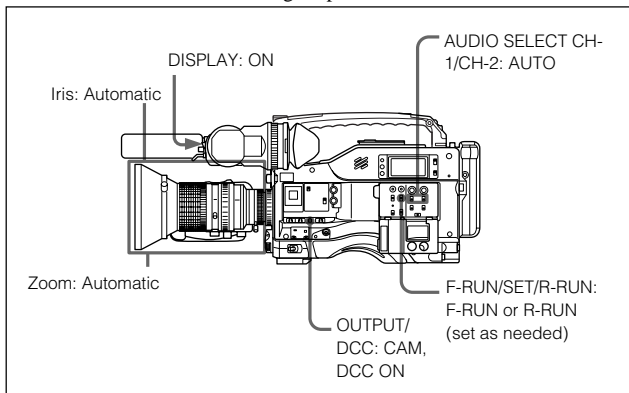
After turning off the power, check whether the drum is dry (even if the HUMID indication is off).

(Continued)

- 3 Check that there are no obstructions near the cassette lid, then press the EJECT button to open the cassette lid.
- 4 After checking the points below load the cassette, and close the cassette lid.
  - The cassette is not write-protected.
  - There is no slack in the tape.
  - The leader tape is wound on the take-up reel.

### Basic procedure for shooting : from adjusting the black balance and white balance to stopping recording

After turning on the power and loading a cassette, set the switches and selectors as shown below and begin operation.

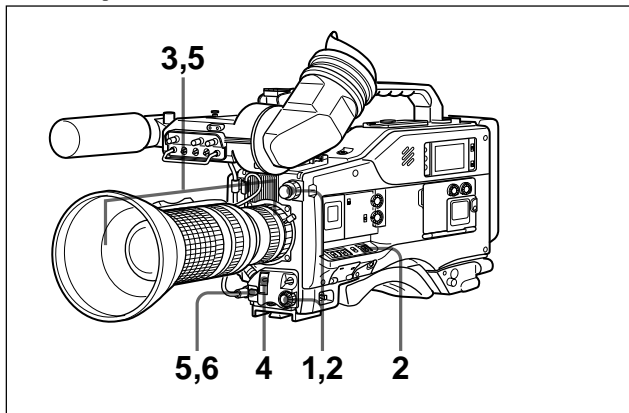


Switch and selector settings before shooting



## Shooting

Follow the procedure below.



Basic procedure for shooting: from adjusting the black balance and white balance to stopping recording

- 1** Push the AUTO W/B BAL switch to BLK to adjust the black balance.
- 2** Select the CC/ND filter (single filter for DVW-707/707P) to match the lighting conditions, and adjust the white balance.

### **When the black balance and white balance settings are already in memory:**

Set the WHITE BAL switch to A or B.

### **When the white balance setting is not in memory and you do not have enough time to adjust the white balance:**

*(Continued)*

---

## DVW-709WS/709WSP/790WS/790WSP

For automatic adjustment of the white balance, set the WHITE BAL switch to PRST, then the FILTER selector to B for 3200 K, to C for 4300 K, or to D for 6300 K.

## 3

### DVW-707/707P

Set the WHITE BAL switch to the PRST position. The white balance is automatically set to 3200 K when the FILTER knob is in position 1, and to 5600 K in other positions.

*For more information, see Section 4-1-2 “Adjusting the White Balance” (page 4-5)*

- 3** Aim the camera at the object, and adjust the focus and zoom.
- 4** If necessary, set the electronic shutter for an appropriate mode and speed.  
*For more information, see Section 4-2 “Setting the Electronic Shutter” (page 4-13).*
- 5** To start recording, press the VTR START button or the VTR button on the lens.

During recording, the REC indicator in the viewfinder goes on. Perform zooming and focus control, if necessary.

- 6** To stop recording, press the VTR START button or the VTR button on the lens again.

The REC indicator goes off.

### Cassette control buttons

During recording, the cassette control buttons (EJECT, REW, F FWD, PLAY, STOP) have no effect.

---

## 3-2-2 Continuous Recording

If the camcorder is in the recording pause mode, simply pressing the VTR START button on the camcorder or the VTR button on the lens continues recording at exactly the next frame.

In other cases, you first need to position the tape at an appropriate point to prevent the recording continuity from being lost.

### When the camcorder is in the recording pause mode

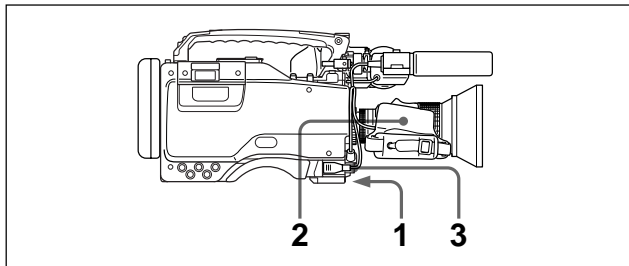
Pressing the VTR START button on the camcorder or the VTR button on the lens positions the tape at the appropriate point automatically.

However, the time taken before recording starts depends on the setting of the VTR SAVE/STBY switch.

- If the VTR SAVE/STBY switch is in the SAVE position, it takes about 4 seconds before recording starts.
- If the VTR SAVE/STBY switch is in the STBY position, recording starts immediately. However, just after the switch position is changed from SAVE to STBY, it takes about 4 seconds before recording starts.

## If you turn off the power during a recording pause

Follow the procedure below to continue recording.



Continuous recording after turning off the power during a recording pause

- 1** Turn on the power again.
- 2** Press the RET button on the lens. (If a video signal is input to the GENLOCK IN connector, make sure that CAM RET. is set to OFF on the FUNCTION 2/2 page of the setup menu.)

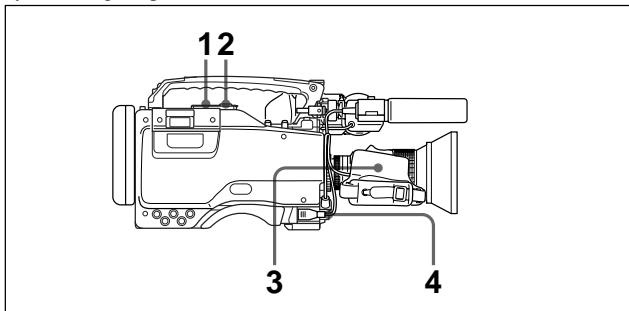
*For more information, see Section 4-9-2 “Selecting the Functions” (page 4-79).*

The camcorder positions the tape at the appropriate point. Note, however, that this function works only for continuously recorded material or consecutively joined segments totaling at least 4 seconds in length.

- 3** Press the VTR START button on the camcorder or the VTR button on the lens to start recording.

## Continuous recording in other cases

After rewinding or fast forward, after removing the cassette, or on a tape that has been partially recorded, you can obtain a continuous recording by following the procedure below.



Continuous recording after rewinding or fast forward, after removing the cassette, or on a tape that has been partly recorded

- 1** Looking in the viewfinder, press the PLAY button to start playback.
- 2** Press the STOP button at the desired point to begin recording. To continue from the end of recording already on the tape, press the STOP button immediately after the end of the previous recording (within 0.5 seconds).
- 3** Press the RET button on the lens. When inputting a video signal to the GENLOCK IN connector, make sure CAM RET. on FUNCTION 2/2 page of the setup menu is set to OFF.

*For more information, see Section 4-9-2 "Selecting the Functions" (page 4-79).*

The tape will rewind and will be positioned at the desired point to continue recording in about 7 seconds.

- 4** Press the VTR START button on the camcorder or the VTR button on the lens to start recording.

### 3-2-3 Starting a Shoot with a Few Seconds of Pre-Stored Picture Data (Loop Rec Function) (When Using a BKDW-703 Extension Board)

By installing the optional BKDW-703 extension board in the camcorder, the camcorder is able to constantly store a few seconds (up to 8 seconds) worth of the most current picture and sound data in the board's memory. Thus, when you press the VTR START button or the VTR button on the lens, the recording starts with the data stored a few seconds before.

#### Turning Loop Rec mode on and off / Setting the Loop Rec time

To record in Loop Rec mode, you need to turn on Loop Rec mode and set the picture data storage time (Loop Rec time).

The Loop Rec time and VTR SAVE / STBY switch settings determine the number of seconds of picture data that will be stored in the BKDW-703's memory and recorded when you press the VTR START button or VTR button on the lens. The following table shows the approximate number of seconds worth of picture data (counting back from the time you begin recording) that will be recorded from memory. However, when changing from SAVE to STBY, or under the special situations explained in the notes on next page, the actual amount of data recorded may be shorter.

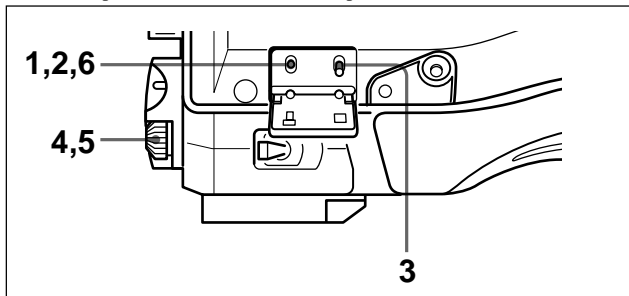
Loop Rec time setting and recording start point

Loop Rec time	VTR STBY mode	VTR SAVE mode
8 (seconds)	About 8 seconds before	About 4 seconds before
4 (seconds)	About 4 seconds before	About the same time
2 (seconds)	About 2 seconds before	About 2 seconds after
1 (second)	About 1 second before	About 3 seconds after

**Notes**

- If you change the Loop Rec mode settings, the picture data stored in memory previous to the change are rendered unrecordable. Thus, when you press the VTR START button or VTR button on the lens, the previously stored picture data will not be recorded.
- Picture data is stored to the BKDW-703's memory only for images that appear in the viewfinder. For this reason, if you change to playback or recording review during Loop Rec mode, then begin recording immediately afterwards, picture data corresponding to the duration of playback or recording review will not be in memory and will therefore not be recorded to tape.

Follow the procedure below to turn Loop Rec mode on.



- 1** Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the viewfinder screen when the last menu operation ended will appear again. (If the menu is being used for the first time, the lowest page of the selected pages will appear).

*(Continued)*

- 2** Push the MENU ON/OFF/PAGE switch repeatedly towards PAGE (or use the rotary encoder) until the OPERATION 2 page shown as below appears.

? 37\*OPERATION 2

AWB LEVEL GATE :	ON
COLOR UF :	COMP
REC TALLY :	UPPER
TIME CODE DISP :	OFF
LOOP RECORDING :	OFF

The state of a Loop Rec mode setting

OPERATION 2 page

### Note

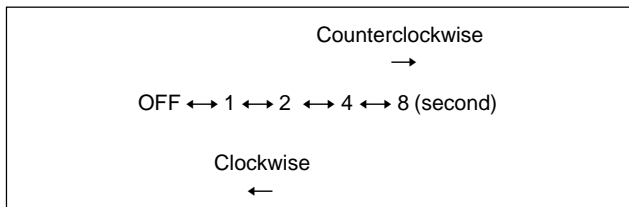
If the BKDW-703 is not installed, the items for LOOP RECORDING are not displayed on the OPERATION 2 page.

- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly towards ITEM (or use the rotary encoder) to move the right arrow cursor to LOOP RECORDING: OFF.
- 4** Push the rotary encoder once.

The right arrow cursor moves to the left of OFF as shown below:  
LOOP RECORDING: →OFF



- 5** If you turn the rotary encoder counterclockwise as seen from the front of the camera, the Loop Rec time will be longer. Turn the rotary encoder counterclockwise (Loop Rec time value will be increasing) or clockwise (Loop Rec time value will be decreasing towards OFF at the end) until you reach the Loop Rec time that you want.



Loop Rec time selected by turning the Rotary Encoder

The camcorder is in the Loop Rec mode when the rotary encoder is any position except OFF. In this mode, picture, sound, and time code are constantly saved to memory. The TALLY lamp (green tally) is on during this time.

- 6** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

Settings made in Loop Rec mode are maintained until changed.

---

You can turn Loop Rec mode on and off by pressing the ASSIGNABLE button on the side of the camcorder.

*For more information on ASSIGNABLE button, see section 4-9-2 “Selecting the Functions” (page 4-79).*

3

### Note

You can change the Loop Rec mode menu settings while recording; any changes that you make, however, do not take effect until after the recording operation is completed.

## Camcorder operations in Loop Rec mode

The recording procedure in Loop Rec mode is basically the same as that for normal recording. Please note, however, the following differences.

- When you record in Loop Rec mode, the picture you shoot is recorded to the tape after an elapse of the Loop Rec time. For this reason, the tape does not stop immediately when you press the STOP button. After pressing the STOP button, the REC lamp begins flashing once every second and all tape operation buttons (EJECT, REW, F FWD, PLAY, and STOP) stop functioning until the Loop Rec time has elapsed. Afterwards, you can begin recording again by pressing the VTR START button or VTR button on the lens.

After pressing the STOP button, if you start recording before a time equal to the Loop Rec time has elapsed, there will be no break in the recorded footage (i.e., it will be as if there were not a pause in recording).

For example, if you press the STOP button with the Loop Rec time set at 8 seconds, you could press the VTR START button 7 seconds later and there would be no break in the recorded material.

- In Loop Rec mode, the time code generator in the camcorder advances constantly at all times, not only during recording. It does this to generate continuous time code data in the memory. For this reason, it is not possible to use the time code for REC RUN mode operations.

- 
- The time code stops advancing while time data is being set (when the F-RUN/SET/R-RUN switch is set to SET). For this reason, if you start recording immediately after switching to F-RUN or R-RUN (i.e., to a position other than SET), you may overwrite a portion of the previously recorded time code.
  - Recontinuation recording in Loop Rec mode is done in the same way as normal recording. In Loop Rec mode, however, when recording is recontinued, the Loop Rec time is subject to a decrease of up to 0.3 second. (DVW-707/709WS/790WS only)

### **Turning off the camera**

- When you turn the POWER switch to OFF, the camera will turn off by itself after the tape has run for a few seconds.
- If you remove the battery, pull out the DC cable, or cut the power to the AC adaptor during recording, the image currently being shot on the camcorder will not be recorded. For this reason, take care not to change the battery while recording.

### **When the tape runs out during recording**

Please note that picture data at the instant the tape stopped is not recorded if the tape runs out and the camcorder stops. The recorded picture data is interrupted before the recording stop point.

---

### 3-2-4 Reversing the picture orientation (vertically and horizontally) (Using the BKDW-704 Extension Board) (DVW- 709WS/709WSP/790WS/790WSP only)

If you have installed the optional BKDW-704 extension board into the camcorder and are using a cinema lens, you can reverse the orientation of the image (vertically and horizontally) and record the reversed image as a normal image.

#### Setting the Picture Orientation

Use REVERSE IMAGE and H DELAY of OPERATION 2 page of the setup menu to reverse the picture orientation and horizontally center the image. To reverse the picture, set REVERSE IMAGE to ON, and use H DELAY to make fine horizontal adjustments of the picture. (H DELAY adjustments are possible only when the picture orientation is reversed. Phase has no effect on pictures which are not reversed.)

#### Note

After making a horizontal adjustment with H DELAY, always do a test recording on your system and play it back to verify that the entire picture fills the screen in the horizontal direction. Any drastic change in the H phase from the factory setting may cause the picture to be cut off at the ends, depending on the blanking width and other settings in your editing system.

## 3-3 Checking the Recording — Playback

---

By pressing the PLAY button, you can review any length of the recording in the viewfinder in black and white. There are two other ways to review the recording.

**Recording review:** You can see the last 2 seconds of the recording in the viewfinder in black and white.

**Color playback:** You can see the recording in color on a color video monitor without the need for any external adaptor.

You can also view the picture by pressing the REW button or F FWD button during playback.

*See Section 2-3 “Audio Functions” (page 2-5), for information about the switches and controls used to select the audio output signal and to adjust the audio level.*

---

### 3-3-1 Checking the Last Two Seconds of the Recording — Recording Review

If you press the RET button on the lens while recording is paused, the last two seconds of the tape is automatically rewound, and that segment is played back on the viewfinder screen. Use this function to check whether recording went smoothly. If you hold the RET button down longer, at most 10 seconds of the tape is rewound and played back. After playback, the camcorder is ready to start recording again.

Set CAM RET. to OFF on the FUNCTION 2/2 page of the setup menu when inputting a return video signal to the GENLOCK IN connector.

*For information about setting the CAM RET. function, see Section 4-9-2 “Selecting the Functions” (page 4-79).*

#### Note

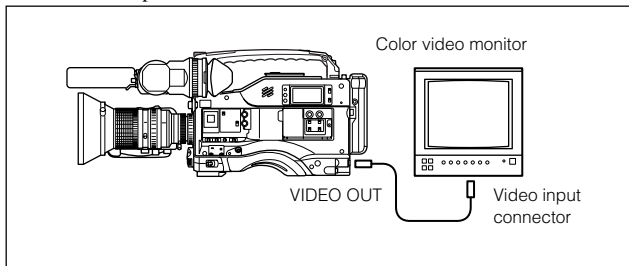
The recording review function only works if the recording you have made is at least 2 seconds long.

---

### 3-3-2 Checking the Recording on the Color Video Monitor — Playback in Color

Connect a color video monitor to the VIDEO OUT connector of the camcorder, and press the PLAY button.

3



Color playback

## 4-1 Adjusting the Black Balance and the White Balance

---

Conditions may require that both the black balance and the white balance be adjusted.

The black balance will require adjustment in the following cases.

- When the camcorder is first used
- When the camcorder is used under conditions in which the surrounding temperature has changed greatly
- When the GAIN selector values have been changed

It is not usually necessary to adjust the black balance when using the camcorder after it has been briefly off.

Always readjust the white balance when the lighting conditions change.

If the black balance or white balance adjustment is started when the display mode is set to 2 or 3, messages that report on the adjustment progress and results are displayed on the viewfinder screen. Change the display mode to 1 to suppress these messages.

*For information about setting the display mode, see Section 4-8-3 “Display Mode and Setting Change and Adjustment Progress Messages” (page 4-61).*

## 4-1-1 Adjusting the Black Balance

In automatic black balance mode, the black balance is adjusted after the black set is adjusted.

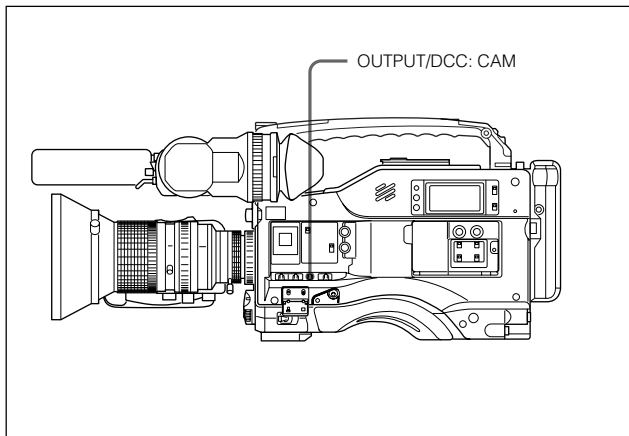
Manual black balance adjustment can be selected from the setup menu.

*Refer to “maintenance manual ” for information about manual black balance adjustment.*

Follow the procedure below to adjust the black balance.

4

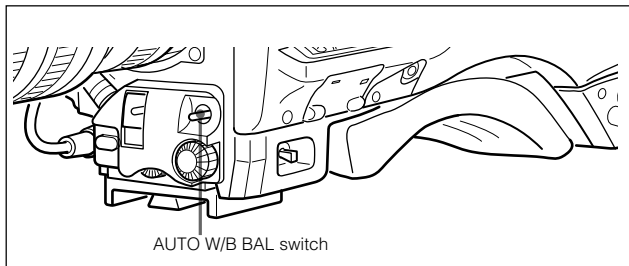
**1** Set the switches as follows:



If you change the setting of the GAIN selector, a message reporting the set position appears in the setting change and adjustment progress message display area of the viewfinder screen for about 3 seconds (in display mode 3).

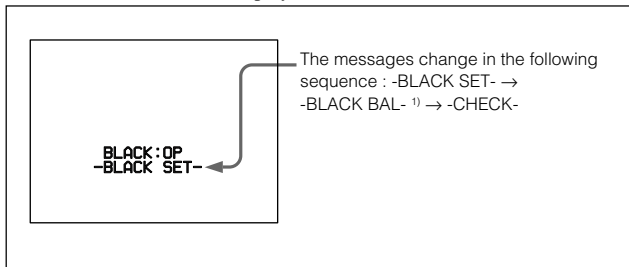


- 2** Push the AUTO W/B BAL switch to BLK, and release the switch.



The switch returns to the center position, and the adjustment is completed.

During adjustment, the following messages are displayed on the viewfinder screen (in display mode 2 or 3).



Message during adjustment

The black balance adjustment ends in a few seconds with the message "BLACK : OK," and the adjustment setting is automatically stored in memory.

*(Continued)*

- 1) If the existing black balance adjustment is satisfactory, the message "BLACK BAL" may not appear, that is, the automatic black balance adjustment may be omitted to save time.

## Notes

- During the black balance adjustment, the iris is automatically closed.
- During the black balance adjustment, the gain selection circuit is automatically activated so you may see flickering on the viewfinder screen, but this is not a fault.

## If automatic black balance adjustment cannot be made

4

If the black balance adjustment cannot be completed normally, an error message will appear for about 3 seconds on the viewfinder screen (in display mode 2 or 3).

Possible messages are listed on the next page.

Black balance adjustment error messages

Error message	Meaning
BLACK : NG IRIS NOT CLOSED	The lens iris did not close; adjustment was impossible.
BLACK : NG R (or G or B) : TIME LIMIT	Adjustment could not be completed within the standard number of attempts.
BLACK : NG R (or G or B) : OVERFLOW	The difference between the reference value and the current value is so great that it exceeds the range. Adjustment was impossible.

If any of the above error messages is displayed, retry the black balance adjustment. If the error message occurs again, an internal check is necessary.

*Refer to "maintenance manual" for information about this internal check.*

## Note

If the lens cable is not firmly connected to the lens connector (see 2-2), it may not be possible to adjust the lens iris. If this happens, the black balance will be incorrect.

## Black balance memory

Values stored in memory are held until the black balance is next adjusted.

### If a memory error occurs

If the error message “: STORED DATA : NG” flashes on the viewfinder screen when the camcorder is turned on, the black balance memory content has been lost.

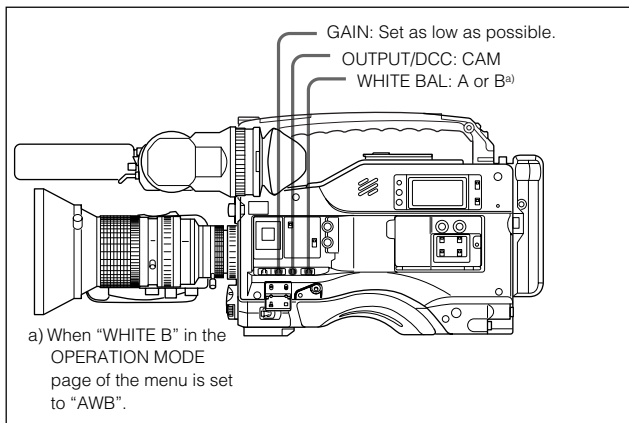
Adjust the black balance again. Contact your Sony representative if this message continues to appear even after the black balance has been adjusted again.

*For more information, refer to “maintenance manual.”*

## 4-1-2 Adjusting the White Balance

Follow the procedure below to automatically adjust the white balance.

### 1 Set the switches as follows:



(Continued)

---

If the setting of the GAIN selector or WHITE BAL switch is changed, a message reporting the set position appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen (in display mode 3 (see 4-8-3)).

## 2 Adjust the FILTER selector to suit the lighting conditions.

The relationships between the various selector settings and filter selections are listed in the tables below.

### DVW-707/707P

FILTER knob setting and filter

<b>FILTER knob setting</b>	<b>Filter</b>
1	3200 K
2	5600 K + $\frac{1}{8}$ ND
3	5600 K
4	5600 K + $\frac{1}{64}$ ND

## DVW-709WS/709WSP/790WS/790WSP

### FILTER knob (outer) setting and CC filter

FILTER knob (outer) setting	CC filter
A	Cross filter
B	3200 K
C	4300 K
D	6300 K

### FILTER knob (inner) setting and ND filter

FILTER knob (inner) setting	ND filter
1	Straight through
2	$\frac{1}{4}$ ND
3	$\frac{1}{16}$ ND
4	$\frac{1}{64}$ ND

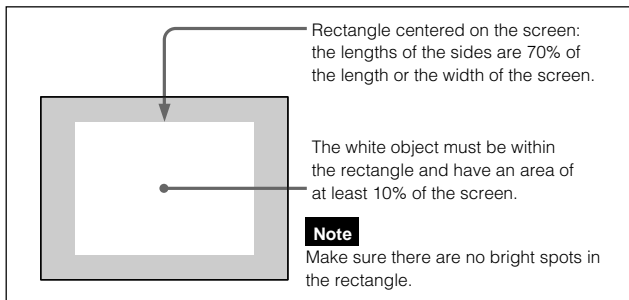
*For examples of FILTER selector settings, see the description of the FILTER selector in Section 2-4 “Shooting and Recording/Playback Functions” (page 2-14).*

If the setting of the FILTER selector is changed, a message reporting the setting appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen (in display mode 3).

- Place a white test card under the same lighting conditions as the subject to be shot, and zoom up to it. Alternatively, any white object such as a cloth or a wall could be used.

*(Continued)*

The absolute minimum white area is as follows:

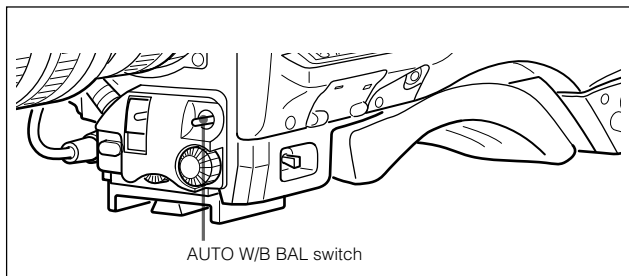


4

#### 4 Adjust the lens iris.

If the lens is manually adjusted, adjust it as appropriate. If the lens has an automatic iris, set the automatic/manual switch on the lens to automatic.

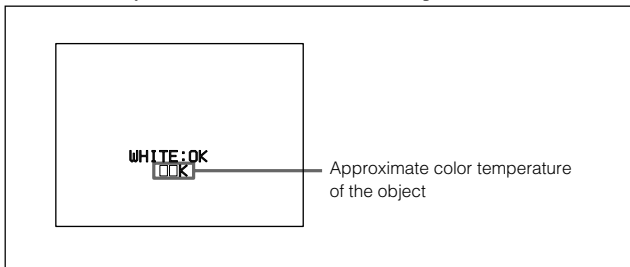
#### 5 Push the AUTO W/B BAL switch to WHT, and release the switch.



The switch returns to the center position, and the adjustment is completed.

During adjustment, the message “WHITE : OP” is displayed on the viewfinder screen (in display mode 2 or 3).

The white balance adjustment ends in a second with the message “WHITE : OK”, and the adjustment setting is automatically stored in the memory (A or B) that was selected in step 1.



### Note

If the camera has a zoom lens with an automatic iris, the iris may hunt <sup>1)</sup> during the adjustment. To prevent this, adjust the iris gain knob (marked with IG, IS, or S) on the lens.

*For more information, refer to the lens operation manual.*

---

#### 1) Hunting

Repeated brightening and darkening of an image, resulting from repeated responses to automatic iris control.

---

## If automatic white balance adjustment cannot be made

If the white balance adjustment cannot be completed normally, an error message will appear for about 3 seconds on the viewfinder screen (in display mode 2 or 3).

Possible messages are listed below.

### White balance adjustment error messages

Error message	Meaning
WHITE : NG LOW LEVEL	The white video level is too low. Either make open the lens iris or increase the gain.
WHITE : NG COLOR TEMP. HIGH	The color temperature is too high. Select a suitable filter setting.
WHITE : NG COLOR TEMP. LOW	The color temperature is too low. Select a suitable filter setting.
WHITE : NG TIME LIMIT	Adjustment could not be completed within the standard number of attempts.
WHITE : NG POOR WHITE AREA	The white area could not be checked.
WHITE : NG LEVEL TOO HIGH	The white video level is too high. Either narrow the lens iris opening or change the ND filter.

If any of the above error messages is displayed, retry the white balance adjustment. If the error message occurs again, an internal check is necessary.

*Refer to "maintenance manual" for information about this internal check.*



---

## If you have no time to adjust the white balance

### DVW-709WS/709WSP/790WS/790WSP

For automatic adjustment of the white balance, set the WHITE BAL switch to PRST, then the FILTER selector to B for 3200 K, to C for 4300 K, or to D for 6300 K.

### DVW-707/707P

Set the WHITE BAL switch to PRST. The white balance is automatically set to 3200 K when the FILTER selector is in position 1, and to 5600 K in other positions.

*For details about setting the white balance manually, see section 4-1-2 “Adjust the White Balance ”(page 4-5).*

## White balance memory

Values stored in memory are held until the white balance is next adjusted.

There are two sets of white balance memories, A and B, and adjustments for each of the filters can be automatically stored in the memory corresponding to the setting (A or B) of the WHITE BAL switch. The camcorder has four built-in filters, so a total of eight ( $4 \times 2$ ) adjustments can be stored. The number of memories allocated each A and B can be limited to one each by setting FILTER INH. to ON on the FUNCTION 2/2 page of the setup menu. In this case, the memory contents are not linked to the filters.

