

MiniDisc AV Recorder

Operating Instructions

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

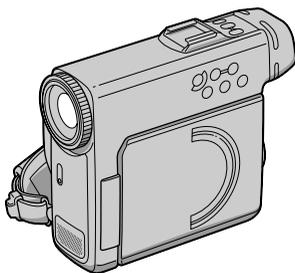
Owner's Record

This recorder's model number is located on the bottom of the unit and serial number is located on the inside the disc lid. The AC power adaptor/charger's 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. **DCM-M1**

Model No. **AC-VQ800**

Serial No. _____ Serial No. _____



DCM-M1

MD DISCAM



Video MD



Welcome!

Congratulations on your purchase of this Sony MiniDisc AV Recorder. With your MiniDisc AV Recorder, you can capture life's precious moments with superior picture and sound quality. Your MiniDisc AV Recorder 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.

Usable MiniDiscs



Use an MD DATA2 disc having this logo. You cannot use a MD DATA disc. MD VIEW is a registered trademark of Sony Corporation for MD DATA2 discs.



You can use an audio MD having this logo for playing only.

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

DISPOSAL OF LITHIUM ION BATTERY. LITHIUM ION BATTERY. DISPOSE OF PROPERLY.

You can return your unwanted lithium ion batteries to your nearest Sony Service Center or Factory Service Center.

Note: In some areas the disposal of lithium ion batteries in household or business trash may be prohibited.

For the Sony Service Center nearest you call 1-800-222-SONY (United States only).

For the Sony Factory Service Center nearest you call 416-499-SONY (Canada only).

Caution: Do not handle damaged or leaking lithium ion battery.

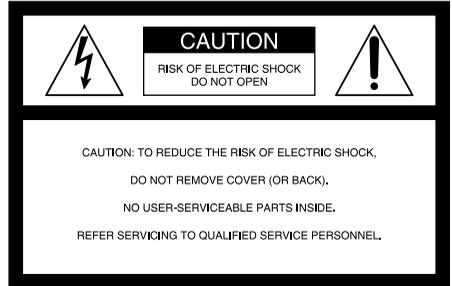
Never expose the battery pack to temperatures above 140°F (60°C) such as in a car parked in the sun or under direct sunlight.

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WARNING

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

For customers in the U.S.A.



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.

If you have any questions about this product, you may call:
Sony Direct Response Center 1-(800)-222-7669
or write to:
Sony Direct Response Center 12451 Gateway
Blvd. Fort Myers, FL 33913

Declaration of Conformity

Trade Name: SONY
Model No.: DCM-M1
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 Service and Technical Assistance on MD Discam™ Call To Free 1-888-449-SONY (United States only).

CAUTION

The use of optical instruments with this product will increase eye hazard.

CAUTION-
Laser radiation when open.
DO NOT STARE INTO BEAM.

This label is located under the video/audio control buttons.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

For customers in CANADA

CAUTION

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

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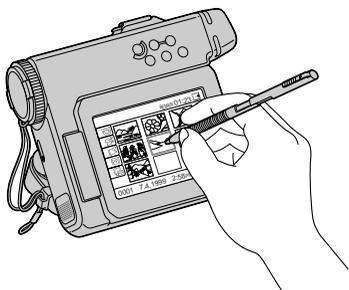
What you can do with your camcorder

Your camcorder can record in the MD DATA2 disc:

- Moving pictures (movies) as long as 10 minutes in SP mode or 20 minutes in LP mode
- Still pictures (photos) of up to 4,500 shots
- Audio of up to 260 minutes.

You can select the picture to play back directly by touching the LCD screen.

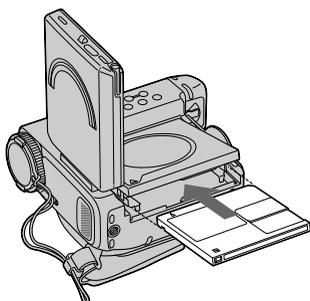
Play or edit the picture by touching the menu displayed on the LCD screen.



Hold the camcorder with both hands when recording.



Insert the disc from the bottom of the camcorder.



What you can do with your camcorder

Various functions available with MiniDisc

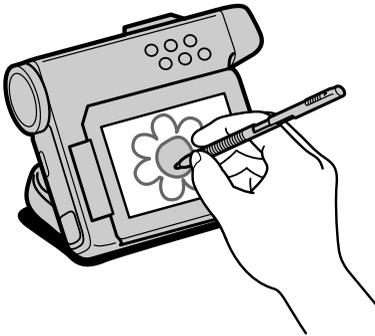
Digital video edit functions (p. 58)



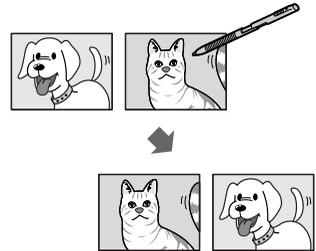
Check the picture just after recording (p. 47)



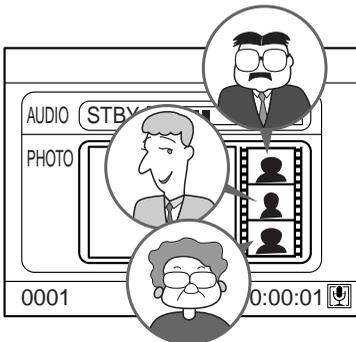
Draw on the picture (p. 78).



Easy to move or erase the picture (p. 64, 65)



Long audio recording including three photos - Interview recording (p. 36)

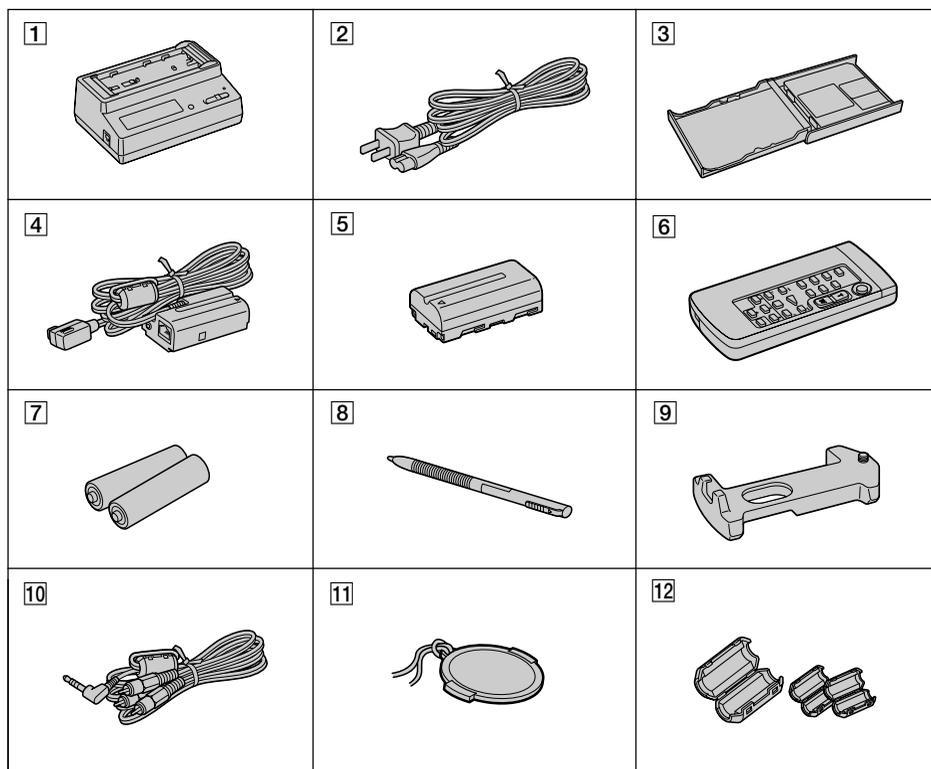


Listen to audio MD (p. 98).



Checking supplied accessories

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



- | | |
|---|---|
| 1 AC-VQ800 AC adaptor/charger (1)
(p. 10, 15) | 7 Size AA (R6) battery for Remote
Commander (2) (p. 125) |
| 2 AC power cord (1) (p. 10, 15) | 8 Input pen (1) (p. 18) |
| 3 MMD-650A MD DATA2 disc (1) (p. 16) | 9 Tripod attachment (1) (p. 122) |
| 4 ZK-ET1 connecting cord (1) (p. 15) | 10 A/V connecting cable (1) (p. 35) |
| 5 NP-F550 battery pack (1) (p. 10, 14) | 11 Lens cap (1) (p. 22) |
| 6 RMT-DCM1 Wireless Remote
Commander (1) (p. 32) | 12 Ferrite cores (large × 1, small × 2)
(p. 124) |
| | 13 Shoulder belt (p. 121) |

Using this manual

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

For example, “set the POWER switch to CAMERA.”

When you carry out an operation, you will hear a beep to indicate that the operation is being carried out.

What is a “track”?

A picture or audio recorded in the MiniDisc is called “track.” A track can be of any length and varies depending on how long you recorded the picture or audio.

- **Movie track**

The track starts when you press START/STOP to begin recording and ends when you press START/STOP again to stop recording. (If you have selected the “ANTI GROUND” recording mode in the menu (p. 93), a track is made while you are pressing START/STOP.)

- **Photo track**

A photo makes one track.

- **Interview recording (Audio track)**

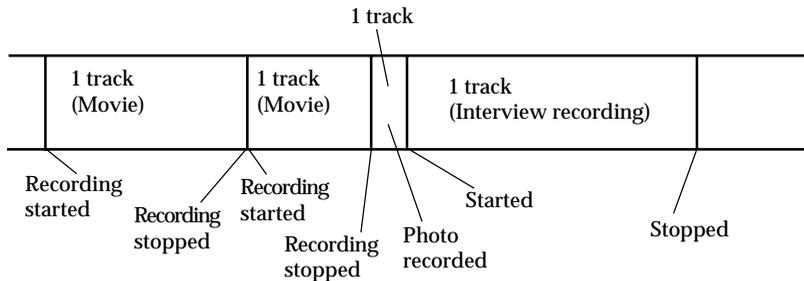
The track starts when you press AUDIO REC to begin audio recording and ends when you press ■ to stop recording. If you record photos during audio recording, the track includes those photos.

- **Title track and Drawing track**

The title track or drawing track makes an individual track, except when you draw on a picture.

Each track is automatically assigned a track number. You can label the track yourself.

The tracks are produced on a disc as shown below. On the index display, each track is indicated by one image regardless of the length or type of the track.



When you edit the picture or audio

Editing the picture and audio is done by tracks. When you move, erase or copy the picture or audio, the track of the selected picture or audio is moved, erased or copied.

Using this manual

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.

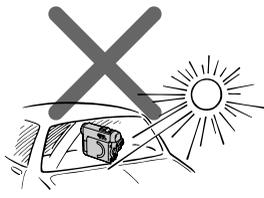
Precautions on camcorder care

- The LCD screen and/or the color viewfinder are manufactured using high-precision technology. However, there may be some tiny black spots and/or bright spots (red, blue or green in color) that constantly appear on the LCD screen and/or in the color viewfinder. These spots occur normally in the manufacturing process and do not affect the recorded picture in any way. Effective number 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 140°F (60°C), 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 toward the sun. The inside of the viewfinder or LCD screen may be damaged [c].

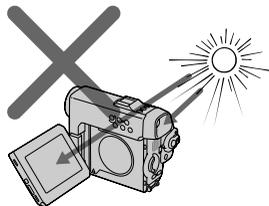
[a]



[b]



[c]



Note on heating

- Your camcorder may heat up during operation due to the internal circuit operation. This is not a malfunction. The temperature differs depending on the operating mode.
- If your camcorder and AC adaptor/charger heat up more than usual, turn off your camcorder and remove the battery pack. When using on the AC adaptor/charger, disconnect the AC adaptor/charger from a wall outlet. Then contact your nearest Sony dealer.

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

Step 1 Preparing the power supply

Charging the battery pack

Use the battery pack after charging it for your camcorder.

Your camcorder operates only with the "InfoLITHIUM" battery pack (L series). If you want to use the camcorder right away indoors, use on the AC adaptor/charger (p. 15).

(1) Set the mode change switch to "CHARGE."

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

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

A beep sounds and the display window lights up.

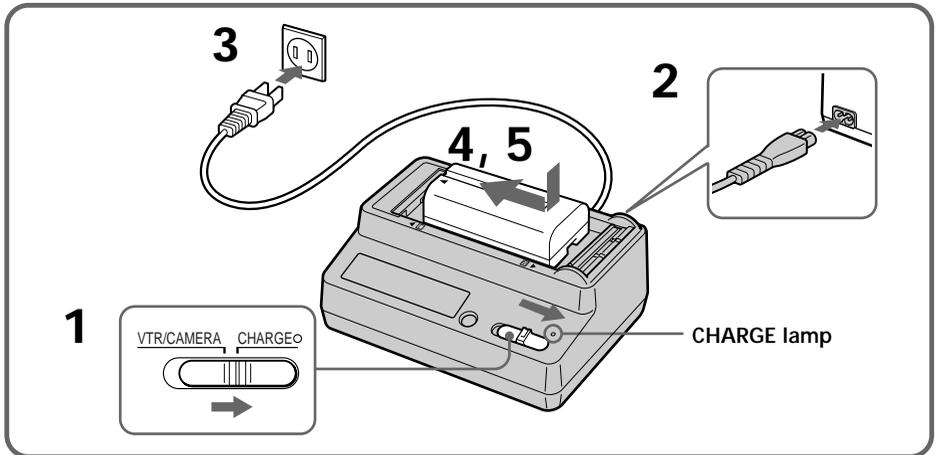
(4) Place the battery pack on the AC adaptor/charger with the ◀ mark facing the terminal shutter.

(5) Slide the battery pack in the direction of the arrow.

Press the battery pack until the terminal shutter enters completely into the AC adaptor/charger.

Charging begins. When the remaining battery indicator becomes  and the CHARGE lamp lights up, normal charge is completed. For full charge, which allows you to use the battery slightly longer than "normal charge," leave the battery pack attached until the CHARGE lamp goes out.

Remove the battery pack when required. It can be used even if the charging is not completed.



To remove the battery pack

Slide the battery pack in the opposite direction of installing, then lift it straight out.

Step 1 Preparing the power supply

Notes

- When the mode change switch is set to VTR/CAMERA during charging, charging stops.
- If the CHARGE lamp does not light or flash, check that the battery pack is correctly attached to the AC adaptor/charger. If it is not attached it will not be charged.
- When you install the battery pack, be sure to not hit it to the terminal of the AC adaptor/charger.
- Be sure that nothing metallic comes into contact with the metal parts of the unit or connecting plate. If it does, a short may occur and the unit may be damaged.

Charging time

The following table shows the charging time for the battery pack which is discharged completely.

Battery pack	Full charge (Normal charge)
NP-F550 (supplied)	115 (55)

- Approximate minute to charge an empty battery pack fully (Full charge).
- Approximate minute in parentheses indicates the time when you charge normally (Normal charge).
- The charging time may differ depending on the condition of the battery pack or the temperature of the environment.

Remaining battery indicator

Normal charge	Full charge
	

Recording time

Battery pack	Recording with the viewfinder		Recording with the LCD screen	
	Continuous*	Typical**	Continuous*	Typical**
NP-F550 (supplied)	75 (70)	37 (35)	65 (60)	32 (30)

- Approximate minutes when you use a fully charged battery
- Numbers in parentheses indicate the time using a normally charged battery.
- If you use both of the LCD screen and the viewfinder, the recording time will be slightly shorter than recording with the LCD screen only.

* Approximate continuous recording time at 77°F (25°C). 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.

Step 1 Preparing the power supply

Playing time

MD DATA2 disc

Battery pack	Playing time on LCD screen	Playing time with LCD closed
NP-F550 (supplied)	80 (75)	100 (95)

Audio MD

Battery pack	Playing time on LCD screen	Playing time with LCD closed
NP-F550 (supplied)	100 (95)	135 (130)

- Approximate minutes 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.

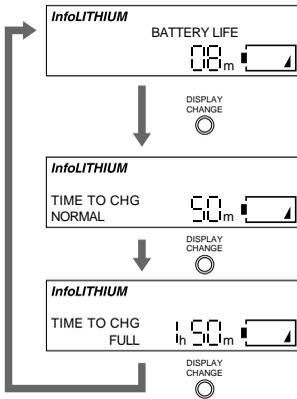
To check charging

During charging, you can check the charging time on the display. BATTERY LIFE lights up on the display shortly after charging has started.

Press DISPLAY CHANGE during charging.

Each time you press DISPLAY CHANGE, the display changes as follows.

The remaining battery time when the battery pack being charged is attached to an "InfoLITHIUM" equipment.



The time is not displayed when the remaining battery time is less than 5 minutes.

The remaining time until normal charge is completed.

The remaining time until full charge is completed.

Step 1 Preparing the power supply

What is "InfoLITHIUM?"

The "InfoLITHIUM" is a lithium ion battery pack which can exchange data with compatible electronic equipment about its battery consumption. Sony recommends that you use the "InfoLITHIUM" battery pack with electronic equipment having the  InfoLITHIUM mark.

Notes

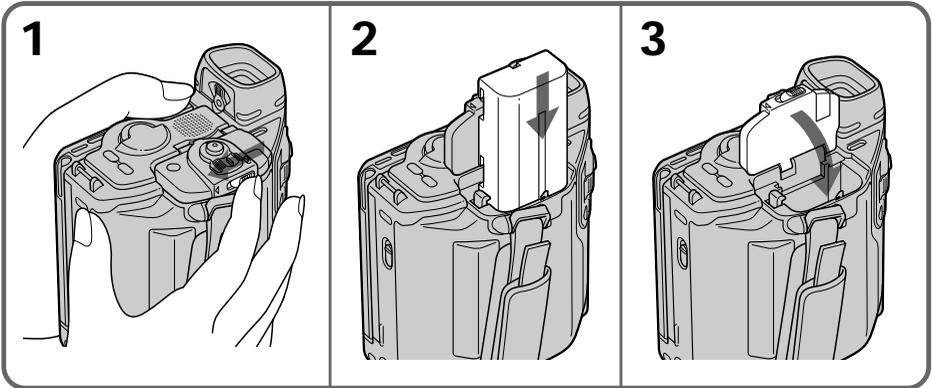
- The time display shows the approximate time when charging at 50°F to 86°F (10°C to 30°C). The time display may differ from the actual charging time depending on using conditions and circumstances.
- The time display may show "---" in the following cases. However, the AC adaptor/charger is not malfunctioning.
 - The remaining battery time is less than 5 minutes.
 - There is a difference between the displayed time and actual charging time. Even if this happens, continue charging.
- Full charge requires about 1 hour after normal charge is completed. If you remove the battery pack between normal charge and full charge, the charging time may not be displayed properly in the next charging.
- If the charging time is not displayed properly, fully charge the battery pack. The charging time will be displayed properly.
- When you attach a fully charged battery pack to this AC adaptor/charger, "TIME TO CHG FULL 1h" may appear on the display. However, this is not a malfunction.
- You may wait for a while after pressing DISPLAY CHANGE until the display shows the time indication.
- To display the remaining battery time of a new battery, attach it to your camcorder and use it for about 30 seconds. Then, charge the battery with the AC adaptor/charger.

Step 1 Preparing the power supply

Installing the battery pack

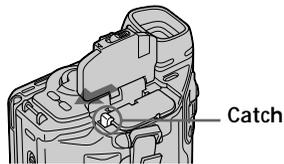
Install the battery pack to use your camcorder outdoors.

- (1) Slide OPEN (BATT) down to open the battery compartment lid.
- (2) With the ▼ mark pointing down, insert the battery pack until it clicks.
- (3) Shut the lid.



To remove the battery pack

Open the lid and push the catch.



Note

Put your hand by the battery compartment lid to prevent the battery pack from dropping.

Remaining battery time indicator of the camcorder

- Approximate time remaining for continuous recording will be displayed on the LCD screen or in the viewfinder. The time may not be correct depending on the condition or environment the camcorder is used.
- It will take about 1 minute for the camcorder to display a correct remaining time when you open or close the LCD screen.
- The remaining time displayed on the camcorder may differ from that on the AC adaptor/charger.

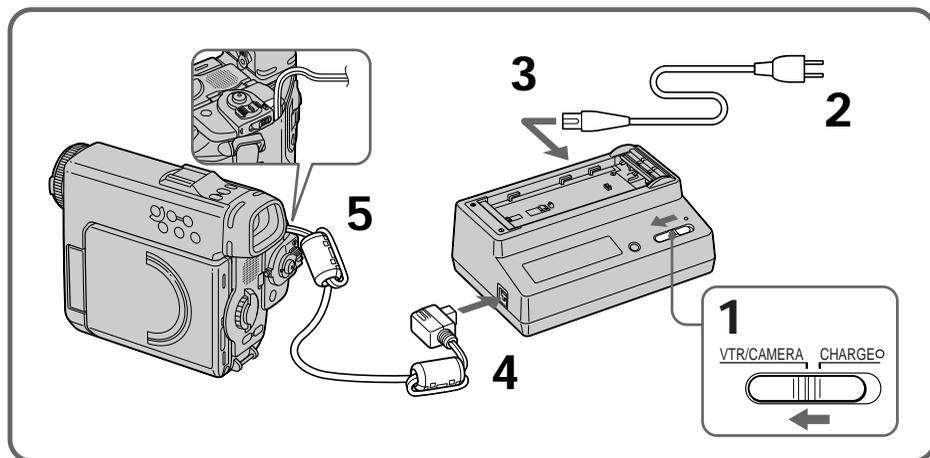
Step 1 Preparing the power supply

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 adaptor/charger.

- (1) Set the mode change switch to VTR/CAMERA.
- (2) Connect the power cord to a wall outlet.
- (3) Connect the power cord to the AC adaptor/charger.
- (4) Connect the connecting cord to the DC OUT connector of the AC adaptor/charger.
- (5) Install the connecting cord to the camcorder.

Insert the connecting adaptor until it clicks. Pass the cord through the cord shutter so that the cord is not caught by the battery lid.



To disconnect the connecting cord

Open the lid and push the catch.

Notes

- If you set the mode change switch to CHARGE while operating the camcorder, the power supply to the camcorder stops.
- Be sure that nothing metallic comes into contact with the metal parts of the AC adaptor/charger. If it does, a short may occur and the AC adaptor/charger may be damaged.
- You cannot charge the battery pack attached to the AC adaptor/charger while supplying the power to the camcorder.
- Keep the AC adaptor/charger away from the camcorder if the picture is disturbed.
- The power cord must only be changed at an authorized service shop.
- The AC adaptor/charger is not disconnected from the AC power source (house current) as long as it is connected to the wall outlet, even if the AC adaptor/charger itself has been turned off.

