SONY

DSR-PD150

SONY

3-060-817-**16** (1)

Digital Camcorder

Operating Instructions

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

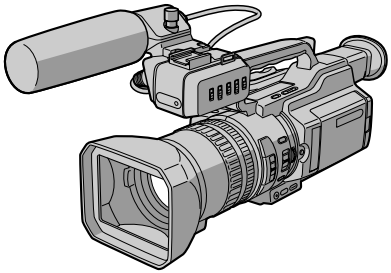
Owner's Record

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

Model No. **DSR-PD150** Model No. **AC-**_____

Serial No. _____ Serial No. _____

DVCAM™ Mini DV Digital Video Cassette



InfoLITHIUM™ L SERIES

Cassette Memory

i™

MEMORY STICK™

DSR-PD150

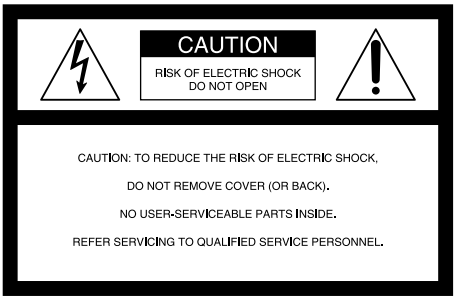
©2000 Sony Corporation

Welcome!

Congratulations on your purchase of this Sony Digital camcorder.
With your Digital camcorder, you can capture life's precious moments with superior picture and sound quality. Your Digital camcorder is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

WARNING

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



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

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

Never expose the battery pack to temperatures above 140 °F (60 °C) such as in a car parked in the sun or under direct sunlight.

For the customers in the U.S.A and CANADA

RECYCLING LITHIUM-ION BATTERIES

Lithium-Ion batteries are recyclable. You can help preserve our environment by returning your used rechargeable batteries to the collection and recycling location nearest you.

For more information regarding recycling of rechargeable batteries, call toll free 1-800-822-8837, or visit http://www.rbrc.org/.

Caution: Do not handle damaged or leaking Lithium-Ion batteries.

For the customers in the U.S.A.

If you have any questions about this product, you may call: Sony Customer Information Center 1-800-222-SONY (7669) or write to: Sony Customer Information Center 1 Sony Drive, Mail Drop #T1-11, Park Ridge, NJ 07656

Declaration of Conformity

Trade Name:	SONY
Model No.:	DSR-PD150
Responsible Party:	Sony Electronics Inc.
Address:	1 Sony Drive, Park Ridge, NJ, 07656 USA
Telephone No.:	201-930-6972

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions.: (1) This device may not cause harmful interference, and (2)this device must accept any interference received, including interference that may cause undesired operation.

CAUTION

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

Note:

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.

For customers in CANADA

CAUTION

TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

"Memory Stick" For customers in the U.S.A.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For customers in CANADA

This Class B digital apparatus complies with Canadian ICES-003.

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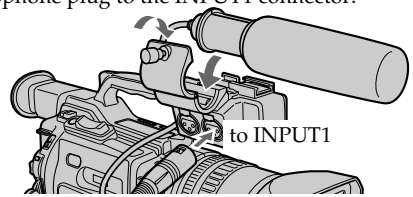
Quick Start Guide

This guide introduces you to the basic way of recording/playback. See the pages in parentheses "( )" for more information.

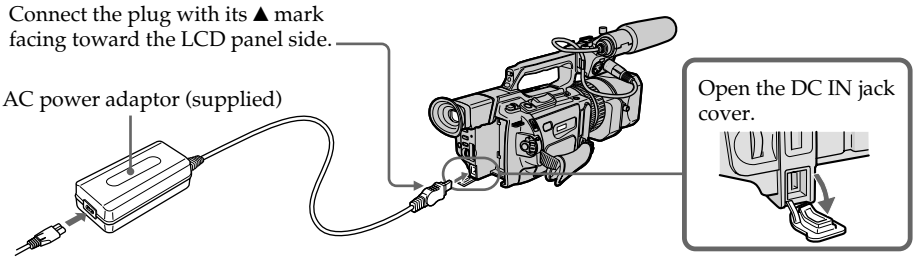
1 Installing the microphone (p. 9)

Install the supplied microphone with the model name (ECM-NV1) facing upward. Be sure to connect the microphone plug to the INPUT1 connector.



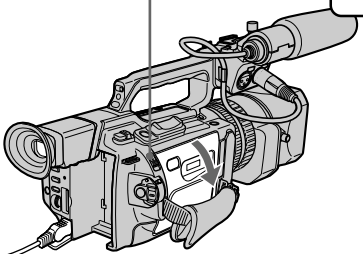
2 Connecting the power cord (p. 14)

Use the battery pack when using your camcorder outdoors (p. 10).

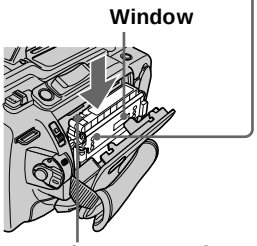


3 Inserting a cassette (p. 15)

❶ While pressing the small blue button on the EJECT switch, slide it in the direction of the arrow.

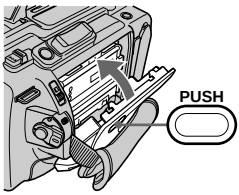


❷ Push the middle portion of the back of the cassette to insert it. Insert the cassette into the cassette compartment with the window facing out and the write-protect tab facing upward.



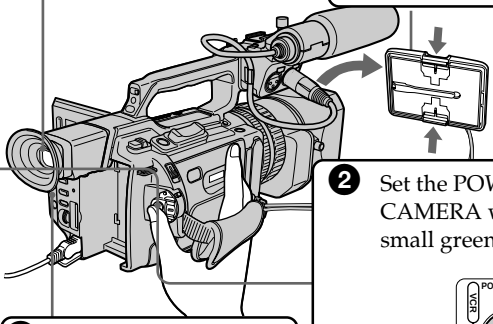
❸ Close the cassette compartment by pressing the PUSH mark on it.

❹ Close the cassette lid by pressing the PUSH button on the cassette lid.



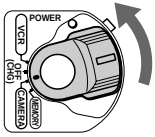
4 Recording a picture (p. 16)

Viewfinder
When the LCD panel is closed, use the viewfinder placing your eye against its eyecup.



1 Remove the hood cap.

2 Set the POWER switch to CAMERA while pressing the small green button.



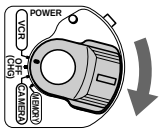
If the ND1 or ND2 indicator flashes, see page 46.

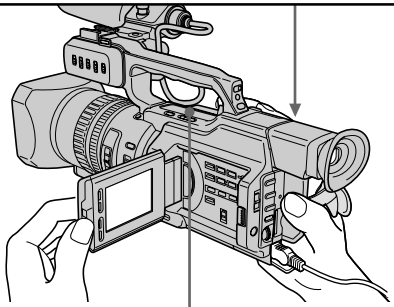
3 Slide OPEN back in the ► mark direction to open the LCD panel.

4 Press START/STOP. Your camcorder starts recording. To stop recording, press START/STOP again.

5 Monitoring the playback picture on the LCD screen (p. 26)

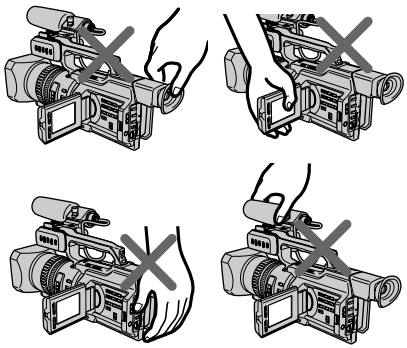
1 Set the POWER switch to VCR while pressing the small green button.





2 Press ◄◄ to rewind the tape.
3 Press ► to start playback.

NOTE
Do not pick up your camcorder by holding the viewfinder, the LCD panel, the battery pack, or the microphone.



Using this manual

As you read through this manual, buttons and settings on your camcorder are shown in capital letters.

e.g. Set the POWER switch to CAMERA.

When you carry out an operation, you can hear a beep or a melody sound to indicate that the operation is being carried out.

Note on cassette memory

Your camcorder is based on the DVCAM/DV format. We recommend that you use a tape with cassette memory .

The functions which require different operations depending on whether or not the tape has cassette memory are:
- Searching the end point of the recording – end search (p. 25, 29)
- Searching a recording by index – index search (p. 64)
- Searching a recording by date – date search (p. 67)
- Searching for a photo – photo search (p. 69).

The functions you can operate only with cassette memory are:
- Searching the boundaries of recorded tape by title – title search (p. 66)
- Superimposing a title (p. 94)
- Making your own titles (p. 98)
- Labeling a cassette (p. 100).

For details, see page 142.

CM only You see this mark in the introduction of the features that are operated only with cassette memory.

Tapes with cassette memory are marked with (Cassette Memory).

Note on TV color systems

TV color systems differ from country to country.
To view your recordings on a TV, you need an NTSC system-based TV.

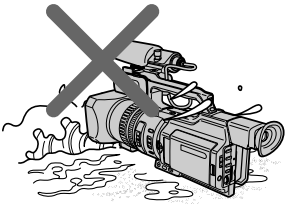
Copyright precautions

Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

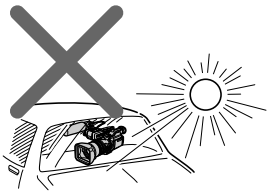
Precautions on camcorder care

- **The LCD screen and the viewfinder are manufactured using high-precision technology. However, there may be some tiny black points and/or bright points (red, blue, green or white) that constantly appear on the LCD screen and in the viewfinder. These points occur normally in the manufacturing process and do not affect the recorded picture in any way. Effective ratio of pixels is 99.99% or more.**
- Do not let your camcorder get wet. Keep your camcorder away from rain and sea water. Letting your camcorder get wet may cause your camcorder to malfunction. Sometimes this malfunction cannot be repaired **[a]**.
- Never leave your camcorder exposed to temperatures above 60 °C (140 °F), such as in a car parked in the sun or under direct sunlight **[b]**.
- Do not place your camcorder so as to point the viewfinder or the LCD screen or lens toward the sun. The inside of the viewfinder, LCD screen, or lens may be damaged **[c]**.

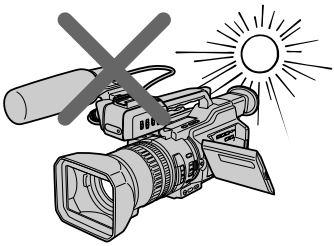
[a]



[b]



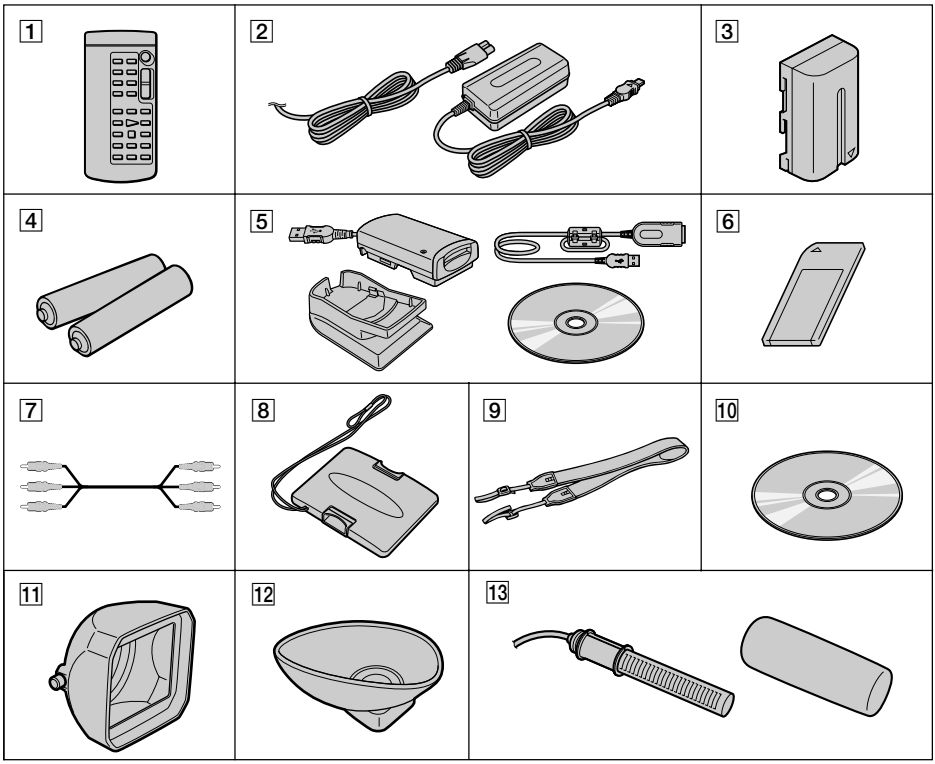
[c]



Contents of the recording cannot be compensated if recording or playback is not made due to a malfunction of the camcorder, video tape, etc.

Checking supplied accessories

Make sure that the following accessories are supplied with your camcorder.



1 **Wireless Remote Commander** (1) (p. 167)

2 **AC-L10A/L10B/L10C AC power adaptor** (1), **Power cord** (1) (p. 11)

3 **NP-F330 battery pack** (1) (p. 10, 11)

4 **Size AA (R6) battery for Remote Commander** (2) (p. 168)

5 **Memory Stick Reader/Writer** (1), **Stand** (1), **Specified extension cable** (1), **Driver software (CD-ROM)** (1)
You cannot use the "PIXELA ImageMixer" software to copy images from your camcorder to your computer.

6 **"Memory Stick"** (1) (p. 113)

7 **A/V connecting cable** (1) (p. 31, 72)

8 **Hood cap** (1) (p. 16)

9 **Shoulder strap** (1) (p. 165)

10 **Application software: PictureGear 4.1Lite (CD-ROM)** (1) (p. 131)

11 **Lens hood** (1) (p. 163)

12 **Eyecup (large)** (1) (p. 20)

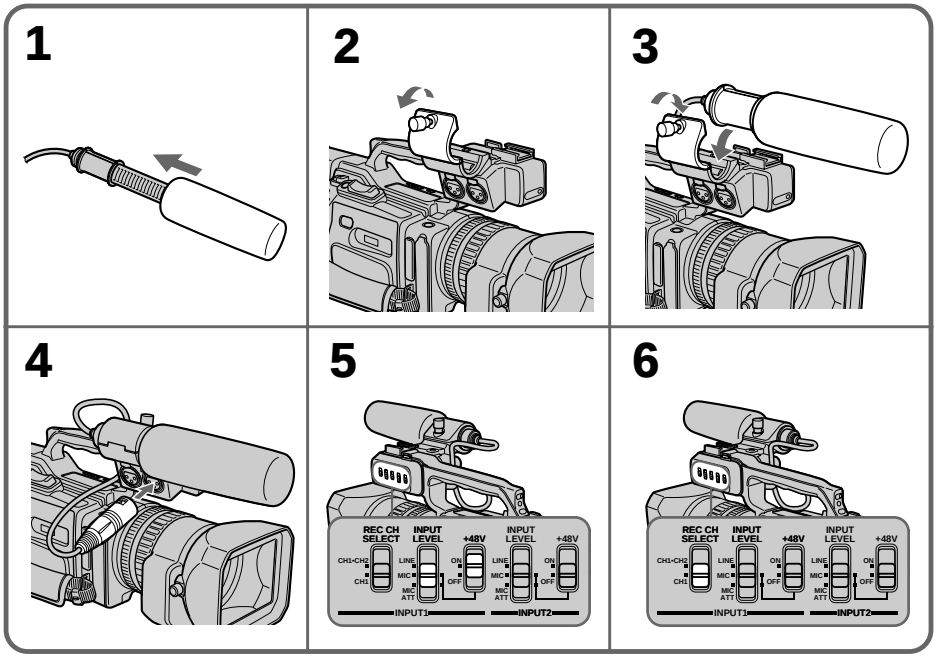
13 **Microphone** (1) (p. 9), **Wind screen** (1) (p. 9)

14 **Operating instructions** (2)

Step 1 Installing the microphone

Install the supplied microphone. Be sure to connect the microphone plug to the INPUT1 connector.

(1) Attach the wind screen to the microphone.
(2) Loosen the microphone holder screw and open the cover.
(3) Place the microphone into the holder with the model name (ECM-NV1) facing upward, close the cover, and tighten the screw.
(4) Connect the plug of the microphone to the INPUT 1 connector.
(5) Set the INPUT LEVEL selector to MIC or MIC ATT. When set to MIC ATT, you can reduce the volume by about 20 dB. And set the +48 V switch to ON.
(6) Select the channel to be used, using the REC CH SELECT switch. When recording only on the channel 1, set it to CH1, and when recording both on the channels 1 and 2, set it to CH1•CH2.



When the wind is blowing hard
Set CH1 or CH2 of WIND to ON in the menu settings according to the input (p. 104).

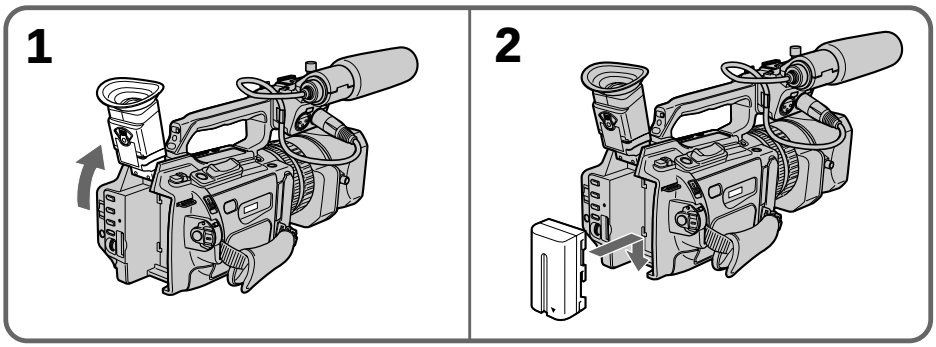
When you unplug the microphone plug
Unplug it while holding the PUSH button down.

Step 2 Preparing the power supply

Installing the battery pack

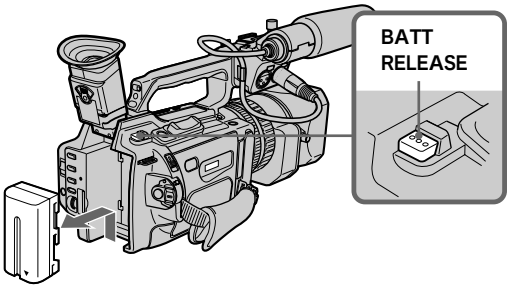
Install the battery pack to use your camcorder outdoors.

(1) Lift up the viewfinder.
(2) Insert the battery pack in the direction of the ▼ mark on the battery pack. Slide the battery pack until it is locked.



To remove the battery pack

Lift up the viewfinder.
Slide the battery pack out in the direction of the arrow while pressing BATT RELEASE down.

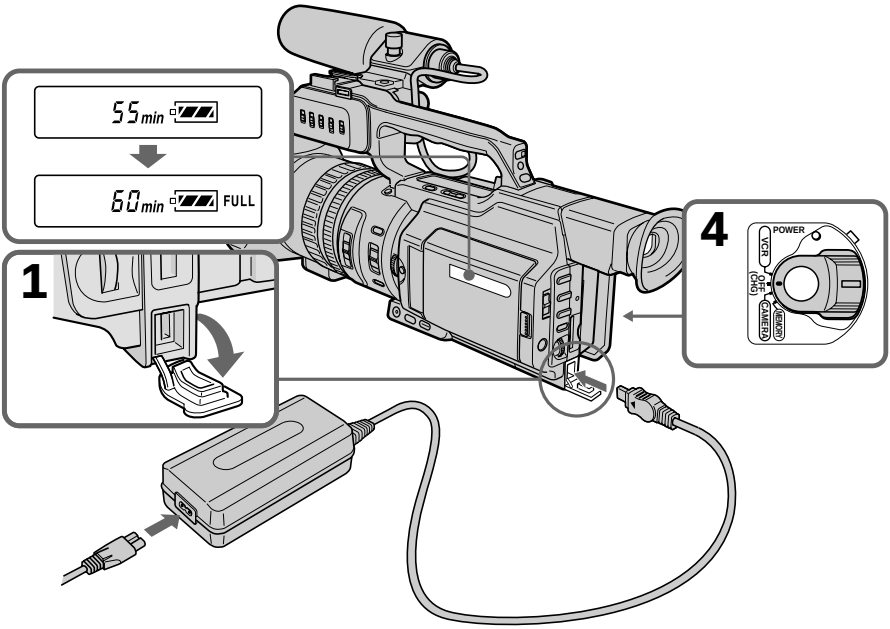


Charging the battery pack

Use the battery pack after charging it.
Your camcorder operates only with the "InfoLITHIUM" battery pack (L series).

(1) Open the DC IN jack cover and connect the AC power adaptor supplied with your camcorder to the DC IN jack with the plug's ▲ mark facing toward the LCD panel side.
(2) Connect the power cord to the AC power adaptor.
(3) Connect the power cord to a wall outlet.
(4) Set the POWER switch to OFF (CHG). Charging begins.

The remaining battery time is indicated in minutes on the display window.
When the remaining battery indicator changes to ▬, **normal charge** is completed. To fully charge the battery **(full charge)**, leave the battery pack attached for about one hour after normal charge is completed until FULL appears on the display window. Fully charging the battery allows you to use the battery longer than usual.



After charging the battery pack
Disconnect the AC power adaptor from the DC IN jack on your camcorder.

Note on the remaining battery time indicator
The remaining battery time indicator on the LCD screen/display window or in the viewfinder indicates the recording time using the viewfinder. The indicator may not be correct, depending on the conditions in which you are recording. When you close the LCD panel and open it again, it takes about one minute for the correct remaining battery time to be displayed.

Notes

- Prevent metallic objects from coming into contact with the metal parts of the DC plug of the AC power adaptor. This may cause a short-circuit, damaging the AC power adaptor.
- Keep the battery pack dry.
- When the battery pack is not to be used for a long time, charge the battery pack once fully, and then use it until it fully discharges again. Keep the battery pack in a cool place.

Until your camcorder calculates the actual remaining battery time

"- - - - min" appears in the display window.

While charging the battery pack, no indicator appears or the indicator flashes in the display window in the following cases:

– The battery pack is not installed correctly.
– The AC power adaptor is disconnected.
– Something is wrong with the battery pack.

Charging time

Battery pack	Full charge (Normal charge)
NP-F330 (supplied)	150 (90)
NP-F530/F550	210 (150)
NP-F730/F730H/F750	300 (240)
NP-F930/F950	390 (330)
NP-F960	420 (360)

Approximate minutes to charge an empty battery pack

Recording time

Battery pack	Recording with the viewfinder		Recording with the LCD screen	
	Continuous*	Typical**	Continuous*	Typical**
NP-F330 (supplied)	60 (55)	30 (30)	50 (45)	25 (25)
NP-F530	100 (90)	55 (50)	85 (75)	45 (40)
NP-F550	130 (115)	70 (60)	110 (100)	60 (55)
NP-F730	230 (205)	125 (110)	190 (170)	105 (95)
NP-F730H/F750	265 (235)	145 (130)	230 (200)	125 (110)
NP-F930	355 (320)	195 (175)	300 (270)	165 (150)
NP-F950	405 (360)	225 (200)	345 (310)	190 (170)
NP-F960	480 (430)	265 (240)	420 (375)	235 (210)

Approximate minutes of recording time when you use a fully charged battery

Numbers in parentheses "( )" indicate the time using a normally charged battery.
You cannot use the NP-500/510/710 battery pack on your camcorder.

* Approximate continuous recording time at 25 °C (77 °F). The battery life will be shorter if you use your camcorder in a cold environment.

** Approximate minutes when recording while you repeat recording start/stop, zooming and turning the power on/off. The actual battery life may be shorter.

Playing time

Battery pack	Playing time on LCD screen	Playing time with LCD closed
NP-F330 (supplied)	75 (65)	85 (75)
NP-F530	120 (110)	145 (130)
NP-F550	150 (135)	180 (160)
NP-F730	265 (240)	295 (265)
NP-F730H/F750	315 (275)	365 (325)
NP-F930	410 (365)	460 (415)
NP-F950	475 (430)	550 (495)
NP-F960	575 (515)	660 (590)

Approximate minutes of playing time when you use a fully charged battery

Numbers in parentheses "( )" indicate the time using a normally charged battery.
The battery life will be shorter if you use your camcorder in a cold environment.
You cannot use the NP-500/510/710 battery pack on your camcorder.

Notes

- The supplied battery pack is charged a little.
- Some types of battery packs may not be sold in your region or country.

What is "InfoLITHIUM?"

The "InfoLITHIUM" is a lithium ion battery pack which can exchange data such as battery consumption with compatible video equipment. This unit is compatible with the "InfoLITHIUM" battery pack (L series). Your camcorder operates only with the "InfoLITHIUM" battery. "InfoLITHIUM" battery packs (L series) have the InfoLITHIUM L mark.
"InfoLITHIUM" is a trademark of Sony Corporation.

If the camcorder is immediately turned off

Even if the remaining battery time is enough to operate, charge the battery pack fully again. The correct remaining time is displayed.

Step 2 Preparing the power supply

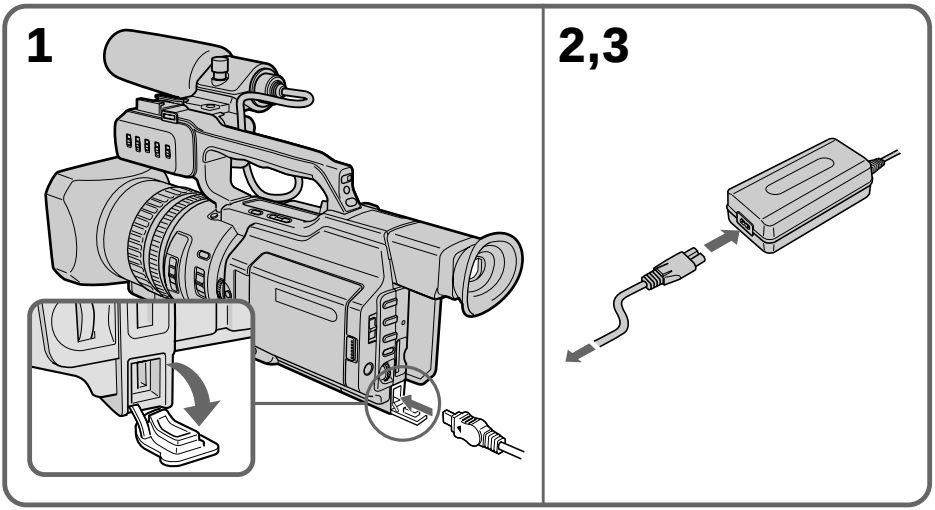
Connecting to a wall outlet

When you use your camcorder for a long time, we recommend that you power it from a wall outlet using the AC power adaptor.

(1) Open the DC IN jack cover and connect the AC power adaptor to the DC IN jack on your camcorder with the plug's ▲ mark facing toward the LCD panel side.

(2) Connect the power cord to the AC power adaptor.

(3) Connect the power cord to a wall outlet.



Precaution

The set is not disconnected from the AC power source (house current) as long as it is connected to the wall outlet, even if the set itself has been turned off.

Notes

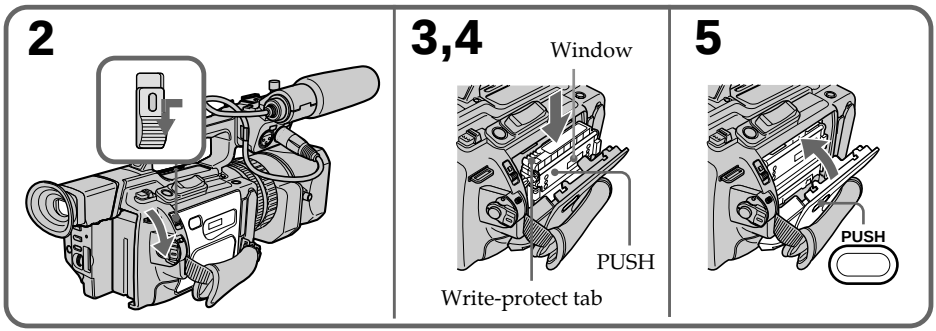
- The power cord must only be changed at an authorized service shop.
- AC power adaptor can supply power even if the battery pack is attached to your camcorder.
- The DC IN jack has source priority. This means that the battery pack cannot supply any power if the power cord is connected to the DC IN jack, even when the power cord is not plugged into a wall outlet.

Using a car battery

Use the Sony DC Adaptor/Charger (not supplied).

Step 3 Inserting a cassette

(1) Install the power source (p. 10).
(2) While pressing the small blue button on the EJECT switch, slide it in the direction of the arrow. After the cassette lid is opened, the cassette compartment automatically opens.
(3) Push the middle portion of the back of the cassette to insert it.
Insert the cassette in a straight line deeply into the cassette compartment with the window facing out and the write-protect tab facing upward.
(4) Close the cassette compartment by pressing the PUSH mark on it.
(5) Close the cassette lid until it clicks by pressing the PUSH button on the lid.



To eject a cassette

Follow the procedure above, and take out the cassette in step 3.

Note

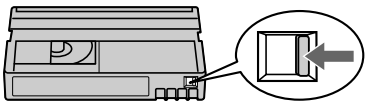
The cassette lid will not be closed when you press any part of the lid other than the PUSH button.

When you use cassettes with cassette memory

Read the instruction about cassette memory to use this function properly (p. 142).

To prevent accidental erasure

Slide the write-protect tab on the cassette to the protect position.



If the grip strap prevents the cassette lid from opening fully

Adjust the length of the grip strap (p. 165).

If flashes even if the cassette has been inserted

Press the PUSH button again to close the cover firmly.

Recording a picture

Your camcorder automatically focuses for you.

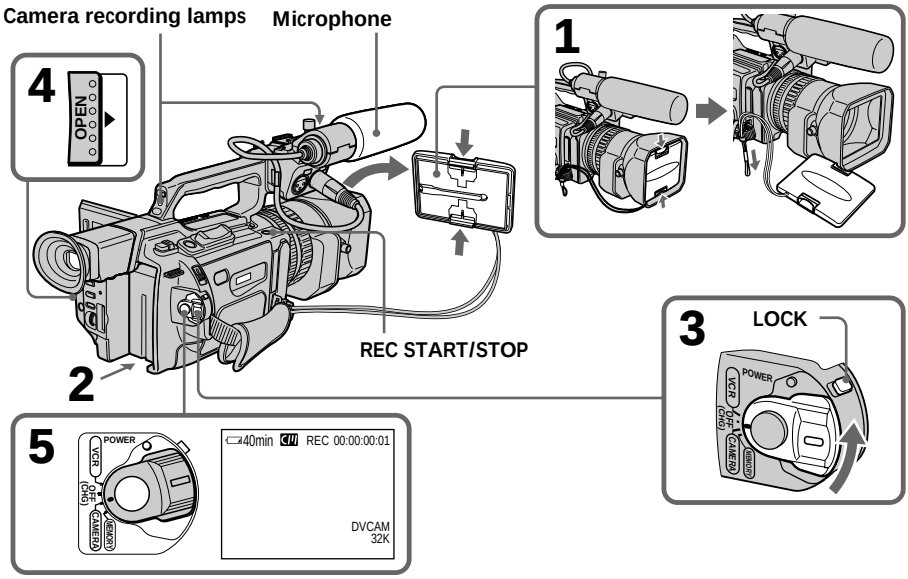
(1) Remove the hood cap and pull the hood cap string to fix it.

(2) Install the power source and insert a cassette. See “Step 2” and “Step 3” for more information (p. 10 to 15).

(3) Set the POWER switch to CAMERA while pressing the small green button. Your camcorder is set to the standby mode.

(4) Slide OPEN in the direction of the ▶ mark to open the LCD panel. The picture now being shot is displayed on the LCD screen, and it disappears from the viewfinder screen.

(5) Press START/STOP. Your camcorder starts recording. The “REC” indicator appears. The camera recording lamps located on the front and rear of your camcorder light up. To stop recording, press START/STOP again. You can use REC START/STOP located on the front instead of START/STOP on the rear.



If the ND1 or ND2 indicator flashes on the LCD screen or in the viewfinder

The ND filter is necessary. Set the ND FILTER selector to 1 or 2. However, if you change the position during recording, the brightness of the picture may change or audio noise may occur. This is not a malfunction. We recommend that you check the position of the ND FILTER selector before shooting. See “Using the ND filter” on page 46.

Note

Fasten the grip strap firmly.

Note on the recording format

Your camcorder records and plays back both in the DVCAM format and in the DV format SP mode. Select the format in the menu settings.

Note on the LOCK switch

When you slide the LOCK switch to the left, the POWER switch can no longer be set to MEMORY accidentally. The LOCK switch is set to the right as a default setting. We recommend that you set the LOCK switch to the left when you record on a cassette.

Note on the progressive mode

If you intend to use the images on your PC or play the images back as still images, we recommend that you set PROG. SCAN to ON in the menu settings before shooting (p. 104). The picture quality may improve in this mode, but if you shoot a moving subject, the image may shake when it is played back.

To enable smooth transition

Transition between the last scene you recorded and the next scene is smooth as long as you do not eject the cassette even if you turn off your camcorder. When you use a tape with cassette memory, however, you can make the transition smooth even after ejecting the cassette if you use the end search function (p. 25).
However, check the following:

- When you change the battery pack, set the POWER switch to OFF (CHG).
- Do not mix recordings in the DVCAM format and the DV format on one tape.

The playback picture may be distorted or the time code may not be written properly between scenes when you change the recording format.

If you leave your camcorder in standby mode for five minutes

The head drum of the camcorder automatically stops rotating. This is to prevent the tape wear and save the battery power. To re-start recording, press the START/STOP button. It may take more time to start recording. This is not a malfunction.

Usable cassettes

You can record both on mini DVCAM cassettes and on mini DV cassettes using your camcorder. When you use a mini DV cassette, set REC MODE to DV SP in the menu settings. You can record on a tape 1.5 times longer than the DVCAM format. When you want to record in the DV format or to make longer recording, use the mini DV cassette.

Notes

- If you record in the DV format, the transition of a tape may not be smooth. We recommend that you use mini DVCAM cassettes and set REC MODE to DVCAM in the menu settings to obtain reliable clear pictures.
- You cannot record on a tape in LP mode in the DV format.

If you use a mini DV cassette without setting REC MODE to DV SP

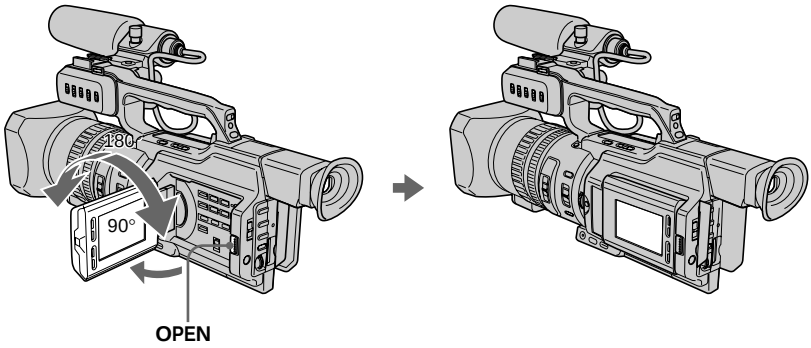
The recordable time is 2/3 time that indicated on the cassette.

Cassettes that can be played back with your camcorder

You can play back both cassettes recorded in the DVCAM format or in the DV format, however, you cannot play back cassettes that recorded in LP mode in the DV format.

Adjusting the LCD screen

The LCD panel is opened up to 90 degrees and it rotates about 90 degrees to the viewfinder side and about 180 degrees to the lens side.
If you turn the LCD panel over so that it faces the other way in standby or recording mode, the ☺ indicator appears on the LCD screen and in the viewfinder **(Mirror mode)**.



To close the LCD panel, set it vertically and swing it into the camcorder body until it clicks.

Note

When opening the LCD panel, the viewfinder is automatically turned off, however, it is not turned off when the LCD panel is turned over or the camcorder is in mirror mode.

When you use the LCD screen outdoors in direct sunlight

The LCD screen may be difficult to see. If this happens, we recommend that you use the viewfinder.

When you adjust the angle of the LCD panel

Make sure that the LCD panel is opened up to 90 degrees.

When using both the LCD screen and the viewfinder during shooting

The usable time of the battery pack when using both the LCD screen and the viewfinder will be shorter a little than when using the viewfinder only.

Pictures in the mirror mode

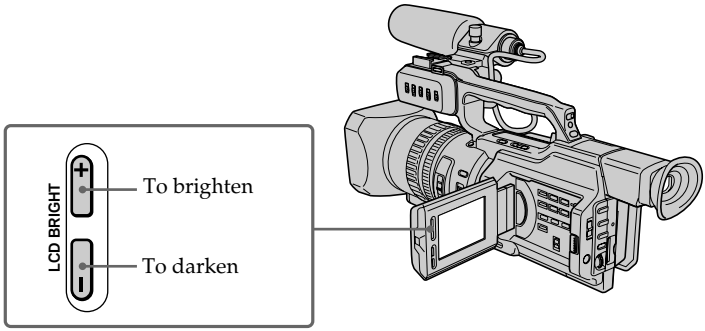
The picture on the LCD screen is a mirror-image. However, the recording picture will be normal.

Indicators in the mirror mode

The STBY indicator appears as ●❚❚ and REC as ●. Some of the other indicators appear mirror-reversed and others are not displayed. However, if you close the LCD panel with the LCD screen turned over, indicators appear normally.

Adjusting the brightness of the LCD screen

To adjust the brightness of the LCD screen, press LCD BRIGHT + or –.
The battery life is longer when the LCD panel is closed. Use the viewfinder instead of the LCD screen to save the battery power.

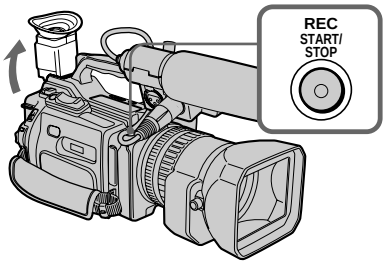


On the LCD screen backlight
You can change the brightness of the backlight. Select LCD B.L. in the menu settings (p. 104).

Even if you do the LCD screen adjustment using the LCD BRIGHT +/– buttons, or using LCD B.L. and LCD COLOR items in the menu settings
The recorded picture will not be affected.

Recording in a low position

You can record in a low position to get an interesting recording angle. Lift up the viewfinder or rotate the LCD panel with the screen facing up to record from a low position. In this case, it is useful to use the REC START/STOP button located on the front or the camcorder.



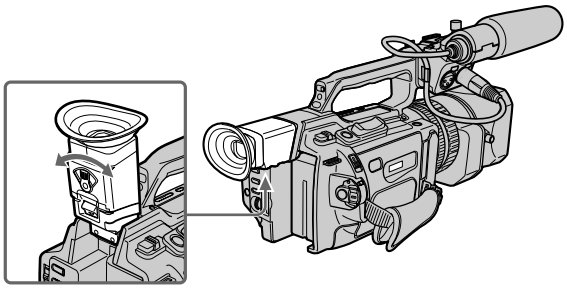
After recording

(1) Set the POWER switch to OFF (CHG).
(2) Close the LCD panel.
(3) Eject the cassette.
(4) Remove the battery pack.

Adjusting the viewfinder

If you record pictures with the LCD panel closed, check the picture with the viewfinder. Adjust the viewfinder lens to your eyesight so that the indicators in the viewfinder come into sharp focus.

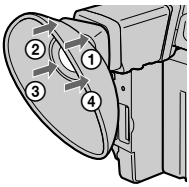
Lift up the viewfinder and move the viewfinder lens adjustment lever.



To adjust the brightness of the viewfinder screen, use the VF B.L. item in the menu settings (p. 104).

Even if you adjust the viewfinder screen backlight
The recorded picture will not be affected.

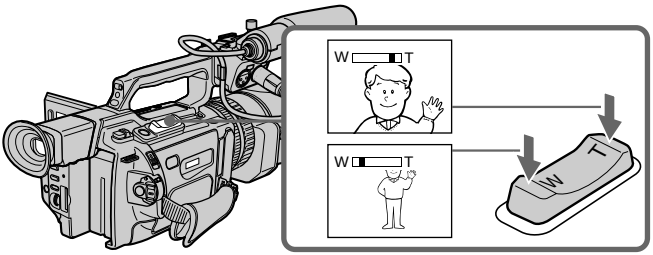
When the shooting conditions are too bright
Use the supplied large eyecup. Fit it onto the camcorder by stretching the corners a little. You can attach it with the large part of it located on both left and right.



Using the zoom feature

To zoom with the zoom lever

Press the power zoom lever a little for a slower zoom. Press it deeper for a faster zoom. Using the zoom function sparingly results in better-looking recordings.
"T" side: for telephoto (subject appears closer)
"W" side: for wide-angle (subject appears farther away)

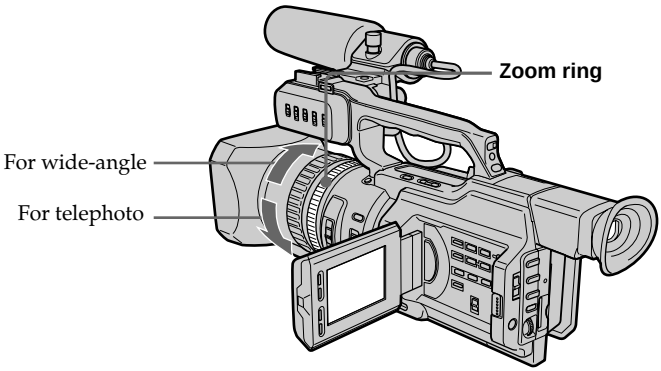


When you shoot close to a subject

If you cannot get a sharp focus, press the "W" side of the power zoom lever until the focus is sharp. You can shoot a subject that is at least about 80 cm (about 2 feet 5/8 inch) away from the lens surface in the telephoto position, or about 1 cm (about 1/2 inch) away in the wide-angle position.