When the WHITE BAL switch is set to B whereas, in the setup menu OPERATION 1 page, “WHITE B” is set to ATW, the ATW function is activated to automatically adjust the white balance of the picture being shot for varying lighting conditions.

---

### **If a memory error occurs**

If the error message “: STORED DATA : NG” flashes on the viewfinder screen when the camcorder is turned on, the white balance memory content has been lost.

Adjust the black balance and the white balance again. Contact your Sony representative if this message continues to appear even after the black balance and the white balance have been adjusted again.

*For more information, refer to “maintenance manual.”*

## 4-2 Setting the Electronic Shutter

This section describes the shutter modes that can be used with the electronic shutter of the camcorder, and describes the procedure for selecting the shutter speed and mode.

### 4-2-1 Shutter Modes

The shutter modes that can be used with the electronic shutter and the shutter speeds that can be selected are listed below.

Selectable shutter modes and speeds

Mode	Shutter speed	Application
Standard	DVW-707/709WS/790WS: 1/100, 1/125, 1/250, 1/500, 1/1000, or 1/2000 sec. DVW-707P/709WSP/ 790WSP: 1/60, 1/125, 1/250, 1/500, 1/1000, or 1/2000 sec.	For shooting fast-moving subjects with little blurring.
CLS (Clear Scan)	DVW-707: 261 speeds in the range of 60.3 Hz to 10156 Hz DVW-709WS/790WS: 260 speeds in the range of 60.1 Hz to 7000Hz DVW-707P: 312 speeds in the range of 50.0 Hz to 10101 Hz DVW-709WSP/790WSP: 310 speeds in the range of 50.2 Hz to 9000 Hz	For shooting subjects such as monitor screens with vertical scanning frequencies of over 60 Hz (DVW-707/709WS/790WS) or over 50 Hz (DVW-707P/709WSP/790WSP), to obtain images with no horizontal bands of noise.

(Continued)

Mode	Shutter speed	Application
ECS (Extended Clear Scan) (For DVW- 790WS/ 790WSP only)	DVW-790WS: 248 speeds in the range of 30.4 Hz to 58.3 Hz DVW-790WSP: 295 speeds in the range of 25.4 Hz to 48.7 Hz	For shooting subjects such as monitor screens with vertical scanning frequencies of up to 60 Hz (DVW-790WS) or up to 50 Hz (DVW-790WSP), to obtain images with no horizontal bands of noise.
EVS (Enhanced Vertical Definition)	DVW-707/709WS/790WS: 1/60 sec. (automatic setting) DVW-707P/709WSP/ 790WSP: 1/50 sec. (automatic setting)	Improved vertical resolution. The sensitivity of the CCD is reduced to about half.

### Notes

- Whatever the operating mode of the electronic shutter, the sensitivity of the CCD decreases with increasing shutter speed.
- When the automatic iris is used, the iris opens wider and wider as the shutter speed increases, thus reducing the depth of field.
- Under artificial light, particularly fluorescent or mercury lamps, the light intensity may appear to be constant, but the strengths of each of the R, G and B colors are actually changing in synchronization with the frequency of the power supply (“flicker”). Using an electronic shutter under such lighting could make the flicker even worse. Color flicker is particularly likely to happen when the power supply is 60 Hz (with the DVW-707/709WS/790WS) or 50 Hz (with the DVW-707P/709WSP/790WSP). However, if the power frequency is 50 Hz (DVW-707/709WS/790WS) or 60 Hz (DVW-707P/709WSP/790WSP), setting the shutter speed to 1/100 or 1/60 can reduce this flicker.

- When a bright object is shot in EVS mode or ECS mode (DVW-790WS/790WSP only) in such a manner that it fills the screen, the upper edge of the picture may have poor quality because of an inherent characteristic of CCD. Before using EVS mode, check the shooting conditions.
- When using the electronic shutter, set FIELD/FRAME to FLD (field accumulation mode) on the FUNCTION 2/2 page of the setup menu.

---

## 4-2-2 Selecting the Shutter Mode and Speed

Use the SHUTTER selector to select a shutter mode or a standard-mode shutter speed. To set the shutter speed in CLS/ECS mode, with the SHUTTER switch set to ON and the CLS/ECS mode selected, turn the rotary encoder.

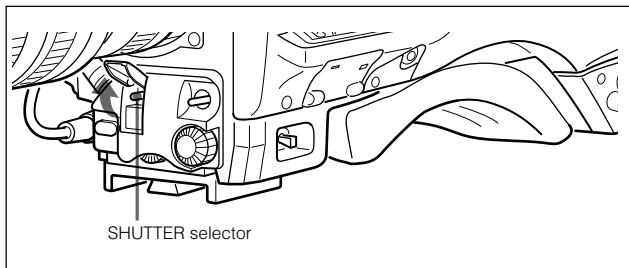
You can use the SHUTTER page of the setup menu to narrow the range of choice in advance, or to select in advance whether you use CLS, ECS or EVS mode.

### Setting the shutter mode and standard-mode shutter speed

- 1 Follow the procedure described in “Changing the display mode” (page 4-63) to set the display mode to 2 or 3 from the VF DISP page of the setup menu.

*(Continued)*

- 2** Open the SHUTTER selector cover, then push the SHUTTER selector from ON to SEL.



The current shutter setting appears for about 3 seconds in the setting change and adjustment progress message display area of the viewfinder screen.

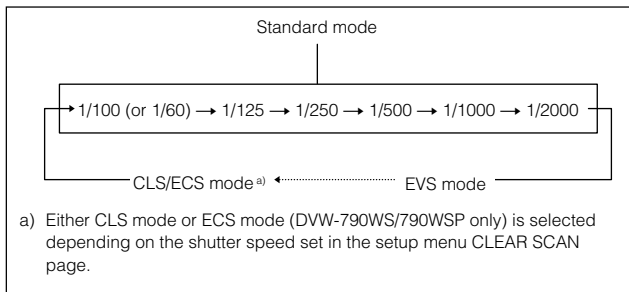
E.g.: SS : 1/250 or : CLS : 60.6 Hz

- 3** Before the message from step **2** disappears, push the SHUTTER selector to SEL again and repeat until the desired mode or speed appears.

Pushing the SHUTTER selector to SEL repeatedly allows you to cycle through the settings of mode and speed preselected on the SHUTTER page of the setup menu.

Note that all modes and all standard-mode speeds listed in the table on page 4-12 are preselected using the SHUTTER page of the setup menu.

*For more information about the SHUTTER page, see “Changing the range of choice of shutter mode and speed settings” (page 4-19).*



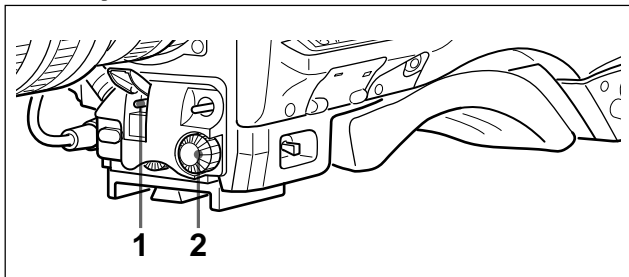
Selectable settings of shutter mode and speed (factory setting)

Once a shutter speed is selected, it is maintained until the next shutter speed setting operation.

When the message “STORED DATA:NG” appears, the shutter speed returns to 1/100 s (DVW-707/709WS/790WS) or 1/60 s (DVW-707P/709WSP/790WSP).

## Setting the shutter speed in CLS mode

Follow the procedure below.



Setting the shutter speed in CLS mode

*(Continued)*

## 1 Set the shutter speed mode to CLS.



CLS: 60.3Hz

The value indicated differs between camcorder models.

CLEAR SCAN page (factory settings)

## 2 Turn the rotary encoder counterclockwise as seen from the front of the camera to increase the value, or clockwise to decrease the value, until the desired frequency appears.

The frequency ranges as follows.

DVW-707:	60.3 Hz to 10156 Hz in 261 steps
DVW-709WS:	60.1 Hz to 7000 Hz in 260 steps
DVW-790WS:	60.1 Hz to 7000 Hz in 260 steps, and 30.4 Hz to 58.3 Hz in 248 steps
DVW-707P:	50.0 Hz to 10101 Hz in 312 steps
DVW-709WSP:	50.2 Hz to 9000 Hz in 310 steps
DVW-790WSP:	50.2 Hz to 9000 Hz in 310 steps, and 25.4 Hz to 48.7 Hz in 295 steps

Pressing the MENU CANCEL/PRST/ITEM switch toward the CANCEL/PRST position returns the setting to the default value, 60.3 Hz (DVW-707)/60.1 Hz (DVW-709WS/790WS) or 50.0 Hz (DVW-707P)/50.2 Hz (DVW-709WSP/790WSP).

### When the RM-B150 Remote Control Unit is connected

You can set the shutter speed of CLS with the rotary encoder of the RM-B150.



## When the RM-P9 Remote Control Unit is connected

You can set the shutter speed of CLS using the UP/DOWN switch of the RM-P9.

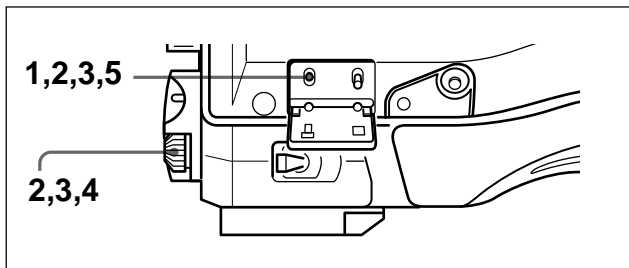
## Changing the range of choice of shutter mode and speed settings

You can reduce the time required to select the shutter mode and speed by narrowing the choice of settings in advance. This can be done by using the SHUTTER page of the setup menu.

Follow the procedure below.

### Note

The SHUTTER page cannot be accessed when a remote control unit is connected to the camcorder.



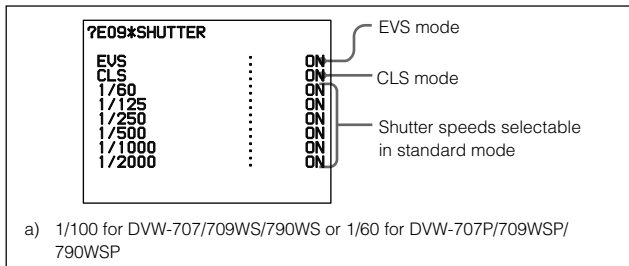
Changing the range of choice of shutter mode and speed settings

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered page of the currently selected pages for configuring the menu appears.)

*(Continued)*

- 2** Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SHUTTER page shown as below appears (or use the rotary encoder).



SHUTTER page (factory settings)

- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the mode or shutter speed you want (or use the rotary encoder).
- 4** To use the selected mode or speed (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera. In order not to use it (the “OFF” setting), turn the rotary encoder clockwise.

Note that pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST has no effect on the SHUTTER page. To select another mode or speed, return to step **3**.

- 5** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF. (When you close the cover, the MENU ON/OFF/PAGE switch is set to OFF automatically.)

The setup menu disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder.

## 4-3 Changing the Reference Value for Automatic Iris Adjustment

---

The reference value for automatic iris adjustment can be changed to enable the shooting of clear pictures of back-lit subjects, or to obtain special effects. The reference value for the lens iris can be set within the following range with respect to the standard value as defined by an F number.

- 0.25: about 0.25 stop further open
- 0.5: about 0.5 stop further open
- -0.25: about 0.25 stop further closed
- -0.5: about 0.5 stop further closed

To change the reference value, set A. IRIS OVERRIDE to ON (factory setting is OFF) on the FUNCTION 2/2 page of the setup menu.

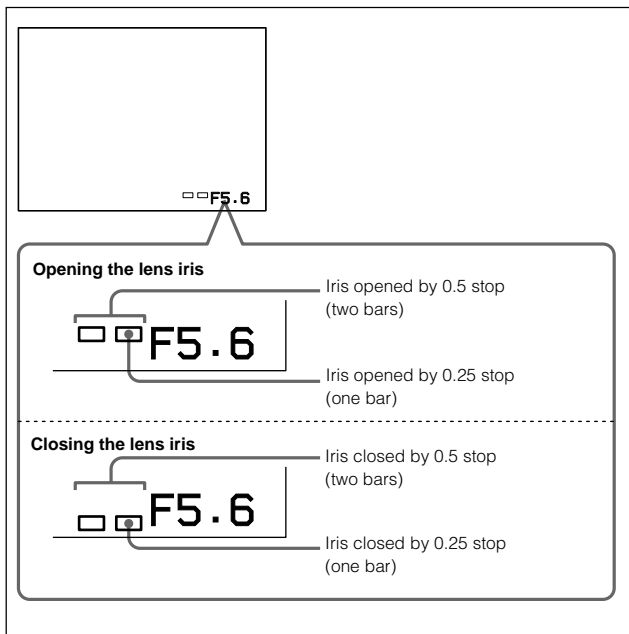
The reference value is normally set to the standard value. Even if the reference value is changed, it reverts to the standard value every time the power is turned on.

### Opening or closing the lens iris

- 1 Set the MENU ON/OFF/PAGE switch to OFF to close the menu.
- 2
  - To open the iris by 0.25 stop: turn the rotary encoder counterclockwise as seen from the front of the camera. One bar appears in the upper part to the left of the F number in the iris indication.
  - To open the iris by 0.5 stop: turn the rotary encoder further counterclockwise as seen from the front of the camera. Two bars appear in the upper part to the left of the F number in the iris indication.

*(Continued)*

- To close the iris by 0.25 stop: turn the rotary encoder clockwise as seen from the front of the camera.  
One bar appears in the lower part to the left of the F number in the iris indication.
- To close the iris by 0.5 stop: turn the rotary encoder further clockwise as seen from the front of the camera.  
Two bars appear in the lower part to the left of the F number in the iris indication.



Opening or closing the lens iris

---

**When the RM-B150 Remote Control Unit is connected**

The IRIS control knob of the RM-B150 can be used for lens iris setting. The bar display (□) will not appear, however.

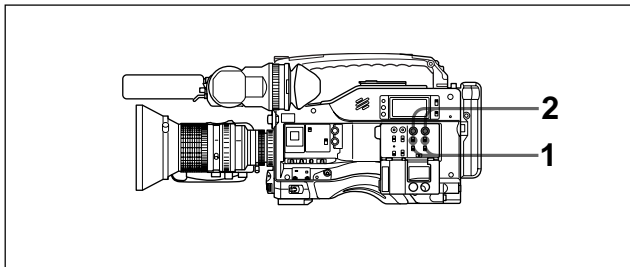
**When the RM-P9 Remote Control Unit is connected**

The IRIS control knob of the RM-P9 can be used for lens iris setting. The bar display (□) will not appear, however.

## 4-4 Adjusting the Audio Level

If you set the AUDIO SELECT CH-1/CH-2 switches to AUTO, the input levels for the corresponding channels are adjusted automatically.

Follow the procedure below to manually adjust the level for both audio channels.



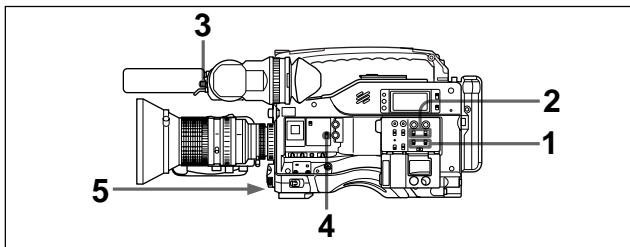
Audio level manual adjustment

- 1** Set the AUDIO SELECT CH-1/CH-2 switches to MANUAL.
- 2** Adjust the AUDIO LEVEL CH-1/CH-2 controls so that at the maximum sound level the level meter indicates  $-20$  dB.

---

## Adjusting the audio level of the microphone

You can adjust the audio level input from the microphone for channels 1 and 2 by using the MIC AUDIO LEVEL control on the front of the camcorder.



Microphone audio level adjustment

- 1 Set either or both AUDIO IN switches to FRONT as follows:
  - When using the front microphone input for both channels 1 and 2:  
Set both AUDIO IN switches to FRONT.
  - When using the front microphone input for either channel 1 or 2:  
Set the AUDIO IN switch for the desired channel to FRONT.
- 2 Set the AUDIO SELECT switch(es) for the desired channel(s) to MANUAL.
- 3 Set the DISPLAY switch at the viewfinder to ON.

The audio level indication of the channel 1 will appear in the viewfinder.

*(Continued)*

- 4** Use the MONITOR switch to select the channel whose audio level is indicated in the viewfinder.

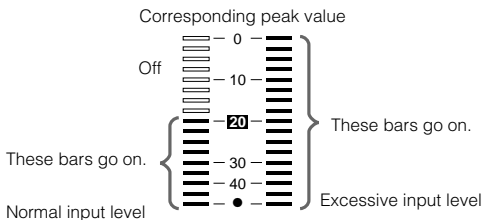
**CH1:** Audio level of CH-1

**CH2:** Audio level of CH-2

**MIX:** Mixed audio level of CH-1 and CH-2

- 5** Turn the MIC AUDIO LEVEL control on the front of the camcorder to adjust the audio level while seeing the audio level indication on the window screen.

- When the incoming audio level is normal, the nine bars from the bottom are on.
- The second bar from the top may turn on occasionally, but do not allow the top bar to go on. If it goes on, the audio level is too high.



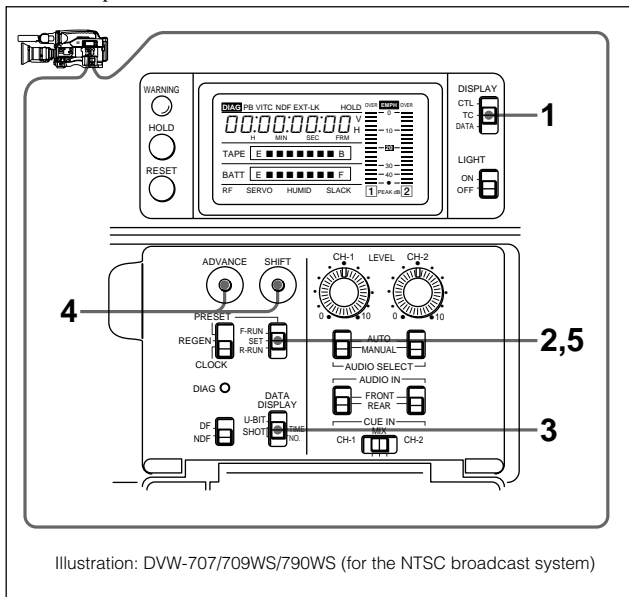


# 4-5 Setting the Time Data

## 4-5-1 Setting the User Bits

By setting the user bits (up to hexadecimal 8 digits), you can record user information such as the date, time, or scene number on the time code track.

Follow the procedure below to set the user bits.



Setting the user bits

- 1** Set the DISPLAY switch of the camcorder to DATA.

(Continued)

- 2 Set the F-RUN/SET/R-RUN switch to SET.
- 3 Set the DATA DISPLAY switch to U-BIT.
- 4 Set the user bits, using the SHIFT and ADVANCE buttons.
 

**SHIFT:** Selects a digit to set. Each time you press it, the flashing column moves one to the right.  
Pressing this button while holding down the HOLD button moves the flashing digit one to the left.

**ADVANCE:** Increments the value of the flashing digit.  
Pressing this button while holding down the HOLD button decrements the flashing digit.

Hexadecimal digits A to F are displayed as follows:

<b>Hexadecimal</b>	A	B	C	D	E	F
<b>Display</b>	<i>A</i>	<i>b</i>	<i>C</i>	<i>d</i>	<i>E</i>	<i>F</i>

- 5 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.

The specified user bits will be recorded in the LTC and VITC.

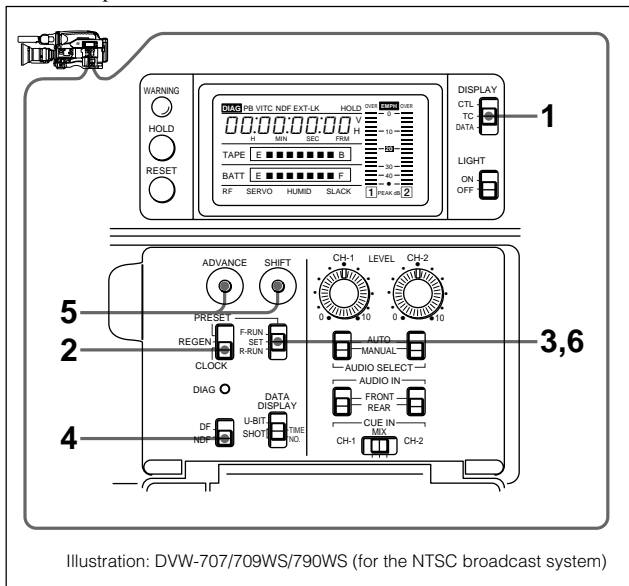
### Storing the user bits in memory

The user bits setting (apart from the real time) is stored in memory when the power is turned off.

## 4-5-2 Setting the Time Code

The time code setting range is from 00 : 00 : 00 : 00 to 23 : 59 : 59 : 29 (hour : minute : second : frame) for the DVW-707/709WS/790WS, or to 23 : 59 : 59 : 24 for the DVW-707P/709WSP/790WSP.

Follow the procedure below to set the time code.



Setting the time code

- 1 Set the DISPLAY switch of the camcorder to TC.
- 2 Set the PRESET/REGEN/CLOCK switch to PRESET.

(Continued)

- 
- 3** Set the F-RUN/SET/R-RUN switch to SET.
- 4** If you are using the DVW-707/709WS/790WS, set the DF/NDF switch. (NTSC only)
- DF:** Drop frame mode
- NDF:** Non-drop frame mode
- 5** Using the SHIFT and ADVANCE buttons, set the time code.
- SHIFT:** Selects a digit to set. Each time you press it, the flashing column moves to the right one digit.
- Pressing this button while holding down the HOLD button moves the flashing digit one to the left.
- ADVANCE:** Increments the flashing digit.
- Pressing this button while holding down the HOLD button decrements the flashing digit.
- 6** Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.
- F-RUN:** Free run - The time code advances constantly.
- R-RUN:** Record run - The time code stops except during recording.

### Notes

- The time code continues to advance when Loop Rec mode is turned on, even when the system is set to REC-RUN mode.
- When you turn on the Loop Rec function, make sure either the mode is set to F-RUN or R-RUN after setting the time code. If you begin recording with the switch in SET position, the time code will not be recorded correctly.

*The Loop Rec function is provided by the optional BKDW-703 extension board. For more details, see Section 3-2-3 "Starting a Shot with a Few Seconds of Pre-Stored Picture Data (Loop Rec Function)(When Using a BKDW-703 Extension Board)"(page 3-12)*

---

## Making the time code continuous

When the F-RUN/SET/R-RUN switch is set to R-RUN, recording a number of scenes on the tape normally produces continuous time codes. If, however, you take the cassette out at some point, the time code will no longer be continuous.

To make the time code continuous, follow the procedure below.

- 1 Set the PRESET/REGEN/CLOCK switch to REGEN.
- 2 Use the PLAY buttons to play back.
- 3 Watching the playback, find the point of the previous recording on the tape from which you wish to continue recording, and press the STOP button.
- 4 Press the RET button on the lens.

This reads the previous recording, and synchronizes the internal time code generator, thus allowing the new time code recorded to follow on consecutively. (When the Loop Rec function is on, this function does not operate.)

---

### 4-5-3 Saving the Real Time in the Time Code

Setting the PRESET/REGEN/CLOCK switch to CLOCK saves the real time in the time code.

When it is necessary to set the real time, use the VTR menu.

*For more information about the VTR menu, see Section 4-10 "VTR Menu Display in the Display Panel" (page 4-99).*

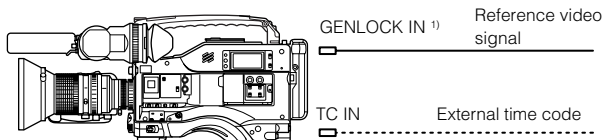
## 4-5-4 Synchronizing the Time Code

You can synchronize the internal time code generator of this camcorder with an external generator for the regeneration of an external time code. You can also synchronize the time code generators of external VTRs with the internal generator of this camcorder.

### Connections for time code synchronization

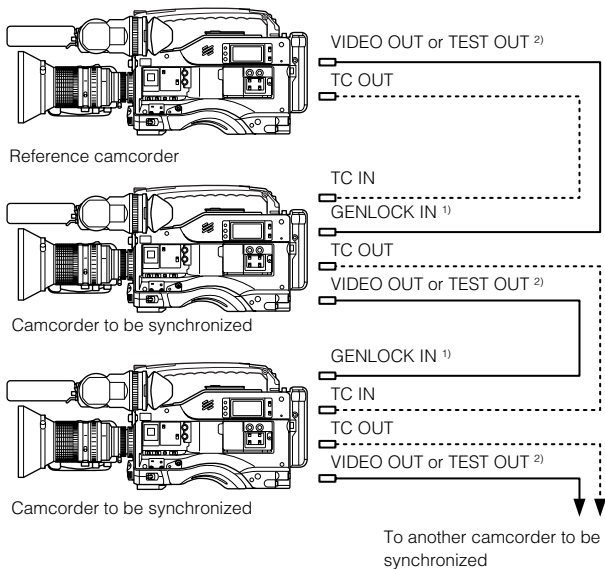
Connect both the reference video signal and the external time code as illustrated below.

#### Example 1: Synchronizing with an external time code



- 1) Set GENLOCK to ON from the FUNCTION 2/2 page of the setup menu.  
*For information about this setting, see Section 4-9-2 “Selecting the Functions” (page 4-79).*

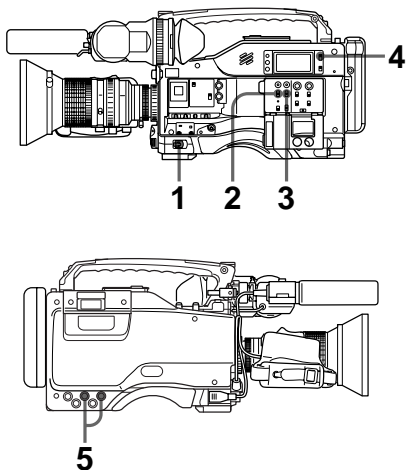
### Example 2: Interconnecting a number of camcorders for time code synchronization



- 1) Set GENLOCK to ON from the FUNCTION 2/2 page of the setup menu.  
*For information about this setting, see Section 4-9-2 "Selecting the Functions" (page 4-79).*
- 2) Output a composite video signal from the TEST OUT connector. In the FUNCTION 1/2 page of the setup menu, set TEST OUT to ENC.  
*For more information, see Section 4-9-3 "Selecting the Test Output" (page 4-83).*

## Procedure for time code synchronization

Follow the procedure below to synchronize the time code.



Synchronizing the time code

- 1** Turn on the POWER switch.
- 2** Set the PRESET/REGEN/CLOCK switch to PRESET.
- 3** Set the F-RUN/SET/R-RUN switch to F-RUN.
- 4** Set the DISPLAY switch of the camcorder to TC.



- 
- 5** Supply the time code to the TC IN connector and reference video signals that comply with the SMPTE (DVW-707/709WS/790WS) or EBU (DVW-707P/709WSP/790WSP) time code standard and are in the proper phase relationship to the GENLOCK IN connector (set GENLOCK to ON with the FUNCTION 2/2 page).

This operation synchronizes the internal time code generator with the external time code. After about 10 seconds, you can disconnect the external time code without losing the synchronization. However, the synchronization will be disrupted if you connect or disconnect the time code during recording.

**Note**

When you finish the above procedure, the time code is immediately synchronized with the external time code and the counter display will show the value of the external time code. However, wait for a few seconds until the sync generator stabilizes before recording.

**User bits settings during time code synchronization**

When the time code is synchronized, only the time data is synchronized with the external time code value. Therefore, the user bits can have their own settings for each camcorder.

You can also synchronize the user bits with external user bit data.

*For more information, refer to "maintenance manual."*

**Releasing the time code synchronization**

First disconnect the external time code, then set the F-RUN/SET/R-RUN switch to R-RUN.

---

### **Changing the power supply from the battery pack to an external power supply during time code synchronization**

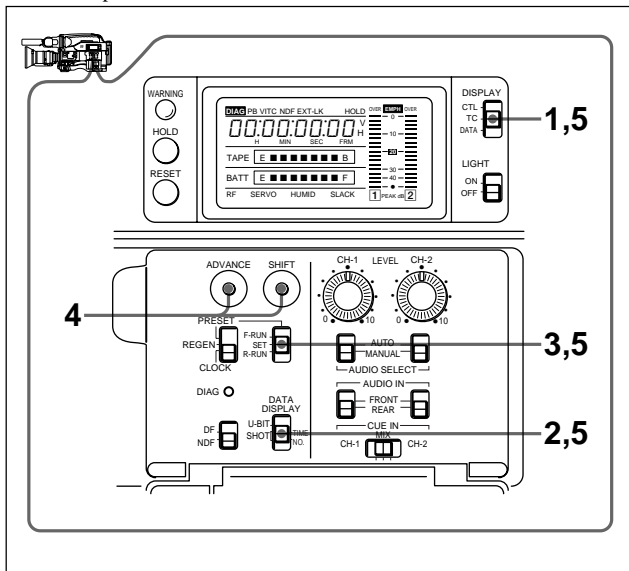
To maintain a continuous power supply, connect the external power supply to the DC IN connector before removing the battery pack. You may lose time code synchronization if you remove the battery pack first.

