SONY

2-584-905-**11** (1)

Digital Video Camera Recorder

HANDYCAM

Operating Guide

DCR-HC21

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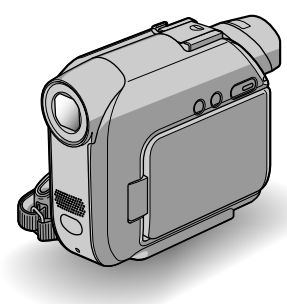

Mini DV Digital Video Cassette

InfoLITHIUM P SERIES

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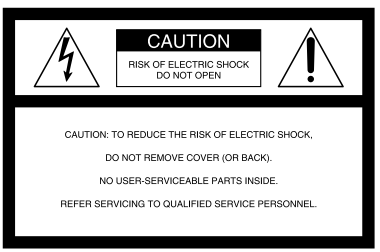
Read this first

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

WARNING

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



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

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

Notice

If static electricity or electromagnetism causes data transfer to discontinue midway (fail), restart the application or disconnect and connect the communication cable (USB, etc.) again.

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

RECYCLING LITHIUM-ION BATTERIES

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

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

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

Battery pack

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.

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

For customers in the U.S.A.

If you have any questions about this product, you may call:

Sony Customer Information Center 1-800-222-SONY (7669).

The number below is for the FCC related matters only.

Regulatory Information

Declaration of Conformity

Trade Name: SONY
Model No.: DCR-HC21
Responsible Party: Sony Electronics Inc.
Address: 16450 W. Bernardo Dr, San Diego, CA 92127 U.S.A.
Telephone No.: 858-942-2230
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.

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

Owner's Record

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

Model No. DCR-HC21

Serial No.

Model No. AC-

Serial No.

Notes on use

Your camcorder is supplied with two kinds of operations guides.

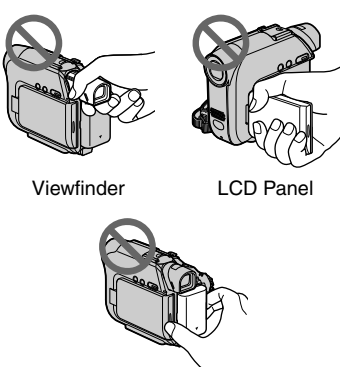
– "Operating Guide" (This manual)
– "First Step Guide" for using the supplied software (stored on the supplied CD-ROM)

On the types of recording media you can use in your camcorder

A mini DV cassette marked with Mini DV (mini DV cassettes with Cassette Memory are incompatible) (p. 78).

On using the camcorder

• Do not hold the camcorder by the following parts.



Viewfinder LCD Panel

Battery pack

• Before connecting your camcorder to another device with a USB or i.LINK cable, be sure to insert the connector plug in the proper direction. If you insert the connector plug forcibly in the wrong direction, the terminal may be damaged, or this may cause a malfunction of your camcorder.

Continued ➡

On the menu items, the LCD panel, viewfinder, and lens

- A menu item that is grayed out is not available under the current recording or playback conditions.
- The LCD screen and the viewfinder are manufactured using extremely high-precision technology, so over 99.99% of the pixels are operational for effective use. However, there may be some tiny black points and/or bright points (white, red, blue, or green in color) that appear constantly on the LCD screen and the viewfinder. These points are normal results of the manufacturing process and do not affect the recording in any way.
- Exposing the LCD screen, the viewfinder, or the lens to direct sunlight for long periods of time may cause malfunctions.
- Do not aim at the sun. Doing so might cause your camcorder to malfunction. Take pictures of the sun only in low light conditions, such as at dusk.

On recording

- Before starting to record, test the recording function to make sure the picture and sound are recorded without any problems.
- Compensation for the contents of recordings cannot be provided, even if recording or playback is not possible due to a malfunction of the camcorder, storage media, etc.
- TV color systems differ depending on the countries/regions. To view your recordings on a TV, you need an NTSC system-based TV.
- Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the copyright laws.

On this manual

- The images of the LCD screen and the viewfinder used in this manual for illustration purposes are captured using a digital still camera, and therefore may appear different.
- The on-screen displays in each local language are used for illustrating the operating procedures. Change the screen language before using your camcorder if necessary (p. 45).

About the Carl Zeiss lens

Your camcorder is equipped with a Carl Zeiss lens, which was developed jointly by Carl Zeiss, in Germany, and Sony Corporation, and produces superior images. It adopts the MTF* measurement system for video cameras and offers a quality typical of a Carl Zeiss lens.

* MTF stands for Modulation Transfer Function. The number value indicates the amount of light from a subject coming into the lens.

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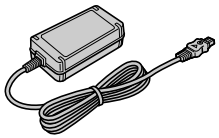
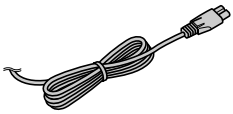
Step 1: Checking supplied items

Make sure that you have following items supplied with your camcorder.
The number in the parentheses indicates the number of that item supplied.

AC Adaptor (1) (p. 10)



Power cord (1) (p. 10)

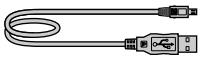


Wireless Remote Commander (1) (p. 28)

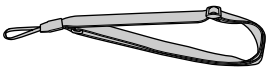
A button-type lithium battery is already installed.

A/V connecting cable (1) (p. 30, 48)

USB cable (1) (p. 53)



Shoulder Strap (1) (p. 85)



Rechargeable battery pack NP-FP30 (1) (p. 10, 79)

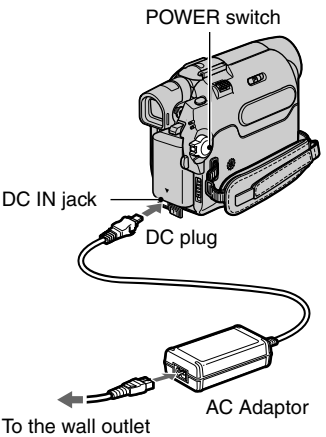
CD-ROM “Picture Package Ver.1.5” (1) (p. 53)

Shoe cover (1)
Attached to the camcorder.

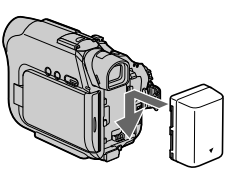
Operating Guide (This manual) (1)

Step 2: Charging the battery pack

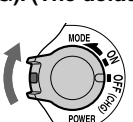
You can charge the “InfoLITHIUM” battery pack (P series) (p. 79) after attaching it to your camcorder.



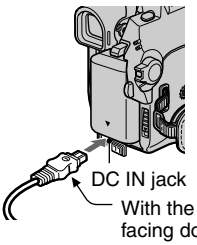
1 Attach the battery pack by sliding it in the direction of the arrow until it clicks.



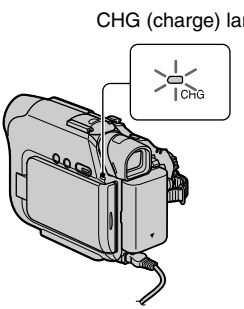
2 Slide the POWER switch up to OFF (CHG). (The default setting.)



3 Connect the AC Adaptor to the DC IN jack on your camcorder.



4 Connect the power cord to the AC Adaptor and the wall outlet.

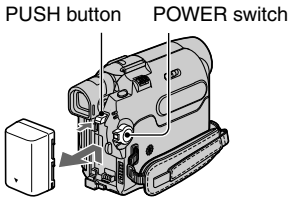


The CHG (charge) lamp lights up and charging starts.

5 The CHG (charge) lamp turns off when the battery is fully charged. Disconnect the AC Adaptor from the DC IN jack.

To remove the battery pack

Turn off the power, then press PUSH button and remove the battery pack.



When storing the battery pack

Fully discharge the battery before storing it for an extended period (p. 79).

To use an outside power source

You can operate your camcorder using the power from the wall outlet by making the same connections as you do when charging the battery pack. The battery pack will not lose its charge in this case.

Charging time

Approximate time (min.) required when you fully charge a fully discharged battery pack.

Battery pack	Charging time
NP-FP30 (supplied)	115
NP-FP50	125
NP-FP70	155
NP-FP90	220

Recording time

Approximate time (min.) available when you use a fully charged battery pack.

Battery pack	Continuous recording time	Typical recording time*
NP-FP30 (supplied)	80 105	40 50
NP-FP50	115 150	55 75
NP-FP70	240 310	120 155
NP-FP90	435 550	215 275

- All times measured under the following conditions:
  Top: Recording with LCD screen.
  Bottom: Recording with viewfinder LCD panel closed.

* Typical recording time shows the time when you repeat recording start/stop, turning the power on/off and zooming.

Playing time

Approximate time (min.) available when you use a fully charged battery pack.

Battery pack	LCD panel opened	LCD panel closed
NP-FP30 (supplied)	95	120
NP-FP50	135	170
NP-FP70	280	350
NP-FP90	500	620

On the battery pack

- Before changing the battery pack, slide the POWER switch up to OFF (CHG).
- The CHG (charge) lamp flashes during charging, or the battery information (p. 23) will not be correctly displayed under the following conditions.
  – The battery pack is not attached correctly.
  – The battery pack is damaged.
  – The battery pack is fully discharged. (For Battery Info only.)
- The power will not be supplied from the battery as long as the AC Adaptor is connected to the DC IN jack of your camcorder, even when the power cord is disconnected from the wall outlet.

On the charging/recording/playback time

- The recording and playback time will be shorter when you use your camcorder in low temperatures.
- The recording and playback time will be shorter depending on the conditions under which you use your camcorder.
- Times measured with the camcorder at 25°C (77°F). (10 - 30 °C (50 - 86°F) is recommended.)

Continued ➡

On the AC Adaptor

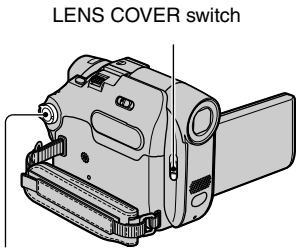
- Use the nearby wall outlet when using the AC Adaptor. Disconnect the AC Adaptor from the wall outlet immediately if any malfunction occurs while using your camcorder.
- Do not use the AC Adaptor placed in a narrow space, such as between a wall and furniture.
- Do not short-circuit the DC plug of the AC Adaptor or battery terminal with any metallic objects. This may cause a malfunction.

PRECAUTION

- Even if your camcorder is turned off, AC power (house current) is still supplied to it while connected to the wall outlet via the AC Adaptor.

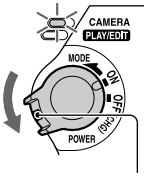
Step 3: Turning the power on and holding your camcorder firmly

To record or play back, slide the POWER switch repeatedly to turn on the respective lamp.
When using it for the first time, the CLOCK SET screen appears (p. 16).



1 Slide the LENS COVER switch to OPEN.

2 Slide the POWER switch repeatedly in the direction of the arrow to turn on the respective lamp.

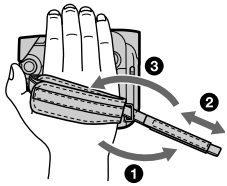


If the POWER switch is set to OFF (CHG), slide it down while pressing the green button.

Lamps that light up
CAMERA: To record on a tape.
PLAY/EDIT: To play or edit pictures.

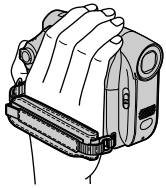
- When you slide the POWER switch to turn on the CAMERA lamp, the current date and time will be displayed on the screen for about 5 seconds.

3 Put your wrist through the Strap Belt.



The length of the Strap Belt is adjustable.

4 Hold the camcorder as illustrated below.



To turn off the power

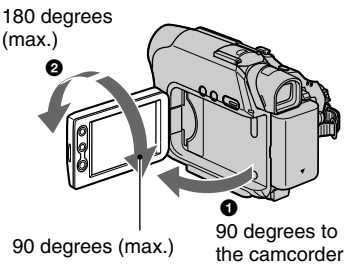
Slide the POWER switch up to OFF (CHG).

- At the time of purchase, the power will be set to turn off automatically if you leave your camcorder without any operation attempted for approximately 5 minutes, to save battery power. ([A.SHUT OFF], p. 46).

Step 4: Adjusting the LCD panel and viewfinder

The LCD panel

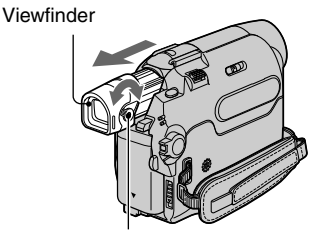
Open the LCD panel 90 degrees to the camcorder (❶), then rotate it to the best angle to record or play (❷).



- Do not press the buttons on the LCD frame accidentally when you open or adjust the LCD panel.
- If you rotate the LCD panel 180 degrees to the lens side, you can close the LCD panel with the LCD screen facing out. This is convenient during playback operations.
- If you rotate the LCD panel 180 degrees to the lens side, you can see the image in the viewfinder.
- See [LCD BRT] (p. 34) to adjust the brightness of the LCD screen.

The viewfinder

You can view images using the viewfinder when you close the LCD panel to avoid wearing down the battery, etc.



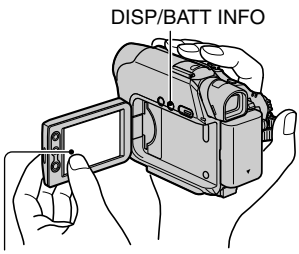
Viewfinder lens adjustment lever
Move it until the picture is clear.

- You can adjust the brightness of the viewfinder backlight by selecting [LCD/VF SET] - [LCD B.L.] (p. 44).
- You can adjust the [FADER] and the [EXPOSURE] setting using the viewfinder. (p. 33)

Step 5: Using the touch panel

You can play back recorded pictures (p. 21), or change the settings (p. 31) using the touch panel.

Place your hand on the rear side of the LCD panel to support it. Then, touch the buttons displayed on the screen.



Touch the button on the LCD screen.

- Perform the same actions as explained above when you press the buttons on the LCD frame.
- Be careful not to press buttons on the LCD frame accidentally while using the touch panel.

To hide the screen indicators

Press DISP/BATT INFO to toggle the screen indicators (such as time code, etc.) on or off.

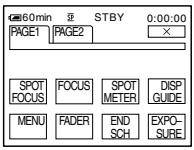
Changing the language setting

You can change the on-screen displays to show messages in a specified language. Select the screen language in [LANGUAGE] on the (SETUP MENU) (p. 31, 45).

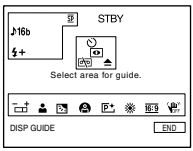
Checking the screen indicators (Display Guide)

You can easily check the meaning of each indicator that appears on the LCD screen.

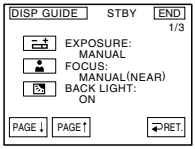
1 Touch [FN].



2 Touch [DISP GUIDE].



3 Touch the area including the indicator that you want to check.



The meanings of the indicators in the area are listed on the screen. If you cannot find the indicator you want to check, touch [PAGE ↓]/[PAGE ↑] to toggle.
When you touch [RET.], the screen returns to the area selecting display.

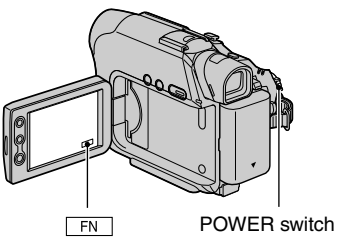
To finish the operation

Touch [END].

Step 6: Setting the date and time

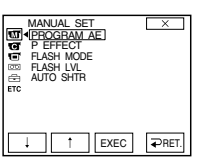
Set the date and time when using this camcorder for the first time. If you do not set the date and time, the CLOCK SET screen appears every time you turn on your camcorder.

- If you do not use your camcorder for **about 3 months**, the built-in rechargeable battery gets discharged and the date and time settings may be cleared from the memory. In that case, charge the rechargeable battery and then set the date and time again (p. 83).