To zoom with the zoom ring

Using the zoom ring, you can control the zoom by your desired speed and you can make fine adjustments.
During recording, turn the zoom ring to the desired speed.



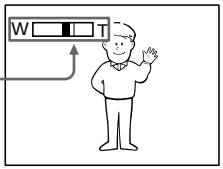
Note

If you turn the zoom ring quickly, the zoom may not respond to the zoom ring adjustment. Rotate the zoom ring with appropriate speed.

Using the digital zoom – Zoom greater than 12×

Zoom greater than 12× is performed digitally, if you set D ZOOM to 24× or 48× in the menu settings. The digital zoom function is set to OFF as a default setting (p. 104). If you use the digital zoom function, the picture quality deteriorates.

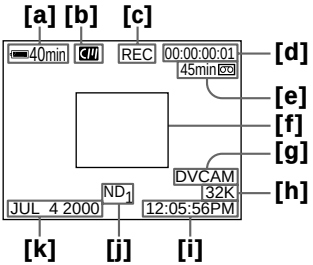
The right-ended portion of the bar shows the digital zooming zone. The digital zooming zone appears when you set D ZOOM to 24× or 48×.



You cannot use the digital zoom:
– When you set PROG. SCAN to ON in the menu settings (p. 104).
– When the POWER switch is set to MEMORY.

Indicators displayed during recording

The indicators are not recorded on the tapes.



[a] Remaining battery time indicator
This appears after you turn on the power and wait for a while.
[b] Cassette memory indicator
This appears when using a tape with cassette memory.
[c] STBY/REC indicator
[d] Time code/User bits
[e] Remaining tape indicator
This appears after you insert a cassette.
[f] Guide frame
[g] DVCAM format/DV format in SP mode indicator
[h] Audio mode indicator
[i] Time indicator
[j] ND filter indicator
The most suitable mode will flash regardless of the current mode.
When you have selected it, the ND filter mode displayed on the LCD screen or in the viewfinder will disappear.
[k] Date indicator

Time code
The time code indicates the recording or playback time, "00:00:00:00" (hours : minutes : seconds : frames). You cannot rewrite only the time code. You can preset the time code. The time code can be preset or be reset during recording (p. 89). You can select the drop frame or non-drop frame system using the menu.

On user bits display
You can display the user bits, pressing TC/U-BIT (p. 93).

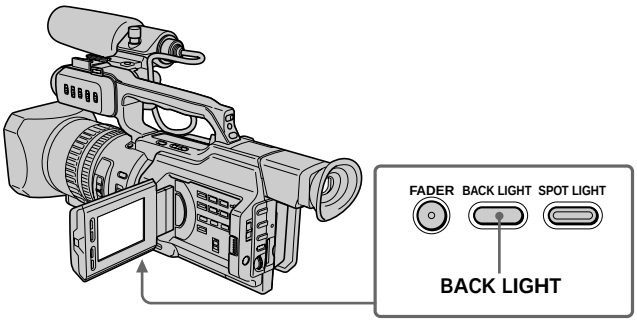
Remaining tape indicator
The indicator may not be displayed accurately depending on the tape.

Note on the date/time indicator
Recording date/time is not displayed during shooting, however, it is automatically recorded on the tape. You can check the recording date/time during playback by pressing DATA CODE. When you want to display the date and time during shooting, set DATE REC to ON in the menu settings. However, once you record with the date and time, you cannot erase them.

Shooting backlit subjects (BACK LIGHT)

When you shoot a subject with the light source behind the subject or a subject with a light background, use the backlight function.

Press BACK LIGHT in standby, recording, or memory mode.
The ◪ indicator appears on the LCD screen or in the viewfinder.
To cancel, press BACK LIGHT again.



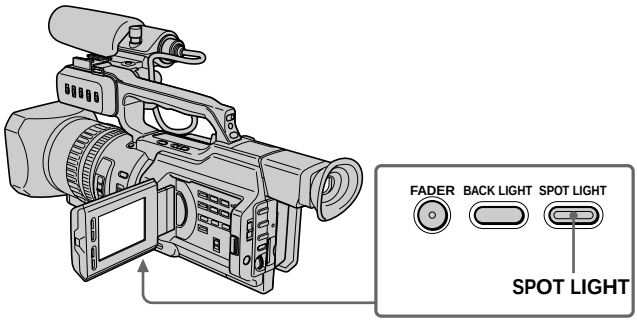
If you press SPOT LIGHT when using the backlight function
The backlight function will be canceled and the spot light function will be enabled.

When you manually adjust more than two of the following functions: iris, gain, and shutter speed
You cannot use the backlight function.

Spot light

This function prevents people's faces, for example, from appearing excessively white when shooting subjects lit by strong light, such as in the theater.

Press SPOT LIGHT in standby, recording, or memory mode.
The indicator appears on the LCD screen or in the viewfinder.
To cancel, press SPOT LIGHT again.

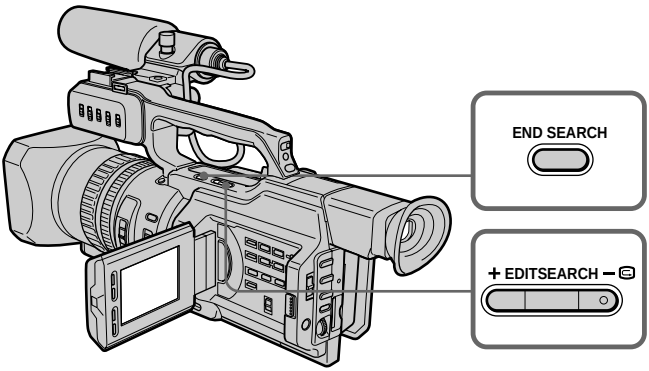


If you press BACK LIGHT when using the spot light function
The spot light function will be canceled and the backlight function will be enabled.

You cannot use the spotlight mode while in the following settings:
– Old movie
– Shutter speed value of 1/30 or smaller
– When you manually adjust more than two of the following functions: iris, gain, and shutter speed

Checking the recording – END SEARCH / EDITSEARCH / Rec Review

You can use these buttons to check recorded pictures or shoot so that the transition between the last recorded scene and the next scene you record is smooth.



Searching the end point of the recording — END SEARCH

You can easily go to the end of the last recorded portion.

Press END SEARCH in standby mode.
The camcorder rewinds or fast-forwards the tape and the last five-second recorded picture is played back. After playback the camcorder turns to standby mode. You can monitor the sound from the speaker or headphones.

Changing the next recording start point — EDITSEARCH

You can change the next recording start point in standby mode.

Hold down the +/– side of EDITSEARCH in standby mode. The recorded picture is played back.
+: to go forward
–: to go backward
Release EDITSEARCH to stop playback. If you press START/STOP, re-recording begins from the point you released EDITSEARCH. You cannot monitor the sound.

Checking the last recorded picture — Rec Review

You can check the last recorded portion.

Press the –⏪ side of EDITSEARCH momentarily in standby mode.
The last few-seconds of picture is played back and the camcorder returns to standby. You can monitor the sound from the speaker or headphones.

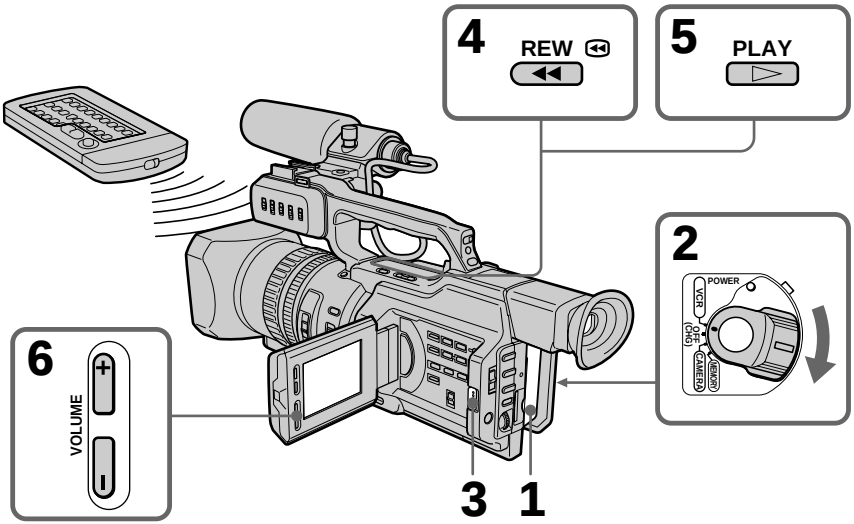
End search function

When you use a tape without cassette memory, the end search function does not work once you eject the cassette after you have recorded on the tape. If you use a tape with cassette memory, the end search function works even once you eject the cassette.
If there is a blank portion at the beginning or between the recorded portions, the end search function may not work correctly (p. 142).

Playing back a tape

You can monitor the playback picture on the LCD screen. If you close the LCD panel, you can monitor the playback picture in the viewfinder. You can also control playback using the Remote Commander supplied with your camcorder.

(1) Install the power source and insert the recorded tape.
(2) Set the POWER switch to VCR while pressing the small green button. The video control buttons light up.
(3) Slide OPEN in the direction of the ▶ mark to open the LCD panel.
(4) Press ◀◀ to rewind the tape.
(5) Press ▶ to start playback.
(6) To adjust the volume, press either of the VOLUME +/– buttons .

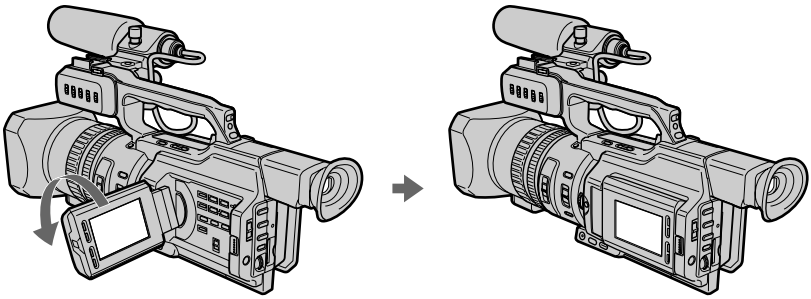


To stop playback

Press ■.

When monitoring on the LCD screen

You can turn the LCD panel over and move it back to the camcorder body with the LCD screen facing out.

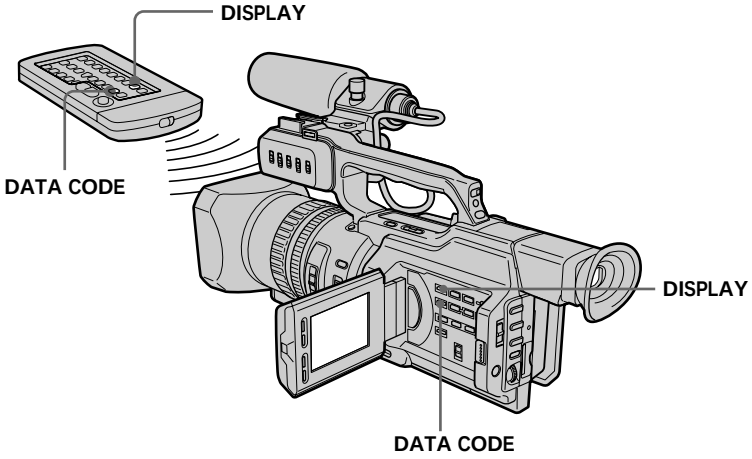


When you close the LCD panel

You cannot monitor the sound from the speaker. However, when the LCD panel is turned over to view on the LCD screen, you can monitor the sound from the speaker.

To control the display of the screen indicators

Press DISPLAY on the camcorder or on the Remote Commander supplied with your camcorder.
The indicators appear on the LCD screen or in the viewfinder.
To make the indicators disappear, press DISPLAY again.



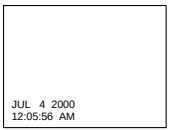
Using the data code function

Your camcorder automatically records not only images on the tape but also the recording data (date/time or various settings when recorded) **(Data code)**.

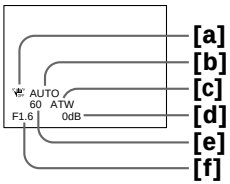
Press DATA CODE on the camcorder or on the Remote Commander supplied with your camcorder in playback mode.

The display changes as follows:
date/time → various settings (SteadyShot, white balance, gain, shutter speed, aperture value, exposure mode) → no indicator

Date/time



Various settings



[a] SteadyShot OFF indicator
[b] Exposure mode indicator
[c] White balance indicator
[d] Gain indicator
[e] Shutter speed indicator
[f] Aperture value

To not display the various settings

Set DATA CODE to DATE in the menu settings (p. 104).
The display changes as follows:
date/time ↔ no indicator

Recording data

Recording data is your camcorder's information when you have recorded something. In CAMERA mode, the recording data will not be displayed.

When you use the data code function, "--- -- ----" (date) or "-- : -- : --" (time) appears if:

– A blank portion of the tape is being played back.
– The tape is unreadable due to tape damage or noise.
– The tape was recorded by the camcorder without the date and time set.

Data code

When you connect your camcorder to the TV, the data code also appears on the TV screen (p. 31).

Note on the date/time indicator

Recording date/time is not displayed during shooting, however, it is automatically recorded on the tape. You can check the recording date/time during playback by pressing DATA CODE. When you want to display the date and time during shooting, set DATE REC to ON in the menu settings. However, once you record with the date and time, you cannot erase them.

If the aperture adjustment is set to minimum

"CLOSE" is displayed at the location of the aperture value.

Various playback modes

To operate video control buttons, set the POWER switch to VCR.

To view a still picture (playback pause)

Press II during playback. To resume normal playback, press ► or II.

To advance the tape

Press ►► in stop mode. To resume normal playback, press ►.

To rewind the tape

Press ◄◄ in stop mode. To resume normal playback, press ►.

To change the playback direction

Press < on the Remote Commander during playback to reverse the playback direction. To resume normal playback, press ►.

To locate a scene monitoring the picture (picture search)

Keep pressing ◄◄ or ►► during playback. To resume normal playback, release the button.

To monitor the picture at high-speed while advancing or rewinding the tape (skip scan)

Keep pressing ◄◄ while rewinding or ►► while advancing the tape. To resume rewinding or advancing, release the button.

To view the picture at slow speed (slow playback)

Press I► during playback. For slow playback in the reverse direction, press < on the Remote Commander, then press I►. To resume normal playback, press ►.

To view the picture at double speed

Press ×2 on the Remote Commander during playback. For double speed playback in the reverse direction, press <, then press ×2 on the Remote Commander. To resume normal playback, press ►.

To view the picture frame-by-frame

Press II► on the Remote Commander in playback pause mode. For frame-by-frame playback in the reverse direction, press ◄II. To resume normal playback, press ►.

To search the last scene recorded (END SEARCH)

Press END SEARCH in stop mode. The last five seconds of the recorded portion plays back and stops.

In various playback modes

- Sound is muted.
- The previous picture may remain as a mosaic image during playback.

When the playback pause mode lasts for five minutes

Your camcorder automatically enters the stop mode. To resume playback, press ►.

Slow playback

Slow playback can be performed smoothly on your camcorder: however, this function does not work for a signal output through the i.LINK DV IN/OUT jack.

When you play back a tape in reverse

Horizontal noise may appear at the center, or the top and bottom of the screen. This is not a malfunction.

Note on DV-formatted tapes

You can play back DV-formatted tapes on this camcorder if the tape is recorded in SP mode. "DV SP" appears on the LCD screen or in the viewfinder during playback. You cannot play back DV-formatted tapes recorded in LP mode.

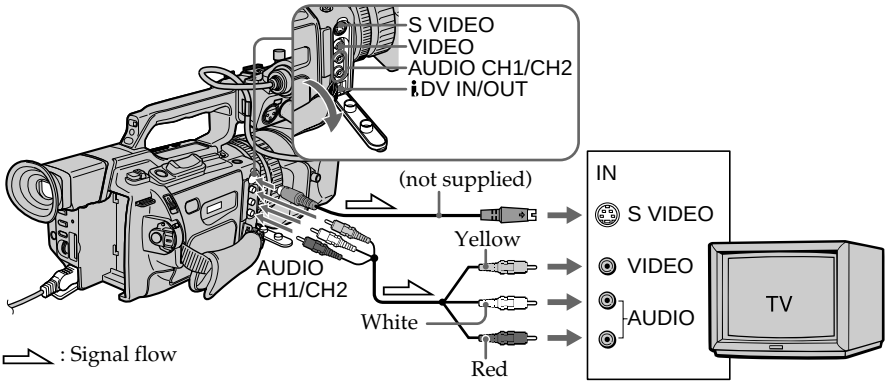
If you insert the cassette recorded in a PAL system

The camcorder automatically identify the system, and playback starts. You can only view the picture only on the LCD screen or in the viewfinder of your camcorder. **(Quasi PAL playback)**

Viewing the recording on TV

Connect your camcorder to your TV or VCR with the A/V connecting cable supplied with your camcorder to watch the playback picture on the TV screen. You can operate the video control buttons in the same way as when you monitor playback pictures on the LCD screen. When monitoring the playback picture on the TV screen, we recommend that you power your camcorder from a wall outlet using the AC power adaptor (p. 14). Refer to the operating instructions of your TV or VCR.

Open the jack cover. Connect your camcorder to the TV using the A/V connecting cable supplied with your camcorder. Then, set the TV/VCR selector on the TV to VCR.



If your TV is connected to a VCR

Connect your camcorder to the line input on the VCR by using the A/V connecting cable supplied with your camcorder. Set the input selector on the VCR to LINE.

If your TV or VCR is a monaural type

Connect with the TV or VCR using the audio cable (monaural ↔ stereo) (not supplied).

If your TV or VCR has an S video jack

Connect using an S video cable (not supplied) to obtain high-quality pictures. With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable.

Connect the S video cable (not supplied) to the S video jacks on both your camcorder and the TV or the VCR.

This connection produces higher quality DVCAM/DV format pictures.

When you adjust the TV screen

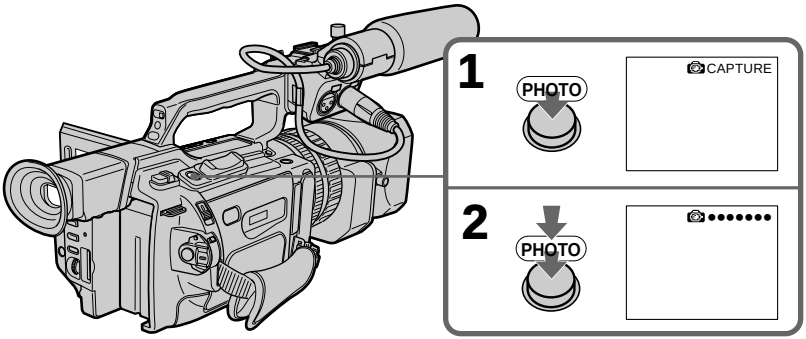
If you monitor the shooting picture, not the playback picture, set COLOR BAR to ON in the menu settings (p. 104). The color bar is displayed on the TV screen.

Recording a still image on a tape – Tape Photo recording

You can record still images on tapes with all the pixels in the progressive mode. See page 34 for details. This mode is useful when you print images using a video printer (not supplied).
Besides the operation described here, your camcorder can record still images on a "Memory Stick" (p. 118).

(1) In standby mode, keep pressing PHOTO lightly until a picture freezes. The CAPTURE indicator appears. Recording does not start yet.
To change the image, release PHOTO, select an image again, and then press and hold PHOTO lightly.

(2) Press PHOTO deeper.
The still image on the LCD screen or in the viewfinder is recorded for about seven seconds. The sound during those seven seconds is also recorded.
The still image is displayed on the LCD screen or in the viewfinder until recording is completed.



The number of still images recordable on a cassette

You can record about 340 images in the DVCAM format on a 40-minute DVCAM cassette and about 510 images in the DV format on a 60-minute DV cassette.

Notes

- During tape photo recording, you cannot change the mode or setting.
- The PHOTO button does not work:
  – While the fader function is set or in use.
  – While the digital effect function is set or in use.
- Do not shake the camcorder during tape photo recording, the recorded image may be blurred.

To do tape photo recording using the Remote Commander

Press PHOTO on the Remote Commander. Your camcorder immediately records an image on the LCD screen or in the viewfinder.

When you do tape photo recording during normal CAMERA recording

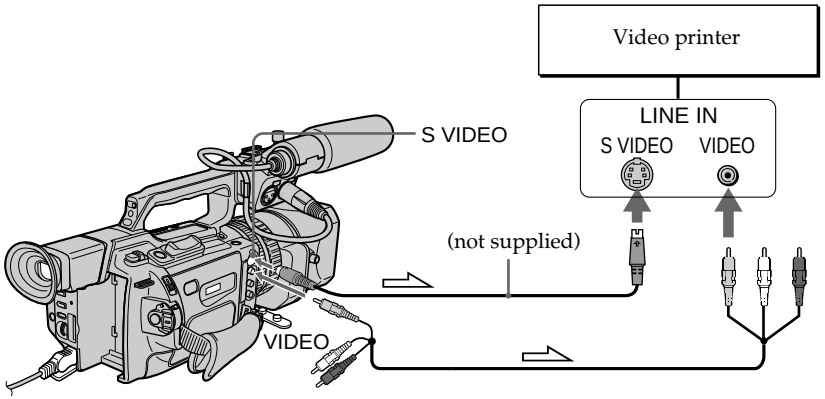
You cannot check an image on the LCD screen or in the viewfinder by pressing PHOTO lightly. Press PHOTO deeper. The still image is then recorded for about seven seconds and your camcorder returns to standby mode.

When shooting a moving object in Tape Photo recording

When playing back the image by another unit, the image may be blurred. This is not a malfunction.

Printing the still image

You can print a still image by using a video printer (not supplied). Connect with the video printer using the A/V connecting cable supplied with your camcorder. Connect the yellow plugs of the cable to the video input of the video printer and the VIDEO jack on your camcorder. Refer to the operating instructions of the video printer as well.



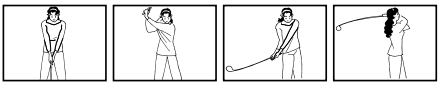
: Signal flow

If the video printer is equipped with an S video input

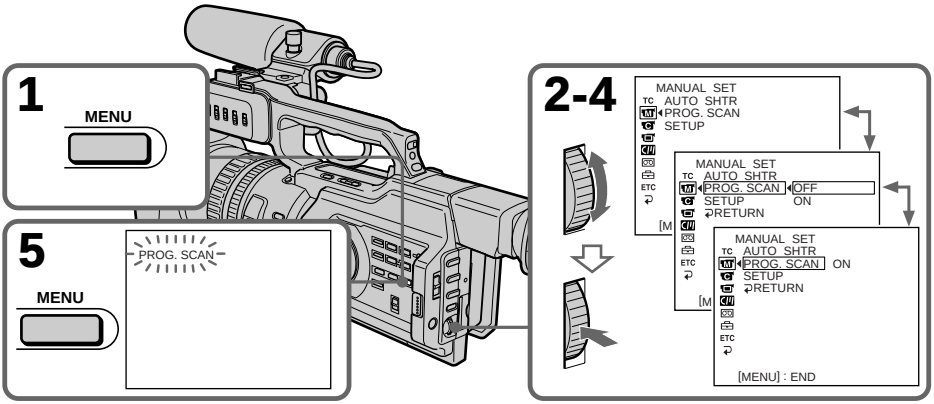
Use an S video connecting cable (not supplied). Connect it to the S VIDEO jack on your camcorder and the S video input of the video printer.

Shooting with all the pixels – PROG. SCAN

To import moving images to your PC to view still images, we recommend you record in progressive mode. To use progressive mode, follow the procedure below. Still images produced this way are more stable than those recorded on a mini DV in normal mode, and thus are more suitable for analyzing high-speed action such as sports scenes. (Since this camcorder takes in an image every 1/15 of a second in progressive mode, moving images recorded in this mode may be subject to too much jitter. To view moving images, we recommend recording in normal mode.)



(1) Press MENU to display the menu in standby mode.
(2) Turn the SEL/PUSH EXEC dial to select M, then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select PROG. SCAN, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(5) Press MENU to erase the menu display. The PROG. SCAN indicator lights up.



To return to normal mode

Select OFF in step 4, then press the SEL/PUSH EXEC dial.

Note on the progressive mode

A normal TV broadcast divides the screen into two finer fields and displays them in turns every 1/60 of a second. Thus, the actual image displayed in an instant covers only half of the apparent image area. Displaying the whole image simultaneously on a full screen is called displaying with all the pixels. In this mode, the resolution of the still picture is clearer than in the normal mode. This camcorder takes in an image every 1/15 of a second, which may cause the image of a moving object to go out of focus. This camcorder is originally programed to record in the normal TV format.

When shooting under fluorescent light

When shooting in progressive mode under fluorescent light or light bulbs, a rare phenomenon may happen in which the screen lights up brightly (Flicker phenomenon). This is not a malfunction. If you want to stop this phenomenon, set PROG. SCAN to OFF in the menu settings.

On digital zooming

You cannot use digital zooming in this mode.

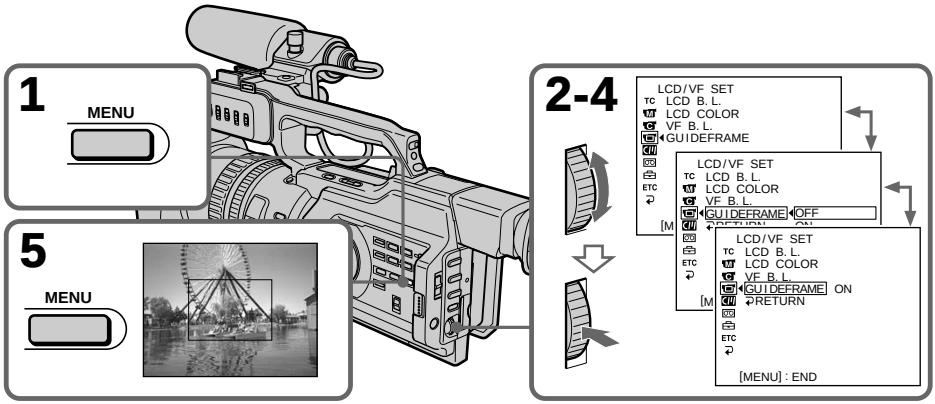
When the auto logo insert function is activated

You cannot use the progressive mode.

Using the guide frame

You can easily make the picture be on a horizontal line using the guide frame. The guide frame is not recorded.

(1) Press MENU to display the menu in standby, recording, or memory mode.
(2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select GUIDEFRAME, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(5) Press MENU to erase the menu display. The guide frame is displayed on the LCD screen or in the viewfinder.



To clear the guide frame

Select OFF in step 4, then press the SEL/PUSH EXEC dial or simply press DISPLAY.

Note

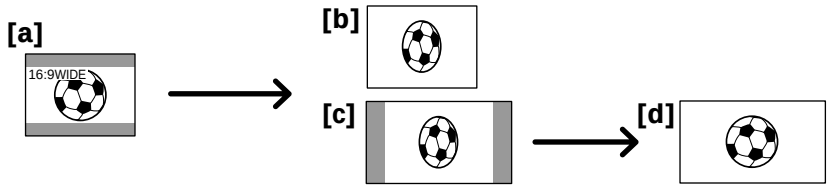
The guide frame indicates only a rough level. The size and position of the guide frame do not affect the setting of the camcorder.

If you set GUIDEFRAME to ON

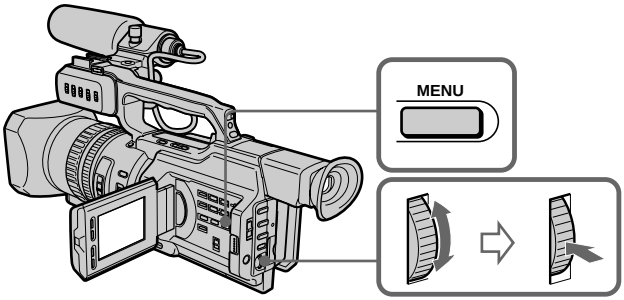
The other screen indicators are also displayed on the LCD screen or in the viewfinder.

Using the wide mode

You can record a 16:9 wide picture to watch on a 16:9 wide-screen TV (16:9WIDE). Black bands appear on the LCD screen or in the viewfinder during recording in 16:9WIDE mode **[a]**. The picture during playback on a normal TV **[b]** or on a wide-screen TV **[c]** is compressed in the widthwise direction. If you set the screen mode of the wide-screen TV to the full mode, you can watch pictures of normal images **[d]**.



In standby mode, set 16:9WIDE to ON in in the menu settings (p. 104).



To cancel the wide mode

Set 16:9WIDE to OFF in the menu settings (p. 104).

In wide mode, you cannot select the following modes:

- Old movie
- Progressive mode

Connection to a TV

Pictures recorded in 16:9WIDE mode automatically appear on the TV screen at full size when you connect your camcorder to a TV that is compatible with the video ID (ID-1/ ID-2) system and when you connect to the S video input jack on a TV.

ID-1 system

The ID-1 system sends aspect ratio information (16:9, 4:3, or letter box) using video signals. If you connect a TV compatible with the ID-1 system, the screen size is automatically selected.

ID-2 system

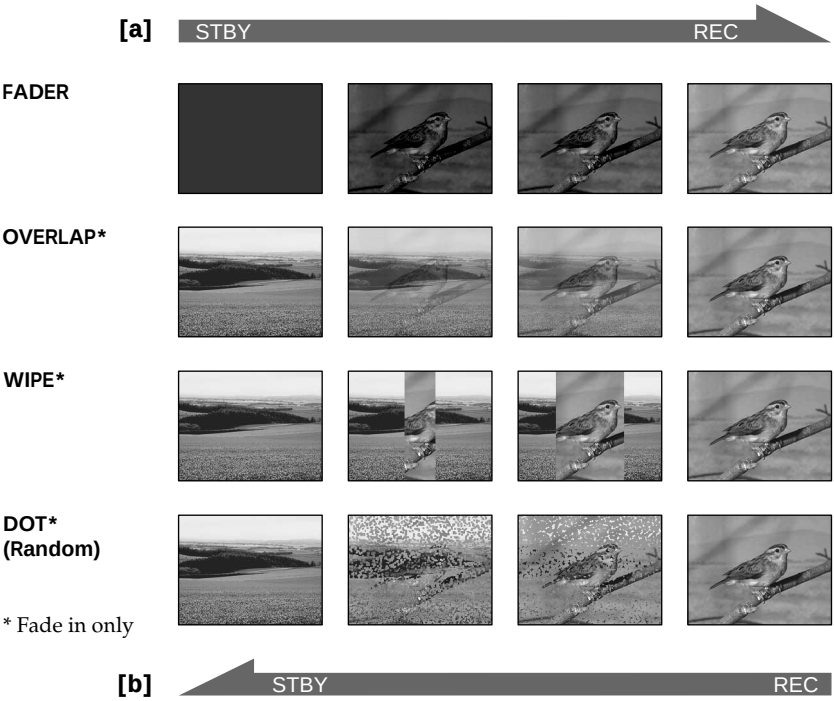
The ID-2 system sends a copyright protection signal with ID-1 signals inserted between video signals when you connect your camcorder to other equipment using an A/V connecting cable.

During recording

You cannot operate the wide mode function. When you cancel the wide mode, set your camcorder to the standby mode and then set 16:9WIDE to OFF in the menu settings.

Using the fader function

You can fade the picture in or out to give your recording a professional appearance.

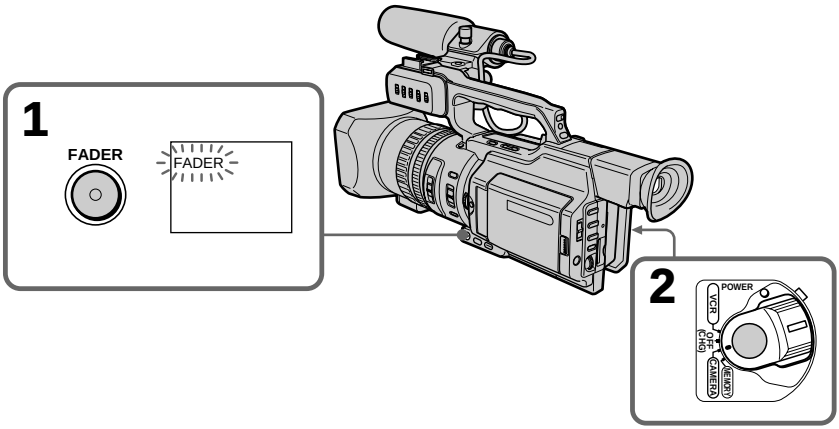


MONOTONE

When fading in, the picture gradually changes from black-and-white to color.
When fading out the picture gradually changes from color to black-and-white.

(1) When fading in [a]
In standby mode, press FADER until the desired fader indicator flashes.
When fading out [b]
In recording mode, press FADER until the desired fader indicator flashes.
The indicator changes as follows:
FADER → MONOTONE → OVERLAP → WIPE → DOT → no indicator
The last selected fader mode is indicated first.

(2) Press START/STOP. After the fade in/out is carried out, your camcorder automatically returns to the normal mode.



To cancel the fader function

Press FADER until the indicator disappears.

Note

You cannot use the following functions while using the fader function, and vice versa:
– Digital effect
– Tape Photo recording
– Interval recording
– Cut recording

When the OVERLAP, WIPE, or DOT indicator appears

Your camcorder automatically stores the image recorded on a tape. As the image is being stored, the fader indicator flashes fast, and the playback picture appears.

Using special effects – Digital effect

You can add special effects to recorded pictures using the various digital functions. The sound is recorded normally.

STILL
You can record a still image so that it is superimposed on a moving picture.

FLASH (FLASH MOTION)
You can record still images successively at constant intervals.

LUMI. (LUMINANCEKEY)
You can swap a brighter area in a still image with a moving picture.

TRAIL
You can record the picture so that an incidental image like a trail is left.

OLD MOVIE
You can add an old movie type atmosphere to pictures. The black bands appear on the upper and lower of the screen to change the virtual screen size to the cinemascope size, and the picture effect is set to SEPIA.

STILL

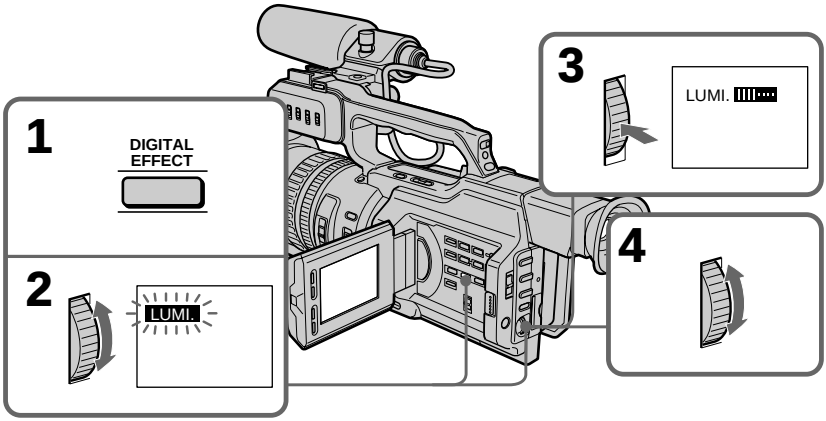
LUMI.

(1) In standby or recording mode, press DIGITAL EFFECT. The digital effect indicator appears.
(2) Turn the SEL/PUSH EXEC dial to select the desired digital effect mode. The digital effect indicator changes as follows:
STILL ↔ FLASH ↔ LUMI. ↔ TRAIL ↔ OLD MOVIE
(3) Press the SEL/PUSH EXEC dial. The indicator lights up and the bar appears. In STILL and LUMI. modes, the still image is stored in memory.
(4) Turn the SEL/PUSH EXEC dial to adjust the effect.

Items to be adjusted

STILL	The rate of the still image you want to superimpose on the moving picture
FLASH	The interval of flash motion
LUMI.	The color scheme of the area in the still image which is to be swapped with a moving picture
TRAIL	The time until the incidental image vanishes
OLD MOVIE	No adjustment necessary

The longer the bar on the screen, the stronger the digital effect. The bar appears in the following modes: STILL, FLASH, LUMI. and TRAIL.



To cancel the digital effect

Press DIGITAL EFFECT. The digital effect indicator disappears.

Notes

- The following functions do not work in digital effect mode:
  – Fader
  – Tape Photo recording
  – Shutter speed (1/30 or smaller) adjustment
- The following functions do not work in old movie mode:
  – Wide mode
  – Spot light mode
  – Shutter speed adjustment

When you turn the power off

The digital effect will be automatically canceled.

Shooting with manual adjustment

Under normal conditions, this unit automatically makes various adjustments as it shoots. However, you can adjust the following functions manually to suit your preference.

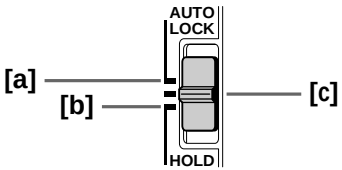
Functions you can adjust by setting the AUTO LOCK selector to the center (auto lock release) position
Iris, gain, shutter speed, and white balance

Functions you can adjust in menu settings
Deactivating the SteadyShot

Functions you can adjust by using other selectors/rings
ND filter, zebra pattern, focus, AE shift, and zoom

The following describes how to adjust all the functions mentioned above except white balance (p. 50), focus (p. 58), and zoom (p. 21).

AUTO LOCK selector
Set the selector as shown below to maintain or release the settings of the functions.



AUTO LOCK [a]
Select this position to let the unit adjust all the functions automatically.

HOLD [b]
Select this position after setting the functions manually to maintain the settings.

Manual position (AUTO LOCK release) [c]
Select this position to adjust the functions listed above manually.

If you use the video flash light (not supplied)
We recommend that you set the AUTO LOCK selector to AUTO LOCK.

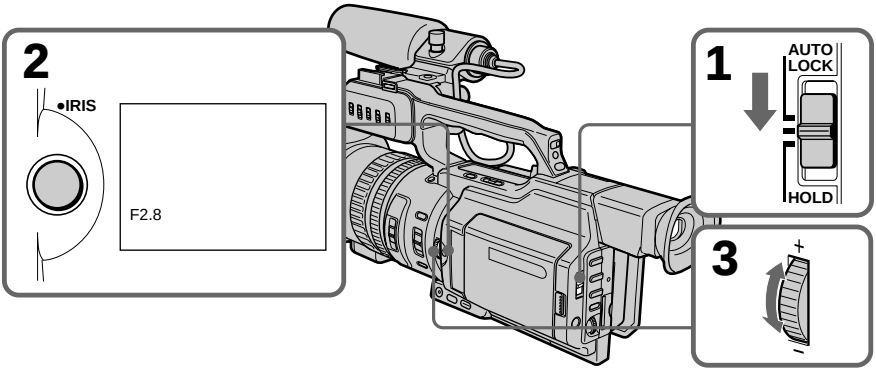
Notes

- When you manually adjust more than two of the following functions during backlight or spot light mode: iris, gain, and shutter speed, the backlight or spot light function will be automatically canceled.
- The functions (iris, gain, and shutter speed) that are not adjusted manually will be automatically adjusted according to shooting conditions.

Adjusting the iris

Adjust the iris manually depending on the depth of field.

(1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
(2) Press IRIS. The iris indicator appears on the LCD screen or in the viewfinder.
(3) Turn the IRIS dial to adjust the iris.
As you turn the dial, the F value changes as follows:
F1.6 ⟷ ... ⟷ F11 ⟷ CLOSE.
For a smaller aperture, select a higher value.



To return to automatic iris mode

Set the AUTO LOCK selector to AUTO LOCK or press IRIS. The iris indicator disappears from the LCD or viewfinder screen.

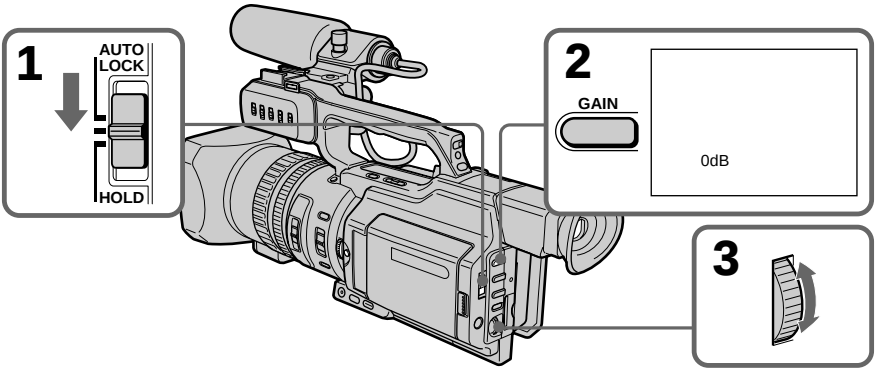
About the depth of field

The depth of field is the in-focus range, measured from the distance behind a subject to the distance in front. The depth of field can vary with the iris (F value) and the focal length. Lowering the F value (large iris) reduces the depth of field. Raising the F value (small iris) provides a larger depth of field. Zooming in telephoto position offers a smaller depth of field while the depth of field in the wide-angle position is greater.

The depth of field	Shallow	Deep
Iris	Near open (Low F value)	Near close (High F value)
Zoom	Telephoto (T)	Wide (W)

Adjusting the gain

(1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
(2) Press GAIN. The gain indicator appears on the LCD screen or in the viewfinder.
(3) Turn the SEL/PUSH EXEC dial to adjust the gain.
As you turn the dial the gain value changes between 0 dB and 18 dB.