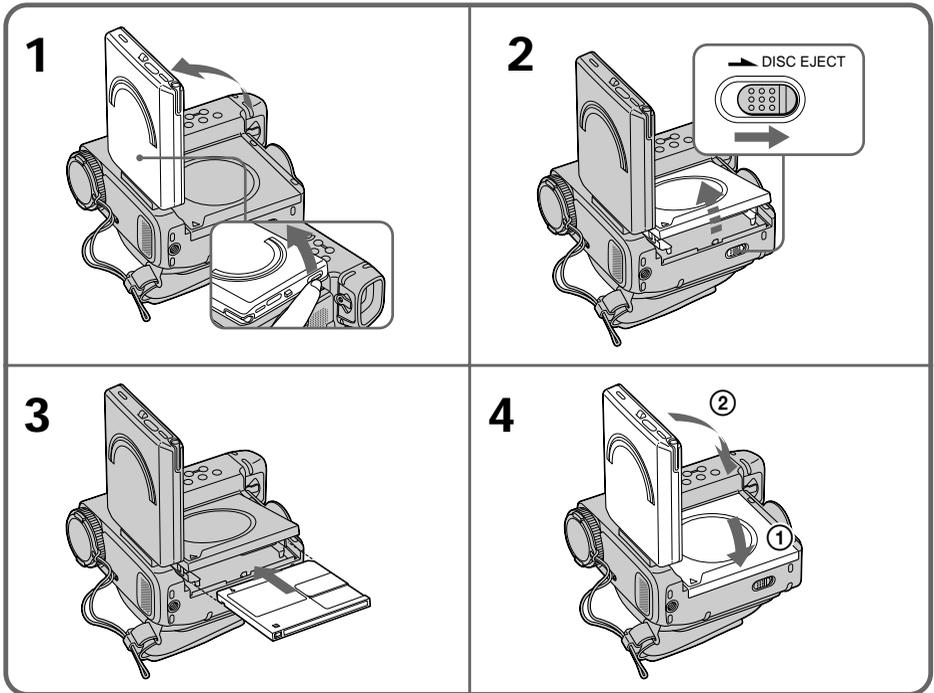
Using a car battery

Use Sony DC adaptor/charger DC-VQ800 (not supplied) or car battery adaptor DCC-L50 (not supplied).

Step 2 Inserting an MD DATA2 disc

Use an MD DATA2 disc. You cannot record on other types of MDs.

- (1) Lift the ◀OPEN protrusion and open the LCD panel until it stops.
- (2) Slide DISC EJECT on the bottom in the direction of the arrow and open the lid manually.
- (3) Insert the disc.
Push the disc in the direction of the arrow deeply into the disc compartment with the label facing up.
- (4) Close the disc lid.



To eject the disc

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

Notes

- If the POWER switch is set to "CAMERA" or "INTERVIEW," you may not be able to eject the disc. If this happens, turn off the power first and then reconnect the power sources. Then try again.
- Do not face the disc opening down when you insert or eject a disc to avoid dropping the disc.

To prevent misoperation

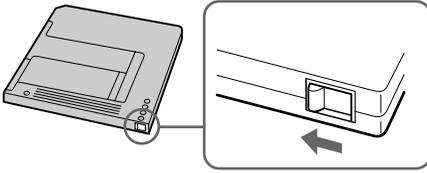
Turn the POWER switch to "OFF" when you insert or eject a disc.

Step 2 Inserting an MD DATA2 disc

To prevent accidental erasure

Slide open the tab at the side of the disc (so the tab is concealed).

Rear of the disc



Step 3 Using the touch panel

You operate your camcorder by selecting the items on the index display or menu on the LCD screen.

Select the tracks or menu items by touching with the input pen or a finger, or using the control dial.

The operation will be described mainly by touching the LCD screen with the input pen in this manual.

How to operate the menu is described here as an example.

Using the input pen

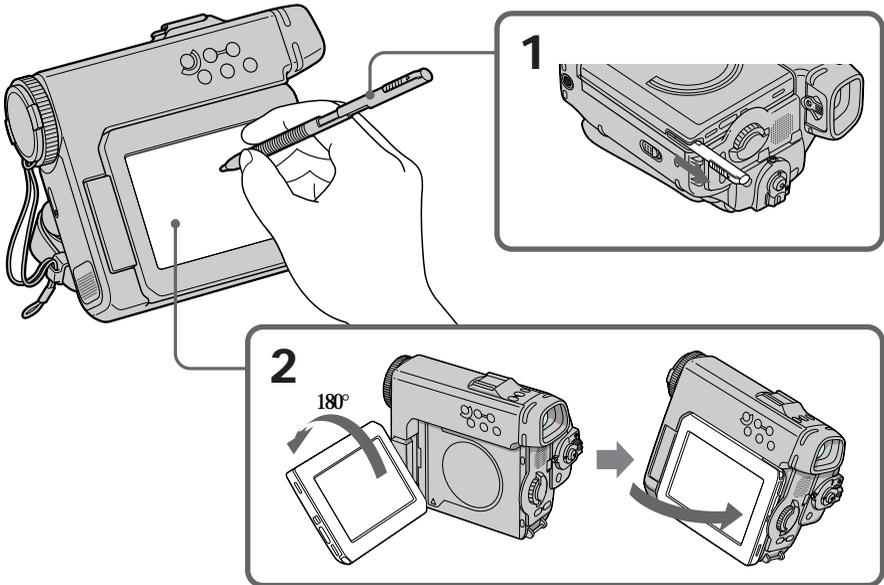
Example: turning off the beep

(1) Pull out the input pen.

Adjust the length of the input pen. The length of the input pen can be extended by about 12/32 inch (about 1 cm).

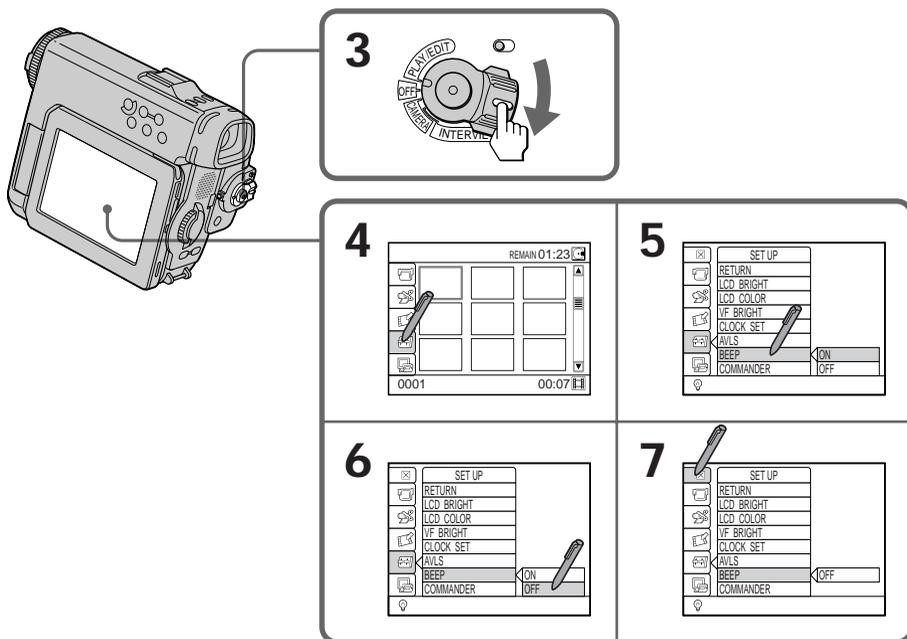
(2) Lift the ◀OPEN protrusion and open the LCD panel. Turn the LCD panel over and move it back into the camcorder body with the LCD screen facing out.

You will get more accurate results by touching the LCD screen in this position.



Step 3 Using the touch panel

- (3) Set the POWER switch to PLAY/EDIT while pressing the small green button. The index display appears. If nothing is recorded in the disc, no index image will be displayed.
- (4) Touch  SET UP on the left of the screen.
- (5) Touch BEEP.
- (6) Touch OFF.
- (7) Touch  to close the menu. The index display appears.



Notes on the LCD screen

- Operative pressure may be influenced by the atmospheric temperature or pressure.
- You can touch the LCD panel directly with a finger. Do not touch the LCD panel with a wet hand.
- Do not push on the LCD screen with a pointed object such as a pen.

Notes on the input pen

- Use only the supplied input pen. You may not be able to operate your camcorder with other commercially available input pens.
- Do not push on or hit the LCD panel hard with the input pen. Doing so may cause your camcorder to malfunction.
- Take care not to damage or dirty the tip of the input pen.
- If you made the input pen longer, shorten it to the original length before you put it back into your camcorder.

Step 3 Using the touch panel

If the LCD screen is dirty

- Do not use the input pen when the LCD screen is dirty or dusty. Doing so may damage the LCD screen.
- If the LCD screen is dirty, turn the POWER switch to “OFF” first and then wipe the LCD screen lightly with a soft dry cloth.

If the LCD screen does not react correctly to touching

Calibrate it (p. 108).

When PLEASE WAIT is displayed on the LCD screen

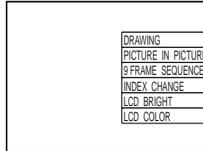
Do not apply a mechanical shock to the camcorder, or disconnect the power source.

Using the shortcut menu

You can display some of the menu items quickly.

(1) Press MENU during playback or pause.

The shortcut menu appears.



(2) Touch the desired item. The setting or adjusting display of the item appears.

To turn off the shortcut menu

Press MENU again.

Step 3 Using the touch panel

Using the control dial

Turn the control dial up or down to select an item, and press it to confirm.

The control dial rotates up or down endlessly.

Example: turning on the digital zoom function

(1) Set the POWER switch to CAMERA while pressing the small green button.

(2) Press MENU.

(3) Turn the control dial to select CAMERA and press the dial.

(4) Turn the control dial to select D ZOOM and press the dial.

(5) Turn the control dial to select ON and press the dial.

(6) Press MENU to close the menu.

The diagram illustrates the process of turning on the digital zoom function through six numbered steps:

- Step 1:** A hand presses the small green button on the camera's top right.
- Step 2:** A hand presses the MENU button on the touch panel.
- Step 3:** The control dial is rotated to select 'CAMERA'. The touch panel shows a menu with 'CAMERA' highlighted. A hand presses the control dial.
- Step 4:** The control dial is rotated to select 'D ZOOM'. The touch panel shows 'D ZOOM' highlighted with 'OFF' selected. A hand presses the control dial.
- Step 5:** The control dial is rotated to select 'ON'. The touch panel shows 'ON' selected under 'D ZOOM'. A hand presses the control dial.

Touch panel menu screens shown in steps 3, 4, and 5:

Item	Value
RETURN	
SELF TIMER	
PROGRAM AE	
D ZOOM	OFF
STEADYSHOT	ON
WHT BAL	
AUTO SHTR	
ANTI WIND NOISE	

Recording a picture

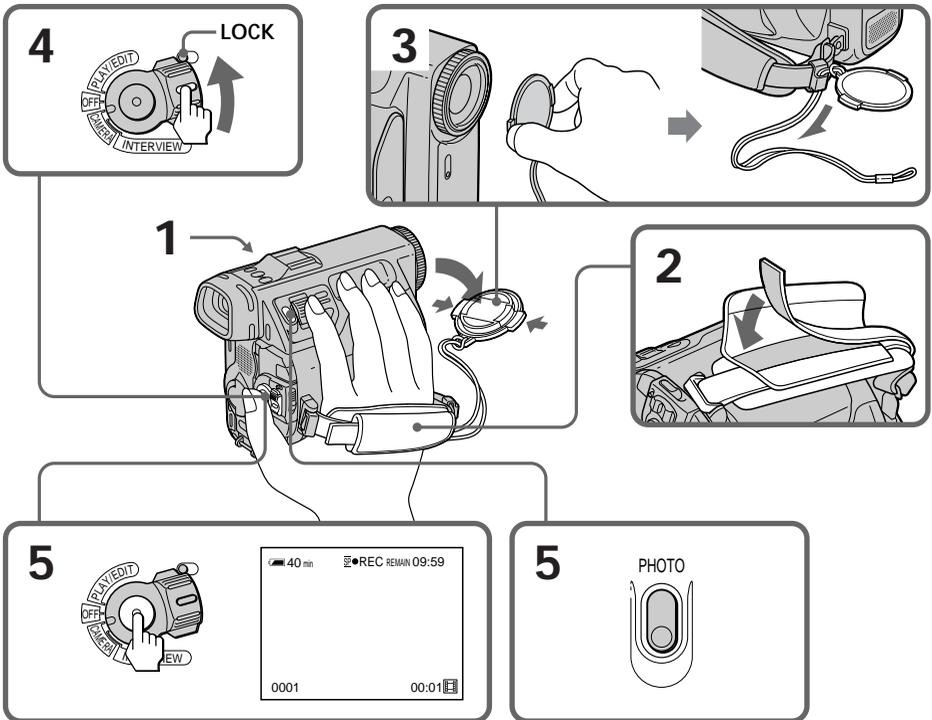
Your camcorder automatically focuses for you.

- (1) Install the power source and insert a disc. See “Step 1” and “Step 2” for more information (p. 10 to p. 17).
- (2) Fasten the grip strap firmly.
- (3) Remove the lens cap and pull the lens cap string to fix it.
- (4) Set the POWER switch to CAMERA while pressing the small green button. Your camcorder is set to the standby mode after a few seconds.
- (5) To record a movie:

Press START/STOP. Your camcorder starts recording. The “REC” indicator appears. The camera recording lamp located on the front of your camcorder lights up. To stop recording, press START/STOP again.

To record a photo:

Press PHOTO once. The scene when you press the button is recorded.



Note on the date and time

The clock is set to New York or Panama time at the factory. You can reset the clock (p. 89).

If you want to record longer

Select the LP (long play) recording mode in the menu (p. 26). The available recording time becomes twice the SP (standard play) mode; however, the picture quality will not be as good as the SP mode.

If you leave your camcorder in the standby mode for five minutes

Your camcorder automatically turns off. This is to save battery power. To resume the standby mode, set the POWER switch to OFF and to CAMERA again.

While writing in the MD

The “STBY” indicator on the LCD screen flashes.

- While the “STBY” indicator is flashing, make sure that you do not:
 - shake or hit the camcorder.
 - turn off the camcorder.
 - eject the disc and the battery.

The above may damage the picture data and disc.

- While the “STBY” indicator is flashing, you cannot start the next recording.

One recording makes one track

- From when you press START/STOP to begin recording until you press START/STOP to stop recording makes one track and is written in the disc as the last recorded track.
- In the ANTI GROUND recording mode, recording while you are pressing START/STOP makes one track (p. 93).
- You can renew tracks every 10 seconds (p. 93).
- One photo makes one track.

Note on recording a photo

If you record a fast moving object, the playback picture may look blurred. This is not a malfunction of your camcorder.

To record in the dark

Use a video flash (not supplied). You can use a video flash when  is displayed on the LCD screen. If you are adjusting the exposure manually, the video flash does not flash ( is not displayed).

Note on the LOCK switch

When you slide the LOCK switch to the left, the POWER switch cannot be set to INTERVIEW accidentally. The LOCK switch is set to the right as the default setting.

Note on the microphone

Do not touch the built-in microphone during recording.

If you are recording in strong wind

Set ANTI WIND NOISE to ON in the menu to reduce the wind noise (p. 92).

If you input audio from the LINE IN jack of the connecting cord during recording

The audio from the LINE IN jack is recorded.

If you are using headphones

The sound from headphones will be muted for a moment when you start and stop recording. The sound recorded in the disc is not affected. (The situation is same for the speaker output when audio equipment is connected to LINE IN.)

Recording a picture

After recording

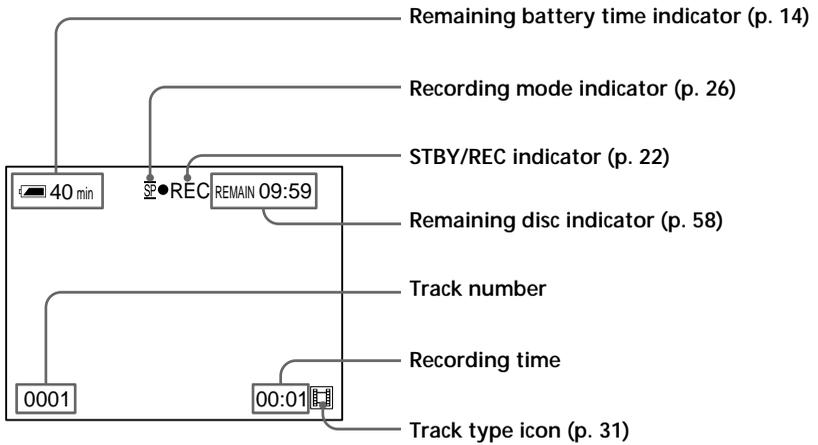
- (1) Set the POWER switch to OFF.
- (2) Eject the disc.
- (3) Remove the battery pack.

If you remove the battery before ejecting the disc

Since the disc lid is locked in the CAMERA and INTERVIEW mode, you cannot open the disc lid without the battery.

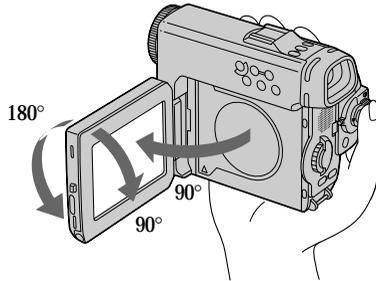
Indicators displayed in the recording mode

The indicators are not recorded in the disc.



Adjusting the LCD screen

- (1) Pull the ◀OPEN protrusion and open the LCD panel.
- (2) Adjust the angle.



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

Note

When using the LCD screen except in the mirror mode, the viewfinder automatically turns off.

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 angles of the LCD panel

Make sure that the LCD panel is opened up to 90 degrees.
Do not open or turn the LCD screen forcibly.

When you adjust the brightness of the LCD panel

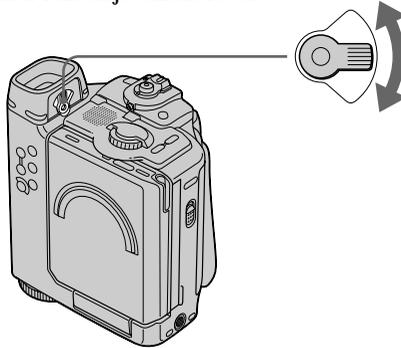
Select LCD BRIGHT in the menu and adjust (p. 87). This adjustment does not change the picture brightness recorded in the disc.

Recording a picture

Adjusting the viewfinder

When 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.

(1) Move the viewfinder lens adjustment lever.



Recording time

One MD DATA2 disc can record:

Track type	Record mode	Recording time
Movie	SP mode	Max. 10 min.
	VP mode	13 min. to 20 min.
	LP mode	Max. 20 min.
Photo		Max. 4500 shots
Audio		Max. 260 min.

Recording mode of movie

SP (standard play):

High picture quality (the default setting).

VP (variable picture quality):

The data consumption is automatically adjusted according to the object being recorded. The deterioration of picture quality is kept to a minimum and the recording time is longer than the SP mode.

LP (long play):

The recording time is double the SP mode. The picture quality is lower than the SP mode.

To select the recording mode

(1) Press MENU.

(2) Select REC MODE in  SET UP.

(3) Select the desired recording mode.

Note on deterioration of picture quality

The playback picture of a subject which moves fast or changes brightness may have block-shaped noise or rough outlines.

Recording a picture

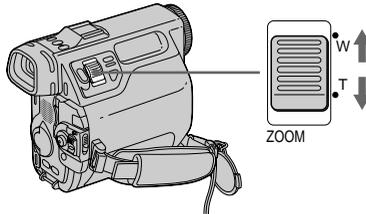
Using the zoom feature

- (1) Move the power zoom lever a little for a slower zoom. Move it further for a faster zoom.

Using the zoom function sparingly results in better-looking recordings.

“T” side: for telephoto (subject appears closer)

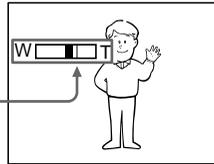
“W” side: for wide-angle (subject appears farther away)



Zoom greater than 10× is performed digitally, if you set D ZOOM to ON in the menu settings. The digital zoom function is set to OFF as a default setting (p. 92).

The right-ended portion of the bar shows the digital zooming zone.

The digital zooming zone appears when you set D ZOOM to ON.



When you shoot close to a subject

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

Notes on digital zoom

- Digital zoom starts to function when zoom exceeds 10x.
- The picture quality deteriorates as you go toward the “T” side. Set D ZOOM to OFF in the menu settings. Otherwise the digital zoom activates without notice (p. 92).

Recording a picture

Recording while showing the picture on the LCD screen

You can record a person while showing himself/herself on the LCD screen. You can also record yourself if you place your camcorder in a stable position. The supplied Remote Commander will make it easy to record yourself.



- (1) Pull the ◀OPEN protrusion and open the LCD panel.
- (2) Turn the LCD panel over so that it faces the other way.
The ☺ indicator appears on the LCD screen and in the viewfinder (**Mirror mode**).



- (3) Start recording.

Picture in the mirror mode

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

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.

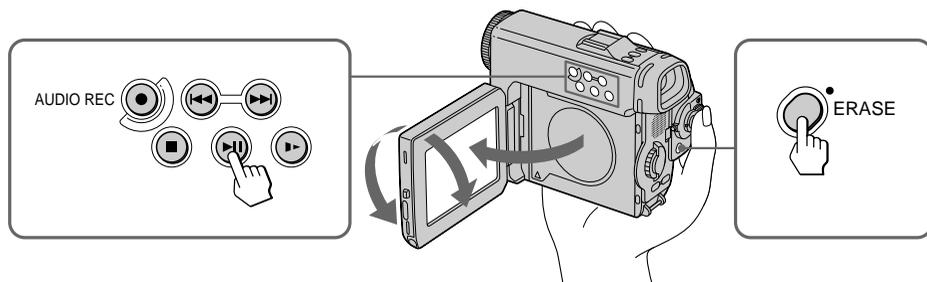
Recording time using the battery pack in the mirror mode

Recording time is slightly shorter than the recording time using the LCD screen only (p. 11).

Checking the recorded picture

You can view the picture just after you have recorded with the POWER switch kept to CAMERA.

You can erase the track or unnecessary portion of the track.

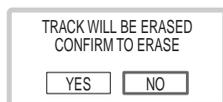


Viewing the last recorded track

- (1) During recording standby, press ►||. The last picture you recorded will be played repeatedly. Press ■ to stop playing.

Erasing the last recorded track

- (1) During recording standby or playing, press ERASE. The last recorded track is played and the confirmation message appears.



- (2) Turn the control dial to select YES, and press the dial to confirm. After the PLEASE WAIT message which appears while the change is written in the disc, the camcorder returns to the recording standby mode. The track is erased.

Note

You cannot restore the track once it has been erased.

To erase all tracks

While pressing ERASE, press START/STOP.

Erasing the last portion of the last recorded track

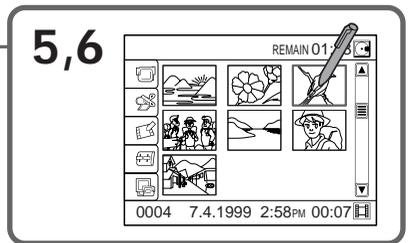
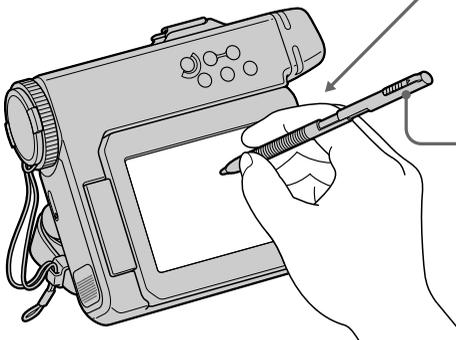
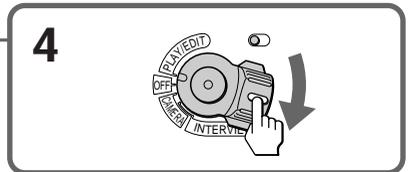
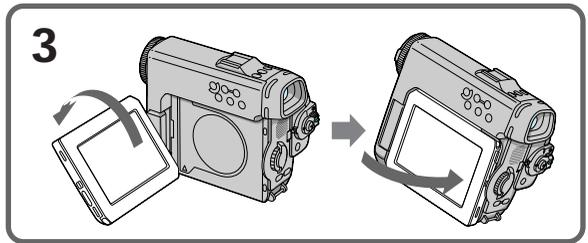
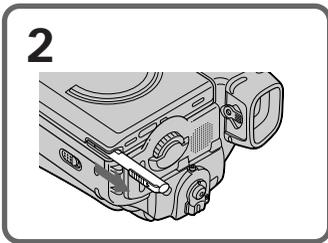
- (1) During recording standby, press ►||. The last picture you recorded will be played repeatedly.
- (2) At the scene from where you want to erase, press ►|| to pause.
- (3) Press ERASE. The portion to be erased is played and the confirmation message appears.
- (4) Turn the control dial to select YES, and press the dial to confirm. That portion of the track is erased.

