# SONY®

Digital Camcorder

Operating Instructions

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

Owner's Record

The model and serial numbers are located on the bottom. Record the
serial number in the space provided below. Refer to these numbers
whenever you call upon your Sony dealer regarding this product.
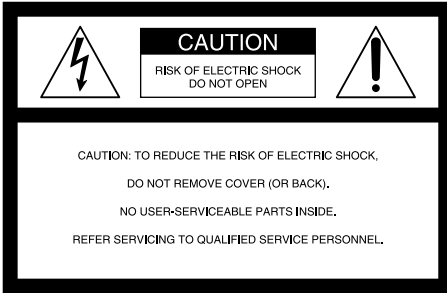
Model No. **DSR-200A**   Serial No. _____

DVCAM™
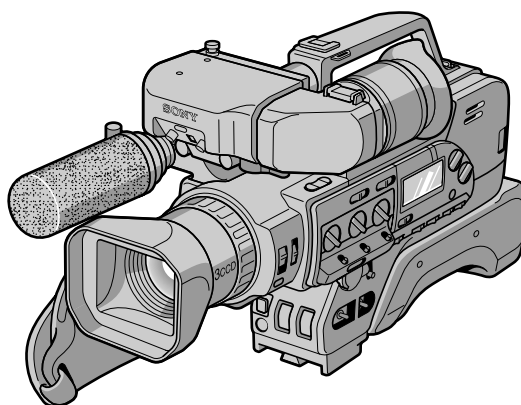
DSR-200A

WARNING

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

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,

DO NOT REMOVE COVER (OR BACK).

NO USER-SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

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.

DISPOSAL OF LITHIUM ION BATTERY.

LITHIUM ION BATTERY.
DISPOSE OF PROPERLY.

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

Note: In some areas the disposal of lithium ion batteries in household or business trash may be prohibited.
For the Sony Service Center nearest you call
1-800-222-SONY (United States only)
For the Sony Factory Service Center nearest you call
416-499-SONY (Canada only)

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

For the customers in the U.S.A.

WARNING
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
— Reorient or relocate the receiving antenna.
— Increase the separation between the equipment and receiver.
— Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

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

For the customers in CANADA

CAUTION

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

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Table of contents

Using this manual

As you read through this manual, buttons and settings on the digital camcorder are shown in capital letters.
e.g. Set the POWER switch to ON.
As indicated with ♪ in the illustrations, you can hear the beep sound to confirm your operation.

Note on TV color systems

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

Precaution on copyright

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

Precautions on digital camcorder care

• Do not let sand get into the digital camcorder. When you use the digital camcorder on a sandy beach or in a dusty place, protect it from the sand or dust. Sand or dust may cause the unit to malfunction, and sometimes this malfunction cannot be repaired [a].
• Do not let the digital camcorder get wet. Keep the digital camcorder away from rain and sea water. Letting the digital camcorder get wet may cause the unit to malfunction, and sometimes this malfunction cannot be repaired [b].
• Never leave the digital camcorder exposed to temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight [c].

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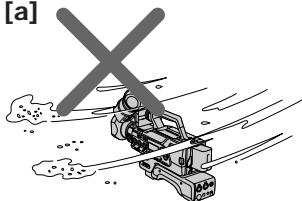
[b]
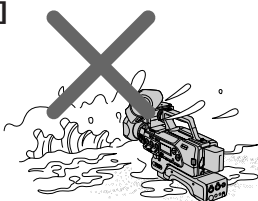
[c]
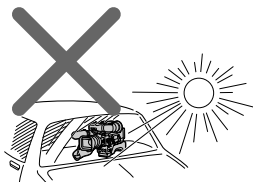
Contents of the recording cannot be compensated if recording or playback is not made due to a malfunction of the digital camcorder, video tape, etc.

Checking supplied accessories

Check that the following accessories are supplied with your digital camcorder.
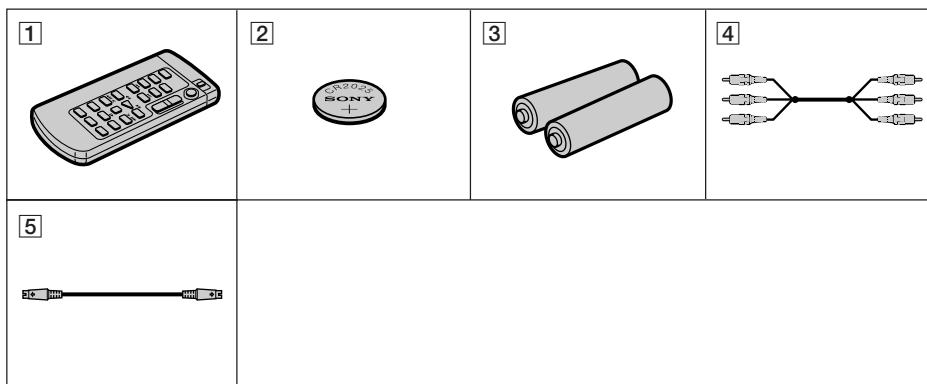
① **Wireless Remote Commander** (1) (p.11)

② **CR2025 Lithium Battery** (1) (p. 78)

The lithium battery is already installed in your digital camcorder.

③ **Size AA (R6) battery for Remote Commander** (2) (p. 12)

④ **A/V connecting cable** (1) (p. 34)

⑤ **S video cable** (1) (p. 34)

5

Identifying the parts

1 **Stopper** (p. 20)
Lift up and hold to remove the viewfinder.

2 **Viewfinder** (p. 20, 27, 87)

3 **Viewfinder adjustment ring** (p. 27)

4 **PUSH button** (p. 87)
Press and hold to raise the eyecup.

5 **Viewfinder release lever** (p. 32)
Push forward to move the position of the viewfinder front and back.

6 **Focus ring** (p. 52)

7 **FOCUS switch** (p. 52)
Set to select auto or manual focus.

8 **ND FILTER switch** (p. 63)

9 **PUSH AUTO button** (p. 52)
Push to use automatic focus momentarily.

10 **POWER switch** (p. 26)

11 **CAMCORDER/VTR switch** (p. 26)

12 **Accessory shoe** (p. 46)

13 **Hook for shoulder strap** (p. 16)

14 **Cassette compartment and cassette compartment cover** (p. 24)

15 **Hook for shoulder strap** (p. 16)

16 **EJECT ▲ button** (p. 25)
Press to eject the cassette.

17 **Speaker** (p. 28)

18 **Battery mounting surface** (p. 23)

19 **BATT lever** (p. 23)
Press and hold to release the batteries.

20 **VIDEO OUT jack (for BNC type plug)** (p. 35)

21 **AUDIO IN jacks** (p. 65)
Input external audio/microphone signals.

6

22 **Microphone holder attaching point** (p. 18)

23 **TALLY lamp** (p. 27)
Lights while recording and when the battery becomes low.

24 **CONTR knob** (p. 27)
Turn to adjust the viewfinder's contrast.

25 **TALLY switch** (p. 27)
Set to select TALLY lamp ON/OFF.

26 **Front Remote Commander sensor** (p. 14)

27 **Grip** (p. 31)

28 **Grip strap** (p. 31)

29 **Lens hood**
You can attach a wide teleconversion lens (not supplied) by removing the lens hood.

30 **Lens hood cap** (p. 26)

31 **BRIGHT knob** (p. 27)
Turn to adjust the viewfinder's brightness.

32 **EDITSEARCH button** (p. 33)

33 **Front START/STOP button** (p. 31)

34 **FADER/OVERLAP button** (p. 43, 44)

35 **WHITE BALANCE (one-push white balance) button** (p. 60)

36 **CP CHECK button** (p. 70)
Press to check the custom preset settings.

7
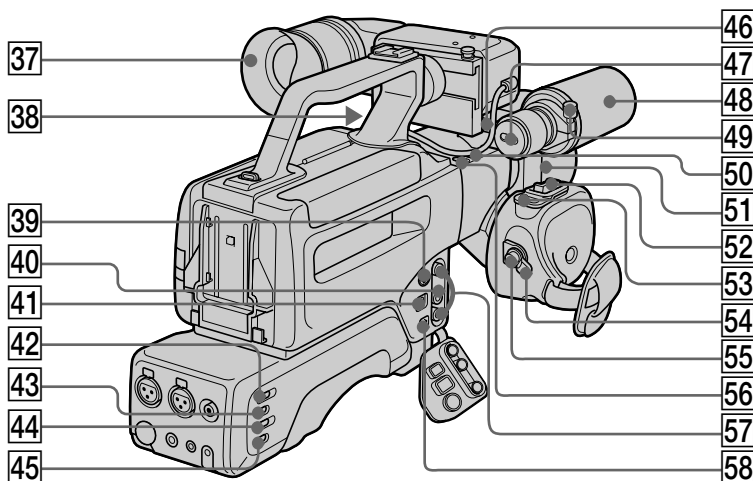
37 **Eyecup**

38 **VIEW FINDER jack** (p. 20)

39 **S VIDEO OUT jack** (p. 34)

40 **RFU DC OUT jack** (p. 35)

41 **DV IN/OUT jack** (p. 74)
Connect DV products using the
connecting DV cable.

i

This "i.LINK" mark is a trademark of
Sony Corporation and indicates that this
product is in agreement with IEEE 1394-
1995 specifications and their revisions.

The DV IN/OUT jack is i.LINK
compatible.

42 **CH-1 LINE/MIC switch** (p. 65)
Set to change the audio source using a
CH-1 input.

43 **CH-1 ATT switch** (p. 67)
Set ON to attenuate the CH-1 input
microphone level.

44 **CH-2 LINE/MIC switch** (p. 65)
Set to change the audio source using
CH-2 input.