### **Camera synchronization during time code synchronization**

During time code synchronization, the camera is genlocked to the reference video signal input from the GENLOCK IN connector.

## 4-5-5 Setting Cassette Numbers and Shot Numbers

Follow the procedure below to set a cassette number or shot number.



Setting a cassette number or shot number

- 1 Set the DISPLAY switch to DATA.
- 2 Set the DATA DISPLAY switch to SHOT-NO.

A cassette number (left-hand 3 digits) and a shot number (right-hand 3 digits) appear in the display panel.

(Continued)

- 
- 3** Set the F-RUN/SET/R-RUN switch to SET.

The rightmost digit of the shot number starts flashing.

- 4** Using the SHIFT and ADVANCE buttons, set the cassette number or shot number (up to 999).

**SHIFT:** Selects a digit to set. Each time you press this button, the flashing digit moves one to the left.

Pressing this button while holding down the HOLD button moves the flashing digit one to the right.

**ADVANCE:** Increments the value of the flashing digit.

Pressing this button while holding down the HOLD button decrements the value of the flashing digit.

**To reset the cassette number or shot number to 001**

Select any digit of the cassette number or shot number, making it flash, then press the RESET button.

- 5** Return the DISPLAY, DATA DISPLAY and F-RUN/SET/R-RUN switches to the original positions.

## 4-6 Setup Menu Display on the Viewfinder Screen

If the MENU ON/OFF/PAGE switch is set to ON, the setup menu is displayed on the viewfinder screen.

Use this setup menu to select settings and also to select which items are displayed on the viewfinder screen as well as how they are displayed.

### 4-6-1 Setup Menu Configuration

The setup menu is displayed as individual pages. The pages that make up the setup menu and brief details of the function of each page are listed in the table below.

You can change the configuration of the setup menu to suit your requirements. At the factory, the pages marked with the a) in the table are available.

Pages and functions of the setup menu

Page number	Page name	Function	Reference
1 <sup>a)</sup>	MARKER 1/3	Sets markers (center marker and safety zone marker).	Section 4-8-4 "Setting the Marker Display"
2	MARKER 2/3	Sets markers (box cursor).	Maintenance Manual
3	MARKER 3/3	Sets the output of the markers	Maintenance Manual
4 <sup>a)</sup>	VF DISP 1/2	Selects the viewfinder screen display, the extender display, and the zoom position display.	Section 4-8-2 "Selecting the Display Items"

a) At the factory, the setup menu consists of these pages.

*(Continued)*

Page number	Page name	Function	Reference
5 <sup>a)</sup>	VF DISP 2/2	Viewfinder screen display selections (filter, white balance memory, and gain)	Section 4-8-2 "Selecting the Display Items"
6 <sup>a)</sup>	MASTER GAIN	Sets the GAIN selector value.	Section 4-9-1 "Setting the GAIN Selector Values"
7 <sup>a)</sup>	SHOT ID	Sets the shot data ID.	Section 4-8-6 "Setting the Shot ID"
8 <sup>a)</sup>	SHOT DISP.	Selects the shot data display.	Section 4-8-5 "Recording Superimposed Shot Data in Color Bars"
9	SHUTTER	Sets the shutter speed and mode.	Section 4-2 "Setting the Electronic Shutter"
10	'!' LED	Sets the operation of the (ⓘ) indicator.	Section 4-7-2 "Setting the ⓘ Indicator"
11 <sup>a)</sup>	SETUP CARD	Accesses the setup card.	Section 4-11 "Using the Setup Card"
12	FUNCTION 1/2	Selects functions to use.	Maintenance Manual
13	FUNCTION 2/2	Selects functions to use (continued).	Section 4-9-2 "Selecting the Functions"
14	WIDE SCREEN (DVW-709WS/ 709WSP/ 790WS/ 790WSP only)	Selects the aspect ratio.	Section 4-9-4 "Selecting the Aspect Ratio"

a) At the factory, the setup menu consists of these pages.

Page number	Page name	Function	Reference
15	VF SETTING	Selects viewfinder function.	Maintenance Manual
16 - 29	LEVEL 1 to 12	Adjust levels.	
30 to 32	W-SHADING G/R/B	Adjusts the white shading.	
33	DCC ADJ.	Adjusts the DCC.	
34	OFFSET WHITE	Sets the offset for the AWB value.	
35	PRESET WHITE	Sets the white preset value.	
36 and 37	OPERATION 1-2	Use to make various settings.	
38	FRM SHUTTER	Sets the optional flame shutter.	
39	SG ADJ.	Sets the SG.	
40	ENC ADJ.	Sets the ENC.	
41	DATA-RESET	Resets menu data.	

### Note

When the camcorder is connected to a remote control unit and is being controlled remotely, the SHUTTER and several pages of the engineer-oriented menu (MEASUREMENT and DATA RESET pages) are not displayed. There are also some pages which are displayed but which you cannot use to change settings.

*For information about the function of each page, refer to the relevant sections in this manual or "maintenance manual."*

---

## When changing the setup menu

You can configure the setup menu to display only the pages you need. To select pages, use the MENU SELECT page of the engineer-oriented menu. When using the engineer-oriented menu, switch the camcorder to engineer mode. Power off the camcorder, then hold down the rotary encoder and turn the power on again.

To revert to the user mode, turn the camcorder off and then on.

Engineer mode and user mode differ in the following ways.

**Engineer mode:** All the pages in the setup menu can be used. Data set with the menu is written to non-volatile memory and can be stored semi-permanently.

**User mode:** Only the pages selected in the engineer mode MENU SELECT page can be used. Data set with the menu is written to non-volatile memory and can be stored semi-permanently.

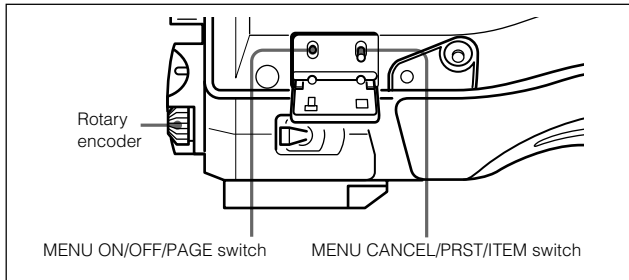
After making settings and adjustments in engineer mode, configure the CAMERAMAN menu on the MENU SELECT page with the pages you use frequently so that you can access them quickly.

*Refer to “maintenance manual” for information about the MENU SELECT page. For information about the CAMERAMAN menu settings, see section 4-9-7 “Setting the CAMERAMAN menu” (page 4-95).*



## 4-6-2 Basic Use of the Setup Menu

Use the MENU ON/OFF/PAGE switch, the MENU CANCEL/PRST/ITEM switch, and the rotary encoder to manipulate the setup menu.



Controls for use of the setup menu

Follow the procedure below to use the setup menu.

- 1 Display the setup menu.
- 2 Select a page.
- 3 Select an item.
- 4 Change the setting of that item, or turn the function or display of that item on or off.
- 5 End the setup menu operation.

## Displaying the setup menu

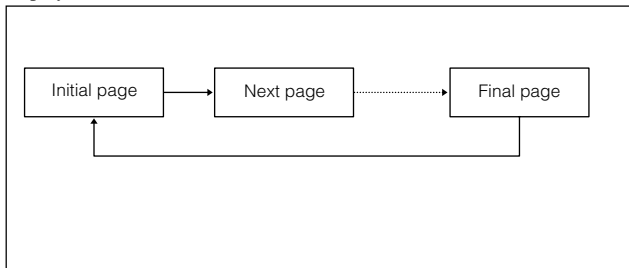
Set the MENU ON/OFF/PAGE switch to ON to display the setup menu. The status display along the top and bottom disappears from the viewfinder screen, and the page that was on the screen when the last menu operation ended appears.

When this menu is first used, the lowest-numbered page of the currently selected pages for menu configuration appears. This also occurs if you set the MENU ON/OFF/PAGE switch to ON while holding the MENU CANCEL/PRST/ITEM switch at CANCEL.

## Paging through the menu

Push the MENU ON/OFF/PAGE switch from ON to PAGE.

Every time you push this switch to PAGE, the next page of the menu is displayed.



Paging through the menu

While a question mark appears at the left of the page title, you can use the rotary encoder as follows to switch pages.

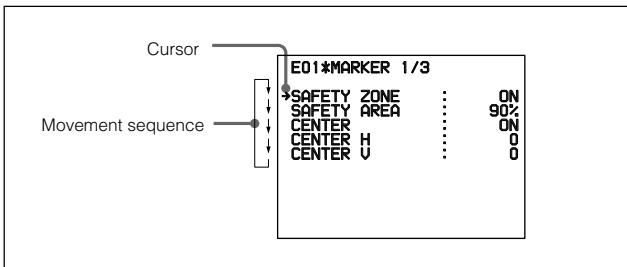
**Turning the rotary encoder counterclockwise as seen from the front of the camera:** advances to the next menu page.

**Turning the rotary encoder clockwise as seen from the front of the camera:** returns to the previous menu page.

## Selecting an item

Push the MENU CANCEL/PRST/ITEM switch to ITEM.

Every time you push this switch to ITEM, the cursor (arrow), which indicates the selected item, moves to the next item.



Cursor movement sequence

You can also use the rotary encoder as follows to switch items.

While a question mark appears at the left of the page title, if you press the rotary encoder, the question mark disappears, and the cursor appears. Next turn the rotary encoder.

**Turning the rotary encoder counterclockwise as seen from the front of the camera:** moves the cursor up continuously.

**Turning the rotary encoder clockwise as seen from the front of the camera:** moves the cursor down continuously.

If you move the cursor to the left of the page title, and press the rotary encoder, a question mark reappears at the left of the page title, and once again you can use the rotary encoder to change pages.

---

## Changing the setting of ON/OFF selection of a selected item

Check that the cursor is by the desired item, then press the rotary encoder. A question mark appears at the left of the setting value. Next carry out one of the following operations.

### To increase a setting value

Turn the rotary encoder counterclockwise as seen from the front of the camera.

### To decrease a setting value

Turn the rotary encoder clockwise as seen from the front of the camera.

### To toggle a setting on or off

To select the “ON” setting, turn the rotary encoder counterclockwise as seen from the front of the camera, and to select the “OFF” setting, turn the rotary encoder clockwise.

## Canceling the settings and resetting to the initial settings

You can cancel the settings and reset them to their initial values (those set at the factory, or in engineer mode) by pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.

When the MENU CANCEL/PRST/ITEM switch is pushed to CANCEL/PRST, the message “CANCEL?” appears below the page name. To cancel the previous settings, push the switch to CANCEL/PRST again. To reset the settings to their initial values, push the switch to CANCEL/PRST a third time. The message “PRESET?” appears below the page name. To reset to the initial settings, push the switch to CANCEL/PRST once more.

---

The action of the CANCEL/PRST function differs for some setting items. Some items are only affected by PRST; check the setting procedure for each item for more information.

### **To confirm a setting**

Press the rotary encoder once more. The question mark at the left of the setting value disappears, and you can again use the rotary encoder to select items.

### **Closing the menu**

Return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen, and displays showing the current status of the camcorder appear along the top and bottom of the viewfinder screen.

### **When you close the switch cover**

When the cover for the MENU ON/OFF/PAGE and MENU CANCEL/PRST/ITEM switches is closed, the MENU ON/OFF/PAGE switch turns off automatically.

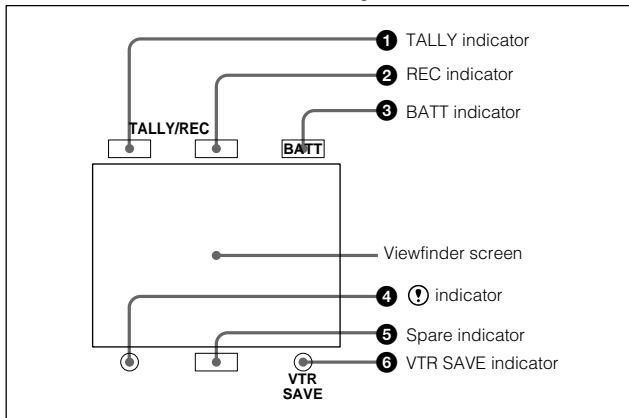
# 4-7 Indicators in the Viewfinder

The indicators of the status of the camcorder and the results of adjustments are arranged along the top and bottom edges of the viewfinder screen.

## 4-7-1 Layout of Indicators in the Viewfinder

The indicators in the viewfinder are arranged as illustrated below.

4



Indicators in the viewfinder

### 1 TALLY indicator

This lights when a green tally control signal is received from the camera control unit and when the camcorder is in Loop Rec mode.

*The Loop Rec function is provided by the optional BKDW-703 extension board. For more details, see Section 3-2-3 "Starting a Shot with a Few Seconds of Pre-Stored Picture Data (Loop Rec Function) (When Using a BKDW-703 Extension Board)"(page 3-12).*

## ② REC (recording) indicator

This indicator lights in red during recording. It also warns by flashing. This lamp also lights when RED TALLY control signal is sent from the camera control unit.

*For more information, see Section 6-3 “Operating Warnings” (page 6-12).*

## ③ BATT (battery) indicator

This indicator starts to flash when the voltage of the battery connected to the camcorder has fallen. This indicator stays on for a few minutes when the battery is dead.

To prevent any interruption in operation, change the battery as soon as it gets low.

*For more information, see Section 5-1-4 “Avoiding Breaks in Operation Due to Dead Batteries” (page 5-7).*

## ④ ! (operation status warning) indicator

This indicator lights when the camcorder is used under one or more of the following conditions and if the corresponding items have been set to ON in the ‘!’ LED page of the setup menu.

- The gain is set to anything but 0 dB.
- The SHUTTER selector is ON.
- The WHITE BAL switch is at PRST.
- ATW is being used.
- The lens extender is in use.
- The FILTER selector is set to anything but 1 (DVW-707/707P).
- The FILTER selector is set to anything but ND:1/CC:B. (DVW-709WS/709WSP/790WS/790WSP only).
- The reference value of the automatic iris adjustment is anything but the standard value.

*See Section 4-7-2 “Setting the ! Indicator” (page 4-50) for more information about selecting the items that will cause the ! indicator to operate.*

## ⑤ Spare indicator

This is a spare indicator. A setup menu operation makes it possible to use this as a REC indicator.

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For more information about the use of this spare indicator, refer to “maintenance manual.”

### ⑥ VTR SAVE indicator

This indicator lights when the VTR SAVE/STBY switch is set to SAVE. This indicator goes off during recording.

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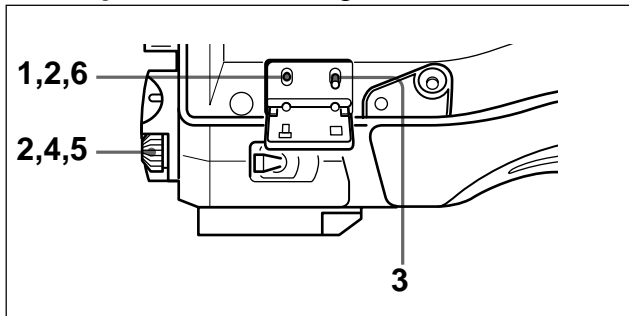
## 4-7-2 Setting the ① Indicator

4

Select the items to be indicated by the ① indicator from the ‘!’ LED page of the setup menu. Note that at the factory the ‘!’ page is not set for display. To access the ‘!’ LED page, either set the camcorder to engineer mode, or select the ‘!’ LED page from the MENU SELECT page before use.

See Section 4-6-1 “Setup Menu Configuration” (page 4-39) for more information about the engineer mode and selecting the display page.

Follow the procedure below to set the ① indicator.




Setting the ① indicator

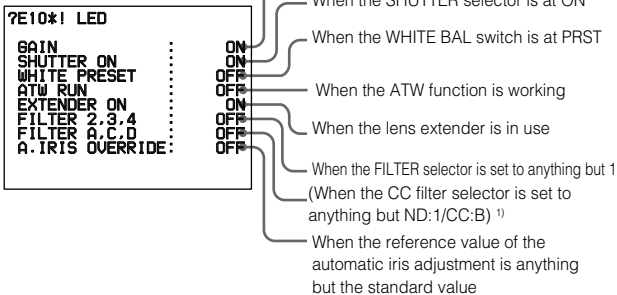
- 1 Set the MENU ON/OFF/PAGE switch to ON.



The display for setting the status disappears from the viewfinder screen, and the page that was on the screen when the last menu operation ended appears. (When this menu is first used, the lowest-numbered page of the currently selected pages for configuring the menu appears.)

- 2** Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the '!' LED page shown below appears (or use the rotary encoder).

Select whether the  indicator is to light for each of the following item conditions.




1) DVW-709WS/709WSP/790WS/790WSP only

'! LED page (factory settings)

- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired item (or use the rotary encoder).

(Continued)

- 
- 4** Turn the rotary encoder to select whether the  indicator should light with respect to the selected item (the “ON” setting), or not light (the “OFF” setting).

**For the “ON” setting:** Press the rotary encoder, and when a question mark appears to the left of the “ON/OFF” indication, turn the rotary encoder counterclockwise as seen from the front of the camera. The “ON/OFF” indication switches to “ON”.

**For the “OFF” setting:** Press the rotary encoder, and when a question mark appears to the left of the “ON/OFF” indication, turn the rotary encoder clockwise as seen from the front of the camera. The “ON/OFF” indication switches to “OFF”.

To turn the setting of another item ON or OFF, repeat steps **3** and **4**.

- 5** Press the rotary encoder to make the question mark to the left of the “ON/OFF” indication disappear.

- 6** To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

## 4-8 Status Display on the Viewfinder Screen

---

The viewfinder screen displays not only the video picture but also characters and messages indicating the camcorder settings and operating status, a center marker, a safety zone marker, etc.

When the MENU ON/OFF/PAGE switch is set to OFF, and the viewfinder DISPLAY switch is set to ON, the items for which an “ON” setting was made in the VF DISP page of the setup menu or with related switches are displayed at the top and bottom of the screen. The messages that give details of the settings and adjustment progress and results can also be made to appear for about 3 seconds while settings are being changed, during adjustment, and after adjustment.

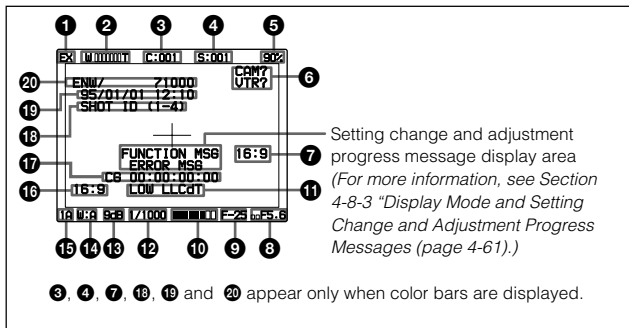
*For information about the display item selection, see Section 4-8-2 “Selecting the Display Items” (page 4-58); for information about setting change and adjustment progress messages, see Section 4-8-3 “Display Mode and Setting Change and Adjustment Progress Messages” (page 4-61); and for information about marker display, see Section 4-8-4 “Setting the Marker Display” (page 4-64).*

### Note

When the setup menu is displayed using the MENU ON/OFF/PAGE switch, no superimposed information on the camera settings (e.g. white balance) appears on the viewfinder screen.

## 4-8-1 Layout of the Status Display on the Viewfinder Screen

All items that can be displayed on the viewfinder screen are shown below.



Status display on the viewfinder screen

### 1 Extender indicator

This indicator appears when a lens extender is used.

### 2 Zoom position indicator <sup>1)</sup>

This indicator indicates the approximate position of the variator <sup>2)</sup> of the zoom lens, between wide angle (W) and telephoto (T).

### 3 Cassette number indicator

This shows the cassette number.

#### 1) Zoom position indicator

This indicator appears only when you use a lens that has a zoom position display function.

#### 2) Variator

A group of lenses that are moved to adjust the focal length.

**4 Shot number indicator**

This shows the shot number.

**5 Battery state indicator**

When an Anton Bauer Intelligent Battery System is used, this shows the remaining battery capacity numerically.

**6 Self-diagnosis indicator**

When a fault has been detected in the camcorder, the indication “xxx?” appears. For example, when a fault is detected in the camera, the indication “CAM?” appears.

**7 16:9 mode recording indicator (DVW-709WS/709WSP/790WS/790WSP only)**

This indicates recording in the 16:9 mode. This indicator is recorded together with the color bars.

**8 Iris setting indicator <sup>1)</sup>**

This shows the iris setting (the f-stop) of the lens.

**9 Remaining tape indicator**

This shows the remaining tape recording time (in minutes) of the VTR.

Example of remaining tape indicator

Display	Tape time remaining
F-30	Full to 30 minutes
30-25	30 to 25 minutes
25-20	25 to 20 minutes
20-15	20 to 15 minutes

(Continued)

.....  
1) Iris setting indicator

This indicator appears only when you use a lens that has an iris opening display function.

### Example of remaining tape indicator

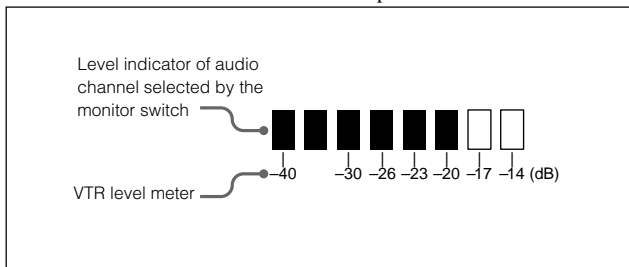
Display	Tape time remaining
15-10	15 to 10 minutes
10-5	10 to 5 minutes
5-0	5 to 2 minutes
5-0 (flashing)	Less than 2 minutes

## 4

### 10 Audio level indicator

This indicator indicates the level of the audio channel selected by the monitor switch.

This indicator roughly corresponds to the peak indication of the level meter of the internal VTR of a sine wave input as follows:



Audio level indicator

For information about turning the audio level indicator on and off, see Section 4-4 “Adjusting the Audio Level” (page 4-24).

### 11 Subject illumination indicator

This appears, depending on the setting, to indicate that the subject illumination is inadequate.

### 12 Shutter speed and mode indicator

This indicator indicates the shutter speed and mode settings.

---

**1/100 (DVW-707/709WS/790WS) or 1/60 (DVW-707P/709WSP/790WSP), 1/125, 1/250, 1/500, 1/1000, 1/2000:** Shutter speed (in seconds) in standard mode.

**CLS:** CLS mode

**ECS:** ECS mode (DVW-790WS/790WSP only)

**EVS:** EVS mode

### **13 Gain indicator**

This indicator indicates the gain (in dB) of the video amplifier, as set by the GAIN selector.

### **14 White balance memory indicator**

This indicator indicates the currently selected white balance automatic adjustment memory.

**A:** The WHITE BAL switch is set to A.

**B:** The WHITE BAL switch is set to B.

**P:** The WHITE BAL switch is set to PRST or when the preset button on the RM-B150 has been pushed.

**M:** The WHITE BAL switch of the RM-P9 Remote Control Unit is set to MANUAL.

**T:** ATW is being used.

### **15 Filter indicator**

This indicator indicates the currently selected filter types.

### **16 16:9 mode indicator (DVW-709WS/709WSP/790WS/790WSP only)**

This indicates the 16:9 mode.

### **17 Time code indicator**

This indicates the time code, user bits or other information selected by the DISPLAY switch and DATA DISPLAY switch settings.

*For more information, see the section “Relationships between the DISPLAY switch and DATA DISPLAY switch settings and the time counter displays” (page 2-41).*

---

**18 ID number indicator**

This indicates the ID number selected from ID1 to ID4. This indicator is recorded together with the color bars.

**19 Date and time indicator**

This shows the date and time of recording. This indicator is recorded together with the color bars

**20 Model name and serial number indicator**

This displays the model name and serial number of the camcorder. This indicator is recorded together with the color bars.

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## 4-8-2 Selecting the Display Items

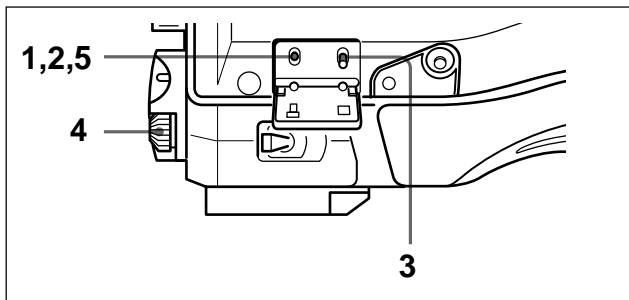
To select the items to be displayed on the viewfinder screen from the VF DISP page, turn on or off the indication next to each item. Selection of the following items can be turned on or off on the VF DISP 1/2 and 2/2 pages.

- Display mode (*For more information, see Section 4-8-3 “Display Mode and Setting Change and Adjustment Progress Messages” (page 4-61).*)
- Extender indicator
- Zoom position indicator
- Filter indicator
- White balance memory indicator
- Gain indicator
- Shutter speed and mode indicator
- Remaining tape indicator
- Iris opening indicator

### Selecting the display items

Follow the procedure below to select the items to be displayed on the viewfinder screen.



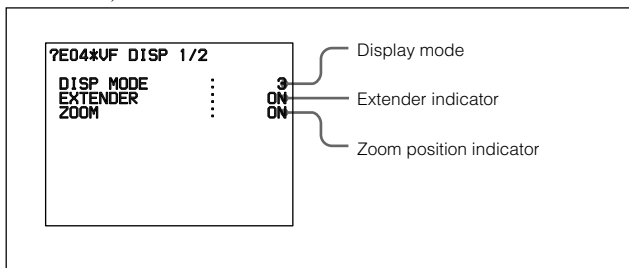


Selecting the display items

- 1 Set the MENU ON/OFF/PAGE switch to ON.

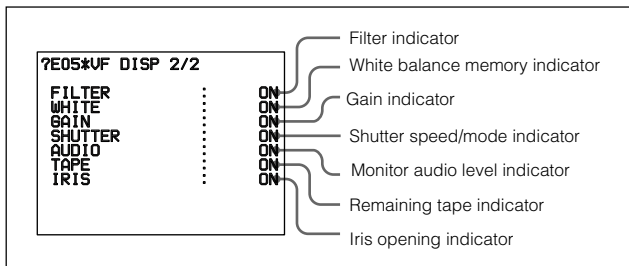
The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears).

- 2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the VF DISP 1/2 or 2/2 page shown below appears (or use the rotary encoder).



VF DISP 1/2 page (factory settings)

(Continued)



VF DISP 2/2 page (factory settings)

- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired item (or use the rotary encoder).
- 4** Turn the rotary encoder to select whether the selected item should appear in the viewfinder display (the “ON” setting), or not appear (the “OFF” setting).

Note that pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST on this page has no effect.

To turn the setting of another item ON or OFF, repeat steps **3** and **4**.

- 5** To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the display indicating the current status of the camcorder appears along the top and bottom of the viewfinder screen (when the viewfinder DISPLAY switch is set to ON).

### 4-8-3 Display Mode and Setting Change and Adjustment Progress Messages

You can limit or suppress the messages that give details of setting changes and adjustment progress and results by setting a display mode. The conditions under which messages are displayed and their correspondence with the display mode are as follows:

Setting change and adjustment progress messages and display modes

Y: Message is displayed.

N: Message is not displayed.

Message display condition	Message	Display mode setting		
		1	2	3
When the filter selection has been changed	FILTER : n (where n = 1, 2, 3, 4)	N	N	Y
When the gain setting has been changed	GAIN : n (where n = -3dB, 0dB, 3dB, 6dB, 9dB, 12dB, 18dB, 24dB, 30dB, 36dB, 42dB, 48dB)	N	N	Y
When the setting of the WHITE BAL switch has been changed	WHITE : n (where n = A CH, B CH, PRST) or ATW : RUN	N	N	Y
When the OUTPUT/DCC selector has been set to DCC ON or OFF	DCC : ON (or OFF)	N	Y	Y

(Continued)

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Setting change and adjustment progress messages and display modes

Y: Message is displayed.

N: Message is not displayed.

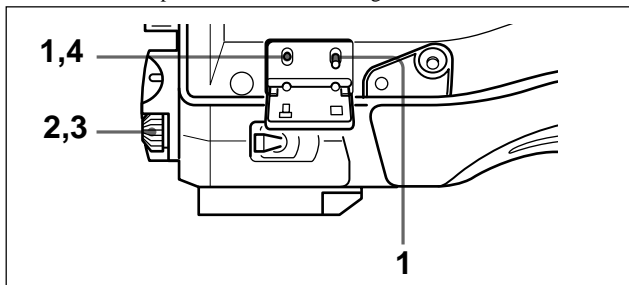
Message display condition	Message	Display mode setting		
		1	2	3
When the shutter speed and mode setting has been changed <sup>a)</sup>	: SS : 1/100 (DVW-707/709WS/790WS) or 1/60 (DVW-707P/709WSP/790WSP) (or 1/125, 1/250, 1/500, 1/1000, 1/2000, CLS, ECS <sup>b)</sup> , EVS)	N	Y	Y
When the black or white balance has been adjusted	E.g. WHITE : OK <i>For more information, see Section 4-1 "Adjusting the Black Balance and the White Balance" (page 4-1).</i>	N	Y	Y

a) This is also displayed for about 3 seconds when the SHUTTER selector is set to ON.

b) DVW-790WS/790WSP only

## Changing the display mode

The currently set display mode appears on the VF DISP page of the setup menu. Follow the procedure below to change it.