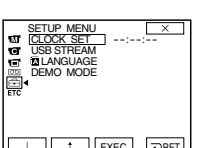


Skip to step 4 when you set the clock for the first time.

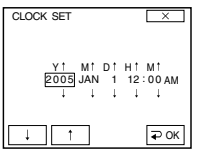
1 **Touch FN →[MENU].**



2 **Select SETUP MENU with ↓/↑, then touch [EXEC].**

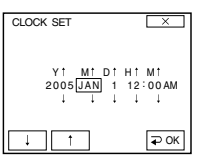


3 **Select [CLOCK SET] with ↓/↑, then touch [EXEC].**



4 **Set [Y] (year) with ↓/↑, then touch OK.**

You can set any year up to the year 2079.



5 **Set [M] (month), [D] (day), [H] (hour) and [M] (minute), then touch OK.**

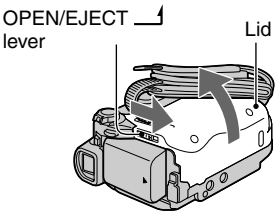
For midnight, set it to 12:00 AM.
For midday, set it to 12:00 PM.
The clock starts.

Step 7: Inserting a cassette

You can use mini DV Mini DV cassettes only (p. 78).

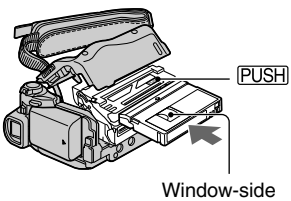
- The recordable time varies depending on [REC MODE] (p. 45).

1 Slide the OPEN/EJECT lever and open the lid.



The cassette compartment automatically comes out and opens up.

2 Insert a cassette with its window facing up, then press PUSH.



Push the center of the back of the cassette lightly.
The cassette compartment automatically slides back in. Do not force the cassette into the compartment. This may cause a malfunction.

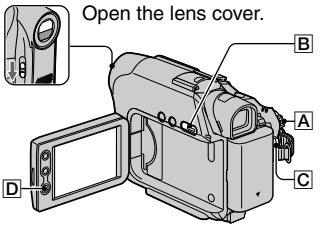
3 Close the lid.

To eject the cassette

Proceed with the same steps as you would when inserting a cassette tape.

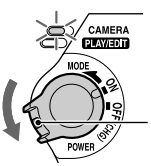
Recording/Playback with ease (Easy Handycam)

With this Easy Handycam operation, most of the camera settings are automatically adjusted optimally, which frees you from detailed adjustment.
Since only basic functions become available and screen font size increases for easy viewing, even first time users can enjoy easy operation.
Go through the procedures described in steps 1 to 7 (p. 9 to 17) before operation.



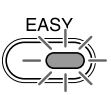
Recording with ease

1 Slide the POWER switch A in the direction of the arrow to turn on the CAMERA lamp.



If the POWER switch A is set to OFF (CHG), slide it down while pressing the green button.

2 Press EASY B.



The EASY lamp lights up in blue.

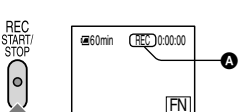
Easy Handycam operation ON

The message appears.

3 Start recording.

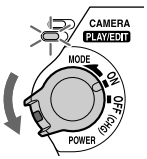
Press REC START/STOP C (or D).

The indicator (A) changes [STBY] to [REC].
To stop recording, press C (or D) again.
The picture is recorded in the SP mode (p. 45).

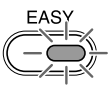


Playing back with ease

1 Slide the POWER switch A in the direction of the arrow repeatedly to turn on the PLAY/EDIT lamp.



2 Press EASY B.



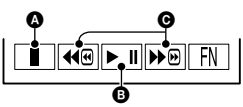
The EASY lamp lights up in blue.

Easy Handycam operation ON

The message appears.

3 Start playing back.

Touch ◄◄, then touch ►II to start playback.



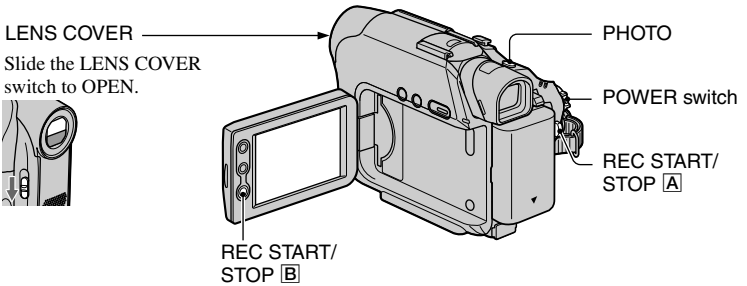
A Stop
B Play/Pause toggles as you touch it
C Rewind/Fast forward

To cancel Easy Handycam operation

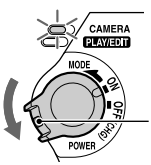
Press EASY B again.
The EASY lamp turns off and all the settings are returned to the previous situation.

- When you touch FN and MENU during Easy Handycam operation, only the available functions are displayed on the screen and the functions which don't appear go back to the default setting (p. 32, 38).
- You can use the following functions during playback:
  - Playing the picture on a TV (p. 30)
  - Dubbing to other recording devices (p. 49)
- During Easy Handycam operation, the following buttons are not available:
  - BACK LIGHT
  - PHOTO
- [Invalid during Easy Handycam operation] appears if operations not available during Easy Handycam are attempted.

Recording



1 Slide the POWER switch in the direction of the arrow to turn on the CAMERA lamp.

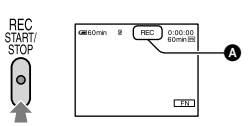


If the POWER switch is set to OFF (CHG), slide it down while pressing the green button.

2 Start recording.

Movies

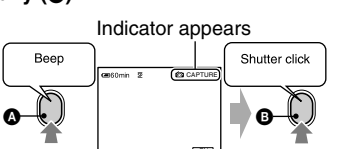
Press REC START/STOP A (or B).



The indicator (A) changes [STBY] to [REC].

Still images

Press and hold PHOTO lightly to check the image (A), then press it fully (B).



A shutter sound is heard, and the image is recorded with sound for 7 seconds.

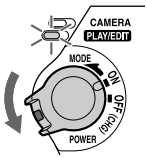
To stop movie recording

Press REC START/STOP again.

- appears when the tape photo recording does not work.

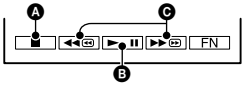
Playback

1 Slide the POWER switch in the direction of the arrow repeatedly to turn on the PLAY/EDIT lamp.



2 Start playing back.

Touch ◄◄, then touch ► II to start playback.



A Stop
B Play/Pause toggles as you touch it
C Rewind/Fast forward
• Playback automatically stops if pause is engaged for more than 3 minutes.

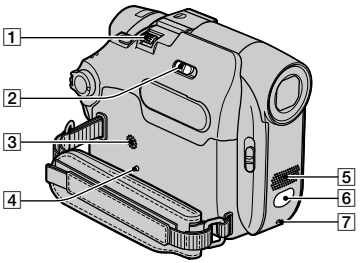
To adjust the volume

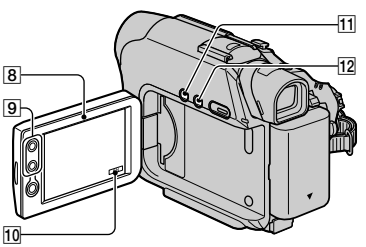
Touch FN → [PAGE1] → [VOL], then −/+ to adjust the volume.

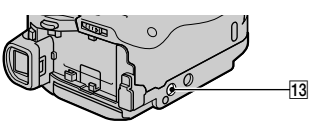
To search for a scene during playback

Touch and hold ►►/◄◄ during playback (Picture Search), or ►►/◄◄ while fast forwarding or rewinding the tape (Skip Scan).
• You can play back in various modes ([V SPD PLAY], p. 35).

Functions used for recording/playback, etc.





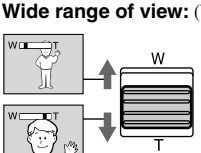


Recording

To use zoom 1, 9

Move the power zoom lever 1 slightly for a slower zoom. Move it further for a faster zoom.

Wide range of view: (Wide angle)



Close view: (Telephoto)

- You can also use the zoom buttons on the LCD panel 9. You cannot change the zoom speed with these buttons.
- The minimum distance required between your camcorder and the subject to get a sharp focus is about 1 cm (about 1/2 inch) for wide angle and about 80 cm (about 2 5/8 feet) for telephoto.
- You can set the [D ZOOM] in case you want to zoom to a level greater than 20 times (p. 42).

To record in dark places (NightShot plus) 2

Set the NIGHTSHOT PLUS switch 2 to ON. (and ["NIGHTSHOT PLUS"] appear.)

- The NightShot plus uses infrared light. Therefore, do not cover the infrared port 6 with your fingers or other objects.
- Adjust the focus manually ([FOCUS], p. 32) when it is hard to focus automatically.
- Do not use these functions in bright places. This may cause a malfunction.

To adjust the exposure for backlit subjects 11

To adjust the exposure for backlit subjects, press BACK LIGHT 11 to display . To cancel the back light function, press BACK LIGHT again.

To adjust the focus for an off center subject (SPOT FOCUS) 10

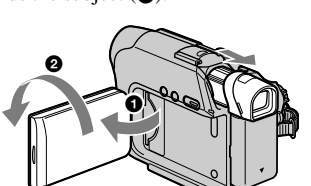
See [SPOT FOCUS] on page 32.

To fix the exposure for the selected subject (Flexible spot meter) 10

See [SPOT METER] on page 32.

To record in mirror mode 8

Open the LCD panel 8 90 degrees to the camcorder (❶), then rotate it 180 degrees towards the subject (❷).



• A mirror-image of the subject appears on the LCD screen, but the picture will be normal when recorded.

To use a tripod 13

Attach the tripod (optional: the length of the screw must be less than 5.5 mm (7/32 inches)) to the tripod receptacle 13 using a tripod screw.

Playback

To play back the images with added special effects..... 10

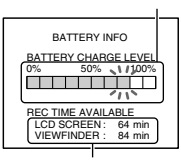
See [P EFFECT] on page 40.

Recording/playback

To check the remaining battery (Battery Info) 12

Set the POWER switch up to OFF (CHG), then press DISP/BATT INFO 12. The battery information appears for about 7 seconds. Keep the button pressed to view it for about 20 seconds.

Remaining battery (approx.)



Recording capacity (approx.)

To turn off the operation confirmation beep 10

See [BEEP] on page 46.

To initialize the settings 4

Press RESET 4 to initialize all the settings, including the setting of the date and time.

Other part names and functions

3 Speaker
Sounds come out from the speaker.
• For how to adjust the volume, see page 21.

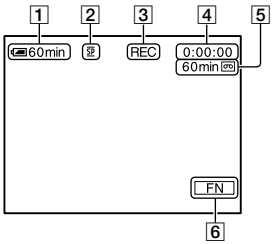
7 REC lamp
The REC lamp lights up in red during recording (p. 47).

6 Remote sensor
Point the Remote Commander (p. 28) towards the remote sensor to operate your camcorder.

5 Internal stereo microphone

Indicators displayed during recording/playback

Recording



1 Remaining battery (approx.)

2 Recording mode (SP or LP) (45)

3 Recording status ([STBY] (standby) or [REC] (recording))

4 Time code (hour: minute: second: frame)/Tape counter (hour: minute: second)/Tape photo recording (20)

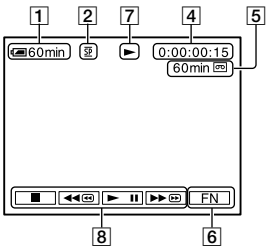
5 Recording capacity of the tape (approx.) (45)

6 Function button (31)

Data code during playback

The date/time data and the camera setting data will be recorded automatically. They do not appear on the LCD panel or viewfinder during recording, but you can check them as [DATA CODE] during playback (p. 35).

Viewing



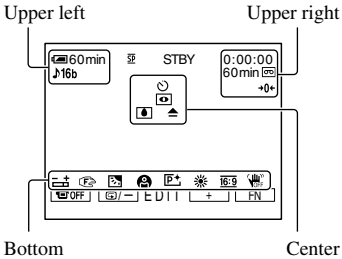
7 Tape transport indicator

8 Video operation buttons (19, 21)

( ) is a reference page.
The indicators during recording will not be recorded.

Indicators when you made changes

The following indicator is displayed if you change the setting during recording or playing.



Upper left

Indicator	Meaning
♪16b	AUDIO MODE (45)
ϟ+ ϟ−	FLASH MODE (41)/ FLASH LVL (41)

Upper right

Indicator	Meaning
DV IN	DV input (50)
→0←	Zero set memory (28)

Center

Indicator	Meaning
	Self-timer recording (34)
	NightShot plus (22)
	Warning (74)

Bottom

Indicator	Meaning
	Flexible spot meter (32)/ Manual exposure (33)
	Manual focus (32)
	Backlight (22)
	PROGRAM AE (40)
P	Picture effect (40)
	White balance (33)
16:9	Wide select (42)
OFF	SteadyShot off (42)

• You can use [DISP GUIDE] (p. 15) to check the function of each indicator that appears on the LCD screen.

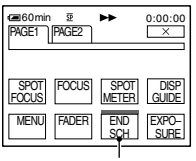
Searching for the starting point

Make sure that the CAMERA lamp lights up.

Searching for the last scene of the most recent recording (END SEARCH)

[END SCH] (END SEARCH) will not work once you eject the cassette after you have recorded on the tape.

Touch FN → [PAGE1], then touch [END SCH].



Touch here again to cancel the operation.

The last scene of the most recent recording is played back for about 5 seconds, and the camcorder enters the standby mode at the point where the last recording has finished.

- [END SCH] will not work correctly when there is a blank section between recorded sections on the tape.
- When the PLAY/EDIT lamp lights up, you can do this operation.

Searching manually (EDIT SEARCH)

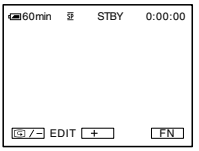
You can search for the start point to start the next recording while viewing the pictures on the screen. The sound is not played back during the search.

1 Touch FN → [PAGE1] → [MENU].

2 Select (CAMERA SET) with ↓/↑, then touch [EXEC].

3 Select [EDITSEARCH] with ↓/↑, then touch [EXEC].

4 Select [ON] with ↓/↑, then touch [EXEC] → ×.



5 Touch and hold (to go backward)/+ (to go forward) and release it at the point where you want the recording to start.

Reviewing the most recently recorded scenes (Rec review)

You can view a few seconds of the scene recorded just before you stopped the tape.

1 Touch FN → [PAGE1] → [MENU].

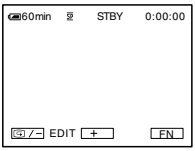
2 Select (CAMERA SET) with ↓/↑, then touch [EXEC].

3 Select [EDITSEARCH] with ↓/↑, then touch [EXEC].

4 Select [ON] with ↓/↑, then

touch [EXEC] → [×].

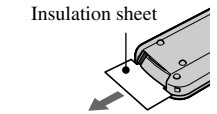
5 Touch [⏮/−].

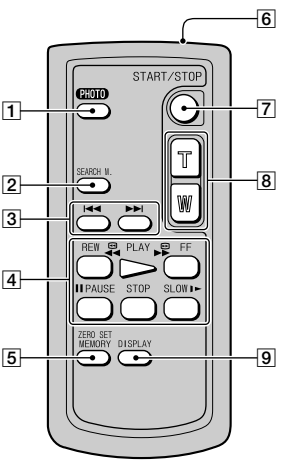


The last few seconds of the most recently recorded scene are played back. Then, your camcorder is set to the standby.

Remote Commander

Remove the insulation sheet before using the Remote Commander.