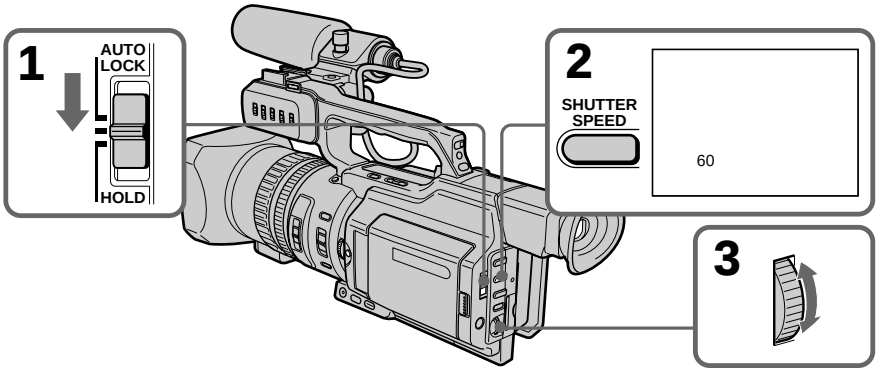


To return to automatic gain mode

Set the AUTO LOCK selector to AUTO LOCK or press GAIN. The gain indicator disappears from the LCD or viewfinder screen.

Adjusting the shutter speed

(1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.
(2) Press SHUTTER SPEED. The shutter speed indicator appears on the LCD screen or in the viewfinder.
(3) Turn the SEL/PUSH EXEC dial to select the desired speed. As you turn the dial, the shutter speed changes as follows:
1/4 ↔ 1/8 ↔ 1/15 ↔ 1/30 ↔ ... ↔ 1/4000 ↔ 1/6000 ↔ 1/10000
To increase the shutter speed, select a smaller setting (large value indicator on the LCD screen or in the viewfinder).



To return to automatic shutter speed mode

Set the AUTO LOCK selector to AUTO LOCK or press SHUTTER SPEED. The shutter speed indicator disappears from the LCD or viewfinder screen.

When shooting at slow shutter speed

At slow shutter speed, automatic focus may be lost. Adjust the focus manually using a tripod.

When shooting under fluorescent light or light bulbs

When shooting under fluorescent light or light bulbs, a rare phenomenon may happen in which the screen lights up brightly depending on the shutter speed (Flicker phenomenon).

If you set the shutter speed value to 1/30 or smaller

You cannot use the spot light (p. 24) and digital effect (p. 39) functions.

Using the ND filter

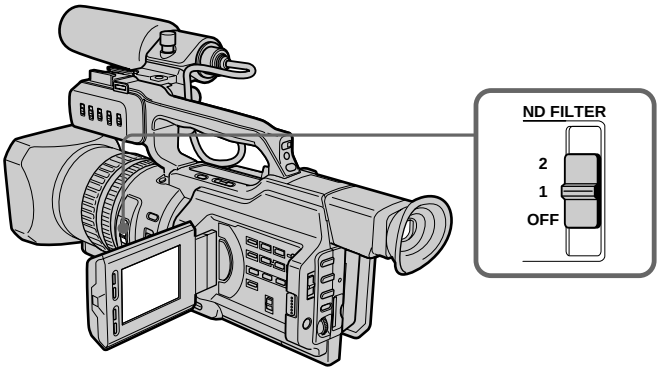
Using the ND filter (the ND filter 1 setting corresponds to 1/4 of the quantity of light and the ND filter 2 setting corresponds to 1/32 of the quantity of light), you can record a picture clearly by adjusting light amounts, even if you shoot under too bright conditions.

When the ND1 or ND2 indicator flashes on the LCD screen or in the viewfinder

The ND filter is necessary.
When ND 1 flashes, set the ND FILTER selector to 1 so that the ND 1 indicator disappears from the LCD or viewfinder screen.
When ND 2 flashes, set the ND FILTER selector to 2 so that the ND 2 indicator disappears from the LCD or viewfinder screen.

When ND OFF flashes on the LCD screen or in the viewfinder

The ND filter is not necessary. Set the ND FILTER selector to OFF so that the indicator disappears from the LCD or viewfinder screen.
The ND filter is now deactivated.



Notes

- If you set the ND FILTER selector to another positions during recording, the picture may be blurred or audio noise may occur. We recommend that you check the position of the ND FILTER selector before shooting.
- When shooting a too bright object, diffraction off the small aperture may cause slight off set in focusing. This phenomenon is quite common with a use of a video camera recorder. Using the ND filter will reduce influence of such phenomenon, and you can attain a better shooting condition.

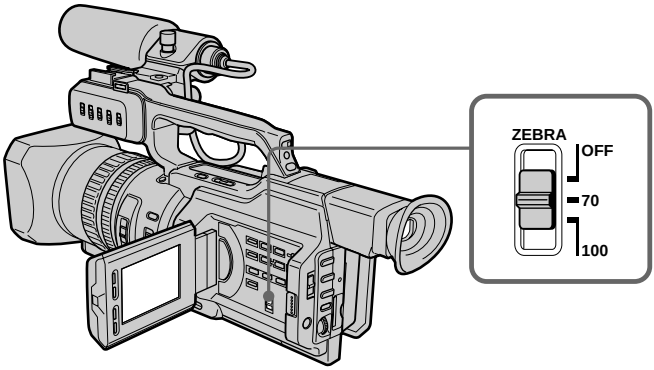
If you use the video flash light (not supplied)

Set the ND FILTER selector to OFF when you use the flash.

Shooting with the zebra pattern

You can set the camcorder to display a zebra pattern (diagonal stripes) in the portion of the picture on the LCD screen or in the viewfinder with a subject whose brightness exceeds a certain level. When the ZEBRA selector is set to 100, the portion of the picture where zebra pattern appears is an area of high brightness and overexposure. You can check the picture level of a subject by displaying the zebra pattern. Use the zebra pattern as a guide for adjusting the exposure and shutter speed so that you can get the desired picture.

Set the ZEBRA selector to 70 or 100 in standby or memory mode.



Setting	Meaning
70	The zebra pattern appears in the portion of the picture on the LCD screen or in the viewfinder with a subject whose brightness is about 70 IRE.
100	The zebra pattern appears in the portion of the picture on the LCD screen or in the viewfinder with a subject whose brightness exceeds more than 100 IRE.
OFF	The zebra pattern does not appear on the LCD screen or in the viewfinder.

To erase the zebra pattern

Set the ZEBRA selector to OFF.

Note on shooting with the zebra pattern

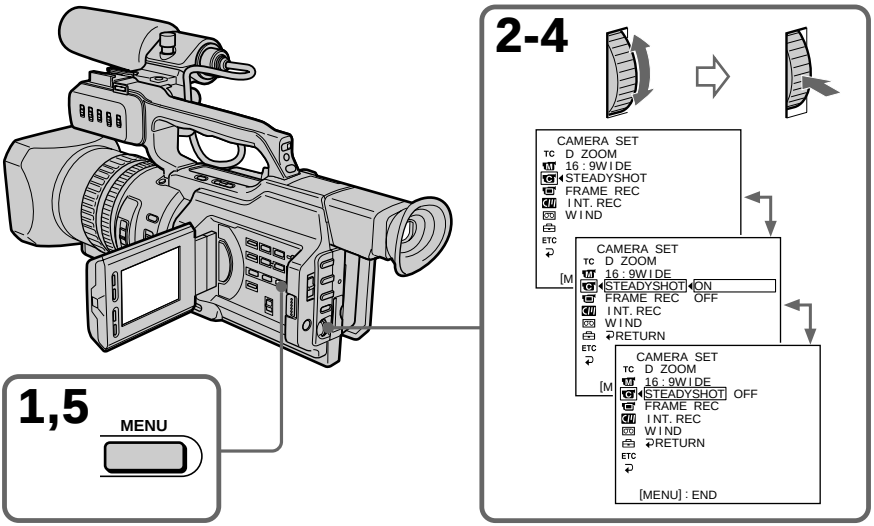
Even though you see the zebra pattern on the LCD screen or in the viewfinder, the zebra pattern is not recorded.

Releasing the SteadyShot function

When the SteadyShot function is working, the camcorder compensates for camera-shake.

You can release the SteadyShot function when you do not need to use it. The OFF indicator appears on the LCD screen or in the viewfinder. Do not use the SteadyShot function when shooting a stationary object with a tripod.

(1) Press MENU to display the menu in standby or memory mode.
(2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select STEADYSHOT, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select OFF, then press the dial.
(5) Press MENU to erase the menu display.



To activate the SteadyShot function again

Select ON in step 4, then press the SEL/PUSH EXEC dial.

Notes on the SteadyShot function

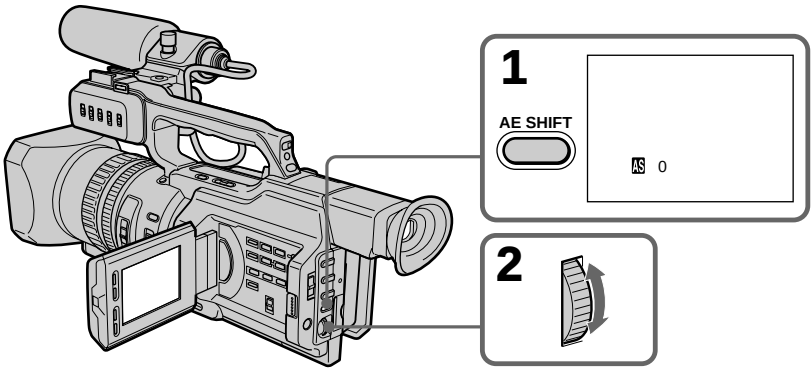
- The SteadyShot function will not correct excessive camera-shake.
- If you use a tele conversion lens (not supplied) or a wide conversion lens (not supplied), these lens may influence the SteadyShot function.

Adjusting the AE shift

You can adjust the AE shift in accordance with shooting conditions and a subject.

(1) Press AE SHIFT in standby, recording, or memory mode. The AE shift indicator appears on the LCD screen or in the viewfinder.

(2) Turn the SEL/PUSH EXEC dial to adjust the brightness.



To deactivate AE shift

Set the AE shift value to 0, or press AE SHIFT.

When you adjust AE shift

The AS –4 to AS +4 indicator is displayed on the LCD screen or in the viewfinder. The number varies corresponding to the AE shift level.

Adjusting the white balance

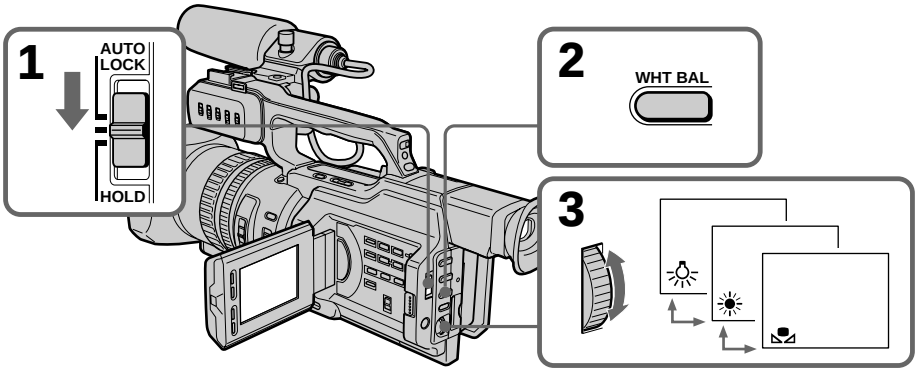
White balance adjustment makes white subjects look white and allows more natural color balance for camera recording. Normally, white balance is automatically adjusted. You can obtain better results by adjusting the white balance manually when lighting conditions change quickly or when recording outdoors: e.g., neon signs, fireworks.

(1) Set the AUTO LOCK selector to the center (auto lock release) position while the camcorder is in standby, recording, or memory mode.

(2) Press WHT BAL. The white balance indicator appears on the LCD screen or in the viewfinder.

(3) Turn the SEL/PUSH EXEC dial to select the appropriate white balance mode under the following conditions. As you turn the dial, the display changes as follows:

(One-push white balance) ↔ (Outdoor) ↔ (Indoor).



Indicator	Shooting conditions
	• Adjusting the white balance according to the light source. This operation is not available during recording. Follow the procedure described on the next page to adjust the setting again.
(Outdoor)	• Recording a sunset/sunrise, just after sunset, just before sunrise, neon signs, or fireworks • Under a color matching fluorescent lamp
(Indoor)	• Lighting condition changes quickly • Too bright a place such as a photography studio • Under sodium lamps or mercury lamps

If you have selected in step 3

When you set the white balance to one-push white balance mode, the setting is locked and maintained even if lighting conditions change. You can achieve recording with natural colors without the image being affected by ambient light.
(With the indicator on the screen)

(1) Shoot a white object such as paper fully.

(2) Press the SEL/PUSH EXEC dial.

The indicator flashes quickly. When the white balance has been adjusted and stored in the memory, the indicator stops flashing. The setting will be maintained even if the battery is detached.

To return to automatic adjustment

Set the AUTO LOCK selector to AUTO LOCK or press WHT BAL. The white balance indicator disappears from the LCD or viewfinder screen.

Notes on white balance

- When you shoot with studio lighting or video lighting, use the (indoor) mode.
- When you shoot with fluorescent lighting, readjust the white balance using the (one-push white balance) mode , or use the automatic white balance mode. If you use the (indoor) mode, white balance may not be adjusted appropriately.

Shooting when lighting conditions have changed

- When lighting conditions have changed, readjust the white balance while the camcorder is in standby mode.
- In automatic white balance mode, point your camcorder at a white subject for about 10 seconds after setting the POWER switch to CAMERA to get a better adjustment when:
  – You detach the battery for replacement.
  – You bring your camcorder outdoors from the interior of a house, or vice versa.

If the indicator does not stop flashing after you press the SEL/PUSH EXEC dial

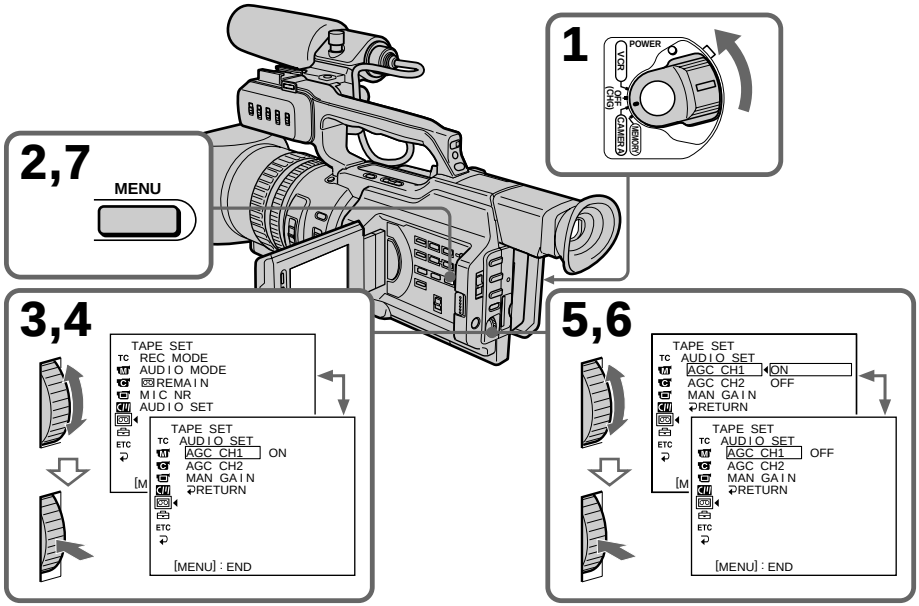
The white balance cannot be set. Use the automatic white balance mode.

Adjusting the recording level manually – Sound recording level

You can adjust the recording sound level. Use headphones to monitor the sound when you adjust it. You can adjust the channel 1 and channel 2 separately.

Selecting the channel to be adjusted manually

(1) Set the POWER switch to CAMERA or VCR.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select AUDIO SET, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial.
(6) Turn the SEL/PUSH EXEC dial to select the setting of the item, then press the dial.
(7) Press MENU to erase the menu display.



Items to be adjusted

Item	Setting	Meaning
AGC CH1	ON OFF	Switches the recording level adjustment of the channel 1 from automatic (ON) and manual (OFF).
AGC CH2[a)]	ON OFF	Switches the recording level adjustment of the channel 2 from automatic (ON) and manual (OFF).
MAN GAIN[a)b)]	SEPARATED LINKED	Sets the recording levels of channel 1 and channel 2 linked (LINKED) or separated (SEPARATED).

a) This is only available when connecting the external microphone to the INPUT2 connector.
b) LINKED is only available when both AGC CH1 and AGC CH2 are set to OFF.

To adjust the recording level automatically

Set AGC CH1 to ON when you automatically adjust the recording level of the channel 1. And set AGC CH2 to ON when you automatically adjust the recording level of the channel 2.

When the recording level is adjusted manually

The recording level indicator appears at the lower-right on the LCD screen or in the viewfinder.

The sound input through the AUDIO CH1/CH2 jacks or DV IN/OUT jack

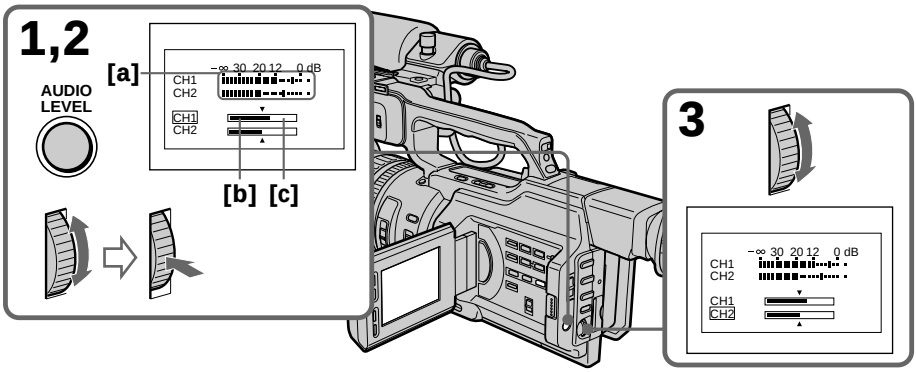
You cannot adjust the recording level.

Adjusting the recording level

(1) Press AUDIO LEVEL to display the recording level adjustment display in standby or recording mode.

(2) Turn the SEL/PUSH EXEC dial to adjust the recording level of the channel 1, then press the dial. The cursor moves to "CH2," and you can adjust the recording level of the channel 2.

(3) Turn the SEL/PUSH EXEC dial to adjust the recording level of the channel 2.



[a] Recording level meter
[b] Decreases the recording level
[c] Increases the recording level

To clear the recording level adjustment display

Press AUDIO LEVEL again.

When AGC CH1 or AGC CH2 is set to ON

You can see the recording level adjustment display, however, you cannot adjust the recording level of the channel that the item above is set to ON.

When MAN GAIN is set to LINKED

The recording level adjustment display is changed as follows.

Connecting an optional external microphone

You can get your desired audio quality, connecting multiple microphones or an optional microphone to your camcorder.

(1) Loosen the microphone holder screw and open the cover.

(2) Detach the supplied microphone and unplug the cable from the camcorder.

(3) Connect the microphone (not supplied) to the INPUT1 or INPUT2 connector.

(4) Select the channel to be used, using the REC CH SELECT switch. Used channels according to the position of the REC CH SELECT switch are as follows:

Audio input through	The position of the REC CH SELECT switch	The audio is recorded on
INPUT1	CH1	Channel 1
	CH1•CH2	Channels 1/2
INPUT2	CH1	Channel 2
	CH1•CH2	—

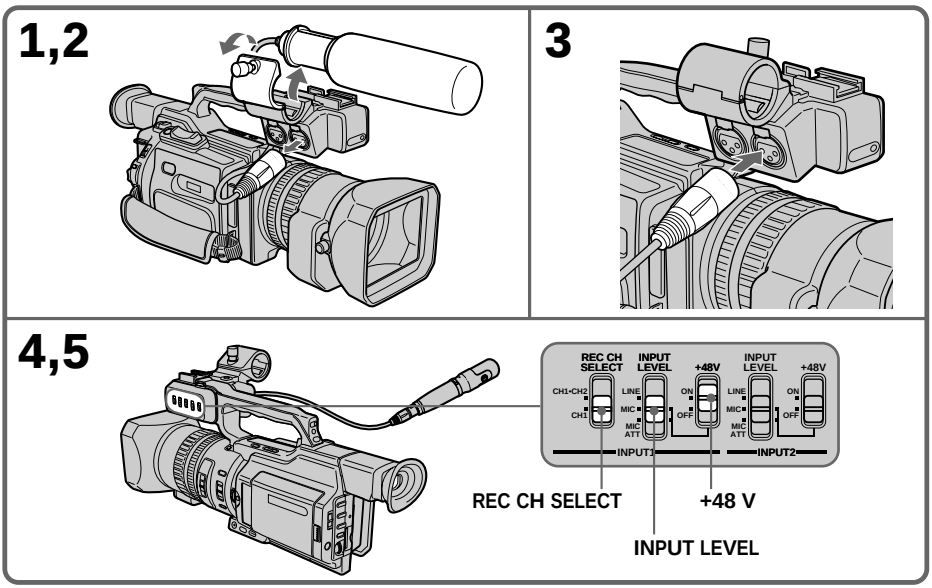
(5) Set the following settings.

When connecting a microphone

Set the INPUT LEVEL selector to MIC or MIC ATT. When set to MIC ATT, you can reduce the volume by about +20 dB. And set the +48V switch to ON if the microphone is powered through its cable.

When connecting audio equipment

Set the +48 V switch to OFF and set the INPUT LEVEL selector to LINE.



When the wind is blowing hard

Set CH1 or CH2 of WIND to ON in the menu settings according to the input (p. 104).

We recommend that you set MIC NR to OFF in the menu settings in the following cases:

- When you use the external microphone at a distance from the camcorder.
- When the REC CH SELECT switch is set to CH1 and you will not record any audio via the INPUT2 connector.
- When you set the INPUT LEVEL selector to LINE.

When you unplug the microphone plug

Unplug it while holding the PUSH button down.

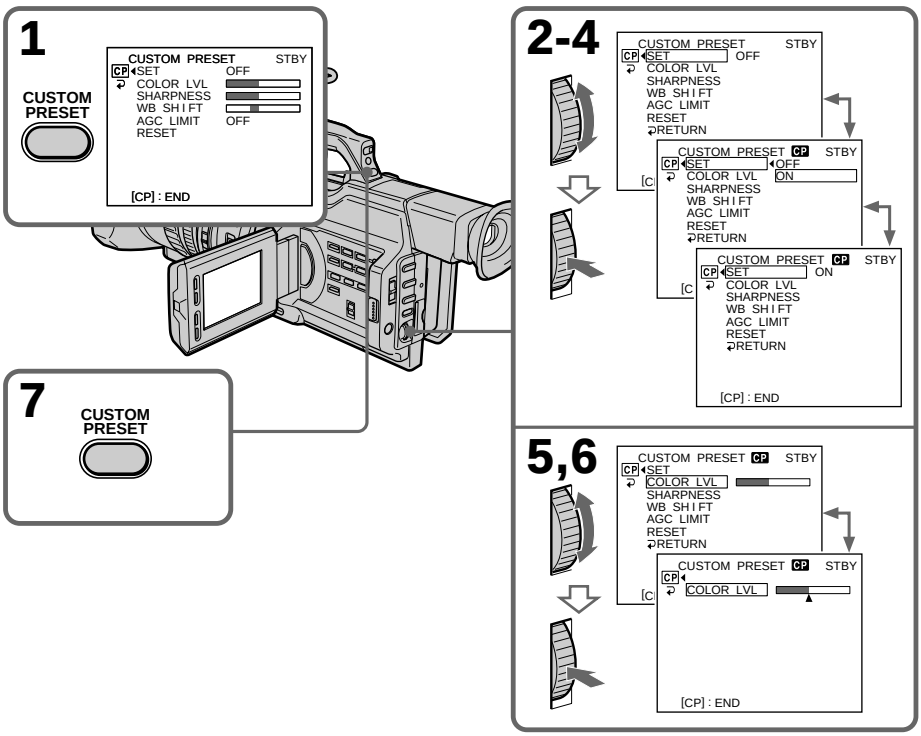
Notes

- When you use an external microphone, make sure that the wind screen does not appear on the screen, using an underscan monitor.
- If you use equipment other than a 48-V microphone with the +48V switch set to ON, a malfunction of the equipment may occur. When you connect equipment other than a 48-V microphone, set it to OFF.

Presetting the adjustment for picture quality – Custom preset

You can preset the camcorder to record the picture with the desired picture quality. When presetting, adjust the picture by shooting a subject and checking the picture displayed on a TV using the menu settings.

(1) Press CUSTOM PRESET to display the CUSTOM PRESET menu in standby or memory mode.
(2) Press the SEL/PUSH EXEC dial.
(3) Turn the SEL/PUSH EXEC dial to select SET, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial.
(6) Turn the SEL/PUSH EXEC dial to adjust the selected item, then press the dial.
(7) Press CUSTOM PRESET.
The CUSTOM PRESET menu disappears and the indicator CP appears on the LCD screen or in the viewfinder.



Items to be adjusted

Item	Meaning	Adjustment value
COLOR LVL	Color intensity	Decreases color intensity ⟷ Increases color intensity
SHARPNESS	Sharpness	Softer ⟷ Sharper
WB SHIFT	White balance	Bluish ⟷ Reddish
AGC LIMIT	Auto Gain-limit	6 dB/12 dB/OFF
RESET	Sets items above to the default settings.	

To cancel using the custom preset

Select OFF in step 4, then press the SEL/PUSH EXEC dial.

To return to the standard setting

Select OK from the RESET item in step 5, then press the SEL/PUSH EXEC dial. To cancel, select RETURN, then press the SEL/PUSH EXEC dial.

To check the custom preset setting

Press CUSTOM PRESET while the camcorder is in standby, recording or memory mode.
The custom preset setting appears on the LCD screen or in the viewfinder.

About the AGC limit

When adjusting the gain manually, the level of the gain is up to 18 dB (OFF).

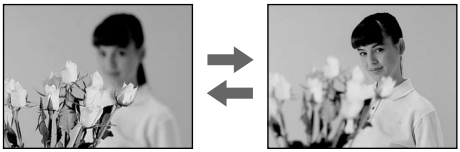
When you preset the desired picture quality in CAMERA or memory mode

The preset is only available in each mode you preset. If you want to use a preset both in CAMERA and memory modes, you have to preset in each mode.

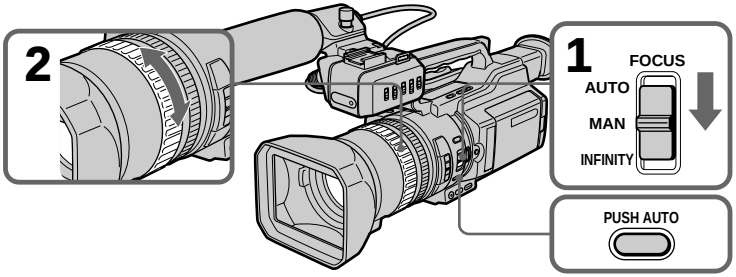
Focusing manually

You can gain better results by manually adjusting the focus in the following cases:

- The autofocus mode is not effective when shooting
  - subjects through glass coated with water droplets
  - horizontal stripes
  - subjects with little contrast with backgrounds such as walls and sky
- When you want to change the focus from a subject in the foreground to a subject in the background
- Shooting a stationary subject when using a tripod



(1) Slide FOCUS down to MANUAL. The ☞F indicator appears on the LCD screen or in the viewfinder in recording, standby, or memory mode.
(2) Turn the focus ring to sharpen the focus.



To return to the autofocus mode

Slide FOCUS up to AUTO to turn off the ☞F or ▲ indicator.

To focus in infinity

Slide FOCUS to INFINITY. The ▲ indicator appears on the LCD screen or in the viewfinder. This function is useful when the nearer subject is focused automatically, even though you want to focus on a faraway subject.

To shoot with auto focusing momentarily

Press PUSH AUTO.
The auto focus functions while you are pressing PUSH AUTO.
Use this button to focus on one subject and then another with smooth focusing.
When you release PUSH AUTO, manual focusing resumes.

To obtain the correct focus

First, focus on a subject manually with the zoom set toward the "T" (telephoto) side, then adjust the zoom by pressing the "W" side of the lever gradually.

When you shoot close to the subject

Focus at the end of the "W" (wide-angle) position.

☞F changes as follows:

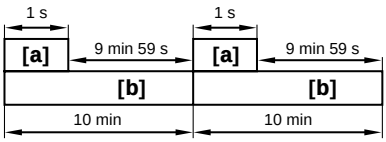
▲ when recording a distant subject.
▲ when the subject is too close to focus on.

Interval recording

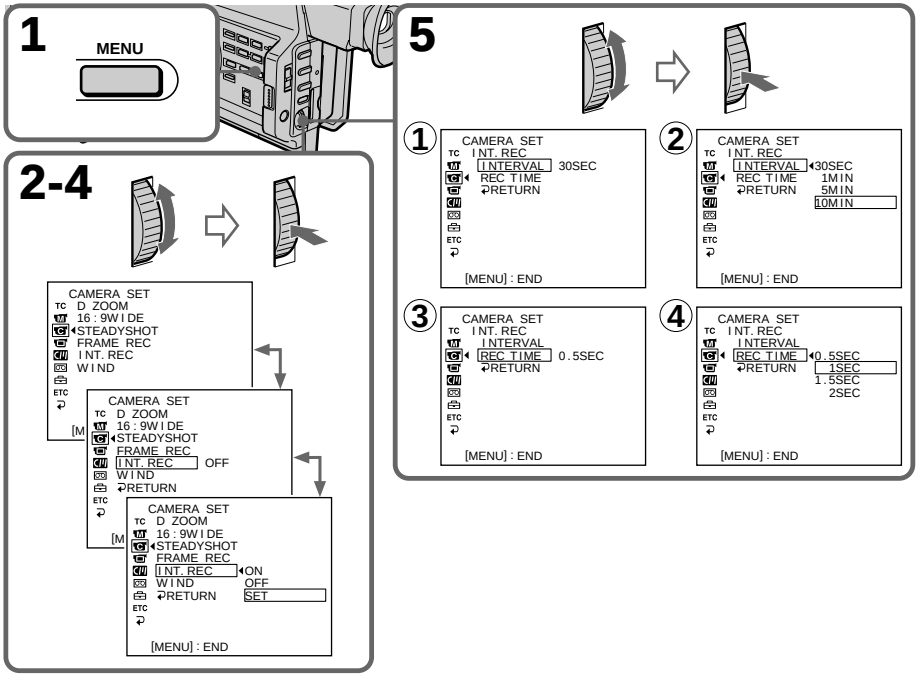
You can make a time-lapse recording by setting the camcorder to automatically record and standby sequentially. You can achieve an excellent recording for flowering, emergence, etc., with this function.

[a] Recording time
[b] Waiting time

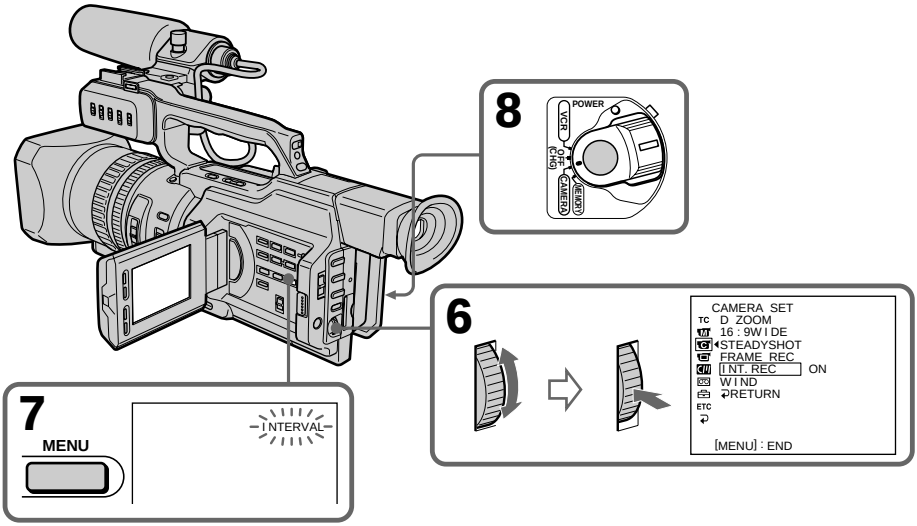
Example



(1) Press MENU to display the menu in standby mode.
(2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select INT. REC, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select SET, then press the dial.
(5) Set INTERVAL and REC TIME.
① Turn the SEL/PUSH EXEC dial to select INTERVAL, then press the dial.
② Turn the SEL/PUSH EXEC dial to select the desired interval time, then press the dial.
The time: 30SEC ↔ 1MIN ↔ 5MIN ↔ 10MIN.
③ Turn the SEL/PUSH EXEC dial to select REC TIME, then press the dial.
④ Turn the SEL/PUSH EXEC dial to select the desired recording time, then press the dial.
The time: 0.5SEC ↔ 1SEC ↔ 1.5SEC ↔ 2SEC.
⑤ Turn the SEL/PUSH EXEC dial to select ↩ RETURN, then press the dial.



(6) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(7) Press MENU to erase the menu display. The interval recording indicator flashes.
(8) Press START/STOP to start interval recording. The interval recording indicator lights up.



To cancel the interval recording

- Set INT. REC to OFF in the menu settings.
- Set the POWER switch to OFF (CHG), VCR or MEMORY.

To stop the interval recording momentarily and perform normal recording

Press START/STOP. You can perform normal recording only once. To cancel the normal recording, press START/STOP again.

Note on interval recording

You cannot do interval recording in memory mode.

On recording time

There may be a discrepancy in recording time of up to +/– 6 frames from the selected time.

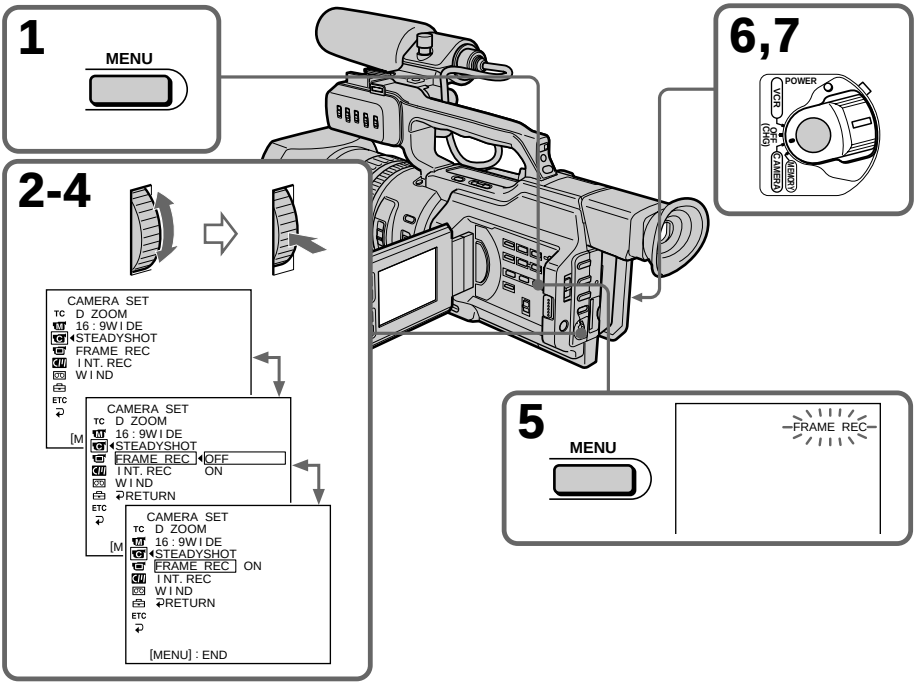
Even if you press INDEX MARK during interval recording

You cannot mark an index.

Frame by frame recording – Cut recording

You can make a recording with a stop-motion animated effect using cut recording. To create this effect, alternately move the subject a little and make a cut recording. We recommend that you use a tripod, and operate the camcorder using the Remote Commander after step 6.

(1) Press MENU to display the menu in standby mode.
(2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select FRAME REC, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(5) Press MENU to erase the menu display.
The FRAME REC indicator lights up.
(6) Press START/STOP to start cut recording. The camcorder makes a recording for about six frames, and returns to recording standby.
(7) Move the subject, and repeat step 6.



To cancel the cut recording

- Set FRAME REC to OFF in the menu settings.
- Set the POWER switch to OFF (CHG), VCR, or MEMORY.

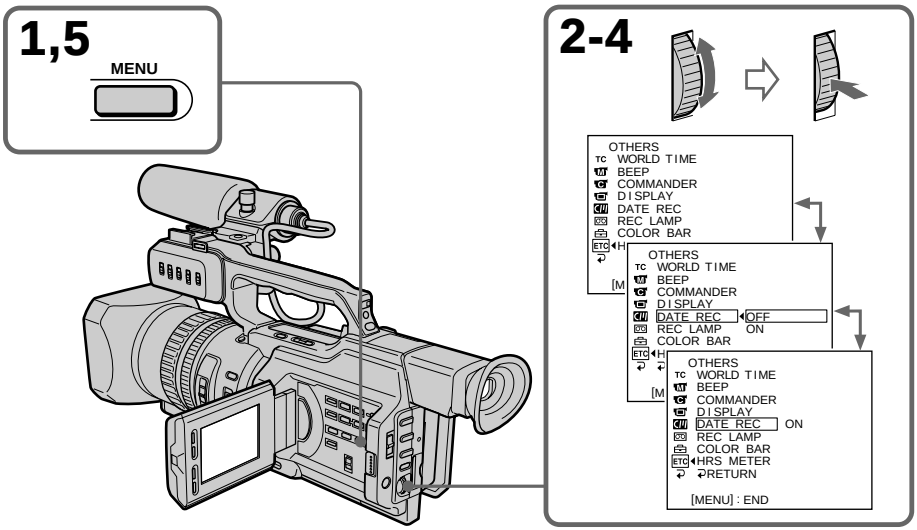
Notes on cut recording

- The last recorded cut is longer than other cuts.
- The proper remaining tape time is not indicated if you use this function continuously.
- You cannot mark an index during cut recording.

Superimposing the date and time on a picture

You can superimpose the date/time indication directly on the picture, besides the date/time display as data code.

(1) Press MENU to display the menu in standby mode.
(2) Turn the SEL/PUSH EXEC dial to select ETC, then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select DATE REC, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(5) Press MENU to erase the menu display.
The date/time indicator displayed on the LCD screen or in the viewfinder.



To cancel superimposing the date/time indication

Select OFF in step 4, then press the SEL/PUSH EXEC dial.

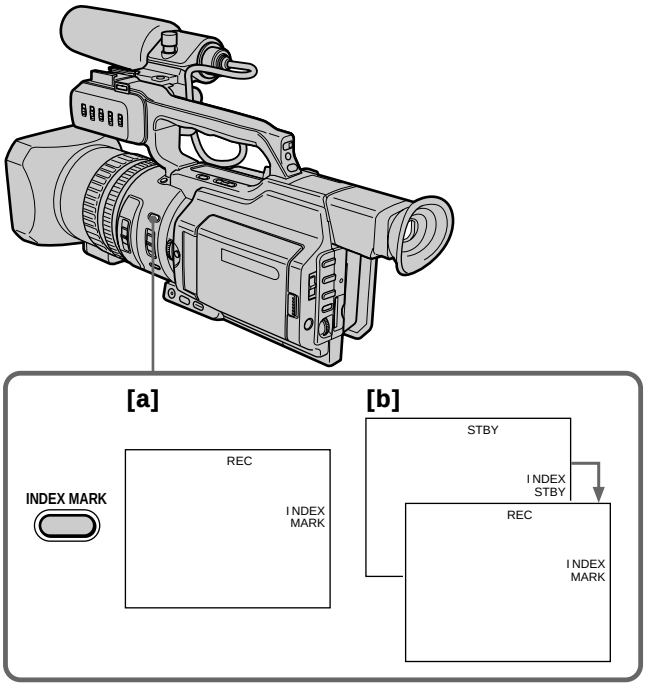
Note

You cannot erase the recorded date/time data on the picture. Before using this function, make sure that you set the date and time correctly.

Marking an Index

If you mark an index at the scene you want to search for, you can easily search for the scene later (p. 64).

In recording mode [a]:
Press INDEX MARK.
The "INDEX MARK" indicator appears on the LCD screen or in the viewfinder for seven seconds and the index is marked after the indicator disappears.
In standby mode [b]:
Press INDEX MARK.
The "INDEX STBY" indicator appears on the LCD screen or in the viewfinder. And when you press START/STOP to start recording, the "INDEX STBY" indicator changes to "INDEX MARK" and after the indicator disappears, the index marking is complete.
The camcorder starts index-marking at the 11th frame from the recording start point. An index signal will be recorded on cassette memory about 0.3 sec, and on a tape about five seconds.
You can mark an index in VCR mode (p. 82).



To cancel index marking

Press INDEX MARK again in standby mode.

Notes on the index

- Index marks are recorded during recording, you cannot mark an index after recording.
- Index signals will be recorded both on the tape and on cassette memory. If you use cassettes without cassette memory or the cassette memory is full, the signals will be recorded only on the tape.
- When you record over the recorded tape and mark an index on the tape, we recommend that you clear all data in the cassette memory before marking an index.