Changing the display mode

- 1** Follow steps **1** to **3** in Section 4-8-2 “Selecting the Display Items” (page 4-58), until the VF DISP 1/2 page of the setup menu is on the viewfinder screen and the cursor is at DISP MODE.
- 2** Press the rotary encoder so that a question mark appears to the left of the display mode indication, then turn the rotary encoder to change the display mode selection.
- 3** When the setting is completed, press the rotary encoder.  
  
The question mark to the left of the display mode indication disappears.
- 4** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

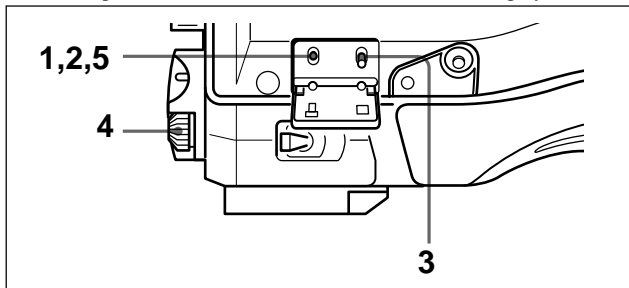
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## 4-8-4 Setting the Marker Display

Use the MARKER 1/3 page of the setup menu to switch the display of the center and safety zone markers on or off and to select whether the area indicated by the safety zone marker is 80%, 90% or 100% of the screen area.

### Setting the marker display

Follow the procedure below to set details of the marker display.

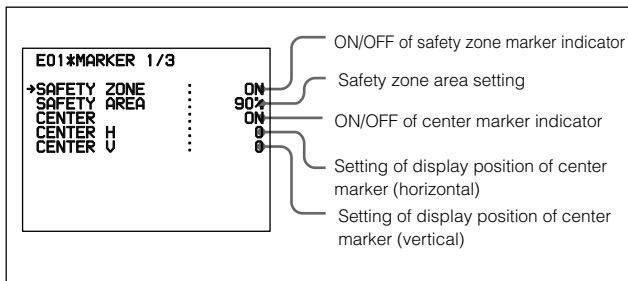


Setting the marker display

- 1** Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

- 2** Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the MARKER 1/3 page shown on the next page appears (or use the rotary encoder).



MARKER 1/3 page (factory settings)

**3** Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired item (or use the rotary encoder).

**4** For each item, operate the rotary encoder as follows (directions indicated as seen from the front of the camera).

**CENTER or SAFETY ZONE selections:** For an “ON” display setting, turn the rotary encoder counterclockwise; for an “OFF” display setting, turn the rotary encoder clockwise.

**SAFETY AREA selection:** To set the safety zone to 100% of the screen area, turn the rotary encoder counterclockwise, and to set the safety zone to 80% of the screen area, turn the rotary encoder clockwise.

**CENTER H selection:** To move the center marker to the right in the viewfinder, turn the rotary encoder counterclockwise, and to move the center marker to the left in the viewfinder, turn the rotary encoder clockwise.

**CENTER V selection:** To move the center marker up in the viewfinder, turn the rotary encoder counterclockwise, and to move the center marker down in the viewfinder, turn the rotary encoder clockwise.

(Continued)

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If any of the above selections is set to ON, the corresponding marker is displayed.

Note that the CANCEL and PRESET functions can also be used for the CENTER H and CENTER V selections.

If the MENU CANCEL/PRST/ITEM switch is pressed twice to CANCEL/PRST, all the previous settings are canceled. If the switch is pressed twice more to CANCEL/PRST, the settings are reset to their initial values.

4

- 5** To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

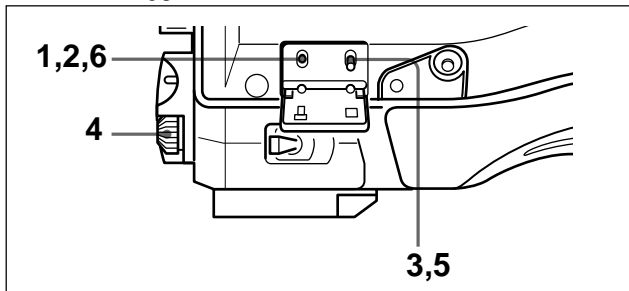
---

## 4-8-5 Recording Superimposed Shot Data in Color Bars

In the setup menu SHOT DISP. page, you can select which shot data is recorded superimposed on the color bars. You can also select which of the shot IDs (1 to 4) set in the SHOT DATA page is recorded superimposed on the picture.



Use the following procedure.



Selecting the shot data for superimposed recording

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The last page accessed appears in the viewfinder display (initially the SHOT DATA page appears).

- 2 Press the MENU ON/OFF/PAGE switch repeatedly toward the PAGE position (or use the rotary encoder) until the SHOT DISP. page appears, as shown below.

?E08*SHOT DISP.		
DATE	:	OFF
TIME	:	OFF
MODEL NAME	:	OFF
SERIAL NO.	:	OFF
CASSETTE NO.	:	OFF
SHOT NO.	:	OFF
ID SELECT	:	OFF

(Continued)

- 
- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly toward the ITEM position until the cursor is positioned to the left of the item you wish to set (or use the rotary encoder).

The items and their meanings are as follows:

**DATE:** date

**TIME:** time

**MODEL NAME:** model name

**SERIAL NO.:** serial number

**CASSETTE NO.:** cassette number

**SHOT NO.:** shot number

**ID SELECT:** shot ID set in SHOT DATA page

Next press the rotary encoder so that a question mark appears to the left of the selected item.

- 4** Turn the rotary encoder to select whether or not to record the selected item superimposed on the picture.

**To carry out superimposed recording:** turn the rotary encoder counterclockwise as seen from the front of the camera to select “ON”.

**Not to carry out superimposed recording:** turn the rotary encoder clockwise as seen from the front of the camera to select “OFF”.

In the ID SELECT item, in order not to carry out superimposed recording of any shot ID, select “OFF”, and to carry out superimposed recording of a shot ID, select the shot ID number (1 to 4).

To set other items on or off, continue to step **5**. If all item settings are complete, skip to step **6** to end the process.

- 
- 5 Press the MENU CANCEL/PRST/ITEM switch toward the ITEM position (or use the rotary encoder), to advance the cursor to the next position, then return to step 4 to make the next on/off setting.
  - 6 To exit from the menu, return the MENU ON/OFF/PAGE switch to the OFF position.

The setup menu disappears from the viewfinder screen.

### To carry out superimposed recording

To actually record the items selected for superimposed recording in the SHOT DISP. page, set the OUTPUT/DCC switch to BARS, DCC OFF. The items selected for superimposed recording appear in the viewfinder screen and are recorded superimposed on the picture.

---

## 4-8-6 Setting the Shot ID

In the SHOT ID page of the setup menu, you can set a shot ID, of up to 12 alphanumeric characters, spaces, and symbols.

When the OUTPUT/DCC switch is set to BARS, DCC OFF, this shot ID is output with the color bar signal. The shot ID comprises ID1 to ID4, and the setting can be changed using the SHOT DISP. page of the setup menu.

### Notes

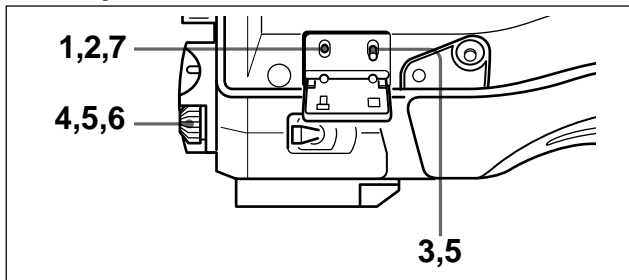
- To display the shot ID, set the TEST OUT item in the FUNCTION 1/2 page of the setup menu to ENC, and make the signal output from the TEST OUT connector a composite signal.

*For information about the TEST OUT page, see Section 4-9-3 “Selecting the Test Output” (page 4-83).*

- When the setup menu is displayed, the shot ID is not displayed even if the color bar signal is output.

## Setting the shot ID

Follow the procedure below to set the shot ID.

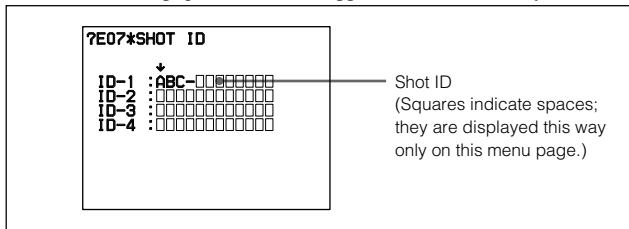


Setting the shot ID

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered page of the currently selected pages for configuring the menu appears).

- 2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SHOT ID page shown below appears (or use the rotary encoder).



- 
- 3** Press the MENU CANCEL/PRST/ITEM switch repeatedly toward the ITEM position, until the ID (one of ID-1 to ID-4) you wish to set has the cursor to the left of it (or use the rotary encoder).

When you press the rotary encoder once more, a question mark appears by the selected ID, and a character position selection cursor (Ø) also appears (the character setting mode).

- 4** Press the rotary encoder repeatedly until the character position cursor indicates the character you wish to set.

Each time you press the rotary encoder, the cursor moves one position to the right. If you press it when the cursor is at the right end, the cursor disappears, the camcorder exits from the character setting mode.

- 5** Turn the rotary encoder until the character you wish to set appears.

Turn the rotary encoder clockwise as seen from the front of the camera to cycle the character from the alphabet, through space (□), the symbols, and the digits, in that order. Turn the rotary encoder counterclockwise to cycle through the characters in the reverse direction.

It is also possible to enter a space when the character position cursor (Ø) is in the required character position, by pressing the MENU CANCEL/PRST/ITEM switch toward the CANCEL/PRST position.

To set more characters, go to step **6**, and to end character setting go to step **7**.

- 6** Press the rotary encoder to advance the character position cursor to the next position, then return to step **5** to set a character.

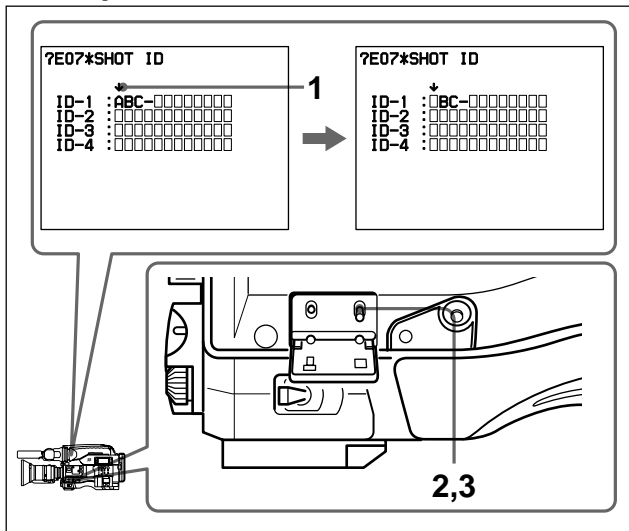
- 7** To end the menu operation, return the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

### Deleting a character

Follow the procedure below.

4



Deleting a character

- 1** Move the cursor (↓) to the position of the character to be deleted.

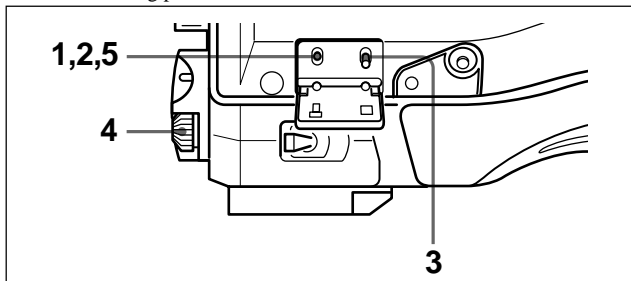
- 2** Press the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.

The character below the character position cursor disappears, and is replaced by a space (□).

- 3** (1) To delete another character, press the rotary encoder repeatedly until the cursor is at the position of the character to be deleted.
- (2) Return to step **2** to delete the character.

## 4-8-7 Displaying Time Code and Other Information

In the setup menu OPERATION 2 page, you can select information to be displayed in the viewfinder and output from the TEST OUT connector. Use the following procedure.



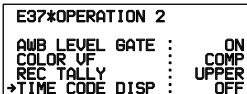
Settings to select whether or not to display or output time code and so forth

- 1** Set the MENU ON/OFF/PAGE switch to ON.

The last page accessed appears in the viewfinder display. When this menu is first used, the lowest-numbered one of the currently selected pages appears.

*(Continued)*

- 
- 2** Press the MENU ON/OFF/PAGE switch toward the PAGE position (or use the rotary encoder) until the OPERATION 2 page appears, as shown below.



```
E37*OPERATION 2
AWB LEVEL GATE : ON
COLOR VF : COMP
REC TALLY : UPPER
→TIME CODE DISP : OFF
```

- 4**
- 3** Push the MENU CANCEL/PRST/ITEM switch toward the ITEM position.

Next press the rotary encoder, to display a question mark to the left of “TIME CODE DISP”.

- 4** Turn the rotary encoder to select whether or not to display or output the time code and other information.

**To display or output the information:** turn the rotary encoder counterclockwise as seen from the front of the camera to select one of the following settings.

- VF: display in the viewfinder.
- TEST: output from the TEST OUT connector.
- BOTH: display in the viewfinder and output from the TEST OUT connector.

**To neither display nor output the information:** turn the rotary encoder clockwise as seen from the front of the camera to select “OFF”.

- 5** To exit from the menu, return the MENU ON/OFF/PAGE switch to OFF.



---

The set up menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder screen.

### **Selecting information to display**

Use the DISPLAY and DATA DISPLAY switches to select the information to display from the following.

- time code
- CTL
- user bits
- shot data date and time
- cassette number and shot number from shot data

*For details, see the section “Time code displays” (page 2-40).*

## 4-9 Adjustments and Settings From the Setup Menu

The camcorder provides a menu for adjustments and settings. The basic method of using this setup menu was described in Section 4-6-2 “Basic Use of the Setup Menu” (page 4-43). This section elaborates how to use the setup menu to carry out each adjustment and setting.

The adjustments and settings provided by the setup menu are listed below.

### Adjustments and settings provided by the setup menu

<b>Item</b>	<b>Page name</b>	<b>Reference</b>
Setting of the GAIN selector values	MASTER GAIN	4-9-1 “Setting the GAIN Selector Values”
Selection of shutter mode and speed	SHUTTER SPEED	4-2 “Setting the Electronic Shutter”
Manipulation of setup card	SETUP CARD	4-11 “Using the Setup Card”
Selection of required functions	FUNCTION 1/2	Maintenance Manual
	FUNCTION 2/2	4-9-2 “Selecting the Functions”
Selection of the aspect ratio (DVW-709WS/709WSP/ 790WS/790WSP only)	WIDE SCREEN	4-9-4 “Selecting the aspect ratio (DVW-709WS/709WSP/ 790WS/790WSP only)”
Level adjustment	LEVEL 1 to12	Maintenance Manual

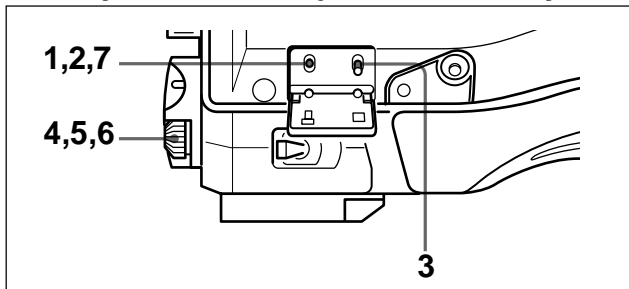
*Refer to “maintenance manual” for procedures of other adjustments and settings.*

## 4-9-1 Setting the GAIN Selector Values

Before using the camcorder, use the MASTER GAIN page of the setup menu to set the gains corresponding to the L, M, and H positions of the GAIN selector and the TURBO GAIN switch, which switches the gain of the video amplifier.

### Setting the GAIN selector values

Follow the procedure below to set a gain value for each switch position.



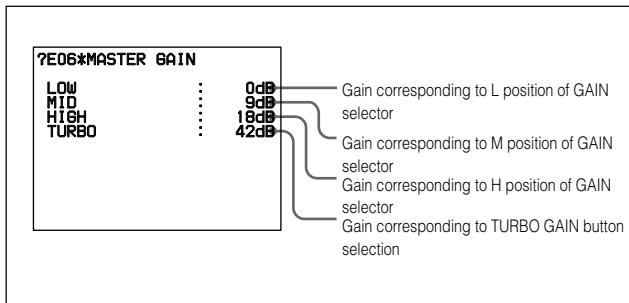
Setting the GAIN selector values

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

- 2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the MASTER GAIN page shown on the next page appears (or use the rotary encoder).

*(Continued)*



MASTER GAIN page (factory settings)

- 3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired position (LOW, MID, HIGH or TURBO) (or use the rotary encoder).
- 4 Press the rotary encoder, to display a question mark to the left of the display.
- 5 Turn the rotary encoder to display the gain value you wish to select.

Any of -3, 0, 3, 6, 9, 12, 18, 24, 30, 36, 42, or 48 dB can be set for each of the L, M, and H positions, in any sequence.

For TURBO, any of -3, 0, 3, 6, ..., 30, 36, 42, or 48 dB<sup>1)</sup> can be selected.

Press the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST to reset the gains to the factory set values (L = 0 dB, M = 9 dB, H = 18 dB, and TURBO = 42 dB).

To change the gain corresponding to another switch position, return to step **3**.

1) Video gain boosted from 30 dB to 36, 42, or 48 dB by combining blocks of 2, 4, or 8 adjacent pixels of the CCD.

If the settings of the GAIN selector values have been changed, the black set must also be adjusted.

*For more information, refer to “maintenance manual.”*

- 6** Press the rotary encoder, so that the question mark disappears.
- 7** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

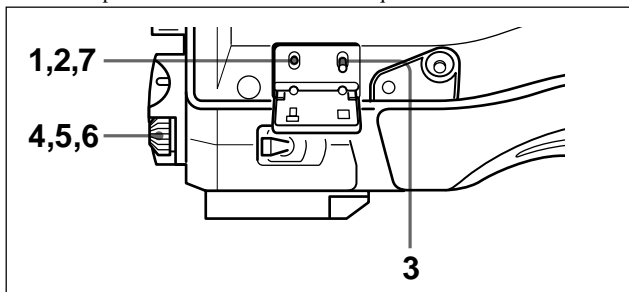
The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

## 4-9-2 Selecting the Functions

Use the FUNCTION 2/2 page of the setup menu to select the camcorder functions related to return video signal.

### Selecting required functions

Follow the procedure below to select the required functions.



Selecting required functions

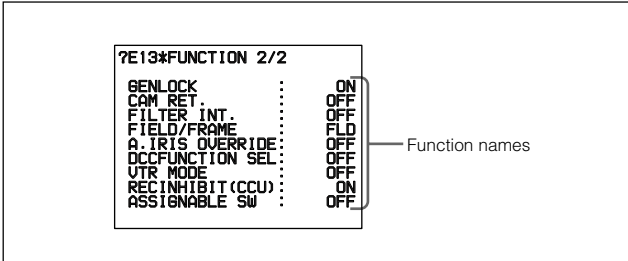
*(Continued)*

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

- 2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the FUNCTION 2/2 page shown below appears (or use the rotary encoder).

4



```
?E13*FUNCTION 2/2
GENLOCK      :      ON
CAM RET.     :      OFF
FILTER INT.  :      OFF
FIELD/FRAME  :      FLD
A. IRIS OVRD:      OFF
DCCFUNCTION SEL:    OFF
UTR MODE     :      OFF
RECINHIBIT (CCU):  ON
ASSIGNABLE SW :      OFF
```

Function names

FUNCTION 2/2 page (factory settings)

- 3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the item whose setting you want to change (or use the rotary encoder).
- 4 Press the rotary encoder, to display a question mark to the left of the display.
- 5 Turn the rotary encoder to change the setting of the selected function.

**GENLOCK:** To use the signal input to the GENLOCK IN connector as a camera genlock signal or for an external time code lock (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to use it (the “OFF” setting), turn the rotary encoder clockwise.

**CAM RET.:** To display the return video signal input to the GENLOCK IN connector on the viewfinder screen by using the RET button on the lens (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to display it (the “OFF” setting), turn the rotary encoder clockwise.

**FILTER INH.:** To restrict the number of white balance memories to one each for A and B (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to restrict the number in this way (the “OFF” setting), turn the rotary encoder clockwise.

**FIELD/FRAME:** Switches between field (FLD) and frame (FRM) for the method of charge accumulation of the CCD sensor.

*For details of menu operation, refer to “maintenance manual.”*

**A. IRIS OVERRIDE:** To make fine adjustment of the reference value for automatic iris adjustment (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera, and in order not to make fine adjustment (the “OFF” setting), turn the rotary encoder clockwise.

*See Section 4-3 “Changing the Reference Value for Automatic Iris Adjustment” (page 4-21) for more information about fine adjustment of the reference value of the automatic iris adjustment.*

*(Continued)*

**DCC FUNCTION SEL:** Specifies either the activation of the DCC or a knee fixed at D Range 600% when the DCC is selected. Select **FIX** if you don't want too sharp a change in image contrast.

**VTR MODE:** Enables the REC switch on the camcorder and the REC switch on an external VTR to function independently when the camcorder is connected to the external VTR via the TRIAX connector on a CA-702/702P.

**REC INHIBIT (CCU):** The VTR section on the camcorder and the 5-inch viewfinder (or color viewfinder) cannot be used while the camcorder is connected to a camera control unit via the TRIAX connector on a CA-755. If you are using a 5-inch viewfinder (or color viewfinder), turn REC INHIBIT (CCU) to ON. If you want to record using the VTR section, turn the REC INHIBIT (CCU) to OFF.

**Note**

When the camera control unit is connected to the camcorder, the playback and rec review functions cannot be used.

**ASSIGNABLE SW:** Sets the functions assigned to the ASSIGNABLE button on the side of the camcorder.

**OFF:** Disables the button.

**ATW:** Assigns the auto-tracing white balance function.

**RET:** Assigns the return function.

**REC:** Assigns the VTR START function (page 2-25).

**TURBO:** Assigns the turbo gain function (page 2-20).

**AUDIO:** Displays the audio mode on the viewfinder screen.

**LOOPR:** (This setting is possible only when the BKDW-703 is installed.) Assigns the Loop Rec mode ON or OFF function. When the Loop Rec time is set to OFF on the OPERATION 2 page, pressing the button alternately selects Loop Rec time 4 and OFF. If the Loop Rec time is set to something other than OFF on the OPERATION 2 page, then pressing the button will toggle the setting between the selected Loop Rec time and OFF.



---

**F.SHT:** (Only when the BKDW-705 is installed) Assigns the ON or OFF function for the frame shutter.

### Notes

- When a remote control unit is connected to the camcorder, the settings of the FILTER INH. and the IRIS OVERRIDE cannot be changed from the remote control unit. These items appear on the menu, but the cursor skips them so that they cannot be selected.
- Pushing the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST has no effect on the FUNCTION 2/2 page.

4

To change the setting of another function, return to step **3**.

**6** Press the rotary encoder, so that the question mark disappears.

**7** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

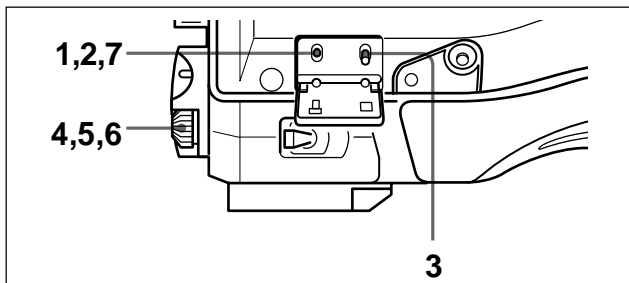
---

### 4-9-3 Selecting the Test Output

Use the TEST OUT page of the setup menu to select the type of video signal to be output from the TEST OUT connector.

Follow the procedure below to select the test output signal.

*(Continued)*

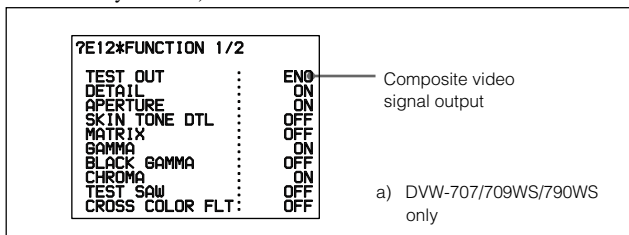


Selecting the test output

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

- 2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the FUNCTION 1/2 page shown on the next page appears (or use the rotary encoder).



FUNCTION 1/2 page (factory settings)

- 
- 3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the desired output (or use the rotary encoder).

Note that the test output signal reverts to ENC (encoded) every time the camcorder is switched on.

- 4 Press the rotary encoder to display a question mark to the left of the display.
- 5 Turn the rotary encoder to select the desired output.

The R-G and B-G signal outputs can be selected only when R-G/B-G SEL on the OPERATION 1 page is set to ON.

*Refer to "maintenance manual" for information about the OPERATION MODE page.*

- 6 Press the rotary encoder, so that the question mark disappears.
- 7 To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder screen.

---

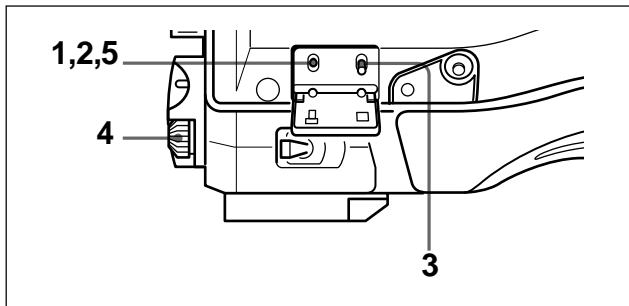
#### **4-9-4 Selecting the Aspect Ratio (DVW-709WS/709WSP/790WS/790WSP Only)**

Use the WIDE SCREEN page of the setup menu to select the aspect ratio of the video output signal and other related items.

##### **Selecting required functions**

Follow the procedure below to select the required function.

*(Continued)*

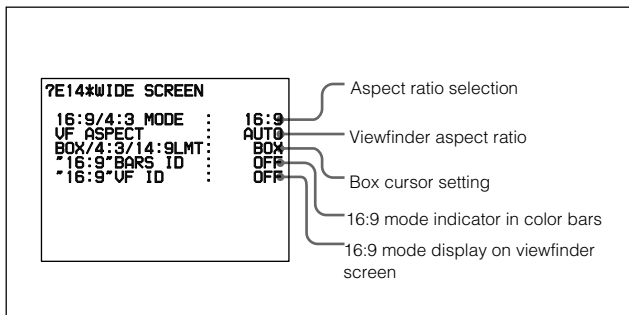


Selecting the aspect ratio

- 1** Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

- 2** Push the MENU ON/OFF/PAGE switch repeatedly toward PAGE until the WIDE SCREEN page (see next page) appears (or use the rotary encoder).



WIDE SCREEN page (factory settings)

- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly toward ITEM until the cursor reaches the item whose setting you want to change (or use the rotary encoder).
- 4** Use the rotary encoder to change the setting of the selected item.  
**16:9/4:3 MODE:** Turn the rotary encoder clockwise to select a 16:9 aspect ratio, or counterclockwise to select a 4:3 aspect ratio.

*(Continued)*

**VF ASPECT:** Turn the rotary encoder clockwise to change the aspect ratio of the viewfinder screen to that selected by 16:9/4:3 MODE (AUTO), or counterclockwise to fix the aspect ratio of the viewfinder screen at 4:3 (4:3) regardless of the 16:9/4:3 MODE setting.

To fix the aspect ratio at 16:9 (16:9A or 16:9B), turn the rotary encoder further counterclockwise.

When the 16:9/4:3 MODE is set to 4:3 with the VF ASPECT set to 16:9A or 16:9B, then the viewfinder shows the whole of the original 16:9 mode picture in the 16:9 mode frame.

When the VF ASPECT is set to 16:9A, a marker indicating the 4:3 mode picture output area appears in the 16:9 mode frame.

When the VF ASPECT is set to 16:9B, the VF signal level outside the current safety zone area (100%, 90% or 80%) drops to a half regardless of whether the SAFETY ZONE setting is ON or OFF.

If you are using the BVF-VC10W Color Viewfinder with the picture output to the viewfinder in 4:3 mode, setting the VF ASPECT to 16:9A or 16:9B disables the viewfinder from showing the picture correctly.

**BOX/4:3 /14:9 LMT:** Turn the rotary encoder clockwise to display the box cursor on the viewfinder screen (BOX). Turn the rotary encoder counterclockwise to display a 4:3 mode area on the 16:9 mode viewfinder screen (4:3). Turn the rotary encoder, and further counterclockwise to display a 14:9 mode area.

**“16:9” BARS ID:** Turn the rotary encoder counterclockwise to record a 16:9 mode indicator in color bars (ON), or clockwise not to record it in color bars (OFF).