45 **CH-2 ATT switch** (p. 67)
Set ON to attenuate the CH-2 input
microphone level.

46 **MIC (PLUG IN POWER) jack** (p. 28)
Connect an external mini jack type
microphone (not supplied). This jack
also accepts a "plug-in-power"
microphone. When using this jack, set
LINE/MIC to MIC FRONT.

47 **DIRECTION SELECT switch** (p. 29)
Set to change the directionality of the
built-in microphone.

48 **Built-in microphone** (p. 65)

49 **Microphone wind screen screw**
Loosen to remove wind screen.

50 **MIC switch** (p. 67)
Set ATT to attenuate the built-in
microphone and external microphone
connected to MIC (PLUG IN POWER)
level.

51 **Lens hood screw**

52 **Power zoom button** (p. 30)

53 **PHOTO button** (p. 46)
Press to shoot in photo mode.

54 **STANDBY (LOCK/STANDBY/PHOTO
STANDBY) switch** (p. 26)

55 **START/STOP button** (p. 26)

56 **BUILT-IN MIC switch** (p. 67)
If recording when there is a loud wind
using the built-in microphone, set to
WIND.

57 **AUDIO OUT/VIDEO OUT jacks** (p. 34)

58 **DC IN jack** (p. 38)

8
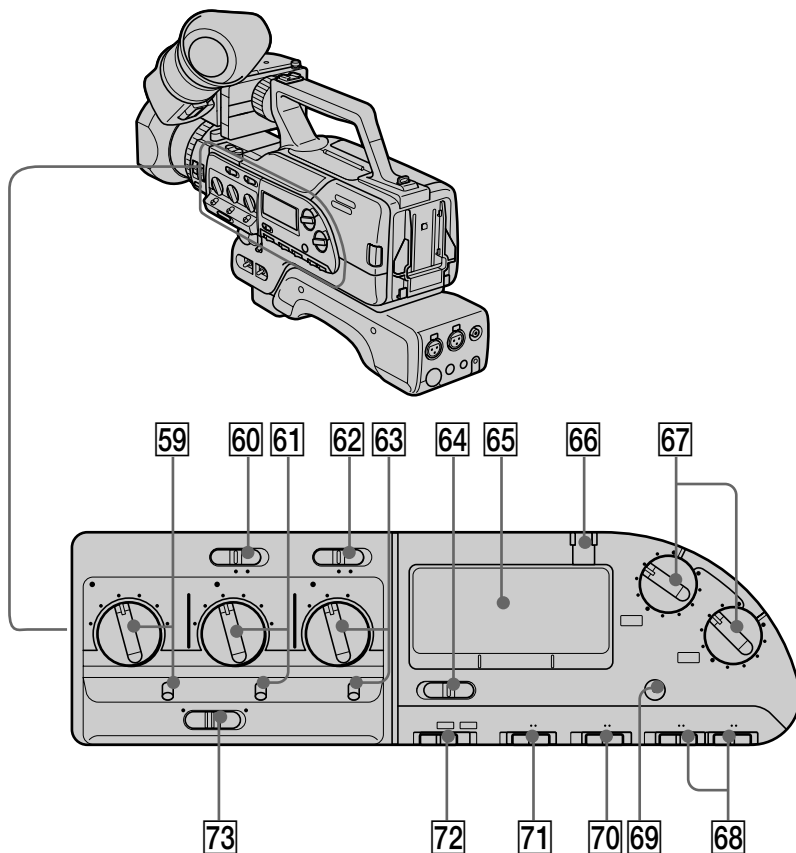
59 **SHUTTER SPEED dial and AUTO/
MANUAL switch** (p. 55)

60 **VF DISPLAY switch** (p. 28)
Set to display (ON) or erase (OFF) the
indicators in the viewfinder.

61 **GAIN dial and AGC/MANUAL switch**
(p. 58)

62 **STEADY SHOT switch** (p. 68)

63 **WHT BAL (white balance) dial and
ATW/MANUAL switch** (p. 60, 61)

64 **DISPLAY LIGHT switch (for display
window)**
Use to set the display back light switch
ON/OFF.

65 **Display window** (p. 16)

66 **PEAK indicators (L and R)** (p. 66)

67 **REC LEVEL dials** (p. 66)

68 **REC LEVEL switches** (p. 66)

69 **TC RESET button**
Set time code to 0:00:00:00 when you
want to reset the time code while
shooting.

70 **AUDIO MODE switch** (p. 29)
Set to select Fs 32k (12 bit) or Fs 48k
(16 bit) audio recording mode.

71 **SPEAKER switch** (p. 28)

72 **AUDIO MONITOR switch** (p. 66)

73 **AUTO LOCK switch** (p. 26)
Set to turn automatic settings for
aperture, shutter speed, gain, and white
balance ON/OFF.

9
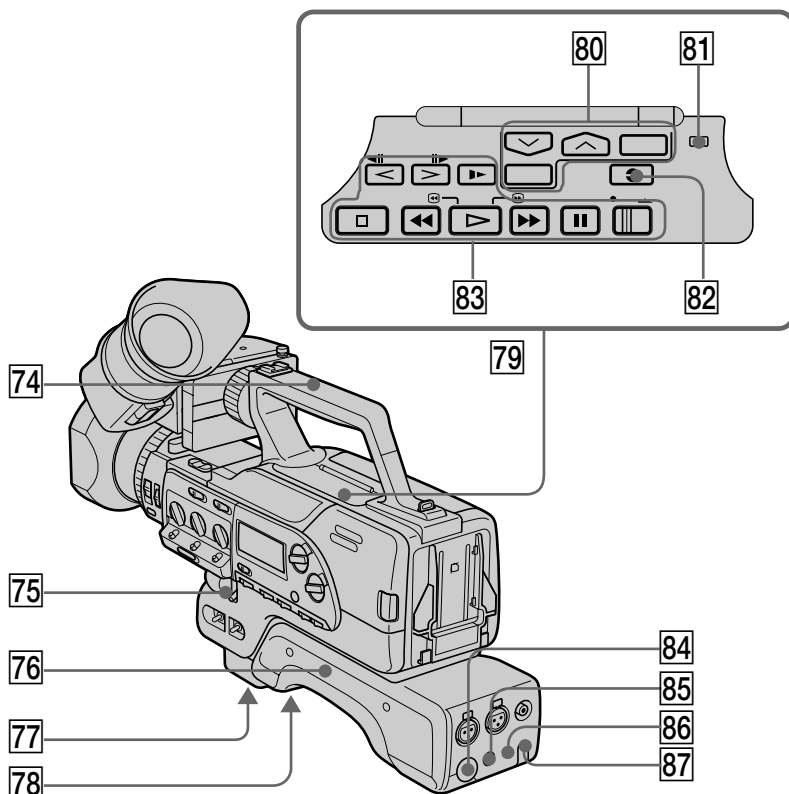
74 **Carrying handle**

75 **IRIS dial and AUTO/MANUAL switch** (p. 54)

76 **Shoulder pad**

77 **Tripod receptacle** (p. 17)

78 **Lithium battery cover** (p. 79)

79 **Cover for menu and video controls**

80 **Menu buttons** (p. 40)

81 **TC switch** (p. 28)
Set to select the drop frame or non-drop frame for time code recording.

82 **AUDIO DUB ⇔ button** (p. 77)

83 **Video controls** (p. 36)
□ STOP button (stop)
◀◀ REW button (rewind)
▷ PLAY button (playback)
▶▶ FF button (fast forward)

❚❚ PAUSE button (pause)
● REC switch (recording)
▶❙ SLOW button (slow speed playback)
◀❚❚/❚❚▶ FRAME button (direction select/frame-by-frame)

84 **MONITOR LEVEL dial** (p. 28)
Turn to adjust the volume level of the headphones and built-in speaker.

85 **∩ (headphones) jack** (p. 28)

86 **⮂ LANC jack**
⮂ stands for Local Application Control Bus System. The ⮂ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.

87 **Tally lamp/Rear Remote Commander sensor** (p. 27, 14)

10

Remote Commander

The buttons that have the same name on the Remote Commander as on the digital camcorder function identically.
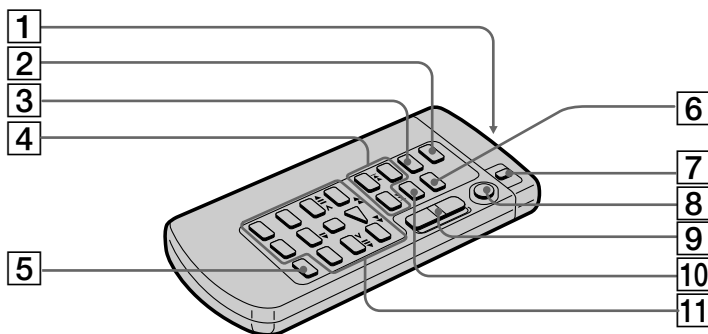
1 **Transmitter**
Point toward the remote sensor to control the digital camcorder after turning on the digital camcorder.

2 **PHOTO button** (p.46)

3 **DISPLAY button** (p. 36)

4 **SEARCH MODE/|◀◀ /▶▶| buttons** (p. 71)
Press SEARCH MODE to select date search or photo search.

5 **AUDIO DUB button** (p. 77)

6 **ZERO SET MEMORY button**
This button does not function.

7 **VTR4/ID/VTR2 switch** (p. 13)
Select VTR4 or ID, the same setting as COMMANDER in the menu system.
The VTR2 position does not function on this digital camcorder.

8 **START/STOP button**

9 **Zoom button**
The zooming speed is unchangeable by the Remote Commander.