1 PHOTO* (p. 20)
The image displayed on the screen when you press this button will be recorded as a still image.

2 SEARCH M.*

3 ⏮ ⏭ *

4 Video control buttons (Rewind, Playback, Fast-forward, Pause, Stop, Slow) (p. 19, 21)

5 ZERO SET MEMORY*

6 Transmitter

7 REC START/STOP (p. 19, 20)

8 Power zoom (p. 18, 22)

9 DISPLAY (p. 15)
Press this button to hide the screen indicators.

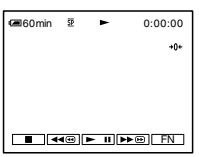
* These buttons are not available during Easy Handycam operation.

- Point the Remote Commander towards the remote sensor to operate your camcorder (p. 23).
- To change the battery, see page 84.

Searching quickly for a desired scene (Zero set memory)

1 During playback, press ZERO SET MEMORY 5 at a point you want to locate later on.

The tape counter is reset to “0:00:00” and →0← appears on the screen.



If the tape counter is not displayed, press DISPLAY 9.

2 Press STOP 4 when you want to stop playback.

3 Press ◀◀REW 4.

The tape stops automatically when the tape counter reaches “0:00:00.”

4 Press PLAY 4.

Playback starts from the point designated “0:00:00” on the tape counter.

- There may be a discrepancy of several seconds between the time code and the tape counter.
- Zero set memory will not function correctly if there is a blank section between recorded sections on the tape.

To cancel the operation

Press ZERO SET MEMORY 5 again.

Searching for a scene by date of recording (Date search)

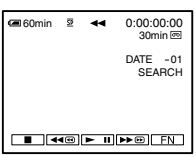
You can locate the point where the recording date changes.

1 Slide the POWER switch down repeatedly to turn on the PLAY/EDIT lamp.

2 Press SEARCH M. 2 to select [DATE SEARCH].

3 Press I◄◄ (previous)/►►I (next) 3 to select a recording date.

Each time you press I◄◄ or ►►I, your camcorder searches for the previous or next date from the current point on the tape.



To cancel the operation

Press STOP 4.

- The Date search will not function correctly when there is a blank section between recorded sections on the tape.

Searching for a still image (Photo search)

Your camcorder can search for the still image automatically, regardless of the recording date.

1 Slide the POWER switch down repeatedly to turn on the PLAY/EDIT lamp.

2 Press SEARCH M. 2 to select [PHOTO SEARCH].

3 Press I◄◄ (previous)/►►I (next) 3 to select a photo.

Each time you press I◄◄ or ►►I, your camcorder searches for the still image before or after the current point on the tape.

To cancel the operation

Press STOP 4.

- The Photo search will not function correctly if there is a blank section between recorded sections on the tape.

Playing back still images in sequence (Photo scan)

You can locate still images one after another and display each image for 5 seconds automatically.

1 Slide the POWER switch down repeatedly to turn on the PLAY/EDIT lamp.

2 Press SEARCH M. 2 to select [PHOTO SCAN].

3 Press I◄◄ (previous)/►►I (next) 3.

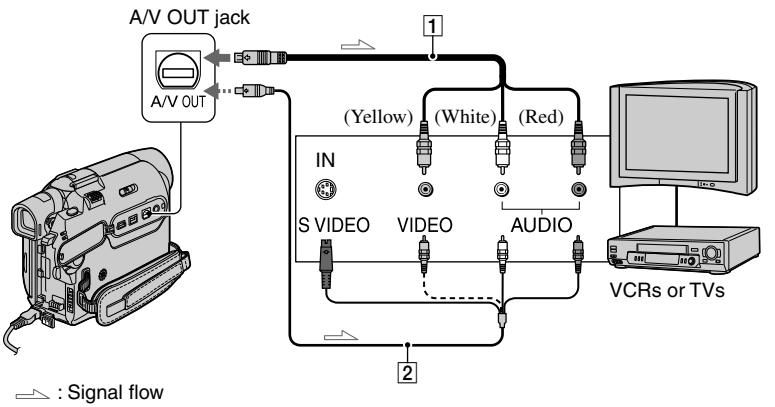
To cancel the operation

Press STOP 4.

- The Photo scan will not function correctly if there is a blank section between recorded sections on the tape.

Playing the picture on a TV

Use any of the connection as shown in the following illustration. Connect your camcorder to the wall outlet using the supplied AC Adaptor for this operation (p. 11). Refer also to the instruction manuals supplied with the devices to be connected.



1 A/V connecting cable (supplied)
Connect to the input jack of the other device.

2 A/V connecting cable with S VIDEO (optional)
When connecting to another device via the S VIDEO jack, by using the A/V connecting cable with an S VIDEO cable (optional), pictures can be reproduced more faithfully than with the supplied A/V cable connection.
Connect the white and red plugs (left/right audio) and S VIDEO plug (S VIDEO channel) of an A/V connecting cable (optional). In this case, the yellow (standard video) plug connection is not necessary.
S VIDEO connection only will not output audio.

When your TV is connected to a VCR

Connect your camcorder to the LINE IN input on the VCR. Set the input selector on the VCR to LINE.

When your TV is monaural (When your TV has only one audio input jack)

Connect the yellow plug of the A/V connecting cable to the video input jack and connect the white (left channel) or the red (right channel) plug to the audio input jack of your TV or VCR.

- You can display the time code on the TV screen by setting [DISP OUT] to [V-OUT/LCD] (p. 47).

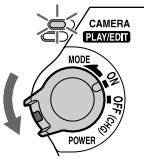
Using the menu items

Follow the instructions below to use each of the items listed after this page.

1 Slide the POWER switch down to turn on the respective lamp.

[CAMERA] lamp: settings for recording on a tape

[PLAY/EDIT] lamp: settings for viewing/editing



2 Touch the LCD screen to select the item.

Unavailable items will be grayed out.

■ To use the operation buttons on PAGE1/PAGE2/PAGE3

For details of the button items, see page 32.

① Touch [FN].

② Touch the desired page.

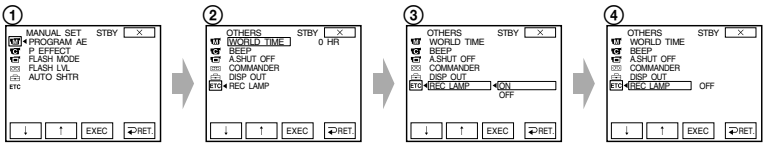
③ Touch the desired button.

④ Select the desired setting, then touch [OK] → [×] (Close).

- With some settings, you do not have to touch [OK].

■ To use menu items

For details of the items, see page 40.



① Touch [FN] → [MENU] on PAGE1.

The menu index screen appears.

② Select the desired menu.

Touch [↓]/[↑] to select the item, then touch [EXEC]. (The process in step ③ and ④ is the same as that in step ②.)

③ Select the desired item.

④ Customize the item.

After finishing the settings, touch [×] (Close) to hide the menu screen.

Each touch of [RET.] takes you to the previous screen.

Operation button items

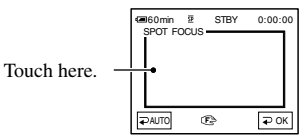
Available operation buttons vary depending on the position of the lamp and the display (PAGE).
The default settings are marked with ▶.
The indicators in parentheses appear when the items are selected.
The available functions during Easy Handycam operation are marked with *.
See page 31 for details on selecting button items.

When the CAMERA lamp lights up

[PAGE1]

SPOT FOCUS

You can select and adjust the focal point to aim it at a subject not located in the center of the screen.



Touch the point where you want to focus on in the frame.
appears.

To adjust the focus automatically, touch [AUTO] or set [FOCUS] to [AUTO].

- If you set [SPOT FOCUS], [FOCUS] is automatically set to [MANUAL].

FOCUS

You can adjust the focus manually. Select this when you want to focus on a certain subject intentionally.

① Touch [MANUAL].
appears.

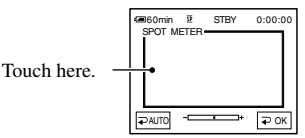
② Keep touching (focusing on close subjects)/ (focusing on distant subjects) until correct focus is achieved. appears when the focus cannot be adjusted any closer, and appears when the focus cannot be adjusted farther away.

To adjust the focus automatically, touch [AUTO].

- It is easier to focus on the subject by moving the power zoom lever towards T (telephoto) to adjust the focus, then towards W (wide angle) to adjust the zoom for recording. When you want to record a close subject, move the power zoom lever towards W (wide angle), then adjust the focus.

SPOT METER (Flexible spot meter)

You can adjust and fix the exposure to the subject, so that it is recorded in suitable brightness even when there is strong contrast between the subject and the background, such as subjects in the spotlight on stage.



Touch the point where you want to fix and adjust the exposure on the screen.
The bar indicator appears.

To return the setting to automatic exposure, touch [AUTO] or set [EXPOSURE] to [AUTO].

- If you set [SPOT METER], [EXPOSURE] is automatically set to [MANUAL].

DISP GUIDE (Display Guide)*

See page 15.

MENU*

See page 38.

FADER

You can add the following effects to currently recording pictures.

① Select the desired effect.
② Press REC START/STOP.
The fader indicator stops flashing and disappears when the fade is complete.

To cancel the operation, touch [↩ OFF].

Fading out Fading in

WHITE FADER

BLACK FADER

MOSAIC FADER

MONOTONE FADER

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

- You can adjust [EXPOSURE] and [FADER] while using the viewfinder by having the LCD panel rotated 180 degrees and closed with the screen facing out.

1 Make sure that the CAMERA lamp lights up.
2 Close the LCD panel with the screen facing out.
[OFF] appears.
3 Touch [OFF].
4 Touch [OK].
The LCD screen is turned off.
5 Touch the LCD screen while checking the display in the viewfinder.
[EXPOSURE], etc. are displayed.
6 Touch the button you want to set.
[EXPOSURE] : Adjust with [−]/[+], and touch [↩OK].
[FADER] : Touch it repeatedly to select a desired effect.
[ON] : The LCD screen lights up.

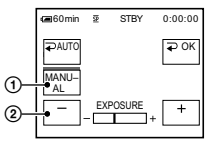
To hide the buttons, touch [↩OK].

END SCH (END SEARCH)

See page 26.

EXPOSURE

You can fix the brightness of a picture manually. When recording indoors on a clear day, for instance, you can avoid backlight shadows on people next to the window by fixing the exposure to that of the wall side of the room.



① Touch [MANUAL].
The bar indicator appears.
② Adjust the exposure by touching [−]/[+].

To return the setting to automatic exposure, touch [↩AUTO].

[PAGE2]

WHT BAL (White balance)

You can adjust the color balance to the brightness of the recording environment.

►↩AUTO
The white balance is adjusted automatically.

Continued ➡

OUTDOOR (☀)

The white balance is set to be appropriate for shooting outdoors or under daylight fluorescent light.

INDOOR (💡)

The white balance is set to the brightness of warm white fluorescent lamps.

ONE PUSH

The white balance will be adjusted according to the ambient light.

① Touch [ONE PUSH].

② Frame a white object such as a piece of paper, to fill the screen under the same lighting conditions as you will shoot the subject.

③ Touch [ONE PUSH].

flashes quickly. When the white balance has been adjusted and stored in the memory, the indicator stops flashing.

- Do not shake your camcorder while is flashing quickly.
- flashes slowly if white balance could not be set.
- If keeps flashing even after you have touched [OK], set [WHT BAL] to [AUTO].

- When you have changed the battery pack while [AUTO] is selected, or you bring your camcorder outdoors from inside the house while using fixed exposure, select [AUTO] and aim your camcorder at a nearby white object for about 10 seconds for better color balance adjustment.
- Redo the [ONE PUSH] procedure if you change the [PROGRAM AE] settings, or bring your camcorder outdoors from inside the house, or vice versa.
- Set [WHT BAL] to [AUTO] or [ONE PUSH] under white or cool white fluorescent lamps.
- The setting returns to [AUTO] when you have the power source disconnected from your camcorder for more than 5 minutes.

SELF TIMER

The self-timer starts recording after about 10 seconds.

① Touch [FN]→[PAGE2]→[SELF TIMER]. appears.

② Touch [×].

③ Press REC START/STOP to record movies, or PHOTO to record still images. To cancel the count down during recording movies, press REC START/STOP.

To cancel the self-timer, redo step ①.

- You can also use the self-timer with the Remote Commander (p. 28).

LCD BRT (LCD bright)

You can adjust the brightness of the LCD screen. The recorded picture will not be affected by this operation.

Adjust the brightness with [−]/[+].

When the PLAY/EDIT lamp lights up

You can use the video operation buttons ([■]/[◄◄]/[►II]/[►►]) on every PAGE.

[PAGE1]

MENU*

See page 38.

VOL* (Volume)

See page 21.
[VOLUME] is displayed during Easy Handycam operation.

END SCH (END SEARCH)

See page 26.

DISP GUIDE (Display Guide)*

See page 15.

[PAGE2]

DATA CODE*

Displays information recorded automatically (data code) during recording.

►⮌ OFF

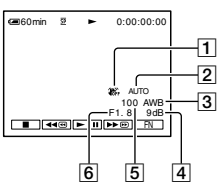
Data code is not displayed.

DATE/TIME

Displays the date and time.

CAM DATA (below)

Displays camera setting data.



1 SteadyShot off
2 Exposure
3 White balance
4 Gain
5 Shutter speed
6 Aperture value

- In the DATE/TIME data display, the date and time are displayed in the same area. If you record a picture without setting the clock, [--- ----] and [--:--:--] will appear.

LCD BRT (LCD bright)

You can adjust the brightness of the LCD screen. The recorded picture will not be affected by this operation.

Adjust the brightness with [−]/[+].

BURN DVD

When your camcorder is connected to a Sony VAIO series personal computer, you can easily burn the picture recorded on the tape to a DVD (Direct Access to "Click to DVD"). (p. 60)

BURN VCD

When your camcorder is connected to a personal computer, you can easily burn the picture recorded on the tape to a CD-R (Direct Access to Video CD Burn).
For details, see "First Step Guide" stored on the supplied CD-ROM.

[PAGE3]

V SPD PLAY (Various speed playback)

You can play back in various modes while viewing movies.

① Touch the following buttons during playback.

To	Touch
change the playback direction*	◄II<(frame)
play back slowly**	[I► SLOW] To reverse direction : ◄II<(frame) → [I► SLOW]
play back 2 times faster (double speed)	×2(double speed) To reverse direction: ◄II<(frame) → ×2(double speed)
play back frame by frame	>II►(frame) during playback pause. To reverse direction: ◄II<(frame) during frame playback.

* Horizontal lines may appear at the top, bottom, or in the center of the screen. This is not a malfunction.

**Pictures output from the i.LINK DV Interface cannot be played back smoothly in slow mode.

② Touch [⮌RET.] → [×].

To return to the normal playback mode, touch [►II] (Play/Pause) twice (once from frame playback).

Continued ➡

- You will not hear the recorded sound. You may see mosaic-like images of the previously played picture.

A DUB CTRL (Audio dubbing)

See page 50.

REC CTRL (Recording control)

See page 50.

Menu items

	Position of lamp: CAMERA	PLAY/EDIT
MANUAL SET menu (p. 40)		
PROGRAM AE	●	×
P EFFECT	●	●
FLASH MODE	●	×
FLASH LVL	●	×
AUTO SHTR	●	×
CAMERA SET menu (p. 42)		
D ZOOM	●	×
WIDE SEL	●	×
STEADYSHOT	●	×
EDITSEARCH	●	×
N.S.LIGHT	●	×
VCR SET menu (p. 43)		
HiFi SOUND	×	●
AUDIO MIX	×	●
LCD/VF SET menu (p. 44)		
LCD B.L.	●	●
LCD COLOR	●	●
VF B.L.	●	●
WIDE DISP	●	●
TAPE SET menu (p. 45)		
REC MODE	●	●
AUDIO MODE	●	×
REMAIN	●	●
SETUP MENU menu (p. 45)		
CLOCK SET*	●	●
USB STREAM	●	●
LANGUAGE*	●	●
DEMO MODE	●	×

Available menu items (●) vary depending on the position of the lamp.
* These functions are available during Easy Handycam operation.