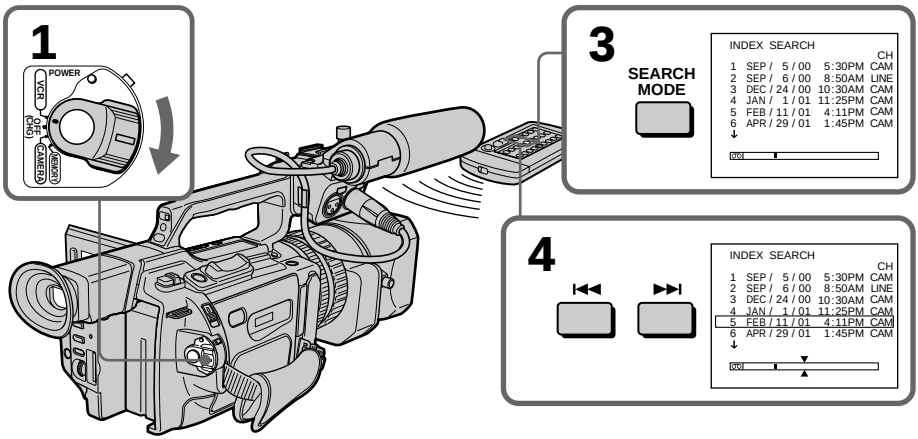
Searching for a recording by index – Index search

You can automatically search for the point where an index is marked and start playback from that point **(Index search)**. Use a tape with cassette memory for convenience. Use the Remote Commander for this operation.
Use this function to check where indexes are marked or to edit the tape at each sequence where the index is marked.

Searching for the index point using cassette memory

You can use this function only when playing back a tape with cassette memory (p. 142).

(1) Set the POWER switch to VCR.
(2) Set CM SEARCH in CM to ON in the menu settings (p. 104). The default setting is ON.
(3) Press SEARCH MODE on the Remote Commander repeatedly, until the index search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
(4) Press ⏮ or ⏭ on the Remote Commander to select the index point for playback.
Your camcorder automatically starts playing back at the selected index point.



To stop searching

Press ■.

In the mark

- The bar in the mark indicates the present point on the tape.
- The mark in the indicates the actual point you are trying to search for.

If a tape has a blank portion between recorded portions

The index search function may not work correctly.

If you mark an index onto an external input signal

"LINE" appears in the CH column.

The index of the recording start point when recorded from external audio equipment

The index mark is not recorded in cassette memory when recorded from external audio equipment. If you want to search for the index point, set CM SEARCH to OFF in the menu settings and search for the index point without cassette memory.

Searching for the index point without using cassette memory

(1) Set the POWER switch to VCR.

(2) Set CM SEARCH in to OFF in the menu settings (p. 104). If using a tape without cassette memory, skip this step.

(3) Press SEARCH MODE on the Remote Commander repeatedly, until the index search indicator appears.
The indicator changes as follows:
INDEX SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator

(4) Press ⏮ on the Remote Commander to search for the previous index point or press ⏭ on the Remote Commander to search for the next index point. Your camcorder automatically starts playback at the selected index point. Each time you press ⏮ or ⏭, your camcorder searches for the previous or next index point.

To stop searching

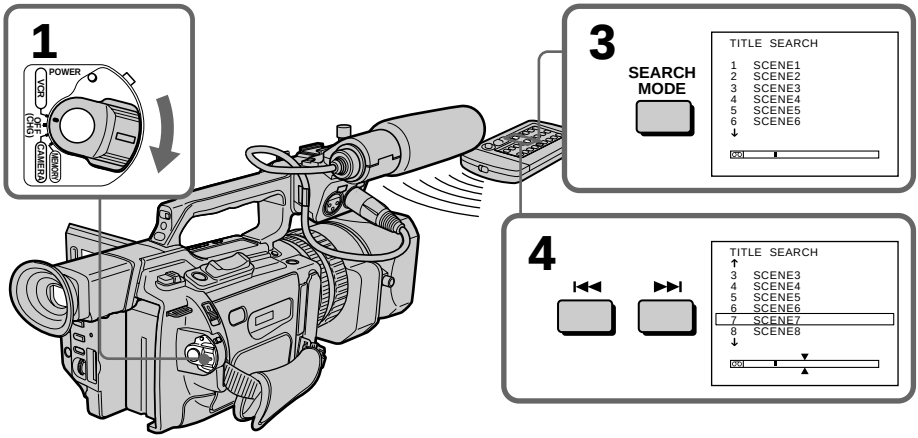
Press ■.

Searching the boundaries of recorded tape by title – Title search

CM only

If you use a tape with cassette memory, you can search for the boundaries of recorded tape by title **(Title search)** (p. 142). Use the Remote Commander for this operation.

(1) Set the POWER switch to VCR.
(2) Set CM SEARCH in CM to ON in the menu settings (p. 104). The default setting is ON.
(3) Press SEARCH MODE on the Remote Commander repeatedly, until the title search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
(4) Press ⏮ or ⏭ on the Remote Commander to select the title for playback.
Your camcorder automatically starts playback of the scene having the title that you selected.



To stop searching

Press ■.

If you use a tape without cassette memory
You cannot superimpose or search for a title.

In the mark
- The bar in the mark indicates the present point on the tape.
- The ⧗ mark in the mark indicates the actual point you are trying to search for.

If a tape has a blank portion between recorded portions
The title search function may not work correctly.

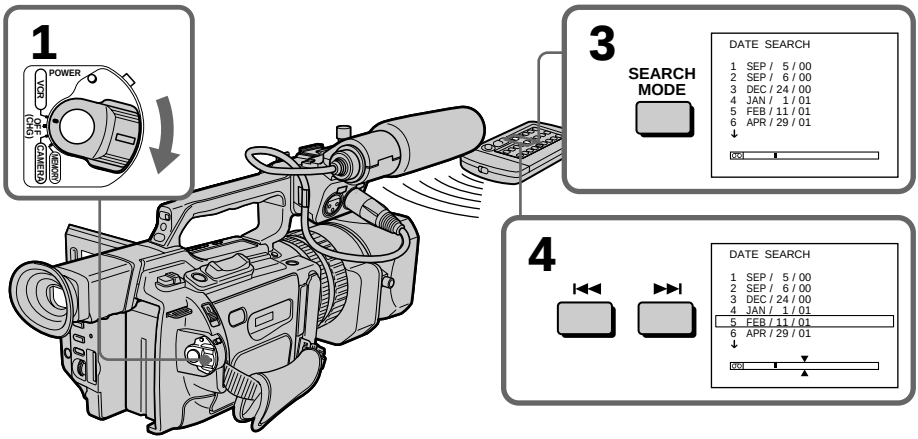
Searching a recording by date – Date search

You can automatically search for the point where the recording date changes and start playback from that point **(Date search)**. Use a tape with cassette memory for convenience. Use the Remote Commander for this operation.
Use this function to check where recording dates change or to edit the tape at each recording date.

Searching for the date using cassette memory

You can use this function only when playing back a tape with cassette memory (p. 142).

(1) Set the POWER switch to VCR.
(2) Set CM SEARCH in CM to ON in the menu settings (p. 104). The default setting is ON.
(3) Press SEARCH MODE on the Remote Commander repeatedly, until the date search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
(4) Press ⏮ or ⏭ on the Remote Commander to select the date for playback. Your camcorder automatically starts playback at the beginning of the selected date.



To stop searching

Press ■.

Note

If one day's recording is less than two minutes, your camcorder may not accurately find the point where the recording date changes.

In the mark

- The bar in the mark indicates the present point on the tape.
- The mark in the indicates the actual point you are trying to search.

If a tape has a blank portion between recorded portions

The date search function may not work correctly.

Searching for the date without using cassette memory

(1) Set the POWER switch to VCR.

(2) Set CM SEARCH in to OFF in the menu settings (p. 104). If using a tape without cassette memory, skip this step.

(3) Press SEARCH MODE on the Remote Commander repeatedly, until the date search indicator appears.
The indicator changes as follows:
INDEX SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator

(4) Press ⏮ on the Remote Commander to search for the previous date or press ⏭ on the Remote Commander to search for the next date. Your camcorder automatically starts playback at the point where the date changes. Each time you press ⏮ or ⏭, your camcorder searches for the previous or next date.

To stop searching

Press ■.

Searching for a photo – Photo search/ Photo scan

You can search for a still picture you have recorded on a tape **(photo search)**.
You can also search for still pictures one after another and display each picture for five seconds automatically regardless of cassette memory **(photo scan)**. Use the Remote Commander for these operations.
Use this function to check or edit still pictures.

Searching for a photo using cassette memory

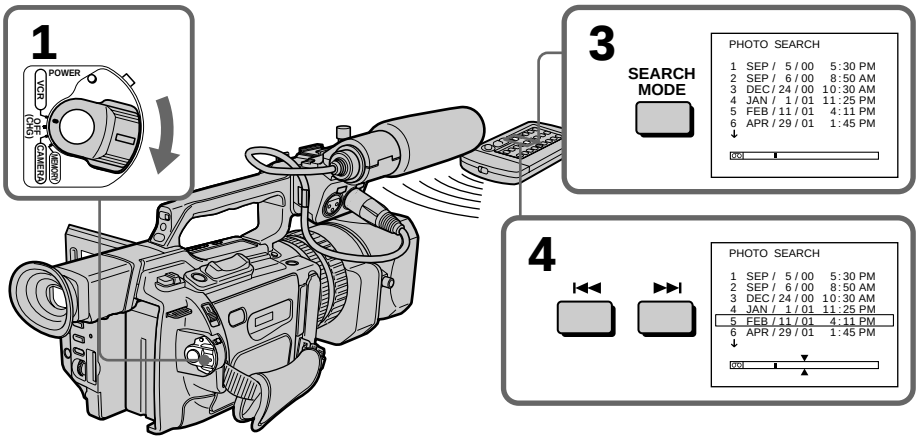
You can use this function only when playing back a tape with cassette memory (p. 142).

(1) Set the POWER switch to VCR.

(2) Set CM SEARCH in CM to ON in the menu settings (p. 104). Default setting is ON.

(3) Press SEARCH MODE on the Remote Commander repeatedly, until the photo search indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator

(4) Press ⏮ or ⏭ on the Remote Commander to select the date for playback.
Your camcorder automatically starts playback of the photo having the date that you selected.



To stop searching

Press ■.

In the mark

- The bar in the mark indicates the present point on the tape.
- The ⧗ mark in the mark indicates the actual point you are trying to search for.

If a tape has a blank portion between recorded portions

The photo search function may not work correctly.

Searching for a photo without using cassette memory

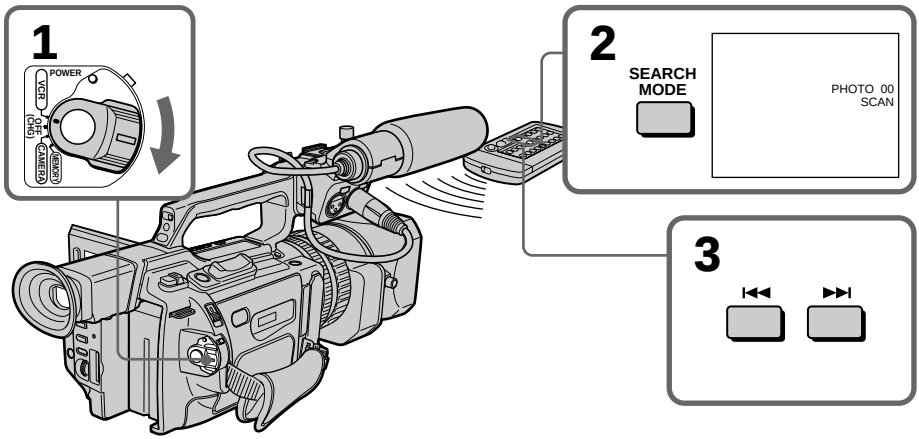
(1) Set the POWER switch to VCR.
(2) Set CM SEARCH in CM to OFF in the menu settings (p. 104).
(3) Press SEARCH MODE on the Remote Commander repeatedly, until the photo search indicator appears.
The indicator changes as follows:
INDEX SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
(4) Press ⏮ or ⏭ on the Remote Commander to select a photo for playback.
Each time you press ⏮ or ⏭, your camcorder searches for the previous or next photo.
Your camcorder automatically starts playback of the photo.

To stop searching

Press ■.

Scanning photo

(1) Set the POWER switch to VCR.
(2) Press SEARCH MODE on the Remote Commander repeatedly, until the photo scan indicator appears.
The indicator changes as follows:
INDEX SEARCH → TITLE SEARCH → DATE SEARCH → PHOTO SEARCH → PHOTO SCAN → no indicator
(3) Press ⏮ or ⏭ on the Remote Commander.
Each photo is played back for about five seconds automatically.



To stop scanning

Press ■.

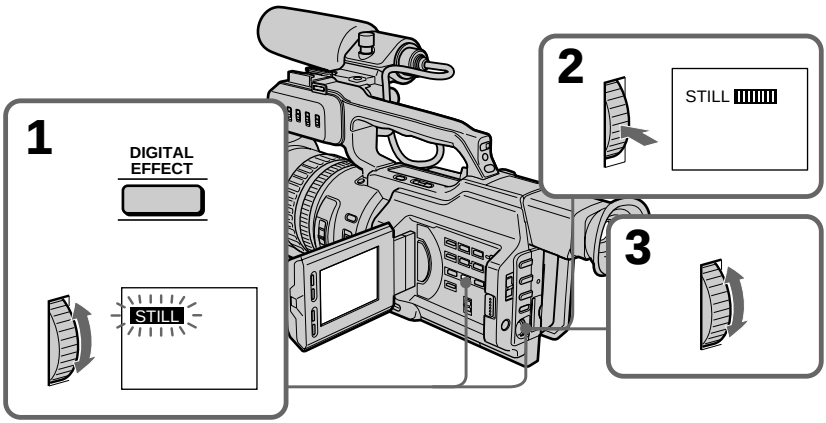
Playing back a tape with digital effects

During playback, you can process a scene using the digital effect functions: STILL, FLASH, LUMI. and TRAIL.

(1) In playback or playback pause mode, press DIGITAL EFFECT and turn the SEL/PUSH EXEC dial until the desired digital effect indicator (STILL, FLASH, LUMI. or TRAIL) flashes.

(2) Press the SEL/PUSH EXEC dial.
The digital effect indicator lights up and the bars appear. In STILL or LUMI. mode, the picture is captured and is stored in memory as a still picture at the time you press the SEL/PUSH EXEC dial.

(3) Turn the SEL/PUSH EXEC dial to adjust the effect.
For details of each digital effect function, see page 39.



To cancel the digital effect function

Press DIGITAL EFFECT so that the indicator disappears.

Notes

- You cannot process a picture using the digital effect function that is input from other equipment.
- To record pictures that you have processed using the digital effect function, record the pictures on the VCR, using your camcorder as a player.

Pictures processed by the digital effect function

Pictures processed by the digital effect function are not output through the i.LINK DV IN/OUT jack.

When you set the POWER switch to OFF (CHG) or stop playing back

The digital effect function will be automatically canceled.

Dubbing a tape

Using the A/V connecting cable

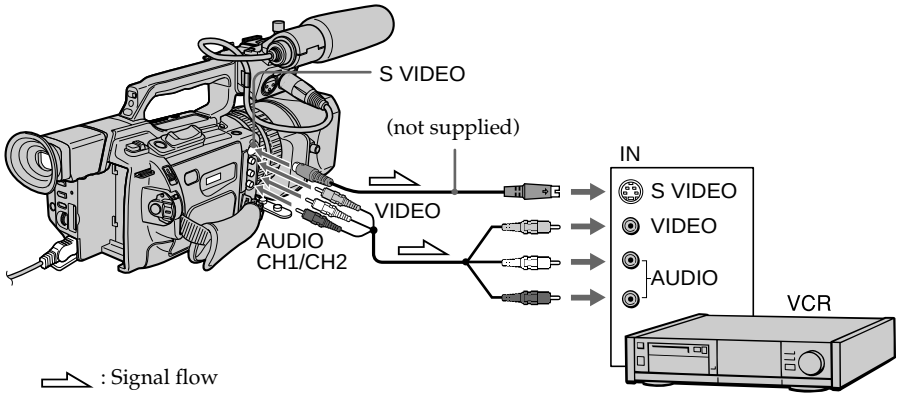
Connect your camcorder to the VCR using the A/V connecting cable supplied with your camcorder. Recording quality by analog input, however, is not satisfying for professional use.

Before a dubbing

Set DISPLAY to LCD in the menu settings. (Default setting is LCD.)

Set the input selector on the VCR to LINE, if available.

(1) Insert a blank tape (or a tape you want to record over) into the VCR, and insert the recorded tape into your camcorder.
(2) Set the input selector on the VCR to LINE. For details, refer to the operating instructions of the VCR.
(3) Set the POWER switch to VCR.
(4) Play back the recorded tape on your camcorder.
(5) Start recording on the VCR. For details, refer to the operating instructions of the VCR.



When you have finished dubbing the tape

Press ■ on both your camcorder and the VCR.

Be sure to clear the indicators from the screen

If they are displayed, press the following buttons so as not to record the indicators on the dubbed tape:

- The DISPLAY button
- The DATA CODE button
- The SEARCH MODE button on the Remote Commander

You can edit on VCRs that support the following systems

8 mm, Hi8 Hi8, Digital8, VHS, S-VHS, VHSC, S-VHSC, Betamax, ED Beta ED Betamax, DVCAM DVCAM, mini DV or DV

If your VCR is a monaural type

Connect with a VCR using the audio cable (monaural ↔ stereo) (not supplied).

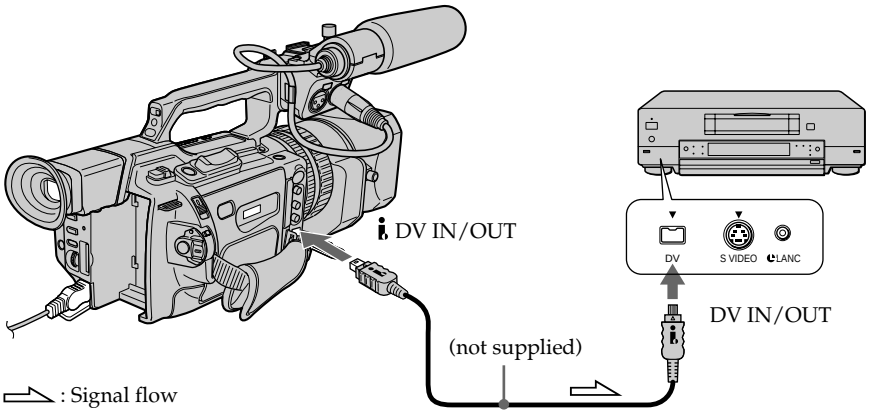
Connect using an S video cable (not supplied) to obtain high-quality pictures
With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable.
Connect an S video cable (not supplied) to the S video jacks of both your camcorder and the VCR.
This connection produces higher quality DVCAM/DV format pictures.

Note
You can edit precisely by connecting a LANC cable (not supplied) to this camcorder and other video equipment having a fine synchro-editing function, using this camcorder as a player.

Using an i.LINK cable (DV connecting cable)

Simply connect the i.LINK cable (DV connecting cable) (not supplied) to i DV IN/OUT and to DV IN/OUT of the DVCAM/DV products. With a digital-to-digital connection, video and audio signals are transmitted in digital form for high-quality editing. You cannot dub the titles, display indicators or the contents of cassette memory.

(1) Insert a blank tape (or a tape you want to record over) into the VCR, and insert the recorded tape into your camcorder.
(2) Set the input selector on the VCR to the DV input position if the VCR is equipped with an input selector. For details, refer to the operating instructions of the VCR.
(3) Set the POWER switch to VCR.
(4) Play back the recorded tape on your camcorder.
(5) Start recording on the VCR.



When you have finished dubbing a tape

Press ■ on both your camcorder and the VCR.

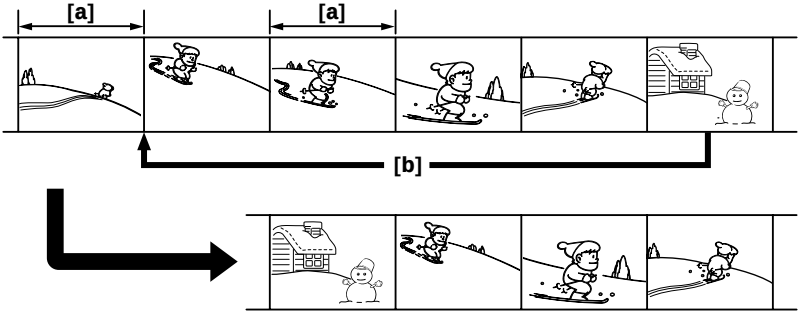
You can connect one VCR only using the i.LINK cable (DV connecting cable)

Pictures processed by the digital effect function
Pictures processed by the digital effect function are not output through the i DV IN/OUT jack.

If you record a playback pause picture with the i DV IN/OUT jack
The recorded picture becomes rough. And when you play back the picture using other video equipment, the picture may jitter.

Dubbing only desired scenes – Digital program editing

You can duplicate selected scenes (programs) for editing onto a tape without operating the VCR. Scenes can be selected by frame.
To use this function, an i.LINK cable (DV connecting cable) (not supplied) will be required.



[a] Undesired frame
[b] Moves the scene

Before operating the digital program editing

Preparation 1 Connecting the VCR. (p. 73)
Preparation 2 Adjusting the synchronization of the VCR (p. 75).

When you dub using the same VCR again, you can skip Preparation 2.

Using the digital program editing function

Operation 1 Making programs. (p. 77)
Operation 2 Performing a digital program editing (Dubbing a tape). (p. 79)

Notes

- You cannot dub the titles, display indicators, or the contents of cassette memory.
- If you start recording from the very beginning of the tape, the first few seconds of the tape may not record properly. Be sure to allow about 10 seconds' lead before starting the recording.

Preparation 1: Connecting the VCR

Connect your camcorder and the VCR as shown on page 73.

Preparation 2: Adjusting the synchronization of the VCR

You can adjust the synchronization of your camcorder and the VCR.
Remove the cassette from the camcorder beforehand. We recommend that you prepare a pen and paper for notes.
When you connect to a Sony VCR using an i.LINK cable (DV connecting cable), the setup below is not necessary.

(1) Insert a recordable tape into the VCR.

(2) Set the POWER switch to VCR.

(3) Press MENU to display the menu.

(4) Turn the SEL/PUSH EXEC dial to select ETC, then press the dial.

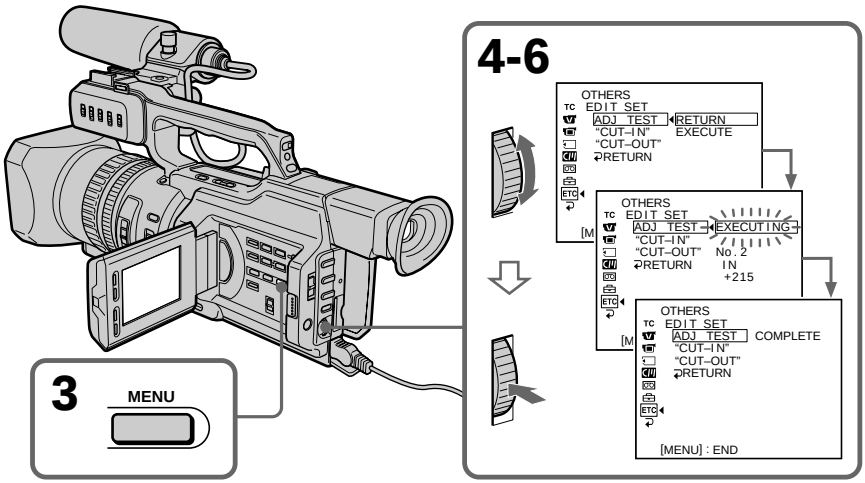
(5) Turn the SEL/PUSH EXEC dial to select EDIT SET, then press the dial.

(6) Turn the SEL/PUSH EXEC dial to select ADJ TEST, then press the dial.

(7) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.
CUT-IN and CUT-OUT are recorded on an image for five times each to calculate the numerical values for adjusting the synchronicity.
The EXECUTING indicator flashes on the LCD screen or in the viewfinder. When finished, the indicator changes to COMPLETE.

(8) Rewind the tape in the VCR, then start slow playback.
Take a note of the opening numerical value of each CUT-IN and the closing numerical value of each CUT-OUT.

(9) Calculate the average of all the opening numerical values of each CUT-IN, and the average of all the closing numerical values of each CUT-OUT.



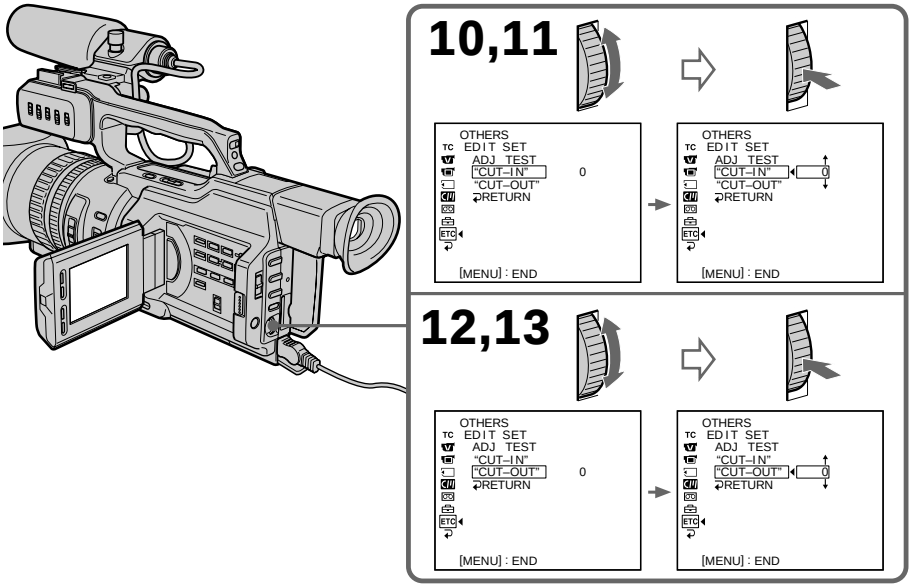
(10) Turn the SEL/PUSH EXEC dial to select "CUT-IN," then press the dial.

(11) Turn the SEL/PUSH EXEC dial to select the average numerical value of CUT-IN, then press the dial.
The calculated start position for recording is set.

(12) Turn the SEL/PUSH EXEC dial to select "CUT-OUT," then press the dial.

(13) Turn the SEL/PUSH EXEC dial to select the average numerical value of CUT-OUT, then press the dial.
The calculated stop position for recording is set.

(14) Turn the SEL/PUSH EXEC dial to select ↩RETURN, then press the dial.



Errors in editing

If you connect your camcorder to Sony equipment with the DV jack, the range of errors is within +/– 5 frames.
The range may become wider in the following conditions:

- The interval between CUT-IN and CUT-OUT is less than five seconds (p. 77).
- CUT-IN or CUT-OUT is set at the beginning of the tape.

Operation 1: Making Programs

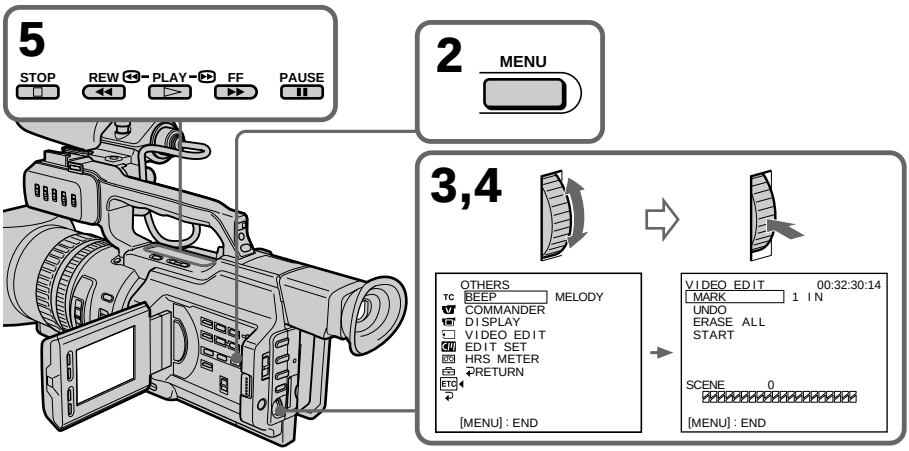
(1) Insert the tape for playback into your camcorder, and insert a tape for recording into the VCR.

(2) Press MENU to display the menu.

(3) Turn the SEL/PUSH EXEC dial to select ETC, then press the dial.

(4) Turn the SEL/PUSH EXEC dial to select VIDEO EDIT, then press the dial.

(5) Search for the beginning of the first scene you want to insert using the video control buttons, then pause playback (p. 29).

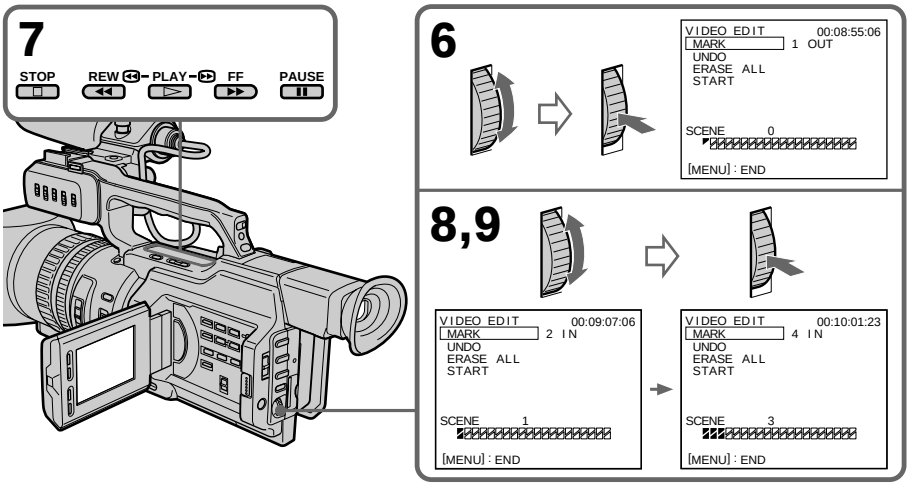


(6) Press the SEL/PUSH EXEC dial, or MARK on the Remote Commander.
The CUT-IN point of the first program is set, and the top part of the program mark changes to light blue.

(7) Search for the end of the first scene you want to insert using the video operating buttons, then pause playback (p. 29).

(8) Press the SEL/PUSH EXEC dial, or MARK on the Remote Commander.
The CUT-OUT point of the first program is set, then the bottom part of the program mark changes to light blue.

(9) Repeat steps 5 to 8, then set PROGRAM.
When the program is set, the program mark changes to light blue.
You can set a maximum of 20 programs.



On a blank portion of the tape

You cannot set CUT-IN or CUT-OUT on a blank portion of the tape.

Erasing the last program

To change the end of the last program, delete the CUT-OUT mark.
To erase the whole program, delete both the CUT-IN and CUT-OUT marks.

(1) Turn the SEL/PUSH EXEC dial to select UNDO, then press the dial.

(2) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.
The last set program mark flashes, then the setting is canceled.

To cancel erasing

Select RETURN in step 2, then press the SEL/PUSH EXEC dial.

Erasing all programs

(1) Select VIDEO EDIT in the menu settings. Turn the SEL/PUSH EXEC dial to select ERASE ALL, then press the dial.

(2) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.
All the program marks flash, then the settings are canceled.

To cancel erasing all programs

Select RETURN in step 2, then press the SEL/PUSH EXEC dial.

To cancel a program you have set

Press MENU.
The program is stored in memory until the tape is ejected.

Operation 2: Performing a digital program editing (Dubbing a tape)

Make sure your camcorder and VCR are connected. When you use a video camera recorder, set its POWER switch to VCR.

(1) Select VIDEO EDIT in the menu settings. Turn the SEL/PUSH EXEC dial to select START, then press the dial.

(2) Turn the SEL/PUSH EXEC dial to select EXECUTE, then press the dial.
Search for the beginning of the first program, then start dubbing.
The EXECUTING indicator flashes.
The SEARCH indicator appears during search, and the EDIT indicator appears during edit on the LCD screen or in the viewfinder.
The PROGRAM indicator lights up after dubbing is complete.
When the dubbing ends, your camcorder and the VCR automatically stop.

To stop dubbing

Press ■ on this camcorder or on the Remote Commander.

To end the digital program editing function

Your camcorder stops when the dubbing is complete. Then the display returns to VIDEO EDIT in the menu settings.
Press MENU to end the video program editing function.

You cannot record on the VCR when:

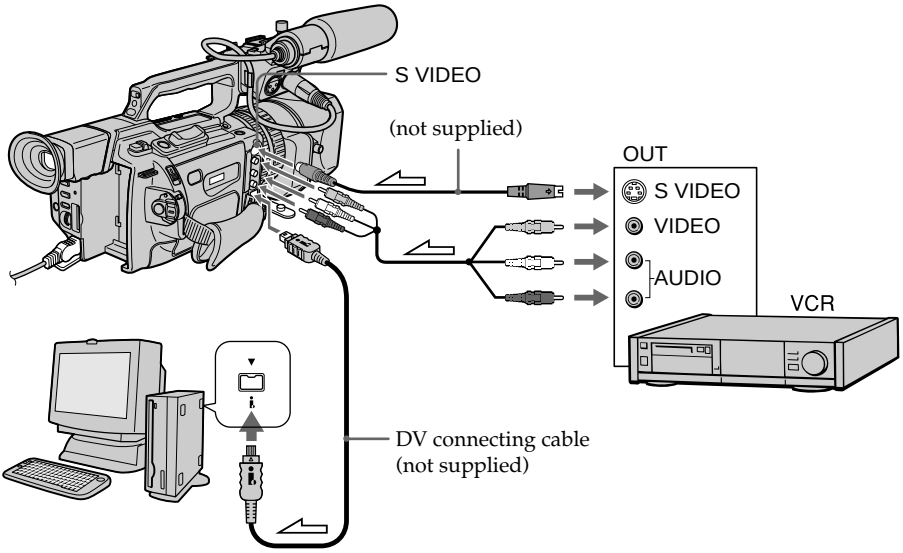
- The cassette is not inserted.
- The tape has run out.
- The write-protect tab is set to the protect position.

NOT READY appears on the LCD screen when:

- The program to operate the digital program editing has not been made.
- An i.LINK cable (DV connecting cable) is not connected.
- The power of the connected VCR is not turned on.

Using with an analog video unit and a PC – Signal convert function

You can convert the analog input signal to the digital signal and output it from the DV IN/OUT jack on this camcorder. You can capture images and sound from an analog video unit connecting a PC which has the i.LINK (DV) jack to your camcorder.



: Signal flow

(1) Set the POWER switch to VCR.

(2) Press MENU to display the menu.

(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.

(4) Turn the SEL/PUSH EXEC dial to select A/V → DV OUT, then press the dial.

(5) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.

(6) Press MENU to erase the menu display.

(7) Start playback on the analog video unit slightly ahead of the point from which you want to start capturing images.

(8) Start capturing procedures on your PC. The operation procedures depend on your PC and the software which you use.
For details on how to capture images, refer to the instruction manual of your PC and your software.

After capturing images and sound

Stop capturing procedures on your PC, and stop the playback on the analog video unit.

Notes

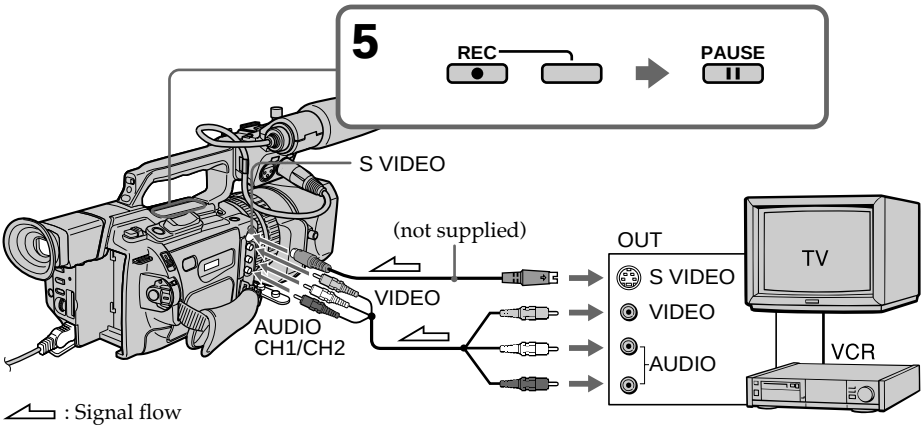
- When you edit the captured image and sound from the analog video unit by a PC, you need to install an appropriate software which can exchange video signals between the camcorder and a PC.
- Depending on the condition of the analog video signals, the PC may not be able to output the images correctly when you convert analog video signals into digital video signals via your camcorder. Depending on the analog video unit, the image may contain noise or incorrect colors.
- The camcorder cannot output the digital signal when you input the analog signal that includes a copyright protection signal.

Recording video or TV programs

Using the A/V connecting cable

You can record a tape from another VCR or a TV program from a TV that has video/audio outputs. Use your camcorder as a recorder.

(1) Insert a blank tape (or a tape you want to record over) into your camcorder. If you want to record a tape from the VCR, insert a recorded tape into the VCR.
(2) Set the POWER switch to VCR on your camcorder.
(3) Set DISPLAY in ETC to LCD in the menu settings (p. 104).
(4) Press MENU to erase the menu display.
(5) Press ● REC and the button on its right simultaneously on your camcorder, then immediately press II on your camcorder.
(6) Press ► on the VCR to start playback if you record a tape from a VCR. Select a TV program if you record from a TV. The picture from a TV or VCR appears on the LCD screen or in the viewfinder.
(7) Press II on your camcorder at the scene from which you want to start recording.



: Signal flow

When you have finished recording

Press ■ on both your camcorder and the VCR.

Using the Remote Commander

In step 5, press ● REC and MARK simultaneously, then immediately press II. And in step 7, press II at the scene from which you want to start recording.

If your VCR is a monaural type
Connect with a VCR using the audio cable (monaural ⟷ stereo) (not supplied).

Connect using an S video cable (not supplied) to obtain high-quality pictures
With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable.
Connect an S video cable (not supplied) to the S video jacks of both your camcorder and the VCR.
This connection produces higher quality DVCAM/DV format pictures.

If you do various playbacks on the VCR during recording
The recorded picture may be blurred.

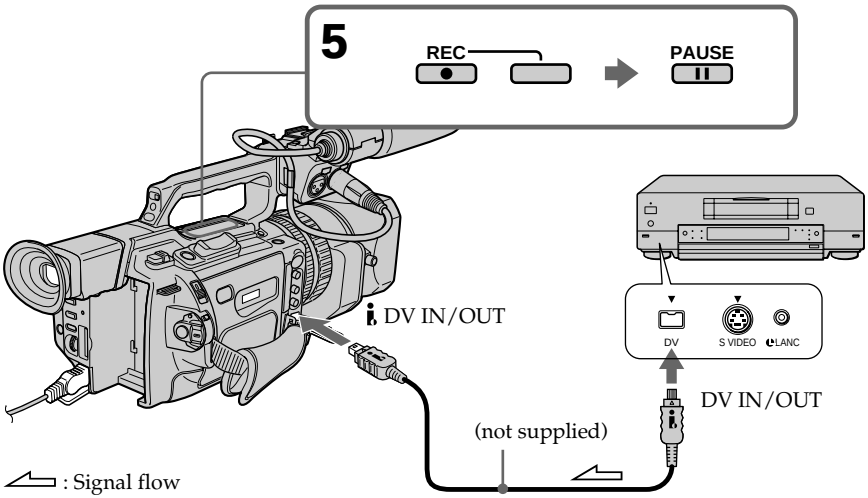
On the commander mode
Your camcorder works in the commander mode, VTR 2. Commander modes 1, 2 and 3 are used to distinguish your camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR in the commander mode VTR 2, we recommend changing the commander mode or covering the sensor of the VCR with black paper.

On index signal
The index is automatically marked on a tape when you start recording. If you mark the index using the INDEX MARK button during recording, "LINE" appears in the CH column on the INDEX SEARCH screen, and the index is recorded on cassette memory.

Using an i.LINK cable (DV connecting cable)

Simply connect the i.LINK cable (DV connecting cable) (not supplied) to DV IN/OUT and to DV IN/OUT of the DV products. With digital-to-digital connection, video and audio signals are transmitted in digital form for high-quality editing.

(1) Insert a blank tape (or a tape you want to record over) into your camcorder, and insert the recorded tape into the VCR.
(2) Set the POWER switch to VCR.
(3) Set DISPLAY in ETC to LCD in the menu settings (p. 104).
(4) Press MENU to erase the menu display.
(5) Press ● REC and the button on its right simultaneously on your camcorder, then immediately press II on your camcorder.
(6) Press ► on the VCR to start playback. The picture to be recorded appears on the LCD screen or in the viewfinder.
(7) Press II on your camcorder at the scene from which you want to start recording.



When you have finished recording

Press ■ on both your camcorder and the VCR.

Using the Remote Commander

In step 5, press ● REC and MARK simultaneously, then immediately press II. And in step 7, press II at the scene from which you want to start recording.

You can connect only one VCR using the i.LINK cable (DV connecting cable)

When you dub a picture in digital form
The color of the display may be uneven. However this does not affect the dubbed picture.

If you record a still picture in playback pause mode via the i DV IN/OUT jack
The recorded picture becomes rough. And when you play back the picture using your camcorder, the picture may jitter.

Before recording
Press DISPLAY and make sure that the DV IN indicator appears on the LCD screen or in the viewfinder. The DV IN indicator may appear on both pieces of equipment.