10 **DATA CODE button** (p. 73)

11 **Video control buttons**

11

To prepare the Remote Commander
To use the Remote Commander, you must insert two size AA (R6) batteries. Use the supplied size AA (R6) batteries.
(1) Remove the battery cover from the Remote Commander.
(2) Insert both of the size AA (R6) batteries with correct polarity.
(3) Put the battery cover back onto the Remote Commander.
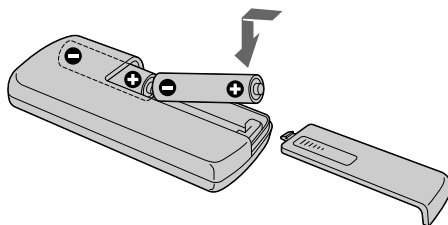
Note on battery life
The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote Commander does not work.

To avoid damage from possible battery leakage
Remove the batteries when you will not use the Remote Commander for a long time.

To use the Remote Commander
Make sure that the COMMANDER is set to VTR4/ID in the menu system on the digital camcorder.

About the ID of the Remote Commander

You can avoid having the digital camcorder accidentally respond to signals from other remote commanders by setting the VTR4/ID/VTR2 switch to ID. Use the supplied Remote Commander when you set the switch to ID. When you use the Remote Commander for the first time, register the ID following the procedure below. Once you have registered the ID, you do not need to do so again.

(1) Install a power source, open the cover, then press MENU to display the menu in the viewfinder.
(2) Press ∨ or ∧ to select COMMANDER, then press EXECUTE.
(3) Press ∨ or ∧ to select ID SET.
(4) Set VTR4/ID/VTR2 on the Remote Commander to ID.
(5) Point the Remote Commander at the Remote Commander sensor on the digital camcorder and press □ on the Remote Commander.
After the beep sound, the ID of the Remote Commander is registered, and the COMMANDER is set to ID in the menu system.
(6) Press MENU to erase the menu display.

Before you begin

1
MENU

MENU
DIGITAL F ⊳ ZOOM/WIDE
D ZOOM
16:9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[MENU] : END

2
MENU

COMMANDER   VTR4
                       OFF
                       ID
                       ID SET

[MENU] : END

3
MENU

COMMANDER   VTR4
                       OFF
                       ID
                       ID SET

COMMANDER [STOP] : ID SET

5
STOP

4
VTR 4 ┐ ID ┌ VTR 2

13
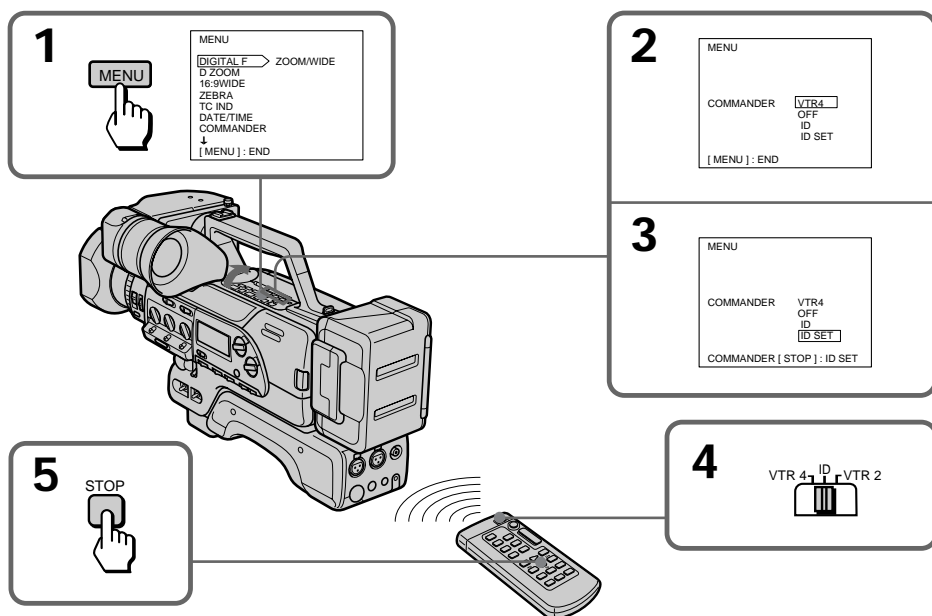
Remote control direction

Aim the Remote Commander at either of the two remote commander sensors.
The range of the Remote Commander is about 16 feet (about 5 m) indoors. Use the
Remote Commander as close to flat as possible, otherwise it may not work.
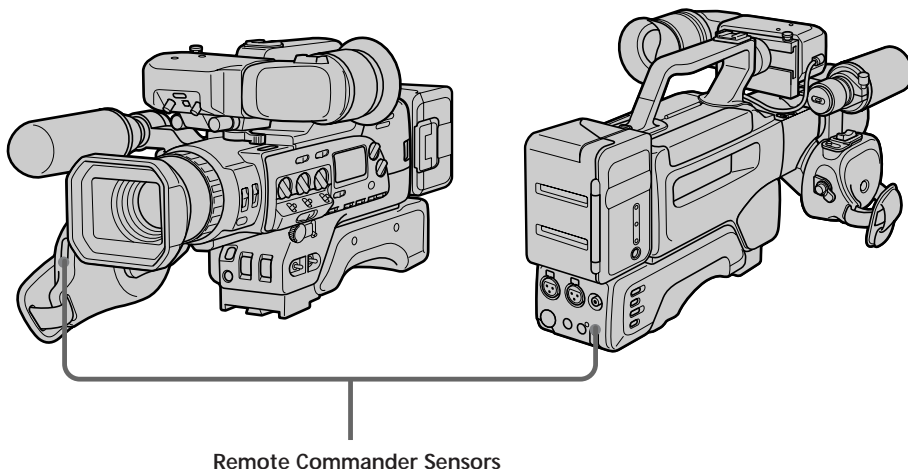
Remote Commander Sensors

Notes on the Remote Commander
• Keep the Remote Commander sensor away from strong light sources such as direct
  sunlight or illumination. Otherwise, the remote control may not be effective.
• Be sure that there is no obstacle between the Remote Commander sensor on the digital
  camcorder and the Remote Commander.
• This digital camcorder works in commander mode VTR 4 or ID. The commander
  modes (VTR 4 and ID) are used to distinguish this digital camcorder from other Sony
  VCRs. If you use another Sony VCR at commander mode ID, we recommend that you
  change the commander mode or cover the Remote Commander sensor of the VCR
  with black paper.
• You do not need to store the ID again, after having done so once. Set COMMANDER
  to ID in the menu system, and set the VTR4/ID/VTR2 switch on the Remote
  Commander to ID.
• The stored ID is not erased even if you replace the lithium battery.

Identifying the parts

In the viewfinder
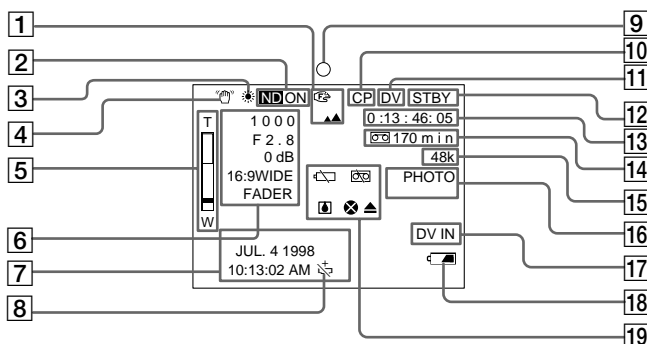
1. **Manual focusing indicator** (p. 53)
   🔺 appears when focusing far, 🔺
   appears when focusing close.

2. **ND filter indicator** (p. 63)

3. **White balance indicator** (p. 60)

4. **Steady shot indicator** (p. 68)

5. **Zoom indicator** (p. 30, 52)

6. **Manual setting data/wide mode/
   fader or overlap/AGC LMT indicators**
   (p. 54, 55, 58, 45, 43, 44)
   If not set, the indicator disappears, and
   all indicators below rise 1 row.

7. **Data code indicators** (p. 73)**/Date and
   Time indicators** (p. 41)

8. **Lithium battery indicator** (p. 78)

9. **Recording/battery indicator** (p. 26)

10. **Custom preset indicator** (p. 69)

11. **DV indicator** (p. 37)
    During DV-formatted cassette playback,
    this indicator appears.

12. **Video control mode** (p. 26)

13. **Time code**

14. **Remaining tape indicator**

15. **Audio mode indicator** (p. 29)

16. **INTERVAL/FRAME REC/PHOTO/
    C MEMORY/date search/Photo search
    indicator** (p. 47, 48, 46, 25, 71)

17. **DV IN indicator** (p. 74)

18. **Remaining battery indicator** (p. 84)

19. **Warning indicators** (p. 95)

15

In the display window

① Time code

② Warning indicators (p. 95)

③ DVCAM indicator
Lights up when using a DVCAM-formatted cassette.
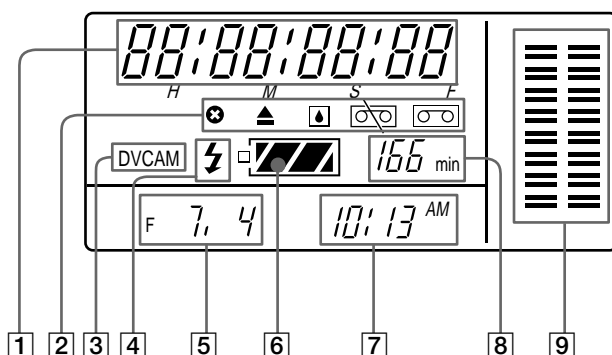
④ Flash indicator

⑤ Date/aperture indicator (p. 54)

⑥ Remaining battery indicator (p. 84)

⑦ Time indicator

⑧ Remaining tape indicators

⑨ Audio level indicators (p. 66)

Attaching the shoulder strap

Attach the shoulder strap (not supplied) to the hooks for the shoulder strap.