	Position of lamp: CAMERA	PLAY/EDIT
ETC OTHERS menu (p. 46)		
WORLD TIME	●	●
BEEP*	●	●
A.SHUT OFF	●	●
COMMANDER	●	●
DISP OUT	●	●
REC LAMP	●	×

MANUAL SET menu

– PROGRAM AE/P EFFECT, etc.

The default settings are marked with ►.
The indicators in parentheses appear when the items are selected.
See page 31 for details on selecting menu items.

PROGRAM AE

You can record pictures effectively in various situations with the PROGRAM AE function.

►AUTO

Select to automatically record pictures effectively without the [PROGRAM AE] function.

SPOTLIGHT*(🚶)

Select to prevent people's faces from appearing excessively white when subjects are lit by strong light.

PORTRAIT (Soft portrait) (👤)

Select to bring out the subject such as people or flowers while creating a soft background.

SPORTS* (Sports lesson) (🏃)

Select to minimize shake when shooting fast moving subjects.

BEACH&SKI*(🏖)

Select to prevent people's faces from appearing dark in strong light or reflected light, such as at a beach in midsummer or on a ski slope.

SUNSETMOON(🌇)**

Select to maintain the atmosphere of situations such as sunsets, general night views or fireworks.

LANDSCAPE(🏔)**

Select to shoot distant subjects clearly. This setting also prevents your camcorder from focusing on glass or metal mesh in windows that comes in between the camcorder and the subject.

- Items with one asterisk (*) can be adjusted to focus on subjects only a short distance away. Items with two asterisks (**) can be adjusted to focus on subjects farther away.

P EFFECT (Picture effect)

You can add special effects to a picture during recording or playback. P✦ appears.

►OFF

Does not use [P EFFECT] setting.

NEG.ART

The color and brightness are reversed.

SEPIA

Pictures appear in sepia.

B&W

Pictures appear in black and white.

SOLARIZE

Pictures appear as an illustration with strong contrast.

PASTEL

Pictures appear as a pale pastel drawing.*

MOSAIC

Pictures appear mosaic-patterned.*

* Available during recording only.

- You cannot add effects to externally input pictures. Also, you cannot output pictures edited with picture effects via the i.LINK DV Interface.
- You can record pictures edited using effects on another tape (p. 49).

FLASH MODE

Note that these settings will not function with unsupported flashes.

►ON

Flashes every time.

AUTO

Flashes automatically.

FLASH LVL (Flash level)

Note that these settings will not function with unsupported flashes.

HIGH

Makes the flash level higher.

►NORMAL

LOW

Makes the flash level lower.

- The setting returns to [NORMAL] when you disconnect the power source from your camcorder for more than 5 minutes.

AUTO SHTR (Auto shutter)

Automatically activates the electronic shutter to adjust the shutter speed when recording in bright conditions if you set it to ON (the default setting).

CAMERA SET menu

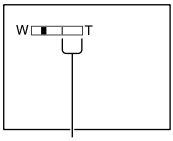
– D ZOOM/WIDE SEL/STEADYSHOT, etc.

The default settings are marked with ►. The indicators in parentheses appear when the items are selected.

See page 31 for details on selecting menu items.

D ZOOM (Digital zoom)

You can select the maximum zoom level in case you want to zoom to a level greater than 20 × (the default setting) while recording on a tape. Note that the image quality decreases when you are using the digital zoom.



The right side of the bar shows the digital zooming factor. The zooming zone appears when you select the zooming level.

►OFF

Up to 20 × zoom is performed optically.

40 ×

Up to 20 × zoom is performed optically, and after that, up to 40 × zoom is performed digitally.

800 ×

Up to 20 × zoom is performed optically, and after that, up to 800 × zoom is performed digitally.

WIDE SEL (Wide select)

You can record a picture in a ratio suitable for the screen on which it will be displayed.

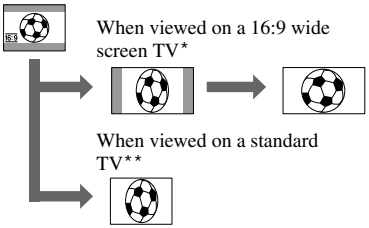
►4:3

Standard setting (to record pictures to be played back on a 4:3 TV).

16:9 WIDE (16:9)

Records pictures to be played back on a 16:9 wide TV in full screen mode.

When viewed on the LCD screen/viewfinder with [16:9 WIDE (16:9)] selected.



* Picture appears in full screen mode when the wide-screen TV switches to full mode.

**Played in 4:3 mode. When you play a picture in the wide mode, it appears as you have seen on the LCD screen or in the viewfinder.

STEADYSHOT

You can compensate for camera-shake (the default setting is [ON]). Set [STEADYSHOT] to [OFF] (OFF) when using a tripod (optional) or the conversion lens (optional).

EDITSEARCH

►OFF

Does not display / – or + on the LCD screen.

ON

Displays / – and + on the LCD screen, and enables the EDIT SEARCH function and Rec review (p. 26).

N.S.LIGHT (NightShot Light)

When using the NightShot plus (p. 22) function to record, you can record clearer pictures by setting [N.S.LIGHT], which emits infrared light (invisible), to [ON] (the default setting).

• Do not cover the infrared port with your fingers or other objects.

- The maximum shooting distance using [N.S.LIGHT] is about 3 m (10 feet). If you record subjects in dark places, such as night scenes or in moonlight, set [N.S.LIGHT] to [OFF]. You can make the image color deeper this way.

VCR SET menu

– HiFi SOUND/AUDIO MIX

The default settings are marked with ►. The indicators in parentheses appear when the items are selected.
See page 31 for details on selecting menu items.

Hifi SOUND

You can select whether to play back audio recorded using other devices with dual sound or stereo sound.

►STEREO

Plays back with main and sub sound (or stereo sound).

1

Plays back with main sound or the left channel sound.

2

Plays back with sub sound or the right channel sound.

- You can play back, but cannot record a dual sound track cassette on your camcorder.
- The setting returns to [STEREO] when you have the power source disconnected from your camcorder for more than 5 minutes.

AUDIO MIX

See page 51.

LCD/VF SET menu

– LCD B.L./LCD COLOR/VF B.L., etc.

The default settings are marked with ►. The indicators in parentheses appear when the items are selected.
See page 31 for details on selecting menu items.

LCD B.L. (LCD back light)

You can adjust the brightness of the LCD screen's backlight.

►BRT NORMAL
Standard brightness.

BRIGHT
Brightens the LCD screen.

- When you connect your camcorder to outside power sources, [BRIGHT] is automatically selected for the setting.
- When you select [BRIGHT], battery life is reduced by about 10 percent during recording.

LCD COLOR

You can adjust the color on the LCD screen with [↓]/[↑]. The recorded picture will not be affected by this operation.

Low intensity High intensity

VF B.L. (Viewfinder brightness)

You can adjust the brightness of the viewfinder.

►BRT NORMAL
Standard brightness.

BRIGHT
Brightens the viewfinder screen.

- When you connect your camcorder to outside power sources, [BRIGHT] is automatically selected for the setting.
- When you select [BRIGHT], battery life is reduced by about 10 percent during recording.

WIDE DISP (Wide display)

You can select how a 16:9 aspect ratio picture appears in the viewfinder and the LCD screen by setting [WIDE SEL] to [16:9 WIDE (16:9)].

►LETTER BOX
Normal setting (standard type of display)

SQUEEZE
Expands the picture vertically when black bands appear at the top and bottom of the screen in 16:9 aspect ratio.

TAPE SET menu

– REC MODE/AUDIO MODE/REMAIN

The default settings are marked with ►. The indicators in parentheses appear when the items are selected.
See page 31 for details on selecting menu items.

REC MODE (Recording mode)

►SP (SP)

Records in the SP (Standard Play) mode on a cassette.

LP (LP)

Increases the recording time to 1.5 times the SP mode (Long Play).

- You can record about 510 images in the SP mode and about 765 images in the LP mode on a 60 minutes tape.
- If you record in the LP mode, a mosaic-like noise may appear or sound may be interrupted when you play back the tape on other camcorders or VCRs.
- When you mix recordings in the SP mode and in the LP mode on one tape, the playback picture may be distorted or the time code may not be written properly between the scenes.

AUDIO MODE

►12BIT

Records in the 12-bit mode (2 stereo sounds).

16BIT (♪16b)

Records in the 16-bit mode (1 stereo sound with high quality).

REMAIN

►AUTO

Displays the remaining tape indicator for about 8 seconds in situations such as those described below.

- When you set the POWER switch to PLAY/EDIT or CAMERA with a cassette inserted.
- When you touch ►II (play/pause).

ON

Always displays the remaining tape indicator.

SETUP MENU menu

– CLOCK SET/USB STREAM/LANGUAGE, etc.

The default settings are marked with ►. The indicators in parentheses appear when the items are selected.
See page 31 for details on selecting menu items.

CLOCK SET

See page 16.

USB STREAM

You can view the pictures displayed on the screen of your camcorder on your computer (USB Streaming) via the USB cable. See page 59.

LANGUAGE

You can select the language to be used on the LCD screen.
You can select from English, Simplified English, Canadian-French, Latin American Spanish, Brazilian-Portuguese, or Korean.

- Traditional Chinese is also available on menu for customers who bought this product in Asia, Middle East, Canada, Latin America or in Japan (as an Overseas Model).
- Your camcorder offers [ENG[SIMP]] (simplified English) for when you cannot find your native tongue among the options.

DEMO MODE

The default setting is [ON], allowing you to view the demonstration in about 10 minutes, after you have removed a cassette from your camcorder, and slide the POWER switch down to turn on the CAMERA lamp.

- The demonstration will be suspended in situations such as those described below.
  - – When you touch the screen during the demonstration. (The demonstration starts again in about 10 minutes.)

Continued ➡

– When a cassette is inserted.
– When the POWER switch is set to other than CAMERA.
– When NIGHTSHOT PLUS is set to ON.

ETC OTHERS menu

– WORLD TIME/BEEP, etc.

The default settings are marked with ►. The indicators in parentheses appear when the items are selected.
See page 31 for details on selecting menu items.

WORLD TIME

When using your camcorder abroad, you can set the time difference by touching [↓]/[↑], the clock will be adjusted in accordance with the time difference.
If you set the time difference to 0, the clock returns to the originally set time.

BEEP

►ON
A melody sounds when you start/stop recording, or operate the touch panel.

OFF
Cancels the melody.

A.SHUT OFF (Auto shut off)

►5 min
The camcorder is automatically turned off when you do not operate your camcorder for more than approximately 5 minutes.

NEVER
The camcorder is not automatically turned off.

• When you connect your camcorder to a wall outlet, [A.SHUT OFF] is automatically set to [NEVER].

COMMANDER

The default setting is [ON], allowing you to use the Remote Commander (p. 28).

• Set to [OFF] to prevent your camcorder from responding to a command sent by another VCR remote control unit.

• The setting returns to [ON] when you have the power source disconnected from your camcorder for more than 5 minutes.

DISP OUT (Display output)

►LCD

Shows displays such as the time code on the LCD screen and in the viewfinder.

V-OUT/LCD

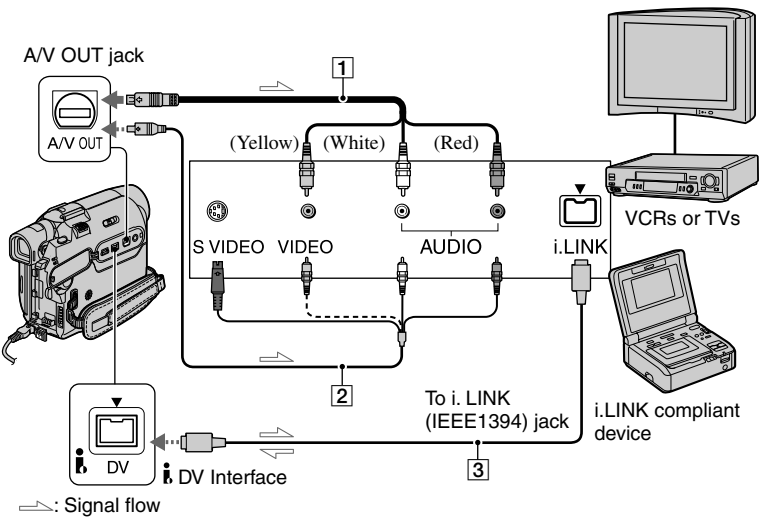
Shows displays such as the time code on the TV screen, LCD screen, and in the viewfinder.

REC LAMP (Recording lamp)

The camera recording lamp will not light up during recording when you set this to [OFF]. (The default setting is [ON].)

Connecting to a VCR or TV

Use any of the connection as shown in the following illustration. Connect your camcorder to the wall outlet using the supplied AC Adaptor for this operation (p. 11). Refer also to the instruction manuals supplied with the devices to be connected.



1 A/V connecting cable (supplied)

2 A/V connecting cable with S VIDEO (optional)

When connecting to another device via the S VIDEO jack, by using the A/V connecting cable with an S VIDEO cable (optional), pictures can be reproduced more faithfully than with the supplied A/V cable connection.

Connect the white and red plugs (left/right audio) and S VIDEO plug (S VIDEO channel) of an A/V connecting cable (optional). In this case, the yellow (standard video) plug connection is not necessary. S VIDEO connection only will not output audio.

3 i.LINK cable (optional)

Use an i.LINK cable to connect your camcorder to another device. The video and audio signals are transmitted digitally, producing high quality pictures.
Note that you cannot output the picture and sound separately.

When your TV is monaural (When your TV has only one audio input jack)

Connect the yellow plug of the A/V connecting cable to the video input jack and connect the white (left channel) or the red (right channel) plug to the audio input jack of your TV or VCR.

- When you connect a device via an A/V connecting cable (supplied), set [DISP OUT] to [LCD] (the default setting) (p. 47) to prevent the screen display dubbed with pictures.

Dubbing to other recording devices

You can copy the picture played back on your camcorder to other recording devices (such as VCRs).

1 Connect your VCR to your camcorder as a recording device.

See page 48 for details of connecting.

- When using an A/V connecting cable, connect to the input jack of the other device.

2 Prepare your VCR for recording.

When dubbing to the VCR, insert a cassette for recording.
When dubbing to the DVD recorder, insert a DVD for recording.

If your recording device has an input selector, set it to the input mode.

3 Prepare your camcorder for playback.

Insert the recorded cassette.

Slide the POWER switch down to turn on the PLAY/EDIT lamp.

4 Start the playback on your camcorder, and record it on the VCR.

Refer to the operating instructions supplied with your recording device for details.

5 When the dubbing is finished, stop your camcorder and the VCR.

- When you connect a device via an A/V connecting cable (supplied), set [DISP OUT] to [LCD] (the default setting) (p. 47) to prevent the screen display dubbed with pictures.
- To record the date/time and camera settings data by using the A/V connecting cable, display them on the screen (p. 35).
- The following cannot be output via the i.LINK DV interface:
  - Titles that are recorded on other camcorder.
  - Indicators
  - [P EFFECT]
- When connected using an i.LINK cable, the recorded picture becomes rough when a picture is paused on your camcorder while recording to a VCR.

Recording pictures from a VCR

You can record pictures from a VCR on a tape. Insert a cassette for recording in your camcorder beforehand.

1 Connect your VCR to your camcorder.

Use an i.LINK cable to connect.
See page 48 for details of connecting.

- The DV IN indicator appears when you connect your camcorder and other devices via an i.LINK cable.