Playing the disc

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.

When you monitor the picture on the LCD screen, tilt your camcorder to its stable position.

- (1) Install the power source and insert the recorded disc.
- (2) Pull out the input pen.
Adjust the length of the input pen. The length of the input pen can be extended by 12/32 inch (about 1 cm).
- (3) Lift the ◀OPEN protrusion and open the LCD panel. Turn the LCD panel over and move it back into the camcorder body with the LCD screen facing out.
- (4) Set the POWER switch to PLAY/EDIT while pressing the small green button. The tracks of recorded pictures appear on the index display.
- (5) Touch the track you want to play with the input pen. The selected track is framed in orange.
- (6) Touch the track again to start playing. The frame turns red. The photo tracks are played for three seconds each.



To stop playing
Press ■.

Playing a disc

When you open/close the LCD panel

Make sure that the LCD panel is set vertically.

Note on playback

It may take a few seconds to start playback depending on the track.

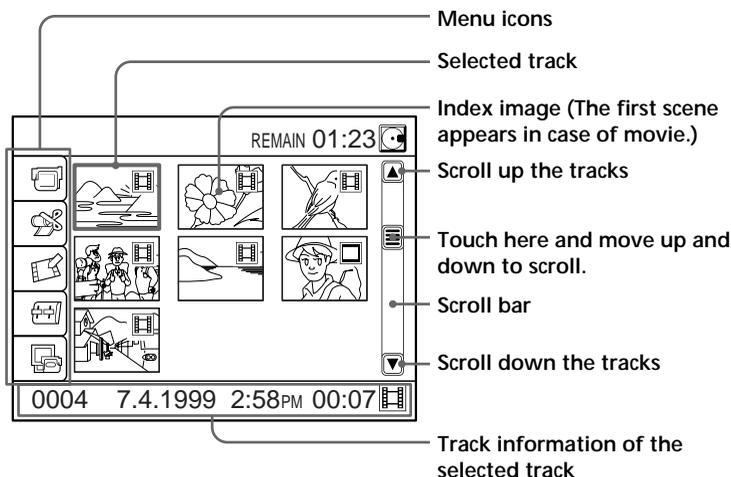
To change the playing time of a photo

Set STILL PLAYBACK TIME in the menu (p. 57).

If you leave the power on for a long time

Your camcorder gets warm. This is not a malfunction.

Index display



Track icons

Type of track is indicated by the icons.

-  Movie track
-  Photo track
-  Audio track
-  Title track
-  Memo track
-  Group track

To change the index image of a movie

You can use the scene you want (p. 62).

If date and time are not set in your camcorder

“--:--:--:--” appears.

To control using the buttons on the camcorder or Remote Commander

When the name of the buttons of the camcorder differs from the buttons of the Remote Commander, those of the Remote Commander are shown in parenthesis.

To play

- Select the desired track, then press **▶|| (▶)**.
- Turn the control dial (press cursor **←/↑/↓/→**) to select the desired track, then press the dial (ENTER).

To stop

Press **■** during playback.

To pause

Press **▶|| (||)** during playback.

To return to normal play, press **▶|| (||)** again.

To go to the next track

Press **▶▶|** briefly during playback. Each time you press **▶▶|**, it goes to the top of the next tracks.

To go to the previous track

Press **◀◀|** briefly during playback. First press of **◀◀|** goes to the top of the current track. If you repeat pressing **◀◀|** in sequence, it goes to the top of the previous track.

To locate a scene monitoring the picture

Keep pressing **◀◀|** or **▶▶|** during playback. To resume normal playback, release the button.

To view the picture frame-by-frame

(1) Press **▶|| (||)** during playback.

(2) Turn the control dial (press cursor **←/↑/↓/→**).

To resume normal playback, press **▶|| (▶)**.

To view the picture at slow speed (movie only)

You can play at the desired speed.

(1) Press **▶▶** during playback.

The picture is played at 1/3 speed. The speed adjusting bar appears.

(2) Turn the control dial (press cursor **←/↑/↓/→**) to adjust the speed.

To resume normal playback, press **▶||** twice.

(On the Remote Commander, press **▶▶**).

In the playback modes other than normal

Sound is muted.

While playing still pictures

If you try frame-by-frame playback, it goes to the first frame of the next track.

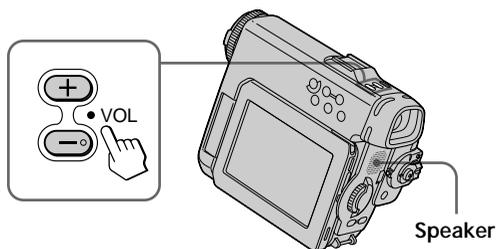
During slow playback

- If you turn the control dial, the playing speed changes.
- If you press **◀◀|** and **▶▶|**, slow playback is canceled.
- The speed adjusting bar appears at the beginning of slow play and while adjusting the speed.

Playing a disc

Adjusting the volume

- (1) Press either of the two buttons on VOL.



To set AVLS

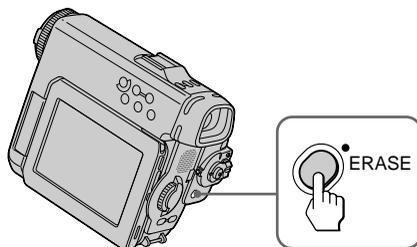
Set AVLS to ON in the menu (p. 93).

To listen using headphones

Connect the headphones (not supplied) to the  jack on the front. Adjust the volume using the VOL buttons. The speaker is muted.

Erasing a track

- (1) Touch the track you want to erase on the index display.
- (2) Press ERASE.
The confirmation message appears.
- (3) Touch YES.
After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears. The track is erased.



Note

You cannot restore the track once erased.

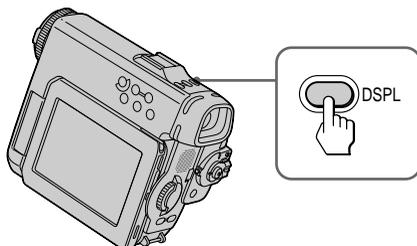
While playing

You can also erase the track by pressing ERASE while the track is being played.

Playing a disc

Turning on or off the information display

- (1) Press DSPL when the index display is on.
The track type icons disappear from the LCD screen.



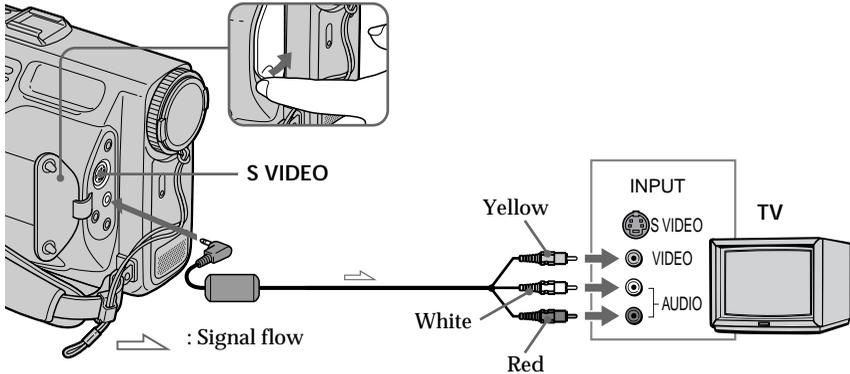
To make the track data appear, press DSPL again.

If you press DSPL during playback
The track data appears.

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 adaptor/charger (p. 15). 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 already connected to a VCR

Connect your camcorder to the LINE IN 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 the yellow plug of the A/V connecting cable to the video input jack and the white or the red plug to the audio input jack on the VCR or the TV. If you connect the white plug, the sound is L (left) signal. If you connect the red plug, the sound is R (right) signal.

If you want to hear in monaural, use a monaural audio cable (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.

Recording audio including photo - Interview recording

While you are recording mainly audio in an MD DATA2 disc, you can record up to three photos. Those photos make one track together with the audio.

Interview recording is possible only with the MD DATA2 discs. You can record up to 4 hours and 20 minutes in a disc.

The index image of the interview recording has the  icon.

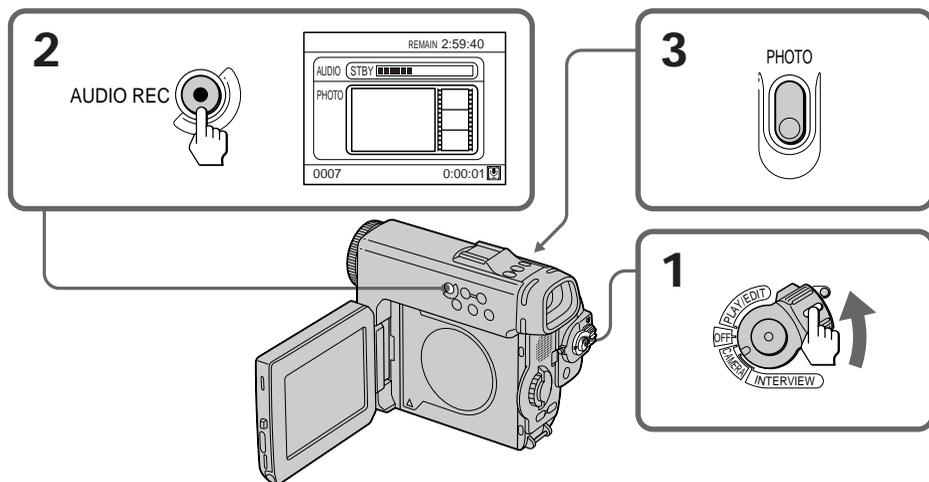
(1) Unlock the mode lock and set the POWER switch to INTERVIEW while pressing the small green button.

(2) Press AUDIO REC.

The AUDIO REC button lights up in red and recording starts. The recording time passed is indicated by  which increases every 10 seconds. When  reaches the right end, it starts over.

(3) Press PHOTO when you want to insert photos.

If you have not started audio recording, you cannot record photos. The recorded photos appear to the right of the screen.



To stop recording

Press .

When you have finished interview recording

Slide the mode lock to the left to prevent the POWER switch from being set to INTERVIEW by accident.

To use a microphone

Connect a microphone (not supplied) to the MIC jack on the front.

To record for long time

We recommend that you power your camcorder from a wall outlet using the AC adaptor/charger (p. 15).

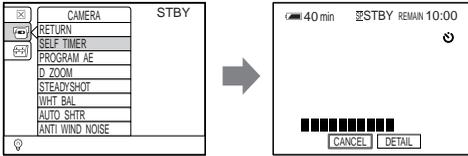
If you record in mirror mode

The picture on the LCD screen does not become a mirror-image.

Self-timer recording

You can make a recording with the self-timer. This mode is useful when you want to record yourself. The Remote Commander will make recording easier.

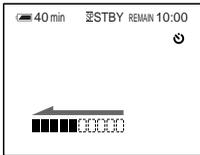
- (1) Press MENU in the standby mode.
- (2) Turn the control dial to select  CAMERA, and press the dial.
- (3) Turn the control dial to select SELF TIMER, and press the dial.



- (4) Start recording.

To record a movie:

Press START/STOP. Self-timer starts counting down from 10 seconds. As the waiting time passes, ■ decreases every 1 second.



When ■ all disappear, your camcorder starts recording automatically. As the recording time passes, the bar becomes longer.

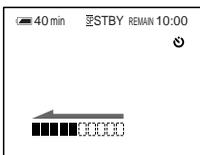


Your camcorder stops recording automatically after 10 seconds.

To record a photo:

Press PHOTO.

Self-timer starts counting down from 10 seconds. As the waiting time passes, ■ decreases every 1 second.



When ■ all disappear, your camcorder records the photo automatically.

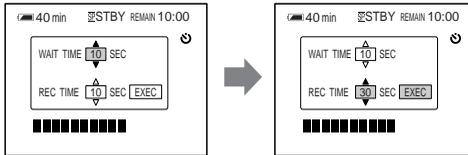
Self-timer recording

To set the waiting and recording time

You can select the waiting time from 5, 10, and 15 seconds.

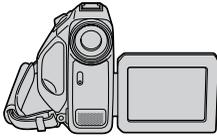
You can select the recording time of movie from 5, 10, 20, 30 and 60 seconds.

- (1) On the self-timer screen, turn the control dial to select **DETAIL**, and press the dial.
- (2) Turn the control dial to select the desired time, and press the dial to confirm.



If you want to see how recording is going

Use your camcorder in the mirror mode.



Note

The self-timer recording mode is automatically canceled when:

- Self-timer recording is done.
- The POWER switch is set to OFF, PLAY/EDIT, or INTERVIEW.

To cancel self-timer recording after counting-down has started

Press START/STOP or PHOTO again.

Note on the mirror mode

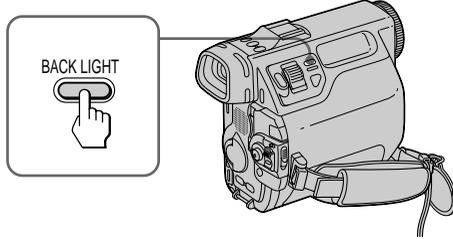
- Since **DETAIL** is not displayed in the mirror mode, set the waiting and recording time before you turn over the LCD panel.
- The bar becomes shorter and longer in the opposite direction in the mirror mode.

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.

(1) Press BACK LIGHT in the recording or standby mode.

The  indicator appears on the LCD screen or in the viewfinder.



To cancel, press BACK LIGHT again.

If you press EXPOSURE when shooting backlit subjects

The backlight function will be canceled.

Using the PROGRAM AE function

You can select PROGRAM AE (Auto Exposure) mode to suit your specific shooting requirements.

Spotlight mode

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

Soft portrait mode

This mode brings out the subject while creating a soft background for subjects such as people or flowers.

Sports lesson mode

This mode minimizes shake on fast-moving subjects such as in tennis or golf.

Beach & ski mode

This mode prevents people's faces from appearing dark in strong light or reflected light, such as at a beach in midsummer or on a ski slope.

Sunset & moon mode

This mode allows you to maintain atmosphere when you are recording sunsets, general night views, fireworks displays and neon signs.

Landscape mode

This mode is for when you are recording distant subjects such as mountains and prevents your camcorder from focusing on glass or metal mesh in windows when you are recording a subject behind glass or a screen.

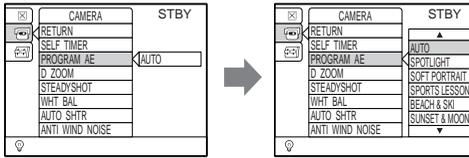
1000/500 Shutter 1000/500 mode

Shutter speed is fixed to 1/1000 or 1/500 seconds. Other parameters such as exposure are adjusted automatically.

This mode minimizes shake on fast-moving subjects. The picture may look dark if you use this mode indoors.

Using the PROGRAM AE function

- (1) Press MENU in the recording or standby mode.
- (2) Turn the control dial to select  CAMERA, and press the dial.
- (3) Turn the control dial to select PROGRAM AE, and press the dial.



- (4) Turn the control dial to select the desired mode, and press the dial.
- (5) Press MENU.

The menu disappears and the selected PROGRAM AE mode indicator appears on the LCD screen or in the viewfinder.

To turn the PROGRAM AE function off

Set PROGRAM AE to AUTO in the menu.

Notes

- In the spotlight, sports lesson and beach & ski modes, you cannot take close-ups. This is because your camcorder is set to focus only on subjects in the middle to far distance.
- In the sunset & moon and landscape modes, your camcorder is set to focus only on distant subjects.

While WHT BAL is set to AUTO in the menu settings

The white balance is adjusted even if the PROGRAM AE function is selected.

If you press EXPOSURE when the PROGRAM AE function is selected

You can adjust the exposure.

If you are recording under a discharge tube such as a fluorescent lamp, sodium lamp or mercury lamp

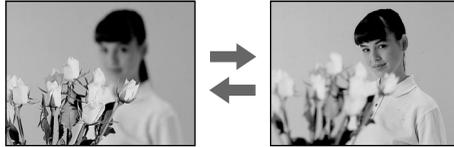
Flickering or changes in color may occur in the following modes. If this happens, turn the PROGRAM AE function off.

- Soft portrait mode
- Sports lesson mode

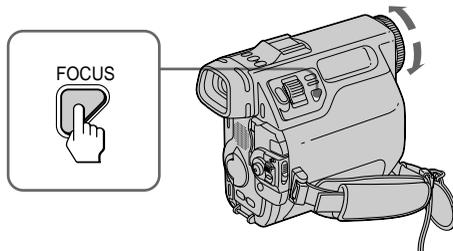
Focusing manually

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) Press FOCUS lightly in the standby or recording mode.
The  indicator appears on the LCD screen or in the viewfinder.
- (2) Turn the focus ring to sharpen focus.



To return to the autofocus mode

Press FOCUS lightly to turn off the ▲ or  indicator.

To record distant subjects

Press FOCUS for more than one second (INFINITY). Your camcorder focuses on distant subjects and the ▲ indicator appears. Use this mode when your camcorder focuses on near objects even though you are trying to shoot a distant object. You can focus manually by turning the focus ring.

To obtain correct focus

First, focus a subject with the power zoom lever moved toward the “T” (telephoto) position, then adjust the zoom.

When you shoot close to the subject

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

 changes as follows:

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

Adjusting the exposure manually

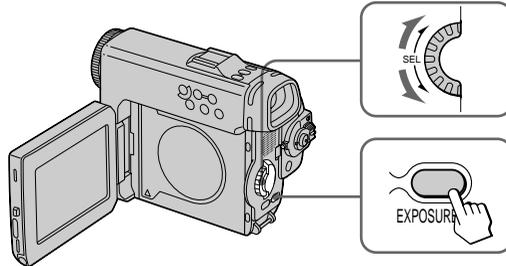
You can manually adjust and set the exposure. Adjust the exposure manually in the following cases:

- The subject is backlit
- Bright subject and dark background
- To record dark pictures (e.g. night scenes) faithfully

(1) In the standby or recording mode, press EXPOSURE.

The exposure indicator appears.

(2) Turn the control dial to adjust the brightness.



To return to the automatic exposure mode

Press EXPOSURE again.

Note

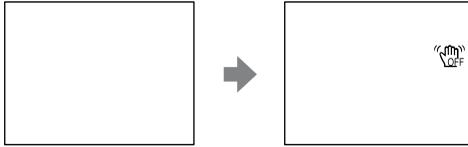
When you adjust the exposure manually, the backlight function does not work.

If you select a PROGRAM AE mode while you are adjusting the exposure manually

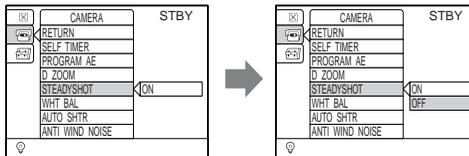
Your camcorder automatically returns to the automatic exposure mode. Press EXPOSURE again and adjust manually.

Releasing the STEADYSHOT function

The STEADYSHOT function compensates for camera-shake. You can release the STEADYSHOT function when you do not need it. Do not use the STEADYSHOT function when shooting a stationary object using a tripod to obtain more natural picture.



- (1) Press MENU in the recording or standby mode.
- (2) Turn the control dial to select  CAMERA, and press the dial.
- (3) Turn the control dial to select STEADYSHOT, and press the dial.



- (4) Turn the control dial to select OFF, and press the dial.
- (5) Press MENU.

The menu disappears and the  indicator appears on the LCD screen or in the viewfinder.

To activate the STEADYSHOT function

Set STEADYSHOT to ON in the menu.

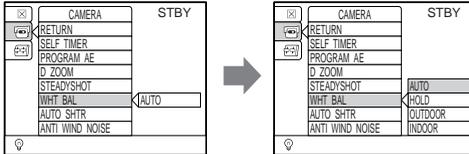
Notes

- The STEADYSHOT function will not correct excessive camera-shake.
- If you attach a tele-conversion lens or wide-conversion lens, the STEADYSHOT function may not work properly.

Adjusting the white balance manually

You can manually adjust and set the white balance. This adjustment makes white subjects look white and allows more natural color balance. Normally white balance is automatically adjusted.

- (1) Press MENU in the recording or standby mode.
- (2) Turn the control dial to select  CAMERA, and press the dial.
- (3) Turn the control dial to select WHT BAL, and press the dial.



- (4) Turn the control dial to select the desired mode, and press the dial.

INDOOR (🏠):

- Lighting condition changes quickly
- Too bright place such as photography studios
- Under sodium lamps or mercury lamps

OUTDOOR (☀️):

- Recording a sunset/sunrise, just after sunset, just before sunrise, neon signs, or fireworks
- Under a color matching fluorescent lamp

HOLD (HOLD):

Recording a single-colored subject or background

- (5) Press MENU.

The menu disappears and the indicator of selected mode appears on the LCD screen or in the viewfinder.

To return to the automatic white balance mode

Set WHT BAL to AUTO in the menu .

If the picture is being taken in a studio lit by TV lighting

We recommend that you record in the 🏠 indoor mode.

When you record under fluorescent lighting

Use the automatic white balance or hold mode.

Your camcorder may not adjust the white balance correctly in the 🏠 indoor mode.

In the 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 to the outdoors from the interior of a house, or vice versa.

If you changed the recording condition in the hold mode

Set the white balance to AUTO and reset to HOLD after a few seconds when:

- You change the PROGRAM AE mode.
- You bring your camcorder to the outdoors from the interior of a house, or vice versa.

Displaying two pictures – Picture-in-picture

A desired scene can be displayed in a small picture-in-picture screen during playback. You can display the image in picture-in-picture screen with the playback picture side by side in the same size.

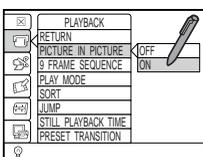
Picture-in-picture



2-picture display



- (1) On the index display, touch  PLAYBACK and then PICTURE IN PICTURE.
- (2) Touch ON.



- (3) Touch  to close the menu.
 appears at the top of the index display.
- (4) Play back the desired track.
- (5) Pause at the scene you want to use in the picture-in-picture screen. You can change the scene by turning the control dial.



- (6) Touch CAPTURE.
The scene appears in the picture-in-picture screen.



- (7) Release pause.

To turn off the picture-in-picture screen

Set PICTURE IN PICTURE to OFF.

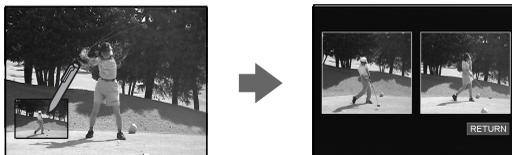
Displaying two pictures – Picture-in-picture

Comparing two pictures – 2-picture display

You can display the picture-in-picture image together with another image not only from the same disc but also from other discs.

- (1) Play back the track you want to compare with the picture-in-picture image.
- (2) Touch the picture-in-picture screen.

The still picture in the picture-in-picture screen appears on the left. The still picture in the currently playing track appears on the right.



To return to the picture-in-picture display, touch RETURN.

To compare with an image in other discs

After you have captured the picture-in-picture image, change the disc. Do not turn off the power of the camcorder.

To operate the menu

You may use the control dial.

If PICTURE IN PICTURE is already set to ON

A previously selected scene appears in the picture-in-picture screen. The picture will be replaced by a new scene when you touch CAPTURE.