Audio dubbing

You can record an audio sound to add to the original sound on a tape by connecting audio equipment or a microphone. If you connect audio equipment, you can add sound to your recorded tape by specifying the starting and ending points. The original sound will not be erased. You can also use the Remote Commander for this operation.

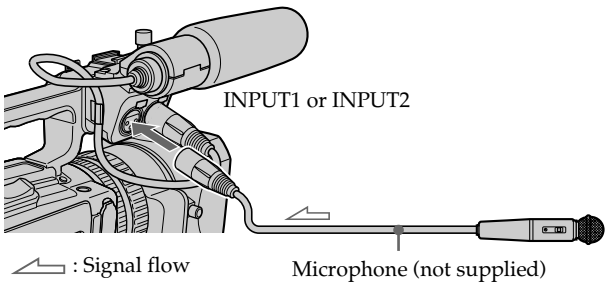
The relationship between audio input and channels on which a dubbed sound will be recorded

The relationship between audio input and channels on which a dubbed sound will be recorded is as follows:

Audio input through	The position of the REC CH SELECT switch	Which audio input will be recorded on	
		Channel 3	Channel 4
AUDIO CH1/CH2	–	AUDIO CH1	AUDIO CH2
AUDIO CH1	–	AUDIO CH1	–
AUDIO CH2	–	–	AUDIO CH2
INPUT1/2	CH1	INPUT1	INPUT2
	CH1•CH2	INPUT1	INPUT1
INPUT1	CH1	INPUT1	–
	CH1•CH2	INPUT1	INPUT1
INPUT2	CH1	–	INPUT2
	CH1•CH2	–	–

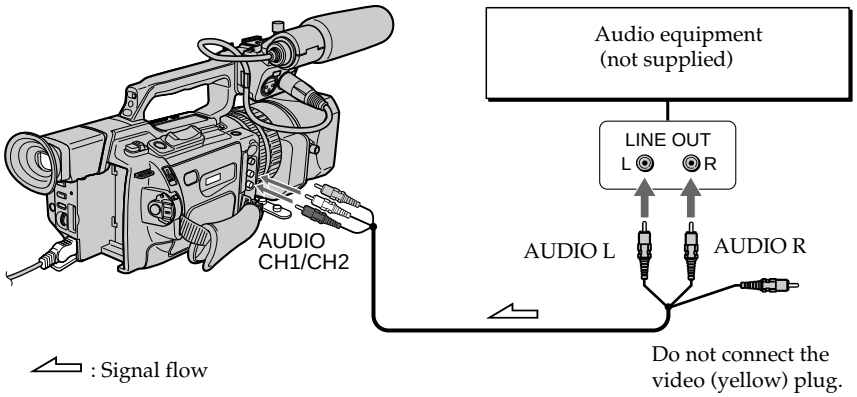
Dubbing with the INPUT1/INPUT2 connectors

For details on setup of the INPUT1/INPUT2 connectors, see “Connecting an optional external microphone” on page 54.



You can check the picture on TV by connecting with the video jack. You cannot monitor the additional sound by the speaker. Use the headphones jack.

Dubbing with the AUDIO CH1/CH2 jacks

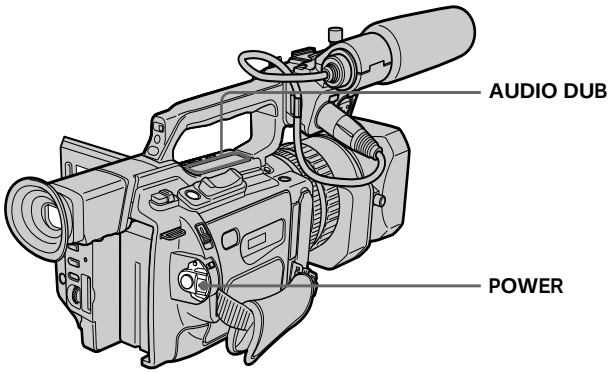


Notes

- You can dub a sound only on a tape recorded in Fs32K mode of the DVCAM format.
- When dubbing with the INPUT1/INPUT2 connectors, you can check the recorded picture on the LCD screen, in the viewfinder, or on the screen of equipment connected with the VIDEO jack, and you can check the recorded sound by using headphones.
- When dubbing with the AUDIO CH1/CH2 jacks, you can check the recorded picture on the LCD screen or in the viewfinder, and you can check the recorded sound by using a headphones.
- You can adjust the balance of the new sound and original sound using AUDIO MIX in the menu settings. You can monitor the sound during audio dubbing.

Adding an audio sound on a recorded tape

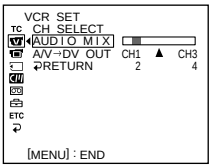
(1) Insert the recorded tape into your camcorder.
(2) Set the POWER switch to VCR on your camcorder.
(3) Locate the recording start point by pressing ►. Then press ❚❚ at the point where you want to start recording to set your camcorder to the playback pause mode.
(4) Press ⏷ AUDIO DUB. The green ⏷❚❚ indicator appears on the LCD screen or in the viewfinder.
(5) Press ❚❚ and start playing back the audio you want to record at the same time. The new sound is recorded in channels 3/4 during playback.
(6) Press ■ at the point where you want to stop recording.



Monitoring the new recorded sound

To play back the sound

Adjust the balance between the channels 1/2 (CH1/2) and the channels 3/4 (CH3/4) by selecting AUDIO MIX in the menu settings (p. 104).



The default setting is for original sound only.
If you set the audio balance beforehand, you can monitor both the original sound and dubbed sound during the dubbing.

Notes

- New sound cannot be recorded on a tape already recorded in Fs48K mode (p. 109).
- New sound cannot be recorded on a tape already recorded in the DV format.
- You cannot add audio with the i, DV IN/OUT jack.

If you make all the connections

The audio input to be recorded will take precedence over others in the following order.

- AUDIO CH1/CH2 jacks
- INPUT1/INPUT2 connectors

If an i.LINK cable (DV connecting cable) (not supplied) is connected to your camcorder

You cannot add sound to a recorded tape.

If you set the write-protect tab of the tape to lock

You cannot record on the tape. Slide the write-protect tab to release the write protection.

We recommend that you add new sound on a tape recorded with your camcorder

If you add new sound on a tape recorded with another camcorder (including an other DSR-PD150), the sound quality may deteriorate.

On blank portions

You cannot add an audio.

When dubbing through the INPUT1/INPUT2 connectors

You can adjust the recording level manually (p. 52).

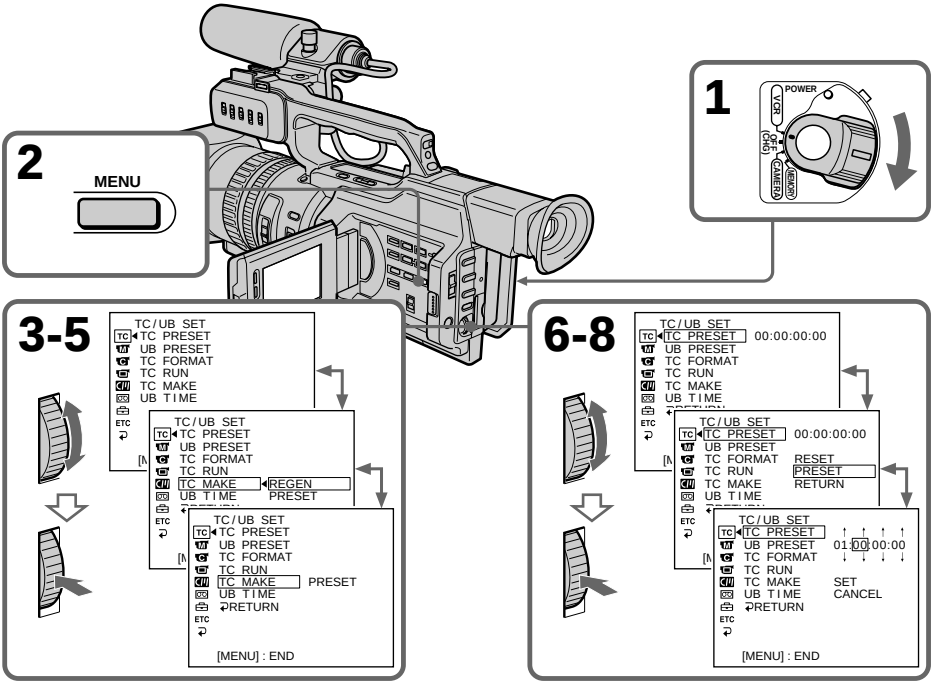
Setting time values

The camcorder uses two types of time values: time code values and user bits. The time value is displayed on the LCD screen, in the viewfinder, or on the display window. The time code and user bits can be set only in DVCAM mode.
The user bits are convenient when using multiple cameras at the same event. When you record the picture, time code data will be recorded automatically.

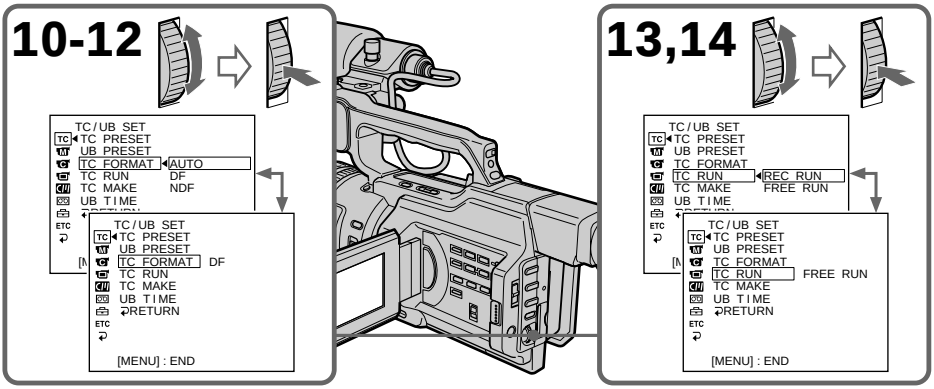
Setting the time code value

This section describes the steps for setting time code recording methods for particular shooting conditions and setting initial values.

(1) Set the POWER switch to VCR or CAMERA.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select TC, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select TC MAKE, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select PRESET, then press the dial.
(6) Turn the SEL/PUSH EXEC dial to select TC PRESET, then press the dial.
(7) Turn the SEL/PUSH EXEC dial to select PRESET, then press the dial.
(8) Set up the first two digits. Turn the SEL/PUSH EXEC dial to select the number, then press the dial. The time code is set between 00:00:00:00 and 23:59:59:29.
(9) Repeat step 8 to set up the other digits.



(10) Turn the SEL/PUSH EXEC dial to select SET, then press the dial.
(11) Turn the SEL/PUSH EXEC dial to select TC FORMAT, then press the dial.
(12) Turn the SEL/PUSH EXEC dial to select the frame mode, then press the dial.
AUTO: Automatically sets the mode in accordance with the inserted cassette.
DF: Selects the drop-frame mode.
NDF: Selects the non-drop-frame mode.
For more information on the drop-frame/non-drop-frame mode, see "Drop-frame mode" on page 91.
(13) Turn the SEL/PUSH EXEC dial to select TC RUN, then press the dial.
(14) Turn the SEL/PUSH EXEC dial to select the desired running mode, then press the dial.
REC RUN: Time code value advances only while recording. When making the time code continuous at back space editing, select this setting.
FREE RUN: Time code advances freely regardless of the camcorder's current operation mode.
For more information on the running mode, see "Making the time code continuous at back space editing" on page 91.



To cancel the time code setting

Select CANCEL in step 10, then press the SEL/PUSH EXEC dial.

To reset the time code

Select RESET in step 7, then press the SEL/PUSH EXEC dial.

Drop-frame mode

In the NTSC standard, the time code value is based on 30 frames per second, but the exact video frame frequency is in fact 29.97 frames per second and the real time, or 18 frames per 10 minutes.
Drop-frame mode corrects for this by skipping two frame counts at the beginning of every minute which is not a multiple of ten.
In non-drop-frame mode, however, no frame counts are omitted, and there is a gradual deviation of the time code from real time.

Making the time code continuous at back space editing

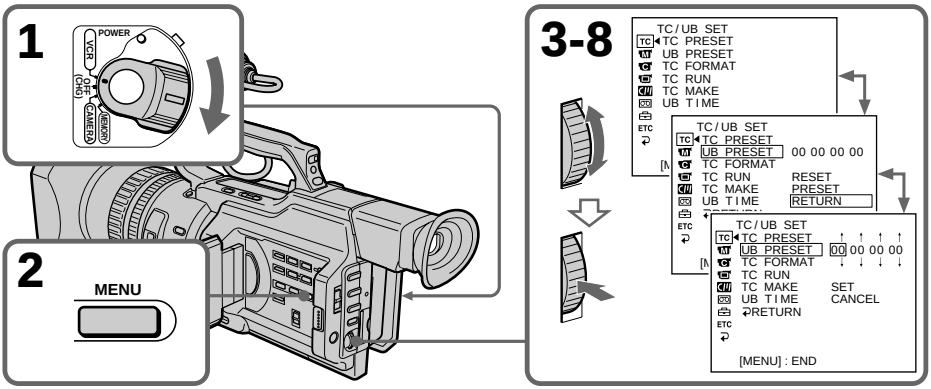
Set TC MAKE to REGEN in the menu settings to make the time code continuous when the recording has been interrupted or when the cassette tape has been removed from the camcorder between shootings.
When the camcorder is in recording pause mode, the recorded time code is read from the tape and synchronized to the internal time code generator.

Once you set TC MAKE to REGEN in the menu settings
Even if TC RUN is set to FREE RUN in the menu settings, the running mode is automatically set to REC RUN.

Setting the user bits value

You can set the user bits as eight-digit hexadecimal values (base 16) to have the date, time, scene number, and other information inserted into the time code.

(1) Set the POWER switch to VCR or CAMERA.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select TC, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select UB PRESET, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select PRESET, then press the dial.
(6) Set up the first two digits. Turn the SEL/PUSH EXEC dial to select the number, then press the dial.
(7) Repeat step 6 to set up the other digits.
(8) Turn the SEL/PUSH EXEC dial to select SET, then press the dial.



To cancel the user bits setting

Select CANCEL in step 8, then press the SEL/PUSH EXEC dial.

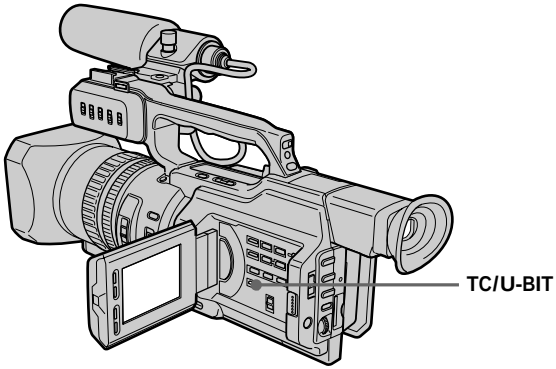
To reset the user bits

Select RESET in step 5, then press the SEL/PUSH EXEC dial.

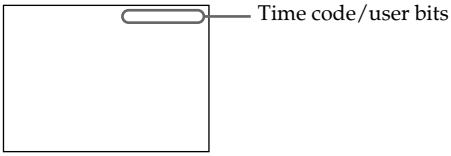
Setting the user bits to the real time clock

Set UB TIME to ON in the menu settings. We recommend that you set the time beforehand.

Switching the time value



Press TC/U-BIT. Each time you press TC/U-BIT, the time value changes between the time code and user bits.
TC: Displays the time code. This is indicated as “00:00:00:00” or “00:00.00:00”.
U-BIT: Displays user bits. This is indicated as “00 00 00 00”.



Note
The time code and user bits cannot be displayed properly if the tape does not have time code and/or user bits recordings or if the time code was recorded using a non-compatible method.

Superimposing a title

CM only

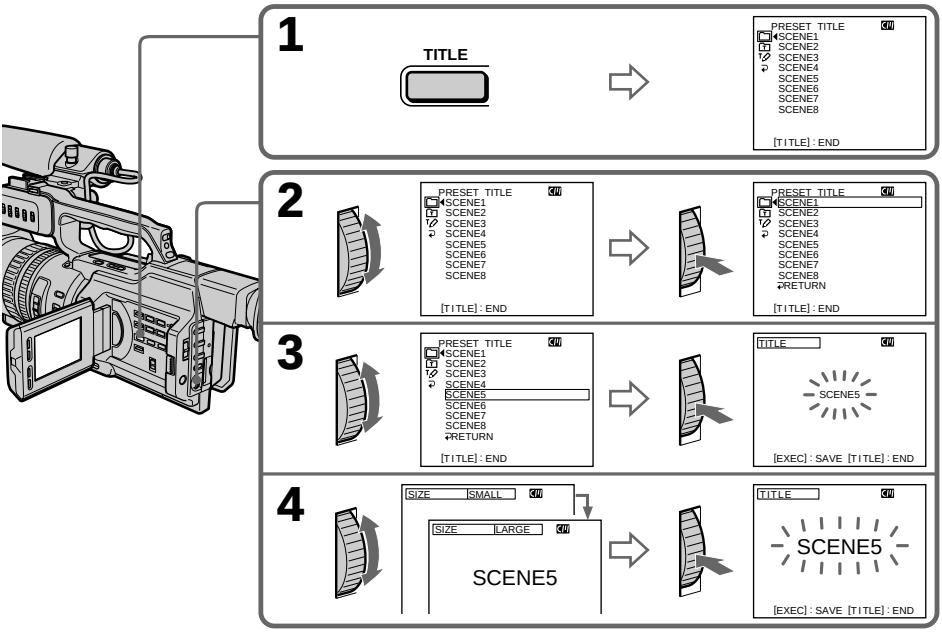
If you use a tape with cassette memory, you can superimpose the title while recording or after recording. When you play back the tape, the title is displayed for five seconds from the point where you superimposed it.

You can select one of eight preset titles and two custom titles (p. 98).

You can also select the color, size and position of titles.

(1) Press TITLE to display the title menu in standby, recording, playback, or playback pause mode.
(2) Turn the SEL/PUSH EXEC dial to select 🗀, then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select the desired title, then press the dial. The title flashes.
(4) Change the color, size, or position, if necessary.
  ① Turn the SEL/PUSH EXEC dial to select the COLOR, SIZE, or POSITION, then press the dial. The item appears.
  ② Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial.
  ③ Repeat steps 1 and 2 until the title is laid out as desired.
(5) Press the SEL/PUSH EXEC dial again to complete the setting.
  In playback, playback pause, or recording mode:
  The "TITLE SAVE" indicator appears on the screen for five seconds and the title is set.
  In standby mode:
  The "TITLE" indicator appears. When you press START/STOP to start recording, "TITLE SAVE" appears on the screen for five seconds and the title is set.

Superimposing a title



If you set the write-protect tab to lock

You cannot superimpose or erase the title. Slide the write-protect tab to release the write protection.

To use a custom title

If you want to use the custom title, select 🅃 in step 2.

If the tape has a blank portion

You cannot superimpose a title on that portion.

If the tape has a blank portion in the middle of the recorded parts

The title may not be displayed correctly.

The titles superimposed with your camcorder

The point you superimposed the title may be detected as an index signal when searching a recording with other video equipment.

To not display titles

Set TITLE DSPL to OFF in the menu settings (p. 104).

Title setting

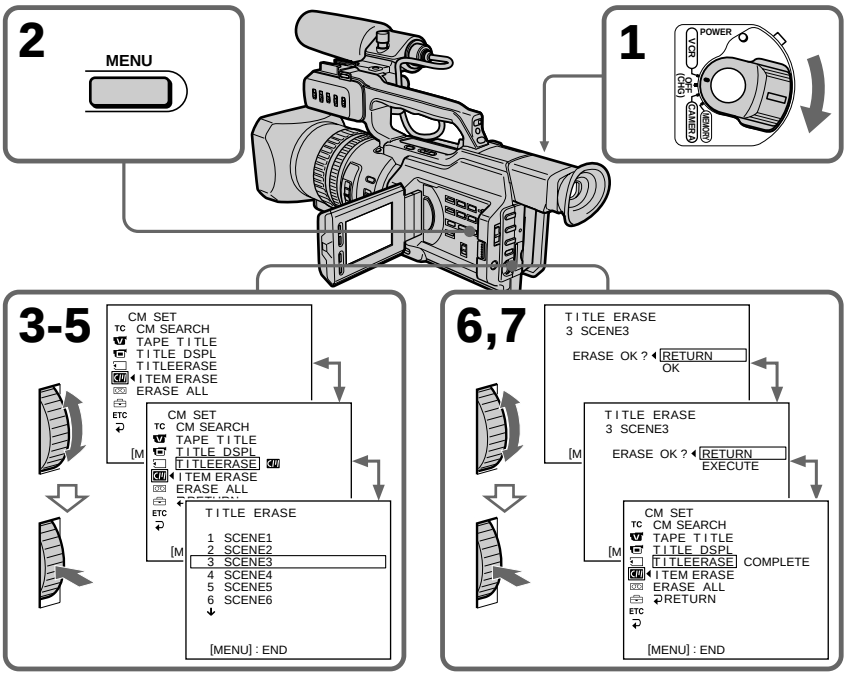
- The title color changes as follows:
  WHITE ↔ YELLOW ↔ VIOLET ↔ RED ↔ CYAN ↔ GREEN ↔ BLUE
- The title size changes as follows:
  SMALL ↔ LARGE
  You cannot input more than 12 characters in LARGE size.
- If you select the title size "SMALL," you have nine choices for the title position.
  If you select the title size "LARGE," you have eight choices for the title position.

If the "CM FULL" mark appears

The cassette memory is full. If you erase the title, index data, date data, photo data, or cassette label in the cassette, you can then superimpose a title.

Erasing a title

(1) Set the POWER switch to VCR or CAMERA.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select TITLEERASE, then press the dial.
The title erase display appears.
(5) Turn the SEL/PUSH EXEC dial to select the title you want to erase, then press the dial.
The "ERASE OK ?" indicator appears.
(6) Make sure the title is the one you want to erase, and turn the SEL/PUSH EXEC dial to select OK, then press the dial.
"OK" changes to "EXECUTE."
(7) Press the SEL/PUSH EXEC dial.
"ERASING" flashes for about two seconds and "COMPLETE" appears after erasing the title.



To cancel erasing

Select RETURN in step 6 or 7, then press the SEL/PUSH EXEC dial.

To erase all the titles

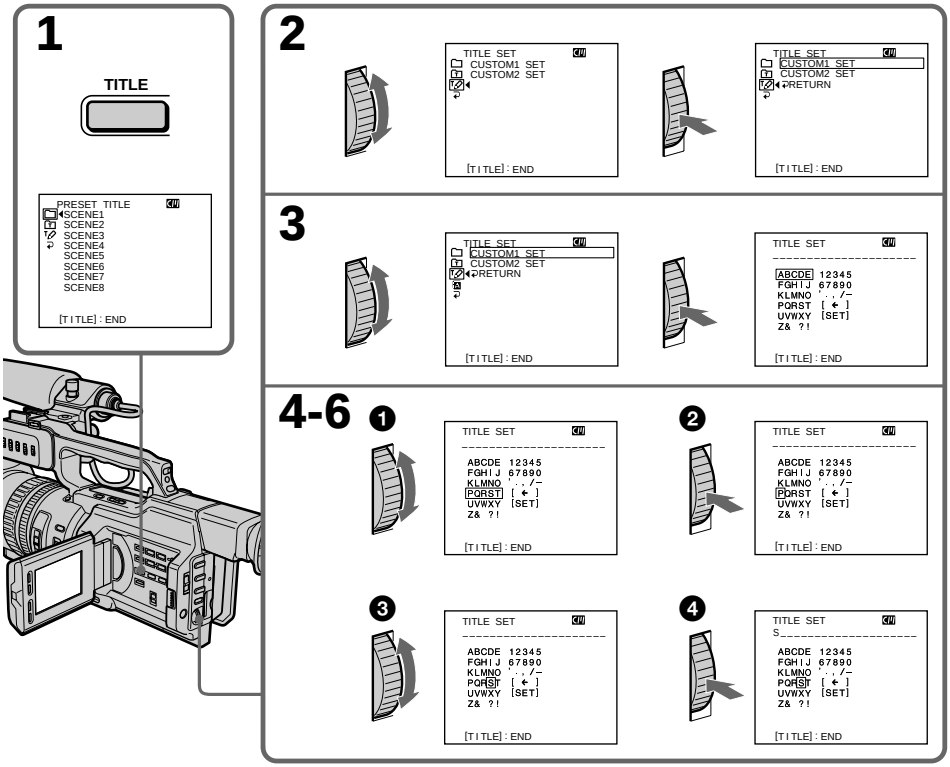
See "Erasing the cassette memory data" on page 102.

Making your own titles

CM only

You can make up to two titles and store them in cassette memory. Each title can have up to 20 characters.

(1) Press TITLE in the standby, playback, or playback pause mode.
(2) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(3) Turn the SEL/PUSH EXEC dial to select CUSTOM1 SET or CUSTOM2 SET, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select the column of the desired character, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select the desired character, then press the dial.
(6) Repeat steps 4 and 5 until you have selected all characters and completed the title.
(7) To finish making your own titles, turn the SEL/PUSH EXEC dial to select [SET], then press the dial. The title is stored in memory.
(8) Press TITLE to make the title menu disappear.



To change a title you have stored

In step 3, select CUSTOM1 SET or CUSTOM2 SET, depending on which title you want to change, then press the SEL/PUSH EXEC dial. Turn the SEL/PUSH EXEC dial to select [←], then press the dial to delete the title. The last character is erased. Enter a new title as desired.

To erase a character

Turn the SEL/PUSH EXEC dial to select [←], then press the dial. The last character is erased.

To enter a space

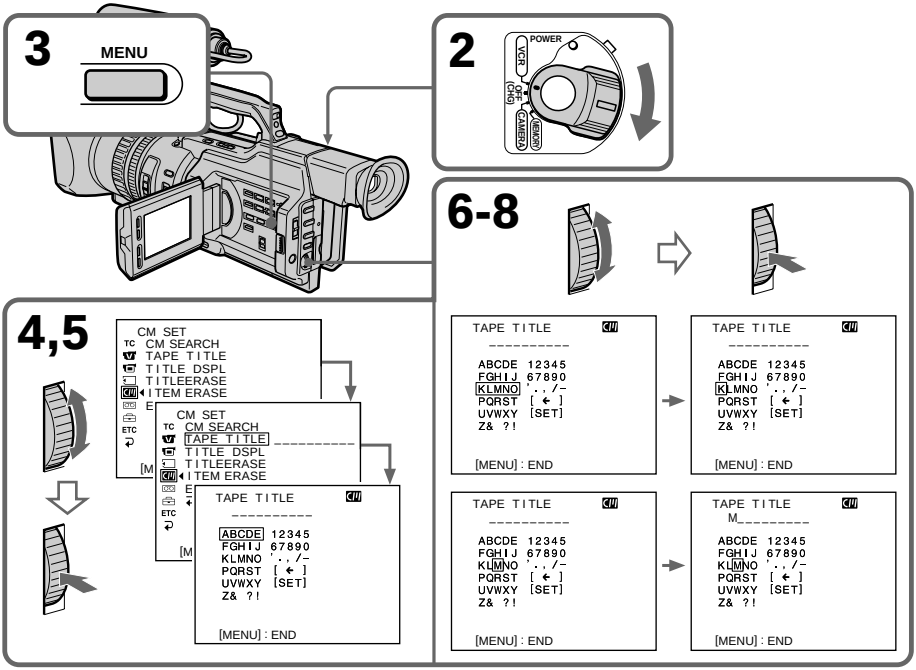
Select [Z& ? !], then select the blank part.

Labeling a cassette

CM only

If you use a tape with cassette memory, you can label a cassette. The label can consist of up to 10 characters and is stored in cassette memory. When you insert the labeled cassette and set the POWER switch to VCR, CAMERA, or MEMORY, the label is displayed for about five seconds.

(1) Insert the cassette you want to label.
(2) Set the POWER switch to VCR or CAMERA.
(3) Press MENU to display the menu.
(4) Turn the SEL/PUSH EXEC dial to select CM, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select TAPE TITLE, then press the dial. The tape title display appears.
(6) Turn the SEL/PUSH EXEC dial to select the column of the desired character, then press the dial.
(7) Turn the SEL/PUSH EXEC dial to select the desired character, then press the dial.
(8) Repeat steps 6 and 7 until you finish the label.
(9) Turn the SEL/PUSH EXEC dial to select [SET], then press the dial. The label is stored in memory.



To change the label you have made

Insert the cassette to change the label, and operate in the same way as you do to make a new label.

If you set the write-protect tab of the tape to lock

You cannot label the tape. Slide the write-protect tab to release the write protection.

If you have superimposed titles in the cassette

When the label is displayed, up to four titles also appear.

When the "-----" indicator has fewer than 10 spaces

The cassette memory is full.
The "-----" indicates the number of characters you can select for the label.

To erase a character

Turn the SEL/PUSH EXEC dial to select [←], then press the dial. The last character is erased.

To enter a space

Select [Z& ? !], then select the blank part.

Erasing the cassette memory data

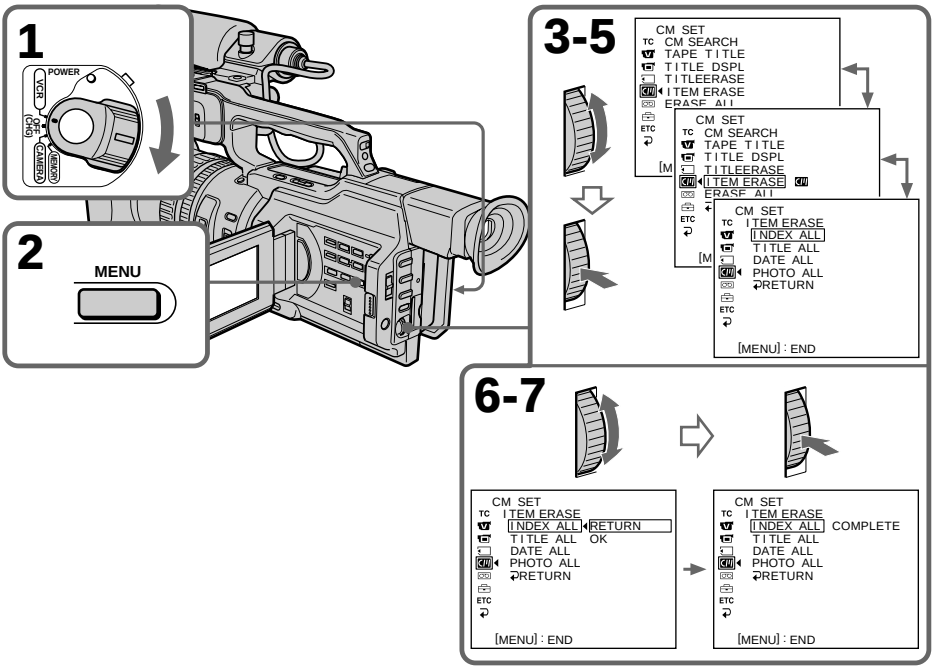
You can erase data stored in cassette memory, each item's data can be erased separately. You can also erase all items' data once.

Erasing each item's data separately

(1) Set the POWER switch to VCR or CAMERA.
(2) Press MENU to display the menu display.
(3) Turn the SEL/PUSH EXEC dial to select CM, then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ITEM ERASE, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select the item that you want to erase its data, then press the dial.

Item	Meaning
INDEX ALL	Erases all the index data.
TITLE ALL	Erases all the title data.
DATE ALL	Erases all the date data.
PHOTO ALL	Erases all the photo data.

(6) Turn the SEL/PUSH EXEC dial to select OK, then press the dial.
"OK" changes to "EXECUTE."
(7) Press the SEL/PUSH EXEC dial.
"ERASING" flashes for about two seconds and "COMPLETE" appears after erasing the selected item's data.



To cancel erasing

Select RETURN in step 6 or 7, then press the SEL/PUSH EXEC dial.

Erasing all the data in cassette memory

(1) Set the POWER switch to VCR or CAMERA.
(2) Press MENU to display the menu display.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select ERASE ALL, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select OK, then press the dial.
"OK" changes to "EXECUTE."
(6) Press the SEL/PUSH EXEC dial.
"ERASING" flashes for about two seconds and "COMPLETE" appears after erasing all the data.

To cancel erasing

Select RETURN in step 5 or 6, then press the SEL/PUSH EXEC dial.

Changing the menu settings

To change the mode settings in the menu settings, select the menu items with the SEL/PUSH EXEC dial. The default settings can be partially changed. First, select the icon, then the menu item and then the mode.

(1) In the standby, VCR, or MEMORY mode, press MENU.

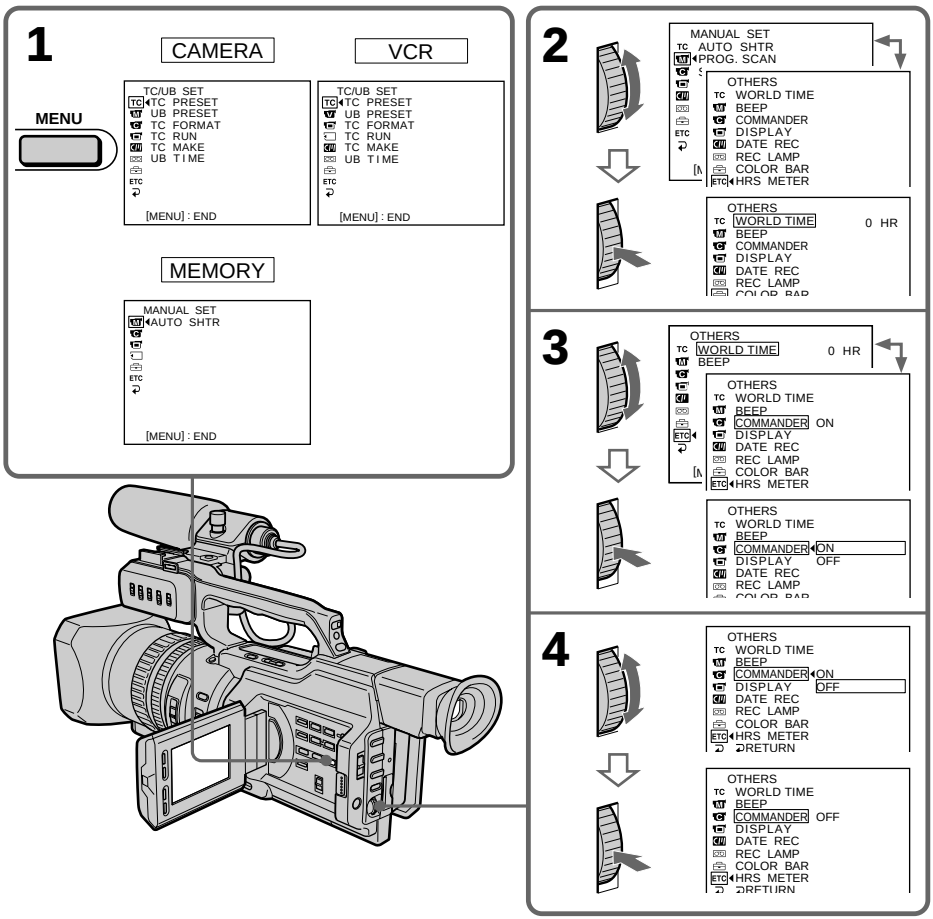
(2) Turn the SEL/PUSH EXEC dial to select the desired icon, then press the dial to set it.

(3) Turn the SEL/PUSH EXEC dial to select the desired item, then press the dial to set it.

(4) Turn the SEL/PUSH EXEC dial to select the desired mode, then press the dial to set it.

(5) If you want to change other items, select ↩ RETURN and press the dial, then repeat steps 2 to 4.

For details, see "Selecting the mode setting of each item" (p. 105).



To make the menu display disappear

Press MENU.

Menu items are displayed as the following icons:

- TC TC/UB SET
- MANUAL SET
- CAMERA SET
- VCR SET
- LCD/VF SET
- MEMORY SET
- CM SET
- TAPE SET
- SETUP MENU
- ETC OTHERS

Selecting the mode setting of each item

● is the default setting.

Menu items differ depending on the position of the POWER switch.
The LCD screen or viewfinder screen shows only the items you can operate at the moment.

Icon/item	Mode	Meaning	POWER switch
TC **TC PRESET**	—	Presets/resets the time code (p. 89).	VCR CAMERA
UB PRESET	—	Presets/resets user bits (p. 92).	VCR CAMERA
TC FORMAT	● AUTO	Automatically sets the frame mode in accordance with the inserted cassette.	VCR CAMERA
	DF	Sets the frame mode to drop-frame mode.	
	NDF	Sets the frame mode to non-drop-frame mode.	
TC RUN	● REC RUN	Time code value advances only while recording. When making the time code continuous at back space editing, select this setting.	VCR CAMERA
	FREE RUN	Time code advances freely regardless of the camcorder's current operation mode. When adjusting the discrepancy between time code value and real time.	
TC MAKE	● REGEN	Makes the time code continuous at back space editing. Regardless of the TC RUN setting, the running mode is automatically set to REC RUN.	VCR CAMERA
	PRESET	Does not make the time code continuous at back space editing.	
UB TIME	● OFF	Does not set user bits to the real time clock.	VCR
	ON	Sets user bits to the real time clock.	CAMERA

Icon/item	Mode	Meaning	POWER switch
M AUTO SHTR	● ON	To automatically adjust the electronic shutter speed.	CAMERA MEMORY
	OFF	To fix the electronic shutter speed.	
PROG. SCAN	● OFF	Records still/moving pictures in the interlace format.	CAMERA
	ON	Records still/moving pictures in progressive mode.	
SETUP	● 0 %	Records with the SETUP 0 % system.	CAMERA
	7.5 %	Records with the SETUP 7.5 % system.	
D ZOOM	● OFF	To deactivate the digital zoom. Up to 12× zoom is carried out.	CAMERA
	24×	To activate the digital zoom. More than 12× zoom is performed digitally. This value goes up to 24× (p. 22).	
	48×	To activate the digital zoom. More than 12× zoom is performed digitally. This value goes up to 48× (p. 22).	
16:9WIDE	● OFF	—	CAMERA
	ON	To record a 16:9 wide picture (p. 36).	
STEADYSHOT	● ON	To compensate for camera-shake.	CAMERA
	OFF	To cancel the SteadyShot function. Natural pictures are produced when shooting a stationary object with a tripod.	MEMORY
FRAME REC	● OFF	Does not make a cut recording.	CAMERA
	ON	Makes a cut recording (p. 61).	
INT. REC	ON	Makes an interval recording (p. 59).	CAMERA
	● OFF	Does not make an interval recording.	
	SET	Sets the interval time and recording time.	
WIND	CH1	Reduces the sound of wind input from the INPUT1 connector (ON) or not (OFF).	CAMERA
	CH2	Reduces the sound of wind input from the INPUT2 connector (ON) or not (OFF).	

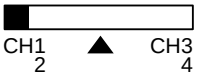
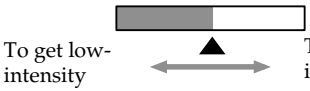
Notes on the SteadyShot function

- The SteadyShot function will not correct excessive camera-shake.
- Attachment of a conversion lens (not supplied) may influence the SteadyShot function.

If you cancel the SteadyShot function

The SteadyShot OFF indicator appears. Your camcorder prevents excessive compensation for camera-shake.

Changing the menu settings

Icon/item	Mode	Meaning	POWER switch
CH SELECT	● CH1, CH2	To play back the CHs 1/2 audios from each channel. However, if you play back the audios via the camcorder's speaker, the audios are mixed.	VCR
	CH1	To play back the CH1 audio from both channels 1/2.	
	CH2	To play back the CH2 audio from both channels 1/2.	
AUDIO MIX	—	To adjust the balance between the channels 1/2 (CH1/2) and channels 3/4 (CH3/4) (p. 87). 	VCR
A/V→DV OUT	● OFF	To output analog images in digital format using your camcorder.	VCR
	ON	To output digital images in analog format using your camcorder.	
LCD B. L.	● BRT NORMAL	To set the brightness on the LCD screen to normal.	VCR CAMERA MEMORY
	BRIGHT	To brighten the LCD screen.	
LCD COLOR	—	To adjust the color on the LCD screen with the SEL/PUSH EXEC dial. 	VCR CAMERA MEMORY
VF B.L.	● BRT NORMAL	To set the brightness on the viewfinder screen to normal.	VCR CAMERA MEMORY
	BRIGHT	To brighten the viewfinder screen.	
GUIDEFRAME	● OFF	Does not display the guide frame.	CAMERA MEMORY
	ON	Displays the guide frame (p. 35).	

Notes on LCD B.L. and VF B.L.

- When you select "BRIGHT," battery life is reduced a little during recording.
- When you use power sources other than the battery pack, "BRIGHT" is automatically selected.

Icon/item	Mode	Meaning	POWER switch
CONTINUOUS	● OFF	Not to record continuously.	MEMORY
	ON	To record four images continuously (p. 119).	
	MULTI SCRN	To record nine images continuously (p. 119).	
QUALITY	● SUPER FINE	To record still images in the super fine image quality mode, using a "Memory Stick" (p. 116).	VCR MEMORY
	FINE	To record still images in the fine image quality mode, using a "Memory Stick" (p. 116).	
	STANDARD	To record still images in the standard image quality mode, using a "Memory Stick" (p. 116).	
PRINT MARK	● OFF	To erase print marks on still images.	VCR MEMORY
	ON	To write a print mark on the recorded still images you want to print out later.	
PROTECT	● OFF	To release protection from still images.	VCR MEMORY
	ON	To protect selected still images against accidental erasure (p. 135).	
SLIDE SHOW	—	To play back all the images as a slide show (p. 134).	MEMORY
DELETE ALL	—	To delete all unprotected images (p. 137).	MEMORY
FORMAT	● RETURN	To cancel formatting.	MEMORY
	OK	To format an inserted "Memory Stick." 1. Select FORMAT with the SEL/PUSH EXEC dial, then press the dial. 2. Turn the SEL/PUSH EXEC dial to select OK, then press the dial. 3. After "EXECUTE" appears, press the SEL/PUSH EXEC dial. "FORMATTING" appears during formatting. "COMPLETE" appears when formatting is finished.	
PHOTO SAVE	—	To duplicate images on a tape onto a "Memory Stick" (p. 127).	VCR

Formatting erases all information on the "Memory Stick"

Check the contents of the "Memory Stick" before formatting:

- Formatting erases sample images on the "Memory Stick."
- Formatting erases the protected image data on the "Memory Stick."