16
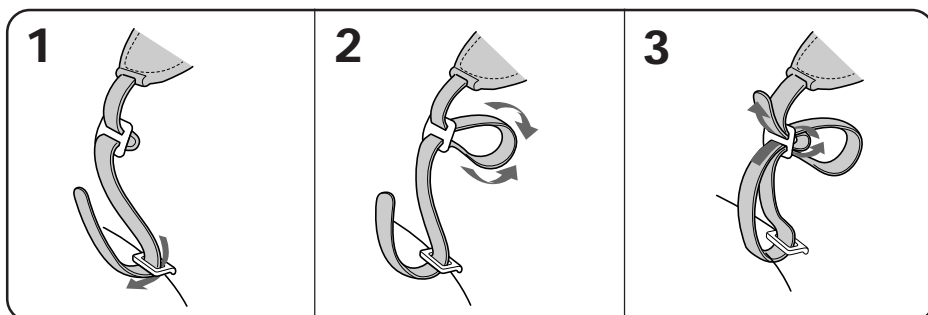
Attaching optional accessories

Attaching digital camcorder to the tripod adaptor

Use the VCT-U14 tripod adaptor (not supplied). Once the tripod adaptor has been attached to the tripod stand, then you may attach the digital camcorder.
(1) Attach the tripod adaptor to the tripod.
(2) Attach the digital camcorder to the tripod stand's grooved surface **[a]**, and slide it forward until you hear a click.
Select a balanced and secure position for the tripod stand.
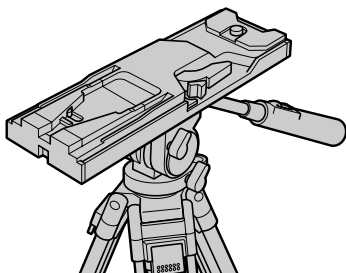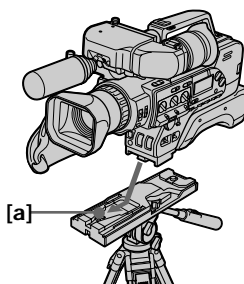
To remove the digital camcorder from the tripod
Press the red button on the release lever **[b]**, and while holding, move the lever in the direction of the arrow to release the lock.
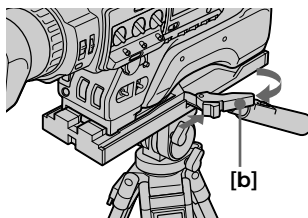
Note on tripod attachment pin
If the tripod attachment pin **[c]** does not return after removing the digital camcorder, press the red button on the release lever, and while holding, move the lever in the direction of the arrow and the pin returns to its original position. If the pin is not set in its original position you will not be able to reattach the digital camcorder.

17
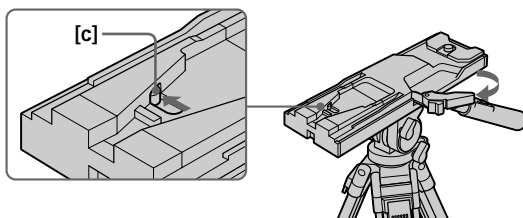
Attaching the external microphone with XLR connector

When using the ECM-672 external microphone (not supplied), attach the CAC-12 microphone holder (not supplied) to the digital camcorder.

(1) Remove the screws from the top of the viewfinder.
Remove the spacer from the screws. They are unnecessary when attaching the microphone holder.

(2) Attach the microphone holder with the supplied washers and the screws removed in step **(1)**.

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

(4) Place the microphone into the holder, close the cover, and tighten the screw.

(5) Connect the microphone to the AUDIO IN jacks of the digital camcorder, then set LINE/MIC to MIC REAR.

1

2

3

4

5

LINE/MIC

AUDIO IN
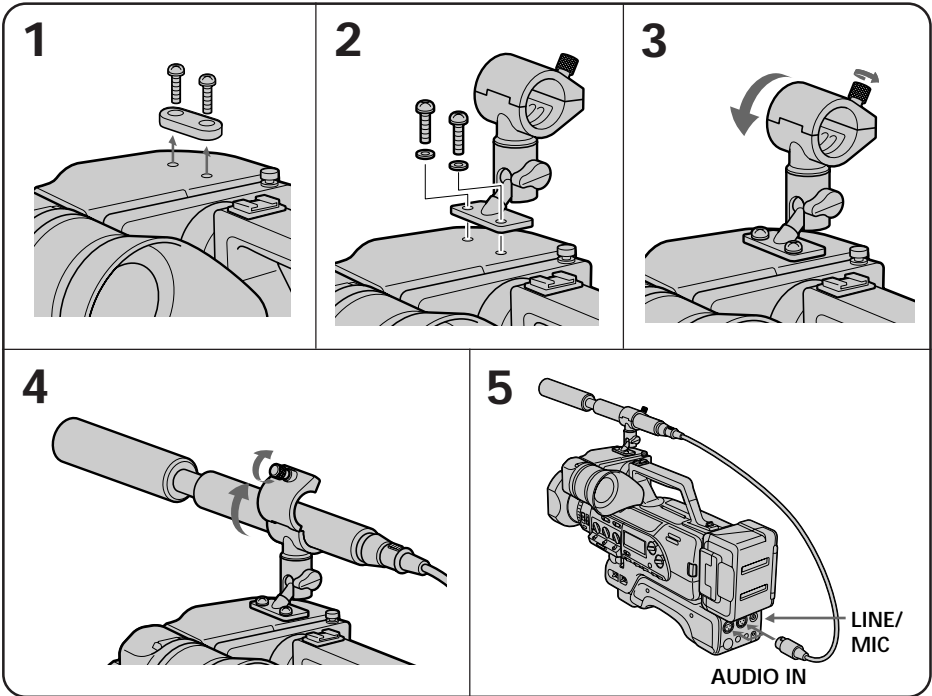
Attaching the battery adaptor

The NPA-10000 battery adaptor (not supplied), can hold up to 3 battery packs NP-F950 or NP-F750 (not supplied). Attach the adaptor to the digital camcorder.
(1) Release the lock and open the cover.
(2) Insert the battery packs in the direction of the ▶ mark on the battery packs.
(3) Close the cover, then lock.
(4) Attach the battery adaptor to the digital camcorder by sliding until it clicks.
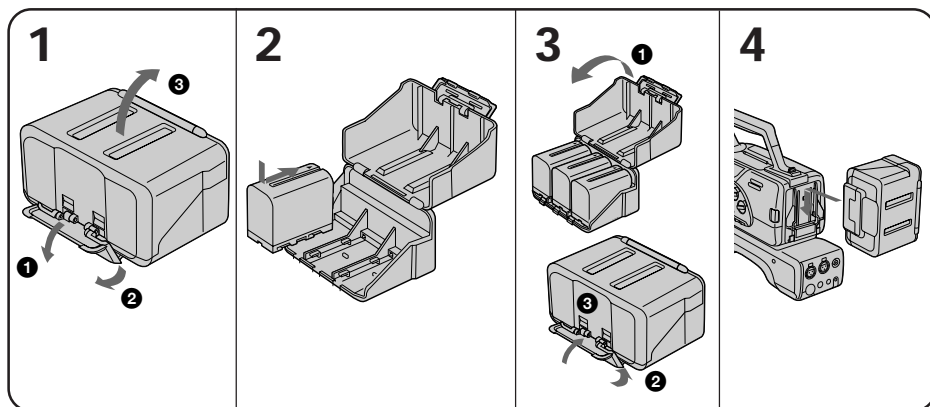
To remove the battery adaptor [a]
While pressing BATT, lift the battery adaptor out in the direction of the arrow.

To remove the battery pack [b]
Open the cover, press and hold the release lever, and slide the battery pack out in the direction of the arrow.

Checking the remaining battery indicator [c]
Press CHECK on the battery adaptor.
If there is still power left in the batteries, the lamp **[d]** lights.

[a]   BATT   [b]   [c]   [d]   CHECK

19
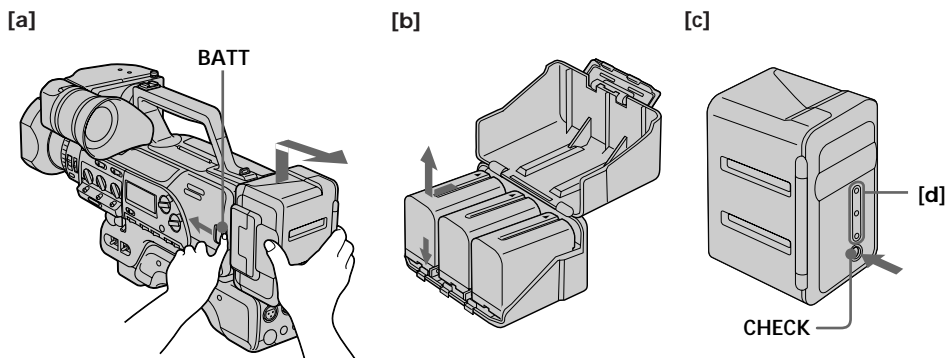
Attaching the viewfinder

Before using the digital camcorder, attach the viewfinder.
(1) Loosen the viewfinder release ring.
(2) Slide the viewfinder onto the attaching plate.
(3) Adjust the position of the viewfinder, then tighten the viewfinder release ring.
(4) Attach the **8 pin** connector to the VIEW FINDER jack on the digital camcorder.
Match ridge on **8 pin** connector to the ridge on the jack.
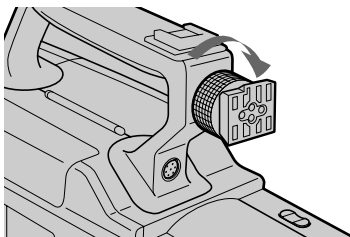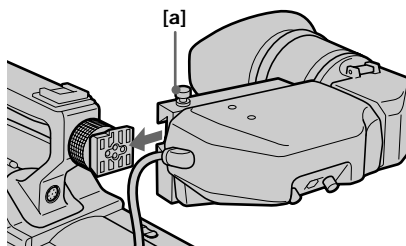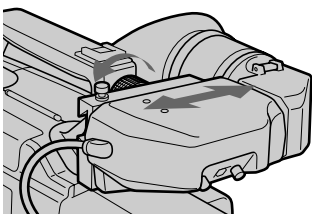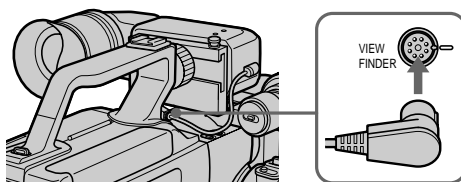
Note on the VIEW FINDER jack
This VIEW FINDER jack is specially designed for this digital camcorder. Do not connect
anything else to this VIEW FINDER jack.