You can select PICTURE IN PICTURE in the shortcut menu

To turn on the shortcut menu, press MENU during playback or playback pause.

The image in the picture-in-picture screen will disappear:

- when several minutes have passed after the POWER switch is set to OFF.
- when the power turned off automatically in the CAMERA or INTERVIEW mode.
- when the power source was disconnected.

Note on digital effect

Scene transition and picture effects are not applied to the picture-in-picture and 2-picture images.

When displaying an audio track

No picture-in-picture screen is displayed.

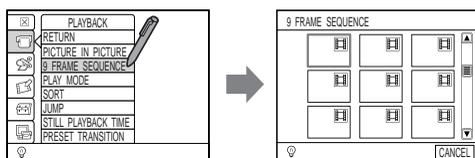
Displaying nine consecutive scenes

- 9 FRAME SEQUENCE

You can view a part of a movie as nine still pictures on the screen. This function is useful when you want to look at a fast-moving subject, such as a golf swing, in detail. 9 FRAME SEQUENCE function displays consecutive scenes of every 0.2 second.



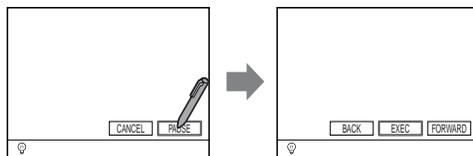
- (1) On the index display, touch  PLAYBACK and then 9 FRAME SEQUENCE.



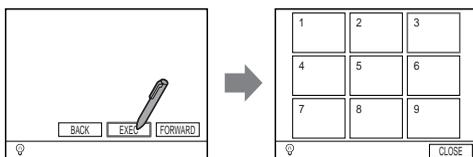
- (2) Touch the desired track.

You can select a movie track only. If you want to cancel the operation, touch CANCEL.

- (3) Touch PAUSE at the desired scene.



- (4) Adjust the scene position by touching FORWARD or BACK, and touch EXEC. Nine still pictures appear on the screen.

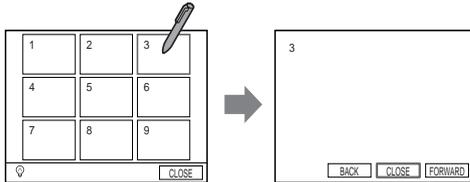


Displaying nine consecutive scenes – 9 FRAME SEQUENCE

To enlarge one of the pictures to entire screen

(1) Touch the desired picture.

If you press BACK, the previous frame appears. If you touch FORWARD, the next frame appears.



To return to the 9 FRAME SEQUENCE screen, touch CLOSE.

To return to the index display

(1) Touch CLOSE.

(2) Touch FINISH.

If you continue the 9 FRAME SEQUENCE operation, touch CONTINUE.

To operate the menu

You may use the control dial.

You can select 9 FRAME SEQUENCE in the shortcut menu

To turn on the shortcut menu, press MENU during playback or playback pause.

To select the scene

You may use the control dial. Turn the control dial to select the scene, and press the dial to confirm.

Note on digital effect

Drawing, scene transition and picture effects are not applied to the nine still pictures or its enlarged picture.

If you select a scene near the end of a track

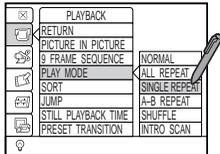
The number of still pictures displayed may be less than nine.

Playing back repeatedly

You can play one track, all tracks in a disc or a portion of a movie (A-B repeat) repeatedly.

Repeating a track

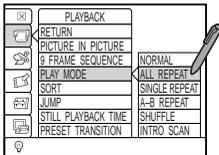
- (1) On the index display, touch  PLAYBACK and then PLAY MODE.
- (2) Touch SINGLE REPEAT.



- (3) Touch  to close the menu.
 appears at the top of the index display.
- (4) Play the track to be repeated.

Repeating all tracks in a disc

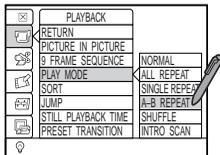
- (1) On the index display, touch  PLAYBACK and then PLAY MODE.
- (2) Touch ALL REPEAT.



- (3) Touch  to close the menu.
 appears at the top of the index display.
- (4) Play the track to be repeated first.

Repeating a portion of a movie - A-B repeat

- (1) On the index display, touch  PLAYBACK and then PLAY MODE.
- (2) Touch A-B REPEAT.



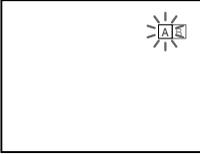
- (3) Touch  to close the menu.
 appears at the top of the index display.

Continued on the next page

Playing back repeatedly

(4) Play the track to be repeated.

[A] of [A][B] flashes.



(5) Press the control dial at the point to start repeating.

Starting point (A) is set and [B] flashes.

(6) Press the control dial at the point to finish repeating.

Finishing point (B) is set. The portion from A to B is repeated.

To stop repeating

Set PLAY MODE to NORMAL.

To operate the menu

You may use the control dial.

Notes on setting the A-B repeat

- You can set the A and B points by touching [A][B] with the input pen.
- A-B repeat is possible only with movie tracks. If you select other type of track, [A][B] appears, but it cannot be set.
- A-B repeat is possible only within one track. You cannot set A in one track and B in another track.
- A-B repeat is possible with a movie track in a group track.
- If the interval between A and B is shorter than 0.5 second, your camcorder automatically adjust the interval to 0.5 second.

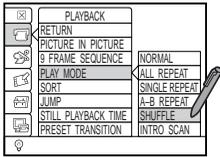
To cancel A and B points

- Press the control dial. Your camcorder plays from the beginning of the track.
- Stop playback.

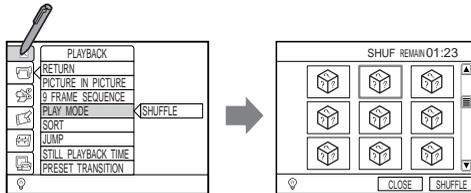
Playing back in random order – SHUFFLE

You can play the tracks in random order.

- (1) On the index display, touch  PLAYBACK and then PLAY MODE.
- (2) Touch SHUFFLE.



- (3) Touch  to close the menu. “SHUF” appears at the top of the index display.



- (4) Touch any track to start playing.
The index of played tracks resume the index image.

To stop shuffle play

Touch CLOSE.

If you want to play tracks in another order, touch SHUFFLE.

To operate the menu

You may use the control dial.

Shuffle play is canceled if you:

- eject the disc.
- turn the POWER switch to OFF.

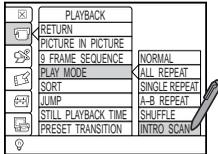
When the shuffle play is set

The menu does not appear on the index display. (You can turn on the shortcut menu.)

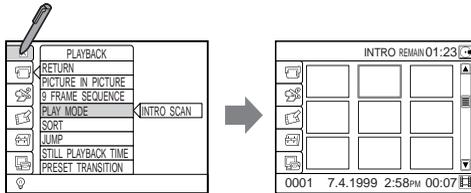
Scanning the top of tracks – INTRO SCAN

You can play the first 3 seconds of all tracks. Photo, memo and title tracks are also played for 3 seconds. Movies shorter than 3 seconds are played for the recorded time.

- (1) On the index display, touch  PLAYBACK and then PLAY MODE.
- (2) Touch INTRO SCAN.



- (3) Touch  to close the menu. INTRO appears at the top of the index display.



- (4) Play the track to be played first. The first 3 seconds of each track are played.

To stop scanning

Set PLAY MODE to NORMAL.

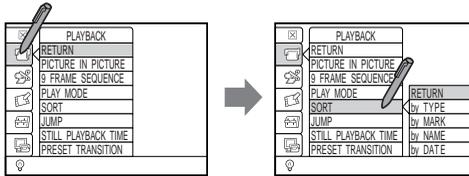
To operate the menu

You may use the control dial.

Sorting the tracks

You can sort the tracks so that you can locate or play the desired tracks first.

- (1) On the index display, touch  PLAYBACK and then SORT.



- (2) Touch the desired way of sorting.

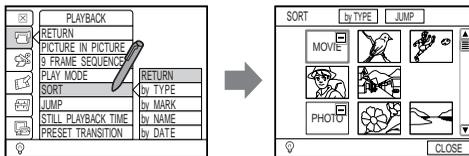
The tracks are sorted in the selected order.

TYPE: Sorted in the order of movie, photo, memo, audio, group and title. The title track indicating the track type automatically appears.

MARK: Marked tracks come first (p. 60).

NAME: Sorted in the alphanumeric order of the track names.

DATE: Sorted in the order of recorded date.



- (3) Play the desired track.

The title tracks are also played.

To sort in another order

- (1) Touch the order item (the left item on the top of the SORT screen).
- (2) Touch the desired order.

To display the desired type of tracks

- (1) Touch JUMP on the SORT screen.
The type of tracks recorded in the disc are displayed.
- (2) Touch the desired track type.

To return to the index display

Touch CLOSE.

To operate the menu

You may use the control dial.

When sorting mode is selected

The menu does not appear on the index display. (You can turn on the shortcut menu.)

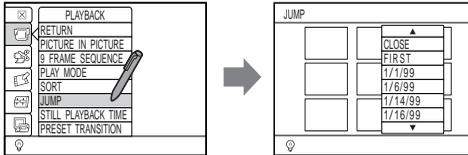
Sorting mode is canceled if you:

- eject the disc.
- turn the POWER switch to OFF.

Jumping to the desired track

You can jump to the tracks directly by the title or track name. This function is useful to locate a track when many tracks are recorded in the disc.

- (1) On the index display, touch  PLAYBACK and then JUMP.
The list of title and track names appears.



- (2) Touch the desired item in the list.
To scroll the list, touch ▲ or ▼, or turn the control dial.
The selected track is framed on the index screen.
Title: Tracks created by the title function (p. 82) or recording date automatically recorded in the disc (p. 93).
Track name: Names input on the track information display (p. 60).

To turn off the list

Touch CLOSE in the list.

To operate the menu

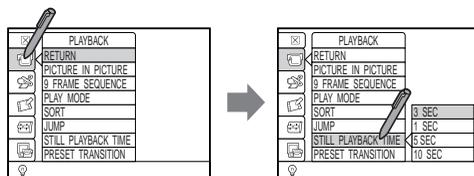
You may use the control dial.

Setting the playing time of still picture tracks

You can select the playing time of still picture tracks such as photo, memo and title from about 1, 3, 5 and 10 seconds. The playing time is set to about 3 seconds as the default setting.

The selected playing time remains until another playing time is selected.

- (1) On the index display, touch  PLAYBACK and then STILL PLAYBACK TIME.



- (2) Touch the desired playing time.
- (3) Touch  to close the menu.
The index display appears.
- (4) Play the desired track.

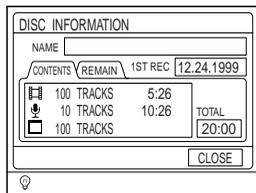
To operate the menu

You may use the control dial.

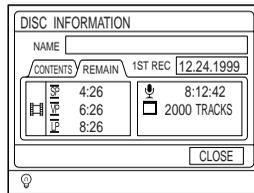
Checking the disc information

You can check the track numbers, remaining time, etc.

Contents display

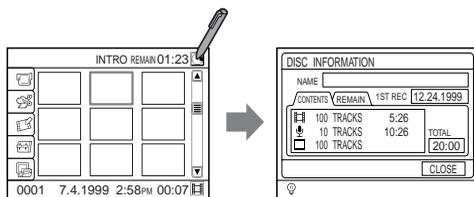


Remain display



Displaying the disc information

- (1) Touch  at the top-right corner of the index display. The disc information display appears.



- (2) To check the remaining time or tracks, touch REMAIN.
- (3) To close the disc information display, touch CLOSE.

Labelling the disc

You can label a disc using up to 100 characters.

- (1) Touch the NAME box on the disc information display.
- (2) Input characters (p. 80).

Note on the figure in "TOTAL"

- "TOTAL" shows the total playback time of movie, photo, memo and title tracks recorded in the disc. Playback time of each still picture track (photo, memo and title) is the one set in the menu.
- If more than 10 hours total playback time is recorded in the disc, "10HOver" appears.

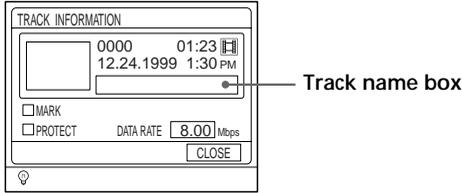
Note on the figure in "REMAIN"

- "REMAIN" shows the remaining recording time or tracks.
- If you set REC MODE to VP, you may be able to record longer than the indicated recording time.

Checking the track information

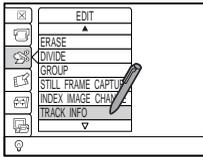
You can check the type, recorded date, data rate, etc., of each track.

Track information display

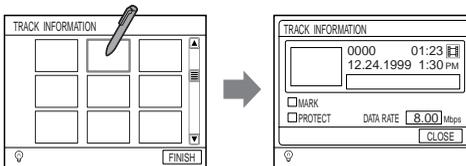


Displaying the track information

- (1) Touch EDIT.
Scroll the menu by touching ▲ or ▼, or by turning the control dial.
- (2) Touch TRACK INFO.



- (3) Touch the desired track.
The track information of the track is displayed.



- (4) To close the track information display, touch CLOSE.
- (5) Touch FINISH.
After the PLEASE WAIT message, the index display appears.

To operate the menu

You can use the control dial.

To display the track information display directly

Select the track on the index display. Touch the track information at the bottom of the screen.

Note on the data rate

The data rate only appears for movie tracks. The average rate appears for the movie tracks recorded in the VP mode.

To check the information of other tracks

Touch CONTINUE in step 5.

Checking the track information

Labelling the track

You can label a track using up to 100 characters.

- (1) Touch the track name box on the track information display.
- (2) Input characters (p. 80).

Note

You can record up to 100 characters in one track, and 5000 characters in one disc.

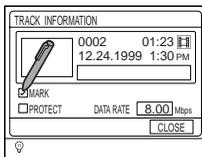
You cannot label the track if:

- the disc is protected.
- the track is protected (✓ is in the PROTECT box).

Marking a track

Mark the tracks which you want to distinguish from others. If you select “MARK” in “SORT” in the PLAY menu, those marked tracks are displayed together at the top of the index display.

- (1) Touch the MARK box in the track information display to indicate ✓.
☐ icon will be displayed on the marked tracks.



To cancel the mark setting

Touch the MARK box again to erase ✓.

You cannot mark the track if:

- the disc is protected.
- the track is protected (✓ is in the PROTECT box).

To mark using the Remote Commander

Select the desired track on the index display, then press MARK on the Remote Commander.

To mark tracks during playback

- (1) Press MARK on the Remote Commander while playing back the track.
The track is played back repeatedly and the confirmation message appears.
- (2) Select YES using ←/→, then press ENTER.

To cancel the mark setting

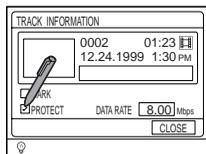
Press MARK again during playback.

Checking the track information

Protecting a track

Protect important tracks to prevent them from being erased by mistake.

- (1) Touch the PROTECT box in the track information display to indicate ✓.
🔒 icon will be displayed on the protected tracks.



To release protection

Touch the PROTECT box again to erase ✓.

You cannot protect the track if:
the disc is protected.

Changing the index image

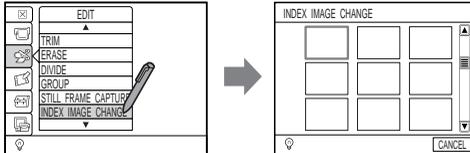
The first scene becomes the index image for movie tracks. You can change the index image to a desired scene from the movie.

(1) Touch  EDIT.

Scroll the menu by touching ▲ or ▼, or by turning the control dial.

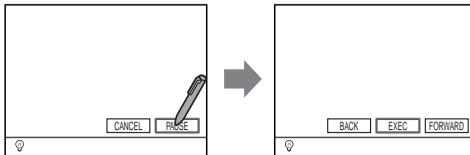
(2) Touch INDEX IMAGE CHANGE.

INDEX IMAGE CHANGE appears at the top of the screen. If you want to cancel changing the index, touch CANCEL.



(3) Touch the desired track. The selected track is played back.

(4) Touch PAUSE at the scene you want to make into the index image.



(5) Touch FORWARD or BACK to adjust the scene position and touch EXEC.

(6) Touch EXEC.

After the PLEASE WAIT message which appears while the change is written in the disc, the INDEX IMAGE CHANGE screen appears.

(7) Touch FINISH. The index display appears.

To operate the menu

You can use the control dial.

You cannot change the index image if:

- the disc is protected.
- the track is protected.

Note on effects

Drawing, scene transition and picture effects are not applied to the index image.

You can select INDEX IMAGE CHANGE in the shortcut menu

To turn on the shortcut menu, press MENU during playback or playback pause.

To select the scene position

You can use the control dial. Turn the control dial to select the position and press the dial to confirm.

To change the index image of other tracks

Touch CONTINUE in step 7.

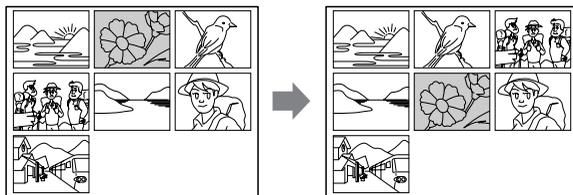
Changing the index image

To change the index image during playback or playback pause

- (1) Press INDEX CHANGE on the Remote Commander at the scene you want to make into the index image.
The confirmation message appears.
- (2) Select YES using ◀/▶, then press ENTER.
After the PLEASE WAIT message, which appears while the change is written in the disc, the camcorder resumes playback.

Moving tracks

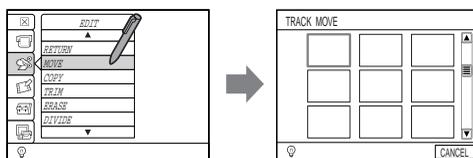
You can move one track at a time, or several tracks together to the desired position in the disc.



(1) Touch  EDIT.

(2) Touch MOVE.

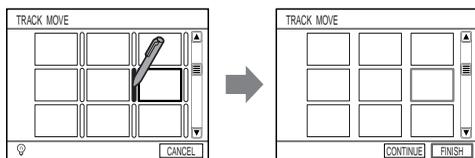
TRACK MOVE appears at the top of the screen.



(3) Touch the desired track.

(4) Touch the position (between the tracks) where you want to move the track.

The track moves to that position.



(5) Touch FINISH.

After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To move several tracks together

First group the tracks, and then move them.

(1) Group the tracks you want to move (p. 74).

(2) Move the tracks as described above.

To operate the menu

You can use the control dial.

You cannot move the track(s) if:
the disc is protected.

To cancel moving

Touch CANCEL.

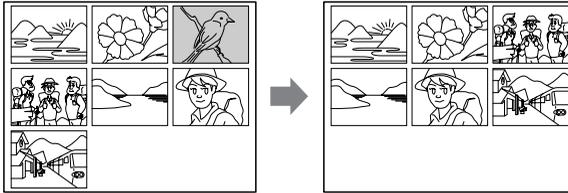
To move other tracks

Touch CONTINUE in step 5, and do steps 3 and 4.

Erasing tracks

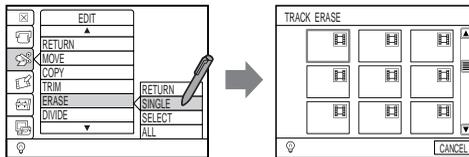
You can erase one track at a time, or several tracks together.

Since the erased tracks cannot be restored, make sure that you can really erase the track.

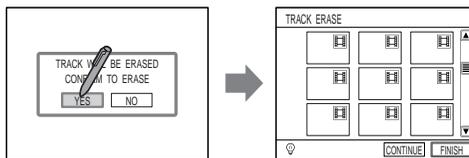


Erasing one track

- (1) Touch  EDIT.
- (2) Touch ERASE, then SINGLE.
TRACK ERASE appears at the top of the screen.



- (3) Touch the desired track.
While the selected track is played back repeatedly, the confirmation message appears.
- (4) Touch YES.
If you do not want to erase the track, touch NO.



- (5) Touch FINISH.
After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears. The track is erased and the track next to the erased track is framed.

To operate the menu

You can use the control dial.

If you erase a group of tracks

All tracks in the group are erased.

You cannot erase the track(s) if:

- the disc is protected.
- the track is protected.

Erasing tracks

You can use the ERASE button
Select the track to be erased and press ERASE.

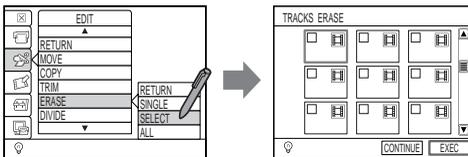
To cancel erasing
Touch CANCEL.

To erase other tracks
Touch CONTINUE in step 5.

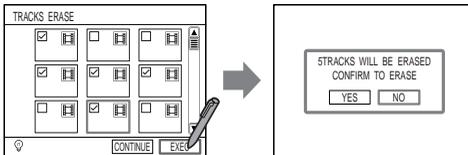
Note on the remaining disc capacity
The remaining disc capacity may not increase even if you erase tracks.

Erasing several tracks together

- (1) Touch  EDIT.
- (2) Touch ERASE, then SELECT.
TRACKS ERASE appears at the top of the screen.



- (3) Touch the box at the top-left of each track you want to erase.
✓ appears in the box.
- (4) Touch EXEC.
The confirmation message appears.



- (5) Touch YES.
If you do not want to erase the tracks, touch NO. After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears. The selected tracks are erased and the first track is framed.

To cancel erasing
Touch CANCEL.

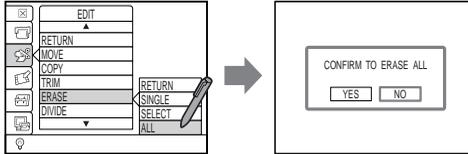
Erasing tracks

Erasing all tracks in the disc

All tracks except the protected tracks will be erased.

(1) Touch  EDIT.

(2) Touch ERASE, then ALL. The confirmation message appears.



(3) Touch YES.

If you do not want to erase the tracks, touch NO. After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears. All tracks except the protected tracks are erased.

To cancel erasing

Touch CANCEL.

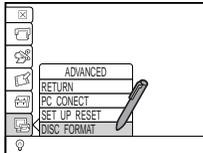
Initializing the disc

All tracks in the disc including the protected tracks will be erased.

(1) Touch  ADVANCED.

(2) Touch DISC FORMAT.

The confirmation message appears.

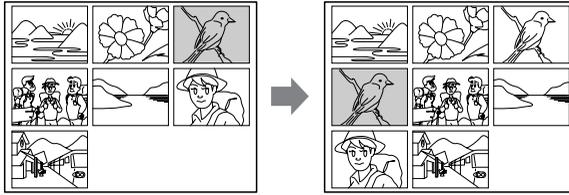


(3) Touch YES.

If you do not want to erase the tracks, touch NO.

Copying tracks

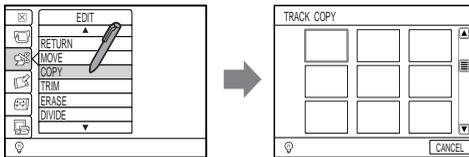
You can copy one track at a time, or several tracks together in the same disc.



(1) Touch EDIT.

(2) Touch COPY.

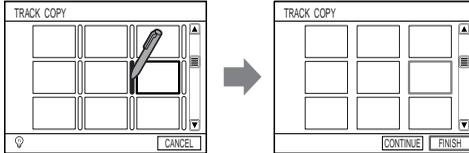
TRACK COPY appears at the top of the screen.