2 Slide the POWER switch down to turn on the PLAY/EDIT lamp.

3 Set your camcorder to recording pause mode.

Touch FN →[PAGE3]→[REC CTRL]→[REC PAUSE].

4 Start playing the cassette on your VCR.

The picture played on the connected device appears on the LCD screen of your camcorder.

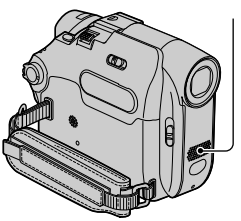
5 Touch [REC START] at the point you want to start recording.

6 Touch ■ (stop).

7 Touch [↩RET.] → ×.

Dubbing sound to a recorded tape

You can add sound to a tape already recorded in the 12-bit mode (p. 45) without erasing the original sound.



You can record audio by using the internal microphone.

- You cannot record additional audio:
  - When the tape is recorded in the 16-bit mode (p. 45).
  - When the tape is recorded in the LP mode.
  - When the tape is recorded on another device with a 4ch microphone (4CH MIC REC).
  - When the tape is recorded in a TV color system other than that of your camcorder.
  - When your camcorder is connected via an i.LINK cable.
  - On blank sections of the tape.
  - When the write-protect tab of the cassette is set to SAVE.
- When you add sound, the picture will not be output from the A/V OUT jack. Check the picture on the LCD screen or the viewfinder.

Recording sound

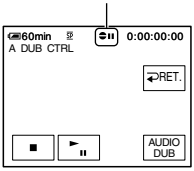
Insert a recorded cassette into your camcorder beforehand.

1 Slide the POWER switch down to turn on the PLAY/EDIT lamp.

2 Touch ►II (play/pause) to play back the tape, then touch it again at the point where you want to start recording the sound.

3 Touch FN → [PAGE3] → [A DUB CTRL] → [AUDIO DUB].

⏀ appears



4 Touch ► II (play) and start playing back the audio you want to record at the same time.

⏀ appears while recording the new sound in stereo 2 (ST2) during the playback of the tape.

5 Touch ■ (stop) when you want to stop recording.

To dub on other scenes, repeat step **2** to select scenes, then touch [AUDIO DUB].

6 Touch [↩ RET.] → ×.

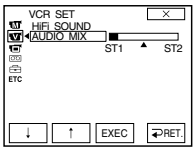
- To set the end point for audio dubbing, press ZERO SET MEMORY on the Remote Commander at the scene at which you want to stop audio dubbing during playback beforehand. After step 2 to 4, the recording stops automatically at the selected scene.
- You can only record additional audio over a tape recorded on your camcorder. The sound may deteriorate when you dub audio on a tape recorded on other camcorders (including other (DCR-HC21) camcorders).

To check the recorded sound

① Play back the tape on which you have recorded audio (p. 21).

② Touch FN → [PAGE1] → [MENU].

③ Select (VCR SET), then touch ↓ / ↑ to select [AUDIO MIX], then touch [EXEC].

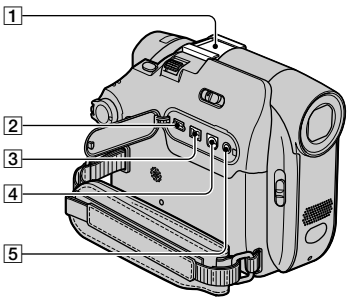


④ Touch ↓/↑ to adjust the balance between the original sound (ST1) and the sound recorded afterwards (ST2), then touch [EXEC].

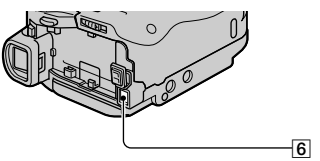
- The original sound (ST1) is output at the default setting.
- The adjusted audio balance returns to the default setting in about 5 minutes after the battery pack or other power sources have been disconnected.

Jacks to connect external devices

Camcorder



Bottom



1 Accessory shoe
- Remove the shoe cover when you use an accessory.
- The accessory shoe has a safety device for fixing the installed accessory securely. To connect an accessory, press down and push it to the end, and then tighten the screw. To remove an accessory, loosen the screw, and then press down and pull out the accessory.

2 ψ (USB) jack (p. 53)

3 i.LINK DV Interface jack (p. 48, 60)

4 A/V (audio/video) OUT jack (p. 30, 48)

5 LANC jack (blue)
- The LANC control jack is used for controlling the tape transport of video devices and peripherals connected to it.

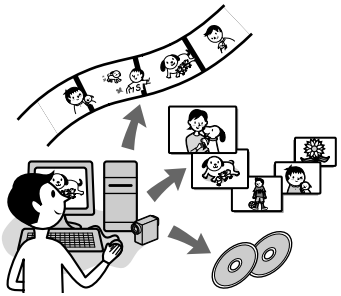
6 DC IN jack (p. 10)

Before referring to the “First Step Guide” on your computer

When you install the Picture Package software on a Windows computer from the supplied CD-ROM, you can enjoy the following operations by connecting your camcorder to your computer.

- Software and features available for Macintosh computers differ from those available for Windows computers. For details, refer to chapter 6 of “First Step Guide” on CD-ROM. For “First Step Guide,” see the next section.
- There are 2 ways to connect your camcorder to a computer.
  - USB cable
    This method is good for copying video and sound recorded on a tape to the computer.
  - i.LINK cable (only for Windows user)
    This method is good for copying video and sound recorded on a tape. Image data is transferred in more clarity than with a USB cable.

For details on connection, see “First Step Guide.”



Viewing video and pictures on a computer

You can view the pictures copied from your camcorder by selecting from thumbnails. Still images and movies are saved in folders by date.

Music Video/Slideshow Producer

You can select your favorite movies and still images from pictures saved on your computer and easily create a short original video or slide show with added music and visual styles.

Automatic Music Video Producer

You can easily create a short original video with added music and visual styles using pictures recorded on a tape.

Copying tape to Video CD

You can import the entire contents of a tape to create a video CD.

Save the images on CD-R

You can save pictures copied onto a computer to a CD-R as a backup.

Burning Video CD

You can compose a video CD with a menu of videos and slide shows. ImageMixer VCD2 is compatible with high resolution still pictures.

USB Streaming Tool

You can view the picture your camcorder is playing back on tape or is currently seeing on a computer.

Video Capturing Tool

You can import the entire contents of a tape to a computer.

- The CD-ROM (supplied) includes the following software.
  - USB Driver
  - “First Step Guide”
  - ImageMixer VCD2
  - Picture Package Ver.1.5

Continued ➡

About "First Step Guide"

"First Step Guide" is an instruction manual you can refer to on your computer.
This "First Step Guide" describes basic operations, from initial hookup of your camcorder and computer and making settings, to general operation the first time you use the software stored on the CD-ROM (supplied). After installing the CD-ROM, reading "Installing the software and "First Step Guide" on a computer" (p. 55), start the "First Step Guide," then follow the instructions.

About the help function of the software

The Help guide explains all the functions of all the software applications. Refer to the Help guide for further detailed operations after reading the "First Step Guide" thoroughly. To display the Help guide, click the [?] mark on the screen.

System requirements

■ For Windows users

When using Picture Package

OS: Microsoft Windows 98, Windows 98SE, Windows 2000 Professional, Windows Millennium Edition, Windows XP Home Edition or Windows XP Professional Standard installation is required.
Operation is not assured if the above OS has been upgraded.
In Windows 98, USB Streaming is not supported.
In Windows 98 and Windows 98SE, DV capturing is not supported.

CPU: Intel Pentium III 500 MHz or faster (800 MHz or faster recommended) (For using ImageMixer VCD2, Intel Pentium II 800 MHz or faster recommended)

Application: DirectX 9.0c or later (This product is based on DirectX technology. It is necessary to have DirectX installed.)
Windows Media Player 7.0 or later
Macromedia Flash Player 6.0 or later

Sound system: 16 bit stereo sound card and stereo speakers

Memory: 64 MB or more

Hard disk: Available memory required for installation: 500 MB or more
Available free hard disk space recommended: 6 GB or more (depending on the size of the image files edited)

Display: 4 MB VRAM video card, Minimum 800 × 600 dots, High color (16 bit color, 65 000 colors), DirectDraw display driver capability (This product will not operate correctly at less than 800 × 600 dots, and less than 256 colors.)

Others: USB port (This must be provided as standard), DV Interface (IEEE1394, i.LINK) (to connect via an i.LINK cable), disc drive (You need a CD-R drive to create a video CD.
For the compatible drive, visit the follog URL:
http://www.ppackage.com/)

■ For Macintosh users

When using ImageMixer VCD2

OS: Mac OS X (v10.1.5 or later)

CPU: iMac, eMac, iBook, PowerBook, PowerMac G3/G4/G5 series

Memory: 128 MB or more

Hard disk: Available memory required for installation 250 MB or more
Available free hard disk space recommended: 4 GB or more (depending on the size of the image files edited)

Display: Minimum 1 024 × 768 dots, 32 000 colors (This product will not operate correctly at less than 1 024 × 768 dots or 256 colors.)

Application: QuickTime 4 or later (QuickTime 5 recommended)

Other: Disc drive

- When you connect your camcorder to a Macintosh computer using a USB cable, you cannot copy pictures recorded on a tape to the computer. To copy recordings from a tape, connect your camcorder to the computer with an i.LINK cable and use the standard software in the OS.

Installing the software and "First Step Guide" on a computer

You need to install the software etc., with the supplied CD-ROM on your computer **before connecting your camcorder** and your computer. Once you install it, the installation is not required thereafter.
The software to be used varies depending on the OS system you are using.
Windows computer: Picture Package (including ImageMixer VCD2)
Macintosh computer: ImageMixer VCD2
For the details on the software, refer to "First Step Guide."

Installing on a Windows computer

Log on as Administrators for installation for Windows 2000/Windows XP.

1 Confirm that your camcorder is not connected to the computer.

2 Turn on the computer.

Close all applications running on the computer before installing the software.

3 Place the CD-ROM in the disc drive of your computer.

The installation screen appears.

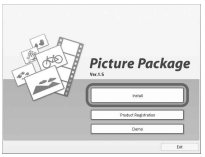
If the screen does not appear

① Double-click [My Computer].
② Double-click [PICTUREPACKAGE] (Disc drive).*

Continued ➡

* Drive names (such as (E:)) may vary depending on the computer.

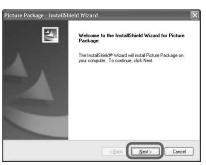
4 Click [Install].



Depending on the OS on the computer, a message appears notifying you that “First Step Guide” cannot be installed automatically with the InstallShield Wizard. In such a case, manually copy “First Step Guide” to your computer according to the message instructions.

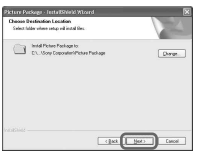
5 Select the language for the application to be installed, then click [Next].

6 Click [Next].



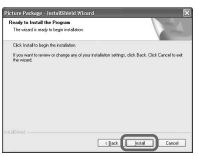
7 Read [License Agreement], check [I accept the terms of the license agreement] when you agree, then click [Next].

8 Select where to save the software, then click [Next].



9 Click [Install] on the [Ready to Install the Program] screen.

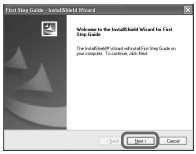
The installation of Picture Package starts.



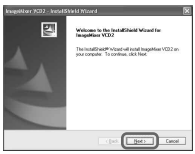
10 Select the language for “First Step Guide” to be installed, then click [Next].

Depending on the computer, this screen may not be displayed. In such a case, skip to step 12.

11 Click [Next] to install the “First Step Guide.”



12 Click [Next], then follow the on-screen instructions to install ImageMixer VCD2.



13 If the [Installing Microsoft (R) DirectX(R)] screen is displayed, follow the steps below to install DirectX 9.0c. If not, skip to step 14.

① Read [License Agreement], then click [Next].

② Click [Next].

③ Click [Finish].

14 Make sure [Yes, I want to restart my computer now.] is checked, then click [Finish].

The computer turns off once, then starts up again automatically (Restart). The short-cut icons for [Picture Package Menu] and [Picture Package Menu destination Folder] (and “First Step Guide,” if installed by steps 11-12) appear on the desktop.

15 Remove the CD-ROM from the disc drive of your computer.

- If you have any questions about Picture Package, contact information is listed on page 59.

Installing on a Macintosh computer

Continued ➡

1 Confirm that your camcorder is not connected to the computer.

2 Turn on the computer.

Close all applications running on the computer before installing the software.

3 Place the CD-ROM in the disc drive of your computer.

4 Double-click CD-ROM icon.

5 Copy [FirstStepGuide.pdf], stored in the desired language in the [FirstStepGuide] folder, to your computer.

6 Then, install ImageMixer VCD2.

7 Copy [IMXINST.SIT] in the [MAC] folder of the CD-ROM to a folder of your choice.

8 Double-click [IMXINST.SIT] in the folder it was copied to.

9 Double-click the unzipped [ImageMixerVCD2_Install].

10 When the user acceptance screen is displayed, enter your name and password.

The installation of ImageMixer VCD2 starts.

• For details on how to use ImageMixer VCD2, refer to the software's on-line help.

Viewing “First Step Guide”

Displaying “First Step Guide”

Starting up on a Windows computer

Viewing with Microsoft Internet Explorer Ver.6.0 or later is recommended.
Double-click the icon on the desktop.

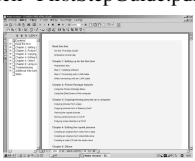
You can also start by selecting [Start], [Programs] ([All Programs] for Windows XP), [Picture Package], and [FirstStepGuide], then start up [FirstStepGuide].

- To view “First Step Guide” in HTML without using automatic installation, copy the desired language folder from the [FirstStepGuide] folder on the CD-ROM, and then double-click “index.html.”
- Refer to “FirstStepGuide.pdf” in the following cases:

– When printing “First Step Guide”
– When “First Step Guide” is not displayed correctly due to the browser setting even in recommended environment.
– When the HTML version of “First Step Guide” is not installed automatically.

Starting up on a Macintosh computer

Double-click “FirstStepGuide.pdf”.



To view the PDF, Adobe Reader is needed. If it is not installed on your computer, you can download it from the Adobe Systems web page:
http://www.adobe.com/

For inquires about this software

Pixela User Support Center

Pixela Home Page
Windows: http://www.ppackage.com/
Macintosh: http://www.ImageMixer.com/
– North America (Los Angeles) Telephone: +1-213-341-0163
– Europe (U.K.) Telephone: +44-1489-564-764
– Asia (Philippines) Telephone: +63-2-438-0090

On Copyrights

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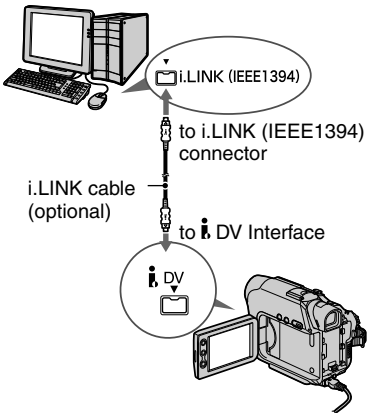
Creating a DVD (Direct Access to “Click to DVD”)

You can create DVDs when you connect your camcorder to a Sony VAIO series computer* that supports “Click to DVD” via an i.LINK cable (optional). The picture is automatically copied and written to a DVD.
The following procedures describe how to create a DVD from a picture recorded on a tape. For system and operation requirements, visit the following URL:

– Europe
http://www.vaio-link.com/
– USA
http://www.ita.sel.sony.com/support/dvimag/
– Asia Pacific Regional
http://www.css.ap.sony.com/
– Korea
http://scs.sony.co.kr/
– Taiwan
http://vaio-online.sony.com/tw/vaio/
– China
http://www.sonystyle.com.cn/vaio/
– Thailand
http://www.sony.co.th/vaio/index.html
– Latin America
http://vaio-online.sony.com/



• You can only use an i.LINK cable for this operation. You cannot use a USB cable.