To remove the viewfinder
Loosen viewfinder release ring. Then pull stopper **[a]** up, and while holding, slide
viewfinder off the attaching plate.

20

Charging and installing the battery pack

Before using your digital camcorder, you first need to charge and install the battery pack (not supplied). To charge the battery pack, use the AC-V615 AC power adaptor (not supplied).
This digital camcorder does not interface with "InfoLITHIUM" batteries. The remaining time (minutes) indication does not appear when using "InfoLITHIUM" batteries.

Charging the battery pack

Charge the battery pack on a flat surface without vibration.
(1) Connect the power cord to the AC power adaptor.
(2) Align the surface of the battery pack indicated by the ▶ mark with the edge of the terminal shutter of the AC power adaptor. Then fit and slide the battery pack in the direction of the arrow.
(3) Connect the AC power cord to a wall outlet. The CHARGE lamp (orange) lights up. Charging begins.
When the CHARGE lamp goes out, **normal charge** is completed. For **full charge**, which allows you to use the battery longer than usual, leave the battery pack in place for approximately one hour. Unplug the unit from the wall outlet, then remove the battery pack and install it into the digital camcorder. You can also use the battery pack before it is completely charged.
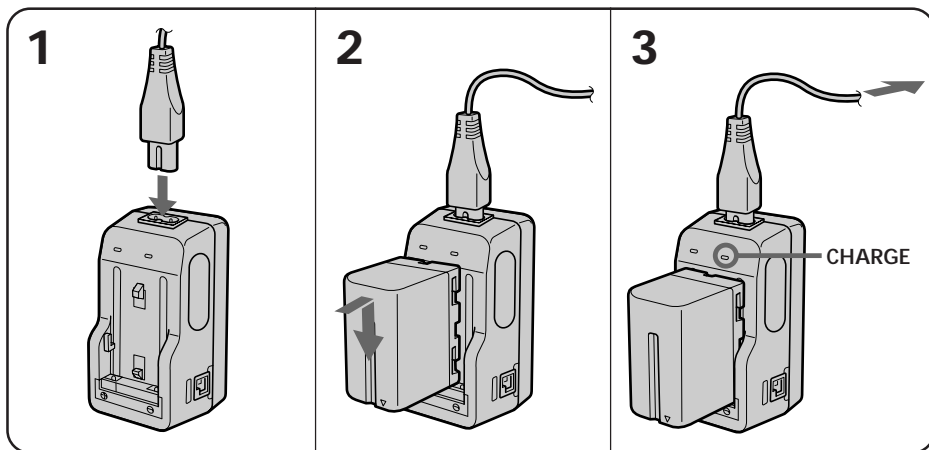
Charging time

Battery pack	Charging time* (min.)
NP-F950	360 (300)
NP-F750	270 (210)

The time required for a normal charge is indicated in parentheses.
* Approximate minutes to charge an empty battery pack using the AC-V615 AC power adaptor. (Lower temperatures require a longer charging time.)

Battery life

Battery pack	Continuous recording time[1]	Typical recording time[2]
NP-F950	150 (135)	80 (70)
NP-F750	95 (85)	50 (45)
NP-F950 (x3)[3]	450 (405)	240 (210)

Numbers in parentheses indicate the time when you use a normally charged battery. Battery life will be shorter if you use the digital camcorder in a cold environment.
1) Approximate continuous recording time indoors.
2) Approximate minutes when recording while you repeat recording start/stop, zooming and turning the power on/off. The actual battery life may be shorter.
3) When using the NPA-10000 battery adaptor.

To remove the battery pack
Slide the battery pack in the direction of the arrow.
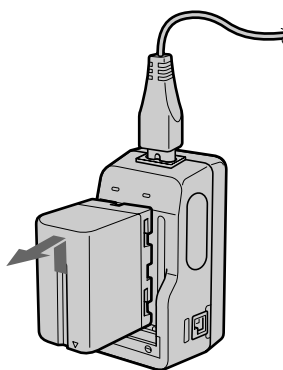
Notes on charging the battery pack
• The CHARGE lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.
• If the CHARGE lamp does not light, disconnect the power cord. After about one minute, reconnect the power cord again.
• When operating the digital camcorder using the AC power adapter, you cannot charge the battery pack.
• When a fully charged battery pack is installed, the CHARGE lamp will light once, then go out.

Installing the battery pack

Insert the battery pack in the direction of the ▼ mark on the battery pack. Slide the battery pack down until it catches on the battery release and clicks.
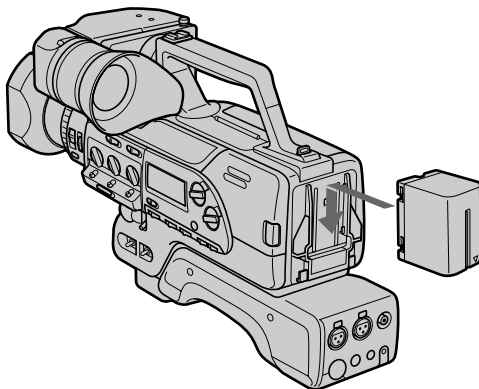
To remove the battery pack
While pressing BATT, lift the battery pack out in the direction of the arrow.

BATT
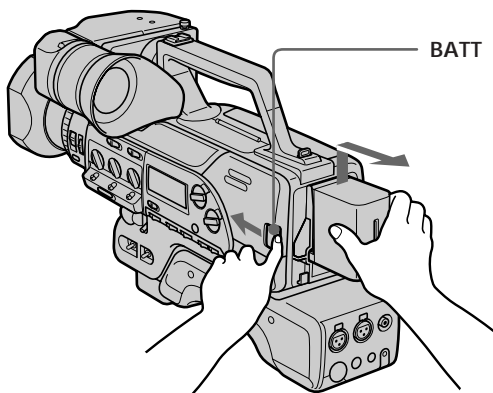
Inserting a cassette

Use a standard DVCAM cassette with $\boxed{DVCAM}$™ logo*.
Make sure that a power source is installed.
We recommend you set the POWER switch to ON before inserting the cassette.
(1) Open the cassette compartment cover.
(2) Insert a cassette (not supplied) with the tab upwards, and the window facing out and press down so that the cassette loads.
(3) Close the cover.

Note on the cassette
Mini DVCAM cassettes and Mini DV cassettes cannot be used.

* $\boxed{DVCAM}$™ is a trademark.

1
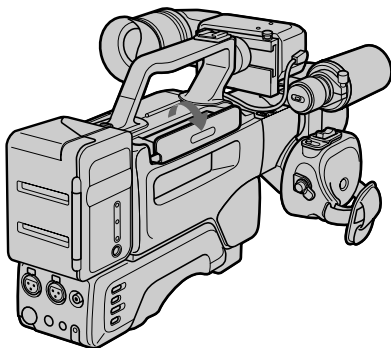
2
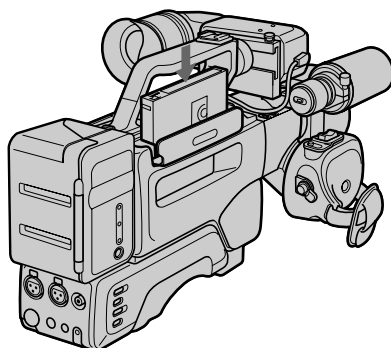
3

EJECT▲
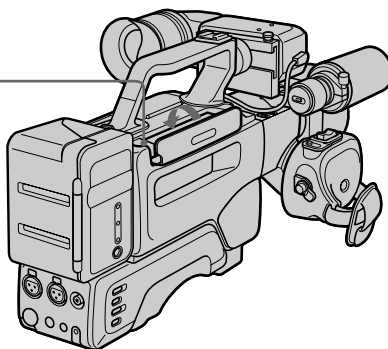
To eject the cassette

Open the cassette compartment cover and press ▲. After the cassette rises, take it out, then close the cover.

You cannot eject the cassette while C MEMORY appears in the viewfinder because the digital camcorder is still writing information into the cassette memory. After C MEMORY disappears the cassette automatically rises.

When ejecting the cassette, never close the cassette compartment cover until the cassette is completely removed.

To prevent accidental erasure

Slide the tab on the cassette to expose the red mark. If you insert the cassette with the red mark exposed, the beeps sound, the ▧ and ▲ indicators flash in the viewfinder and display window, and you cannot record.