### COLOR BAR (SMPTE type)

W	Y	C	G	M	R	B
						16:9
-I	W	Q				

### COLOR BAR (EBU type)

W	Y	C	G	M	R	B
						16:9

“16:9” indicator on the color bar display

**“16:9” VF ID:** Turn the rotary encoder counterclockwise to keep a 16:9 mode indicator displayed on the the viewfinder screen when the 16:9 mode is selected (ON), or clockwise not to display the 16:9 mode indicator on the viewfinder screen (OFF).

---

## Notes

- The BOX CURSOR setting on the MARKER 2/3 page is cancelled in the following cases.
  - The BOX/4:3/14:9 LMT setting is 4:3 or 14:9.
  - The 16:9/4:3 MODE setting is 4:3 with the VF ASPECT set to 16:9.
- The LEVEL 1 page can be individually set for both 16:9 and 4:3 mode.

4

To change the setting of another function, return to step **3**.

- 5** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder screen.



## 4-9-5 Setting the color temperature manually

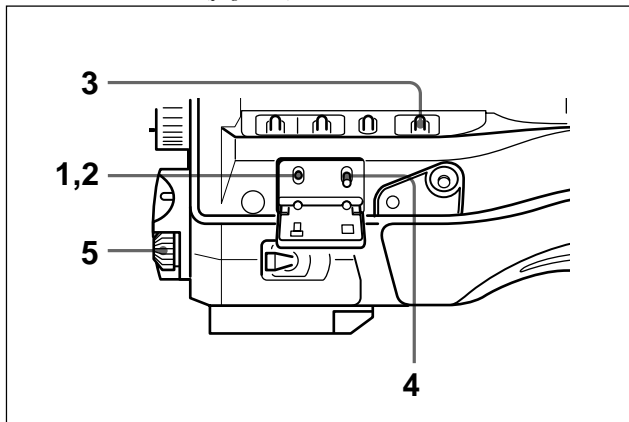
You can adjust the value of the white balance manually by setting the color temperature.

This setting is done in engineer mode. To change the camcorder to engineer mode, turn the power off, then turn it on again while pressing down the rotary encoder.

To do this setting in user mode, go to MENU SELECT 4 in engineer mode or store this item in the CAMERAMAN menu.

*For more details on this setting, refer to “maintenance manual.”*

*For information about the CAMERAMAN menu settings, see section 4-9-7 “Setting the CAMERAMAN menu” (page 4-95).*



- 1 Set the camcorder to the engineer mode and turn the MENU ON/OFF/PAGE switch to ON.

*(Continued)*

- 2** Push the MENU ON/OFF/PAGE switch repeatedly toward PAGE (or press the rotary encoder) until the PRESET WHT page (shown below) appears.

```
E35*PRESET WHT
→COLOR TEMP. <P>:? 6324
FINE          <P>:  0
R GAIN        <P>:  69
B GAIN        <P>: -69
```

4

- 3** Set the WHITE BAL switch to PRST.

**Note**

If the WHITE BAL switch is not set to PRST when you operate the camcorder, the adjustment value will not be reflected in the output signal.

- 4** Push the MENU CANCEL/PRST/ITEM switch repeatedly towards ITEM (or press the rotary encoder) until the cursor reaches the item that you want to change.
- 5** Turn the rotary encoder to change the setting of the selected item.
- COLOR TEMP:** Sets the color temperature for the preset value.  
Adjust the value while looking at the real image because error tends to be bigger for adjustment of high color temperature.
- FINE:** Adjusts the value more precisely when the adjustment through COLOR TEMP is not satisfactory.
- R GAIN:** Only the value of R GAIN is changed.
- B GAIN:** Only the value of B GAIN is changed.

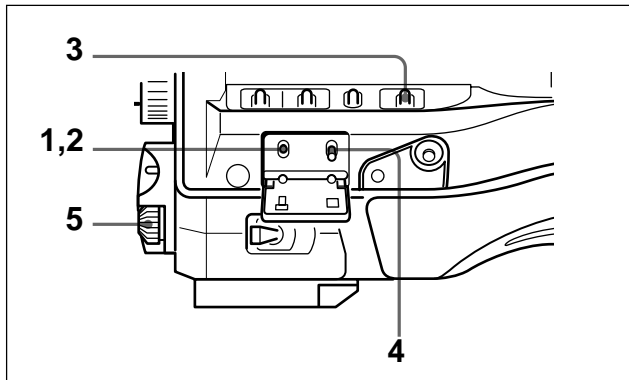
## 4-9-6 Specifying an offset for the auto white balance setting

By setting an offset for the value of auto white balance, you can make the picture warmer or colder.

This setting is done in engineer mode. To change the camcorder to engineer mode, turn the power off, then turn it on again while pressing down the rotary encoder.

To do this setting in user mode, go to MENU SELECT 4 in engineer mode.

*For details on this setting, refer to “maintenance manual.”*



- 1 Set the camcorder to engineer mode and turn the MENU ON/OFF/PAGE switch to ON.

*(Continued)*

- 2** Push the MENU ON/OFF/PAGE switch repeatedly toward PAGE (or press the rotary encoder) until the OFFSET WHT page (shown below) appears.

E34\*OFFSET WHT

→OFFSET WHITE<A>::?	ON
WARM-COOL <A>::	0
FINE <A>::	0
OFFSET WHITE<B>::	OFF
WARM-COOL <B>::	0
FINE <B>::	0

- 3** Set the WHITE BAL switch to channel A or B.

**Note**

If the WHITE BAL switch is not set to A or B when you operate the camcorder, the adjustment value will not be reflected in the output signal.

- 4** Push the MENU CANCEL/PRST/ITEM switch repeatedly toward ITEM (or turn the rotary encoder) until the cursor specifies the item you want to change.

- 5** Turn the rotary encoder to change the setting of the selected function, as follows.

**OFFSET WHITE<A>:** Turns the setting of the offset for channel A ON or OFF.

**WARM-COOL<A>:** While looking at the image, adjust channel A by turning the rotary encoder towards + (to produce a warm image) or towards - (for a cool image).

**FINE<A>:** Adjusts the value more precisely if the adjustment by WARM-COOL<A> is not satisfactory.

---

**OFFSET WHITE <B>:** Turns the setting of the offset for channel B ON or OFF.

**WARM-COOL<B>:** While looking at the image, adjust channel B by turning the rotary encoder towards + (to produce a warm image) or towards – (for a cool image).

**FINE<B>:** Adjusts the value more precisely if the adjustment by WARM-COOL<B> is not satisfactory.

---

## 4-9-7 Setting the CAMERAMAN menu

You can recall your frequently used menu items quickly by storing these menu items in CAMERAMAN menu (up to 5 pages).

A maximum of 10 items can be stored in each page. If you try to store more than 10 items on 1 page, only first 10 items input will be stored.

**Normal operations are disabled while you are storing items in CAMERAMAN menu. After setting the CAMERAMAN menu, be sure to turn the power off, then on again.**

### **To change to CAMERAMAN menu storage mode**

Turn the power off. Then turn the power on again while pressing the ASSIGNABLE button.

When “C01\*MARKER 1/3” appears on the MENU screen, the camcorder is in CAMERAMAN menu storage mode.

#### **Note**

The MARKER 1/3 page may not appear if you release the ASSIGNABLE button too soon.

Turn the power off and try again.

```

?C01*MARKER 1/3
SAFETY ZONE      : OFF
SAFETY AREA     : OFF
CENTER          : OFF
CENTER H        : OFF
CENTER U        : OFF
  
```

- 1 Push the MENU ON/OFF/PAGE switch repeatedly toward PAGE (or turn the rotary encoder) until the page that contains the item you want to store appears .

```

C01*MARKER 1/3
SAFETY ZONE      : OFF
SAFETY AREA     : OFF
→CENTER          : 1
CENTER H        : OFF
CENTER U        : OFF
  
```

- 2 Push the MENU CANCEL/PRST/ITEM switch repeatedly toward ITEM (or turn the rotary encoder) until the cursor is beside the item.

```

C21*LEVEL 4
MASTER BLACK      :      1
→MASTER GAMMA     :      1
MASTER BLK GAMMA : OFF
KNEE POINT        : 98%
KNEE SLOPE        :      0
KNEE SATURATION   :      0
KNEE              : OFF
WHITE CLIP        : OFF
WHITE CLIP LEVEL : OFF

```

- 3** Use the rotary encoder to specify the page number (1 to 5) to be stored to.

To cancel the storage procedure, specify OFF.

- 4** Turn the power off, then on again.

#### After storage has been completed

CAMERAMAN menu (1 to 5) page appears, followed by MARKER 1/3 page.

```

? U1*CAMERAMAN 1
CENTER BLACK      : OFF
MASTER BLACK     :      0
MASTER GAMMA     :      0

```

---

## Notes

- The CAMERAMAN menu pages will not appear if no items have been stored.
- If the settings in CAMERAMAN menu 1 to 5 (of MENU SELECT 5 in engineer mode) are OFF, the CAMERAMAN menu pages will not appear even if items are stored.

*For more details, refer to “maintenance manual.”*



# 4-10 VTR Menu Display in the Display Panel

When the camcorder is stopped, hold down the ADVANCE button and press the SHIFT button for at least one second to display the VTR menu in the display panel.

Using the VTR menu, you can carry out with ease some of the system settings, including adjusting the internal clock, which are possible in the diagnosis mode.

## 4-10-1 Configuration and Functions of the VTR Menu

The VTR menu consists of six submenus, identified by menu numbers, and numbers 3 to 6 of these each include a number of items.

VTR menu items and functions

Menu number	Item	Function
1	TIME SET	Check and update the internal clock time.
2	DATE SET	Check and update the internal clock date.
3	REC START/STOP TONE	Select whether to sound a tone on starting and stopping recording.
	AUTO SHOT NO. RESET	Select whether to automatically reset the shot number when a new cassette is loaded.
	SHOT TIME DISP SEL	Select how to display the shot date and time in the display panel.
	SHOT NO. REGENE	Specifies whether the shot number is continuously recorded or not.
	UBIT GROUP ID SET	Specifies whether the user bit group ID is set or not.

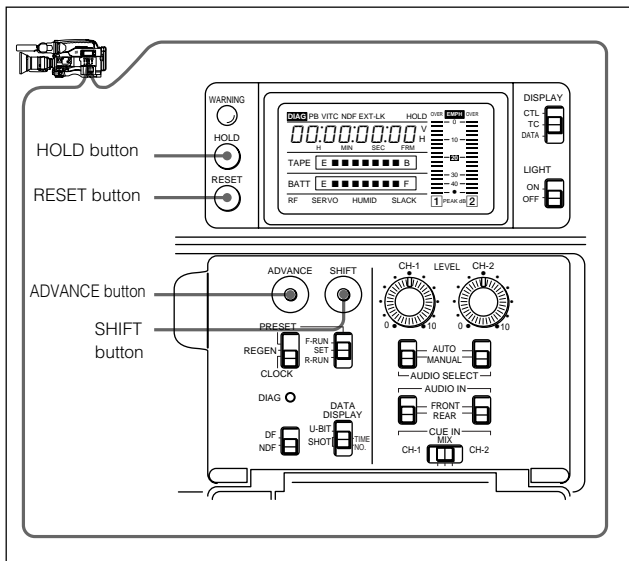
Menu number	Item	Function
4	LTC UBIT	Select the contents of the LTC user bits.
	LTC UBIT MARKER	Select which LTC user bit markers to record.
	REC START MARKER	Select whether to record recording start markers.
	SHOT MARKER 1	Select whether to record shot markers 1.
	SHOT MARKER 2	Select whether to record shot markers 2.
5	VITC UBIT	Select information to be recorded in the VITC user bits.
	SHOT DATA	Select the VITC UBIT DATA mode.
6	WATCH IC REVISE	Check and update the internal clock adjustment.

## 4-10-2 Using the VTR Menu

To access the VTR menu, hold down the ADVANCE button and press the SHIFT button for at least one second.

For operations within the VTR menu, use the SHIFT, ADVANCE, HOLD, and RESET buttons.

To exit the VTR menu, hold down the ADVANCE button and press the SHIFT button.



Buttons used in the VTR menu

## Operations in the VTR menu relating to the internal clock

Menu numbers 1, 2 and 6 are for settings relating to the internal clock. The following summarizes the procedure in these menus.

- 1** Access the VTR menu.
- 2** For menu numbers 2 and 6, press the ADVANCE button to move to the required menu number.
- 3** Press the SHIFT button.

(Continued)

---

**4** Change the internal clock setting as required.

**5** Press the SHIFT button.

**6** Exit the VTR menu.

*For details of operation for menu numbers 1, 2, and 6, see the respective sections, “Changing the time setting of the internal clock” (page 4-106), “Changing the date setting of the internal clock” (page 4-107), and “Changing the internal clock adjustment” (page 4-111).*

## 4

### **Operations in the VTR menu not relating to the internal clock**

Menu numbers 3 to 5 each include a number of functions. Each setting is generally a binary choice (such as ON/OFF), but some settings have three choices.

The following summarizes the procedure in these menus.

**1** Access the VTR menu.

**2** Press the ADVANCE button to move to the required menu number.

**3** Press the SHIFT button repeatedly until the setting you wish to change is flashing.

**4** Press the ADVANCE button to change the setting.

**5** Press the SHIFT button to advance to the last function in this submenu.

**6** Press the SHIFT button once more.

**7** Exit the VTR menu.

## Menu item settings and indications in the display panel

### TIME SET

Setting	Indication
Internal clock time	1:xx xx xx

### DATE SET

Setting	Indication
Internal clock date	2:xx xx xx

### REC START/STOP TONE

Setting	Indication
No tone on starting and stopping recording	3:0xx
Sound tone on starting and stopping recording	3:1xx

### AUTO SHOT NO. RESET

Setting	Indication
Reset shot number when new cassette loaded	3:x0x
Do not reset shot number when new cassette loaded	3:x1x

### SHOT TIME DISP SEL

Setting	Indication
Show shot time as "month-day:hour-minute"	3:xx0
Show shot time as "day-month:hour-minute"	3:xx1
Show shot time as "day:hour-minute-second"	3:xx2

(Continued)

## SHOT NO. REGENE

Setting	Indication
The shot number is recorded continuously.	3:xxx0
The shot number is not recorded continuously.	3:xxx1

## UBIT GROUP ID SET

Setting	Indication
The UBIT group ID is not set.	3:xxxx0
The UBIT group ID is set.	3:xxxx1

## LTC UBIT

Setting	Indication
Set LTC user bits to fixed user bit values	4:0xxxx
Set LTC user bits to real time	4:1xxxx
Record shot data in LTC user bits	4:2xxxx

## LTC UBIT MARKER

Setting	Indication
LTC user bit marker recording determined by REC START MARKER and GOOD SHOT MARKER items	4:x0xxx
Both markers (REC START MARKER and GOOD SHOT MARKER) recorded in LTC user bits	4:x1xxx
No markers recorded in LTC user bits	4:x2xxx

## REC START MARKER<sup>1)</sup>

Setting	Indication
Recording start marker recorded in user bits	4:x00xx
Recording start marker not recorded in user bits	4:x01xx

1) This switch is effective when the LTC UBIT MARKER setting is 0 (“SW”).

## SHOT MARKER 1<sup>2)</sup>

Setting	Indication
Shot marker 1 recorded in user bits	4:x0x0x
Shot marker 1 not recorded in user bits	4:x0x1x

2) This switch is effective when the LTC UBIT MARKER setting is 0 (“SW”).

## SHOT MARKER 2<sup>3)</sup>

Setting	Indication
Shot marker 2 recorded in user bits	4:x0xx0
Shot marker 2 not recorded in user bits	4:x0xx1

3) This switch is effective when the LTC UBIT MARKER setting is 0 (“SW”).

## VITC UBIT

Setting	Indication
Set VITC user bits to fixed user bit values	5:0x
Set VITC user bits to real time	5:1x
Record shot data in VITC user bits	5:2x

## SHOT DATA

Setting	Indication
Use standard mode for shot data	5:20
Use extended mode for shot data	5:21

*(Continued)*

---

## WATCH IC REVISE

---

Setting	Indication
Adjustment for internal clock (frames/hour)	6:xxx

---

### 4-10-3 Example Operations in the VTR Menu

This section describes typical examples of setting operations carried out using the VTR menu.

## 4

#### Changing the time setting of the internal clock

- 1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

- 2 Press the SHIFT button.

The hours indication flashes.

- 3 Set the hours value.

To increase the value, press the ADVANCE button.

To decrease the value, hold down the HOLD button and press the ADVANCE button.

- 4 Press the SHIFT button.

The minutes indication flashes.

- 5 Set the minutes value.



---

To increase the value, press the ADVANCE button.

To decrease the value, hold down the HOLD button and press the ADVANCE button.

- 6** Press the RESET button to set the seconds value to 00.

If before you press the RESET button the seconds value is less than 30, the minutes value does not change. If before you press the RESET button the seconds value is 30 or more, the minutes value is incremented by 1 at the moment the seconds value changes to 00.

- 7** Press the SHIFT button.

The corrected time appears in the display.

- 8** Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

### **Changing the date setting of the internal clock**

- 1** Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

- 2** Press the ADVANCE button once.

This moves to DATE SET.

- 3** Press the SHIFT button.

The year indication flashes.

- 4** Set the year.

*(Continued)*

---

To increase the value, press the ADVANCE button.

To decrease the value, hold down the HOLD button and press the ADVANCE button.

**5** Press the SHIFT button.

The month indication flashes.

**6** Set the month.

To increase the value, press the ADVANCE button.

To decrease the value, hold down the HOLD button and press the ADVANCE button.

**7** Press the SHIFT button.

The day indication flashes.

**8** Set the day.

To increase the value, press the ADVANCE button.

To decrease the value, hold down the HOLD button and press the ADVANCE button.

**9** Press the SHIFT button.

The corrected date appears in the display.

**10** Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

---

## Sounding a tone on starting and stopping recording

- 1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

- 2 Press the ADVANCE button twice.

- 3 Press the SHIFT button.

The current setting of REC START/STOP TONE flashes.

- 4 Press the ADVANCE button until the displayed setting value is 1.

In the viewfinder, this appears as “ON”.

- 5 Press the SHIFT button three times.

This saves the new setting value.

- 6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

### If the new setting is not saved correctly

When you press the SHIFT button in step 5, an indication “3:Ex xx” appears. Make the setting once more.

## Recording all markers in the LTC user bits

- 1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

- 2 Press the ADVANCE button three times.

*(Continued)*

- 
- 3** Press the SHIFT button twice.

The current setting of LTC UBIT MARKER flashes.

- 4** Press the ADVANCE button until the displayed setting value is 1.

- 5** Press the SHIFT button three times.

This saves the new setting value.

- 6** Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

#### **If the new setting is not saved correctly**

When you press the SHIFT button in step **5**, an indication “4:Ex xx x” appears. Make the setting once more.(Continued)

#### **Recording shot data in the VITC user bits**

- 1** Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

- 2** Press the ADVANCE button four times.

- 3** Press the SHIFT button.

The current setting of VITC UBIT flashes.

- 4** Press the ADVANCE button until the displayed setting value is 2.

- 5** Press the SHIFT button twice.

This saves the new setting value.

- 
- 6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

### **If the new setting is not saved correctly**

When you press the SHIFT button in step 5, an indication “5:Exx” appears. Make the setting once more.

### **Changing the internal clock adjustment**

The rate of advancement of the internal clock while the camcorder is powered off can be adjusted as follows.

- 1 Hold down the ADVANCE button and press the SHIFT button for at least one second.

This displays the VTR menu.

- 2 Press the ADVANCE button six times.

- 3 Press the SHIFT button.

The current setting of the internal clock adjustment value flashes.

- 4 Set the adjustment value (number of frames/day).

To increase the value, press the ADVANCE button.

To decrease the value, hold down the HOLD button and press the ADVANCE button.

- 5 Press the SHIFT button.

This saves the new setting value.

- 6 Hold down the ADVANCE button and press the SHIFT button to exit the VTR menu.

*(Continued)*

---

**If the new setting is not saved correctly**

When you press the SHIFT button in step **5**, an indication “6:E x xx” appears. Make the setting once more.

# 4-11 Using the Setup Card

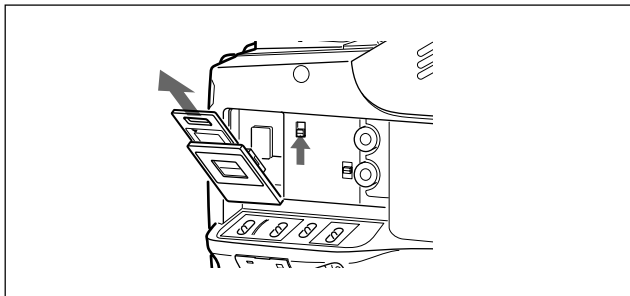
You can save the contents of the setup menu in the BSC-1 Setup Card (not supplied). This data enables rapid recreation of suitable setup conditions.

## 4-11-1 Handling the Setup Card

The setup card can be inserted or removed from the camcorder with the power turned on or off.

### Removing the setup card

Push up on the tab on the right-hand side of the card insertion lid to open the lid.



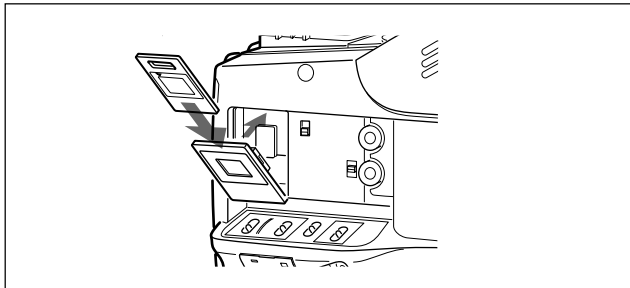
Removing the setup card

### Note

Do not touch the pins on the card connector.

## Inserting the setup card

With SONY logo on the setup card facing you (you should be able to read the text), insert the card completely into the insertion slot, then close the lid.



Inserting the setup card

### Note

Make sure that you can read the “SONY” logo when you insert the card. If there is some resistance when you insert the card, the card might be turned around or upside down. Do not force the card into the slot. Check that the card is correctly oriented, then try inserting it again.

## Using and storing the setup card

The following points apply to the use and storage of a setup card.

- Avoid high temperature and humidity.
- Make sure the card does not get dirty or wet.
- Avoid static electricity.
- Store the card by inserting it into the camcorder and closing the card insertion lid.

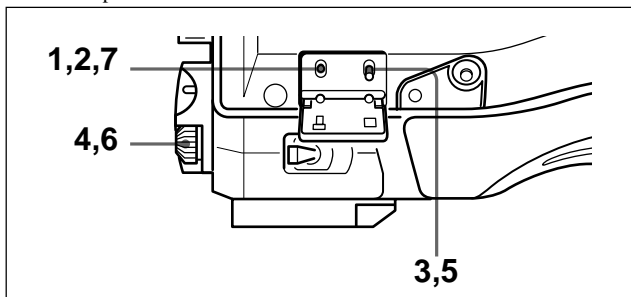


## 4-11-2 Using Data on the Setup Card

The operations of saving data to the setup card and reading the saved data from the setup card are done from the SETUP CARD page of the setup menu.

### Writing data to the setup card

Follow the procedure below.



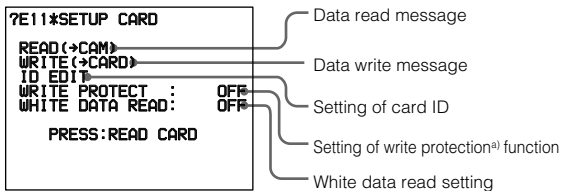
Writing data to the setup card

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

*(Continued)*

- 2** Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SETUP CARD page shown below appears (or use the rotary encoder).



a) Displayed in engineer mode only

SETUP CARD page (factory settings)

If no card is inserted, the message “CARD NOT INSERTED!” appears. Close the menu and insert a card.

- 3** Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the WRITE (→ CARD) position (or use the rotary encoder).
- 4** Press the rotary encoder.

A message asking whether or not data and the card ID of the camera are to be written to the card appears.

```
E11*SETUP CARD
READ (→CAM)
→WRITE (→CARD)
ID EDIT
WRITE PROTECT : OFF
WHITE DATA READ: OFF

ID:□□□□□□□□□□

WRITE? (Y:PRESS)
```

- 5**
- To end writing data, push the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.
  - To continue the writing of data, go on to step **6**.

- 6** Press the rotary encoder.

The displayed card ID and the setting data stored in the camcorder are written to the card.

While the data is being written, the message “WRITING DATA!” is displayed.

When the writing is completed, the message “WRITE : OK” appears.

- 7** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

*(Continued)*

## Updating the data

If data is already saved on the card, a message asking whether or not that data is to be updated is displayed in step 6 (page 4-117). The message is illustrated below.

```
E11*SETUP CARD
READ (→CAM)
→WRITE (→CARD)
ID EDIT
WRITE PROTECT : OFF
WRITE DATA READ: OFF

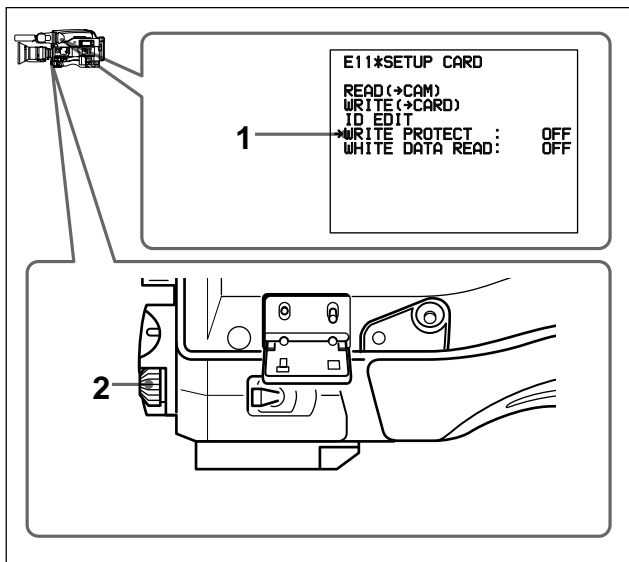
ID:□□□□□□□□□□

CARD CONTAINS DATA!
REPLASE? (Y:PRESS)
```

To update the data, press the rotary encoder.

## Protecting saved data

If you set the WRITE PROTECT setting to “ON” in engineer mode to protect data written to a setup card, then pressing the rotary encoder in step 6 of the foregoing procedure (page 4-117) does not carry out overwriting. Follow the procedure below (possible in engineer mode only).



Protecting saved data

- 1 Move the cursor to the WRITE PROTECT position.

- 2**
- To enable the write-protection function (the “ON” setting), turn the rotary encoder counterclockwise as seen from the front of the camera.
  - To disable the write-protection function (the “OFF” setting), turn the rotary encoder clockwise.

### If data cannot be written

If when you press the rotary encoder in step **6** of the foregoing procedure (page 4-116) one of the following error messages appears, then the data was not written.

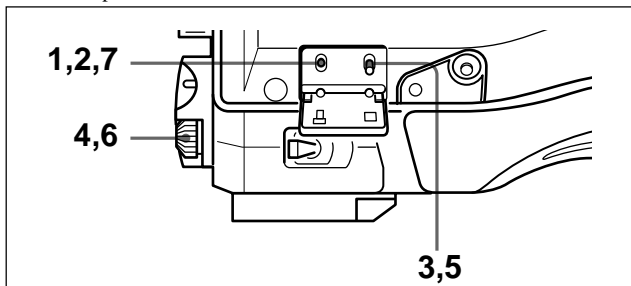
4

Data write error messages

Error message	Reason	Action
CARD NOT INSERTED!	No setup card is inserted.	Close the menu and insert or reinsert the card.
WRITE PROTECTED!	WRITE PROTECT is set to ON.	Set WRITE PROTECT to OFF.
WRITE ERROR! (flashing)	Circuit or card fault	Check the circuitry, or replace the card with a verified card.

### Reading saved data from a card

Follow the procedure below.

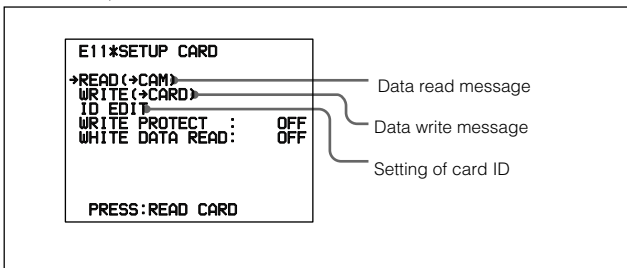


Reading saved data from a card

- 1 Set the MENU ON/OFF/PAGE switch to ON.

The page that was on the screen when the last menu operation ended appears on the viewfinder screen. (When this menu is first used, the lowest-numbered one of the currently selected pages appears.)

- 2 Push the MENU ON/OFF/PAGE switch repeatedly to PAGE until the SETUP CARD page shown below appears (or use the rotary encoder).



SETUP CARD page (factory settings)

If no card is inserted, the message “CARD NOT INSERTED!” message appears. Close the menu and insert a card.

- 3 Push the MENU CANCEL/PRST/ITEM switch repeatedly to ITEM until the cursor reaches the READ (→ CAM) position (or use the rotary encoder).
- 4 Press the rotary encoder.

A message asking whether or not data and the card ID of the camera are to be read from the card appears.

```
E11*SETUP CARD
→READ (→CAM)
WRITE (→CARD)
ID EDIT
WRITE PROTECT : OFF
WHITE DATA READ: OFF

ID:□□□□□□□□□□

READ? (Y:PRESS)
```

- 5**
- To end reading data, push the MENU CANCEL/PRST/ITEM switch to CANCEL/PRST.
  - To continue the reading of data, go on to step **6**.