(3) Touch the desired track.

(4) Touch the position (between the tracks) where you want to copy the track.

The new track appears at that position.



(5) Touch FINISH.

After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To copy several tracks together

First group the tracks, and then copy them.

(1) Group the tracks you want to copy (p. 74).

(2) Copy the tracks as described above.

To operate the menu

You can use the control dial.

You cannot copy the track(s) if:

the disc is protected.

Note on the remaining disc capacity

The remaining disc capacity may not increase even if you copy tracks.

Copying tracks

To not erase a track by mistake

Copy the track and use the copy for editing.

To cancel copying

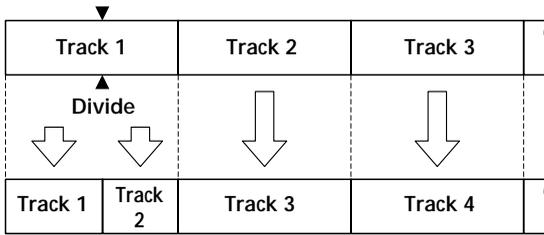
Touch CANCEL.

To copy other tracks

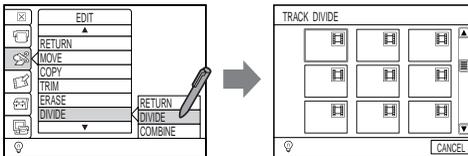
Touch CONTINUE in step 5.

Dividing tracks

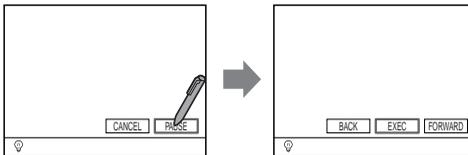
You can divide movie tracks at the desired position.



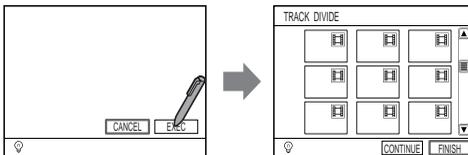
- (1) Touch EDIT.
- (2) Touch DIVIDE, then DIVIDE.
TRACK DIVIDE appears at the top of the screen.



- (3) Touch the desired track.
The selected track is played back repeatedly.
- (4) Touch PAUSE where you want to divide the track.



- (5) Adjust the scene position by touching FORWARD or BACK, then touch EXEC.
- (6) Touch EXEC.



- (7) Touch FINISH.
After the PLEASE WAIT message, which appears while the change is written in the disc, the new track made by dividing appears next to the original track.

To operate the menu

You can use the control dial.

To cancel dividing

Touch CANCEL.

Dividing tracks

You cannot divide the track if:

- the track is shorter than about 2 seconds.
- the disc is protected.
- the track is protected.

Note on the dividing position

The dividing position is automatically adjusted so that both tracks become at least 0.5 second long.

To adjust the dividing position

You can use the control dial. Turn the control dial to adjust the position and press the dial to confirm.

Index image of the track made by dividing

The scene at the divided position becomes the index image.

Recorded time of the track made by dividing

It is same as the original track.

To divide other tracks

Touch CONTINUE in step 7.

Combining the divided track

If the divided track has been moved away from the original track, you cannot recombine them. First line them up in the same order as the original track.

(1) Touch  EDIT.

(2) Touch DIVIDE, then COMBINE.

TRACK COMBINE appears at the top of the screen.

(3) Touch the first track of the divided tracks.

The confirmation message appears.

(4) Touch YES.

The selected track in step 3 is combined with the next track.

(5) Touch FINISH.

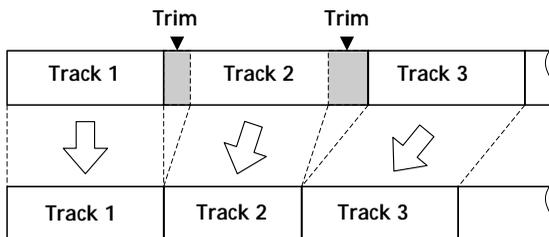
After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To combine other tracks

Touch CONTINUE in step 5.

Trimming unnecessary scenes

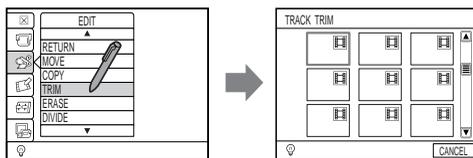
You can trim the unnecessary scenes at the beginning and the end of a movie. Since the trimmed scenes cannot be restored, make sure that you really do not want the scenes.



(1) Touch EDIT.

(2) Touch TRIM.

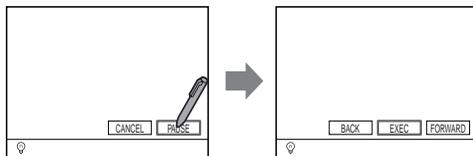
TRACK TRIM appears at the top of the screen.



(3) Touch the desired track.

The selected track is played back repeatedly.

(4) Touch PAUSE where you want to keep the scenes from.

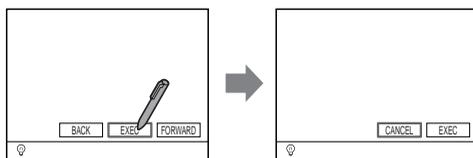


(5) Adjust the scene position by touching FORWARD or BACK, then touch EXEC.

(6) Touch PAUSE where you want to keep the scenes up to.

(7) Adjust the scene position by touching FORWARD or BACK, then touch EXEC.

The scenes you have kept are displayed.



(8) Touch EXEC.

(9) Touch FINISH.

After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

Trimming unnecessary scenes

To operate the menu

You can use the control dial.

To cancel trimming

Touch CANCEL.

You cannot trim the track if:

- the track is shorter than about 2 seconds.
- the disc is protected.
- the track is protected.

Note on the trimming position

The trimming position is automatically adjusted so that trimmed track becomes at least 0.5 second long.

Note on effects

Scene transition setting will be canceled if you trim the track.

To adjust the trimming position

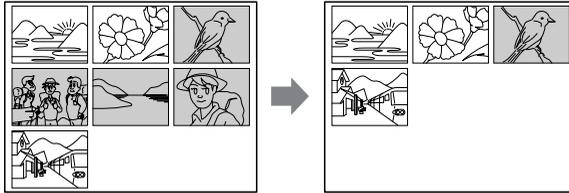
You can use the control dial. Turn the control dial to adjust the position and press the dial to confirm.

To trim other tracks

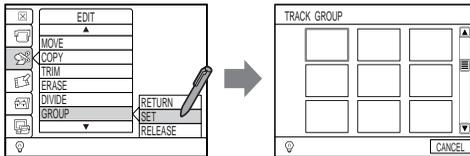
Touch CONTINUE in step 9.

Grouping the tracks

You can group the tracks lined up in succession on the index display. Only the first track of the group appears on the index display. This is convenient to move or copy tracks quickly, or to save the index display space when there are many tracks. The  icon appears on the group track on the index display.

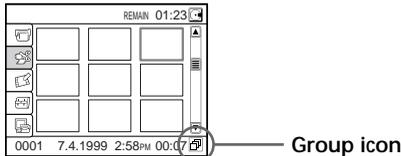


- (1) Touch  EDIT.
- (2) Touch  GROUP, then SET.
TRACK GROUP appears at the top of the screen.



- (3) Touch the first track to be included in the group.
- (4) Touch the last track to be included in the group.
- (5) Touch FINISH.

After the PLEASE WAIT message, which appears while the change is written in the disc, only the first track of the group is displayed on the index display.



To operate the menu
You can use the control dial.

To cancel grouping
Touch CANCEL.

You cannot group the tracks if:
the disc is protected.

If you include a protected track in the group
The entire group track becomes protected. If you release protecting in the track information display of this group track, all tracks in the group become unprotected tracks.

Grouping the tracks

A group track can be included in the group

You can include a group track when making another group. If you release grouping of the tracks, all tracks are released and become individual tracks.

To group other tracks

Touch CONTINUE in step 5.

You cannot select the following items on the group track

- PLAY menu
 - 9 FRAME SEQUENCE (You can, however, select from the shortcut menu during playback.)
- EDIT menu
 - TRIM
 - DIVIDE
 - STILL FRAME CAPTURE
 - INDEX IMAGE CHANGE
- DRAWING/EFFECT menu
 - DRAWING
 - SCENE TRANSITION
 - PICTURE EFFECT

Releasing the tracks from the group

If you want all the tracks to appear individually on the index display after you have moved or copied the tracks in a group, release the group.

(1) Touch  EDIT.

(2) Touch GROUP, then RELEASE.

(3) Touch the grouped track.

All the tracks in the group appear individually.

(4) Touch FINISH.

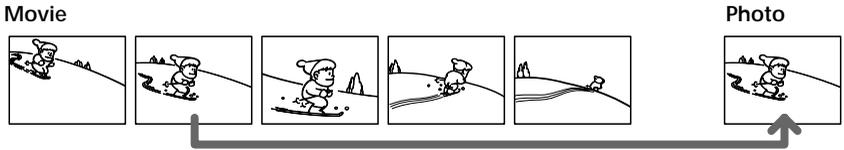
After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To release other group tracks

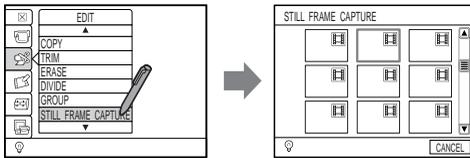
Touch CONTINUE in step 4.

Making a photo track from a movie

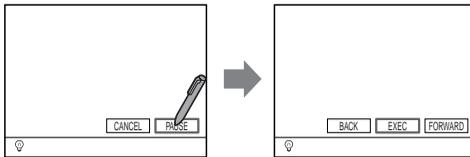
You can make a new photo track of a desired scene in a movie.



- (1) Touch  EDIT.
Scroll the menu by touching ▲ or ▼, or by turning the control dial.
- (2) Touch STILL FRAME CAPTURE.
STILL FRAME CAPTURE appears at the top of the screen.



- (3) Touch the desired movie track.
The selected track is played back.
- (4) Touch PAUSE where you want to capture the scene.



- (5) Adjust the scene position by touching FORWARD or BACK, then touch EXEC.
- (6) Touch EXEC.
After the PLEASE WAIT message, which appears while the change is written in the disc, the new photo track of the scene appears next to the original movie track.
- (7) Touch FINISH.
The index display appears.

To operate the menu

You can use the control dial.

To cancel the operation

Touch CANCEL.

You cannot make a track by capturing a scene if:
the disc is protected.

Note on the picture quality

The picture quality of a photo made by this operation is not as good as a recorded photo.

Making a photo track from a movie

Note on effects

Drawing, scene transition and picture effects which have been set on the original movie are not applied to this photo track.

To adjust the scene position

You can use the control dial. Turn the control dial to adjust the position and press the dial to confirm.

To continue making photo tracks

Touch CONTINUE in step 7.

Drawing on the picture

You can draw directly on the movie or photo tracks (ADD LAYER), or on a black screen which makes a new memo track (INSERT TRACK). The drawing can be erased (ERASE).

The drawn track has the  icon, and the memo track has the  icon on the index screen.

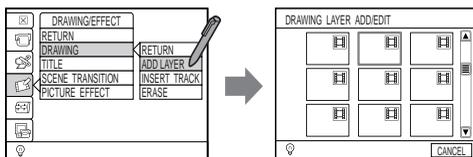


Drawing on a picture

(1) Touch  DRAWING/EFFECT.

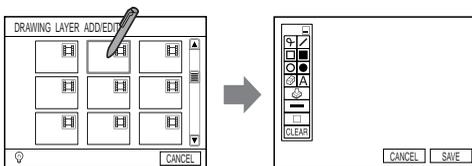
(2) Touch DRAWING, then ADD LAYER.

DRAWING LAYER ADD/EDIT appears at the top of the screen.



(3) Touch the desired track.

The illustration tool appears while the selected track is played back repeatedly.



(4) Draw as you like, then touch SAVE.

See page 77 for how to use the illustration tool.

After the PLEASE WAIT message, which appears while the change is written in the disc, the DRAWING mode display appears.

(5) Touch FINISH.

The index display appears.

To operate the menu

You can use the control dial.

To cancel drawing

Touch CANCEL. All the drawing you made so far is canceled.

You cannot draw if:

- the disc is protected.
- the track is protected.

You can select DRAWING in the shortcut menu

To turn on the shortcut menu, press MENU during playback or playback pause.

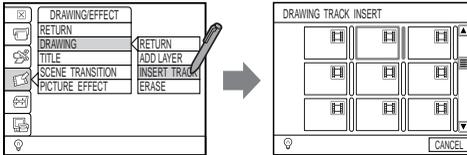
Drawing on the picture

To continue drawing on other tracks
Touch CONTINUE in step 5.

Drawing on a black screen (memo track)

You can write up to 24 characters.

- (1) Touch  DRAWING/EFFECT.
- (2) Touch DRAWING, then INSERT TRACK.



- (3) Touch the position (between the tracks) where you want to insert the memo track.
The illustration tool appears on the black screen.
- (4) Draw as you like, then touch SAVE.
See page 80 for how to use the illustration tool.
After the PLEASE WAIT message, which appears while the change is written in the disc, the DRAWING mode display appears.
- (5) Touch FINISH.
The index display appears.

To revise the memo track

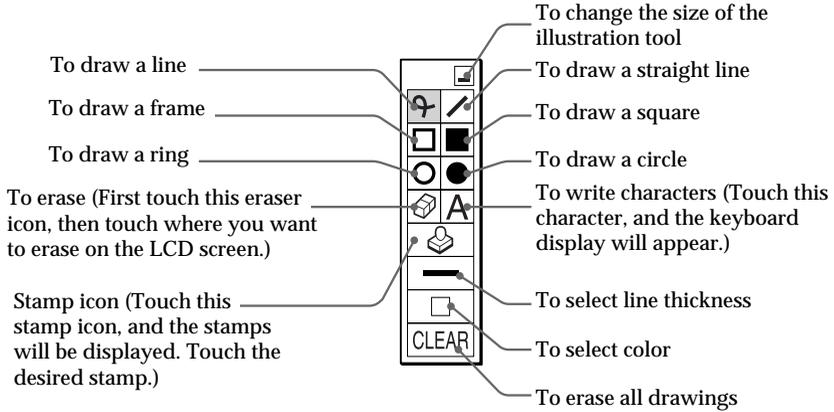
Select ADD LAYER, then the memo track to be revised.

Drawing on the picture

Using the illustration tool

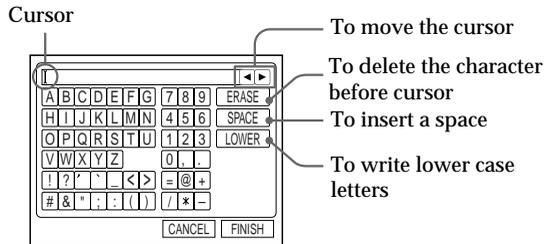
Illustration tool

Touch the desired tool and draw on the LCD screen using the input pen.



Keyboard display

Touch the desired characters to write.



Drawing on the picture

Erasing the drawings

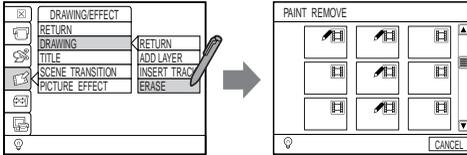
Note that the drawings and paintings cannot be restored after being erased.

The pictures are not erased by erasing the drawings.

(1) Touch  DRAWING / EFFECT.

(2) Touch DRAWING, then ERASE.

PAINT REMOVE appears at the top of the screen. If you want to cancel erasing, touch CANCEL.

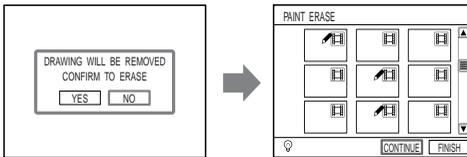


(3) Touch the desired track.

The confirmation message appears while the selected track is played back repeatedly.

(4) Touch YES.

The  icon disappears from the track.



(5) Touch FINISH.

After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To cancel erasing

Touch NO.

If you select CLEAR in the illustration tool

The  icon does not disappear. To erase the  icon, follow the above steps.

To erase the memo track

Erase the track by selecting ERASE in the EDIT menu.

To continue erasing the drawing on other tracks

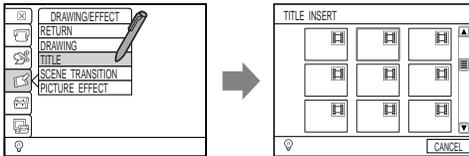
Touch CONTINUE in step 5.

Inserting a title track

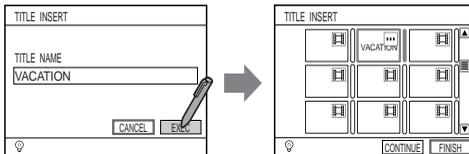
You can use the title track to locate the tracks, or to categorize the tracks.
A title track made on the TITLE INSERT display can be quickly located by sorting or jumping for playback. A title track makes one track.
The title track has the  icon on the index display.

- (1) Touch  DRAWING/EFFECT.
- (2) Touch TITLE.

TITLE INSERT appears at the top of the screen.



- (3) Touch the position (between the tracks) where you want to insert the title track.
- (4) Touch the box to input the title.
The keyboard appears. See page 80 for how to use the keyboard.
- (5) Input the title you like, then touch EXEC.
The title you made appears at the selected position.



- (6) Touch FINISH.
After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To operate the menu

You can use the control dial.

To cancel making a title

Touch CANCEL.

Track name of the title track

The title track has the same name as the title itself.

If you change the track name on the track information display

The title automatically becomes what you input on the track information display.

To continue making titles

Touch CONTINUE in step 6.

Switching the tracks with special effects

You can switch the tracks with special effects such as fading in/out. These effects can be applied to the movie and photo tracks only, and are recorded in the disc.

Effects to be applied to the beginning and end of a track

- Fade (in/out)
The picture fades in from black, and fades out to black.
- Wipe (in/out)
The picture appears as the black screen opens, and disappears as the black screen closes.
- Mosaic (in/out)
The picture appears from mosaic, and disappears to mosaic.

Effects to be applied across two tracks

- Cross-fade
As the previous track fades out, the next track fades in.
- Cross-wipe
The next track appears turning over the previous track.
- Cross-dissolve
The next track appears inlaid into the previous track.

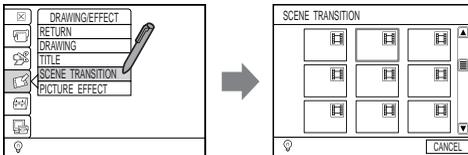
Effects to be applied only to the end of a track

- Blackout
A black screen is displayed at the end of each track.
- Hold
Each track pauses for a while at the end.

(1) Touch  DRAWING/EFFECT.

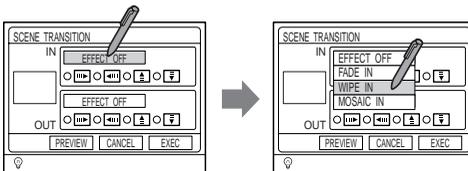
(2) Touch SCENE TRANSITION.

SCENE TRANSITION appears at the top of the screen.

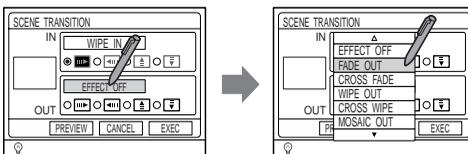


(3) Touch the desired track.

(4) Touch the effect and direction for the track to appear.



(5) Touch the effect and direction for the track to disappear.

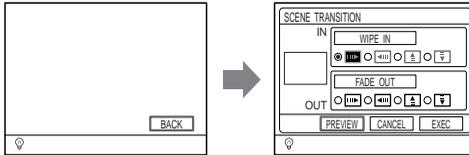


Switching the tracks with special effects

(6) Touch PREVIEW.

The last 5 seconds of the track before the selected track, the selected track itself and the first 5 seconds of the next track will be played back with the selected effects.

(7) Confirm the playback, then touch BACK.



(8) Touch EXEC.

(9) Touch FINISH.

After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To not apply the scene transition effect

Select EFFECT OFF.

To operate the menu

You can use the control dial.

To cancel setting the effects

Touch CANCEL. All the settings you made so far is canceled.

Notes on cross-fade, cross-wipe and cross-dissolve effects

- Select the track which appears first when you set these effects.
- These effects are available only when you select a track followed by either a movie or a photo track.
- These effects are canceled:
 - if you set an IN-effect to its succeeding track.
 - if you move the track.
 - if you move or copy other track between the tracks.

Notes on wipe and cross-wipe effects

Touch the desired direction to switch.

You cannot set switching effects if:

- the disc is protected.
- the track is protected.

The switching effects will not be played back on:

- picture-in-picture, 2-picture and 9 FRAME SEQUENCE (including enlarged picture) displays
- a photo set to play for one second
- a very short movie

To continue setting switching effects

Touch CONTINUE in step 9.

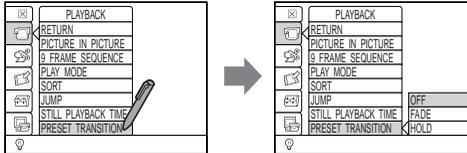
Switching the tracks with special effects

Playing back all the tracks with fade or hold effect

If you set the PRESET TRANSITION to FADE or HOLD, your camcorder always plays back discs with fade or hold effect.

This setting is not recorded in the disc.

- (1) Touch  PLAYBACK on the index display, then touch PRESET TRANSITION.



- (2) Touch FADE or HOLD.
- (3) Touch  to close the menu.
The index display appears.
- (4) Touch the track to be played first.
The tracks are played back with the selected effect.

To not fade or hold

Select OFF of PRESET TRANSITION.

Note

The PRESET TRANSITION setting is kept even if your camcorder is turned off.

If a SCENE TRANSITION effect of the EDIT menu is set to the track

The track is played back with the SCENE TRANSITION effect.

Note on playback

The PRESET TRANSITION effects will not be played back on:

- a photo set to play for one second
- a very short movie

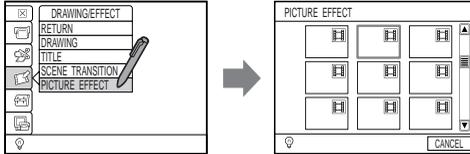
Note on a group track

Each track in the group is played back with the effect.

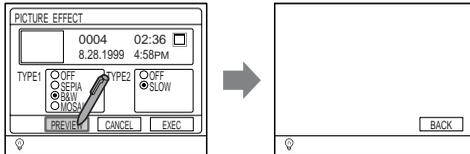
Applying the picture effect to the tracks

You can make movie and photo tracks into sepia, black-and-white, mosaic, or slow-motion play by digital processing. You can also set the slow-motion play to a track in addition to other effects. The picture effect setting is recorded in the disc.

- (1) Touch  DRAWING/EFFECT.
- (2) Touch PICTURE EFFECT.
PICTURE EFFECT appears at the top of the screen.



- (3) Touch the desired track.
- (4) Touch the desired effect, then touch PREVIEW.
The track will be played back with the selected effect.



- (5) Confirm the playback, then touch BACK.
- (6) Touch EXEC.
- (7) Touch FINISH.
After the PLEASE WAIT message, which appears while the change is written in the disc, the index display appears.

To not apply the digital effect on the track

Select OFF.

To operate the menu

You can use the control dial.

To cancel setting the picture effects

Touch CANCEL. All the settings you made so far are canceled.

You cannot set the picture effects if:

- the disc is protected.
- the track is protected.