To re-record on this tape, slide the tab back out, covering the red mark.
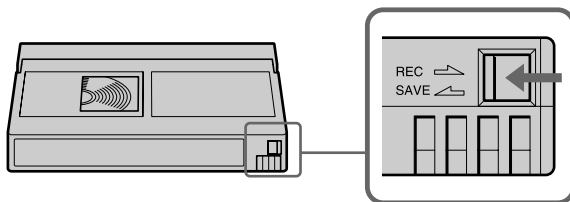
Camera recording

Make sure that the power source is installed and a cassette is inserted and that AUTO LOCK is set to ON. When AUTO LOCK is set to ON, all settings are automatically adjusted to best suit your shooting environment. Before you record one-time events, you may want to make a trial recording to make sure that the digital camcorder is working correctly.

When you use the digital camcorder for the first time, power on it and reset the date and time to your time before you start recording (p. 80).

(1) Remove the lens hood cap, and attach it to the grip strap.
(2) Set the POWER switch to ON.
(3) Set CAMCORDER/VTR to CAMCORDER.
(4) Turn STANDBY up to STANDBY.
(5) Press START/STOP.
  The digital camcorder starts recording. The "REC" indicator appears and the red lamp lights up in the viewfinder. The tally lamps located on the front and rear also light up.
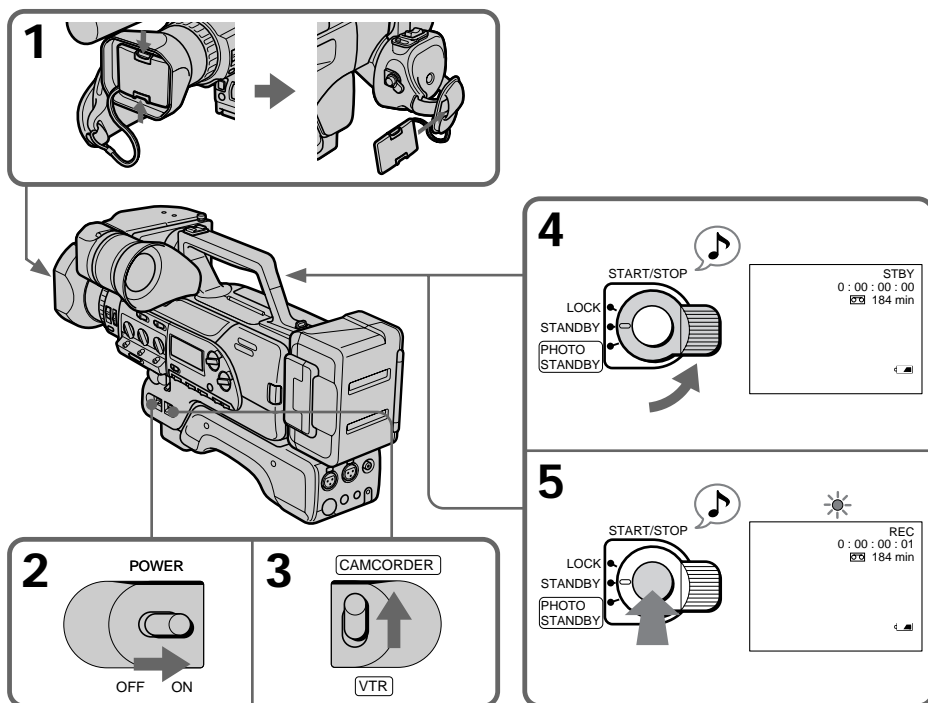
When ND ON flashes in the viewfinder
Set ND FILTER to ON.

To stop recording momentarily [a]
Press START/STOP again. The "STBY" indicator appears in the viewfinder **(Standby mode)**.

To finish recording [b]
Press START/STOP again. Turn STANDBY down to LOCK, and set the POWER switch to OFF. Then, eject the cassette and remove the battery pack.

Basic operations

[a]


```
                      STBY
0 : 13 : 46 : 00
            170 min
```
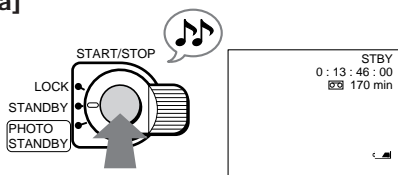
[b]
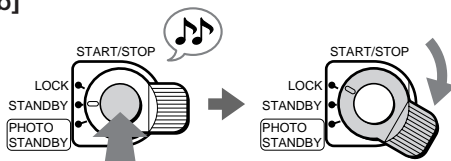
To focus the viewfinder lens [c]
If you cannot see the indicators in the viewfinder clearly, or after someone else has used the digital camcorder, focus the viewfinder lens. Turn the viewfinder lens adjustment ring so that the indicators in the viewfinder come into sharp focus.

To adjust the contrast and the brightness of the viewfinder [d]
To adjust the contrast, turn the CONTR knob.
To adjust the brightness, turn the BRIGHT knob.

If you want to turn off the tally lamp [d]
Set TALLY to OFF.
The rear tally lamp cannot be turned off.

[c]

[d]

BRIGHT
TALLY
CONTR

27
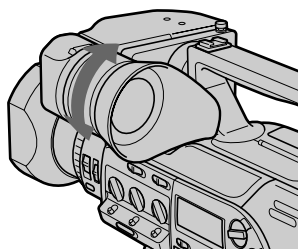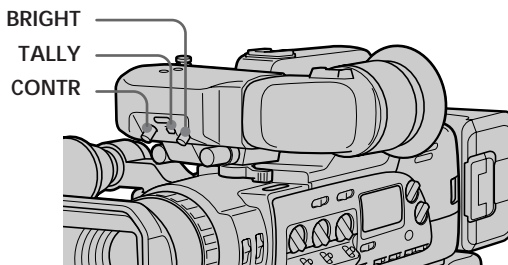
To erase the indicators in the viewfinder
You can erase the indicators in the viewfinder except for menu and warning indicators. Set VF DISPLAY to OFF.

VF DISPLAY

ON ● ● OFF
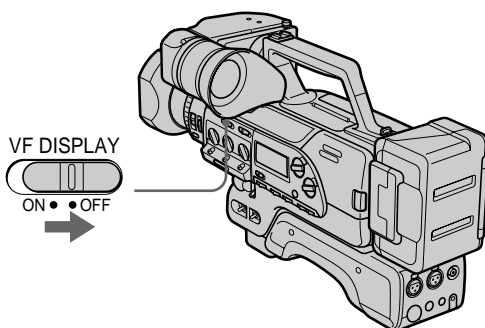
Note on recording
When you record from the beginning of a tape, run the tape by recording for about 15 seconds before you start the actual recording. This will ensure that you won't miss any start-up scenes when you play back the tape.

Note on Standby mode
If you leave the digital camcorder in Standby mode for 5 minutes while a cassette is inserted, the digital camcorder turns off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down and up again. To start recording, press START/STOP.

Note on time code display
While recording or playing back, the time code shows hours, minutes, seconds and frame number (0:00:00:00). If there is a blank portion between pictures on a tape, the time code restarts from zero. You cannot rewrite the time code only.
You can select the drop frame or non-drop frame system. Set DF or NDF using the TC switch inside the cover of the video control buttons.
You can erase only time code display in the viewfinder. Set TC IND in the menu to OFF.

Note on the beep sound
As indicated with ♪ in the illustration, a beep sounds when you turn the power on or when you start recording, and two beeps sound when you stop recording, confirming the operation. Several beeps also sound as a warning of any unusual condition of the digital camcorder.
Note that the beep sound is not recorded on the tape. If you do not want to hear the beep sound, select "OFF" in the menu system.

To change the directionality of the built-in microphone
Set DIRECTION SELECT on the back of the microphone to the desired position (0°⁄
90°⁄120°).

To record through an external microphone
Connect a microphone (not supplied) to the MIC (PLUG IN POWER) jack or AUDIO IN
input jacks. You can also attach a microphone to the accessory shoe or to the
microphone holder (not supplied). Then select the input mode using the LINE⁄MIC
switches. In this case, sound from the built-in microphone will not be recorded.

When the microphone has	Connect to	Set LINE/MIC to
Mini-plug	MIC (PLUG IN POWER)	MIC FRONT
XLR connector	AUDIO IN (CH-1⁄CH-2)	MIC REAR

To monitor the sound while recording
Use headphones or the built-in speaker. To turn on the built-in speaker, set SPEAKER
to ON. To use headphones, connect them to the ⌒ jack. Use the MONITOR LEVEL dial
to adjust the volume of the speaker or headphones. When using headphones the built-
in speaker becomes inactive.
When monitoring the built-in speaker, feedback may occur. In this case, turn down the
MONITOR LEVEL or SPEAKER set to OFF.

To select Fs 48k [a] or Fs 32k [b] recording mode
Set AUDIO MODE to Fs 48k (16 bit) so that you can get higher sound quality. In Fs 48k
mode, the digital camcorder records one video sector [c] and one audio sector [d]. In
the viewfinder the "48k" indicator appears.
Set AUDIO MODE to Fs 32k (12 bit), and 1 sector is left open for audio dubbing
afterwards. In Fs 32k mode, the digital camcorder records one video sector [c], one
audio sector [d], and one blank audio sector [e], which enables you to add narration or
music after the initial recording.