Notes on formatting

- Supplied or optional "Memory Stick"s have been formatted at the factory. Formatting with this camcorder is not required.
- While the display shows "FORMATTING," do not turn the POWER switch, press any button, or eject the "Memory Stick"
- You cannot format a "Memory Stick" if the write-protect tab on the "Memory Stick" is set to LOCK.
- Format again if the message "⚠" appears.

If formatting fails

The "⚠ FORMAT ERROR" message appears.

Icon/item	Mode	Meaning	POWER switch
CM SEARCH	● ON	To search using cassette memory (p. 64, 66, 67, 69).	VCR
	OFF	To search without using cassette memory.	
TAPE TITLE	—	To label a cassette (p. 100).	VCR CAMERA
TITLE DSPL	● ON	To display the title you have superimposed.	VCR
	OFF	Not to display the title.	
TITLEERASE	—	To erase the title you have superimposed (p. 97).	VCR CAMERA
ITEM ERASE	—	To erase each item's data in cassette memory (p. 102).	VCR CAMERA
ERASE ALL	—	To erase all the data in cassette memory (p. 103).	VCR CAMERA
REC MODE	● DVCAM	To record in the DVCAM format.	VCR
	DV SP	To record in the DV format (SP mode).	CAMERA
AUDIO MODE	● FS32K	To record in Fs32K (12-bit) mode (4-channel sounds).	VCR CAMERA
	FS48K	To record in Fs48K (16-bit) mode (2-channel sounds with high quality).	

Notes on AUDIO MODE

- You cannot dub audio sound on a tape recorded in the Fs48K (16-bit) mode.
- When playing back a tape recorded in the Fs48K (16-bit) mode, you cannot adjust the balance in AUDIO MIX.

Note on REC MODE

You cannot dub any audio sound on a tape recorded in the DV format (SP mode), even if you recorded it in Fs32K (12-bit) mode.

Icon/item	Mode	Meaning	POWER switch
REMAIN	● AUTO	To display the remaining tape indication: • for about eight seconds after your camcorder is turned on and calculates the remaining amount of tape • for about eight seconds after a cassette is inserted and your camcorder calculates the remaining amount of tape • for about eight seconds after ► is pressed in VCR mode • for about eight seconds after DISPLAY is pressed to display the screen indicators • for the period of tape rewinding, forwarding or picture search in the VCR mode	VCR CAMERA
	ON	To always display the remaining tape indicator.	
DATA CODE	● DATE/CAM	To display date, time and various settings during playback.	VCR
	DATE	To display date and time during playback.	
MIC NR	● ON	To reduces the microphone noise.	VCR
	OFF	To deactivate the function above.	CAMERA
AUDIO SET	—	Adjusts the audio recording level manually (p. 52).	VCR CAMERA
CLOCK SET	—	To reset the date or time (p. 112).	CAMERA MEMORY
LTR SIZE	● NORMAL	To display selected menu items in normal size.	VCR CAMERA
	2×	To display selected menu items at twice the normal size.	MEMORY
LOGO INS	—	To always insert the still image on the moving picture. For details, refer to the operating instructions (for the auto logo insert function) supplied with this camcorder.	CAMERA
ETC WORLD TIME	—	To set the clock to the local time. Turn the SEL/PUSH EXEC dial to set a time difference. The clock changes by the time difference you set here. If you set the time difference to 0, the clock returns to the originally set time.	CAMERA MEMORY

Icon/item	Mode	Meaning	POWER switch
ETC **BEEP**	MELODY	To chime a melody in normal operations, and beep a warning sound for five seconds.	VCR CAMERA MEMORY
	● NORMAL	To beep in the following situations: turning on the power, pressing the start/ stop button, and when a warning message appears.	
	OFF	To cancel the melody, beep, and shutter click sound.	
COMMANDER	● ON	To activate the Remote Commander supplied with your camcorder.	VCR CAMERA MEMORY
	OFF	To deactivate the Remote Commander to avoid remote control misoperation caused by an other VCR's remote control.	
DISPLAY	● LCD	To show the display on the LCD screen and viewfinder screen.	VCR CAMERA MEMORY
	V-OUT/LCD	To show the display on a TV screen, LCD screen and viewfinder screen.	
DATE REC	● OFF	To not superimpose the date and time on the picture.	CAMERA
	ON	To superimpose the date and time on the picture.	
REC LAMP	● ON	To light up the camera recording lamps at the front and rear of your camcorder.	CAMERA MEMORY
	OFF	To turn the camera recording lamp off.	
COLOR BAR	● OFF	Does not display the color bar.	CAMERA
	ON	Displays the color bar.	
VIDEO EDIT	—	To make programs and perform video editing (p. 77).	VCR
EDIT SET	—	To adjust and set the synchronization of your camcorder and a VCR for dubbing in edit set mode (p. 75).	VCR
HRS METER	OPERATION	The cumulative total hours of operation is displayed in 10-operation increments.	VCR CAMERA
	DRUM RUN	The cumulative total hours of drum rotation with tape threaded is displayed in 10-operation increments.	
	TAPE RUN	The cumulative total hours of tape running is displayed in 10-operation increments.	
	THREADING	The cumulative number of tape unthreading operation is displayed in 10-operation increments.	

Notes

- If you press DISPLAY with DISPLAY set to V-OUT/LCD in the menu settings, the picture from a TV or VCR will not appear on the LCD screen even when your camcorder is connected to outputs on the TV or VCR (except using an i.LINK cable (DV connecting cable)).
- You cannot erase the date and time superimposed using the DATE REC function.

Resetting the date and time

The date and time are set at the factory. Set the time according to the local time in your country. If you do not use your camcorder for about four months, the date and time settings may be released because the vanadium-lithium battery installed in your camcorder will have been discharged (p. 157).

First, set the year, then the month, the day, the hour and then the minute.

(1) Press MENU to display the menu in the standby mode.

(2) Turn the SEL/PUSH EXEC dial to select [camera], then press the dial.

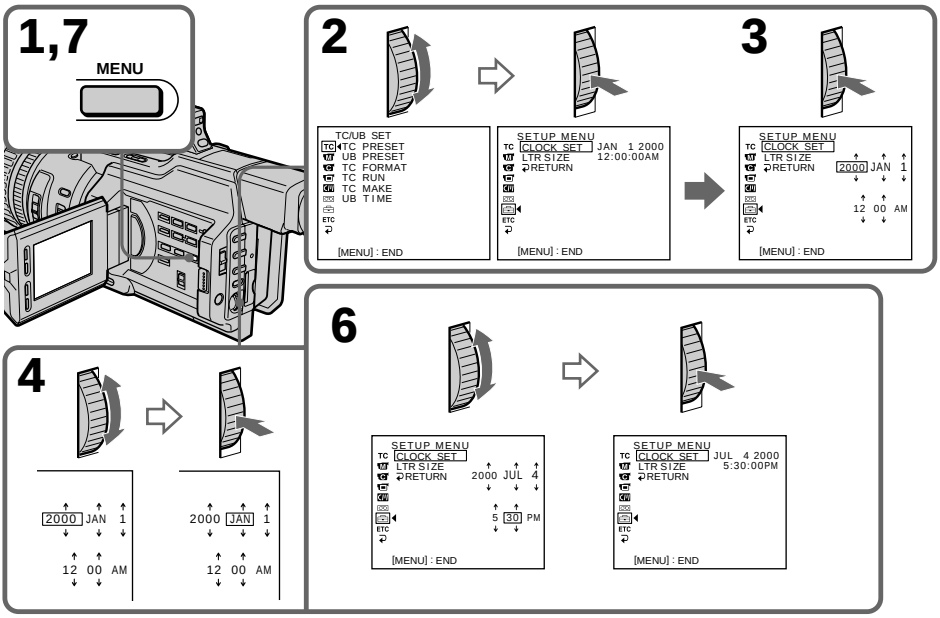
(3) Turn the SEL/PUSH EXEC dial to select CLOCK SET, then press the dial.

(4) Turn the SEL/PUSH EXEC dial to adjust to the desired year, then press the dial.

(5) Set the month, day and hour by turning the SEL/PUSH EXEC dial and pressing the dial.

(6) Set the minute by turning the SEL/PUSH EXEC dial and pressing the dial by the time signal. The clock starts to move.

(7) Press MENU to make the menu settings disappear.



The year changes as follows:

1995 ⟷ 1996 ⟵ · · ⟶ 2000 ⟵ · · · · ⟶ 2079

If you do not set the date and time

"- -:- -:- -" as time, and "- - - - - - - - -" as date will be recorded.

Note on the time indicator

The internal clock of this camcorder operates on a 12-hour cycle.

- 12:00 AM stands for midnight.
- 12:00 PM stands for noon.

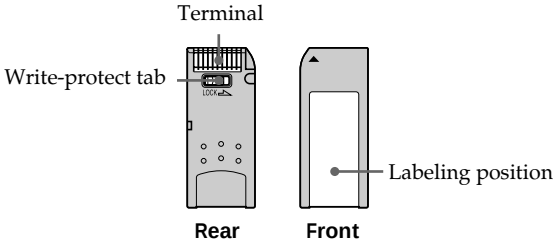
Using a "Memory Stick" – introduction

You can record and play back still images on the "Memory Stick" supplied with your camcorder. You can easily play back, record or delete still images. You can exchange image data with other equipment such as a personal computer etc., using the Memory Stick Reader/Writer supplied with your camcorder or a PC card adaptor for Memory Stick (not supplied).

On file format (JPEG)
Your camcorder compresses image data in JPEG format (extension .jpg).

Typical image data file name
100-0001: As displayed on the LCD screen or in the viewfinder of the camcorder.
Dsc00001.jpg: As displayed on your PC screen.

Before using a "Memory Stick"



- You cannot record or erase still images when the write-protect tab on the "Memory Stick" is set to LOCK.
- We recommend backing up important data.
- Image data may be damaged in the following cases:
  – If you remove the "Memory Stick," turn the power off, or detach the battery for replacement when the access lamp is flashing.
  – If you use a "Memory Stick" near static electricity or magnetic fields.
- Prevent metallic objects or your finger from coming into contact with the metal parts of the connecting section.
- Stick its label on the labeling position.
- Do not bend, drop or apply strong shock to a "Memory Stick."
- Do not disassemble or modify a "Memory Stick."
- Do not let the "Memory Stick" get wet.
- Do not use or keep a "Memory Stick" in locations that are:
  – Extremely hot such as in a car parked in the sun or under the scorching sun.
  – Under direct sunlight.
  – Very humid or subject to corrosive gases.
- When you carry or store a "Memory Stick," put it in its case.

A "Memory Stick" formatted by a computer

A "Memory Stick" formatted by the Windows OS or Macintosh computers does not have a guaranteed compatibility with this camcorder.

Notes on image data compatibility

- Image data files recorded on a "Memory Stick" by your camcorder conform to the Design Rules for Camera File Systems universal standard (DCF98 standard) established by the JEIDA (Japan Electronic Industry Development Association). You cannot play back on your camcorder still images recorded on other equipment (DCR-TRV890E/TRV900/TRV900E or DSC-D700/D770) that does not conform to this universal standard. (These models are not sold in some areas.)
- If you cannot use a "Memory Stick" that is used with other equipment, format it with this camcorder (p. 108). However, formatting erases all information on the "Memory Stick."

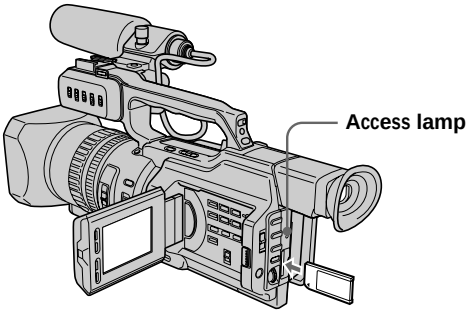
"Memory Stick" and MEMORY STICK are trademarks of Sony Corporation.

- Windows is a registered trademark licensed to Microsoft Corporation, registered in the U.S.A. and other countries.
- Macintosh and Mac OS are trademarks of Apple Computer, Inc.
- All other product names mentioned herein may be the trademarks or registered trademarks of their respective companies.

Furthermore, "™" and "®" are not mentioned in each case in this manual.

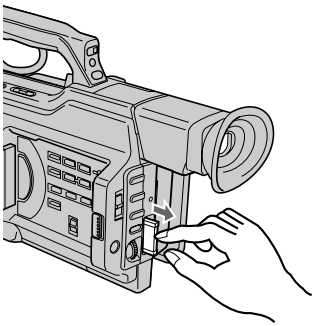
Inserting a "Memory Stick"

Insert the "Memory Stick" with the Sony logo pointing toward the LCD panel and the ◀ mark pointing inward.



To eject a "Memory Stick"

Push the "Memory Stick" inward, then release your finger. The "Memory Stick" comes out a little.



Note

The "Memory Stick" may pop out depending on the way you push it.

When the access lamp is lit or flashing

Never shake or strike your camcorder. Do not turn the power off , eject a "Memory Stick" or remove the battery pack. Otherwise, image data breakdown may occur.

If the "⚠ MEMORY STICK ERROR" indicator appears

The "Memory Stick" is broken or the file format is not proper. Eject the "Memory Stick," check it, and insert it again. If the same indicator appears, use another "Memory Stick."

Selecting the image quality mode

You can select the image quality mode in still picture recording. The default setting is SUPER FINE.

(1) Set the POWER switch to VCR or MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select QUALITY, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select the desired image quality, then press the dial.

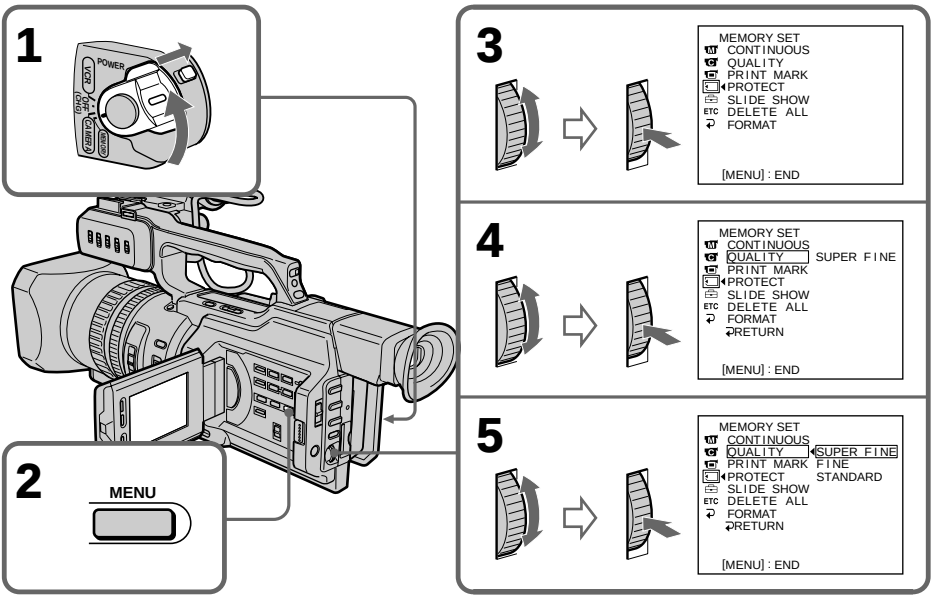


Image quality settings

Setting	Meaning
SUPER FINE	This is the highest image quality in this camcorder. The number of still images you can record is fewer than FINE. The image is compressed to about 1/3.
FINE	Use this mode when you want to record high quality images. The image is compressed to about 1/6.
STANDARD	This is the standard image quality. The image is compressed to about 1/10.

Note

In some cases, changing the image quality mode may not affect the image quality, depending on the types of images you are shooting.

Differences in image quality mode

Recorded images are compressed in JPEG format before being stored in memory. The memory capacity allotted to each image varies depending on the image quality mode selected. Details are shown in the table below.

Image quality mode	Memory capacity
SUPER FINE	Approx. 190 KB
FINE	Approx. 100 KB
STANDARD	Approx. 60 KB

Note on the image quality mode indicator

This is only displayed during recording.

The approximate number of images you can record on a "Memory Stick"

The approximate number of images you can record on a "Memory Stick" that is formatted using this camcorder varies depending on which image quality mode you select and the complexity of the subject.

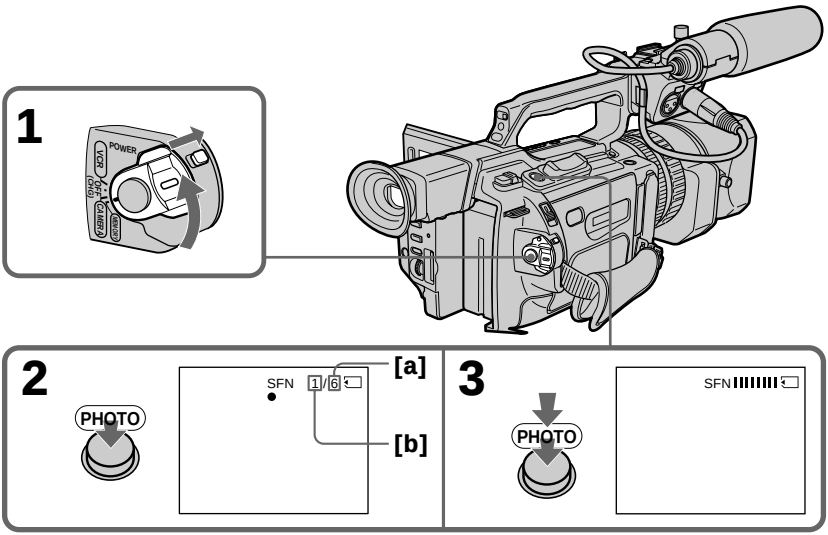
	Image quality mode		
	SUPER FINE	FINE	STANDARD
4 MB type (supplied)	20 images	40 images	60 images
8 MB type (not supplied)	40 images	81 images	122 images
16 MB type (not supplied)	82 images	164 images	246 images
32 MB type (not supplied)	164 images	329 images	494 images
64 MB type (not supplied)	329 images	659 images	988 images

Recording still images on a "Memory Stick" – Memory Photo recording

You can record still images on a "Memory Stick."

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Keep pressing PHOTO lightly until the desired still picture appears. The green ● mark stops flashing, then lights up. The brightness of the picture and focus are re-adjusted, being targeted for the middle of the picture and are fixed. Recording does not start yet.
(3) Press PHOTO deeply. The shutter clicks and the image is frozen. The image displayed on the screen will be recorded on the "Memory Stick." Recording is complete when the bar scroll indicator disappears.



[a] The number of images that can be recorded on the "Memory Stick"
[b] The number of recorded images

When the POWER switch is set to MEMORY
The following functions do not work: wide TV mode, digital effect, title, digital zoom, fader, and shutter speed (1/30 or smaller) adjustment .

Note
When you press the PHOTO button lightly at step 2, the focus of the image seems to be momentarily out.

When the auto logo insert function is activated
You cannot do memory photo recording.

While you are recording a still image
You can neither turn off the power nor press PHOTO.

When you press PHOTO on the Remote Commander
Your camcorder immediately records the image that is on the screen when you press the button.

Recording images continuously

You can record still images continuously. Select one of the two modes described below before recording.

Continuous mode [a]
You can record four still images continuously. The number of images is in accordance with remaining capacity of the “Memory Stick.”

Multi screen mode [b]
You can record nine still images continuously on a single page.

[a]

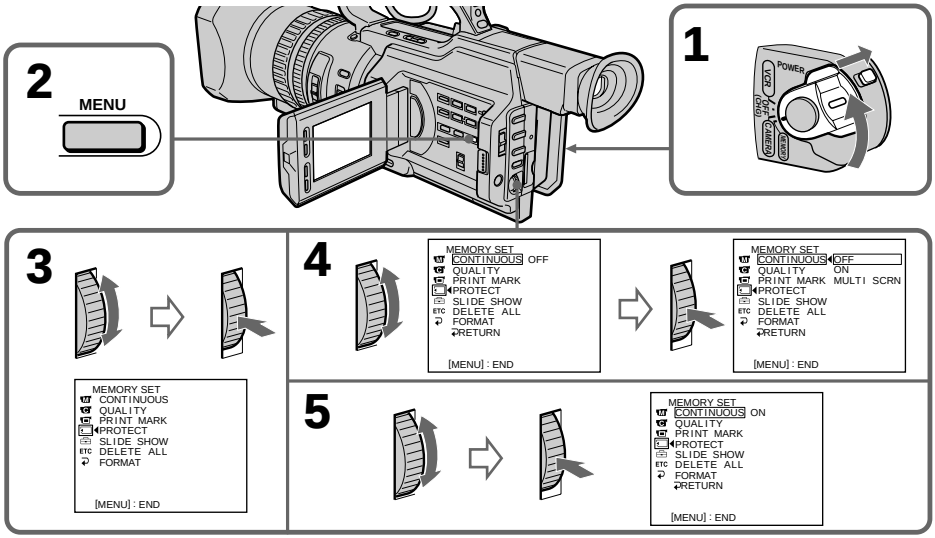
[b]

The number of images in continuous shooting
The number of images you can shoot continuously varies depending on the remaining capacity of the “Memory Stick.” The shutter always clicks four times, however, the number of images recordable may be less than four.

Note on using a video flash light (not supplied)
The video flash light does not work in the continuous or multi screen mode if you install it to the intelligent accessory shoe.

Recording still images on a "Memory Stick" – Memory Photo recording

(1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select CONTINUOUS, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select the desired setting, then press the dial.



Continuous shooting settings

Setting	Meaning (indicator on the screen)
OFF	Your camcorder shoots one image at a time. (no indicator)
ON	Your camcorder shoots up to four still images at about 0.5 sec intervals. ( )
MULTI SCRN	Your camcorder shoots nine still images at about 0.5 sec intervals and displays the images on a single page divided into nine boxes. ( )

If the capacity of the "Memory Stick" becomes full

" FULL" appears on the screen, and you cannot record still pictures on this "Memory Stick."

Superimposing a still image in a “Memory Stick” on a moving picture – MEMORY MIX

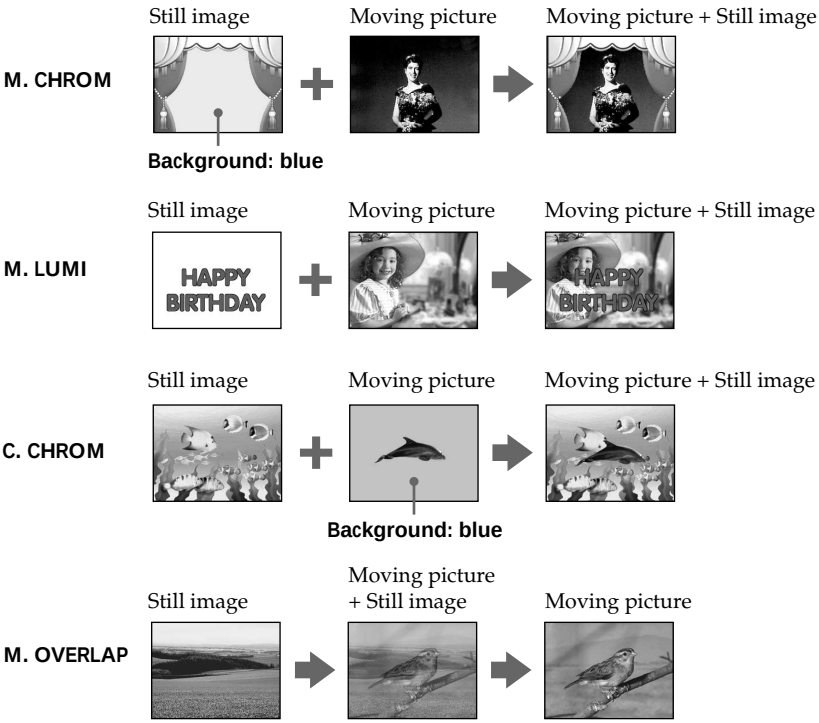
You can superimpose a still image you have recorded on a “Memory Stick” on the top of the moving picture you are recording.

M. CHROM (Memory chromakey)
You can swap a blue area of a still image such as an illustration or a frame with a moving picture.

M. LUMI (Memory luminancekey)
You can swap a brighter area of a still image such as a handwritten illustration or title with a moving picture. Record a title on a “Memory Stick” before a trip or event for convenience.

C. CHROM (Camera chromakey)
You can superimpose a moving picture on a still image that used as background. Shoot the subject against a blue background. The blue area of the moving picture will be swapped with a still image.

M. OVERLAP (Memory overlap)
You can make a moving picture fade in on top of a still image.



Superimposing a still image in a "Memory Stick" on a moving picture – MEMORY MIX

Before operation

Insert a recorded "Memory Stick" and a tape to be recorded into your camcorder.

(1) Set the POWER switch to CAMERA.

(2) Press MEMORY MIX in standby mode.
The last recorded or last composed image appears on the lower part of the screen as a thumbnail image.

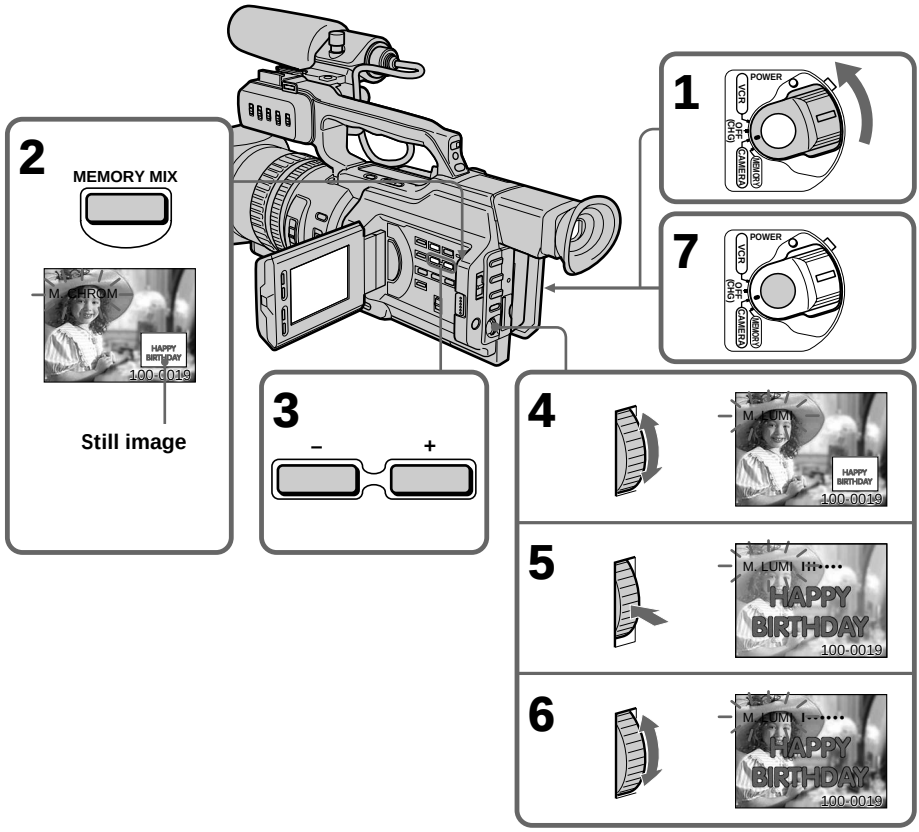
(3) Press MEMORY+/– or +/– on the Remote Commander to select the still image you want to superimpose.
To see the previous image, press MEMORY – or – on the Remote Commander.
To see the next image, press MEMORY+ or + on the Remote Commander.

(4) Turn the SEL/PUSH EXEC dial to select the desired mode.
The mode changes as follows:
M. CHROM ↔ M. LUMI ↔ C. CHROM ↔ M. OVERLAP

(5) Press the SEL/PUSH EXEC dial.
The still image is superimposed on the moving picture, and your camcorder is in standby mode.

(6) Turn the SEL/PUSH EXEC dial to adjust the effect.

(7) Press START/STOP to start recording.



Items to be adjusted

M. CHROM	The color (blue) scheme of the area in the still picture which is to be swapped with a moving picture
M. LUMI	The color (bright) scheme of the area in the still picture which is to be swapped with a moving picture
C. CHROM	The color (blue) scheme of the area in the moving picture which is to be swapped with a still picture
M. OVERLAP	No adjustment necessary

As the bar is shorter, the effect is enhanced.

To change the still image to be superimposed

Do either of the following:
– Press MEMORY+/– before step 6.
– Press the SEL/PUSH EXEC dial before step 6, and repeat the procedure from step 4 (except M. OVERLAP).

To change the mode setting

Press SEL/PUSH EXEC dial after step 6, and repeat the procedure from step 4 (except M. OVERLAP).

To cancel MEMORY MIX

Press MEMORY MIX again.

During recording
You cannot change the mode setting.

The "Memory Stick" supplied with your camcorder has 20 images stored
– For M. CHROM: 18 images (such as a frame) 100-0001 to 100-0018
– For C. CHROM: two images (such as background) 100-0019 to 100-0020

Sample images
Sample images stored in the "Memory Stick" supplied with your camcorder are protected (p. 135).

If a still image to be superimposed has lots of white areas
The thumbnail image may not be displayed clearly.

Image data modified with personal computers or shot with other equipment
You may not be able to play them back with your camcorder.

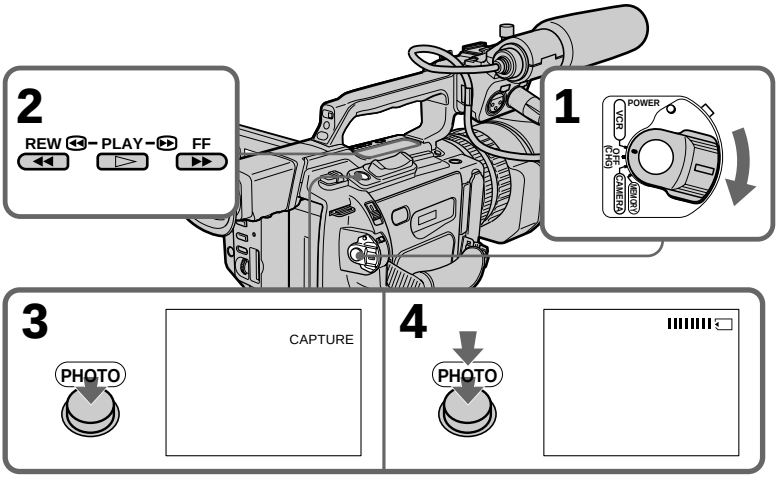
When the auto logo insert function is activated
You cannot use memory mix function.

Recording an image from a tape as a still image

Your camcorder can read moving picture data recorded on a tape and record it as a still image on a "Memory Stick." Your camcorder can also take in moving picture data through the input connector and record it as a still image on a "Memory Stick."

Before operation
Insert a recorded tape and a "Memory Stick" into your camcorder.

(1) Set the POWER switch to VCR.
(2) Press ►. The picture recorded on the tape is played back.
(3) Keep pressing PHOTO lightly until the picture from the tape freezes. "CAPTURE" appears on the LCD screen or in the viewfinder. Recording does not start yet.
(4) Press PHOTO deeper. The image displayed on the screen will be recorded on a "Memory Stick." Recording is complete when the bar scroll indicator disappears.



When the access lamp is lit or is flashing
Never shake or strike the unit. Also, do not turn the power off , eject a "Memory Stick" or remove the battery pack. Otherwise, image data breakdown may occur.

If "⚠" appears on the LCD screen or in the viewfinder
The inserted "Memory Stick" is incompatible with your camcorder because its format does not conform to that of your camcorder. Check the format of the "Memory Stick."

If you press PHOTO lightly in the playback mode
The playback pauses momentarily.

Sound recorded on a tape
You cannot record the sound from a tape.

When the auto logo insert function is activated
You cannot use this function.

Recording an image from a tape as a still image

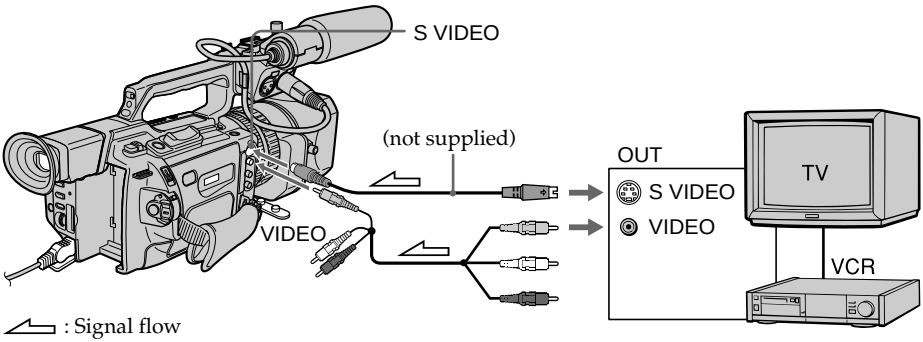
Titles that are already recorded on tapes
You cannot record the titles on a "Memory Stick."

When you press PHOTO on the Remote Commander
Your camcorder immediately records the image that is on the screen when you press the button.

Recording a still image from other equipment

(1) Set the POWER switch to VCR and set DISPLAY in ETC to LCD in the menu settings.
(2) Play back the recorded tape, or turn the TV on to see the desired program. The picture from the other equipment appears on the LCD screen or in the viewfinder.
(3) Follow steps 3 and 4 on page 124.

When recording an image through the VIDEO jack

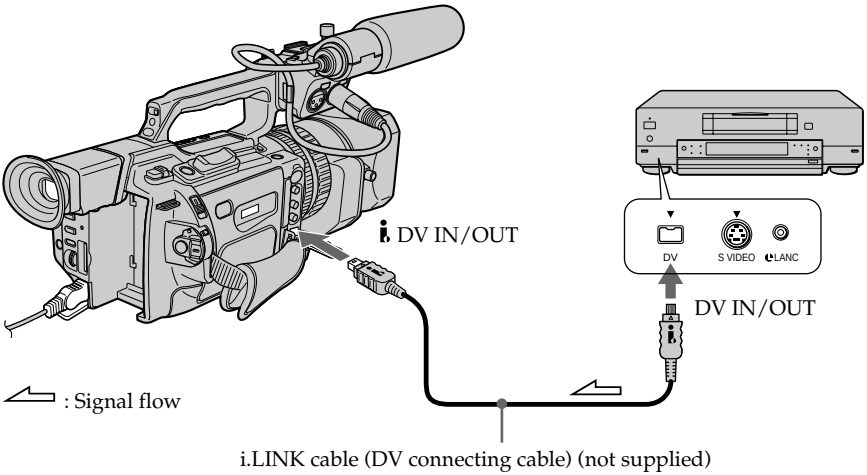


Connect the yellow plug of the A/V connecting cable supplied with your camcorder to the video jack on the VCR or the TV.

Connect using an S video cable (not supplied) to obtain high-quality pictures
With this connection, you do not need to connect the yellow (video) plug of the A/V connecting cable.
Connect an S video cable (not supplied) to the S video jacks of both your camcorder and the VCR/TV.
This connection produces higher quality DVCAM/DV format pictures.

Recording an image from a tape as a still image

When recording the image through the i DV IN/OUT jack



i.LINK cable (DV connecting cable) (not supplied)

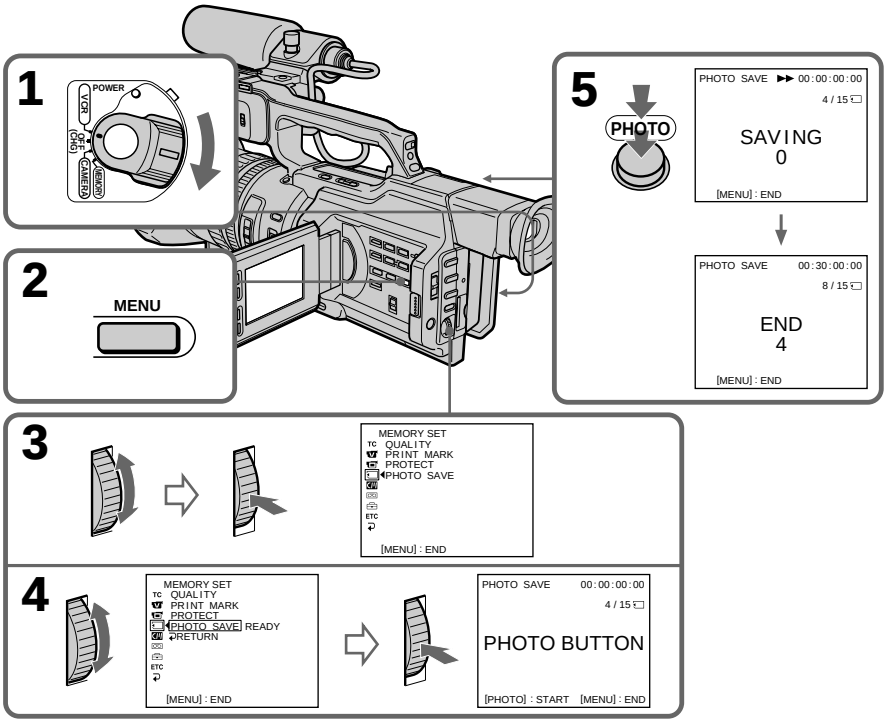
Copying still images from a tape – Photo save

Using the search function, you can automatically take in only still images from tapes and record them on a "Memory Stick" in sequence.

Before operation

- Insert a recorded tape into your camcorder and rewind the tape.
- Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to VCR.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select PHOTO SAVE, then press the dial. "PHOTO BUTTON" appears on the LCD screen or in the viewfinder.
(5) Press PHOTO deeply. The still image from the tape is recorded on the "Memory Stick." The number of still images copied is displayed. "END" is displayed when copying is completed.



To cancel copying

Press MENU.

When the memory of the "Memory Stick" is full

"MEMORY FULL" appears on the LCD screen or in the viewfinder, and the copying stops. Insert another "Memory Stick" and repeat the procedure from step 2.

When the access lamp is lit or flashing

Never shake or strike your camcorder. Also, do not turn the power off, eject the "Memory Stick" or remove the battery pack. Otherwise, the image data breakdown may occur.

To record all the images recorded on the tape

Rewind the tape all the way back and start copying.

If the write-protect tab on the "Memory Stick" is set to LOCK

"NOT READY" appears when you select the item in the menu settings.

When you change the "Memory Stick" in the middle of copying

Your camcorder resumes copying from the last image recorded on the previous "Memory Stick."

When the auto logo insert function is activated

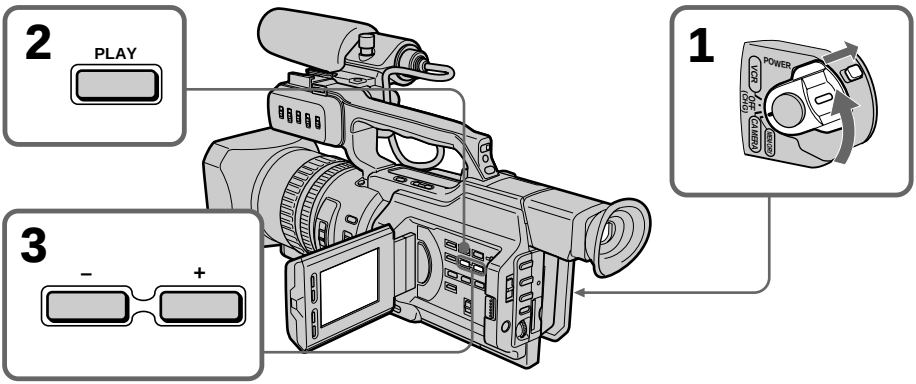
You cannot use the photo save function.

Viewing a still picture – Memory Photo playback

You can play back still images recorded on a "Memory Stick." You can also play back six images at a time by selecting the index screen.

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to VCR or MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Press MEMORY PLAY. The last recorded image is displayed.
(3) Press MEMORY +/– or +/– on the Remote Commander to select the desired still image. To see the previous image, press MEMORY – or – on the Remote Commander. To see the next image, press MEMORY + or + on the Remote Commander.



To stop memory photo playback

Press MEMORY PLAY again.

To play back recorded images on a TV screen

- Connect your camcorder to the TV with the A/V connecting cable supplied with your camcorder before operation.
- When operating memory photo playback on a TV or on the LCD screen, the image quality may appear to have deteriorated. This is not a malfunction. The image data is as good as ever.
- Turn the audio volume of the TV down before operation, or noise (howling) may be output from the TV speakers.

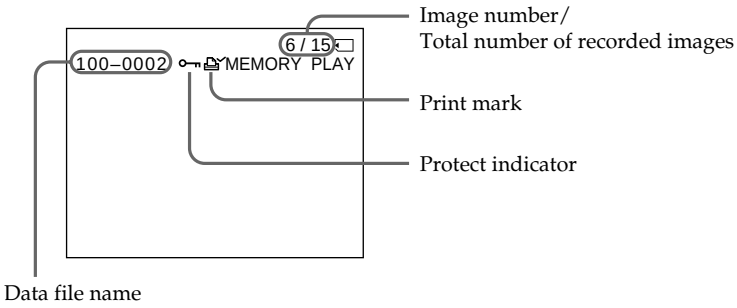
When no images are recorded on the "Memory Stick"
The message "NO FILE" appears.