### Notes

- The data and the card ID read from the card overwrite the data stored in the camcorder. Before going on to step **6**, re-check the card ID and decide whether it is necessary to read the data and card ID from the card.
- The card stores data for both user-mode settings and engineer-mode settings. Both sets of data are read and written together.  
*For more information, refer to “maintenance manual.”*
- There is no setup card read-write compatibility between different models of digital camcorder. For example, a card written by the DVW-707 cannot be read by the DVW-790WS or DVW-707P, and vice versa.

- 6** Press the rotary encoder once more.

While data is being read, the message “READING DATA!” is displayed.

When reading is completed, the message “READ : OK” appears.



- 7** To end the menu operation, set the MENU ON/OFF/PAGE switch to OFF.

The setup menu disappears from the viewfinder screen and the displays indicating the current status of the camcorder appear along the top and bottom of the viewfinder.

### If data cannot be read

If when you press the rotary encoder in step **6** of the above procedure (page 4-122) one of the following error messages appears, then the data was not read.

### Reading white data for AWB

The white data for AWB can be read from a card only when WHITE DATA READ is set to ON.

Data read error messages

Error message	Reason	Action
CARD NOT INSERTED!	No setup card is inserted.	Close the menu and insert or reinsert the card.
READ ERROR! (flashing)	Circuit or card fault	Re-check, and consult a Sony representative.
CARD DATA NG! (flashing)	The card contains the data that cannot be read into this camcorder.	Do not try to read the data written for another camcorder.

*(Continued)*

---

## Setting the card ID

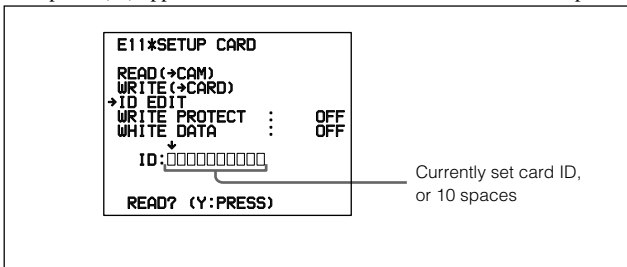
When data is written to a setup card, it is useful to set an ID for the card to identify it.

When data is saved to a card, a card ID is written to the card together with the data. When data is read from a card, the card ID is also read, and that ID overwrites the card ID associated with the data that was previously in the camcorder.

4

- 1 Move the cursor to ID EDIT on the SETUP CARD page.
- 2 Press the rotary encoder.

The currently set card ID appears. If no card ID is currently set, 10 spaces (□) appear. The cursor is at the left-most character or space.



- 3 Turn the rotary encoder clockwise as seen from the front of the camera until the character you wish to set appears.

The character display cycles from the alphabet, through the symbols, and the digits in that order. Turn the rotary encoder counterclockwise to cycle through the characters in the reverse direction.

---

**4** Press the rotary encoder to advance the cursor to the next position.

When the settings are completed, press the rotary encoder repeatedly until the cursor reaches the rightmost position.

To set another character, return to step **3**.

When 10 characters are set, EDIT mode is exited automatically.

**5** To change the card ID, press the MENU CANCEL/PRST/ITEM switch toward the CANCEL position.

If a correction is required after once pressing the rotary encoder, press the rotary encoder once again, to display the cursor above the card ID and enable correction (returning to the state in step **2**).

### Notes

- Shot ID-1 is read and written always together with other data. Therefore, if shot ID-1 is written to a card after being set or modified through the SETUP CARD page for data stored in the camera, other data than shot ID-1 will also be written onto the card. Shot ID-2 to shot ID-4 are not recorded on the setup card.
- To set or modify only the card ID of data stored on a card, read the data from the card to the camcorder, set or modify the card ID, then write that data back to the card.



## 5-1 Power Supply

You need to power on the camcorder for the flange focal length adjustment, viewfinder focus and screen adjustment, etc., which are described later.

The following power supplies can be used with the camcorder.

- A BP-L60A/L90A lithium-ion battery pack
- An NP-1B or a BP-90A Ni-Cd battery pack
- AC power using AC-550/550CE or AC-DN1/DN2A

Alternatively, you can make combined use of internal and external batteries, by mounting one of the above batteries as an internal battery and connecting an external battery that can be a BP-90A contained in a DC-210 Battery Adaptor and connected to the DC IN connector of the camcorder.

### 5-1-1 Using a BP-L60A/L90A Battery Pack

With a battery pack, the camcorder will operate continuously for the time listed in the table below.

Approximate continuous operating time with BP-L60A/L90A Battery Pack

	DVW-707/707P	DVW-709WS/ 709WSP	DVW-790WS/ 790WSP
BP-L60A	135 minutes	125 minutes	120 minutes
BP-L90A	205 minutes	190 minutes	185 minutes

Before use, charge the battery pack with a BC-L100/L100CE Battery Charger. It takes about 2.5 hours to charge one BP-L60A, and about 3.5 hours to charge one BP-L90A.

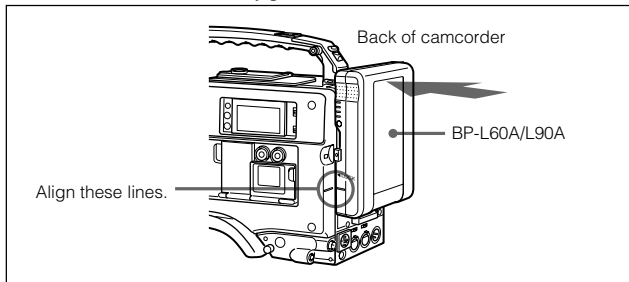
*For more information, refer to the BC-L100/L100CE manual.*

#### Note on using the battery pack

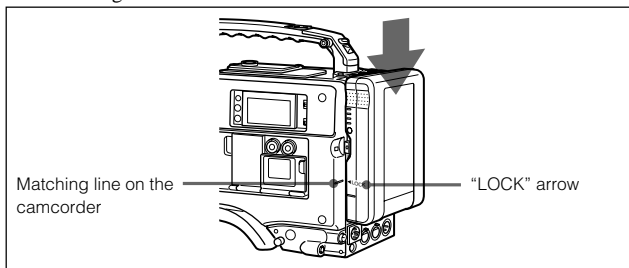
A warm battery pack may not be able to be fully recharged.

## Attaching the battery pack

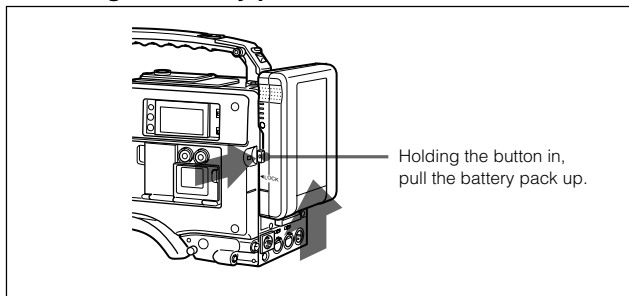
- 1 Press the battery pack against the back of the camcorder, aligning the side line of the battery pack with the line on the camcorder.



- 2 Slide the battery pack down until its "LOCK" arrow points at the matching line on the camcorder.



## Detaching the battery pack



Detaching the battery pack

---

## 5-1-2 Using an NP-1B Battery Pack

The camcorder will operate continuously for about 40 minutes with an NP-1B Battery Pack. Use of this battery pack requires a DC-L1 Battery Adaptor (not supplied).

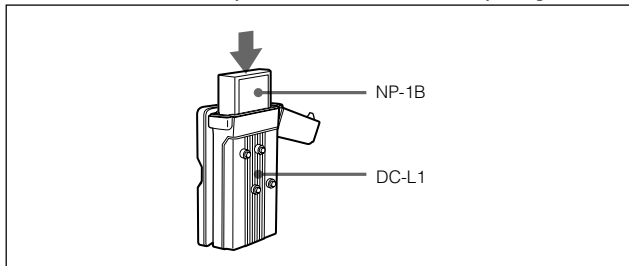
Before use, charge the battery pack with a BC-1WD/1WDCE Battery Charger for about 1 hour.

*For more information, refer to the BC-1WD/1WDCE manual.*

### Attaching the battery pack

5

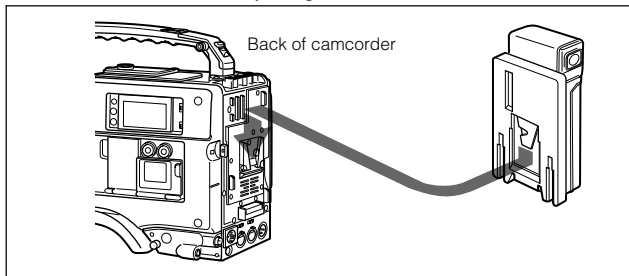
- 1 Slide an NP-1B Battery Pack into the DC-L1 Battery Adaptor.





---

## 2 Mount the DC-L1 Battery Adaptor on the back of the camcorder.



---

### 5-1-3 Using a BP-90A Battery Pack

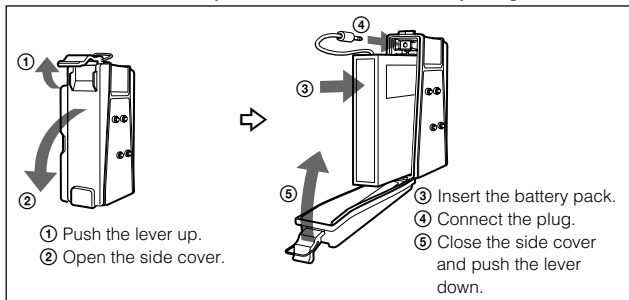
The camcorder will operate for about 120 minutes (DVW-707/707P), 110 minutes (DVW-709WS/709WSP) or 105 minutes (DVW-790WS/790WSP) with a BP-90A Battery Pack. Use of this battery pack requires a DC-L90 Battery Adaptor (not supplied).

Before use, charge the battery pack with a BC-210/210CE/410/410CE Battery Charger for about 2 hours.

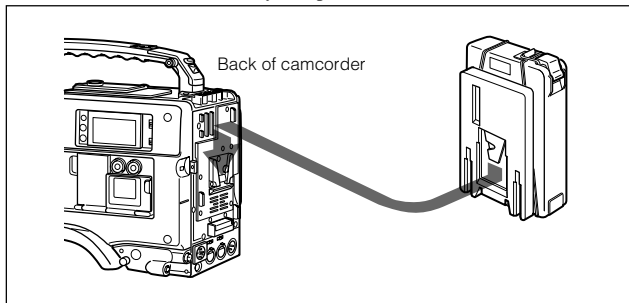
*For more information, refer to the BC-210/210CE/410/410CE or BC-L100/L100CE manual.*

## Attaching the battery pack

**1** Fit a BP-90A Battery Pack in the DC-L90 Battery Adaptor.



**2** Mount the DC-L90 Battery Adaptor on the back of the camcorder.



---

## 5-1-4 Avoiding Breaks in Operation Due to Dead Batteries

If you use both an internal battery pack and an external battery connected to the DC IN connector at the same time, you can avoid breaks in operation due to the dead batteries.

### **When the external battery begins to fail and an internal battery pack is also used**

Remove the DC output cable of the external battery from the DC IN connector. The power source will switch to the internal battery pack.

### **When the external battery begins to fail and an internal battery pack is not used**

First load the camcorder with a fully charged internal battery pack, then remove the DC output cable of the external battery from the DC IN connector. The power source will switch to the internal battery pack. To use an external battery again, connect a fully charged external battery to the DC IN connector before unloading the internal battery pack. The power source will switch to the external battery.

### **Continuous operation when operating with only an internal battery pack**

First, connect a fully charged external battery to the DC IN connector, then change the internal battery.

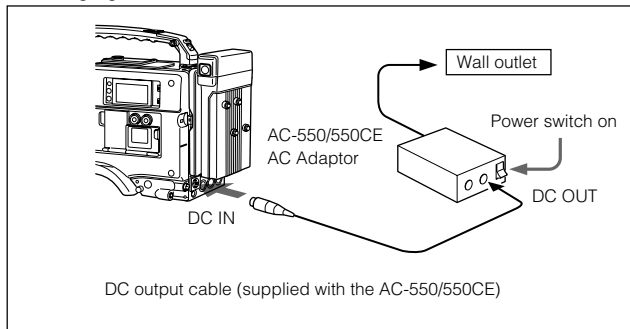
#### **Notes**

- Whenever an internal battery pack is loaded and an external battery is connected to the DC IN connector, the external battery is always used as the power source.
- There may be some noise on the video signal at the instant the power sources are switched.

## 5-1-5 Using an AC Adaptor

### Using an AC-550/550CE AC Adaptor

Connect the camcorder to the AC power supply as shown in the following figure, and turn the POWER switch of the AC-550/550CE on.

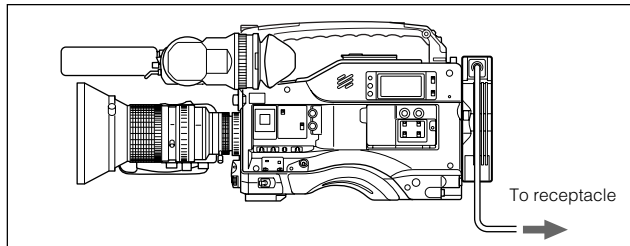


Using an AC Adaptor

### Using an AC-DN1/DN2A AC Adaptor

Mount the AC-DN1/DN2A on the camcorder in the same way as a battery, then connect to the AC power supply.

The AC-DN1 can supply up to 38 W of power, and the AC-DN2A up to 150 W.



Connection to an AC power supply using an AC-DN1/DN2A AC Adaptor

---

## 5-1-6 Using the Anton Bauer Ultralight System

By fitting the camcorder with the Anton Bauer Ultralight System, and setting the LIGHT switch to AUTO, you can switch the light on and off automatically as you start and stop VTR operation. (This system operates with lights powered by 12 V, with a maximum power consumption of 50 W.)

### Notes

- The AC-DN1 cannot be used when the light is used.
- The light cannot be used if both the CA-705/755 and camera control unit are connected to the camcorder.

---

## 5-1-7 Using the Anton Bauer Intelligent Battery System

You can equip the camcorder with a special battery mount which the Anton Bauer Corporation has developed for its Intelligent Battery System and Ultralight System.

When the camcorder is used with an Anton Bauer Digital Magnum series battery, the remaining battery capacity is shown numerically in the viewfinder display.

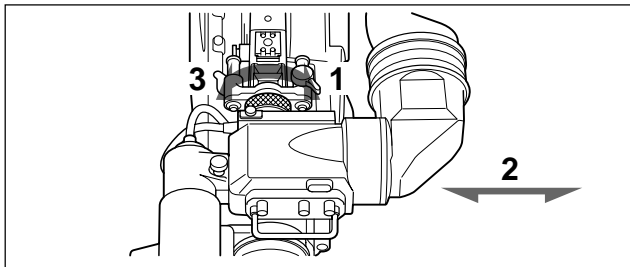
*Contact your Sony representative for more information.*

## 5-2 Adjusting the Viewfinder

For maximum viewing convenience, you can adjust the viewfinder position in the left-right and backward-forward directions.

### 5-2-1 Adjusting the Viewfinder Position

#### Adjusting the position to left or right



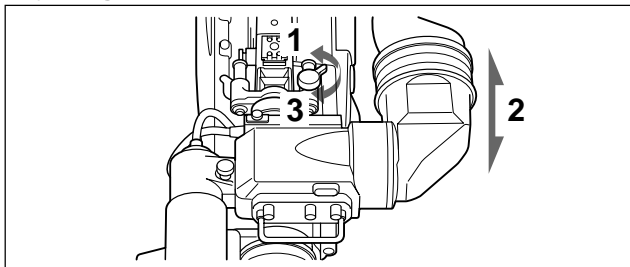
Adjusting the position to left or right

- 1** Loosen the viewfinder left-right positioning ring.
- 2** Slide the viewfinder to the most convenient position.
- 3** Tighten the viewfinder left-right positioning ring.

#### Storing the camcorder in the carrying case

Always store the camcorder with the viewfinder moved fully in the direction opposite to the barrel and the viewfinder left-right positioning ring tightened.

## Adjusting the position backward or forward



Adjusting the position backward or forward

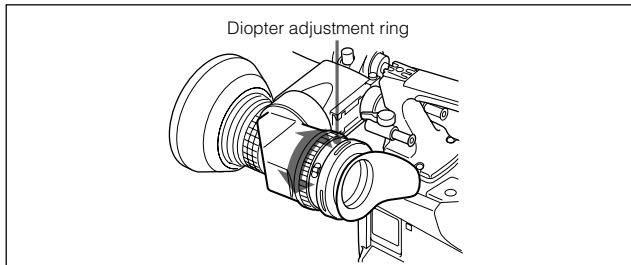
- 1** Loosen the viewfinder front-rear positioning lever.
- 2** Slide the viewfinder longitudinally to the most convenient position.
- 3** Tighten the viewfinder front-rear positioning lever.

---

## 5-2-2 Adjusting the Viewfinder Focus and Screen

### Adjusting the viewfinder focus

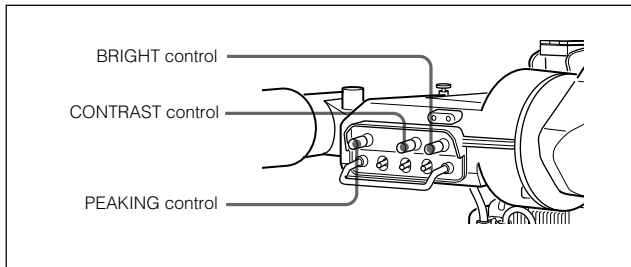
Turn the diopter adjustment ring until the viewfinder image is sharpest.



Adjusting the viewfinder focus

### Adjusting the viewfinder screen

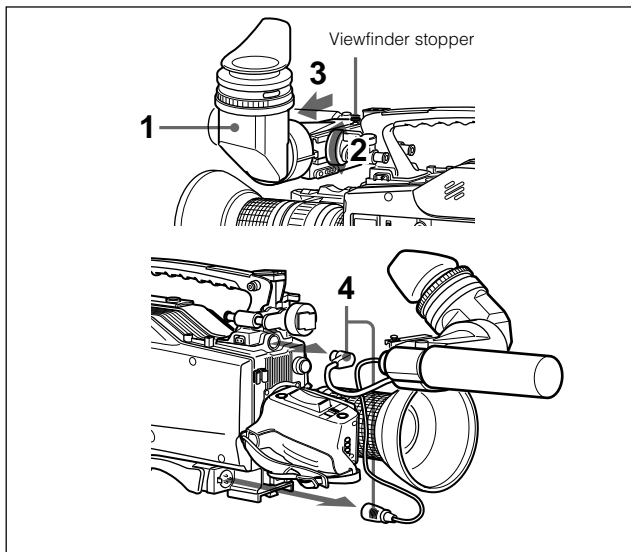
Adjust the brightness, contrast, and peaking of the viewfinder screen with the controls shown below.



Adjusting the viewfinder screen



## 5-2-3 Detaching the Viewfinder



Detaching the viewfinder

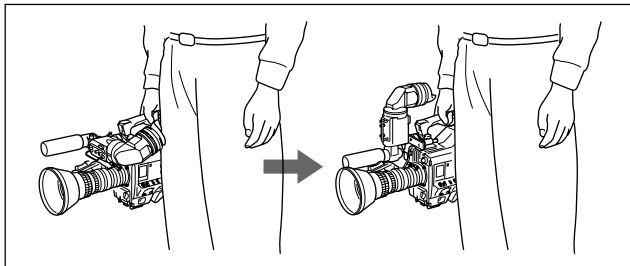
- 1** Point the viewfinder barrel up or down.
- 2** Loosen the viewfinder left-right positioning ring.
- 3** Holding the viewfinder stopper up, slide the viewfinder in the direction indicated by the arrow and detach it.
- 4** Remove the viewfinder cable and microphone cable from the clamps and disconnect them.

---

## The viewfinder rotation bracket

By fitting a BKW-401 Viewfinder Rotation Bracket (not supplied), you can rotate the viewfinder out of the way so that your right leg does not hit the viewfinder while you are carrying the camcorder.

*For more information, refer to the BKW-401 manual.*

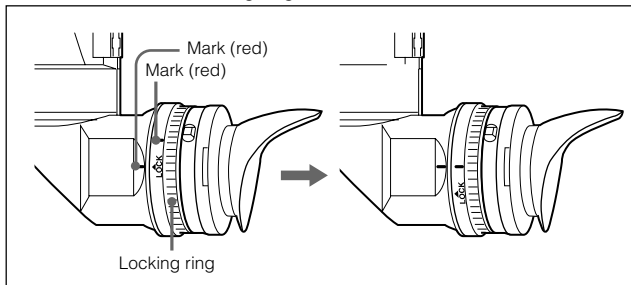


Using the BKW-401 Viewfinder Rotation Bracket

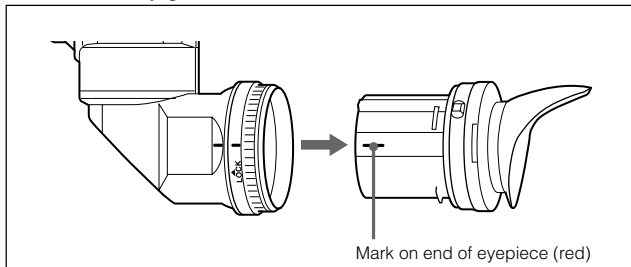
## 5-2-4 Detaching the Eyepiece

Removing the eyepiece gives a clearer view of the screen from further away. It is also easy to remove dust from the viewfinder screen and mirror when the eyepiece is detached.

- 1 Turn the eyepiece locking ring fully counterclockwise, to line up the red marks on the locking ring and the viewfinder barrel.



- 2 Detach the eyepiece.



---

## Reattaching the eyepiece

- 1** Align the mark on the eyepiece locking ring with the one on the viewfinder barrel.
- 2** Align the mark on the eyepiece end (see step **2** in the illustration for eyepiece detachment) with those on the eyepiece locking ring and viewfinder barrel. Then insert the eyepiece into the viewfinder barrel.
- 3** Turn the eyepiece locking ring clockwise until its “LOCK” arrow points at the mark on the viewfinder barrel.

5

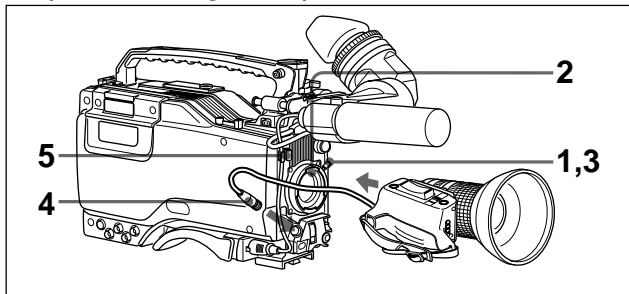
### Note

When the eyecup is worn out, replace it with a new one (service part number 3-723-079-02).

## 5-3 Mounting the Lens

Follow the procedure below to mount the lens.

*For information about using the lens, refer to the lens manual.*



Mounting the lens

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- 1** Push the lens locking lever up and remove the lens mount cap from the lens mount.
- 2** Align the center slot in the lens mount with the center pin on the lens, and insert the lens into the mount.
- 3** Holding the lens in place, push the lens locking lever down to mount the lens.
- 4** Connect the lens cable to the LENS connector.
- 5** Secure the lens cable with the cable clamps.

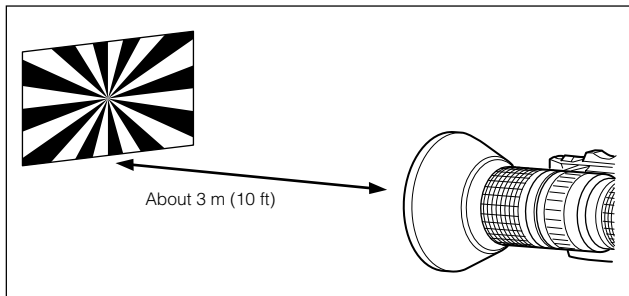
## 5-4 Adjusting the Flange Focal Length

If the lens does not stay in focus properly as you zoom from telephoto to wide angle, adjust the flange focal length (the distance from the plane of the lens mounting flange to the imaging plane). Make this adjustment after mounting or changing the lens.

### Adjusting the flange focal length

The positions of the controls for adjusting the flange focal length vary somewhat from lens to lens. Check the identification of the various controls in the lens manual.

5



Adjusting the flange focal length

- 1 Set the iris to manual.
- 2 Open the iris. Place the flange focal length adjustment chart about 3 m (10 ft) away from the camera, lit well enough to provide a satisfactory video output level.

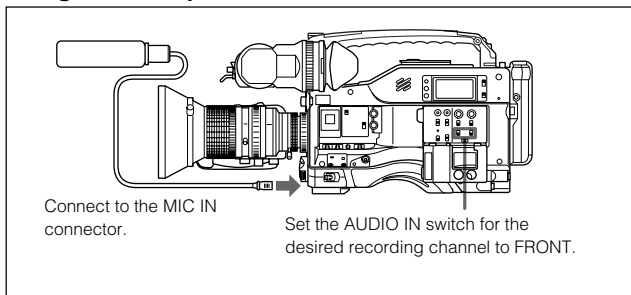
- 
- 3** Loosen the fixing screws on the Ff ring (flange focal length adjustment ring).
  - 4** Use manual or power zoom to set the lens to telephoto.
  - 5** Point the camera at the chart, and focus on it.
  - 6** Set the zoom to wide angle.
  - 7** Turn the Ff ring until the chart is in focus, being careful not to disturb the focus ring.
  - 8** Repeat steps **4** to **7** until the chart stays in focus all the way from wide angle to telephoto.
  - 9** Tighten the Ff ring fixing screws.

# 5-5 Audio Input System

## 5-5-1 Using the Supplied Microphone

You can use the supplied microphone either detached from or attached to the camcorder.

### Using the microphone detached from the camcorder



Using the microphone detached from the camcorder

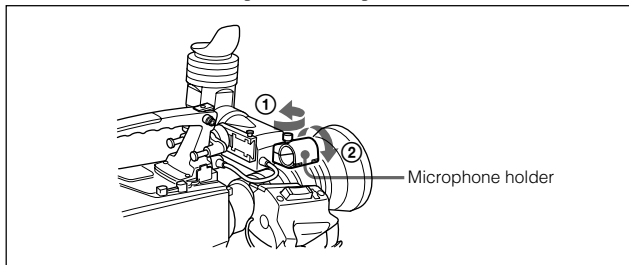
#### Note

When using the supplied microphone with an extension cable, always use an external power supply type cable.



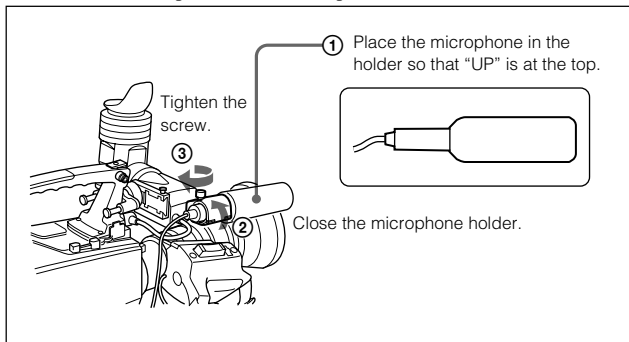
## Using the microphone attached to the camcorder

- 1 Loosen the screw and open the microphone holder.



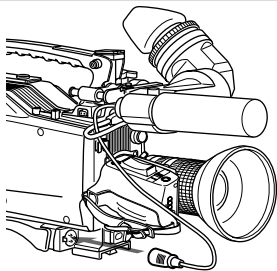
5

- 2 Place the microphone in the microphone holder.



*(Continued)*

- 
- 3** Plug the microphone cable into the MIC IN connector, and set the AUDIO IN switch for the desired recording channel to FRONT.



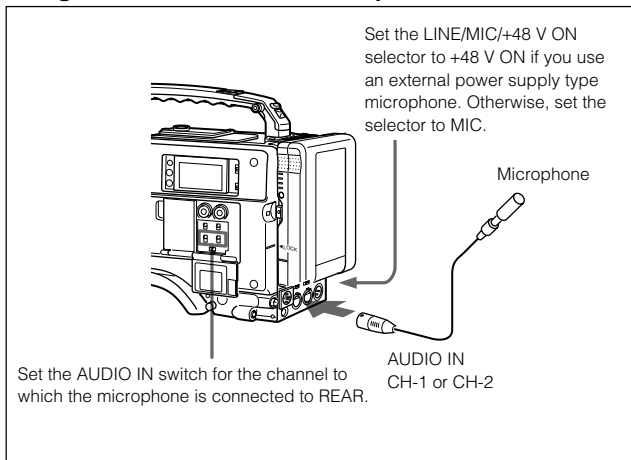
Connect to the MIC IN connector.

## 5-5-2 Using an External Microphone

You can connect up to two external microphones, using the AUDIO IN CH-1 and CH-2 connectors. When you use an external power supply type microphone, set the LINE/MIC/+48 V ON selector for the appropriate AUDIO IN connector to +48 V ON.

If a microphone you use is not the external power supply type, set the LINE/MIC/+48 V ON selector to MIC.