* Note that you need a Sony VAIO computer equipped with a DVD drive that can be used to write DVDs. You also need the computer with “Click to DVD Ver.1.2” (Sony original software) or later installed.

Using the Direct Access to “Click to DVD” function for the first time

The Direct Access to “Click to DVD” function enables you to copy pictures recorded on a tape to a DVD easily if your camcorder is connected to a computer. Before operating the Direct Access to “Click to DVD” function, follow the steps below to start “Click to DVD Automatic Mode Launcher.”

① Turn on the computer.
② Click the start menu, then select [All Programs].
③ Select [Click to DVD] from the programs displayed, then click [Click to DVD Automatic Mode Launcher].
[Click to DVD Automatic Mode Launcher] starts up.

• After you start up [Click to DVD Automatic Mode Launcher] once, from then on it starts up automatically when you turn on your computer.
• [Click to DVD Automatic Mode Launcher] is set up for each Windows XP user.

1 Turn on the computer.

Quit all applications running with an i.LINK.

2 Prepare the power source for your camcorder, then slide the POWER switch down to turn on the PLAY/ EDIT lamp.

Use the supplied AC Adaptor as the power source since it takes a few hours

to create a DVD.

3 Insert a recorded cassette into your camcorder.

4 Connect your camcorder to a computer via an i.LINK cable (optional) (p. 52, 60).

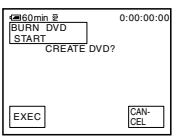
- When you connect your camcorder to a computer, make sure you insert the connector in the correct direction. If you insert the connector forcibly, it may be damaged, and causes a malfunction of your camcorder.
- For details, see “First Step Guide.”

5 Touch FN → [PAGE2] → [BURN DVD] → OK.

“Click to DVD” starts up and the on-screen instructions appear on your computer.

6 Place a writable DVD in the disc drive of the computer.

7 Touch [EXEC] on the screen of your camcorder.



The status of the operation on your computer is displayed on the LCD screen of your camcorder.

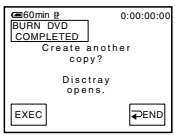
CAPTURING: The picture recorded on the tape is being copied to the computer.

CONVERTING: The picture is being converted to the MPEG2 format.

WRITING: The picture is being written onto the DVD.

- If you use a DVD-RW/+RW which has other data stored on it, the message [This is a recorded disc. Delete and overwrite?] appears on the LCD screen of your camcorder. When you touch [EXEC], the existing data is erased and new data is written.

8 Touch [↩ END] to finish creating a DVD.



The disc tray comes out automatically. To create another DVD with the same content, touch [EXEC].
The disc tray comes out. Place a new writable DVD in the disc drive. Then, repeat step 7 and 8.

To cancel the operation

Touch [CANCEL] on the LCD screen on your camcorder.

- You cannot cancel the operation after [Finalizing DVD.] is displayed on the LCD screen of your camcorder.
- Do not disconnect the i.LINK cable or set the POWER switch to another mode on your camcorder until the picture is completely copied to the computer.
- When [CONVERTING] or [WRITING] is displayed on the screen, capturing of pictures has already finished. Even if you disconnect the i.LINK cable or turn off the camcorder at this stage, DVD creation will continue on your computer.
- When any of the following occurs, copying of the picture is canceled. A DVD containing the data up to the point the operation was canceled is created. Refer to the help files of “Click to

Continued ➡

DVD Automatic Mode Launcher" for details.

– When there is a blank portion of 10 seconds or longer on the tape.
– When the data of the tape contains a date before the recording date of the later images.
– When normal and wide size pictures are recorded on the same tape.

• You cannot operate your camcorder in the following situations:
– While playing back a tape
– When "Click to DVD" is started up from the computer

Troubleshooting

If you run into any problems using your camcorder, use the following table to troubleshoot the problem. If the problem persists, remove the power source and contact your Sony dealer.

Overall operations/Easy Handycam

The power does not turn on.

- The battery pack is discharged, running low, or not attached to the camcorder.
- Attach a charged battery pack to the camcorder.
- Use the AC Adaptor to connect to a wall outlet (p. 10).

The camcorder does not operate even when the power is set to on.

- Disconnect the AC Adaptor from the wall outlet or remove the battery pack, then reconnect it after about 1 minute. If the functions still do not work, press the RESET button (p. 23) using a sharp-pointed object. (If you press the RESET button, all settings including the clock setting are reset.)

You cannot turn Easy Handycam operation on.

- During recording or communicating with another device via USB cable, you cannot turn Easy Handycam operation on.

Settings change during Easy Handycam operation.

- During Easy Handycam operation, the settings of the functions that are not displayed on the screen return to their defaults. Previously made settings are restored when you cancel the Easy Handycam operation.

[DEMO MODE] does not start.

- You cannot view the demonstration when the NIGHTSHOT PLUS switch is set to ON.
- Eject the cassette from your camcorder (p. 17).

The camcorder gets warm.

- This is because the power has been turned on for a long time. This is not a malfunction.

Batteries/Power sources

The power abruptly turns off.

- When approximately 5 minutes have elapsed while you do not operate your camcorder, the camcorder is automatically turned off (A.SHUT OFF). Change the setting of [A.SHUT OFF] (p. 46), or turn on the power again, or use the AC adapter.
- Charge the battery pack (p. 10).

The CHG (charge) lamp does not light while the battery pack is being charged.

- Slide the POWER switch up to OFF (CHG) (p. 10).

Continued ➡

- Attach the battery pack to the camcorder correctly (p. 10).
- No power is supplied from the wall outlet. (p. 10).
- The battery charge is completed (p. 10).

The CHG (charge) lamp flashes while the battery pack is being charged.

- Attach the battery pack to the camcorder correctly. If the problem persists, disconnect the AC Adaptor from the wall outlet and contact your Sony dealer. The battery pack may be damaged.

The power turns off frequently although the remaining battery time indicator indicates that the battery pack has enough power to operate.

- A problem has occurred in the remaining battery time indicator, or the battery pack has not been charged enough. Fully charge the battery again to correct the indication (p. 10).

The remaining battery time indicator does not indicate the correct time.

- The temperature of the environment is too high or too low, or the battery pack has not been charged enough. This is not a malfunction.
- Fully charge the battery again. If the problem persists, replace the battery pack with a new one. It may be damaged (p. 10, 79).
- The indicated time may not be correct depending on the environment of use. When you open or close the LCD panel, it takes about 1 minute to display the correct remaining battery time.

The battery pack is quickly discharged.

- The temperature of the environment is too high or low, or the battery pack has not been charged enough. This is not a malfunction.
- Fully charge the battery again. If the problem persists, replace the battery pack with a new one. It may be damaged (p. 10, 79).

A problem occurs when the camcorder is connected to the AC Adaptor.

- Turn off the power, and disconnect the AC Adaptor from the wall outlet. Then, connect it again.

LCD screen/viewfinder

A blurry pattern appears on the LCD screen when you touch it.

- This is not a malfunction. Do not touch the screen strongly.

An unknown picture appears on the LCD screen or viewfinder.

- The camcorder is in [DEMO MODE] (p. 45). Touch the LCD screen or insert a cassette to cancel [DEMO MODE].

An unknown indicator appears on the screen.

- Refer to the indicator list (p. 74).

The picture remains on the LCD screen.

- This occurs if you disconnect the AC Adaptor from the wall outlet or remove the battery pack without turning off the power first. This is not a malfunction.

The buttons do not appear on the touch panel.

- Touch the LCD screen lightly.
- Press DISP/BATT INFO on your camcorder (or DISPLAY on the Remote Commander) (p. 15).

The buttons on the touch panel do not work correctly or do not work at all.

- Adjust the screen ([CALIBRATION]) (p. 83).

The picture in the viewfinder is not clear.

- Use the viewfinder lens adjustment lever to adjust the lens (p. 14).

The picture in the viewfinder has disappeared.

- Close the LCD panel. The picture is not displayed in the viewfinder when the LCD panel is open (p. 14).

Cassette tapes

The cassette cannot be ejected from the compartment.

- Make sure the power source (battery pack or AC Adaptor) is connected correctly (p. 10).
- Remove the battery pack from the camcorder, then attach it again (p. 10).
- Attach a charged battery pack to the camcorder (p. 10).

The cassette is not ejected even when the cassette lid is open.

- Moisture condensation is starting in your camcorder (p. 82).

The Cassette Memory indicator or title display does not appear while using a cassette with Cassette Memory.

- This camcorder does not support Cassette Memory, so the indicator does not appear.

The remaining tape indicator is not displayed.

- Set [REMAIN] to [ON] to always display the remaining tape indicator (p. 45).

Continued ➡

Recording

Refer also to “Adjusting the image during recording” (p. 66).

The tape does not start when you press REC START/STOP.

- Slide the POWER switch down to turn on the CAMERA lamp (p. 18, 20).
- The tape has reached the end. Rewind it, or insert a new cassette.
- Set the write-protect tab to REC or insert a new cassette (p. 78).
- The tape is stuck to the drum due to moisture condensation. Remove the cassette and leave your camcorder for at least 1 hour, then re-insert the cassette (p. 82).

You cannot record a smooth transition on a tape from the last recorded scene to the next.

- Note the following.
  – Perform END SEARCH (p. 26).
  – Do not remove the cassette. (The picture will be recorded continuously without a break even when you turn the power off.)
  – Do not record pictures in SP mode and LP mode on the same tape.
  – Avoid stopping then recording a movie in the LP mode.

The shutter sound is not heard when you record a still image.

- Set [BEEP] to [ON] (p. 46).

The external flash (optional) does not work.

- The power of the flash is not turned on, or the flash is not attached correctly.
- Two or more flashes are attached. Only one external flash can be attached.

[END SCH] does not work.

- The cassette was ejected after recording (p. 26).
- The cassette is new and has nothing recorded.

[END SCH] does not work correctly.

- There is a blank section in the beginning or middle of the tape. This is not a malfunction.

Adjusting the image during recording

Refer also to “Menu” (p. 69).

The auto focus does not function.

- Set [FOCUS] to [↩ AUTO] (p. 32).
- The recording conditions are not suitable for auto focus. Adjust the focus manually (p. 32).

[STEADYSHOT] does not function.

- Set [STEADYSHOT] to [ON] (p. 42).

The BACK LIGHT function does not function.

- The BACK LIGHT function is canceled when you set [EXPOSURE] to [MANUAL] (p. 33) or select [SPOT METER] (p. 32).
- The BACK LIGHT function does not work during Easy Handycam operation.

A vertical band appears when recording candlelight or electric light in the dark.

- This occurs when the contrast between the subject and the background is too high. This is not a malfunction.

A vertical band appears when recording a bright subject.

- This phenomenon is called the smear effect. This is not a malfunction.

The color of the picture is not correctly displayed.

- Deactivate the NightShot plus function (p. 22).

The picture appears too bright on the screen, and the subject does not appear on the screen.

- Deactivate the NightShot plus function (p. 22).
- Cancel the BACK LIGHT function (p. 22).

Flickering or changes in color occurs.

- This occurs when recording pictures under a fluorescent lamp, sodium lamp, or mercury lamp with [PORTRAIT] or [SPORTS]. Cancel [PROGRAM AE] in this case (p. 40).

Black bands appear when you record a TV screen or computer screen.

- Set [STEADYSHOT] to [OFF] (p. 42).

Playback

You cannot play back the tape.

- Slide the POWER switch down to turn on the PLAY/EDIT lamp.
- Rewind the tape (p. 21).

Horizontal lines appear on the picture. The displayed pictures are not clear or do not appear.

- Clean the head using the cleaning cassette (optional) (p. 82).

Continued ➡

No sound or only a low sound is heard.

- Set [HiFi SOUND] to [STEREO] (p. 43).
- Turn up the volume (p. 21).
- Adjust [AUDIO MIX] from the [ST2] (additional sound) side until the sound is heard appropriately (p. 51).
- When you are using an S VIDEO plug, make sure the red and white plugs of the A/V connecting cable are connected as well (p. 30).

The sound breaks off.

- Clean the head using the cleaning cassette (optional) (p. 82).

"---" is displayed on the screen.

- The tape you are playing was recorded without setting the date and time.
- A blank section on the tape is being played.
- The data code on a tape with a scratch or noise cannot be read.

Noises appear and PAL is displayed on the screen.

- The tape was recorded in a TV color system other than that of your camcorder (NTSC). This is not a malfunction (p. 77).

♪4ch-12b is displayed on the screen.

- The tape you are playing was recorded on another device with a 4ch microphone (4CH MIC REC). Your camcorder is not compatible with 4ch microphone recording.

Date Search does not work correctly.

- If one day's recording is less than 2 minutes, your camcorder may not accurately find the point where the recording date changes.
- There is a blank section in the beginning or middle of the tape. This is not a malfunction.

Remote Commander

The supplied Remote Commander does not function.

- Set [COMMANDER] to [ON] (p. 46).
- Remove any obstructions between the Remote Commander and the remote sensor.
- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Remote Commander may not function properly.
- Insert a new battery. Insert a battery into the battery holder with the +/– polarities correctly matching the +/– marks. (p. 84).

Another VCR malfunctions when you use the supplied Remote Commander.

- Select a commander mode other than VTR 2 for your VCR, or cover the sensor of your VCR with black paper.

Menu

Menu items are grayed out.

- You cannot select grayed items in the current recording/playback situation.

You cannot use [SPOT METER].

- You cannot use [SPOT METER] together with NightShot plus.
- If you set [PROGRAM AE], [SPOT METER] is automatically set to [↩ AUTO].

You cannot use [EXPOSURE].

- You cannot use [EXPOSURE] together with NightShot plus.

You cannot use [WHT BAL].

- You cannot use [WHT BAL] when you use NightShot plus.

You cannot use [SPOT FOCUS].

- You cannot use [SPOT FOCUS] together with [PROGRAM AE].

You cannot use [PROGRAM AE].

- You cannot use [PROGRAM AE] when the NIGHTSHOT PLUS switch is set to ON.

Dubbing/Editing/Connecting to other devices

Time code and other information appears in the display of the connected device.

- Set [DISP OUT] to [LCD] while connected with an A/V connecting cable (p. 47).

You cannot dub correctly using the A/V connecting cable.

- Set [DISP OUT] to [LCD] (p. 47).
- The A/V connecting cable is not connected properly. Make sure that the A/V connecting cable is connected to the input jack of another device for dubbing a picture from your camcorder.

New sound added to a recorded tape is not heard.

- Adjust [AUDIO MIX] from the [ST1] (original sound) side until the sound is heard appropriately (p. 51).

Pictures from connected devices are not displayed correctly.

- The input signal is not NTSC.

Connecting to a computer

The computer does not recognize your camcorder.
USB i.LINK

- Disconnect the cable from the computer and camcorder, then connect it again securely.
- Disconnect USB devices other than the keyboard, the mouse, and the camcorder from the computer.
- Disconnect the cable from the computer and camcorder, restart the computer, then connect them again correctly.

An error message appears when you place the supplied CD-ROM in your computer.

- Set the computer display as follows:
  – Windows: 800 × 600 dots or more, High Color (16 bits, 65 000 colors) or more
  – Macintosh: 1 024 × 768 dots or more, 32 000 colors or more

---

You cannot view the pictures the camcorder is seeing on the computer. USB i.LINK

- Disconnect the cable from the computer, turn on the camcorder, then connect it again.
- Slide the POWER switch down to turn on the CAMERA lamp, set [USB STREAM] to [ON] (p. 45). (Only when connecting to the Windows computer with a USB cable)

You cannot view the pictures recorded on a tape on the computer. USB i.LINK

- Disconnect the cable from the computer, then connect it again.
- Slide the POWER switch down to turn on the PLAY/EDIT lamp, set [USB STREAM] to [ON]. (p. 45) (Only when connecting to the Windows computer with a USB cable)

The image does not appear on the screen of the Windows computer when using the USB cable. USB

- The USB driver has been registered incorrectly as the computer was connected to your camcorder before the installation of the USB driver was completed. Follow the procedure below to install the USB driver correctly.