Note on playback

Sepia, black-and-white (B & W) and mosaic effects will not be played back on picture-in-picture, 2-picture and 9 FRAME SEQUENCE (including enlarged picture) displays.

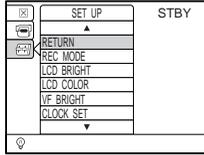
To continue setting picture effects

Touch CONTINUE in step 7.

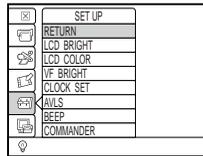
Adjusting the brightness and color of the LCD screen

- (1) In the CAMERA, PLAY/EDIT or INTERVIEW mode, press MENU.
- (2) Touch  SET UP.

Camera/Interview mode



Play/Edit mode



- (3) To adjust the brightness, touch LCD BRIGHT. To adjust the color, touch LCD COLOR. The bar indicator appears.
- (4) Turn the control dial to adjust the brightness or color, then press the dial.



Note

You cannot adjust the brightness and color of the LCD screen when the LCD screen is closed.

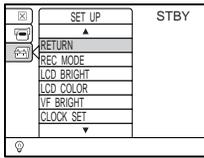
To operate the menu

You can use the control dial to select the menu items.

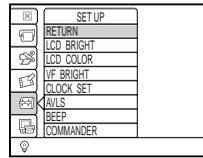
Adjusting the brightness of the viewfinder

- (1) In the CAMERA, PLAY/EDIT or INTERVIEW mode, press MENU.
- (2) Turn the control dial to select  SET UP and press the dial.

Camera/Interview mode



Play/Edit mode



- (3) Turn the control dial to select VF BRIGHT and press the dial.
The bar indicator appears.
- (4) Turn the control dial to adjust the brightness while looking into the viewfinder, then press the dial.



Note

You cannot adjust the brightness of the viewfinder when the viewfinder is turned off.

Resetting the date and time

The default clock setting is set to New York or Panama time.

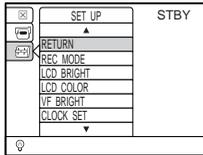
If you do not use your camcorder for about four months, the date and time settings may be released (bars may appear) because the vanadium-lithium battery installed in your camcorder will have been discharged. If this happened, charge the vanadium-lithium battery (p. 108) before setting the clock.

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

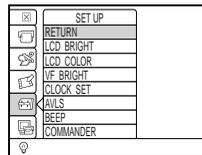
(1) In the CAMERA, PLAY/EDIT or INTERVIEW mode, press MENU.

(2) Touch  SET UP.

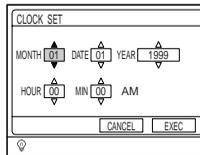
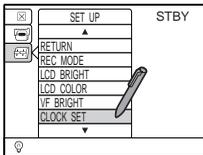
Camera/Interview mode



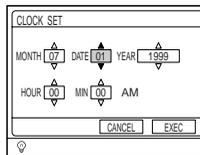
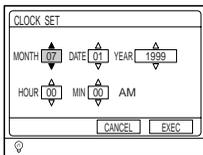
Play/Edit mode



(3) Touch CLOCK SET.



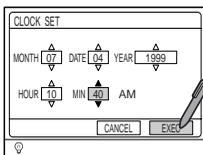
(4) Turn the control dial to adjust the year, then press the dial.



(5) Set the month, day, hour and minute by turning the control dial and pressing the dial.

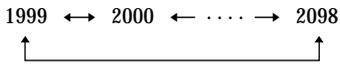
(6) Touch EXEC on the screen.

The clock starts to operate.



Resetting the date and time

The year changes as follows:



If you do not set the date and time

“--:--:-- --:--” is recorded in the disc.

Note on the time indicator

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

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

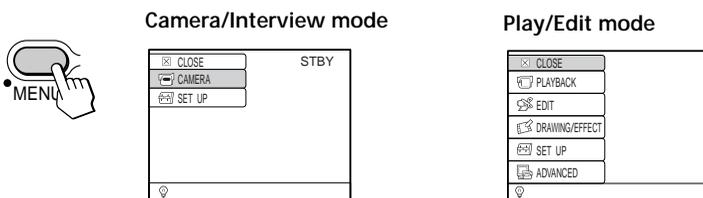
To operate the menu

You can use the control dial to select the menu items.

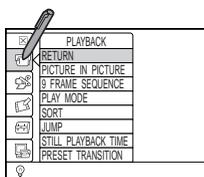
Changing the menu settings

To change the settings in the menu, touch the desired item on the LCD screen. The default settings can be partially changed. First, display the main menu, select the icon, the menu item and then the mode.

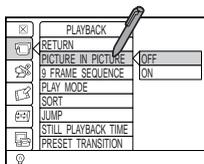
(1) In the CAMERA, PLAY/EDIT or INTERVIEW mode, press MENU.



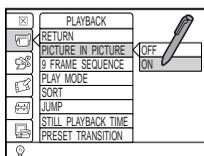
(2) Touch the desired icon.



(3) Touch the desired item.



(4) Touch the desired mode.



(5) Repeat steps 2 to 4 to set other items.

To go back to step 2, touch RETURN.

(6) To close the menu, touch or press MENU.

Items in the main menu are displayed with the following icons:

- CAMERA menu
- SET UP menu
- PLAYBACK menu
- EDIT menu
- DRAWING/EFFECT menu
- ADVANCED menu

Changing the menu settings

Menu in the CAMERA and INTERVIEW mode

● is the default setting.

Icon/item	Mode	Meaning
 SELF TIMER*	-	To start recording automatically when the preset waiting time has passed, and stop recording automatically when the preset recording time has passed (p. 38).
PROGRAM AE	-	To suit your specific shooting requirement (p. 41).
D ZOOM	● OFF	To deactivate the digital zoom. Up to 10× zoom is carried out.
	ON	To activate the digital zoom. More than 10× to 40× zoom is performed digitally.
STEADYSHOT	OFF	To cancel the SteadyShot function (p. 45). Natural pictures are produced when shooting a stationary object with a tripod.
	● ON	To compensate for camera-shake.
WHT BAL	-	To adjust the white balance (p. 46).
AUTO SHTR	OFF	To deactivate the electronic shutter even when shooting in bright conditions.
	● ON	To automatically activate the electronic shutter when shooting in bright conditions.
ANTI WIND	● OFF	—
NOISE	ON	To reduce the noise caused by strong wind.
 REC MODE*	● SP (8Mbps)	To record in high quality picture mode.
	VP (VARIABLE)	To save the data consumption by adjusting the picture quality depending on the subject.
	LP (4Mbps)	To increase the recording time by reducing the picture quality. (Actual data rate is 3.75 Mbps.)
LCD BRIGHT	-	To adjust the brightness of the LCD screen (p. 87).
LCD COLOR	-	To adjust the color of the LCD screen (p. 87).
VF BRIGHT	-	To adjust the brightness of the viewfinder screen (p. 88).
CLOCK SET	-	To set the date and time (p. 89).

* You cannot select the item in the INTERVIEW mode.

More than one day after removing the power source

The “COMMANDER,” “PROGRAM AE” and “WHT BAL” items return to their default settings.

The other menu items are held in memory even when the power source is removed.

Changing the menu settings

Icon/item	Mode	Meaning
 AVLS	● OFF	The sound volume is as adjusted.
	ON	To activate the Automatic Volume Limiter System when the volume is turned up. This works on the headphones and speaker.
BEEP	OFF	To cancel the beep sound.
	● ON	To output the beep when you start/stop recording or press other operation buttons.
REC LAMP	OFF	To turn off the camera recording lamp so that person is not aware of the recording.
	● ON	To turn on the camera recording lamp at the front of the camcorder.
COMMANDER	OFF	To deactivate the Remote Commander to avoid remote control misoperation caused by other VCR's remote control.
	● ON	To activate the Remote Commander supplied with your camcorder.
PICTURE IN PICTURE*	● OFF	To not display the last track index image during recording standby.
	NORMAL	To display the last track index image during recording standby.
AUTO DATE	● OFF	To not make the title track of recording date.
TITLE	ON	The camcorder automatically makes the title track of recording date by day of recording. You can locate this track by jump.
10sec. TRACK*	● OFF	Your camcorder does not renew the track until the recording stops. The entire recording makes one track.
	ON	Your camcorder makes new tracks of 10 seconds while recording a movie. (The last track will be longer than 6 seconds but shorter than 16 seconds.)
START/STOP*	● NORMAL	To start recording by pressing START/STOP and stop recording by pressing it again.
	ANTI GROUND	To record only while you are pressing START/STOP to avoid recording the ground by mistake.

* You cannot select the item in the INTERVIEW mode.

Notes on "10sec. TRACK"

- The every track made with the "10sec. TRACK" function has the same recorded time as the first track of the recording.
- If you record for long time in one recording with 10sec. TRACK set to ON, it may take a maximum of 16 minutes to write in the disc after recording.

Note on REC LAMP

When REC LAMP is set to ON, the red camera-recording lamp on the front of the camcorder may reflect on the subject if it is close. In this case, we recommend you set REC LAMP to OFF.

Changing the menu settings

Menu in the PLAY/EDIT mode ● is the default setting.

Icon/item	Mode	Meaning	
 PICTURE IN	● OFF	To not display the picture-in-picture screen.	
	ON	To display a scene in the picture-in-picture screen (p. 47).	
	9 FRAME SEQUENCE	-	To display successive scenes of a movie as 9 still pictures (p. 49).
	PLAY MODE	-	To play back repeatedly or in random order (p. 51, 53, 54).
	SORT	-	To play back in the desired order (p. 55).
	JUMP	-	To directly call up the desired track on the screen (p. 56).
	STILL PLAYBACK TIME	-	To set the playing time of a still picture to 1, 3, 5 or 10 seconds (p. 57).
	PRESET TRANSITION	● OFF FADE HOLD	To play back all the tracks in the disc with an effect such as fade (p. 85).
	 MOVE	-	To move tracks to the desired position (p. 64).
		-	To copy tracks to the desired position (p. 68).
-		To erase unnecessary scenes at the beginning and the end of a movie (p. 72).	
-		To erase tracks (p. 65).	
-		To divide a movie track into two tracks (p. 70).	
-		To group some tracks (p. 74).	
-		To make a photo track of a scene in a movie (p. 76).	
-		To change the scene of the track to be displayed on the index display (p. 62).	
-		To display and edit the track information such as recording date (p. 59).	
 DRAWING		-	To draw pictures on a tracks (p. 78).
		-	To make and insert a title track in the disc for easy locating (p. 82).
		-	To switch tracks with special effect (p. 83).
		-	To give a picture a professional look by digital effect (p. 86).
	 LCD BRIGHT	-	To adjust the brightness of the LCD screen (p. 87).
-		To adjust the color of the LCD screen (p. 87).	
-		To adjust the brightness of the viewfinder screen (p. 88).	
-		To set the date and time (p. 89).	
● OFF		The sound volume is as adjusted.	
ON		To activate the Automatic Volume Limiter System when the volume is turned up. This works on the headphones and speaker.	

Changing the menu settings

Icon/item	Mode	Meaning	
 BEEP	OFF	To cancel the beep sound.	
	● ON	To output the beep when you start/stop recording or press other operation button.	
COMMANDER	OFF	To deactivate the Remote Commander to avoid remote control misoperation caused by other VCR's remote control.	
	● ON	To activate the Remote Commander supplied with your camcorder.	
 PC CONNECT	-	To transmit the picture data to a computer (p. 101)	
	SET UP RESET	-	To reset the settings to the default settings.
	DISC FORMAT	-	To erase all tracks and initialize a disc (p. 67).

If you select SET UP RESET

The confirmation message will appear. To reset, select YES. The index screen will appear after a while.

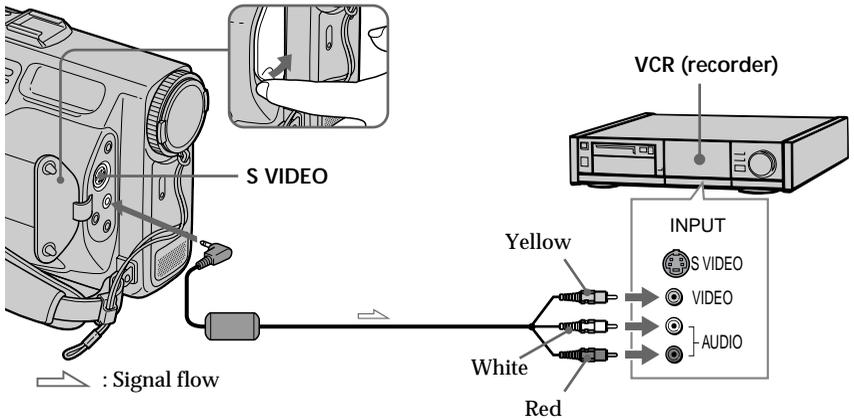
Not only the settings you have made in the menu but also those you have made with the operation buttons will be reset to the default settings, except for clock setting.

Dubbing on a tape

Connect your camcorder to the VCR using the A/V connecting cable supplied with your camcorder.

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 disc 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 PLAY/EDIT.
- (4) Play back the recorded disc on your camcorder
- (5) Start recording on the VCR. For details, refer to the operating instructions of the VCR.



When you have finished dubbing

Press ■ on both your camcorder and the VCR.

You can edit on VCRs that support the following systems

8 mm, Hi8 Hi8, Digital8, VHS VHS, S-VHS S-VHS, VHS-C VHS-C, S-VHS-C S-VHS-C, Betamax, ED Beta ED Betamax, Mini DV or DV

If your VCR is a monaural type

Connect the yellow plug of the A/V connecting cable to the video input jack and the white or the red plug to the audio input jack on the VCR. When the white plug is connected, the left channel audio is output, and the red plug is connected, the right channel audio is output.

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.

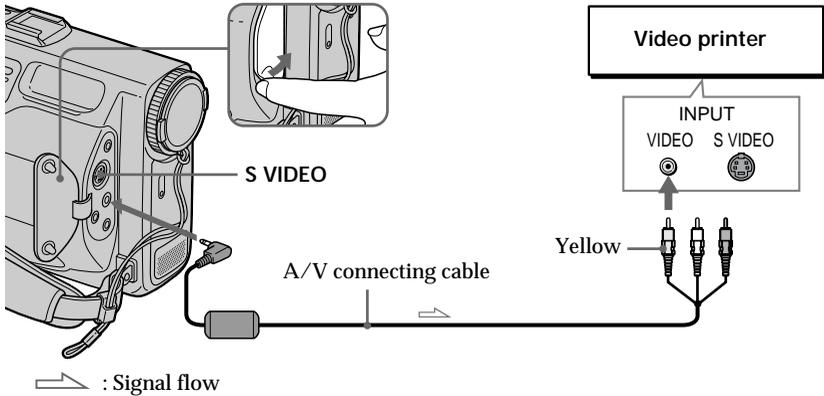
This connection produces higher quality pictures.

Be sure to clear the indicators from the screen

If they are displayed, press DSPL not to record the indicators on the dubbed tape.

Printing the still picture

You can print a photo by using the video printer (not supplied). Connect the video printer using the A/V connecting cable supplied with your camcorder. Connect it to the AUDIO/VIDEO jack and connect the yellow plug of the cable to the video input of the video printer. Refer to the operating instructions of the video printer as well.



If the video printer is equipped with S video input

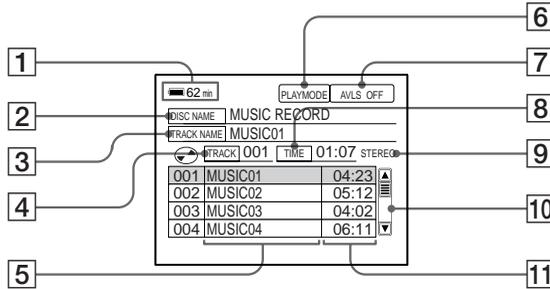
Use the S video connecting cable (not supplied). Connect it to the S VIDEO jack and the S video input of the video printer.

Listening to an audio MD

Your camcorder can play an audio MD. You can enjoy better sound if you use headphones (not supplied).

- (1) Insert the audio MD.
- (2) Set the POWER switch to PLAY/EDIT.
The operation screen for audio MDs appears.
- (3) Touch the desired title or track.
- (4) Press ►|| to start playing.

Using the operation screen



- 1 Battery remaining time
- 2 Disc title*
- 3 Current track title*
- 4 Current track number
- 5 Track titles*
- 6 Touch to change the play mode. A play mode indicator such as ↻ appears to the left.
- 7 Touch to turn AVLS on or off.
- 8 Playing time of current track
- 9 Recording mode (stereo or monaural)
- 10 Scroll bar
- 11 Play time of each track

* displayed only if it is recorded in the MD.

Note on headphones

Use headphones of the stereo mini plug type.

To select a track

You can use the control dial. Turn the control dial to select the track, and press the dial to start playing.

Note on the menu

You cannot control the menu when an audio MD is in your camcorder.

If you use your camcorder while jogging

Continuous vibration caused by jogging may result in intermittent playback.

Listening to an audio MD

Various ways of playback

To	Do this
pause playback	Press ► . Press again to release pause.
go to the next track	Press ►► briefly.
go back to the top of the current track	Press ◀◀ briefly.
fast-forward	Keep ►► pressed.
fast-reverse	Keep ◀◀ pressed.
stop playback	Press ■.
turn up the volume	Press VOL +.
turn down the volume	Press VOL -.

To fast-forward or fast-reverse at high speed

Keep pressing ◀◀ or ►► during pause. You will hear no sound.

To activate AVLS (Automatic Volume Limiter System)

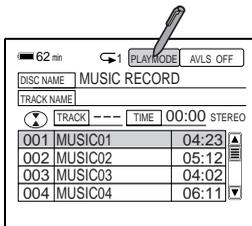
Touch AVLS and set to ON. If you try to turn up the volume higher than a certain level, AVLS appears on the LCD screen. You cannot turn up the volume any more.

The AVLS function reduces sound leakage from headphones and pressure on your ears and also helps you remain aware of your surroundings so you can avoid mishaps.

Playing repeatedly or in random order

You can play one track or all tracks repeatedly, or all tracks in random order.

- (1) Insert the audio MD and set the POWER switch to PLAY/EDIT. The operation screen for audio MDs appears.
- (2) Touch PLAY MODE repeatedly until the desired play mode icon appears to the left.



Icon	Play mode
None (normal play)	All the tracks are played once.
↻1 (single repeat)	A signal track is played repeatedly.
↻ (all repeat)	All the tracks are played repeatedly.
↻SHUF (shuffle repeat)	All the tracks are played repeatedly in random order.

Viewing on the computer display

Your camcorder is capable of sending the movies or photos recorded in the MD DATA2 disc to a World Wide Web (WWW) homepage.

You can view the pictures using the browser software such as Internet Explorer or Netscape Navigator by connecting the 10BASE-T terminal of the connecting cord to a computer.

Homepage



Recommended browser

- Microsoft Internet Explorer Ver. 4.0 or greater
- Netscape Navigator Ver. 4.5 or greater

Notes on the camcorder's homepage

- No interview, group, or memo track is displayed. To view the grouped tracks, first disconnect the computer and then release the group.
- No scene transition, picture effect, drawing is displayed.
- No audio track is sent to the computer.

To play the photo on the computer

The format of the photo turns into JPEG format.

To play the movie on the computer

The format of the movie turns into Quick Time format (Motion JPEG) on the camcorder's homepage. To play the movie, Apple Quick Time Ver. 3.0 or greater is required.

Data size

Photo: about 96 kilobytes per track

Movie: about 8 kilobytes minimum, about 96 kilobytes maximum per frame

Microsoft, Windows, Widows NT, Microsoft Internet Explorer logo are registered trademarks of Microsoft Corporation in the United States and other countries.

Apple, Macintosh, Quick Time are trademarks licensed to Apple Computer, Inc., registered in the U.S.A. and other countries.

Netscape Navigator is a trademark of Netscape Communications Corporation.

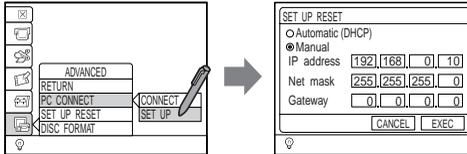
All other product names mentioned herein may be the trademarks or registered trademarks of their respective companies.

Step 1 Setting the address for your camcorder

Set the camcorder's address so that you can access your camcorder from the computer. You do not need to reset the address as long as the computer is used under same environment.

- (1) Touch  ADVANCED, then PC CONNECT.
- (2) Touch SET UP.

The screen to set IP address, etc. appears.



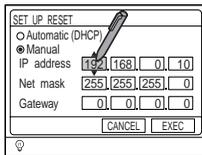
- (3) Touch MANUAL to put a black dot in the white circle. You can set the IP address, net mask, and gateway.

- (4) Set the IP address.

You can keep as it is, or put any desired number. This number becomes your camcorder's homepage address.

Net mask: For example, set to 255.255.255.0.

Gateway: If you are not sure, set to 0.0.0.0.



- (5) Touch EXEC.

If you change the setting, touch CANCEL and repeat from step 1.

- (6) Touch CONFIRM.

The camcorder automatically turns off and on again. The setting is completed.

To set the IP address on the computer

Set the IP address on the computer in accordance with your camcorder.

In case of the above setting (192.168.0.10), set as follows:

IP address: 192.168.0.X (X can be any number from 1 to 254 except 10. Do not use the same number for the last digit as that of the camcorder's IP address.)

Net mask: 255.255.255.0

Gateway: Keep blank.

To operate the menu

You can use the control dial.

To return to the previous screen

Touch RETURN.

The first digit of IP address

Changes ranging from 0 to 223.

Viewing on the computer display

Net mask

Changes in the order of 255 - 254 - 252 - 248 - 240 - 224 - 192 - 128 - 0 - 255.

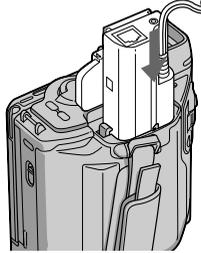
Using the DHCP server of the network

You can set the address automatically. Touch AUTO in step 3 and proceed to step 5.

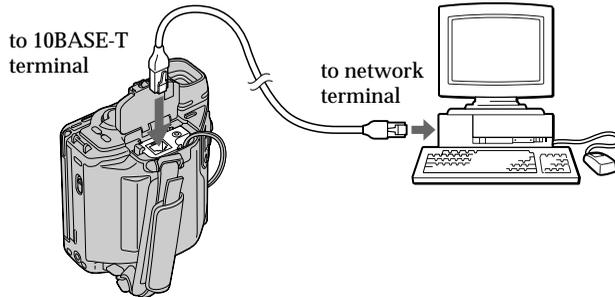
Step 2 Connecting the camcorder to the computer

Use a commercially available cross cable.

(1) Connect the connecting cable to the camcorder.



(2) Connect the camcorder to the computer using a commercially available cross cable.



Notes

- Turn off the power of the camcorder and computer before connection.
- You cannot shut the battery lid when the cross cable is connected.

Note on the type of the computer's network terminal

Either an exclusive 10BASE-T terminal or a 10BASE-T/100BASE-T compatible terminal can be connected.

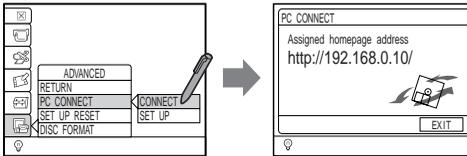
Viewing on the computer display

Viewing the pictures

A browser software such as Internet Explorer or Netscape Navigator is required to view the pictures on the computer.

- (1) Turn on the computer.
- (2) Insert the recorded MD DATA2 disc in the camcorder.
- (3) Set the POWER switch to PLAY/EDIT.
- (4) Touch  ADVANCED, then PC CONNECT.
- (5) Touch CONNECT.