Basic operations

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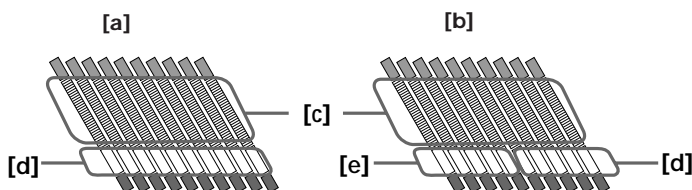
Using the zoom feature

Zooming is a recording technique that lets you change the size of the subject in the scene.
"T" side: for telephoto (subject appears closer)
"W" side: for wide-angle (subject appears farther away)
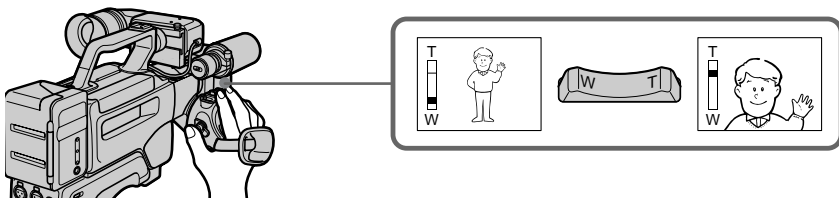
Zooming speed (Variable speed zooming)
Press the power zoom button a little for a slower zoom, press it more for a faster zoom.

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

To use digital zoom
Set DIGITAL F in the menu system to ZOOM/WIDE. Then set D ZOOM in the menu system to ON.

Notes on digital zoom
• More than 10x zoom is performed digitally and the picture quality deteriorates as you go toward the "T" side.
• The upper side [a] of the power zoom indicator shows the digital zooming zone, and the lowerside [b] shows the optical zooming zone. If you set the D ZOOM function to OFF, the [a] zone disappears.
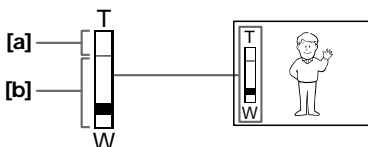
Hints for better shooting

When shooting with the digital camcorder on your shoulder, you'll get better results by holding the digital camcorder according to the following suggestions:
• Place the digital camcorder on your shoulder and secure it with the grip strap so that you can easily manipulate the controls with your thumb.
• To adjust the grip, loosen the grip screw [a] with a coin, rotate the grip, and then tighten the screw. Set the grip to one of the three different position marks.

[a]
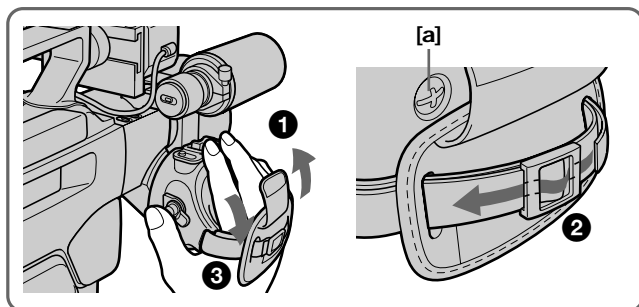
• Place your right elbow against your side.
• Place your left hand under the digital camcorder to support it. Be sure to not touch the built-in microphone.
• Place your eye firmly against the viewfinder eyecup.
• Use the viewfinder frame as a guide to determine the horizontal plane.
• You can also record in a low position to get an interesting angle. Lift the viewfinder up for recording from a low position [b].
• While recording in a low position, you can use the front START/STOP button [c].
• You can rotate the viewfinder 120° up and 90° down. This is useful when recording in a high or low position [d].

[b]

[c]

START/STOP

[d]

120°

90°

• You can move the viewfinder up to about 1 3/16 inches (30 mm) laterally. Turn the lock ring to release the viewfinder, and then move it. Turn back the lock ring to fix the viewfinder in place [e].
• You can move the viewfinder up to about 1 3/16 inches (30 mm) lengthwise. Turn the lock lever under the viewfinder to release it, and then move the viewfinder. Turn back the lock lever to fix the viewfinder in place [f].

[e]

[f]

Release

Lock
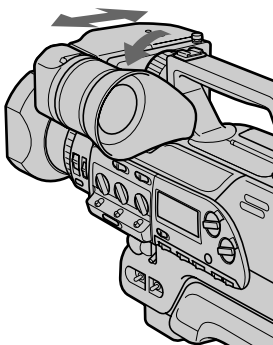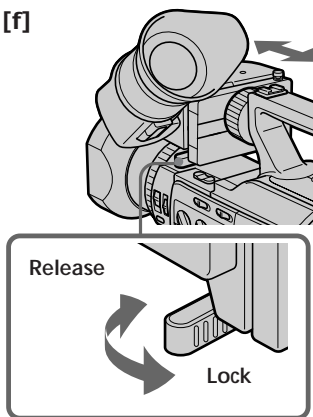
Caution on carrying
Do not pick up the digital camcorder by anything other than the grip or handle [g].

Caution on the viewfinder
Do not place the digital camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder may be damaged.
Be careful when placing the digital camcorder under sunlight or by a window [h].

[g]
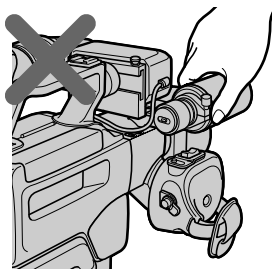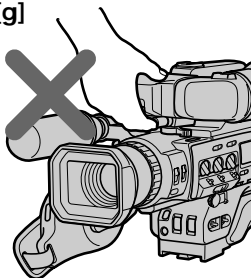
[h]
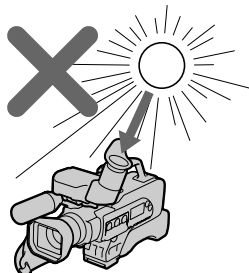
Note on the viewfinder
When attaching the video light (not supplied) to the accessory shoe, do not lift the viewfinder. The video light heat may damage the eyecup.

Checking the recorded picture

Using EDITSEARCH, you can review the last recorded scene or check the recorded picture in the viewfinder.

(1) Set the POWER switch to ON and then set CAMCORDER/VTR to CAMCORDER.
(2) Turn STANDBY up to STANDBY.
(3) Press the – (⑤) side of EDITSEARCH momentarily; the last few seconds of the recorded portion play back **(Rec Review)**.
Hold down the – side of EDITSEARCH until the digital camcorder goes back to the scene you want. The last recorded portion is played back. To go forward, hold down the + side **(Edit Search)**.
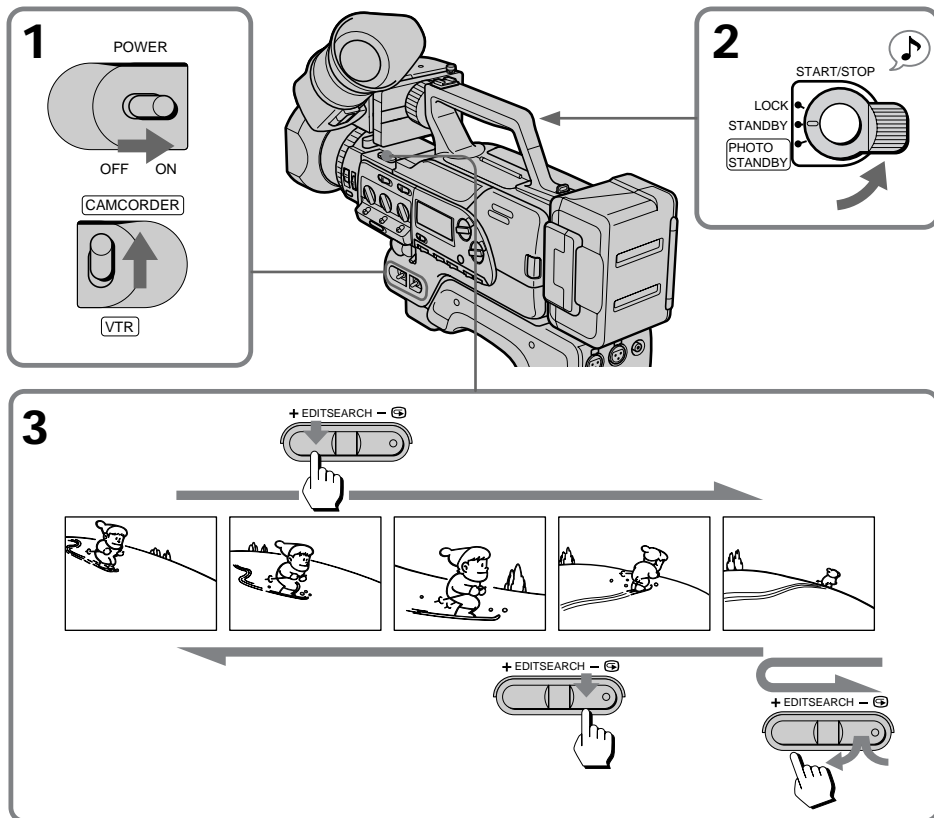
To stop playback
Release EDITSEARCH.

To begin re-recording
Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the cassette, the transition between the last scene you recorded and the next scene you record will be smooth.

Note on the EDITSEARCH
If you press EDITSEARCH fully, the playback speed doubles.

Connections for playback

You can use this digital camcorder as a VCR by connecting it to monitor for playback. There are some ways to connect the digital camcorder to monitor. When monitoring the playback picture by connecting the digital camcorder to monitor, we recommend you to use house current for power source.

Connecting directly to a monitor with Video/Audio input jacks

If you connect directly to a monitor
Open the jack cover and connect the digital camcorder to the inputs on the monitor by using the supplied A/V connecting cable.