### Using a detached external microphone



Using a detached external microphone

## Using an external microphone attached to the camcorder

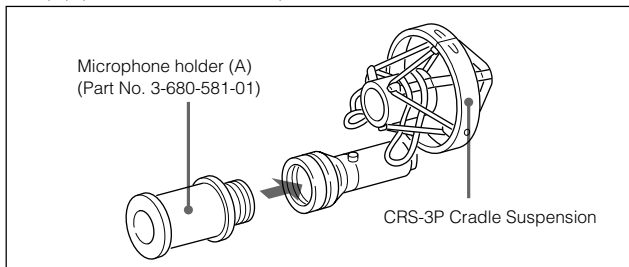
You can attach an external microphone to the camcorder by using a CAC-12 Microphone Holder (not supplied). Additionally, by using a CRS-3P Cradle Suspension (not supplied), you can reduce the mechanical vibration noise from the VTR, and can also attach a long microphone. Note, however, that use of the CRS-3P requires a microphone holder (A) (Part No. 3-680-581-01), which is not supplied with the CRS-3P.

The procedure for attaching an external microphone using a CAC-12 and CRS-3P is shown below.

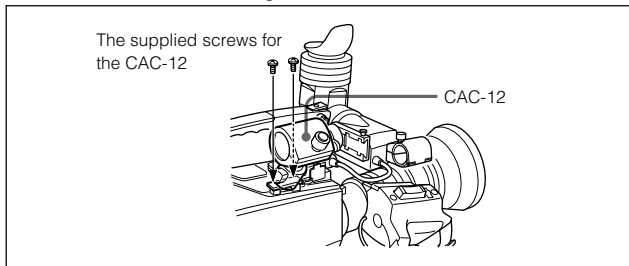
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Refer to the microphone holder or cradle suspension manual for more information.

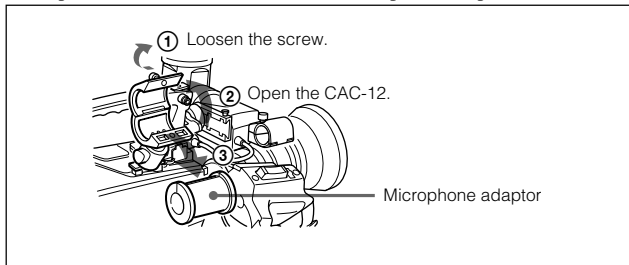
- 1 Assemble the CRS-3P Cradle Suspension and microphone holder (A) (Part No. 3-680-581-01).



## 2 Attach the CAC-12 Microphone Holder.

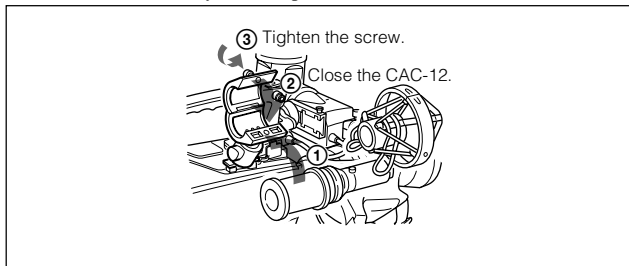


## 3 Open the CAC-12 and remove the microphone adaptor.



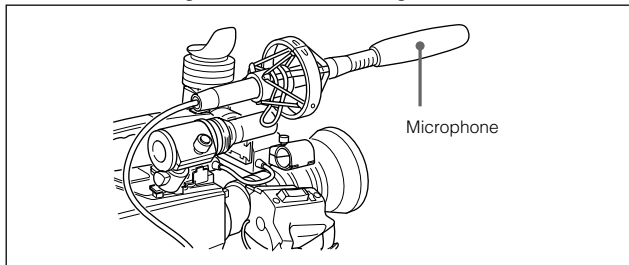
*(Continued)*

**4** Mount the assembly from step 1 in the CAC-12.



**5**

**5** Mount the microphone into the cradle suspension.



- 
- 6** Connect the microphone cable to the AUDIO IN connector for channel 1 or 2. Set the corresponding AUDIO IN switch to REAR.

Set the LINE/MIC/+48 V ON selector to +48 V ON or MIC in accordance with the type of the microphone power supply.

### Notes

- You can only connect an external power supply type microphone to the MIC IN connector.
- If the microphone you connect to the AUDIO IN CH-1/CH-2 connector is of the external power supply type, set the appropriate LINE/MIC/+48 V ON selector to +48 V ON. Otherwise, set the selector to MIC.

---

### 5-5-3 Attaching a UHF Portable Tuner (for a UHF Wireless Microphone System)

To use a Sony UHF wireless microphone system, fit one of the following UHF portable tuners:

- WRR-28M/810A/860A UHF Portable Tuner

For each of these UHF portable tuners, use the following attachment procedure. (For the WRR-28M/810A/860A UHF Portable Tuner, the WRR-28M is taken as an example.)

*Refer to the UHF portable tuner manual for more information.*

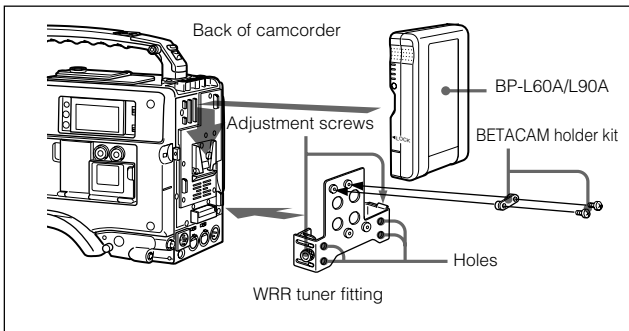
## 5

### Fitting a WRR-28M (using a BP-L60A/L90A Battery Pack)

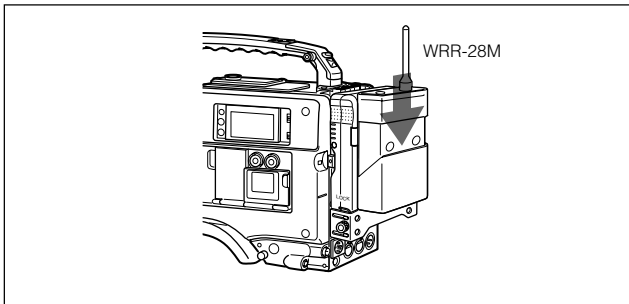
- 1 (1) Attach the WRR tuner fitting (not supplied, service part number A-8278-057-A) to the back of the camcorder.
  - ① Pass a screwdriver through the holes and tighten the screws.
  - ② Loosen the adjustment screws.
  - ③ Adjust the metal fitting position for a BP-L60A/L90A Battery Pack to be attached, and tighten the adjustment screws to fix its position.
  - ④ Attach the BETACAM holder kit supplied with the tuner to the WRR tuner fitting.
- (2) Attach the battery pack.

*For more information about attaching the BP-L60A/L90A Battery Pack, see Section 5-1-1 "Using a BP-L60A/L90A Battery Pack" (page 5-1).*



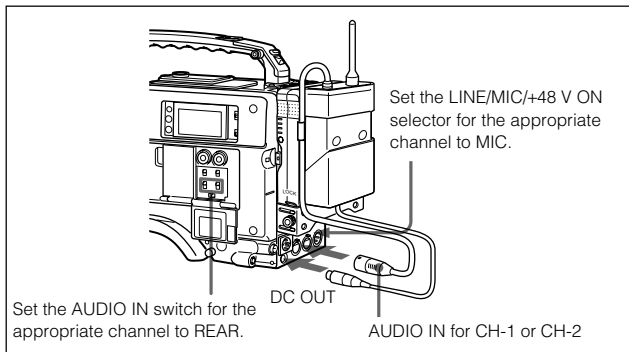


## 2 Mount the tuner on the WRR tuner fitting.



*(Continued)*

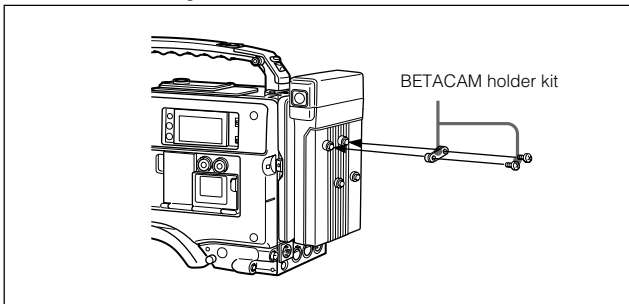
- 3** Connect the tuner power cord to the DC OUT connector of the camcorder, and the audio output cable to the AUDIO IN connector for channel 1 or 2.



### Fitting a WRR-28M (using an NP-1B or BP-90A Battery Pack)

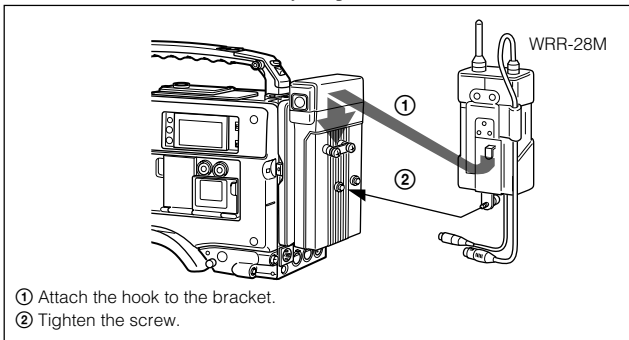
Before attempting the following attachment, make sure that an NP-1B Battery Pack is contained in the DC-L1 Battery Adaptor or that a BP-90A Battery Pack is contained in the DC-L90 Battery Adaptor.

- 1** Attach the BETACAM holder kit supplied with the tuner to the WRR tuner fitting.



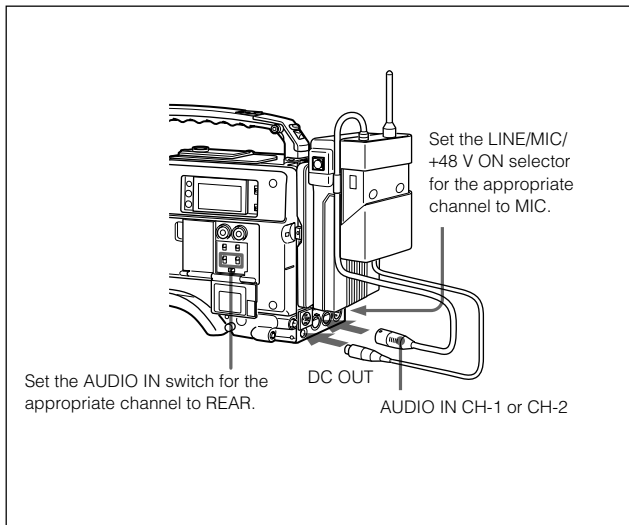
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- 2** Mount the tuner on the battery adaptor.



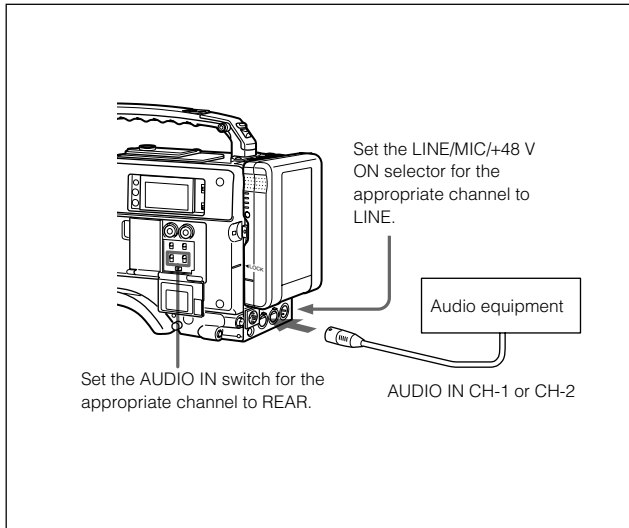
*(Continued)*

- 3** Connect the tuner power cord to the DC OUT connector of the camcorder, and the audio output cable to the AUDIO IN CH-1 or CH-2 connector.



## 5-5-4 Connecting Line Input Audio Equipment

Connect the audio output connector of the audio equipment that supplies the line input signal to the AUDIO IN CH-1 or CH-2 connector.



Line input connection

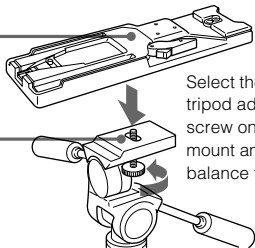
## 5-6 Tripod Mounting

You can easily mount and dismount the camcorder on a tripod by using the tripod adaptor (not supplied).

- 1 Attach the tripod adaptor to the tripod.

Tripod adaptor

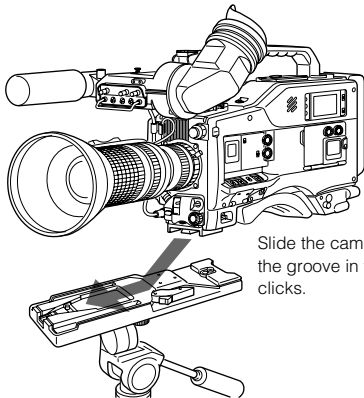
Camera mount



Select the screw hole in the tripod adaptor that fits the screw on your tripod camera mount and gives the best balance for the camcorder.

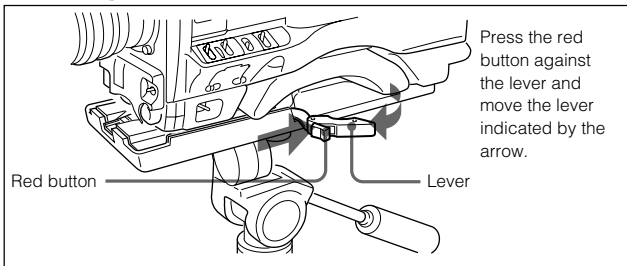
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- 2 Mount the camcorder on the tripod adaptor.



Slide the camcorder forward along the groove in the adaptor until it clicks.

## Removing the camcorder from the tripod adaptor

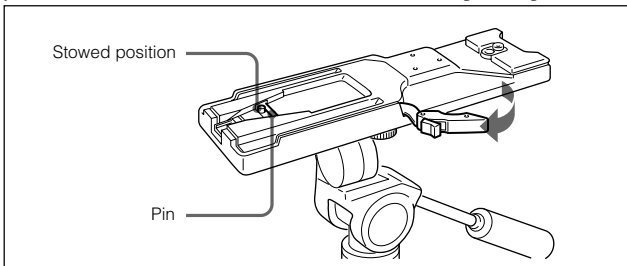


Removing the camcorder from the tripod adaptor

5

### Note

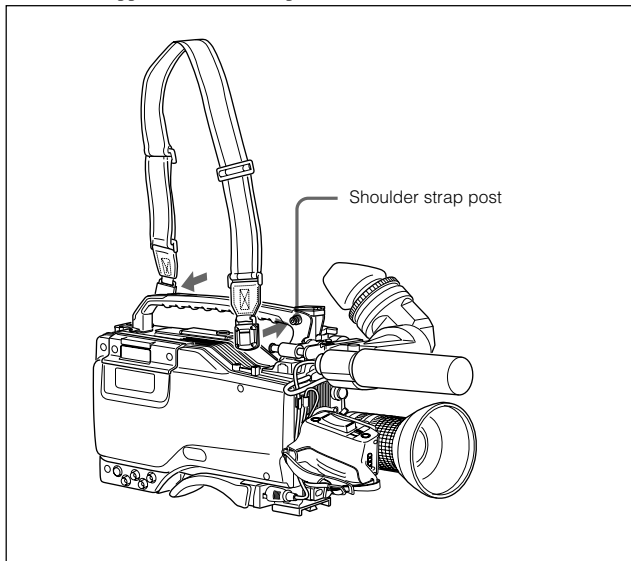
The tripod adaptor pin may remain in the engaged position even after the camcorder is removed. If this happens, press the red button against the lever a second time and move the lever as shown below until the pin returns to the stowed position. If the pin remains in the engaged position, you will not be able to mount the camcorder on the tripod adaptor.



If the pin remains in the engaged position

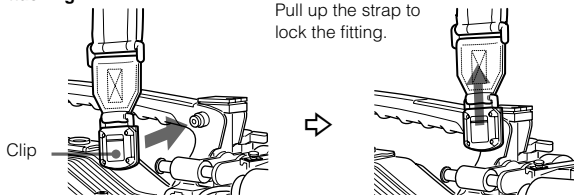
## 5-7 Attaching the Shoulder Strap

Attach the supplied shoulder strap as shown below.

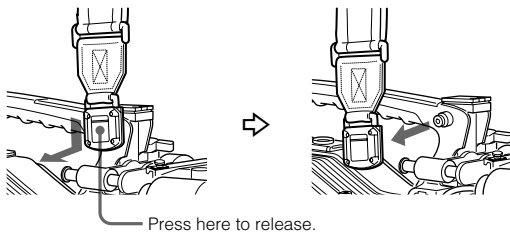


Attaching the shoulder strap



**Attaching**

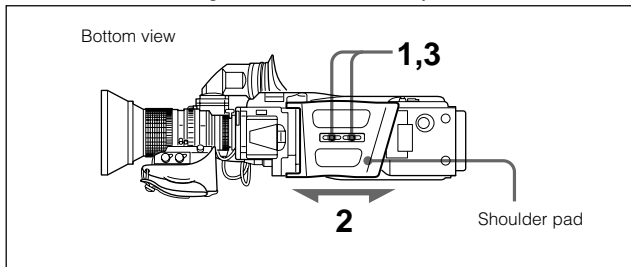
Attaching the shoulder strap

**Removing**

Removing the shoulder strap

## 5-8 Adjusting the Shoulder Pad Position

You can shift the shoulder pad from its center position backward or forward by up to 10 mm (3/8 inch). This adjustment helps you get the best balance for shooting with the camcorder on your shoulder.

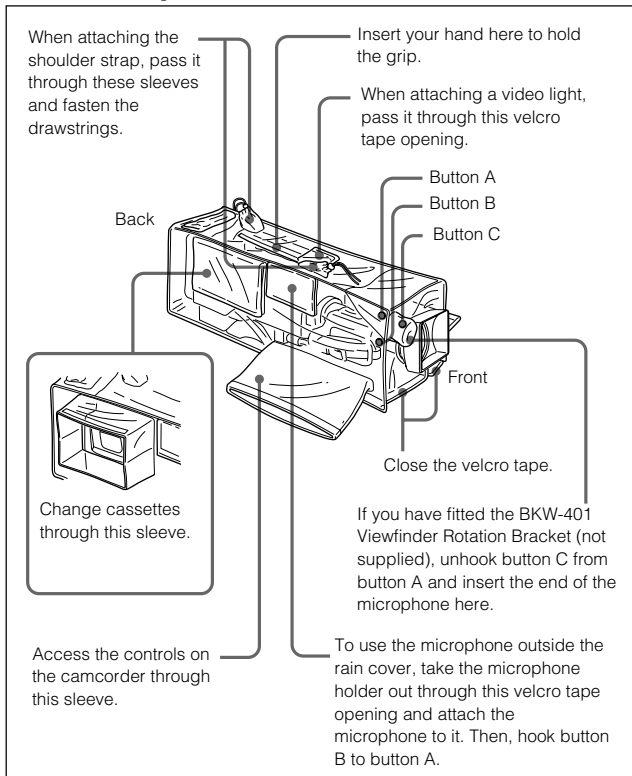


Adjusting the shoulder pad position

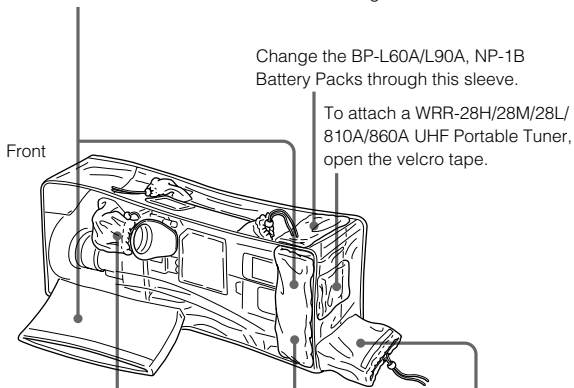
- 1** Loosen the two screws.
- 2** Slide the shoulder pad backward or forward until it is in the most convenient position.
- 3** Tighten the screws.

## 5-9 Putting On the Rain Cover

Attach the optional rain cover as illustrated below. This cover is so designed that you can change cassettes, reach the controls, and mount the camcorder on a tripod with the cover on.



Access the controls on the camcorder through these sleeves.



Front

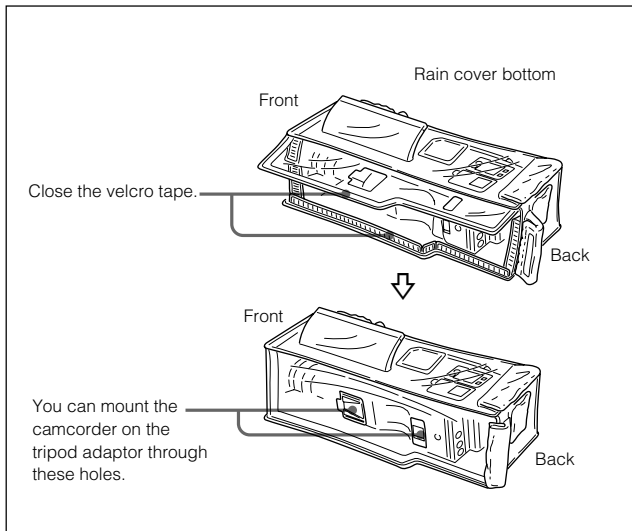
Change the BP-L60A/L90A, NP-1B  
Battery Packs through this sleeve.

To attach a WRR-28H/28M/28L/  
810A/860A UHF Portable Tuner,  
open the velcro tape.

Change the BP-90A Battery Packs  
through this sleeve.

When connecting external equipment, pass the connection  
cables through this sleeve and fasten the drawstrings.  
When not using this sleeve, fold it onto the velcro tape at  
the bottom of the rain cover.

Insert the viewfinder barrel here with the eyecup out,  
and fasten the drawstrings around the eyecup.



# 5-10 Connecting the Remote Control Unit

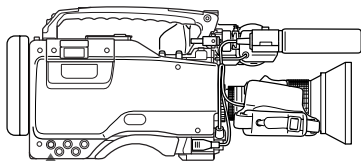
Connecting the RM-B150 or RM-P9 Remote Control Unit (not supplied) enables remote control of the principal camera functions.

Turning the POWER switch of the camcorder to ON when the Remote Control Unit is connected to the REMOTE connector (8 pin), automatically puts the camcorder into remote control mode. If you disconnect the Remote Control Unit, remote control mode is canceled.

RM-B150



Remote connector



REMOTE

Remote control cable (10 m) (about 33 ft),  
supplied with RM-B150

Connecting the remote control unit

## Note

To connect the RM-P9 to the camcorder, you need the CCA-86-0.4 cable (not supplied) besides the remote control cable supplied with RM-P9.

---

## When connecting the remote control unit to the camcorder

- The OUTPUT/DCC switch, GAIN switch, AUTO W/B BAL switch, SHUTTER switch, and the MENU ON/OFF/PAGE switch and so forth will not function.
- When you connect the remote control unit, the camcorder will return to the settings that were in effect the last time you used the remote control unit.

*For more details, refer to “maintenance manual.”*

## When removing the remote control unit from the camcorder

The setting of the camcorder changes to the setting before you connected the remote control unit.

By setting the DIP switch inside the camcorder, the setting of the paint adjustment on the remote control unit can be stored (except the setting of the camcorder by the camcorder’s switch)

### Note

You can use a setup card to store the camcorder settings before you connect the remote control unit. This will allow you to restore those settings at later time, even if you make changes on the remote control unit and save those changes using the DIP switch in the camcorder. After disconnecting the remote control unit, you can restore the original settings by reading them from the setup card.

*For more details, refer to “maintenance manual.”*

---

## Using the setup card while connecting the remote control unit

When connecting the remote control unit, information can be written to the setup card; reading information, however, is subject to the following restrictions:

### When the RM-P9 is connected

After reading from the setup card, the parameter settings on the setup card may be different from the volume setting on the RM-P9. (The values may, however, match by coincidence.) For this reason, there may be a great change in the parameter setting on the setup card even if the volume on the RM-P9 has been changed only slightly.

5

### When the RM-B150 is connected

Even if you read the information from the setup card, the absolute value setting on the setup card will be overwritten by the volume setting on the RM-B150. This, however, can be avoided by setting the volume to relative mode.

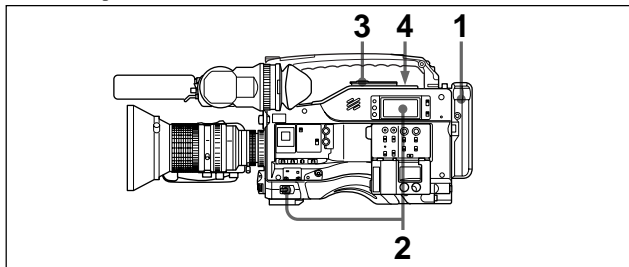


# 6-1 Testing the Camcorder Before Shooting

Check the functions of the camcorder before setting out for a shooting session, preferably by operating the camcorder together with a color video monitor.

## 6-1-1 Preparations for Testing

Follow the procedure below.



Preparations for testing

- 1** Load a fully charged battery pack.
- 2** Set the POWER switch to ON, and check that the HUMID indicator does not appear and that the BATT indicator shows at least five segments. When using a BP-L60A/L90A Battery Pack, check that the four LED indicator segments on the battery pack are lit.
  - If the HUMID indicator appears, wait until it disappears.
  - If the BATT indicator does not show at least five segments, replace the battery pack with a fully charged one.
- 3** Check that there are no obstructions near the cassette lid, then press the EJECT button to open the cassette lid.

(Continued)

- 
- 4** After checking the points below, load the cassette and close the cassette lid.
- The cassette is not write-protected.
  - There is no slack in the tape.
  - The leader tape is wound on the take-up reel.

## Condensation

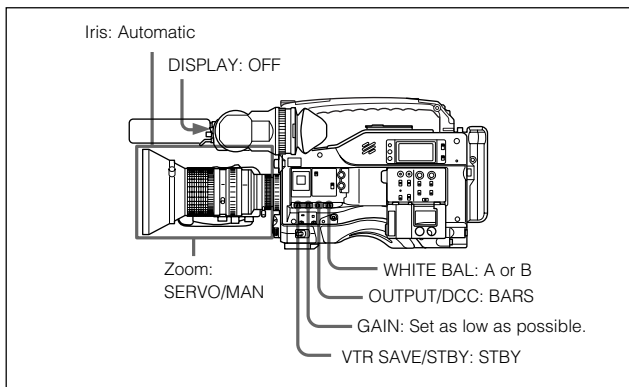
If you move the camcorder from a very cold place to a warm place, or use it in a damp location, condensation may form on the head drum. Then, if the camcorder is operated in this state, the tape may adhere to the drum, and cause a failure or even permanent damage. Do the following to prevent this from happening.

- When moving the camcorder from a cold place to a warm place, be sure no cassette is loaded in the camcorder.
- Whenever you turn on the power, check that the HUMID indicator does not appear. If it appears, wait until it disappears before loading a cassette.

*For more information, see Section 3-1-1 “Loading and Unloading a Cassette” (page 3-1), and Section 6-3 “Operation Warnings” (page 6-12).*

## 6-1-2 Testing the Camera

Set the switches and selectors as follows:



Switch and selector settings for testing

### Testing the viewfinder


- 1 Adjust the position of the viewfinder.
- 2 Check that the color bars are displayed in the viewfinder, and adjust the BRIGHT, CONTRAST, and PEAKING controls to give the best color bar display.
- 3
  - (1) Set the MENU ON/OFF/PAGE switch to ON and check that the setup menu is displayed on the viewfinder screen.
  - (2) Push the MENU ON/OFF/PAGE switch to PAGE and check that the setup menu page changes to the next page.
  - (3) Push the MENU CANCEL/PRST/ITEM switch to ITEM and check that the cursor moves within the current page.

*(Continued)*

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(4) Turn the rotary encoder and check that the setting value or ON/OFF indication of the item selected by the cursor changes.

**4** After once setting the MENU ON/OFF/PAGE switch to OFF, set the OUTPUT/DCC selector to CAM, and change the ND FILTER selector position in the sequence of 1, 2, 3, 4. Check that the FILTER indicator on the viewfinder screen displays the correct numbers.

**5** Check each of the following operations, and make sure that the  indicator lights if the corresponding item has been turned on in the '!' LED page.

(1) Set the gain to anything but 0 dB by the GAIN selector and on the MASTER GAIN page of the setup menu.

(2) Set the SHUTTER selector to ON.

(3) Set the WHITE BAL switch to PRST.

(4) Use the lens extender.

(5) Set the ND FILTER selector to anything but 1.

(6) Set the iris to automatic mode, and turn the rotary encoder to change the reference value to other than the standard value.

**6** Push the SHUTTER selector from ON to SEL repeatedly, and check that the shutter setting changes on the viewfinder screen.

**7** Pointing the camera at a suitable subject, focus the camera and check the picture on the viewfinder screen.

**8** (1) Set both of the AUDIO IN switches to FRONT and the DISPLAY switch on the viewfinder to ON. Check that when sound is input to a microphone connected to the MIC IN connector on the front of the camcorder, the audio level indication appears on the viewfinder screen.

---

(2) Turn off the DISPLAY switch, and check that the audio level indication in the viewfinder disappears.

- 9** Check that setting the ZEBRA switch to ON and OFF makes the zebra pattern appear and disappear on the viewfinder screen.