The homepage address appears on the camcorder's screen.



- (6) Operate the browser software on the computer and input the address displayed in step 5.

The homepage with pictures recorded in the MD DATA2 disc appears on the computer screen.

Note

Do not access the camcorder's homepage from more than one computer at the same time. Doing so may cause malfunction.

If the "Connect the network cable" message appears

Make connection as described in "Step 2 Connecting the camcorder to the computer."

Caution

Do not change the disc while the homepage is displayed. When you change the disc, close the homepage first.

If the picture in the previous disc appears on the computer display after you have changed the disc, check connection and press the RELOAD button of the browser.

If you do not have the recommended browser

You may be able to access by adding "/text.htm" at the end of the address (example: <http://192.168.0.10/text.htm>).

Note on the browser software

Do not set the proxies. You may not be able to access your camcorder.

Viewing on the computer display

Homepage of your camcorder



- 1 You can customize the index image of the movie on the index display.
Picture size: 624 x 380, 304 x 240, 144 x 120
Number of frames per second: 30 , 15, 5, 2, 1
- 2 Track number
- 3 Title track
- 4 Click the index image, another window will open.
- 5 Go back to previous page.
- 6 Go to the browser page of text only
- 7 Movie track
- 8 Playback time
- 9 Photo track
- 10 Go to next page
- 11 Jump to the designated page

To close the homepage

- (1) Quit the browser on the computer.
- (2) Touch EXIT on the homepage on your camcorder's screen.
- (3) Turn off your camcorder.

Precautions and maintenance information

Precautions

Operation

- Operate your camcorder on 7.2 V (battery pack) or 8.4 V (AC adaptor/charger).
- For DC or AC operation, use the accessories recommended in the operating instructions.
- Keep the POWER switch set to OFF when you are not using your camcorder.
- Do not wrap your camcorder in a towel, for example, and operate it. Doing so may cause heat to build up inside.
- Keep your camcorder away from strong magnetic fields or mechanical vibration.
- Keep your camcorder away from TV and AM receivers. TV and AM receivers may cause noise in recording.
- Pass the microphone and remote cords under the flap of the grip strap so that they are not included in the picture, especially when using a wide conversion lens.
- Adjust the angle of the LCD screen not to reflect the sun. The LCD screen reflects a strong light, it is difficult to look and not good for your eyes.
- Do not shoot the sun directly. Doing so may cause malfunction of your camcorder.
- You may hear intermittent sound during operation. This is due to inherent nature of the MD and not a malfunction.

Handling

- If any solid object or liquid gets 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.
- Do not touch the lens in the disc compartment. If the lens becomes dirty, playback may not be performed or pictures may dropout. To keep the lens away from dust, keep the disc lid shut except when you insert or eject a disc.
- To attach a tripod, use the supplied tripod attachment. If you do not use the tripod attachment, make sure that the tripod is securely attached and stable.
- 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.

Safety

- When a conversion lens is attached, do not look at the sun directly.
- If you have skin trouble after using the eyecup, stop using your camcorder and consult a doctor.
- Keep the input pen, the ferrite cores and the plastic tie of the cables out of the reach of children to prevent children from swallowing them.

Moisture condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside and outside the camcorder. Using the camcorder in this condition may result in malfunction of the camcorder. If moisture condensation occurs, remove the battery, turn off the camcorder, and leave it for about one hour with the battery compartment open.

Precautions and maintenance information

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 warm place.
- 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 rain shower.
- You use your camcorder in a place with high temperature and humidity.

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).

LCD screen (touch panel)

- Use only the supplied input pen. Using another pen may damage the touch panel.
- Do not push the LCD screen too hard. Doing so may cause uneven color or malfunction of the LCD screen.
- If your camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- The back of the LCD panel may heat up during operation. This is not a malfunction.
- Do not grab the LCD screen when you move or carry your camcorder. Doing so may cause malfunction of the LCD screen.

AC adaptor/charger

- Unplug the AC adaptor/charger from the wall outlet when you are not using the AC adaptor/charger 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 AC adaptor/charger with a damaged cord or if the AC adaptor/charger has been dropped or damaged.
- Replace the AC adaptor/charger with model AC-VQ800 only, if replacement is necessary.
- 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 AC adaptor/charger may be damaged.
- Always keep metal contacts clean.
- Do not disassemble the AC adaptor/charger.
- Do not apply mechanical shock or drop the AC adaptor/charger.
- While the AC adaptor/charger is in use, particularly during charging, keep it away from AM receivers and video equipment. It may disturb AM reception and video operation.
- The AC adaptor/charger becomes warm during use. This is not a malfunction.
- Do not place the AC adaptor/charger in locations that are:
 - Extremely hot or cold
 - Dusty or dirty
 - Very humid
 - Vibrating

Precautions and maintenance information

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 140°F (60°C), 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.

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.

Remote Commander

The supplied Remote Commander operates only this camcorder and cannot operate other model. It is not possible to operate this camcorder with a Remote Commander supplied with other model.

If any problem occurs, unplug your camcorder and contact your nearest Sony dealer.

Precautions and maintenance information

Maintenance

Camcorder

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.

Lens

Clean the lens with a commercially available blower.

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 discharge 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 it is discharged.

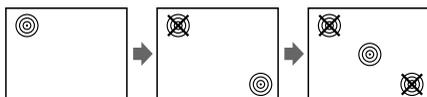
Charging the vanadium-lithium battery:

Connect your camcorder to house current using the AC adaptor/charger supplied with your camcorder, and leave your camcorder with the POWER switch turned off for more than 24 hours.

Calibrating the LCD screen (touch panel)

If the touch panel does not react correctly when you touch it, calibrate the touch panel.

- (1) Set the POWER switch to OFF.
- (2) Eject the disc.
If you have connected other equipment, disconnect them.
- (3) Open the LCD panel.
- (4) While pressing DSPL and **■** together, set the POWER switch to PLAY/EDIT.
- (5) Touch the  marks displayed on the LCD screen one by one.



- (6) Turn the LCD panel over and close it to the camcorder body,
- (7) Touch the  marks displayed on the LCD screen one by one.
- (8) Touch FINISH.
The index display appears.

Usable MiniDiscs

Structure of MiniDisc

The 2.5-inch MiniDisc (MD) is compact and easy to handle requiring less caution as it is encased in a plastic cartridge that looks like a 3.5-inch diskette.

Disc variation

MiniDiscs come in three types: MDs to enjoy music, MD DATA and MD DATA2 discs to record computer data, etc. Your camcorder uses MD DATA2 disc to record pictures.



DATA

MD DATA2 disc

Records and plays digital data of moving pictures, etc.



DATA

MD DATA disc

Records and plays digital data of computers, etc.



Audio MDs

Comes in two types: pre-mastered (pre-recorded) and recordable (blank).
Premastered MDs are played like regular CDs.

“MD DATA” and “MD DATA2” are registered trademarks of Sony Corporation.
MD VIEW is a registered trademark of Sony Corporation for MD DATA2 discs.

Usable MDs with your camcorder

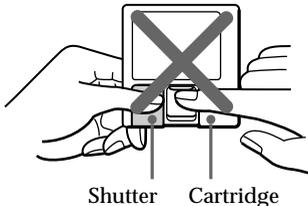
- For recording and playing audio and picture: MD DATA2
- For playing audio only: Audio MD

You cannot use any other discs with your camcorder.

Notes on MDs

The MiniDisc (MD) is easy to handle requiring less caution about dust or fingerprints as it is encased in a plastic cartridge. However, if the cartridge is dusty or warped, a malfunction may occur. To keep the quality of the picture and sound, handle the MD as follows.

- Do not open the shutter to expose the MD. Close the shutter immediately if the shutter opens.



- Do not leave the MD in a location near heat sources, or in a place subject to direct sunlight. Do not leave the MD where sand may get into the MD such as at the beach.
- Wipe the disc cartridge with a dry cloth to remove dirt.

System limitations of the MD

The recording system in your camcorder is radically different from those used in cassette and DAT decks and the system has limitations as described below. Note, however, that these limitations are due to the inherent nature of the MD recording system itself and not to mechanical causes.

The remaining recording time does not increase even after erasing numerous short tracks.

Tracks under 8 seconds long are not counted, so erasing them may not increase the recording time.

It takes a long time to save or edit pictures

Saving and editing on a disc which has hundreds of recorded pictures will take a long time.

The total recorded time and the remaining time on the MD may not reach the maximum recording time.

Repeated editing may reduce the recordable time of the disc.

The picture or sound may dropout while fast-forwarding or reversing the edited tracks.

Tracks created through editing may exhibit picture or sound dropout during fast-forwarding or reversing because high-speed playback takes more time to search the position on the disc when the tracks are scattered on the disc.

Notes

- Your camcorder conforms to the Video MD format.

Video MD

- An MD recorded by equipment without bearing Video MD logo cannot be used on your camcorder.
- An MD recorded a video signal other than NTSC system cannot be used on your camcorder.

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.

Camcorder

Recording

Symptom	Cause and/or Corrective Actions
Recording or interview recording is not possible.	<ul style="list-style-type: none">• The POWER switch is not set to CAMERA or INTERVIEW. → Set it to CAMERA (p. 22) or INTERVIEW (p. 36).• The disc is full. → Erase unnecessary tracks (p. 65) or insert a new disc (p. 16).• The battery pack is dead or nearly dead. → Install a charged battery pack (p. 10).• START/STOP is set to ANTI GROUND in the menu. → Set it to NORMAL (p. 93).• Moisture has condensed inside the camcorder. → Remove the disc and leave the camcorder for a couple of hours (p. 105).
Recording stops in a few seconds.	<ul style="list-style-type: none">• START/STOP is set to ANTI GROUND in the menu. → Set it to NORMAL (p. 93).
The power goes off.	<ul style="list-style-type: none">• While being operated in CAMERA mode, the camcorder has been in the standby mode for more than five minutes. → Set the POWER switch to OFF and then to CAMERA or INTERVIEW again (p. 23).
The image on the viewfinder screen is not clear.	<ul style="list-style-type: none">• The viewfinder lens is not adjusted. → Adjust the viewfinder lens (p. 26).
The SteadyShot function does not work.	<ul style="list-style-type: none">• STEADYSHOT is set to OFF. → Set it to ON (p. 45).
The autofocus function does not work.	<ul style="list-style-type: none">• The camcorder is in manual focus mode. → Turn to auto focus mode (p. 43).• Shooting conditions are not suitable for autofocus. → Adjust focus manually (p. 43).
Black index appeared for the recorded track.	<ul style="list-style-type: none">• Power source is disconnected during recording. → Select a scene for the index (p. 62).
A vertical band appears when you shoot a subject such as lights or a candle flame against a dark background.	<ul style="list-style-type: none">• The contrast between the subject and background is too high. This is not a malfunction.

Continued on the next page

Troubleshooting

Symptom	Cause and/or Corrective Actions
Picture appears too bright, and the subject does not appear on the LCD screen or in the viewfinder.	<ul style="list-style-type: none">• EXPOSURE is set to manual adjustment mode. → Set it back to automatic adjustment (p. 44).• BACKLIGHT adjustment function is working. → Deactivate the function (p. 40).
The beep or click of the shutter does not sound.	<ul style="list-style-type: none">• BEEP is set to OFF. → Set it to ON (p. 93).
The picture on the LCD screen or in the viewfinder turns off.	<ul style="list-style-type: none">• The picture turns off when you insert or eject the disc. This is not a malfunction.
It takes time for the picture to appear on the LCD screen or in the viewfinder when the POWER switch is set to CAMERA.	<ul style="list-style-type: none">• It happens occasionally. This is not a malfunction.

Playback

Symptom	Cause and/or Corrective Actions
The video control buttons do not operate.	<ul style="list-style-type: none">• The POWER switch is not set to PLAY/EDIT. → Set it to PLAY/EDIT (p. 30).• The battery pack is dead or nearly dead. → Install a charged battery pack (p. 10).
The playback picture is not clear.	<ul style="list-style-type: none">• The camcorder is placed close to equipment generating a strong magnetic field such as television. → Move the camcorder away from the equipment.
No sound or only a low sound is heard when playing back a tape.	<ul style="list-style-type: none">• The volume is turned to minimum. → Turn up the volume (p. 33).• AVLS is set to ON. → Set to OFF (p. 94).
The track cannot be erased.	<ul style="list-style-type: none">• The track is protected. → Release the protection (p. 61).• The write protect tab of the disc is open. → Check the write protect tab (p. 17).
No picture appears on the TV when you connected the camcorder to TV or VCR.	<ul style="list-style-type: none">• Disconnect the AV connecting cable once and connect it again.
Normal playback cannot be done.	<ul style="list-style-type: none">• Repeat play is selected. → Set PLAY MODE to NORMAL (p. 52).
Playback does not start from the first track in the audio MD.	<ul style="list-style-type: none">• Playback was stopped on the way the last time. → Select the first track. → Press ⏮ repeatedly until it returns to the first track. → Open the disc lid. The playback starts from the first track.
Dropout of picture and sound occurs.	<ul style="list-style-type: none">• The camcorder is used under mechanical vibration. → Avoid using the camcorder under mechanical vibration.• If the track is extremely short, picture and sound may dropout.

Troubleshooting

Recording/playback/editing

Symptom	Cause and/or Corrective Actions
The camcorder does not operate when the POWER switch is set to CAMERA, PLAY/EDIT, or INTERVIEW.	<ul style="list-style-type: none">• The battery pack is not installed, or is dead or nearly dead. → Install a charged battery pack (p. 10).• The AC power cord is not connected to a wall outlet. → Connect the AC adaptor/charger to a wall outlet (p. 15).• The mode change switch of the AC adaptor/charger is set to CHARGE. → Set it to VTR/CAMERA (p. 15).
The picture does not appear in the viewfinder.	<ul style="list-style-type: none">• The LCD screen is open. → Close the LCD screen.
The battery pack is quickly discharged.	<ul style="list-style-type: none">• The operating temperature is too low.• The battery pack is not fully charged. → Charge the battery pack fully (p. 10).• The battery pack is completely dead, and cannot be recharged. → Replace with a new battery pack.
The disc lid does not open.	<ul style="list-style-type: none">• The camcorder is writing on the disc. → Wait for a while.• The AC power cord was disconnected or the battery pack was completely discharged during recording or editing. → Connect the AC power cord (p. 15), or install the charged battery pack (p. 10).
Recording does not start again.	<ul style="list-style-type: none">• The camcorder is writing on the disc. → Wait until STBY flashing on the screen goes off.• The AC adaptor/charger is not connected to a wall outlet. → Connect the AC adaptor/charger to a wall outlet (p. 15).
The battery remaining indicator does not indicate the correct time.	<ul style="list-style-type: none">• You are using 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.• The battery is dead. → Use a fully charged battery pack (p. 10).
Recording or editing is not possible.	<ul style="list-style-type: none">• The write protect tab of the disc is open. → Close the write protect tab (p. 17).• The track is protected. → Release the protection (p. 61).• The disc is for playback only. → Use the MD DATA2 disc.• The AC adaptor/charger was disconnected or electricity was cut during recording or editing. → Recording or editing up to the power failure is canceled. Do it again from the beginning.

Continued on the next page

Troubleshooting

Others

Symptom	Cause and/or Corrective Actions
The Remote Commander supplied with the camcorder does not work.	<ul style="list-style-type: none">• COMMANDER is set to OFF . → Set it to ON (p. 93).• Something is blocking the infrared rays. → Remove the obstacle.• The batteries are inserted in the battery holder with the + - polarities incorrectly matching the + - marks. → Insert the batteries with the correct polarity (p. 125).• The batteries are dead. → Insert new ones (p. 125).
Wrong item is selected when you touch the LCD screen.	<ul style="list-style-type: none">• Calibration of the touch panel is required. → Perform calibration adjustment (p. 108).
The camcorder does not turn on.	<ul style="list-style-type: none">• Internal error. → Disconnect the power source once, and connect it again.
The camcorder does not operate.	<ul style="list-style-type: none">• Moisture condensed inside the camcorder. → Remove the disc and leave your camcorder for a couple of hours (p. 105).• The camcorder suffered strong noise due to mechanical shock or abnormal voltage caused by excessive static electricity, thunder, etc., during operation. → Do as follows.<ol style="list-style-type: none">1. Disconnect the power source.2. Leave the camcorder as it is for about 30 seconds.3. Connect the power source.
“DISC ERROR”/nothing but blue screen/“MEMORY OVER” is displayed.	<ul style="list-style-type: none">• The disc is damaged, or has improperly written information of recording or editing. → Disconnect the power source once, and connect it again. → Eject the disc once, and insert it again.
“THIS DISC CANNOT BE USED” is displayed.	<ul style="list-style-type: none">• The disc does not conform with Video MD format or NTSC system. → Use MD DATA2 disc.
The battery pack cannot be charged.	<ul style="list-style-type: none">• The AC adaptor/charger is disconnected. → Connect it properly (p. 15). → Check the mode change switch (p. 15).
No sound is heard from the headphones.	<ul style="list-style-type: none">• The headphones are not connected securely. → Connect the headphones to the  jack securely. → Turn up the volume (p. 33).
The clock is wrong.	<ul style="list-style-type: none">• The vanadium-lithium battery in the camcorder has discharged since no power was supplied for long time. → Connect the camcorder to an wall outlet using the AC adaptor/charger (p. 15).
The recorded date and time is not recorded.	<ul style="list-style-type: none">• The clock is not set. → Set the clock (p. 89).
“--:--:-- --:--:--” is displayed instead of the recorded date and time.	<ul style="list-style-type: none">• The clock is not set. → Set the clock (p. 89).

Troubleshooting

Symptom	Cause and/or Corrective Actions
The starting screen stays on the LCD screen.	<ul style="list-style-type: none">• Internal error.<ul style="list-style-type: none">→ Disconnect the power source once, and connect it again.→ Eject the disc once, and insert it again.
“PLEASE WAIT” stays on the LCD screen.	<ul style="list-style-type: none">• There are so many tracks recorded in the disc that the camcorder requires a long time to read.• If the above is not the case,<ul style="list-style-type: none">→ Disconnect the power source once, and connect it again.→ Eject the disc once, and insert it again.

AC adaptor/charger

If the CHARGE lamp flashes during charging the battery pack, do as follows to find out whether the AC adaptor/charger or the battery pack is malfunctioning.

Remove the battery pack once from the AC adaptor/charger, and install the same battery pack again.

If the CHARGE lamp lights up and no longer flashes

If the CHARGE lamp turns off when charging time has passed, neither the AC adaptor/charger or the battery pack has problem.

If the CHARGE lamp flashes again

Try with another battery pack.

- If the CHARGE lamp flashes again, the AC adaptor/charger seems to be malfunctioning.
- If the CHARGE lamp lights up, no longer flashes, and turns off when charging time has passed, the first battery pack seems to be malfunctioning.

Consult your nearest Sony dealer.

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

Flashing:

- The battery is nearly dead.

Fast flashing:

- The battery is dead.

Depending on conditions, the  indicator may flash, even if there are 5 to 10 minutes remaining.

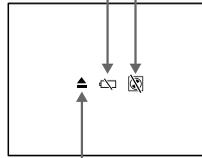
You need to eject the disc

Slow flashing:

- The write-protect tab on the disc is out.

Fast flashing:

- The disc is full.



Warning indicator as to disc

Slow flashing:

- Remaining disc is less than 15 seconds.
- Remaining disc is less than 5 minutes in the interview recording mode.
- No disc is inserted.
- The write-protect tab on the disc is out.

Fast flashing

- The disc is full.

Warning indicators and messages

Warning messages

Warning messages appear on the LCD screen with the respective warning indicators. Main warning messages are listed below.

- CHANGE THE BATTERY (p. 10)
- THIS BATTERY IS OLD PLEASE CHANGE
- FOR "InfoLITHIUM" BATTERY ONLY (p. 10)
- DISC IS FULL
- INSERT A DISC (p. 16)
- PLEASE SET THE CLOCK TIME (p. 89)
- CANNOT RECORD ON AUDIO MD (p. 109)
- CANNOT USE MD DATA DISC (p. 109)
- THIS DISC IS PLAY ONLY
- EJECT ENABLED
- DISC LID IS OPEN (p. 16)
- TOO MANY CHARACTERS (p. 60)
- THIS TRACK IS PROTECTED (p. 61)
- CAN NOT RECORD ON AUDIO MD
- DISC ERROR (p. 114)
- PLEASE CHECK THE BATTERY
- HIGH TEMPERATURE REMOVE THE BATTERY AND WAIT A WHILE TO COOL DOWN
- CANNOT OPEN DISC LID WHILE RECORDING
- THIS DISC IS BLANK AUDIO MD
- DISC FORMAT ERROR PLEASE CHANGE THE DISC (p. 110)
- MEMORY OVER (p. 114)

Specifications

Camcorder

System

System

MiniDisc digital AV system

Video signal

NTSC color, EIA standards

Viewfinder

Electric viewfinder (color)

Image device

1/4 inch CCD (Charge Coupled Device)

Approx. 680,000 pixels

(Effective: Approx. 340,000 pixels)

Lens

Combined power zoom lens

Filter diameter 30 mm.

10× (Optical), 40× (Digital)

Focal length

3.3 - 33 mm

When converted to a 35 mm still camera: 42 - 420 mm

Color temperature

Auto, HOLD (Hold), Indoor (3200K), Outdoor (5800K)

Minimum illumination

11 lux (F 1.7)

Illumination range

11 to 100,000 lux

Recommended illumination

100 lux or more

Data compression format

Video: MPEG2

Audio: ATRAC

Image data format

In conformity with Video MD

Main image: 704×480

Index image: 176×112

Usable disc

MD DATA2 disc (record and play)

Audio MD (play only)

Recording/playback time

To record movie using MD DATA2:

SP: 10 min.

VP: 13 to 20 min.

LP: 20 min.

Interview (audio) recording:

Max. 260 min.

To play audio MD

Max. 160 min. using MDW-80 recorded in monaural

Max. 80 min. using MDW-80 recorded in stereo

Recordable still pictures

Max. 4500 tracks (MPEG 2 Intra-Picture adopted)

Recording system

Laser strobing magnetic modulation system

Reading system

Non-contact optical reading (semiconductor laser used)

Laser diode properties

Material: AlGaInP

NA = 0.52

Wavelength: 655 nm

Emission duration: Continuous

Laser output: less than 1000 μ W

(This output is the value measured at a distance of about 200 mm from the objective lens surface on the optical pickup block with 7 mm aperture.)

Error correction

Using MD DATA2:

Reed Solomon Product Code (RSPC)

Using audio MD:

Advanced Cross Interleave Reed Solomon Code (ACIRC)

Modulation system

Using MD DATA2:

DC component suppressed RLL (1.7) (DRL)

Using audio MD:

EFM

Audio

Channel

Stereo 2 channels

Sampling frequency

44.1 kHz

Frequency response

20 to 20,000 Hz +/-3 dB

Wow and flutter

Below measurable limit

Input/Output connectors

S video output

4-pin mini DIN (1)

Luminance signal: 1 Vp-p,

75 ohms, unbalanced

Chrominance signal: 0.286 Vp-p,

75 ohms, unbalanced

Audio/Video output

AV MINI JACK (1)

Video: 1 Vp-p, 75 ohms,

unbalanced, sync negative

Audio: 194 mV at 10 kilohms load impedance

Headphones jack

Stereo minijack (\varnothing 3.5 mm) (1)

MIC jack

Stereo minijack (\varnothing 3.5 mm) (1)
0.388 mV low impedance with 2.4

V DC, input impedance 6.8 kilohms

REMOTE jack

Stereo mini-mini jack (\varnothing 2.5 mm) (1)

LINE IN jack (audio)

(supplied connecting cord)

Stereo mini jack (\varnothing 3.5 mm) (1)

194 mV, input impedance 47 kilohms or more

10BASE-T jack

(supplied connecting cord)

8-pin modular jack (1)

LCD screen

Touch panel

Picture

3.5 inches measured diagonally
2 7/8 × 2 inches (72.4 × 50.4 mm)

LCD panel

TFT drive

Total dot number

184,580 (839 × 220)

General

Power requirements

7.2 V (battery pack)

Average power consumption

During camera recording using viewfinder (SP mode)

7.0 W

During camera recording using LCD (SP mode)

8.0 W

Playback when connected using AV connecting cable (SP mode/LCD on)

6.5 W

Operating temperature

32°F to 104°F (0°C to 40°C)

Storage temperature

-4°F to +140°F (-20°C to +60°C)

Dimensions (approx.)