■ For Windows 98/Windows 98SE/Windows Me

When copying or playing the pictures on a tape using a computer, the operation is not guaranteed on Windows 98.

1 Check that your camcorder is connected to a computer.
2 Right-click [My Computer], then click [Properties].
  The [System Properties] screen appears.
3 Click the [Device Manager] tab.
4 If the devices below are already installed, right-click them, then click [Remove] to delete them.

For copying and viewing pictures recorded on a tape

– [USB Audio Device] in the [Sound, video and game controllers] folder

– [USB Device] in the [Other devices] folder
– [USB Composite Device] in the [Universal Serial Bus Controller] folder

5 When the [Confirm Device Removal] screen appears, click [OK].

6 Turn off the power of your camcorder, disconnect the USB cable, then restart the computer.

7 Place the supplied CD-ROM in the disc drive of your computer.

8 Follow the steps below and try to install the USB driver again.

1 Double-click [My Computer].
2 Right-click [PICTUREPACKAGE] (Disc drive)*.
* Drive names (such as (E:)) may vary depending on the computer.
3 Click [Open].
4 Double-click [Driver].
5 Double-click [Setup.exe].

• Deleting anything other than [USB Audio Device], [USB Device], [USB Composite Device], [? Sony Handycam] and [? Sony DSC] may cause a malfunction of your computer.

■ For Windows 2000

Log on as Administrator.

1 Check that your camcorder is connected to a computer.

2 Right-click [My Computer], then click [Properties].

The [System Properties] screen appears.

3 Click the [Hardware] tab → [Device Manager] → [View] → [Devices by type].

4 If the devices below are already installed, right-click them, then click [Uninstall] to delete them.

For copying and viewing pictures recorded on a tape

– [USB Composite Device] in the [Universal Serial Bus Controller] folder
– [USB Audio Device] in the [Sound, video and game controller] folder
– [Composite USB Device] in the [Other devices] folder

5 When the [Confirm Device Removal] screen appears, click [OK].

6 Turn off the power of your camcorder, disconnect the USB cable, then restart the computer.

7 Place the supplied CD-ROM in the disc drive.

8 Follow the steps below and try to install the USB driver again.

1 Double-click [My Computer].
2 Right-click [PICTUREPACKAGE] (Disc drive)*.
* Drive names (such as (E:)) may vary depending on the computer.
3 Click [Open].
4 Double-click [Driver].
5 Double-click [Setup.exe].

• Deleting anything other than [USB Composite Device], [USB Audio Device], [Composite USB Device], [? Sony Handycam] and [? Sony DSC] may cause a malfunction of your computer.

Continued ➡

■ **For Windows XP**

Log on as Administrator.

1 Check that your camcorder is connected to a computer.

2 Click [Start].

3 Right-click [My Computer], then click [Properties].

The [System Properties] screen appears.

4 Click and choose the [Hardware] tab → [Device Manager] → [View] → [Devices by type].

5 If the devices below are already installed, right-click them, then click [Uninstall] to delete them.

For copying and viewing pictures recorded on a tape

– [USB Composite Device] in the [Universal Serial Bus Controller] folder

– [USB Audio Device] in the [Sound, video and game controller] folder

– [USB Device] in the [Other devices] folder

6 When the [Confirm Device Removal] screen appears, click [OK].

7 Turn off the power of your camcorder, disconnect the USB cable, then restart the computer.

8 Place the supplied CD-ROM in the disc drive of your computer.

9 Follow the steps below and try to install the USB driver again.

1 Double-click [My Computer].

2 Right-click [PICTUREPACKAGE] (Disc drive)*.

* Drive names (such as (E:)) may vary depending on the computer.

3 Click [Open].

4 Double-click [Driver].

5 Double-click [Setup.exe].

• Deleting anything other than [USB Composite Device], [USB Audio Device], [USB Device], [? Sony Handycam] and [? Sony DSC] may cause a malfunction of your computer.

There is no sound when the camcorder is connected to the Windows computer via a USB cable. USB

• Change the settings for your computer environment as described in the following procedures:

1 Select [Start]→[Programs]([All Programs] for Windows XP)→[Picture Package]→[Handycam Tools]→[USB Streaming Tool].

2 Select another device on the [Select audio device] screen.

3 Follow the on-screen instructions, click [Next], then click [Done].

• Sound is not supported on Windows 98.

The movie is not smooth during USB streaming. USB

• Change the settings as described in the following procedures:

1 Select [Start]→[Programs]([All Programs] for Windows XP)→[Picture Package]→[Handycam Tools]→[USB Streaming Tool].

2 Adjust the slider in the (-) direction on [Select video quality].

3 Follow the on-screen instructions, click [Next], then click [Done].

Picture Package does not function correctly.

- Close Picture Package, then restart the computer.

An error message appears while operating Picture Package.

- Close Picture Package first, then slide the POWER switch on your camcorder to turn on another lamp.

The CD-R drive is not recognized or data cannot be written on the CD-R in Picture Package Auto Video, Producer, CD Backup, or VCD Maker.

- For compatible drives, visit the following URL:
  http://www.ppackage.com/

"First Step Guide" is not displayed correctly.

- Follow the procedure below and refer to "First Step Guide" (FirstStepGuide.pdf).

1 Place the supplied CD-ROM in the disc drive of your computer.

2 Double-click [My Computer].

3 Right-click [PICTUREPACKAGE] (Disc drive)*.

* Drive names (such as (E:)) may vary depending on the computer.

4 Click [Explorer].

5 Double-click [FirstStepGuide].

6 Double-click the desired language folder.

7 Double-click "FirstStepGuide.pdf."

Warning indicators and messages

Self-diagnosis display/Warning indicators

If indicators appear on the LCD screen or in the viewfinder, check the following. Some symptoms you can fix by yourself. If the problem persists even after you have tried a couple of times, contact your Sony dealer or local authorized Sony service facility.

C:(or E:) □□:□□ (Self-diagnosis display)

C:04:□□

- The battery pack is not an "InfoLITHIUM" battery pack. Use an "InfoLITHIUM" battery pack (p. 79).

C:21:□□

- Moisture condensation has occurred. Remove the cassette and leave your camcorder for at least 1 hour, then re-insert the cassette (p. 82).

C:22:□□

- Clean the head using a cleaning cassette (optional) (p. 82).

C:31:□□ / C:32:□□

- Symptoms that are not described above have occurred. Remove and insert the cassette, then operate your camcorder again. Do not perform this procedure if moisture starts to condense (p. 82).
- Remove the power source. Reconnect it again and operate your camcorder again.
- Change the cassette. Press RESET (p. 23), and operate your camcorder again.

E:61:□□ / E:62:□□

- Contact your Sony dealer or local authorized Sony service facility. Inform them of the 5-digit code, which starts from "E."

(Battery level warning)

- The battery pack is nearly used up.
- Depending on the operating, environment, or battery conditions, may flash, even if there are approximately 5 to 10 minutes remaining.

(Moisture condensation warning)*

- Eject the cassette, remove the power source, and then leave it for about 1 hour with the cassette lid open (p. 82).

(Warning indicators pertaining to the tape)

Slow flashing:

- There is less than 5 minutes remaining on the tape.
- No cassette is inserted.*
- The write-protect tab on the cassette is set to lock (p. 78).*

Fast flashing:

- The tape has run out.*

(Eject cassette warning)*

Slow flashing:

- The write-protect tab on the cassette is set to lock (p. 78).

Fast flashing:

- Moisture condensation has occurred (p. 82).
- The self-diagnosis display code is displayed (p. 74).

(Warning indicator pertaining to the external flash)

Slow flashing:

- Still charging

Fast flashing:

- The self-diagnosis display code is displayed (p. 74).*
- There is something wrong with the flash.

* You hear a melody when the warning indicators appear on the screen (p. 46).

Description of warning messages

If messages appear on the screen, follow the instructions.

■ Battery

Use the " InfoLITHIUM" battery pack. (p. 79)

Battery level is low.

- Change the battery (p. 10, 79)

Old battery. Use a new one. (p. 79)

⏏Re-attach the power source. (p. 10)

■ Moisture condensation

⏏Moisture condensation. Eject the cassette. (p. 82)

Moisture condensation. Turn off for 1H. (p. 82)

■ Cassette/Tape

Insert a cassette. (p. 17)

⏏Reinsert the cassette.

- Check if the cassette is damaged.

⏏The tape is locked - check the tab. (p. 78)

The tape has reached the end.

- Rewind or change the tape.

■ Flash

Charging… Cannot record still images.

- You are trying to record a still image while charging the flash (optional).

■ Others

Cannot record due to copyright protection. (p. 78)

Cannot add audio. (p. 50)

Cannot add audio. Disconnect the i.LINK cable. (p. 50)

Not recorded in SP mode. Cannot add audio. (p. 50)

Not recorded in 12-bit audio. Cannot add audio. (p. 50)

Cannot add audio on the blank portion of a tape. (p. 50)

Dirty video head. Use a cleaning cassette. (p. 82)

Cannot start Easy Handycam / Cannot cancel Easy Handycam. (p. 63)

Cannot start Easy Handycam with USB connected

Continued ➡

- You cannot start the Easy Handycam settings while the USB cable is connected. Disconnect the USB cable from your camcorder first.

USB invalid during Easy Handycam

- You cannot connect the USB cable during Easy Handycam. Touch [OK].

HDV recorded tape. Cannot playback.

- Your camcorder cannot play back this format. Play back the tape with the equipment that recorded it.

HDV recorded tape. Cannot add audio.

- Your camcorder does not allow you to add audio on a section of a tape recorded in HDV format.

Using your camcorder abroad

Power supply

You can use your camcorder in any countries/regions using the AC Adaptor supplied with your camcorder within the AC 100 V to 240 V, 50/60 Hz range. Use a commercially available AC plug adaptor [a], if necessary, depending on the design of the wall outlet [b].

AC-L25A/L25B [a] [b]

On TV color systems

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 (see the following list) with an AUDIO/VIDEO input jack.

System	Used in
NTSC	Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Guyana, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.
PAL	Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, Germany, Holland, Hong Kong, Hungary, Italy, Kuwait, Malaysia, New Zealand, Norway, Poland, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Thailand, United Kingdom, etc.
PAL - M	Brazil
PAL - N	Argentina, Paraguay, Uruguay.
SECAM	Bulgaria, France, Guiana, Iran, Iraq, Monaco, Russia, Ukraine, etc.

Simple setting of the clock by time difference

You can easily set the clock to the local time by setting a time difference when using your camcorder abroad. Select [WORLD TIME] in the ETC (OTHERS) menu, then set the time difference (p. 46).

Usable cassette tapes

You can use mini DV format cassettes only. Use a cassette with the Mini DV mark.

Mini DV Digital Video Cassette is a trademark.
Your camcorder is not compatible with cassettes with Cassette Memory.

To prevent a blank section from being made on the tape

Go to the end of the recorded section using END SEARCH (p. 26) before you begin the next recording in the following cases:
• You have played back the tape.
• You have used EDIT SEARCH.

Copyright signal

■ When you play back

If the cassette you play back on your camcorder contains copyright signals, you cannot copy it to a tape in another video camera connected to your camcorder.

■ When you record

You cannot record software on your camcorder that contains copyright control signals for copyright protection of software. [Cannot record due to copyright protection.] appears on the LCD screen, or on the viewfinder if you try to record such software. Your camcorder does not record copyright control signals on the tape when it records.

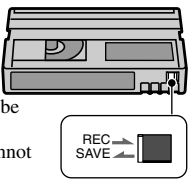
Notes on use

■ When not using your camcorder for a long time

Remove the cassette and store it.

■ To prevent accidental erasure

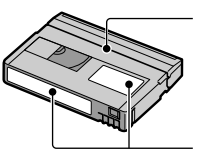
Slide the write-protect tab on the cassette to set it to SAVE.



REC: The cassette can be recorded.
SAVE: The cassette cannot be recorded (write-protected).

■ When labeling the cassette

Be sure to place the label only on the locations shown in the following illustration so as not to cause a malfunction of your camcorder.

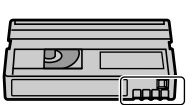


■ After using the cassette

Rewind the tape to the beginning to avoid distortion of the picture or the sound. The cassette should then be put in its case, and stored in an upright position.

■ When cleaning the gold-plated connector

Generally, clean the gold-plated connector on a cassette with a cotton-wool swab after every 10 times it has been ejected.
If the gold-plated connector on the cassette is dirty or dusty, the remaining tape indicator may not be indicated correctly.



About the “InfoLITHIUM” battery pack

This unit is compatible with an “InfoLITHIUM” battery pack (P series). Your camcorder operates only with an “InfoLITHIUM” battery pack. “InfoLITHIUM” P series battery packs have the InfoLITHIUM P mark.

What is an “InfoLITHIUM” battery pack?

An “InfoLITHIUM” battery pack is a lithium-ion battery pack that has functions for communicating information related to operating conditions between your camcorder and an optional AC Adaptor/charger.
The “InfoLITHIUM” battery pack calculates the power consumption according to the operating conditions of your camcorder, and displays the remaining battery time in minutes.
With an AC Adaptor/charger (optional), the remaining battery time and charging time appear.

To charge the battery pack

- Be sure to charge the battery pack before you start using your camcorder.
- We recommend charging the battery pack in an ambient temperature of between 10°C to 30°C (50°F to 86°F) until the CHG (charge) lamp turns off. If you charge the battery pack outside of this temperature range, you may not be able to charge it efficiently.
- After charging is complete, disconnect the cable from the DC IN jack on your camcorder or remove the battery pack.

To use the battery pack effectively

- Battery pack performance decreases when the surrounding temperature is 10°C (50°F) or below, and the length of time you can use the battery pack becomes shorter. In that case, do one of the following to use the battery pack for a longer time.
  – Put the battery pack in a pocket to warm it up, and insert it in your camcorder right before you start taking shots.
  – Use a large capacity battery pack: NP-FP50/FP70/FP90 (optional).
- Frequent use of the LCD screen or a frequent playback, fast forward or rewind operation wears out the battery pack faster. We recommend using a large capacity battery pack: NP-FP50/FP70/FP90 (optional).
- Be sure to set the POWER switch to OFF (CHG) when not recording or playing back on your camcorder. The battery pack is also consumed when your camcorder is in recording standby or playback pause.
- Have spare battery packs ready for two or three times the expected recording time, and make trial recordings before making the actual recording.
- Do not expose the battery pack to water. The battery pack is not water resistant.

About the remaining battery time indicator

- When the power goes off even though the remaining battery time indicator indicates that the battery pack has enough power to operate, charge the battery pack fully again. The indication on the remaining battery time will be indicated correctly. Note, however, that the battery indication will not be restored if it is used in high temperatures for a long time, or if left in a fully charged state, or when the battery pack is frequently used. Use the remaining battery time indication as a guide to the approximate shooting time.
- The mark that indicates low battery flashes even if there are still 5 to 10 minutes of battery time remaining, depending on the operating conditions or ambient temperature and environment.

About storage of the battery pack

- If the battery pack is not used for a long time, fully charge the battery pack and use it up on your camcorder once a year to maintain proper function. To store the battery pack, remove it from your camcorder and put it in a dry, cool place.
- To discharge the battery pack on your camcorder completely, set [A.SHUT OFF] to [NEVER] on the ETC (OTHERS) menu and leave your camcorder in tape recording standby until the power goes off (p. 46).