Image data modified with personal computers or shot with other equipment
You may not be able to play them back with your camcorder.

Note on the date/time indicator
Recording date/time is not displayed, however, it is automatically recorded on the "Memory Stick." You can check the recording date/time while in memory playback mode by pressing DATA CODE.

When the auto logo insert function is activated
You cannot do memory photo playback.

Screen indicators during still image playback



On data file name

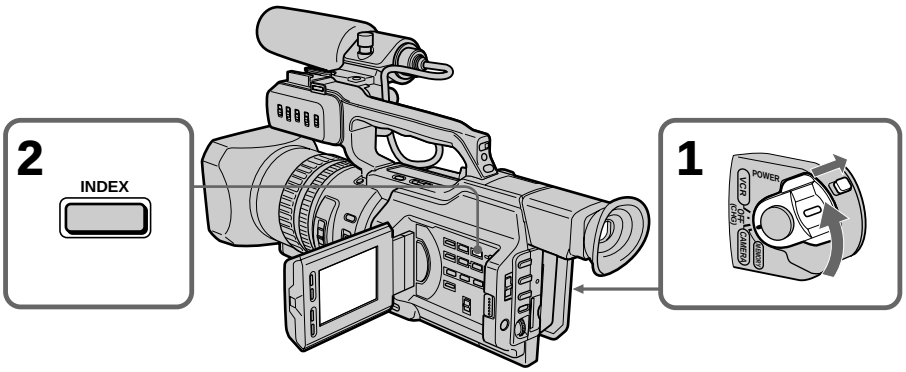
- When the hyphen is indicated between the directory and the file number, this data file name means that this file corresponds to the DCF98 standard.
- When the underbar is indicated between the directory and the file number, this data file name means that this file does not correspond to the DCF98 standard.
- The directory is not indicated if the file structure in the "Memory Stick" does not correspond to the DCF98 standard.
- The "DIRECTORY ERROR" message may appear if the file structure in the "Memory Stick" does not correspond to the DCF98 standard. In this case, you cannot record on that "Memory Stick," however, you can play back images in the "Memory Stick."
- When the data file name is flashes, the file may be broken or the file format does not correspond to your camcorder.

Playing back six recorded images at a time (index screen)

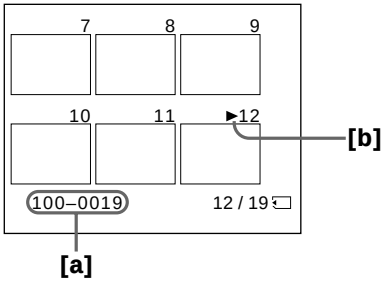
You can play back six recorded images at a time. This function is especially useful when searching for a particular image.

(1) Set the POWER switch to VCR or MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.

(2) Press MEMORY INDEX to display the index screen.



A red ▶ mark appears above the image that is displayed before changing to the index screen mode.
MEMORY – : to display the previous six images
MEMORY + : to display the following six images



[a] File name
[b] ▶ mark

To return to the normal playback screen (single screen)

Press MEMORY +/– to move the ▶ mark to the image you want to display on full screen, then press MEMORY PLAY.

Files modified with personal computers

These files may not be displayed on the index screen. Image files shot with other equipment may not be displayed on the index screen either.

Note

When displaying the index screen, a number appears above each image. This indicates the order in which images are recorded on the "Memory Stick." These numbers are different from the data file names.

Viewing the recorded images using a personal computer

The image data recorded with your camcorder is compressed in the JPEG format. If you use the application software, "PictureGear 4.1Lite" supplied with your camcorder, you can see images recorded on a "Memory Stick" on a computer screen. Use the Memory Stick Reader/Writer supplied with your camcorder or PC card adaptor for Memory Stick (not supplied) for this operation. For detailed instructions on operation, refer to the operating instructions of the Memory Stick Reader/Writer or PC card adaptor for Memory Stick and your application software. For details, refer to the operating instructions of your accessory.

- Do not modify the directory of the file that corresponds to the DCF98 standard. The modified file will not be read.
- If you use the new "Memory Stick," be sure to use it first with this camcorder.

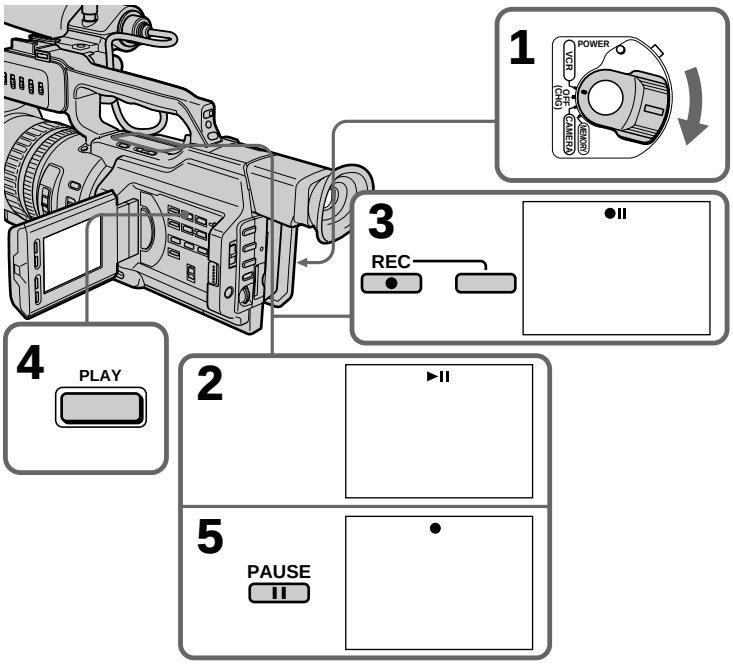
Copying an image recorded on a “Memory Stick” to tapes

You can copy still images or titles recorded on a “Memory Stick” and record them to a tape.

Before operation

Insert a tape for recording and a “Memory Stick” for playback into your camcorder.

(1) Set the POWER switch to VCR.
(2) Using the video control buttons, search for a point where you want to record the desired still image. Set the tape to playback pause mode.
(3) Press ● REC and the button on its right simultaneously on your camcorder. The tape is set to the recording pause mode.
(4) Press MEMORY PLAY to play back the still image you want to copy.
(5) Press ❚❚ to start recording and press ❚❚ again to stop.
(6) If you have more to copy, repeat steps 4 and 5.



To stop copying in the middle

Press ■.

During copying

- You cannot operate the following buttons:
  MEMORY PLAY, MEMORY INDEX, MEMORY DELETE, MEMORY +, MEMORY –, and MEMORY MIX.
- If you continue copying, do not use EDITSEARCH to search for the point where you want to record the desired still image. If you do, the playback image disappears from the screen.

Copying an image recorded on a “Memory Stick” to tapes

Note on the index screen
You cannot record the index screen.

Image data modified with personal computers or shot with other equipment
You may not be able to copy them with your camcorder.

If you press DISPLAY in standby or recording mode
You can see memory playback and the file name indicators in addition to the indicators pertinent to tapes, such as the time code indicator.

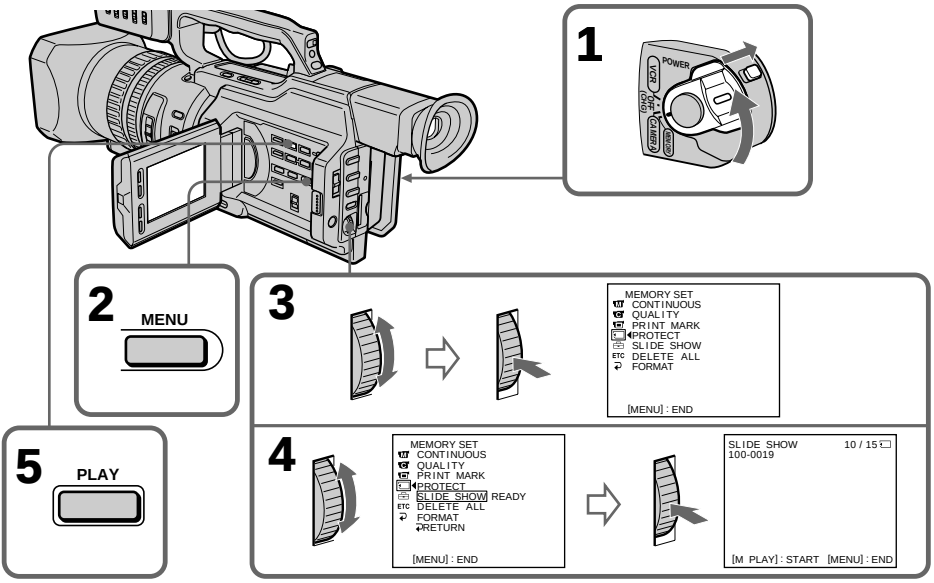
When the auto logo insert function is activated
You cannot use this function.

Playing back images continuously – SLIDE SHOW

You can automatically play back images in sequence. This function is useful especially when checking recorded images or during a presentation.

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select SLIDE SHOW, then press the dial.
(5) Press MEMORY PLAY. Your camcorder plays back the images recorded on the "Memory Stick" in sequence.



To stop or end the slide show
Press MENU.

To pause during a slide show
Press MEMORY PLAY.

To start the slide show from a particular image
Select the desired image using MEMORY +/– buttons before step 2.

To view the recorded images on TV
Connect your camcorder to a TV with the A/V connecting cable supplied with your camcorder before operation.

If you change the "Memory Stick" during operation
Be sure to follow the steps again from the beginning.

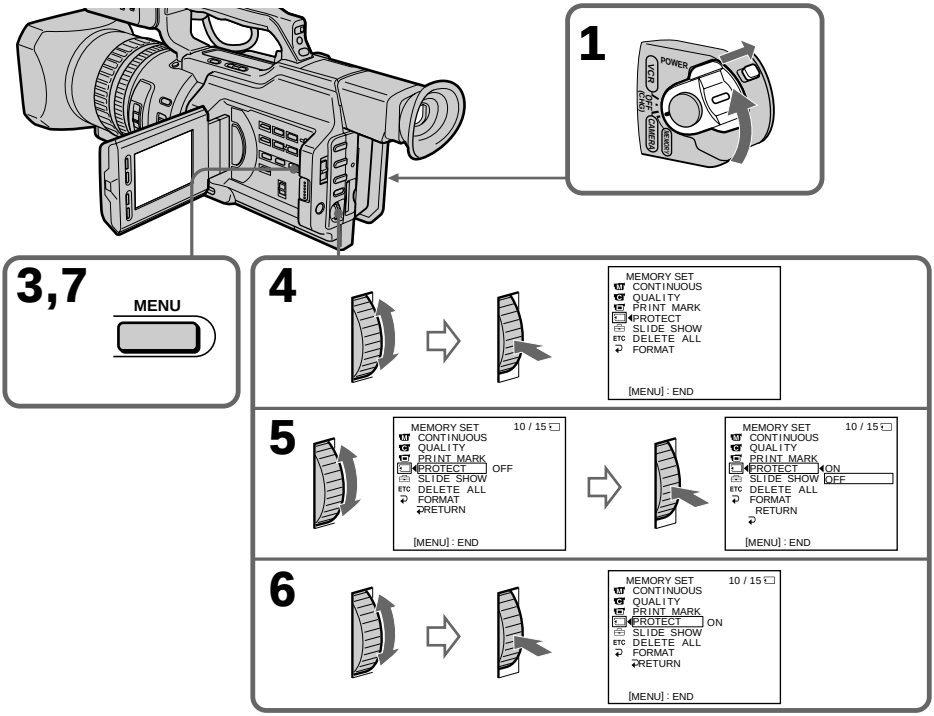
When the auto logo insert function is activated
You cannot use this function.

Preventing accidental erasure – Image protection

To prevent accidental erasure of important images, you can protect selected images.

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to MEMORY or VCR. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Play back the image you want to protect (p. 129).
(3) Press MENU to display the menu.
(4) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select PROTECT, then press the dial.
(6) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(7) Press MENU to erase the menu display. The "🔑" mark is displayed beside the data file name of the protected image.



To cancel image protection

Select OFF in step 6, then press the SEL/PUSH EXEC dial.

Note

Formatting erases all information on the "Memory Stick," including the protected image data. Check the contents of the "Memory Stick" before formatting.

If the write-protect tab on the "Memory Stick" is set to LOCK
You cannot carry out image protection.

When the auto logo insert function is activated
You cannot use this function.

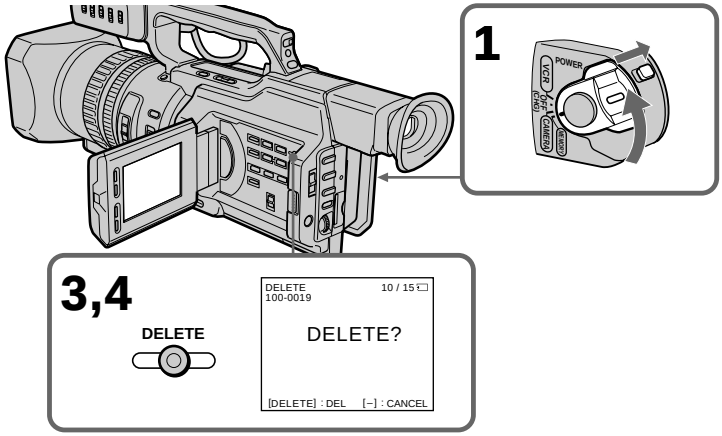
Deleting images

You can delete images stored in a "Memory Stick."

Deleting selected images

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to MEMORY or VCR. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Play back the image you want to delete (p. 129).
(3) Press MEMORY DELETE. "DELETE?" appears on the LCD screen or in the viewfinder.
(4) Press MEMORY DELETE again. The selected image is deleted.



To cancel deleting an image

Press MEMORY – in step 4.

To delete an image displayed on the index screen

Press MEMORY +/– to move the ▶ indicator to the desired image and follow steps 3 and 4.

Notes

- To delete a protected image, first cancel image protection.
- Once you delete an image, you cannot restore it. Check the images to be deleted carefully before deleting them.

While "DELETING" appears
Do not turn the POWER switch or press any buttons.

If the write-protect tab on the "Memory Stick" is set to LOCK
You cannot delete any image.

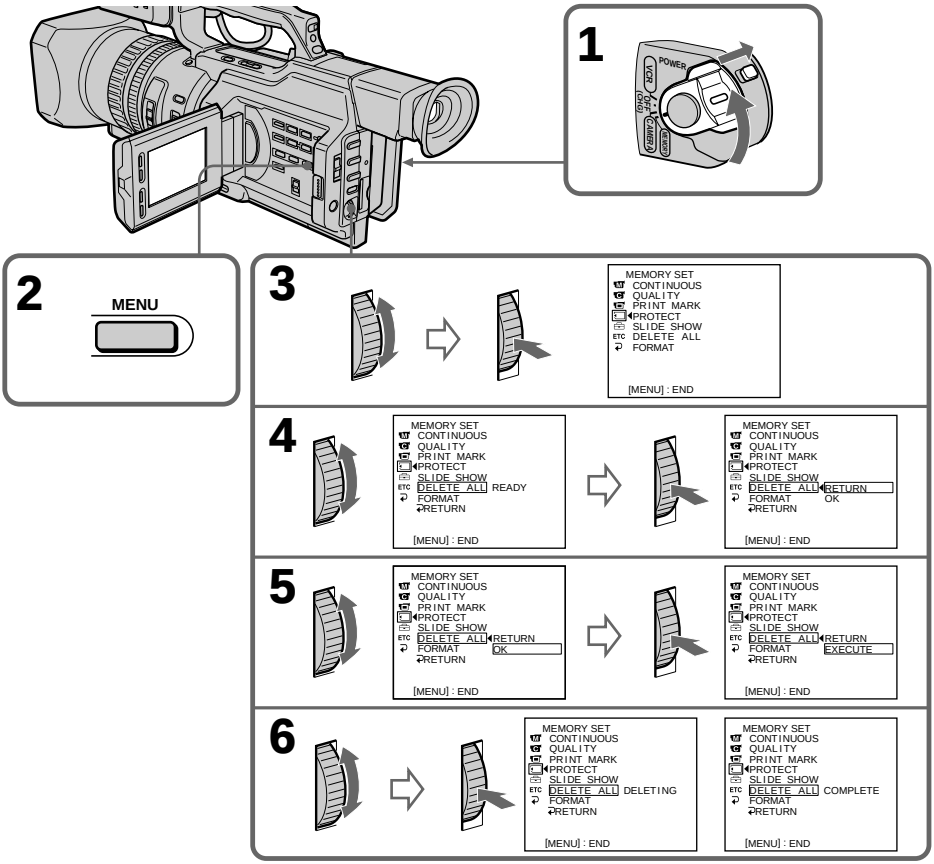
When the auto logo insert function is activated
You cannot use this function.

Deleting all the images

You can delete all the unprotected images in a "Memory Stick."

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to MEMORY. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Press MENU to display the menu.
(3) Turn the SEL/PUSH EXEC dial to select , then press the dial.
(4) Turn the SEL/PUSH EXEC dial to select DELETE ALL, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select OK, then press the dial. "OK" changes to "EXECUTE."
(6) Press the SEL/PUSH EXEC dial. "DELETING" appears on the LCD screen or in the viewfinder. When all the unprotected images are deleted, "COMPLETE" is displayed.



To cancel deleting all the images in the "Memory Stick"

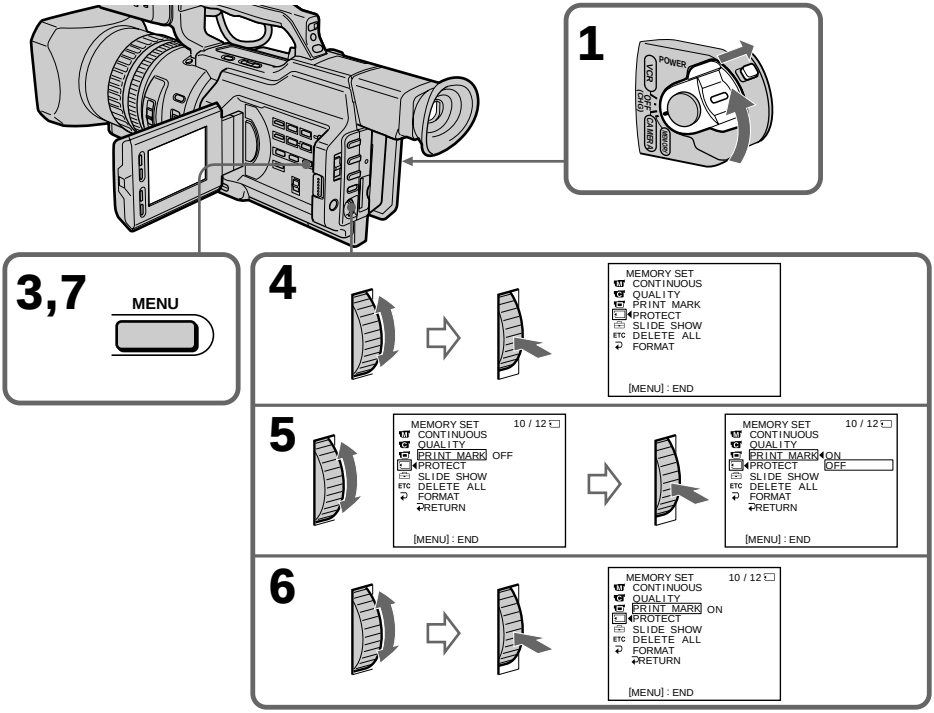
Select RETURN in step 5, then press the SEL/PUSH EXEC dial.

Writing a print mark – Print mark

You can specify the recorded still image to be printed out. This function is useful for printing out still images later.
Your camcorder conforms with the DPOF (Digital Print Order Format) standard for specifying the still images to print out.

Before operation
Insert a "Memory Stick" into your camcorder.

(1) Set the POWER switch to MEMORY or VCR. Make sure that the LOCK switch is set to the right (unlock) position.
(2) Play back the image to be printed out (p. 129).
(3) Press MENU to display the menu.
(4) Turn the SEL/PUSH EXEC dial to select 🖼, then press the dial.
(5) Turn the SEL/PUSH EXEC dial to select PRINT MARK, then press the dial.
(6) Turn the SEL/PUSH EXEC dial to select ON, then press the dial.
(7) Press MENU to erase the menu display. The "🖶" mark is displayed beside the data file name of an image with a print mark.



To cancel writing print marks

Select OFF in step 6, then press the SEL/PUSH EXEC dial.

If the write-protect tab on the "Memory Stick" is set to LOCK
You cannot write print marks on still images.

When the auto logo insert function is activated
You cannot use this function.

Compatibility of DVCAM and DV formats

DVCAM format is developed as a more reliable and higher end format than consumer DV format. Here explained are the differences, compatibility, and limitations on editing about DVCAM and DV formats.

Differences between DVCAM and DV formats

Item	DVCAM	DV
Track pitch	15 µm	10 µm
Audio sampling frequency	12 bit: 32 kHz 16 bit: 48 kHz	12 bit: 32 kHz 16 bit: 32 kHz, 44.1 kHz, 48 kHz
Audio recording mode [1)]	Lock mode	Unlock mode
Time code	Drop frame system or Non-drop frame system (SMPTE time code)	Drop frame system only

[1)] There are two modes for audio recording, lock mode and unlock mode. In lock mode, the sampling frequencies of audio and video are synchronized. In unlock mode, which consumer DV format adopts, the two sampling frequencies are independent. Therefore, lock mode is more effective than unlock mode in digital processing and smooth transition during audio editing.

Mini DVCAM and mini DV cassettes

Both mini DVCAM and mini DV cassettes can be used on mini DVCAM or mini DV video equipment. The recording format of picture is defined according to recorder's format as described below.

Recorder's format	Cassette's format	Recording format
DVCAM	DVCAM	DVCAM
	DV	DVCAM
DV	DVCAM	DV
	DV	DV

This digital camcorder complies with DVCAM format. Though mini DV cassettes can be used for recording, we recommend you to use mini DVCAM cassettes to get the most out of high reliability of DVCAM format. The recording time of mini DV cassettes is 2/3 shorter than that indicated on the mini DV cassettes.

Compatibility on playback

Some tapes cannot be played back on mini DVCAM or mini DV video equipment.

Tape	On DV video equipment	On DVCAM video equipment
DV-formatted	Can be played back	Can be played back (only when recorded in SP mode)
DVCAM-formatted	Some equipment may be able to play back	Can be played back

Compatibility on editing using DV connectors

When this digital camcorder is connected to other DVCAM or DV video equipment using DV connectors, the recording format of edited tapes is defined according to recorder's format as described below.

Source tape	Player's format	Recorder's format	Recording format
DVCAM-formatted [2) 3)]	DVCAM	DVCAM	DVCAM
DVCAM-formatted	DVCAM	DV	DV [4)]
DVCAM-formatted [2)]	DV [5)]	DVCAM	DVCAM [7)]
DVCAM-formatted	DV [5)]	DV	DV [4)]
DV-formatted [6)]	DVCAM	DVCAM	DVCAM [1)]
DV-formatted [6)]	DVCAM	DV	DV
DV-formatted	DV	DVCAM	DVCAM [1)]
DV-formatted	DV	DV	DV

[1)] When using the mini DVCAM video equipment to carry out DV dubbing of a tape recorded in DV format, the tape produced will be in DVCAM format as follows:
– Audio recording mode will be unlock mode.
– The time code format will be partly maladjusted. (There will be no effect on the recorded picture except in certain case.)

[2)] If the tape is to be dubbed is DVCAM formatted tape as in 1), the tape produced will be in DVCAM format as follows:
– Audio recording mode will be unlock mode.
– The time code format will be partly maladjusted.

[3)] Depending on signal conditions of the source tape, you may not be able to edit the tape using the DV connectors.

[4)] Audio recording mode of the edited tape is lock mode.

[5)] Some mini DV video equipment may be able to play back a DVCAM-formatted tape. Even if the tape is played back, contents of the playback cannot be guaranteed.

[6)] DV-formatted tapes recorded in SP mode only can be used as source tapes.

[7)] Depending on model of video equipment, you may not be able to edit.

Limitations on editing

You will find the following limitations when editing.

- Due to the difference of a track pitch, you cannot record or edit on DV-formatted tapes using mini DVCAM video equipment.
- Depending on signal conditions, you may not be able to record or edit on DVCAM-formatted tapes.

In these cases, do the following:

- Edit using audio/video jacks.
- Dub a DV-formatted tape using audio/video jacks, then use the dubbed tape as a source tape.

Usable cassettes

Selecting cassette types

You can use the DVCAM mini DVCAM cassette* and Mini DV mini DV cassette* in this camcorder. You cannot use any other DV DV, 8 8 mm, Hi8 Hi8, Digital 8, VHS VHS, S-VHS S-VHS, VHSC VHSC, S-VHSC S-VHSC, β Betamax or ED Beta ED Betamax cassette.

* There are two types of mini DVCAM/mini DV cassettes: with cassette memory and without cassette memory. Tapes with cassette memory have C-II (Cassette Memory) mark. Sony recommends that you use a tape with C-II mark to enjoy your camcorder fully.

The IC memory is built in the cassette with cassette memory. Using this IC memory, your camcorder can read, write, and search data such as the date of recording or titles. The functions using the cassette memory require successive signals recorded on the tape. If the tape has a blank portion in the beginning or between the recorded portions, a title may not be displayed properly or the search functions may not work correctly. Not to make any blank portion on the tape, press END SEARCH to return to the end of the recorded portion before you begin the next recording when:
– You have ejected the cassette while recording.
– You have played back the tape in VCR mode.
If there is a blank portion or discontinuous signal on your tape, re-record from the beginning to the end of the tape concerning above.
When you record, using a digital video camera recorder without a cassette memory function, on a tape recorded by one with the cassette memory function, the same result may occur.

C-II16K mark on the cassette

The memory capacity of tapes marked with C-II16K is 16Kb. Your camcorder can accommodate up to 16Kb.

The maximum number of data recordable on cassette memory (when using 16 Kb cassette memory)

Data	Numbers
INDEX	135 (15 bytes/One item of the data)
TITLE	106
DATE	24 (10 bytes/One item of the data)
PHOTO	48 (10 bytes/One item of the data)
CASSETTE LABEL	1

The numbers above are as a guide.

Copyright signal

When you play back

When you connect your camcorder to any other video camera recorder to dub a tape that has recorded copyright control signals for copyright protection, you may not record the tape that played back on your camcorder.

When you record

You cannot record software on your camcorder that contains copyright control signals for copyright protection of software.

"COPY INHIBIT" appears on the LCD screen, in the viewfinder or on the TV screen if you try to record such software.
Your camcorder does not record copyright control signals on the tape when it records.

Audio mode

Fs32K (12-bit) mode: The original sound can be recorded in channels 1 and 2, and the new sound in channels 3 and 4 in 32 kHz. The balance between channels 1/2 and channels 3/4 can be adjusted by selecting AUDIO MIX in the menu settings during playback and audio dubbing. Both sounds can be played back. You can monitor the sound during audio dubbing.
Fs48K (16-bit) mode: A new sound cannot be recorded but the original sound can be recorded in high quality using two channels. The audio mode can be indicated on the LCD screen or in the viewfinder.
You may not add a sound on a DVCAM-formatted tape which does not comply with the condition of the DVCAM format as described on page 140 or when you recorded on a DV-formatted tape. In this case, "NS" appears on the LCD screen or in the viewfinder.

Notes on the mini DVCAM/mini DV cassette

When affixing a label on the mini DVCAM/mini DV cassette

Be sure to affix a label only on the locations as illustrated below **[a]** so as not to cause malfunction of your camcorder.

After using the mini DVCAM/mini DV cassette

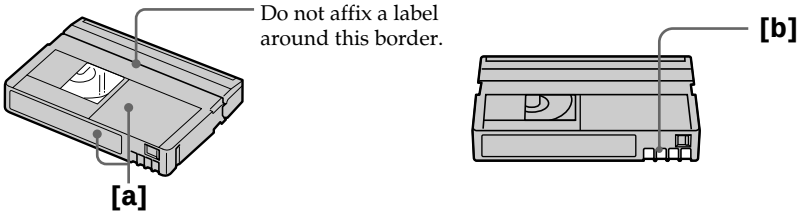
Rewind the tape to the beginning, put the cassette in its case, and store it in an upright position.

If the cassette memory function does not work

Reinsert a cassette a few times. The gold-plated connector of mini DVCAM/mini DV cassettes may be dirty or dusty.

Cleaning the connector

If the gold-plated connector of mini DVCAM/mini DV cassettes is dirty or dusty, you may not operate the function using cassette memory. Clean up the gold-plated connector with cotton-wool swab, about every 10 times ejection of a cassette. **[b]**



About i.LINK

Your camcorder is equipped with the DV input/output connector based on i.LINK (IEEE1394) standard.
This section explains the specifications and features of i.LINK.

What is i.LINK?

i.LINK is a digital serial interface designed to integrate the devices equipped with i.LINK connector. By connecting i.LINK devices, i.LINK allows your device to:
– Transmit and receive data such as digital audio and digital video signals in two ways
– Control other i.LINK devices
– Easily connect with another device using just an i.LINK cable.
Your i.LINK device is capable of connecting AV devices and perform various operations and data transfer. Further availability for connections with versatile equipment and operations will be planned in the future.
Other advantages include the following feature. When connecting multiple i.LINK devices, your device cannot only perform operations and data transfer with the directly connected device but also perform them with any of the devices that are connected via other devices. Therefore, you will not need to concern the order of connecting devices. However, depending on the features and specifications of the connected devices, you may need to operate certain functions differently or may not be able to perform certain operations or data transfer.

Note

Your camcorder can be connected to one device with the i.LINK cable (DV cable). When you connect with a device that has two or more i.LINK connectors, refer to the operating instructions supplied with the connected device.

Tips

- i.LINK, a nickname for IEEE 1394 that Sony proposed, is a trademark supported by a majority of companies worldwide.
- IEEE 1394 is an international standard defined by IEEE, The Institute of Electrical and Electronics Engineers, Inc.

About data transfer speed of i.LINK

i.LINK defines a maximum data transfer speed of approximately 100, 200 and 400 Mbps* that are described as S100, S200 and S400 respectively.
For i.LINK devices, a maximum data transfer speed that the device supports is identified on “specifications” page of the operating instructions supplied with the device or near its i.LINK connector.
With a device that does not identify the data transfer speed, the maximum data transfer speed that the device supports is S100.
When connecting with the device that support different data transfer speed, the actual data transfer speed may be different from those described on the i.LINK connectors.

*What is Mbps?

Mega bits per second. A measure of the rate at which data is transmitted per second. In case of 100 Mbps, 100 Mega bits of data can be transmitted per second.

i. LINK operation with your camcorder

For details on dubbing your camcorder to your VCR equipped with DV input/output connector , see pages 73, 83.
Your camcorder is available for use with other devices equipped with Sony i.LINK (DV) connector.
For details on connection with i.LINK cable and necessary software, refer to the operating instructions supplied with the connected device.

Use Sony i.LINK cables

Use Sony i.LINK cables to connect the i.LINK devices.
4 pins ⟷ 4 pins (For dubbing)

i.LINK and i are trademarks.

Troubleshooting

If you run into any problem using your camcorder, use the following table to troubleshoot the problem. If the problem persists, disconnect the power source and contact your Sony dealer or local authorized Sony service facility. If "C:□□:□□" appears on the LCD screen, display window or in the viewfinder, the self-diagnosis display function has worked. See page 151.

In the recording mode

Symptom	Cause and/or Corrective Actions
START/STOP does not operate.	• The POWER switch is not set to CAMERA. → Set it to CAMERA. (p. 16) • The tape has run out. → Rewind the tape or insert a new one. (p. 15, 29) • The write-protect tab on the cassette is set to expose the red mark. → Use a new tape or slide the tab. (p. 15) • The auto logo insert function is activated. → Refer to the operating instructions (for the auto logo insert function) supplied with this camcorder. • The tape is stuck to the drum (moisture condensation). → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 155)
The power goes off.	• The battery pack is dead or nearly dead. → Install a charged battery pack. (p. 10, 11)
The image on the viewfinder screen is not clear.	• The viewfinder lens is not adjusted. → Adjust the viewfinder lens. (p. 20)
The SteadyShot function does not work.	• STEADYSHOT is set to OFF in the menu settings. → Set it to ON. (p. 104)
The autofocusing function does not work.	• The camcorder is in manual focus mode. → Turn to auto focus mode. (p. 58) • Shooting conditions are not suitable for autofocus. → Adjust focus manually. (p. 58)
The fader function does not work.	• The digital effect function is working. → Cancel it. (p. 39)
A vertical band appears when you shoot a subject such as lights or a candle flame against a dark background.	• The contrast between the subject and background is too high. This is not a malfunction.
Vertical streaks appear when you shoot a very bright subject.	• This is called the smear phenomenon. This is not a malfunction.

(continued on the following page)

Symptom	Cause and/or Corrective Actions
Some tiny white spots appear on the LCD screen or in the viewfinder.	• When the shutter speed is too low.
The click of the shutter does not sound.	• BEEP is set to OFF in the menu settings. → Set it to MELODY or NORMAL. (p. 104)
The image is not bright even if you use the video flash light.	• The ND FILTER selector is set to 1 or 2. → Set it to OFF. (p. 46) • The manual adjustment is not suitable for the situations. (The ϟ indicator flashes.) → Set the AUTO LOCK selector to AUTO LOCK, or cancel the manual adjustment. (p. 42)

In the playback mode

Symptom	Cause and/or Corrective Actions
The tape does not move when a video control button is pressed.	• The POWER switch is not set to VCR. → Set it to VCR. (p. 26)
The playback button does not function.	• The tape has run out. → Rewind the tape. (p. 29)
There are horizontal lines on the picture or the playback picture is not clear or does not appear.	• The video head may be dirty. → Clean the heads using the Sony DVM12CL cleaning cassette (not supplied). (p. 156)
No sound or only a low sound is heard when playing back a tape.	• The volume is turned to minimum. → Turn up the volume. (p. 26) • AUDIO MIX is set to the CH3/4 side in the menu settings. → Adjust AUDIO MIX. (p. 104)
The title search function does not work.	• The tape has no cassette memory. → Use a tape with cassette memory. (p. 66, 142) • CM SEARCH is set to OFF in the menu settings. → Set it to ON. (p. 104) • There is no title in the tape. → Superimpose the titles. (p. 94) • The tape has a blank portion in the recorded portion. (p. 66)

Symptom	Cause and/or Corrective Actions
Displaying the recorded date, date search function does not work.	• The tape has no cassette memory. → Use a tape with cassette memory. (p. 67, 142) • CM SEARCH is set to OFF in the menu settings. → Set it to ON. (p. 104) • The tape has a blank portion in the recorded portion. (p. 68)
The new sound now being added, or that has been added to the recorded tape is not heard.	• AUDIO MIX is set to the CH1/2 side in the menu settings. → Set it to the side you want to monitor. (p. 104)
The title is not displayed.	• TITLE DSPL is set to OFF in the menu settings. → Set it to ON. (p. 104)
The sound is muted or images do not appear when monitoring images through TV.	→ Pull out the A/V connecting cable from the AUDIO CH1/CH2 and VIDEO jacks, then connect it again.

In the recording and playback modes

Symptom	Cause and/or Corrective Actions
The power does not turn on.	• The battery pack is not installed, or is dead or nearly dead. → Install a charged battery pack. (p. 10, 11) • The AC power adaptor is not connected to a wall outlet. → Connect the AC power adaptor to a wall outlet. (p. 14)
The end search function does not work.	• The tape was ejected after recording when using a tape without cassette memory. (p. 25, 29) • You have not recorded on the new cassette yet. (p. 25, 29)
The end search function does not work correctly.	• The tape has a blank portion in the beginning or middle. (p. 25)
The picture does not appear in the viewfinder.	• The LCD panel is open. → Close the LCD panel. (p. 18)
The battery pack is quickly discharged.	• The operating temperature is too low. • The battery pack is not fully charged. → Charge the battery pack fully. (p. 11) • The battery pack is completely dead, and cannot be recharged. → Replace with a new battery pack. (p. 10)
The battery remaining indicator does not indicate the correct time.	• You have used the battery pack in an extremely hot or cold environment for a long time. • The battery pack is completely dead, and cannot be recharged. → Replace with a new battery pack. (p. 10) • The battery is dead. → Use a full-charged battery pack. (p. 10, 11)

(continued on the following page)

Symptom	Cause and/or Corrective Actions
The cassette cannot be removed from the holder.	• The power source is disconnected. → Connect it firmly. (p. 11, 14) • The battery is dead. → Use a charged battery pack. (p. 10, 11)
The ⬇ and ⏏ indicators flash and no functions except for cassette ejection work.	• Moisture condensation has occurred. → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 155)
CM indicator does not appear when using a tape with cassette memory.	• The gold-plated connector of the tape is dirty or dusty. → Clean the gold-plated connector. (p. 143)
Remaining tape indicator is not displayed.	• The REMAIN is set to AUTO in the menu settings. → Set it to ON to always display the remaining tape indicator. (p. 104)

When operating using the "Memory Stick"

Symptom	Cause and/or Corrective Actions
Operations do not function.	• The POWER switch is set to CAMERA or OFF (CHG). → Set it to MEMORY or VCR. • The "Memory Stick" is not inserted. → Insert a "Memory Stick." (p. 115) • The auto logo insert function is activated. → Refer to the extra operating instructions (for Auto Logo Insert).
Recording does not function.	• The "Memory Stick" has already been recorded to its full capacity. → Erase unnecessary images and record again. (p. 118, 136) • The "Memory Stick" formatted incorrectly is inserted. → Format the "Memory Stick" or use another "Memory Stick." (p. 108) • The write-protect tab on the "Memory Stick" is set to LOCK. → Set the tab to write. (p. 113)
The image cannot be deleted.	• The image is protected. → Cancel image protection. (p. 135) • The write-protect tab on the "Memory Stick" is set to LOCK. → Set the tab to write. (p. 113)
You cannot format the "Memory Stick."	• The write-protect tab on the "Memory Stick" is set to LOCK. → Set the tab to write. (p. 113)
Deleting all the images cannot be carried out.	• The write-protect tab on the "Memory Stick" is set to LOCK. → Set the tab to write. (p. 113)
You cannot protect the image.	• The write-protect tab on the "Memory Stick" is set to LOCK. → Set the tab to write. (p. 113) • The image to be protected is not being played back. → Press MEMORY PLAY to play back the image. (p. 129)
You cannot write a print mark on the still image.	• The write-protect tab on the "Memory Stick" is set to LOCK. → Set the tab to write. (p. 113) • The image that you will write a print mark is not being played back. → Press MEMORY PLAY to play back the image. (p. 129)

Symptom	Cause and/or Corrective Actions
The photo save function does not work.	• The write-protect tab on the "Memory Stick" is set to LOCK. ➔ Set the tab to write. (p. 113) • The battery pack is dead. ➔ Install a charged battery pack or use the AC power adaptor instead of the battery pack. (p. 10, 14)

Others

Symptom	Cause and/or Corrective Actions
The title is not recorded.	• The tape has no cassette memory. ➔ Use a tape with cassette memory. (p. 94, 142) • The cassette memory is full. ➔ Erase unnecessary title. (p. 97) • The tape is set to prevent accidental erasure. ➔ Slide the write-protect tab so that red portion is not visible. (p. 15) • Nothing is recorded in that position on the tape. ➔ Superimpose the title to the recorded position. (p. 95)
The cassette label is not recorded.	• The tape has no cassette memory. ➔ Use a tape with cassette memory. (p. 100, 142) • The cassette memory is full. ➔ Erase some data. (p. 102) • The tape is set to prevent accidental erasure. ➔ Slide the write-protect tab so that red portion is not visible. (p. 15)
While editing using the i.LINK cable (DV connecting cable), recording picture cannot be monitored.	➔ Disconnect the i.LINK cable (DV connecting cable), and connect it again. (p. 73)
Digital program editing does not function.	• The input selector on the VCR is not set correctly. ➔ Check the connection and set up the selector position. (p. 72) • Setting program on a blank portion of the tape is attempted. ➔ Set the program again on a recorded portion. (p. 78) • Your camcorder and the VCR are not synchronized. ➔ Synchronize them. (p. 75)

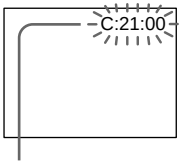
(continued on the following page)

Symptom	Cause and/or Corrective Actions
The Remote Commander supplied with your camcorder does not work.	• COMMANDER is set to OFF in the menu settings. → Set it to ON. (p. 104) • Something is blocking the infrared rays. → Remove the obstacle. • The batteries are inserted in the battery holder with the + – polarities incorrectly. → Insert the batteries with the correct polarity. (p. 168) • The batteries are dead. → Insert new ones. (p. 168)
The input picture does not appear on the LCD screen or in the viewfinder when your camcorder is connected to outputs on the TV or VCR.	• DISPLAY is set to V-OUT/LCD in the menu settings. → Set it to LCD. (p. 104)
The melody or beep sounds for five seconds.	• Moisture condensation has occurred. → Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 155) • Some troubles have occurred in your camcorder. → Remove the cassette and insert it again, then operate your camcorder.
When charging the battery pack, no indicator appears or the indicator flashes in the display window.	• The AC power adaptor is disconnected. → Connect it properly. • The battery pack malfunctions. → Contact your Sony dealer or local authorized Sony service facility.
You cannot charge the battery pack.	• The POWER switch is not set to OFF (CHG). → Set it to OFF (CHG).
The camcorder is immediately turned off even if the amount of the battery remaining time is enough to operate.	→ Charge the battery pack fully again. The correct remaining time is displayed.
No function works though the power is on.	• Disconnect the power cord of the AC power adaptor or remove the battery, then reconnect it after about one minute. Turn the power on. If the functions still do not work, press the RESET button located at the lower-right of the ZEBRA selector using a sharp-pointed object. (If you press the RESET button, all the settings including the date and time return to the default.) (p. 14, 162)

Self-diagnosis display

Your camcorder has a self-diagnosis display function.
This function displays the current condition of your camcorder as a 5-digit code (a combination of a letter and figures) on the LCD screen, display window, or in the viewfinder. If a 5-digit code is displayed, check the following code chart. The last two digits (indicated by □□) will differ depending on the state of your camcorder.