2 19/32 × 4 3/8 × 4 21/32 inches
(74 × 111 × 118 mm) (w/h/d)

Mass (approx.)

1 lb 8 oz (680 g)

main unit only

1 lb 11.8 oz (790 g)

including NP-F550 battery pack and MD DATA2 disc

Microphone

Stereo electret condenser

microphone

Speaker

Dynamic

Supplied accessories

See page 7.

Specifications

AC adaptor/ charger AC-VQ800

Power requirements

100 - 240 V AC, 50/60 Hz

Power consumption

25 W

Charge mode: 35 VA (100 V AC),
50 VA (240 V AC)

Operating mode: 40 VA (100 V
AC), 50 VA (240 V AC)

Output voltage

DC OUT: 8.4 V, 2.0 A in operating
mode

Battery charge terminal: 8.4 V, 1.4
A in charge mode

Operating temperature

32°F to 104°F (0°C to 40°C)

Storage temperature

-4°F to +140°F (-20°C to +60°C)

Dimensions

Approx. 5 1/3 × 1 10/16 × 3 1/2
inches (136 × 48 × 90 mm) (w/h/
d)

Mass

Approx. 8.8 oz (250 g)

Battery pack NP-F550

Type

Lithium ion

Output voltage

DC 7.2 V

Capacity

10.8 Wh

Dimensions (approx.)

1 9/16 × 13/16 × 2 7/8 inches

(38.4 × 20.6 × 70.8 mm) (w/h/d)

Mass (approx.)

3.4 oz (95 g)

Design and specifications are

subject to change without notice.

Recommended accessories

Battery pack

NP-F550

**DC adaptor/charger (car battery
adaptor)**

DC-VQ800

DCC-L50

Wide conversion lens

VCL-0630 S

Tele conversion lens

VCL-2030 S

Filter

VF-30PK S

Tripod

VCT-670RM

VCT-570RM

Video light

HVL-20DW2

Video flash

HVL-F10

Microphone

ECM-MS908C

Cleaning kit

KK-LC3

As of December, 1999

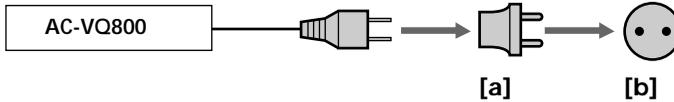
Consult your shop when you
purchase.

Read the operating instructions of
the accessory.

Using your camcorder abroad

You can use your camcorder in any country or area with the AC adaptor/charger supplied with your camcorder within 100 V to 240 V AC, 50/60 Hz.

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 with the AUDIO/VIDEO input jack.

The following shows TV color systems used overseas.

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

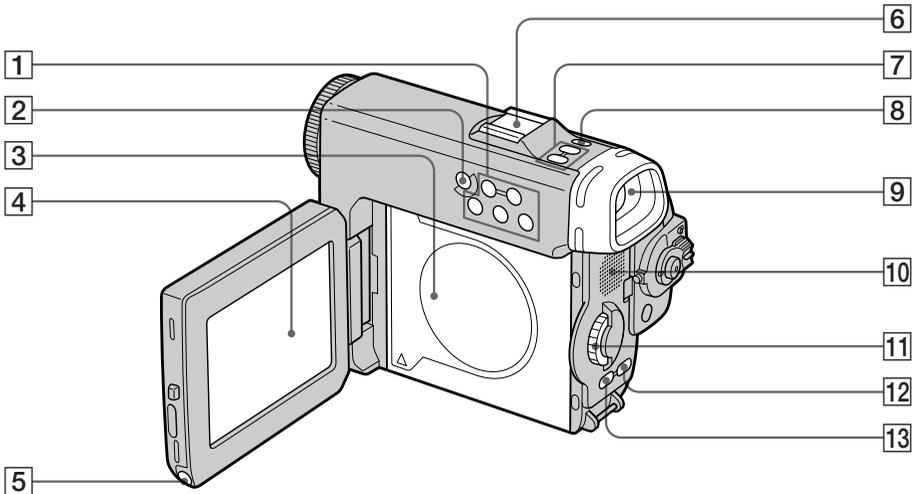
Argentina, Paraguay, Uruguay

SECAM system

Bulgaria, France, Guyana, Hungary, Iran, Iraq, Monaco, Poland, Russia, Ukraine, etc.

Identifying the parts and controls

Camcorder



- 1 Video/audio control buttons (p. 32, 99)
 - (stop)
 - ◀◀ (reverse)
 - ▶▶ (playback/pause)
 - ▶▶ (Fast-forward)
- 2 ● AUDIO REC (recording) (p. 36)
- 3 Disc lid (p. 16)
- 4 LCD screen/touch panel (p. 18, 25)
- 5 Input pen (p. 18)

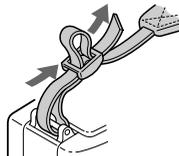
- 6 Accessory shoe
- 7 VOL (volume) buttons (p. 33)
- 8 DSPL (DISPLAY) button (p. 34)
- 9 Viewfinder (p. 26)
- 10 Speaker (p. 33)
- 11 Control dial (p. 21)
- 12 EXPOSURE button (p. 44)
- 13 MENU button (p. 21)



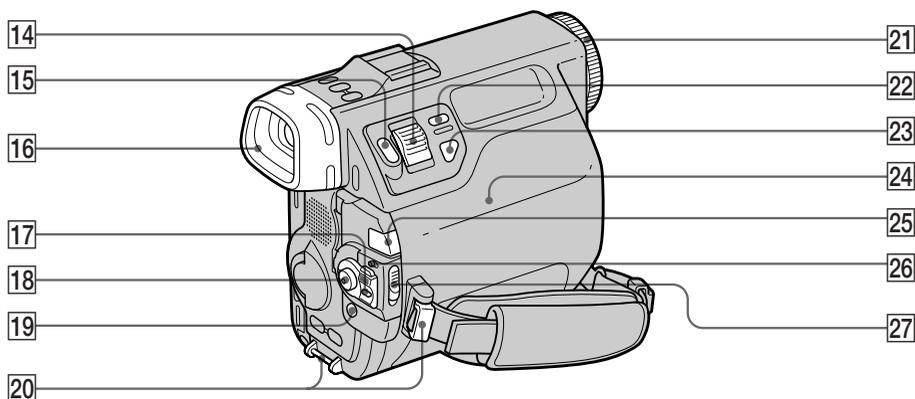
This mark indicates that this product is a genuine accessory for Sony video products.

When purchasing Sony video products, Sony recommends that you purchase accessories with this "GENUINE VIDEO ACCESSORIES" mark.

Attaching the shoulder belt (supplied)



Identifying the parts and controls



14 Power zoom lever (p. 27)

15 PHOTO button (p. 22, 36)

16 Eyecup

17 POWER switch (p. 22, 30, 36)

18 START/STOP button (p. 22)

19 ERASE button (p. 29, 33)

20 Hooks for shoulder belt (p. 121)

21 Focus ring (p. 43)

22 BACK LIGHT button (p. 40)

23 FOCUS button (p. 43)

24 Battery compartment (p. 14)

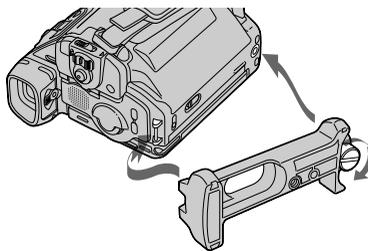
25 Cord shutter (p. 15)

26 LOCK switch (p. 23)

27 OPEN (BATT) (battery) lever (p. 14)

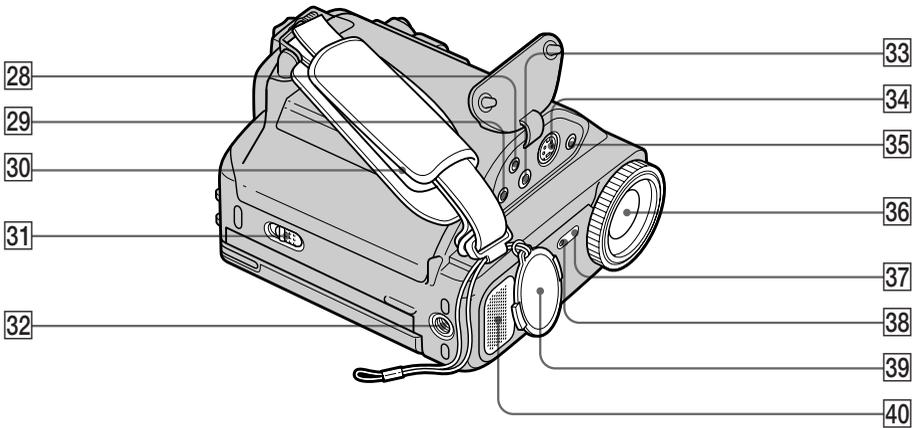
Attaching the supplied tripod attachment

- (1) Hook the tripod attachment to the rear of the camcorder.
- (2) Fasten the screw.



Make sure that you detach the tripod when you change the disc. However, you can change the disc with the tripod attachment attached to the camcorder.

Identifying the parts and controls



- 28** REMOTE jack
Connects the remote control cable of a tripod or video flash (not supplied).
- 29**  (headphones) jack
- 30** Grip strap (p. 22)
- 31** DISC EJECT lever (p. 16)
- 32** Tripod receptacle
Make sure that the length of the tripod screw is less than 1/4 inch (7.5 mm). Otherwise, you cannot attach the tripod securely and the screw may damage your camcorder. If you cannot attach the tripod, use the supplied tripod attachment (p. 122).
- 33** AUDIO/VIDEO output jack (p. 35)
- 34** S VIDEO output jack (p. 35)
- 35** MIC jack (PLUG IN POWER)
Connect an external microphone (not supplied). This jack also accepts a “plug-in-power” microphone.
- 36** Lens
- 37** Remote sensor
- 38** Camera recording lamp (p. 22)
- 39** Lens cap (p. 22)
- 40** Microphone (p. 23)

If you use the headphones

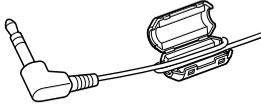
No sound will be heard from the speaker.

Identifying the parts and controls

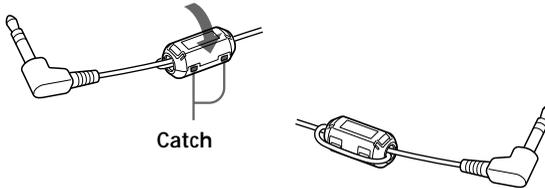
How to affix the ferrite cores

The camcorder is supplied with ferrite cores. Use them to cables as shown in the diagrams below. You must affix the ferrite cores to comply with Part 15 of the FCC Rules.

(1) Wind the cable round the ferrite core once.



(2) Fasten the catch.



Headphones and external microphone

Use the supplied small ferrite cores.

Audio connecting cable

Use the supplied large ferrite core. Connect the plug which the ferrite core is attached to the camcorder.

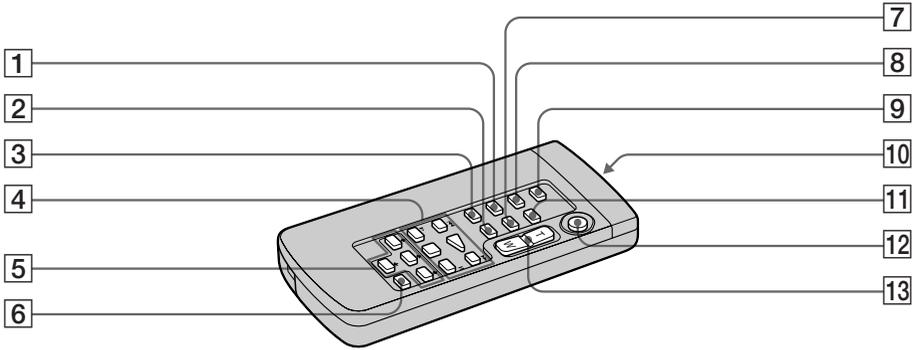
Notes

- Attach the ferrite cores as close to the plug as possible.
- Use headphones with a cord diameter of less than $3/32$ inch (2.5 mm) so that the cord can be tied round the ferrite core.

Identifying the parts and controls

Remote Commander

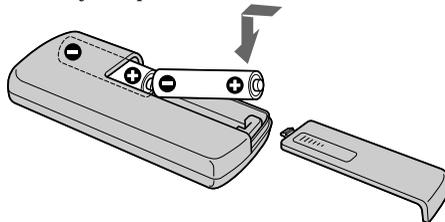
The buttons that have the same name on the Remote Commander as on your camcorder function identically to the buttons on your camcorder.



- | | |
|--|--|
| 1 ERASE button (p. 29, 33) | 8 DISPLAY button (p. 34) |
| 2 INDEX CHANGE button (p. 63) | 9 AUDIO REC button (p. 36) |
| 3 MENU button (p. 21) | 10 Transmitter
Point toward the remote sensor to control your camcorder after turning on your camcorder. |
| 4 Video/audio control buttons (p. 32, 99) | 11 PHOTO button (p. 22, 36) |
| 5 $\leftarrow/\rightarrow/\uparrow/\downarrow$ buttons (p. 21)
You can select tracks on the index display, items on the menu and play frame-by-frame, just like the control dial of the camcorder. | 12 START/STOP button (p. 22)
You cannot do the "ANTI GROUND" recording with this button. |
| 6 ENTER button (p. 21)
Press to confirm the selection in the menu. | 13 Power zoom button (p. 27) |
| 7 MARK button (p. 60) | |

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.



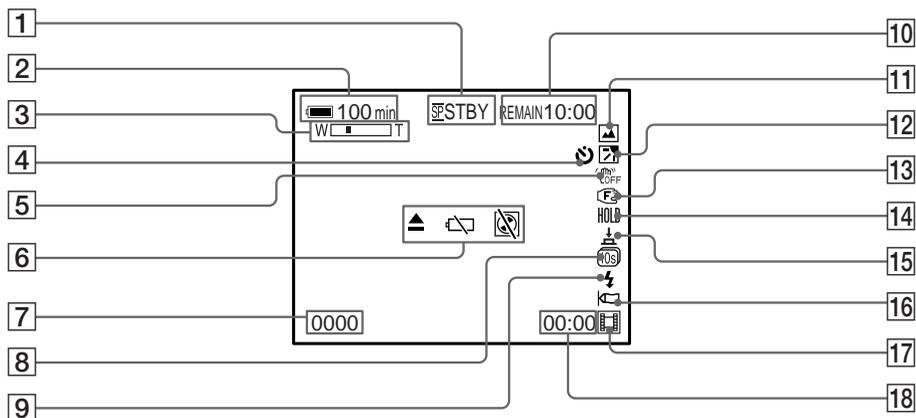
Note on the Remote Commander

Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Remote Commander may not function properly.

Identifying the parts and controls

Operation indicators

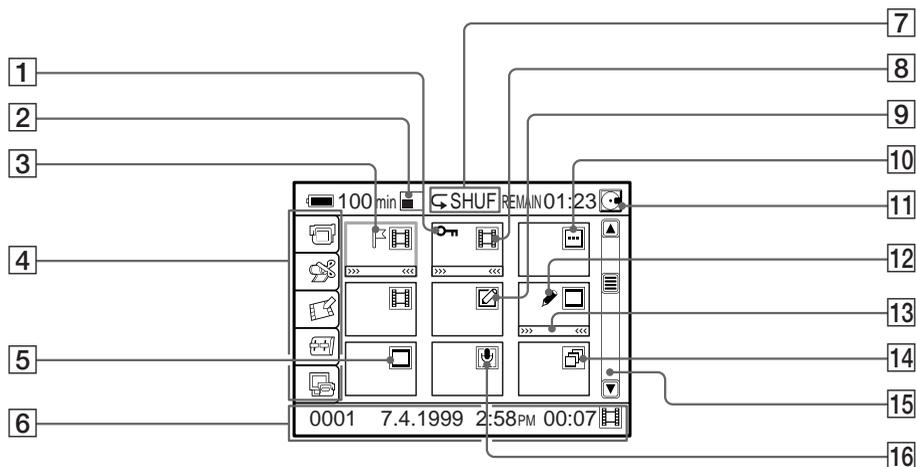
CAMERA/INTERVIEW mode



- | | |
|--|---|
| 1 Standby/Recording indicator (p. 22)/
Recording mode indicator (p. 26) | 11 PROGRAM AE indicator (p. 41) |
| 2 Remaining battery time indicator
(p. 14) | 12 Backlight indicator (p. 40) |
| 3 Zoom indicator (p. 27) | 13 Manual focus/Infinity indicator (p. 43) |
| 4 Self-timer indicator (p. 38) | 14 White balance mode indicator (p. 46) |
| 5 SteadyShot OFF indicator (p. 45) | 15 Anti ground recording indicator
(p. 93) |
| 6 Warning indicators (p. 116) | 16 Anti wind noise indicator (p. 92) |
| 7 Track number | 17 Track type icon (p. 31) |
| 8 10-second track mode indicator (p. 93) | 18 Recording time |
| 9 Flash mode indicator (p. 23) | |
| 10 Remaining disc indicator (p. 58) | |

Identifying the parts and controls

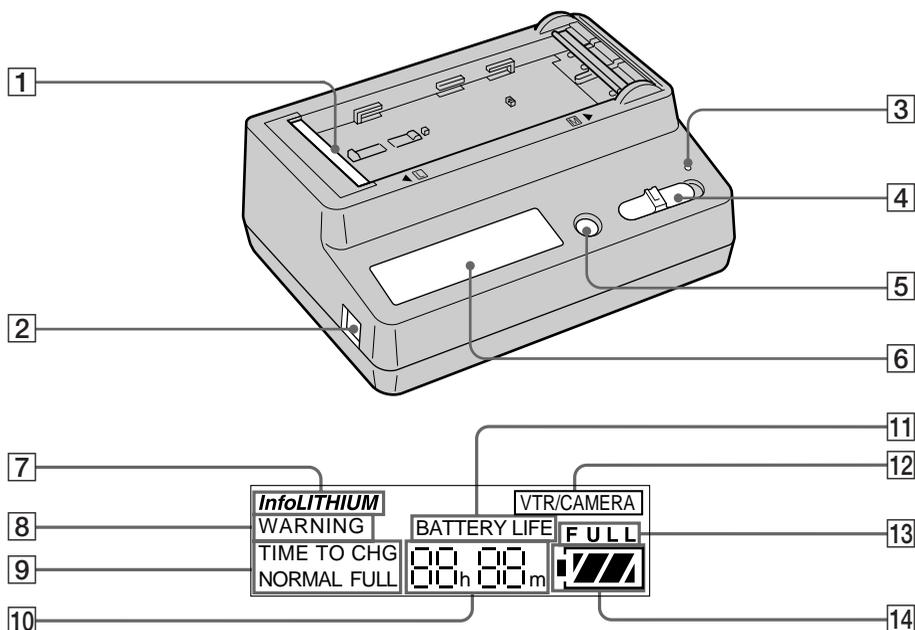
PLAY/EDIT mode



- | | |
|--|--|
| 1 Protect icon (p. 61) | 9 Memo icon (p. 78) |
| 2 Picture-in-picture indicator (p. 47) | 10 Title icon (p. 82) |
| 3 Mark icon (p. 60) | 11 Disc indicator (p. 58) |
| 4 Menu icons (p. 91) | 12 Drawing icon (p. 78) |
| 5 Photo icon (p. 31) | 13 Scene transition/picture effect icon (p. 83, 86) |
| 6 Track data (p. 59)
Track number, recorded date, track name, recording time, track type | 14 Group icon (p. 74) |
| 7 Play mode indicator (p. 51, 53, 54) | 15 Scroll bar (p. 31) |
| 8 Movie icon (p. 31) | 16 Audio icon (p. 36) |

Identifying the parts and controls

AC adaptor/charger



1 Terminal shutter (p. 10)

2 DC OUT connector (p. 15)

3 CHARGE lamp (p. 10)

4 Mode change switch (p. 10, 15)

5 DISPLAY CHANGE button (p. 12)

6 Display window

7 "InfoLITHIUM" indicator

8 WARNING indicator

9 TIME TO CHG (charge) indicator (p. 13)

10 Time indicator (p. 13)

11 BATTERY LIFE (battery remaining time) indicator (p. 12)

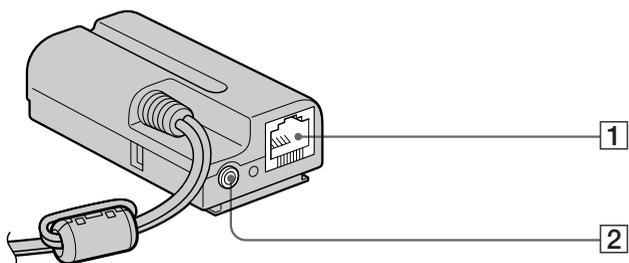
12 VTR/CAMERA indicator

13 Full charge indicator (p. 11)

14 Remaining battery indicator (p. 10)

Identifying the parts and controls

Connecting cord



- 1 10BASE-T connecting jack (p. 102)
- 2 LINE IN jack (p. 23)

Quick Function Guide

Functions to adjust exposure (in the recording mode)

- In dark environments such as sunset, fireworks, or general night views Sunset & moon mode (p. 41)
- Shooting backlit subjects BACK LIGHT (p. 40)
- In spotlight, such as at the theater or a formal event Spotlight mode (p. 41)
- In strong light or reflected light, such as at a beach in midsummer or on a ski slope Beach & ski mode (p. 41)
- To fix the exposure to the desired level EXPOSURE (P. 44)

Functions to give images more impact (in the recording mode)

- Taking a still picture PHOTO (p. 22)
- Creating a soft background for subjects Soft portrait mode (p. 41)

Functions to give a natural appearance to your recordings (in the recording mode)

- Preventing deterioration of picture quality in digital zoom D ZOOM (p. 27)
- Focusing manually Manual focus (p. 43)
- Shooting distant subjects Landscape mode (p. 41)
- Recording fast-moving subjects
 - Variable shutter speed between 1/250 and 1/3000 in accordance with the brightness Sports lesson mode (p. 41)
 - Fixed shutter speed Shutter speed 500/1000 mode (p. 41)

Functions to be used after recording (in the play/edit mode)

- Drawing on the recorded picture Drawing (p. 78)
- Looking at a fast moving scene carefully 9-Frame Sequence (p. 49)
- Comparing with other scenes Picture-in-picture (p. 47), 2-picture display (p. 48)
- Digital processing of recorded images Picture Effect (p. 86)
- Checking the recorded date and time Track information (p. 59)
- Inserting the title track Title (p. 82)
- Searching for scenes having a title Jump (p. 56)
- Playing movies only Sort (p. 55)
- Applying digital effect when the tracks change Scene Transition (p. 83)

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