### Note

The current display status may inhibit one of the displays or operations mentioned in steps **3** to **6**. If this happens, switch the camcorder to engineer mode, set the DISP MODE to 3 in the VF DISP page of the setup menu, then set the desired items in the SHUTTER, '!' LED, and MENU SELECT pages.

## Testing the iris and zoom functions

- 1** Set the zoom to automatic zoom mode and check that the power zoom operates correctly.
- 2** Set the zoom to manual zoom mode and check the zoom functions manually.
- 3** Set the iris to automatic adjustment mode and point the camera at objects of different brightness. Check that the automatic iris adjustment operates correctly.
- 4** Set the iris to manual adjustment mode and check that turning the iris ring adjusts the iris correctly.
- 5** Hold down the instant auto iris button on the lens and point the camera at objects of different brightness. Check that the iris ring turns as the automatic adjustment is made.

*(Continued)*

- 
- 6** Set the iris back to automatic adjustment mode, and check the following points when the GAIN selector is moved from L to M to H.
- For objects of the same brightness, the iris is adjusted to correspond to the change in setting.
  - The gain indicator on the viewfinder screen changes to correspond to the change in setting.
- 7** If an extender mechanism is incorporated in your lens, put it into the operative position and check the effect.

---

### 6-1-3 Testing the VTR

Perform tests ① to ⑥ consecutively in the given order.

## 6

#### ① Testing the tape transport functions

- 1** Set the VTR SAVE/STBY switch to SAVE and check that the VTR SAVE indicator in the viewfinder goes on.
- 2** Set the VTR SAVE/STBY switch to STBY and check that the VTR SAVE indicator in the viewfinder goes off.
- 3** Set the F-RUN/SET/R-RUN switch to R-RUN.
- 4** Set the DISPLAY switch to CTL.
- 5** Press the VTR START button and check the following points.
  - The tape reels are turning.
  - The counter indication is changing.
  - The REC indicator in the viewfinder is on.
  - The RF and SERVO indicators on the display panel are off.

- 
- 6** Press the VTR START button again, and check that the tape stops and that the REC indicator in the viewfinder goes off.
  - 7** Repeat the checks of steps **5** and **6**, this time using the VTR button on the lens.
  - 8** Press the RESET button, and check that the counter display goes to “00 : 00 : 00 : 00”.
  - 9** Turn on the LCD LIGHT switch, and check that the display panel is illuminated.
  - 10** Hold down the REW button to rewind the tape for a while, then press the PLAY button. Check that the rewind and playback functions operate normally.
  - 11** Press the STOP button and press the F FWD button. Check that the fast forward function operates normally.

## ② **Testing the automatic audio level adjusting functions**

- 1** Set the AUDIO SELECT CH-1/CH-2 switches to AUTO.
- 2** Set the AUDIO IN switches to FRONT.
- 3** Aim the microphone connected to the MIC IN connector at a suitable sound source. Check that the level indications for both channels correspond to the sound level.

## ③ **Testing the manual audio level adjusting functions**

- 1** Set the AUDIO IN switches to FRONT.

- 
- 2** Set the AUDIO SELECT CH-1/CH-2 switches to MANUAL.
  - 3** Adjust the MIC AUDIO LEVEL control on the front of the camcorder. Check that the level indications increase as the control is turned counterclockwise.

#### **④ Testing the earphone and speaker**

- 1** Turn the MONITOR control and check that the speaker volume changes accordingly.
- 2** Connect an earphone to the EARPHONE jack. Check that the speaker sound is cut off and that you can hear the sound from the microphone in the earphone.
- 3** Turn the MONITOR control and check that the earphone volume changes accordingly.

#### **⑤ Testing external microphones**

- 1** Set the LINE/MIC selectors to MIC.
- 2** Connect external microphones to the AUDIO IN CH-1/CH-2 connectors.
- 3** Set the AUDIO IN switches to REAR.
- 4** Aim the microphones at a sound source.
- 5** Check that the audio level meter in the display panel and the audio level indication in the viewfinder reflect the changing sound level.

Alternatively, with a single microphone, check each channel in turn.



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## ⑥ Checking the functions of the user bits and time code

- 1** Set the user bits as required.  
*For more information, see Section 4-5-1 “Setting the User Bits” (page 4-27).*
- 2** Set the time code.  
*For more information, see Section 4-5-2 “Setting the Time Code” (page 4-29).*
- 3** Set the F-RUN/SET/R-RUN switch to R-RUN.
- 4** Press the VTR START button, and check that the tape starts and that the counter indication changes.
- 5** Press the VTR START button again, and check that the tape stops and that the counter indication also stops changing.
- 6** Set the F-RUN/SET/R-RUN switch to F-RUN, and check that the counter indication changes regardless of whether the tape is running.
- 7** By setting the DISPLAY switch to DATA, and set the DATA DISPLAY switch to U-BIT, you can check that the user bit value set is displayed.

## 6-2 Maintenance

### 6-2-1 Cleaning the Video Heads

To clean the video heads, always use a Sony BCT-D12CL Cleaning Cassette. Carefully follow the instructions given with the cleaning cassette, as incorrect or excessive use could damage the video heads.

### 6-2-2 Cleaning the Viewfinder

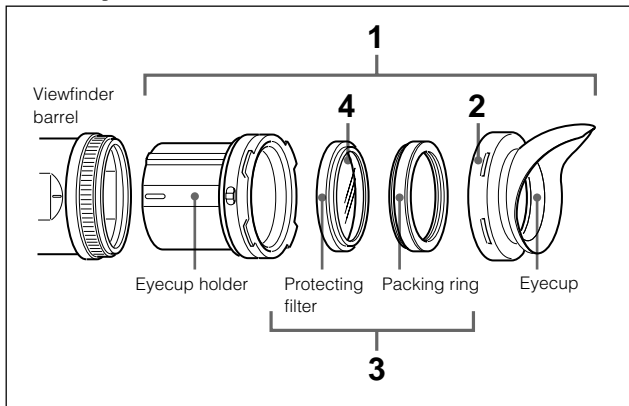
- Use a dust blower to clean the CRT screen and mirror inside the barrel.
- Clean the lens and protecting filter with a commercially available lens cleaner.

#### Caution

Never use organic solvents such as thinners.

#### Disassembling the eyepiece

Follow the procedure below.



Disassembling the eyepiece

- 
- 1 Detach the eyepiece unit from the viewfinder.  
*For more information, see Section 5-2-4 “Detaching the Eyepiece” (page 5-15).*
  - 2 Remove the eyecup from the eyecup holder.
  - 3 Remove the protecting filter together with the packing ring from inside the eyecup holder.
  - 4 Detach the protecting filter from the packing ring.

### **Fog-proof filter**

Depending on the temperature and humidity, the protecting filter may mist because of vapor or your breath. To ensure that the viewfinder is always clear, replace the protecting filter with a fog-proof filter (Part No. 1-547-341-11, not supplied).

### **Fitting the fog-proof filter**

Detach the protecting filter from the packing ring, and replace it with the fog-proof filter.

Be sure to correctly assemble the fog-proof filter, the packing ring, and the eyecup so that the reassembled eyepiece is waterproof.

### **Note**

When cleaning the fog-proof filter, wipe it very gently with a soft cloth to avoid impairing the anti-fogging coating.

# 6-3 Operation Warnings

When a problem occurs either at power on or during operation, warnings are given by the WARNING indicator and tally indicator, in the display panel, and in the viewfinder. The speaker and earphone also give audible warnings.

## Operation warnings

Display panel		Indicators			Warning sound
Warning/indication	Flashing/continuous	: Continuous	: 2 flashes/s.	: 4 flashes/s.	●))) ●)) ●) ●): 4 beeps/s. ●))))))))))): 1 beep/s. ●))))))))))))))): Continuous beep
		WARNING	REC/tally	BATT	
RF	Continuous <sup>a)</sup>				●))) ●)) ●) ●)) <sup>a)</sup>
SERVO	Continuous				●))) ●)) ●) ●))
	Continuous				●)))))))))))))))))
HUMID	Continuous				●))) ●)) ●) ●)) <sup>a)</sup> ●))))))))))))))))) <sup>b)</sup>
SLACK	Continuous				●)))))))))))))))))
TAPE <sup>c)</sup>	Flashing <sup>a)</sup>	<sup>a)</sup>			●)))))))))))))
TAPE and E	Continuous				●)))))))))))))))))
BATT	Flashing				●))))))))))))) <sup>a)</sup>
BATT and E	Flashing				●)))))))))))))))))
(No indication on the display panel)					

a) During recording, b) During playback, fast forward, or rewind,

c) Also "5-0" appears in the tape remaining displays.

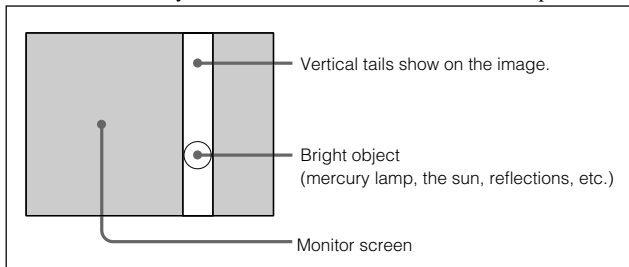
<b>Problem</b>	<b>VTR action</b>	<b>Corrective action</b>
Video head gap clogged or problem in recording circuit.	After clogged head is detected, recording continues but is substandard.	Clean the heads. If recording is still substandard, turn off the power and consult your Sony representative.
Servo lock lost.	Recording continues but is substandard.	Turn off the power and consult your Sony representative. Note that this indication may be given momentarily when the tape starts moving, but this does not indicate a problem.
Interface error between system CPU and servo CPU.	Recording continues but stops if the tape sticks to the head drum. Playback, fast forward, and rewind do not operate.	Stop the tape, and wait until the HUMID indicator disappears.
Condensation on the head drum.	Recording continues but stops if the tape sticks to the head drum. Playback, fast forward, and rewind do not operate.	Stop the tape, and wait until the HUMID indicator disappears.
The tape cannot be wound properly.	VTR stops. An error code appears in the counter display section of the display panel. Look up the error code in the Maintenance Manual.	Remove the cassette by the method described in the Maintenance Manual or by pressing the EJECT button several times. Close the cassette lid without loading a cassette. Turn off the power and consult your Sony representative.
Near the end of tape.	Operation continues.	Be prepared to change the cassette.
End of tape.	Record, playback, and fast forward do not operate.	Change the cassette or rewind the tape.
Low battery.	Operation continues.	Change the battery.
Dead battery.	Operation stops.	Change the battery.
Interface error between system CPU and servo CPU.	Recording continues, but some operations such as review and cuing do not operate. If another problem also occurs, its indication is given priority.	Turn off the power and consult your Sony representative.

---

## Notes on CCD Image Sensors

### Vertical smear

Smear tends to be produced when an extremely bright object is being shot; it is more likely to occur with a faster electronic shutter speed.



Vertical smear

6

### Aliasing

When patterns of stripes or lines are shot, they may appear jagged.

# Specifications

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## Power voltage

12  $\pm$ <sub>1.0</sub><sup>5.0</sup> V

## Power consumption

DVW-707/707P: 29 W

DVW-709WS/709WSP: 31.5 W

DVW-790WS/790WSP: 32 W

(with 12 V DC supply, when recording)

## Operating temperature

0°C to 40°C (32°F to 104°F)

## Operating humidity

25% to 85% (relative humidity)

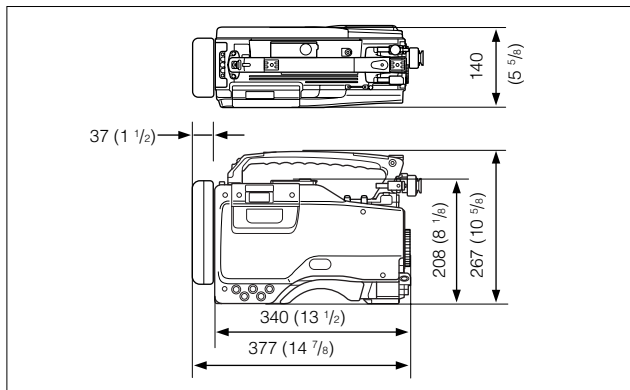
## Storage temperature

-20°C to +60°C (-4°F to +140°F)

## Mass

Approx. 7 kg (15 lb 7 oz) (with lens, cassette and BP-L60A Battery Pack)

## Dimensions



Dimensions in mm (inches)

A

## Video Camera Section

### General

#### Imager

DVW-707/707P/709WS/709WSP:  $\frac{2}{3}$ -inch interline-transfer type Power HAD CCD

DVW-790WS/790WSP:  $\frac{2}{3}$ -inch frame-interline-transfer type Power HAD CCD

#### Imager Configuration

RGB, 3 CCDs

#### Spectral system

F 1.4 prism system (with quartz filter)



## Built-in filters

DVW-707/707P:

ND filter

1 : 3200K

2 : 5600K +  $\frac{1}{8}$  ND

3 : 5600K

4 : 5600K +  $\frac{1}{64}$  ND

DVW-709WS/709WSP/790WS/790WSP:

CC filter

A: Cross filter

B: 3200K

C: 4300K

D: 6300K

ND filter

1: Straight through

2:  $\frac{1}{4}$  ND

3:  $\frac{1}{16}$  ND

4:  $\frac{1}{64}$  ND

## Electronic shutter speed

$\frac{1}{100}$ ,  $\frac{1}{125}$ ,  $\frac{1}{250}$ ,  $\frac{1}{500}$ ,  $\frac{1}{1000}$ ,  $\frac{1}{2000}$  second (DVW-707/709WS/790WS)

- CLS mode: 60.0 Hz to 10156 Hz in 263 steps (DVW-707)  
60.1 Hz to 7000 Hz in 260 steps (DVW-709WS/  
790WS)
- ECS mode: 30.4 Hz to 58.3 Hz in 248 steps (DVW-790WS)
- EVS mode:  $\frac{1}{60}$  second (DVW-707/709WS)
- Super EVS mode:  $\frac{1}{60}$  second (DVW-790WS)
- $\frac{1}{60}$ ,  $\frac{1}{125}$ ,  $\frac{1}{250}$ ,  $\frac{1}{500}$ ,  $\frac{1}{1000}$ ,  $\frac{1}{2000}$  second (DVW-707P/709WSP/790WSP)
- CLS mode: 50.0 Hz to 10101 Hz in 312 steps (DVW-707P)  
50.2 Hz to 9000 Hz in 310 steps (DVW-709WSP/790WSP)
- ECS mode: 25.4 Hz to 48.7 Hz in 295 steps (DVW-790WSP)
- EVS mode:  $\frac{1}{50}$  second (DVW-707P/709WSP)
- Super EVS mode:  $\frac{1}{50}$  second (DVW-790WSP)

---

## **Lens mount**

Special bayonet type

## **Sensitivity**

DVW-707/707P: 89.9% reflection chart, 2000 lx (F10 standard)

DVW-709WS/709WSP/790WS/790WSP: 89.9% reflection chart,  
2000 lx (F9 standard)

## **Minimum illumination**

DVW-707/707P: 0.15 lx (at F 1.4, +48 dB gain)

DVW-709WS/709WSP/790WS/790WSP: 0.2 lx (at F1.4, +48 dB gain)

## **S/N**

DVW-707/709WS/790WS: 65 dB (Y typical)

DVW-707P/709WSP/790WSP: 63 dB (Y typical)

## **Modulation (at center)**

DVW-707/707P: 60%

DVW-709WS/709WSP/790WS/790WSP (4:3 mode): 55%

DVW-709WS/709WSP/790WS/790WSP (16:9 mode): 70%

## **Registration**

0.05% or better for entire screen area (excluding lens distortion)

## **Geometric distortion**

None identified (excluding distortion due to lens)

## **Smear**

-125 dB (DVW-707/707P)/-120 dB (DVW-709WS/709WSP)

(Y typical)/-140 dB (DVW-790WS/790WSP)

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## Viewfinder

### CRT

1 1/2-inch (DVW-707/707P) or 2-inch (DVW-709WS/709WSP/790WS/790WSP) monochrome, quick start type

### Horizontal resolution (at center)

DVW-707/707P: 600 TV lines

DVW-709WS/709WSP/790WS/790WSP: 450 TV lines (16:9 mode)  
600 TV lines (4:3 mode)

*The eyepiece on the DVW-709WS/709WSP/790WS/790WSP has a lower magnification than the eyepiece on the DVW-707/707P.*

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## VTR Section

### General

#### Usable cassette tapes

1/2-inch Digital BETACAM cassette tapes  
BCT-D6/D12/D22/D32/D40

#### Tape speed

Approx. 96.7 mm/s

#### Record/playback time

40 minutes (using BCT-D40)

#### Fast forward time

Approx. 6 minutes (using BCT-D40)

#### Rewind time

Approx. 5 minutes (using BCT-D40)

#### Continuous recording time

Approx. 120 minutes (using BP-L60A)

---

## Video (when using standard playback machine)

Bandwidth	Luminance	0 to 5.75 MHz $^{+0.5}_{-1.0}$ dB
	Chroma (R-Y/B-Y)	0 to 2.75 MHz $^{+0.5}_{-1.0}$ dB
S/N	Luminance	62 dB min.
K factor (2T pulse)		1 % max.
Y/C delay		15 ns max.

## Audio (when using standard playback machine)

Frequency response	20 Hz to 20 kHz $^{+0.5}_{-1.0}$ dB
Dynamic range	85 dB min.
Distortion	0.08% max.
Crosstalk	70 dB max.
Wow and flutter	Below measurable level

# A

## Input/output connectors

### Signal inputs

#### AUDIO IN CH-1/CH-2 (XLR, 3-pin, female)

–60 dBu <sup>1)</sup>/+4 dBu for DVW-707/709WS/790WS, or –60 dBs <sup>2)</sup>/+4 dBs for DVW-707P/709WSP/790WSP

#### MIC IN (XLR, 3-pin, female)

–60 dBu for DVW-707/709WS/790WS, or –60 dBs for DVW-707P/709WSP/790WSP, with an external power supply system (48 V DC, maximum current 3 mA)

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1) 0 dBu = 0.775 V<sub>rms</sub>.

2) 0 dBs = 0.775 V<sub>rms</sub>.

---

**GENLOCK IN (BNC type)**

1.0 V<sub>p-p</sub>, 75 ohms

**TC IN (BNC type)**

0.5 V to 18 V<sub>p-p</sub>, 10 kilohms

**Signal outputs****VIDEO OUT (BNC type)**

1.0 V<sub>p-p</sub>, 75 ohms, unbalanced

**TEST OUT (BNC type)**

1.0 V<sub>p-p</sub>, 75 ohms, unbalanced

**AUDIO OUT (XLR, 5-pin, male)**

0 dBm

**TC OUT (BNC type)**

1.0 V<sub>p-p</sub>, 75 ohms

**EARPHONE (minijack)**

8 ohms,  $-\infty$  to  $-18$  dBu (or  $-18$  dBs) variable

**Others****DC IN (XLR, 4-pin, male)**

11 to 17 V DC

**DC OUT (4-pin)**

11 to 17 V DC, maximum current 0.1 A

**LENS (12-pin)****REMOTE (8-pin)**

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## Supplied Accessories

- Microphone (super cardioid directional, external power supply type) (1)
- Shoulder strap (1)
- Operation Manual (1)
- Maintenance Manual Part 1 <sup>1)</sup> (1)

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## Recommended Additional Equipment

### Power supply and related equipment

- BP-L60A/L90A Battery Pack
- NP-1B Battery Pack
- BP-90A Battery Pack
- BC-L100/L100CE Battery Charger (for BP-L60A/L90A)
- BC-1WD/1WDCE Battery Charger (for NP-1B)
- BC-210/210CE Battery Charger (for BP-90A)
- BC-410/410CE Battery Charger (for NP-1B/BP-90A)
- DC-L1 Battery Adaptor (to hold an NP-1B)
- DC-L90 Battery Adaptor (to hold a BP-90A)
- AC-550/550CE AC Adaptor
- AC-DN1/DN2A AC Adaptor

### Setup card

- BSC-1-Pack (Four BSC-1s with a setup card holder)

### Digital BETACAM cassette tapes

- BCT-D60/D12/D22/D32/D40

### Viewfinder and related equipment

- BVF-VC10W Color Viewfinder

---

1) Maintenance Manual Part 1

This manual gives the information necessary for users to maintain the camcorder and its optional equipment.

---

Fog-proof filter (Part No. 1-547-341-11)  
Lens assembly (farsighted) (−2.8 D to +2.0 D) (Part No. A-8262-537-A)  
Lens assembly (low magnification) (−3.6 D to −0.8 D) (Part No. A-8262-538-A)  
Lens assembly (standard magnification with special compensation for aberrations) (−3.6 D to +0.4 D) (Part No. A-8267-737-A)  
Lens assembly high performance (3 × magnification) (−2.4 D to +0.5 D) (Part No. A-8314-798-A)

### **Optical attachments**

ND filter (1/4 ND) (Part No. 3-194-480-01)  
ND filter (1/16 ND) (Part No. 3-194-481-01)  
Cross filter (Part No. 3-174-682-01)  
Mount ring (Part No. 3-186-442-01)

*Consult your Sony representative for more information about these filters.*

### **Equipment for remote control**

RM-B150 Remote Control Unit  
RM-P9 Remote Control Unit (requires CCA-86-0.4 conversion cable)  
BVR-3 Remote Control Unit  
VA-DN1 Camcorder Interface Adaptor

### **Audio equipment**

C-74 microphone  
ECM-MS5 stereo microphone  
CAC-12 Microphone Holder  
CRS-3P Cradle Suspension  
WRR-28H/28M/28L/810A/860A UHF Portable Tuner  
WRT-27 UHF Transmitter  
BTA-27 UHF Portable Tuner Attachment Kit

### **Equipment for maintenance and easier handling**

BCT-D12CL Cleaning Cassette  
LC-777 Carrying Case

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LC-304SFT Soft Carrying Case

Rain cover

WRR Tuner Fitting (service part number: A-8278-057-A)

VCT-14 Tripod Adaptor

Maintenance Manual Part 2 <sup>1)</sup>

Design and specifications are subject to change without notice.

A

.....  
1) Maintenance Manual Part 2

This manual gives the additional information to fully maintain the comcorder. It contains details of adjustments that can be made, circuit diagrams, etc.



# Glossary

---

## **Aliasing**

Distortion of the signal caused by overlap of the baseband signal and the lower sideband signal when the signal is demodulated.

## **ATW**

Auto Tracing White balance. The white balance is automatically adjusted for the lighting conditions during shooting.

## **Bayonet mount**

A type of lens mount. The lens can be inserted into the lens mount and quickly locked in place by simply rotating the lens locking ring.

## **Black balance adjustment**

To balance the black levels of the R, G, and B channels of a video camera so that black has no color.

## **Black set**

A reference level for black balance adjustment.

## **CCD**

Charge-Coupled Device. A solid state imager used in most video cameras in place of a pickup tube. The device converts input light levels into electrical charges that are first stored and then output in the form of voltage variations.

## **Center marker**

A cross which indicates the center of the image on the viewfinder screen.

## **Color bar signal**

A test signal which can be displayed as vertical bars of different colors on a color video monitor. This signal is used to check chrominance functions of color television and video systems such as cameras and monitors.

---

## **Color temperature**

The temperature in Kelvins (K) to represent the color of a light source, determined by heating a perfectly black body until its color matches that of the light source. Color temperature is higher when the color is bluish and lower when reddish.

## **Condensation**

Moisture condensation on the VTR tape transport mechanism. Condensation on the head drum causes tape to stick to the drum, resulting in damage to tape and a malfunction of the VTR.

## **CRT**

Cathode-Ray Tube. Video camera viewfinders are equipped with a CRT image display, so you can monitor what you are shooting.

## **CTL**

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

## **DCC**

Dynamic Contrast Control. A video camera containing a DCC circuit can handle a wide dynamic range of luminance.

## **Diopter**

A measure of lens power ; its unit is the reciprocal of 1 m (3.28 ft). A diopter lens is a simple supplementary lens placed over the main camera lens to alter its effective focal length.

---

## Drop frame mode

SMPTE time code runs at 30 frames/second, while the NTSC color television system runs at about 29.97 frames/second. This means that a length of 1 hour as indicated by time code is longer than the actual clock time of 1 hour by 108 frames, or about 3.6 seconds. Drop frame mode adjusts the running of time code to eliminate this discrepancy by dropping two frames from the time code value at the beginning of each minute except every tenth minute. In contrast, non-drop frame mode does not adjust the discrepancy between time code value and actual time.

## EBU

European Broadcasting Union. Established by broadcasting and related organizations in Europe.

## E-E mode

Electric-to-Electric mode. When you operate a VTR in E-E mode, input video and/or audio signals pass through electric circuits only and then come out from the output connectors, without passing through electromagnetic conversion circuits such as recording heads. You can use E-E mode to directly check and monitor the input signals without recording them on tape.

## EFP

Electronic Field Production. The use of electronic equipment such as portable video cameras, VTRs, and sound equipment for television production outside studios.

## ENG

Electronic News Gathering. The use of electronic equipment such as portable video cameras, VTRs, and sound equipment for the production of daily news stories and short documentaries.

## Ff

*See* Flange focal length.

---

## **FIT**

Frame Interline Transfer. A type of CCD imager featuring substantially reduced vertical smear. *See also* CCD and Vertical smear.

## **Flange focal length**

The distance from the plane of lens mounting flange to the image focal plane. Abbreviated to Ff.

## **Flare**

Dark or colored flashes caused by signal overload through extreme light reflections of polished objects or very bright lights.

## **Flicker**

Repeated change of brightness on the screen.

## **Genlock**

Generator lock. To synchronize the pulse generator built into video equipment to an external reference (master) sync signal.

# A

## **Geometric distortion**

Any change in geometry or perspective of the reproduced image from the original.

## **HAD**

Hole-Accumulated Diode. A CCD sensor structure designed to suppress certain types of noise inherent to CCDs. *See also* CCD.

## **Horizontal resolution**

The capability of a video camera or a display unit to preserve detail in the horizontal direction. Usually expressed as the number of vertical lines which can be distinguished in the reproduced image of a test chart.

---

## Hunting

Repeated brightening and darkening of an image resulting from repeated response to automatic iris control.

## IRE scale

The scale to determine video signal amplitudes devised by the Institute of Radio Engineers (IRE), an American organization now called the Institute of Electrical and Electronic Engineers (IEEE).

## IT

Interline Transfer. A type of CCD imager.

## LTC

Longitudinal Time Code. A time code recorded along the tape in the forward direction of a tape run. A VTR cannot reproduce LTC when tape run stops to output a still picture. The output level of LTC is very low when tape runs slowly, so an LTC read error is likely to occur while the VTR is playing back in slow motion. *See also* Time code and VITC.

## ND filter

Neutral Density filter. ND filters reduce the amount of incident light equally across the entire visible wavelength range without affecting color.

## R/G mixing detail circuit

A circuit used to mix R and G signals to obtain a Y signal so that a sharp picture is reproduced.

## Reference video signal

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

---

## Sawtooth waveform

A form of signal resembling the teeth of a saw. A video signal having a sawtooth waveform is used to check linearity and other characteristics of video amplifiers.

## Shot data

Data recorded, while shooting, in the color bars, the U-BIT data of the VITC, and so forth. Includes the model name, serial number, date, time, shot number, cassette number, and ID1 to ID4.

## Shutter speed

The length of time for which the shutter stays open. The higher the shutter speed, the more clearly a moving object can be shot.

## Smear

*See* Vertical smear.

# A

## SMPTE

Society of Motion Picture and Television Engineers, a professional association established in the U.S.A. mainly for the purpose of setting forth motion picture and television engineering standards.

## S/N

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

## Time code

A digitally encoded signal which is recorded on video tape to identify each frame of video by hour, minute, second and frame number. SMPTE time code is applied to NTSC system, and EBU time code to PAL and SECAM systems. There are two kinds of recorded signals : longitudinal time code (LTC) and vertical interval time code (VITC). *See also* LTC and VITC.

---

## **Time code synchronization**

To synchronize the built-in time code generator of video equipment such as a VTR to an external time code.

## **Turbo gain**

Video amplifier gain boosted from 30 dB to 36 or 42 dB by combining blocks of 2 or 4 adjacent pixels of the CCD.

## **User bits**

A total of 32 bits are provided in the time code which the user can use to record such information as date, scene number, or reel number on video tape.

## **Vertical smear**

A bright vertical line which appears on the screen when shooting a very bright object with a CCD camera. Also called smear.

## **Video gain**

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

## **VITC**

Vertical Interval Time Code. A time code recorded on video tape in two horizontal lines during each vertical blanking period of a video signal. Unlike LTC, VITC is recorded in the same tracks as the video information, so they can be read even while the tape is not moving. *See also* Time code and LTC.

## **White balance adjustment**

In the light of a particular color temperature, to adjust the white levels of the R, G, and B channels of a color video camera so that any white object shot in that light is reproduced as a truly white image. *See also* Color temperature.

---

## **White shading**

When shooting a white object, the upper and lower portions of the screen may appear magenta or green while the central portion appears white, depending on the performance of the camera lens. This is called white shading.

## **Zebra pattern**

In a video camera, striped patterns which appear in the viewfinder screen to indicate areas of the image where the video level is higher than a certain value. If a zebra pattern appears on the skin when the object is a human being, that is a correct exposure.

## **Zoom**

To gradually change the field of view of a camera lens from wide to narrow angle (zoom in) or narrow to wide angle (zoom out).



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Name

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Office

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Address

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Phone

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