On the LCD screen or in the viewfinder, on the display window



Self-diagnosis display

•C:□□:□□
You can service your camcorder yourself.
•E:□□:□□
Contact your Sony dealer or nearest local authorized Sony service facility.

Five-digit display	Cause and/or Corrective Actions
C:04:□□	• You are using a battery pack that is not an "InfoLITHIUM" battery pack. ➔ Use an "InfoLITHIUM" battery pack. (p. 11)
C:21:□□	• Moisture condensation has occurred. ➔ Remove the cassette and leave your camcorder for at least one hour to acclimatize. (p. 155)
C:22:□□	• The video heads are dirty. ➔ Clean the heads using the Sony DVM12CL cleaning cassette (not supplied). (p. 156)
C:31:□□ C:32:□□	• A malfunction other than the above. ➔ Remove the cassette and insert it again, then operate your camcorder. ➔ Disconnect the power cord of the AC power adaptor or remove the battery pack. After reconnecting the power source, operate your camcorder.
E:61:□□ E:62:□□	• A malfunction that you cannot service has occurred. ➔ Contact your Sony dealer and inform them of the 5-digit code. (example: E:61:10)

If you are unable to rectify the problem even if you try corrective actions a few times, contact your Sony dealer or nearest local authorized Sony service facility.

Warning indicators and messages

If indicators and messages appear on the LCD screen or in the viewfinder, check the following:
See the page in parentheses "( )" for more information.

Warning indicators

The battery is dead or nearly dead

Slow flashing:
- The battery is nearly dead.
  Depending on conditions, the indicator may flash, even if there are five to 10 minutes remaining.

Fast flashing:
- The battery is dead (p. 11).
- The battery is completely dead.

Warning indicator as to tape

Slow flashing:
- The tape is near the end.
- No tape is inserted (p. 15).*
- The write-protect tab on the cassette is out (red) (p. 15).*

Fast flashing:
- The tape has run out (p. 29).*

You need to eject the cassette

Slow flashing:
- The write-protect tab on the cassette is out (red) (p. 15).*

Fast flashing:
- Moisture condensation has occurred (p. 155).*
- The tape has run out (p. 29).*
- The self-diagnosis display function is activated (p. 151).*

Moisture condensation has occurred*

Fast flashing:
- Eject the cassette, turn off your camcorder, and leave it for about one hour with the cassette compartment open (p. 155).

Warning indicator as to cassette memory

Slow flashing:
- No tape with cassette memory is inserted (p. 142).*

Self-diagnosis display (p. 151)

The still image is protected

Slow flashing:
- The still image is protected (p. 135).*

Warning indicator as to "Memory Stick"*

Slow flashing:
- No "Memory Stick" is inserted (p. 115).

Fast flashing:
- Unreadable "Memory Stick" is inserted (p. 115).

100-0001 "(Warning indicators) Memory Stick" file error*
Slow flashing:
- File is broken.
- File has no compatibility.

"Memory Stick" format error*
Fast flashing:
- There are two directories or more.
- Data is broken.
- "Memory Stick" is not formatted correctly (p. 108).

Warning messages

• CLOCK SET	Reset the date and time (p. 112).
• FOR "InfoLITHIUM" BATTERY ONLY	Use an "InfoLITHIUM" battery pack (p. 11).
• MEMORY FULL	The "Memory Stick" is full in photo save function (p. 128).
• CLEANING CASSETTE	The video heads are dirty (p. 156).**
• FULL	The tape cassette memory is full (p. 96).*
• 48K	AUDIO MODE is set to 48K.* You cannot dub new sound (p. 109).
• REC MODE	REC MODE is set to DV SP.* You cannot dub new sound (p. 109).
• TAPE	There is no recorded portion on the tape.* You cannot dub new sound (p. 87).
• "i.LINK" CABLE	i.LINK cable is connected (p. 88).* You cannot dub new sound.
• FULL	The "Memory Stick" is full (p. 120).*
•	The write-protect tab on the "Memory Stick" is set to LOCK (p. 113).*
• NO FILE	No still image is recorded on the "Memory Stick" (p. 129).*
• NO MEMORY STICK	No "Memory Stick" is inserted (p. 115).*
• MEMORY STICK ERROR	The "Memory Stick" data is corrupted (p. 115).*
• FORMAT ERROR	(p. 108)*
• DIRECTORY ERROR	(p. 130)*
• COPY INHIBIT	The tape contains copyright control signals for copyright protection of software (p. 142).*
• TAPE END	The tape has reached the end of the tape (p. 29).*
• NO TAPE	Insert a cassette tape (p. 15).*
• LOGO NOT INSERTED	The logo is not inserted properly, or the "Memory Stick" is not inserted that has the logo data. Check if the "Memory Stick" is inserted properly, or insert the "Memory Stick" with logo data.
• LOGO SYSTEM ERROR	The data setting of the logo insert system is corrupted. Consult your Sony dealer or local authorized Sony service facility.

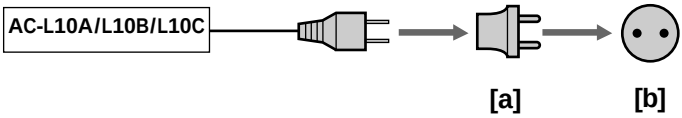
* You hear the melody or beep sound.
** and the message appear alternately.

Using your camcorder abroad

Using your camcorder abroad

You can use your camcorder in any country or area with the AC power adaptor supplied with your camcorder within 100 V to 240 V AC, 50/60 Hz.

When charging the battery pack, use a commercially available AC plug adaptor **[a]**, if necessary, depending on the design of the wall outlet **[b]**.



Your camcorder is an NTSC system-based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system-based TV equipped with audio/video input jacks.

Check the following list.

NTSC system
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

PAL system
Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system
Brazil

PAL-N system
Argentina, Paraguay, Uruguay

SECAM system
Bulgaria, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Ukraine, etc.

Simple setting of clock by time difference

You can easily set the clock to the local time by setting a time difference. Select WORLD TIME in the menu settings. See page 104 for more information.

Maintenance information and precautions

Moisture condensation

If your camcorder is brought directly from a cold place to a warm place, moisture may condense inside your camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or your camcorder may not operate correctly. If there is moisture inside your camcorder, the beep sounds and the [] indicator flashes. When the ⏏ indicator flashes at the same time, the cassette is inserted in your camcorder. If moisture condenses on the lens, the indicator will not appear.

If moisture condensation occurred

None of the functions except cassette ejection will work. Eject the cassette, turn off your camcorder, and leave it for about one hour with the cassette compartment open. Your camcorder can be used again if the [] indicator does not appear when the power is turned on again.

Note on moisture condensation

Moisture may condense when you bring your camcorder from a cold place into a warm place (or vice versa) or when you use your camcorder in a hot place as follows:

- You bring your camcorder from a ski slope into a place warmed up by a heating device.
- You bring your camcorder from an air-conditioned car or room into a hot place outside.
- You use your camcorder after a squall or a shower.
- You use your camcorder in a high temperature and humidity place.

How to prevent moisture condensation

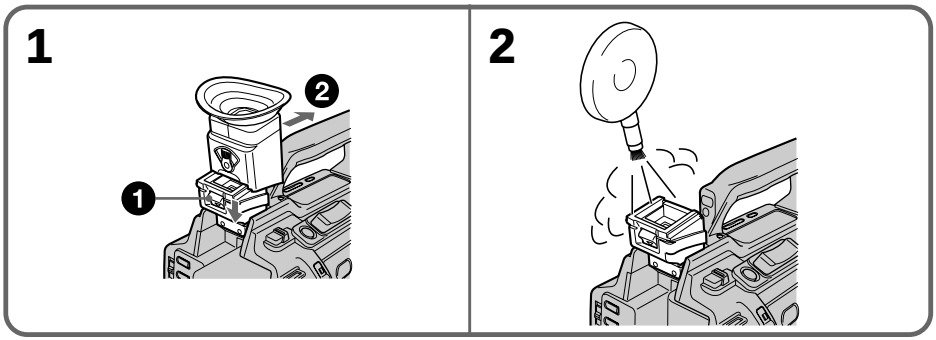
When you bring your camcorder from a cold place into a warm place, put your camcorder in a plastic bag and tightly seal it. Remove the bag when the air temperature inside the plastic bag has reached the surrounding temperature (after about one hour).

Removing Dust from Inside the Viewfinder

Before cleaning, remove the sticker below the viewfinder lens adjustment lever.

(1) While holding down the hook ❶, slide the eyecup in the direction of the arrow and remove it out ❷.

(2) Clean the surface with a commercially available blower.



To reattach the eyecup

Do step 1 above sliding the eyecup in the reverse direction of the arrow.

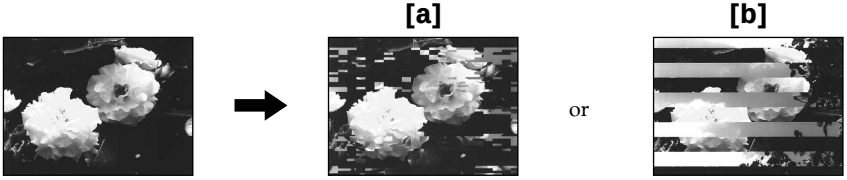
Maintenance information

Cleaning the video head

To ensure normal recording and clear pictures, clean the video heads. The video head may be dirty when:

- mosaic-pattern noise appears on the playback picture.
- playback pictures do not move.
- playback pictures do not appear.
- the ⊗ indicator and "CLEANING CASSETTE" message appear one after another on the LCD screen or in the viewfinder.

If the above problem, **[a]** or **[b]** occurs, clean the video heads for 10 seconds with the Sony DVM12CL cleaning cassette (not supplied). Check the picture and if the above problem persists, repeat cleaning.



Cleaning the LCD screen

If fingerprints or dust make the LCD screen dirty, we recommend using a LCD Cleaning Cloth (not supplied) to clean the LCD screen.

Charging the vanadium-lithium battery in your camcorder

Your camcorder is supplied with a vanadium-lithium battery installed so as to retain the date and time, etc., regardless of the setting of the POWER switch. The vanadium-lithium battery is always charged as long as you are using your camcorder. The battery, however, will get discharged gradually if you do not use your camcorder. It will be completely discharged in about four months if you do not use your camcorder at all. Even if the vanadium-lithium battery is not charged, it will not affect the camcorder operation. To retain the date and time, etc., charge the battery if the battery is discharged.

Charging the vanadium-lithium battery:

- Connect your camcorder to house current using the AC power adaptor supplied with your camcorder, and leave your camcorder with the POWER switch turned off for more than 24 hours.
- Or install the fully charged battery pack in your camcorder, and leave your camcorder with the POWER switch turned off for more than 24 hours.

Precautions

Camcorder operation

- Operate your camcorder on 7.2 V (battery pack) or 8.4 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this operating instructions.
- If any solid object or liquid get inside the casing, unplug your camcorder and have it checked by a Sony dealer before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF (CHG) when you are not using your camcorder.
- Do not wrap your camcorder with a towel, for example, and operate it. Doing so might cause heat to build up inside.
- Keep your camcorder away from strong magnetic fields or mechanical vibration. Noise may appear on the image.
- Do not touch the LCD screen with a sharp-pointed object.
- If your camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using your camcorder, the back of the LCD screen may heat up. This is not a malfunction.

On handling tapes

- Do not insert anything into the small holes on the rear of the cassette. These holes are used to sense the type and thickness of the tape and if the recording tab is in or out.
- Do not open the tape protect cover or touch the tape.
- Avoid touching or damaging the terminals. To remove dust, clean the terminals with a soft cloth.

Camcorder care

- Remove the tape, and periodically turn on the power, operate the CAMERA and VCR sections and play back a tape for about three minutes when your camcorder is not to be used for a long time.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on the lens, remove them with a soft cloth.
- Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

- Do not let sand get into your camcorder. When you use your camcorder on a sandy beach or in a dusty place, protect it from the sand or dust. Sand or dust may cause your camcorder to malfunction, and sometimes this malfunction cannot be repaired.

AC power adaptor

- Unplug the unit from the wall outlet when you are not using the unit for a long time. To disconnect the power cord, pull it out by the plug. Never pull the power cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Do not bend the power cord forcibly, or place a heavy object on it. This will damage the cord and may cause fire or electrical shock.
- Prevent metallic objects from coming into contact with the metal parts of the connecting section. If this happens, a short may occur and the unit may be damaged.
- Always keep metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment. AM receivers and video equipment disturb AM reception and video operation.
- The unit becomes warm during use. This is not a malfunction.
- Do not place the unit in locations that are:
  – Extremely hot or cold
  – Dusty or dirty
  – Very humid
  – Vibrating

Battery pack

- Use only the specified charger or video equipment with the charging function.
- To prevent accident from a short circuit, do not allow metal objects to come into contact with the battery terminals.
- Keep the battery pack away from fire.
- Never expose the battery pack to temperatures above 60 °C (140 °F), such as in a car parked in the sun or under direct sunlight.
- Keep the battery pack dry.
- Do not expose the battery pack to any mechanical shock.
- Do not disassemble nor modify the battery pack.
- Attach the battery pack to video equipment securely.
- Charging while some capacity remains does not affect the original battery capacity.
- The battery pack is not resistant to water. Do not wet the battery pack.
- Unless you use the battery pack for a long period, store the battery pack after you charge it fully and use it completely once a year.
- Store the battery pack in a cool, dry place.

Notes on dry batteries

To avoid possible damage from battery leakage or corrosion, observe the following:

- Be sure to insert the batteries with the + – polarities matched to the + – marks.
- Dry batteries are not rechargeable.
- Do not use a combination of new and old batteries.
- Do not use different types of batteries.
- Current flows from batteries when you are not using them for a long time.
- Do not use leaking batteries.

If batteries are leaking

- Wipe off the liquid in the battery compartment carefully before replacing the batteries.
- If you touch the liquid, wash it off with water.
- If the liquid get into your eyes, wash your eyes with a lot of water and then consult a doctor.

If any problem occurs, unplug your camcorder and contact your nearest Sony dealer.

Specifications

Video camera recorder

System

Video recording system
2 rotary heads
Helical scanning system
Audio recording system
Rotary heads, PCM system
Quantization: Fs32 kHz (12 bits, channels 1/2, channels 3/4), Fs48 kHz (16 bits, channels 1/2)
Video signal
NTSC color, EIA standards
Usable cassette
Mini DVCAM cassette with the DVCAM mark printed
Mini DV cassette with the Mini DV mark printed
Tape speed
DVCAM format:
Approx. 28.218 mm/s
DV format SP mode: Approx. 18.812 mm/s
Recording/playback time (using cassette PDVM-40ME)
DVCAM format: 40 min
DV format SP mode: 1 h
Fast-forward/rewind time (using cassette PDVM-40ME)
Approx. 2 min and 30 s
Viewfinder
Electric viewfinder (B&W)
Image device
1/3 type CCD (3 Charge Coupled Device) Approx. 380 000 pixels (Effective: Approx. 340 000 pixels)
Lens
Combined power zoom lens
Filter diameter 58 mm (2 3/8 in)
12× (Optical), 48× (Digital)
F1.6 - 2.4
Focal length
6 - 72 mm (1/4 - 2 7/8 in)
When converted to a 35 mm still camera
43.2 - 518.4 mm (1 3/4 - 20 1/2 in)
Color temperature
Auto, Indoor (3 200 K), Outdoor (5 800 K),
Minimum illumination
2 lux (F1.6)

Input/Output connectors

S VIDEO input/output
Input/output auto switch
4-pin mini DIN
Luminance signal: 1 Vp-p, 75 ohms, unbalanced
Chrominance signal: 0.286 Vp-p, 75 ohms, unbalanced
VIDEO input/output
Input/output auto switch
RCA pin-jack, 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO CH1/CH2 input/output
Input/output auto switch
RCA pin-jack, 327 mV, (at output impedance more than 47 kilohms)
Output impedance with less than 2.2 kilohms
Input impedance more than 47 kilohms
Headphones jack
Stereo minijack (ø 3.5 mm)
LANC control jack
Stereo mini-minijack (ø 2.5 mm)
INPUT1/INPUT2 connectors
XLR 3-pin, female, –60 dBu: 3 kilohms, +4 dBu: 10 kilohms
(0 dBu = 0.775 Vrms)
DV input/output
4-pin connector
Speaker
Dynamic speaker (ø 20 mm)

LCD screen

Picture
2.5 type measured diagonally
49.9 × 37.3 mm (2 × 1 1/2 in)
Total dot number
200 640 (880 × 228)

General

Power requirements
7.2 V (battery pack)
8.4 V (AC power adaptor)
Average power consumption
(when using the battery pack)
During camera recording using LCD
5.4 W
Viewfinder
4.7 W
Operating temperature
0 °C to 40 °C (32 °F to 104 °F)
Storage temperature
–20 °C to +60 °C (–4 °F to +140 °F)
Dimensions (approx.)
128 × 180 × 405 mm (5 1/8 × 7 1/8 × 16 in) (w/h/d)
Mass (approx.)
1.6 kg (3 lb 8 oz)
main unit only
1.8 kg (3 lb 15 oz)
including the battery pack, NP-F330, cassette PDVM-40ME, microphone and hood cap
Supplied accessories
See page 8.

AC power adaptor

Power requirements
100 - 240 V AC, 50/60 Hz
Power consumption
23 W
Output voltage
DC OUT: 8.4 V, 1.5 A in the operating mode
Operating temperature
0 °C to 40 °C (32 °F to 104 °F)
Storage temperature
–20 °C to +60 °C (–4 °F to +140 °F)
Dimensions (approx.)
125 × 39 × 62 mm
(5 × 1 9/16 × 2 1/2 in) (w/h/d)
excluding projecting parts
Mass (approx.)
280 g (9.8 oz)
excluding power cord
Cord length (approx.)
Power cord: 2 m (6.6 feet)
Connecting cord: 1.6 m (5.2 feet)

Battery pack

Output voltage
DC 7.2 V
Capacity
5.0 Wh
Dimensions (approx.)
38.4 × 20.6 × 70.8 mm (1 9/16 × 13/16 × 2 7/8 in) (w/h/d)
Mass (approx.)
70 g (2.5 oz)
Type
Lithium ion

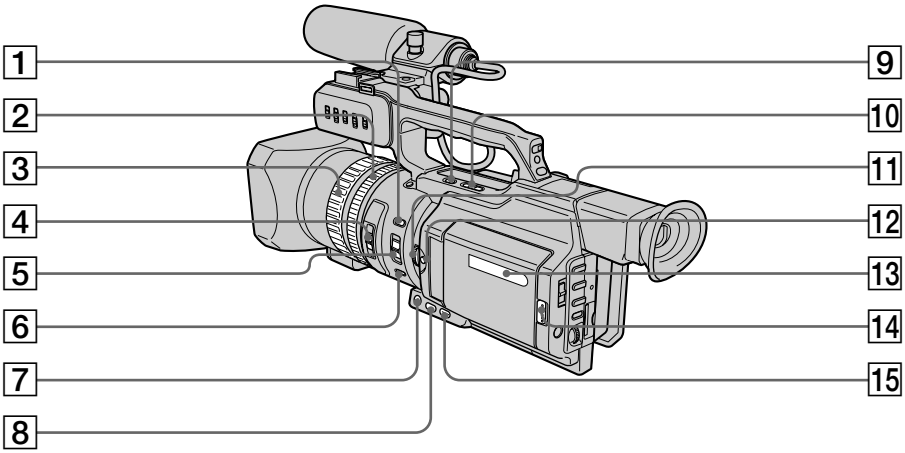
"Memory Stick"

Memory
Flash memory
4MB: MSA-4A
Operating voltage
2.7 V -3.6 V
Power consumption
Approx. 45 mA in the operating mode
Approx. 130 µA in the standby mode
Dimensions (approx.)
50 × 2.8 × 21.5 mm
(2 × 1/8 × 7/8 in) (w/h/d)
Mass (approx.)
4 g (0.14 oz)

Design and specifications are subject to change without notice.

Identifying the parts and controls

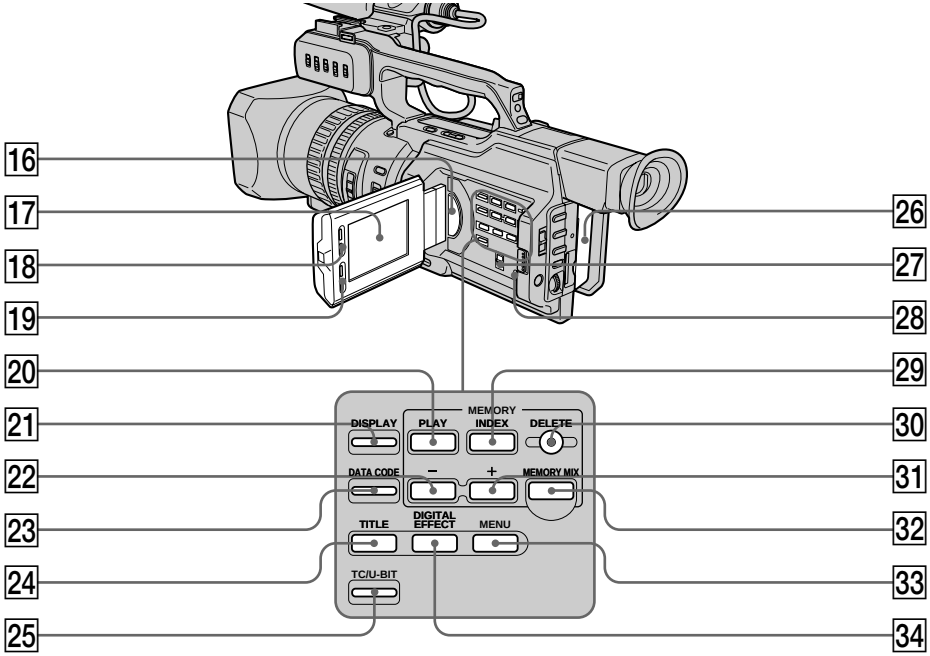
Camcorder



1 **INDEX MARK button** (p. 63)
2 **Zoom ring** (p. 21)
3 **Focus ring** (p. 58)
4 **ND FILTER selector** (p. 46)
5 **Focus selector** (p. 58)
6 **PUSH AUTO button** (p. 58)
7 **FADER button** (p. 38)
8 **BACK LIGHT button** (p. 23)
9 **END SEARCH button** (p. 25)
10 **EDITSEARCH buttons** (p. 25)
11 **IRIS dial** (p. 43)
12 **IRIS button** (p. 43)
13 **Display window** (p. 168)
14 **OPEN button** (p. 16, 26)
15 **SPOT LIGHT button** (p. 24)

This mark indicates that this product is a genuine accessory for Sony video products.
When purchasing Sony video products, Sony recommends that you purchase accessories with this "GENUINE VIDEO ACCESSORIES" mark.

These are trademarks.



16 **Speaker**

17 **LCD screen** (p. 18)

18 **LCD BRIGHT buttons** (p. 19)

19 **VOLUME buttons** (p. 26)

20 **MEMORY PLAY button** (p. 129)

21 **DISPLAY button** (p. 27)

22 **MEMORY – button** (p. 122, 129)

23 **DATA CODE button** (p. 28)

24 **TITLE button** (p. 94)

25 **TC/U-BIT button** (p. 93)

26 **Battery pack** (p. 10)

27 **ZEBRA selector** (p. 47)

28 **RESET button** (p. 150)

29 **MEMORY INDEX button** (p. 130)

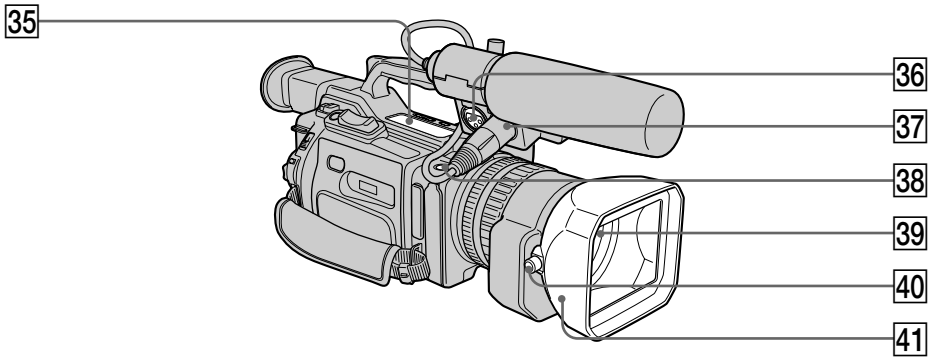
30 **MEMORY DELETE button** (p. 136)

31 **MEMORY + button** (p. 122, 129)

32 **MEMORY MIX button** (p. 122)

33 **MENU button** (p. 104)

34 **DIGITAL EFFECT button** (p. 39)



35 **Video control buttons** (p. 26, 29, 83)
- II► SLOW (slow playback)
- ⬬ AUDIO DUB (dubbing)
- ■ STOP (stop)
- ◄◄ REW (rewind)
- ► PLAY (playback)
- ►► FF (Fast-forward)
- II PAUSE (pause)
- ● REC (recording)

The control buttons light up when you set the POWER switch to VCR.

36 **INPUT2 connector** (p. 54)

37 **INPUT1 connector** (p. 9)

38 **REC START/STOP** (p. 16)

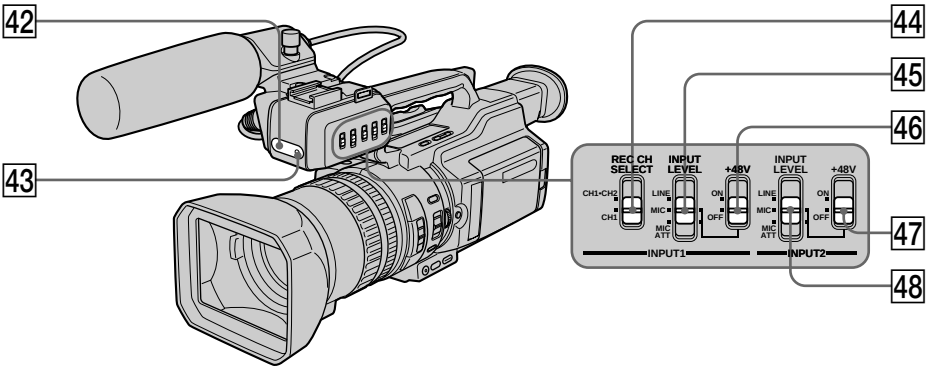
39 **Lens**

40 **Lens hood fixing screw**

41 **Lens hood**
You can attach a wide teleconversion lens (not supplied) by removing the lens hood.

Removing the lens hood
To remove the lens hood for attachment of the wide teleconversion lens, etc., loosen the lens hood fixing screw, and unscrew the lens hood counterclockwise.

When using additional filters
We recommend that you use the Sony made filters having the genuine accessory mark.



42 **Remote sensor**

43 **Camera recording lamp** (p. 16)

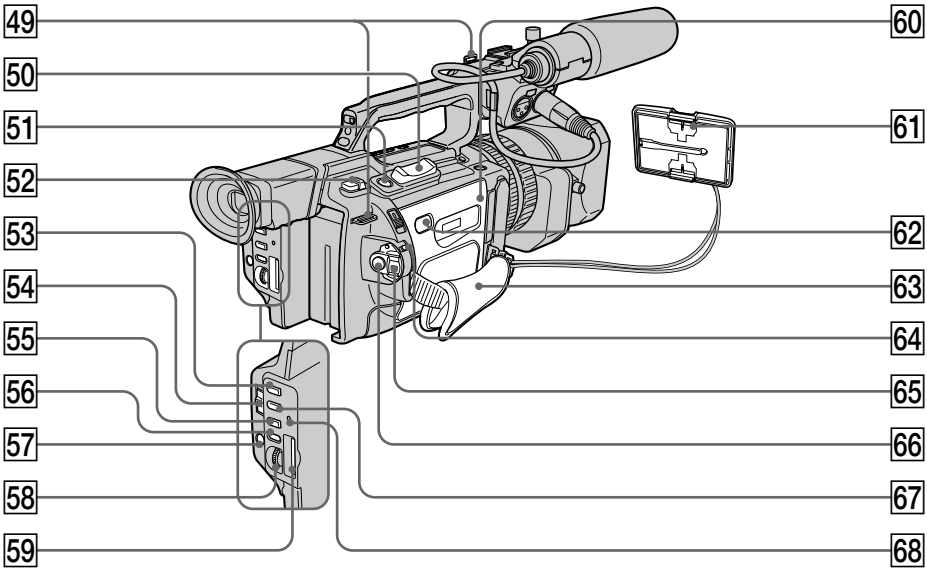
44 **INPUT1 REC CH SELECT switch** (p. 9)

45 **INPUT1 INPUT LEVEL selector** (p. 9)

46 **INPUT1 +48 V switch** (p. 9)

47 **INPUT2 +48 V switch** (p. 9)

48 **INPUT2 INPUT LEVEL selector** (p. 54)



49 **Hooks for shoulder strap**

50 **Power zoom lever** (p. 21)

51 **PHOTO button** (p. 32, 118)

52 **BATT (battery) RELEASE lever** (p. 10)

53 **GAIN button** (p. 44)

54 **AUTO LOCK selector** (p. 42)

55 **WHT BAL button** (p. 50)

56 **AE SHIFT button** (p. 49)

57 **AUDIO LEVEL button** (p. 53)

58 **SEL/PUSH EXEC dial** (p. 104)

59 **"Memory Stick" slot** (p. 115)

60 **Cassette lid** (p. 15)

61 **Hood cap** (p. 16)

62 **PUSH button** (p. 15)

63 **Grip strap**

64 **LOCK switch** (p. 16)

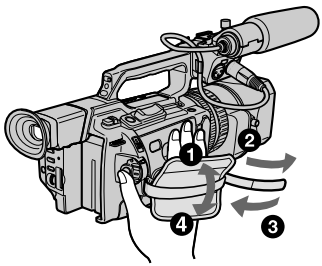
65 **POWER switch** (p. 16)

66 **START/STOP button** (p. 16)

67 **SHUTTER SPEED button** (p. 45)

68 **Access lamp** (p. 115)

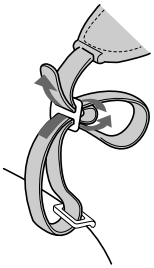
Fastening the grip strap

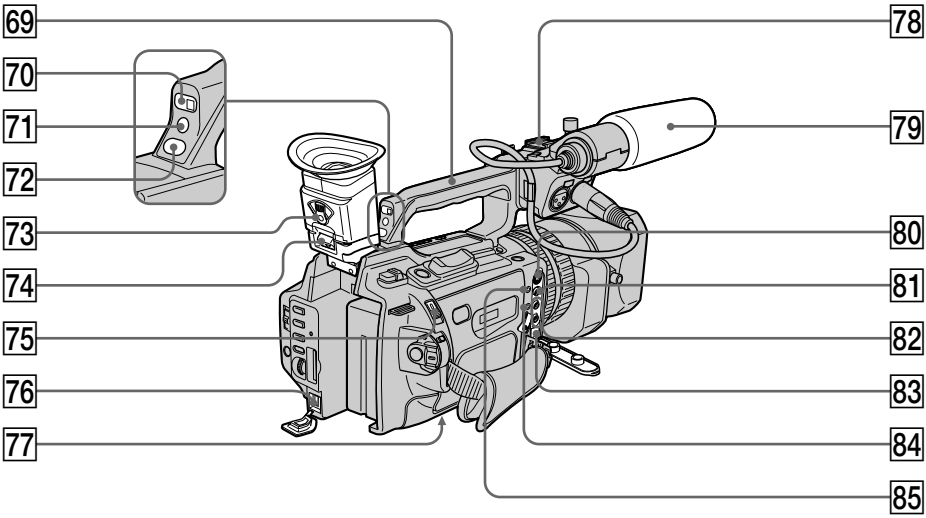


Fasten the grip strap firmly.

Attaching the shoulder strap

Attach the shoulder strap supplied with your camcorder to the hooks for the shoulder strap.





69 **Carrying handle**

70 **Remote sensor**

71 **Camera recording lamp** (p. 16)

72 **CUSTOM PRESET button** (p. 56)

73 **Viewfinder lens adjustment lever** (p. 20)

74 **Hook for removing the viewfinder** (p. 156)

75 **EJECT switch** (p. 15)

76 **DC IN jack** (p. 11)

77 **Tripod receptacle**
Make sure that the length of the tripod screw is less than 6.5 mm (9/32 inch). Otherwise, you cannot attach the tripod securely and the screw may damage your camcorder.

78 **Accessory shoe**

79 **Microphone** (p. 9)

80 **S VIDEO jack** (p. 31, 33, 72, 81, 125)

81 **VIDEO jack** (p. 31, 33, 72, 81, 125)

82 **AUDIO CH1/CH2 jack** (p. 31, 72, 81, 86)

83 **DV IN/OUT jack** (p. 73, 83, 126)
This "i.LINK" mark is a trademark of Sony Corporation and indicates that this product is in agreement with IEEE 1394-1995 specifications and their revisions.

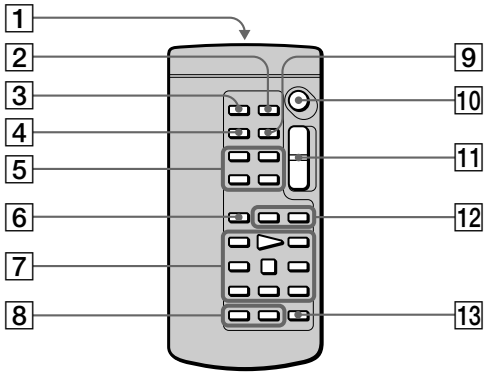
The DV IN/OUT jack is i.LINK compatible.

84 **LANC jack**
LANC stands for Local Application Control Bus System. The LANC control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.

85 **(headphones) jack**
When you use headphones, the speaker on your camcorder is silent.

Remote Commander

The buttons that have the same name on the Remote Commander as on your camcorder function identically to the buttons on your camcorder.



1 **Transmitter**
Point toward the remote sensor to control your camcorder after turning on your camcorder.

2 **ZERO SET MEMORY button**
This button does not function.

3 **PHOTO button** (p. 32, 118)

4 **DISPLAY button** (p. 27)

5 **Memory control buttons** (p. 122, 129)

6 **SEARCH MODE button**
(p. 64, 66, 67, 69)

7 **Video control buttons** (p. 29)

8 **REC button** (p. 81)/**MARK button**
(p. 78)

9 **DATA CODE button** (p. 28)

10 **START/STOP button** (p. 16)

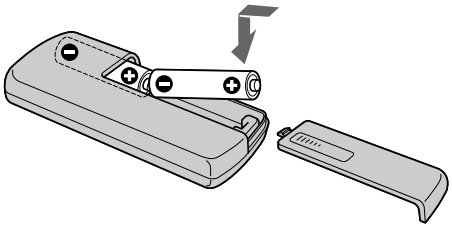
11 **Power zoom button** (p. 21)

12 **I◄◄ / ►►I** buttons (p. 64, 66, 67, 69)

13 **AUDIO DUB button** (p. 87)

To prepare the Remote Commander

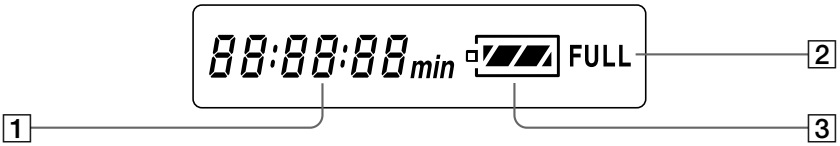
Insert two size AA (R6) batteries by matching the + and – polarities on the batteries to the + – marks inside the battery compartment.



Notes on the Remote Commander

- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Remote Commander may not function properly.
- Your camcorder works in the commander mode VTR 2. Commander modes 1, 2 and 3 are used to distinguish your camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR in the commander mode VTR 2, we recommend changing the commander mode or covering the sensor of the VCR with black paper.

Display window



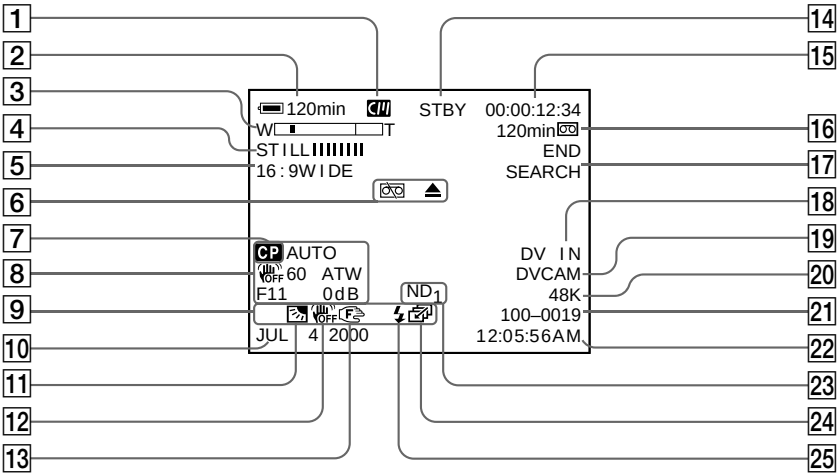
1 **Remaining battery time indicator** (p. 11)/**Memory counter** (p. 130)/**Time code indicator*** (p. 22)/**Self-diagnosis indicator** (p. 151)

2 **FULL charge indicator** (p. 11)

3 **Remaining battery indicator** (p. 11)

* The time code is displayed even if you switch the time code to user bits.

Operation indicators



1 **Cassette memory indicator** (p. 142)

2 **Remaining battery time indicator** (p. 22)

3 **Zoom indicator** (p. 21)/**Data file name indicator** (p. 113)

4 **Digital effect indicator** (p. 39)/**FADER indicator** (p. 37)/**MEMORY MIX indicator** (p. 121)

5 **16:9WIDE indicator** (p. 36)/**PROG. SCAN indicator** (p. 34)

6 **Warning indicators** (p. 152)

7 **Custom preset indicator** (p. 56)

8 **Data code indicator** (p. 28)/**AE SHIFT indicator** (p. 49)/**GAIN indicator** (p. 44)/**IRIS indicator** (p. 43)/**SteadyShot OFF indicator** (p. 28)/**White balance indicator** (p. 50)/**Shutter speed indicator** (p. 45)

9 **LCD bright indicator** (p. 19)/**Volume indicator** (p. 26)

10 **Date indicator** (p. 28)

11 **Backlight indicator** (p. 23)/**Spot light indicator** (p. 24)

12 **SteadyShot OFF indicator** (p. 106)

13 **Manual focus/Infinity indicator** (p. 58)

14 **Standby/Recording indicator** (p. 16)/**Video control mode indicator** (p. 29)/

15 **Time code indicator** (p. 22)/**Self-diagnosis indicator** (p. 151)/**Photo mode indicator** (p. 32)/**Image number indicator** (p. 130)/**User bits indicator** (p. 92)

16 **Remaining tape indicator** (p. 22)/**Memory playback indicator** (p. 130)

17 **END SEARCH indicator** (p. 25)/**FRAME REC indicator** (p. 61)/**Interval recording indicator** (p. 59)

18 **DV IN indicator** (p. 84)/**AV→DV OUT indicator**

19 **DVCAM format indicator**/**DV format SP mode indicator** (p. 22)

20 **Audio mode indicator** (p. 109)

21 **Data file name indicator**
This indicator appears when the MEMORY MIX functions work.

22 **Audio input level**/**Time indicator** (p. 22)

23 **ND filter indicator** (p. 46)

24 **Continuous mode indicator** (p. 119)

25 **Video flash ready indicator**
This indicator appears when you use the video flash light (not supplied).

Quick Function Guide

Functions to adjust exposure (in the recording mode)

• Shooting backlit subjects	BACK LIGHT (p. 23)
• In spotlight, such as at the theater or a formal event	Spotlight mode (p. 24)

Functions to give images more impact (in the recording mode)

• Smooth transition between scenes	FADER (p. 37)
• Taking a still picture	PHOTO (p. 32, 118)
• Digital processing of images	DIGITAL EFFECT (p. 39)
• Superimposing a title	TITLE (p. 94)

Functions to give a natural appearance to your recordings (in the recording mode)

• Preventing deterioration of picture quality in digital zoom	D ZOOM [MENU] (p. 104)
• Focusing manually	Manual focus (p. 58)

Functions to be used in editing (in the recording mode)

• Watching the picture on a wide-screen TV	Wide mode (p. 36)
• Viewing images using a personal computer	"Memory Stick" (p. 113)

Functions to be used after recording (in the playback mode)

• Digital processing of recorded images	DIGITAL EFFECT (p. 71)
• Displaying the date/time or various settings when you recorded	Data code (p. 28)
• Searching for scenes having a title	Title search (p. 66)
• Searching for scenes recorded in the photo mode	Photo search (p. 69)
• Scanning scenes recorded in the photo mode	Photo scan (p. 70)

You can insert the selected logo or mark on the moving picture being shot.
For details, refer to the operating instructions (for the auto logo insert function) supplied with this camcorder.

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