Continued ➡

About i.LINK

About battery life

- The battery life is limited. Battery capacity drops little by little as you use it more and more, and as time passes. When the available battery time is shortened considerably, a probable cause is that the battery pack has reached the end of its life. Please buy a new battery pack.
- The battery life varies depending on how it is stored and the operating conditions and environment for each battery pack.

The DV Interface on this unit is an i.LINK-compliant DV Interface. This section describes the i.LINK standard and its features.

What is i.LINK?

i.LINK is a digital serial interface for transferring digital video, digital audio, and other data to other i.LINK-compatible devices. You can also control other devices using the i.LINK.
i.LINK-compatible devices can be connected using an i.LINK cable. Possible applications are operations and data transactions with various digital AV devices.
When two or more i.LINK-compatible devices are connected to this unit in a daisy chain, operations and data transactions are possible with not only the device that this unit is connected to but also with other devices via the directly connected device. Note, however, that the method of operation sometimes varies according to the characteristics and specifications of the device to be connected. Also, operations and data transactions may not be possible on some connected devices.

- Normally, only one device can be connected to this unit with the i.LINK cable. When connecting this unit to an i.LINK-compatible device having two or more DV Interfaces, refer to the operating instructions of the device to be connected.
- i.LINK is a more familiar term for the IEEE 1394 data transport bus proposed by Sony, and is a trademark approved by many corporations.
- IEEE 1394 is an international standard standardized by the Institute of Electrical and Electronics Engineers.

About the i.LINK Baud rate

i.LINK's maximum baud rate varies according to the device. There are three types.

S100 (approx. 100Mbps*)
S200 (approx. 200Mbps)
S400 (approx. 400Mbps)

The baud rate is listed under "Specifications" in the operating instructions of each piece of equipment. It is also indicated near the i.LINK interface on some devices.
The maximum baud rate for a device that does not have any indication (such as this unit) is "S100."
The baud rate may differ from the indicated value when the unit is connected to a device with a different maximum baud rate.

*** What is Mbps?**
Mbps stands for "megabits per second," or the amount of data that can be sent or received in one second. For example, a baud rate of 100 Mbps means that 100 megabits of data can be sent in one second.

To use i.LINK functions on this unit

For details on how to dub when this unit is connected to other video devices having a DV Interface, see page 49.
This unit can also be connected to other i.LINK (DV Interface) compatible devices made by Sony (e.g. a VAIO series personal computer) as well as to video devices.
Before connecting this unit to your computer, make sure that application software supported by this unit is already installed on your computer.
Some i.LINK compatible video devices, such as Digital Televisions, DVD MICROMV or HDV recorders/players are not compatible with DV devices. Before connecting to other devices, be sure to confirm whether the device is compatible with a DV device or not. For details on precautions and compatible application software, refer also to the operating instructions for the device to be connected.

About the required i.LINK cable

Use the Sony i.LINK 4-pin-to-4-pin cable (during DV dubbing).

Maintenance and precautions

On use and care

- Do not use or store the camcorder and accessories in the following locations.
  - Anywhere extremely hot or cold. Never leave them exposed to temperatures above 60°C (140°F) , such as under direct sunlight, near heaters or in a car parked in the sun. They may malfunction or become deformed.
  - Near strong magnetic fields or mechanical vibration. The camcorder may malfunction.
  - Near strong radio waves or radiation. The camcorder may not be able to record properly.
  - Near AM receivers and video equipment. Noise may occur.
  - On a sandy beach or anywhere dusty. If sand or dust gets in your camcorder, it may malfunction. Sometimes this malfunction cannot be repaired.
  - Near windows or outdoors, where the LCD screen, the viewfinder, or the lens may be exposed to direct sunlight. This damages the inside of the viewfinder or the LCD screen.
  - Anywhere very humid.
- Operate your camcorder on DC 7.2 V (battery pack) or DC 8.4 V (AC Adaptor).
- For DC or AC operation, use the accessories recommended in these operating instructions.
- Do not let your camcorder get wet, for example, from rain or sea water. If your camcorder gets wet, it may malfunction. Sometimes this malfunction cannot be repaired.
- 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, disassembling, modifying, physical shock, or impact such as hammering, dropping or stepping on the subject. Be particularly careful of the lens.
- Keep the POWER switch setting to OFF (CHG) when you are not using your camcorder.
- Do not wrap your camcorder with a towel, for example, and operate it. Doing so might cause heat to build up inside.
- When disconnecting the power cord, pull it by the plug and not the cord.
- Do not damage the power cord such as by placing anything heavy on it.
- Keep metal contacts clean.
- Keep the Remote Commander and button-type

Continued ➡

battery out of children's reach. If the battery is accidentally swallowed, consult a doctor immediately.

- If the battery electrolytic liquid has leaked,
  - consult your local authorized Sony service facility.
  - wash off any liquid that may have contacted your skin
  - if any liquid gets in your eyes, wash with plenty of water and consult a doctor.

■ When not using your camcorder for a long time

- Occasionally turn it on and let it run such as by playing back tapes for about 3 minutes.
- Use up the battery pack completely before storing it.

Moisture condensation

If your camcorder is brought directly from a cold place to a warm place, moisture may condense inside your camcorder, on the surface of the tape, or on the lens. In this state, the tape may stick to the head drum and be damaged or your camcorder may not operate correctly. If there is moisture inside your camcorder, [Moisture condensation. Eject the cassette.] or [Moisture condensation. Turn off for 1H.] appears. The indicator will not appear when the moisture condenses on the lens.

■ If moisture condensation has occurred

None of the functions except cassette ejection will work. Eject the cassette, turn off your camcorder, and leave it for about one hour with the cassette lid open. Your camcorder can be used again if or does not appear when the power is turned on again.
If moisture starts to condense, your camcorder sometimes cannot detect condensation. If this happens, the cassette is sometimes not ejected for 10 seconds after the cassette lid is opened. This is not a malfunction. Do not close the cassette lid until the cassette is ejected.

■ 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 humid place as shown below.

- When you bring your camcorder from a ski slope into a place warmed up by a heating device.
- When you bring your camcorder from an air conditioned car or room into a hot place outside.
- When you use your camcorder after a squall or a shower.
- When you use your camcorder in a hot and humid place.

■ How to prevent moisture condensation

When you bring your camcorder from a cold place into a warm place, put your camcorder in a plastic bag and seal it tightly. Remove the bag when the air temperature inside the plastic bag has reached the surrounding temperature (after about one hour).

Video head

- When the video head becomes dirty, you cannot record pictures normally, or distorted picture or sound is played back.
- If the following problem occurs, clean the video heads for 10 seconds with the Sony DVM-12CLD cleaning cassette (optional).
  - Mosaic-pattern noise appears on the playback picture or the screen is displayed in blue.

  - Playback pictures do not move.
  - Playback pictures do not appear or the sound breaks off.
  - [Dirty video head. Use a cleaning cassette.] appears on the screen during recording.
  - [Dirty video head. Use a cleaning cassette.] appears on the screen during playback.
- The video head suffers from wear after long use. If you cannot obtain a clear image even after using a cleaning cassette, it might be because the video head is worn. Please contact your Sony dealer or local authorized Sony service facility to have the video head replaced.

LCD screen

- Do not exert excessive pressure on the LCD screen, as it may cause damage.
- If your camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using your camcorder, the back of the LCD screen may heat up. This is not a malfunction.

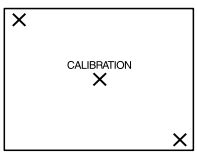
■ To clean the LCD screen

If fingerprints or dust make the LCD screen dirty, it is recommended you use a soft cloth to clean it. When you use the LCD Cleaning Kit (optional), do not apply the cleaning liquid directly to the LCD screen. Use cleaning paper moistened with the liquid.

■ On adjustment of the LCD screen (CALIBRATION)

The buttons on the touch panel may not work correctly. If this happens, follow the procedure below. It is recommended you connect your camcorder to the wall outlet using the supplied AC Adaptor during the operation.

① Slide the POWER switch up to OFF (CHG).
② Eject the cassette from your camcorder, then disconnect any connecting cables except the AC Adaptor from your camcorder.
③ Slide the POWER switch down to turn on the PLAY/EDIT lamp while pressing DISP/BATT INFO on your camcorder, then press and hold DISP/BATT INFO for about 5 seconds.
④ Touch the "×" displayed on the screen with the corner of the "Memory Stick" or the like.



The position of the "×" changes. If you did not press the right spot, start from step ④ again.

- You cannot calibrate the LCD screen if it is rotated.

On handling the casing

- If the casing is soiled, clean the camcorder body with a soft cloth lightly moistened with water, and then wipe the casing with a dry soft cloth.
- Avoid the following to avoid damage to the finish.
  - Using chemicals such as thinner, benzine, alcohol, chemical cloths, repellent and insecticide.
  - Handling with above substances on your hands.
  - Leaving the casing in contact with rubber or vinyl objects for a long period of time.

About care and storage of the lens

- Wipe the surface of the lens clean with a soft cloth in the following instances:
  - When there are fingerprints on the lens surface.
  - In hot or humid locations
  - When the lens is exposed to salty air such as at the seaside.
- Store in a well-ventilated location subject to little dirt or dust.
- To prevent mold, periodically clean the lens as described above. It is recommended that you operate your camcorder about once a month to keep it in optimum state for a long time.

To charge the pre-installed rechargeable battery

Your camcorder has a pre-installed rechargeable battery to retain the date, time, and other settings even when the POWER switch is set to OFF (CHG). The pre-installed rechargeable battery is always charged while you are using your camcorder but it will get discharged gradually if you do not use your camcorder. The rechargeable battery will be fully discharged in about **3 months** if you do not use your camcorder at all. However, even if the pre-installed rechargeable battery is not charged, the camcorder operation will not

Continued ➡

be affected as long as you are not recording the date.

■ Procedures

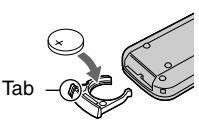
Connect your camcorder to a wall outlet using the supplied AC Adaptor, and leave it with the POWER switch set to OFF (CHG) for more than 24 hours.

To change the battery of the Remote Commander

① While pressing on the tab, inset your fingernail into the slit to pull out the battery case.

② Place a new battery with the + side facing up.

③ Insert the battery case back into the Remote Commander until it clicks.



WARNING

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Caution

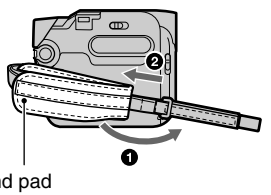
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

- A button-type lithium battery (CR2025) is used in the Remote Commander. Do not use batteries other than the CR2025.
- When the lithium battery becomes weak, the operating distance of the Remote Commander may shorten, or the Remote Commander may not function properly. In this case, replace the battery with a Sony CR2025 lithium battery. Use of another battery may present a risk of fire or explosion.

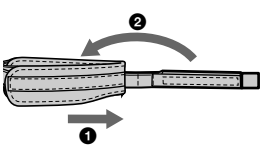
Using the Strap Belt as a wrist strap

This is useful for carrying your camcorder.

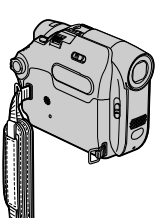
1 Open the hook and loop fastener of the hand pad (❶) and remove it from the ring (❷).



2 Move the hand pad fully to the right (❶), then close the hook and loop fastener again (❷).

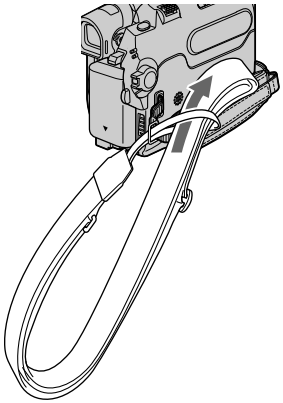


3 Use the Strap Belt as a wrist strap as illustrated.



Attaching the Shoulder Strap

You can attach the Shoulder Strap to the hook for the Shoulder Strap.



Specifications

System

Video recording system	2 rotary heads, Helical scanning system
Audio recording system	Rotary heads, PCM system Quantization: 12 bits (Fs 32 kHz, stereo 1, stereo 2), 16 bits (Fs 48 kHz, stereo)
Video signal	NTSC color, EIA standards
Usable cassette	Mini DV cassette with the Mini DV mark printed
Tape speed	SP: Approx. 18.81 mm/s LP: Approx. 12.56 mm/s
Recording/ playback time	SP: 60 min LP: 90 min (using a DVM60 cassette)
Fast forward/ rewind time	Approx. 2 min 40 s (using a DVM60 cassette)
Viewfinder	Electric viewfinder (black and white)
Image device	3.0 mm (1/6 type) CCD (Charge Coupled Device) Gross: Approx. 680 000 pixels Effective (movie): Approx. 340 000 pixels
Lens	Carl Zeiss Vario-Tessar Combined power zoom lens Filter diameter: 25 mm (1 in.) 20 × (Optical), 800 × (Digital) F=1.8 - 3.1 f=2.3 - 46 mm (3/32 - 1 13/16 in.) When converted to a 35 mm still camera In CAMERA: 44 - 880 mm (1 3/4 - 34 1/32 in.)
Color temperature	[AUTO], [ONE PUSH], [INDOOR] (3 200 K), [OUTDOOR] (5 800 K)
Minimum illumination	5 lx (lux) (F 1.8) 0 lx (lux) (during NightShot plus function)*1

*1 Objects unable to be seen due to the dark can be shot with infrared lighting.

Continued ➡

Input/Output connectors

Audio/Video output	10-pin connector Video signal: 1 Vp-p, 75Ω (ohms), unbalanced Luminance signal: 1 Vp-p, 75Ω (ohms), unbalanced Chrominance signal: 0.286 Vp-p, 75Ω (ohms), unbalanced Audio signal: 327 mV (at output impedance more than 47 kΩ (kilohms)), Output impedance with less than 2.2 kΩ (kilohms)
USB jack	mini-B
LANC jack	Stereo mini-minijack (Ø 2.5 mm)
DV input/output	4-pin connector

LCD screen

Picture	6.2 cm (2.5 type)
Total dot number	123 200 (560 ×220)

General

Power requirements	DC 7.2 V (battery pack) DC 8.4 V (AC Adaptor)
Average power consumption	During camera recording using the viewfinder 1.9 W During camera recording using the LCD 2.4 W
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-20°C to + 60°C (-4°F to + 140°F)
Dimensions (approx.)	54.7 × 90.0 × 111.7 mm (2 1/4 × 3 5/8 × 4 1/2 in.) (w/h/d)
Mass (approx.)	400 g (14 oz) main unit only 460 g (1 lb) including the NP-FP30 rechargeable battery pack and DVM60 cassette.
Supplied accessories	See page 9.

AC Adaptor AC-L25A/L25B

Power requirements	AC 100 - 240 V, 50/60 Hz
Current consumption	0.35 - 0.18 A
Power consumption	18W
Output voltage	DC8.4V*2
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-20°C to + 60°C (-4°F to + 140°F)
Dimensions (approx.)	56 × 31 × 100 mm (2 1/4 × 1 1/4 × 4 in.) (w/h/d) excluding the projecting parts
Mass (approx.)	190 g (6.7 oz) excluding the power cord

*2 See the label on the AC Adaptor for other specifications.

Rechargeable battery pack (NP-FP30)

Maximum output voltage	DC8.4V
Output voltage	DC7.2V
Capacity	3.6 Wh (500 mAh)
Dimensions (approx.)	31.8 × 18.5 × 45.0 mm (1 5/16 × 3/4 × 1 13/16 in) (w/h/d)
Mass (approx.)	40 g (1.5 oz)
Operating temperature	0°C to 40°C (32°F to 104°F)
Type	Lithium ion

Design and specifications are subject to change without notice.

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- i.LINK and i, are trademarks of Sony Corporation.
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