S VIDEO OUT [a] S VIDEO IN
VIDEO OUT VIDEO IN
[b]
AUDIO OUT AUDIO IN

⟶ : Signal flow
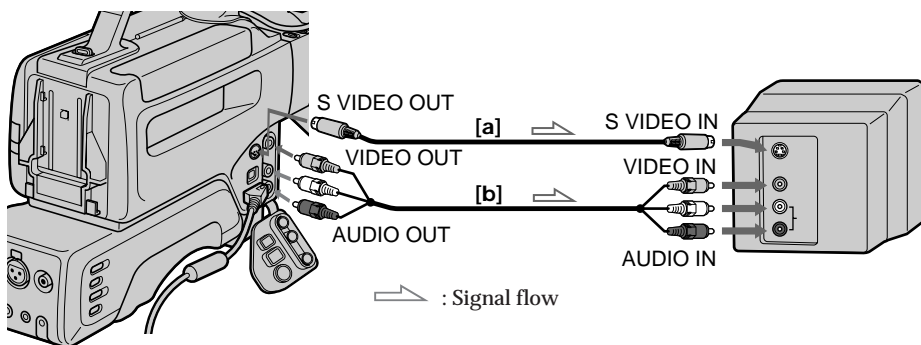
If you are going to connect the digital camcorder using the S video cable **[a]**, you do not need to connect the yellow (video) plug of the A/V connecting cable **[b]**.

If your monitor is already connected to a VCR

Open the jack cover and connect the digital camcorder to the LINE IN inputs on the VCR by using the supplied A/V connecting cable. Set the input selector on the VCR to LINE. Set the monitor/VCR selector on the monitor to VCR.

VCR

S VIDEO OUT
[a]
S VIDEO IN

VIDEO OUT
[b]
VIDEO IN   AUDIO IN

AUDIO OUT

: Signal flow

Basic operations
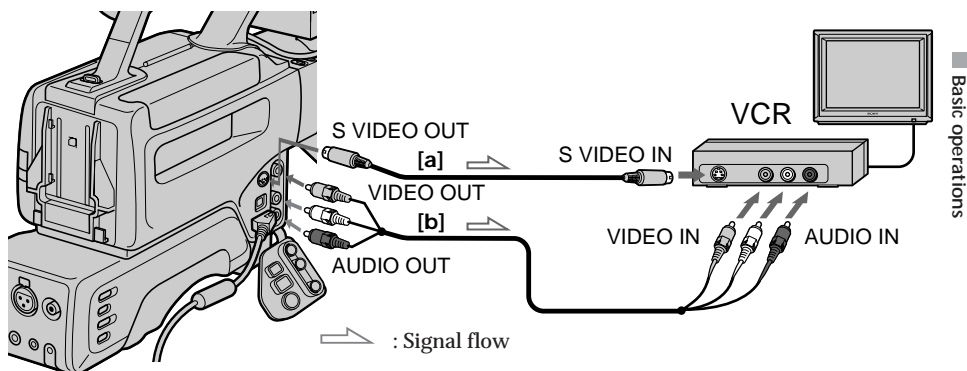
If your monitor or VCR has a BNC jack
When connecting video output using BNC cable, connect to the rear VIDEO OUT jack. In this connection, you need not connect S video cable nor the yellow (video) plug of the A/V connecting cable.

If your monitor or VCR is a monaural type
Connect only the white plug for audio on both the digital camcorder and the monitor. With this connection, the sound is monaural.

To connect to a TV without Video/Audio input jacks
Use the RFU-95UC RFU adaptor (not supplied).

Playing back a tape

You can monitor the playback picture in the viewfinder. You can also monitor the picture on a monitor screen, after connecting the digital camcorder to a monitor or VCR.

(1) Set the POWER switch to ON.
(2) Set CAMCORDER/VTR to VTR.
(3) Insert the recorded tape with the window facing out.
(4) Open the cover, then press ▷ to start playback.
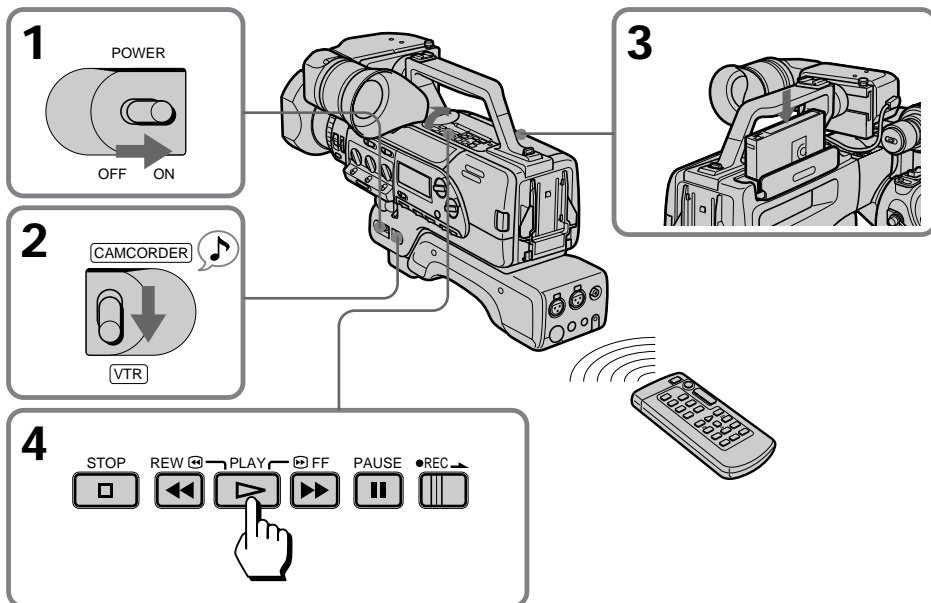
To stop playback, press □.
To rewind the tape, press ◀◀.
To fast-forward the tape rapidly, press ▶▶.

To monitor the sound while viewing the playback picture in the viewfinder
Connect headphones (not supplied) to the ∩ jack or turn on the built-in speaker by setting SPEAKER to ON.

Using the Remote Commander
You can control playback using the supplied Remote Commander. Before using the Remote Commander, insert the size AA (R6) batteries.

Note on the DISPLAY button on the remote commander
Press DISPLAY to display the screen indicators on the monitor screen. To erase the indicators, press DISPLAY again.

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

Various playback modes

To view a still picture (playback pause)
Press **II** during playback. To resume playback, press **II** or ▷.

To locate a scene (picture search)
Keep pressing ◄◄ or ►► during playback. To resume normal playback, release the button.

To monitor the high-speed picture while advancing the tape or rewinding (skip scan)
Keep pressing ◄◄ while rewinding or ►► while advancing the tape. To resume normal playback, press ▷.

To view the picture at 1/5 speed (slow playback)
Press ▮► during playback. To resume normal playback, press ▷. If slow playback lasts for about 1 minute, it shifts to normal speed automatically.

To view the picture at double speed
For double speed playback in the reverse direction, press ◄II/◁, then press x2 on the Remote Commander during playback. For double speed playback in the forward direction, press ▷/II►, then press x2 during playback. To resume normal playback, press ▷.

To view the picture frame-by-frame
Press ◄II/◁ or ▷/II► in playback pause mode. If you keep pressing the button, you can view the picture at 1/30 speed. To resume normal playback, press ▷.

To change the playback direction
Press ◄II/◁ for reverse direction or ▷/II► for forward direction during playback. To resume normal playback, press ▷.

Notes on playback
• Streaks appear and the sound is muted in the various playback modes.
• When playback pause mode is left on for 5 minutes, the digital camcorder automatically enters stop mode.
• When using playback slow or still picture modes, images from the previous frames might to seen mixed in with the main picture.

Basic operations

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Using alternative power sources

You can choose any of the following power sources for your digital camcorder: battery pack and the house current. Choose the appropriate power source depending on where you want to use your digital camcorder.

Place	Power source	Accessory to be used (not supplied)
Indoors	House current	AC power adaptor AC-V615
Outdoors	Battery pack	Battery pack NP-F950, NP-F750 Battery adaptor NPA-10000

Note on AC power adaptor
Use the recommended AC power adaptor, such as AC-V615.

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If this happens, restore the power supply again immediately.

Using the house current

(1) Connect the power cord to the AC power adaptor.
(2) Connect the power cord to a wall outlet, then connect the connecting cord (not supplied) to the DC OUT jack on the AC power adaptor.
(3) Connect the connecting cord to the DC IN jack on the digital camcorder.
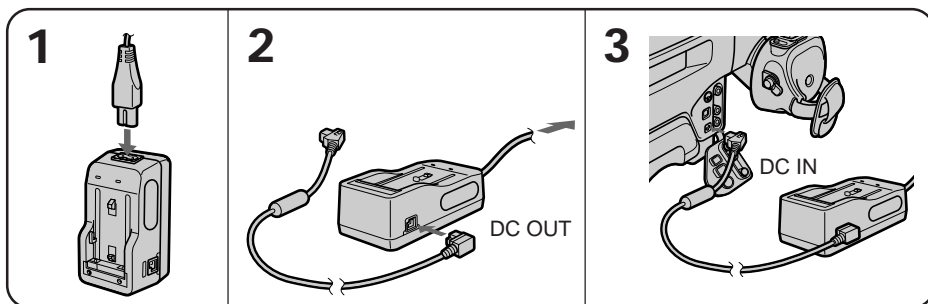
Charging the attached battery pack

After connecting the power cord to the wall outlet and setting the POWER switch on the digital camcorder to OFF, you can charge the battery pack in either of the following two ways:

• Charging the battery pack attached to the digital camcorder
Leave the battery pack attached to the digital camcorder. (The NP-F950 battery pack (not supplied) requires about 390 minutes for a full charge and about 330 minutes for a normal charge.)
While charging, the battery indicator appears repeatedly in the display window:

• Charging two battery packs at the same time
Attach one battery pack to the AC power adaptor and the other to the digital camcorder. Both are charged simultaneously. When charged, CHARGE lamp and the ▬ indicator goes out (normal charge). If either lamp is still lit, both battery packs are not charged (the NP-F950 battery packs (not supplied) require about 480 minutes for a full charge and about 420 minutes for a normal charge).

To remove the adaptor

Pull out by the plug. Never pull on the connecting cord itself.

WARNING

The power cord must only be changed at a qualified service shop.

PRECAUTION

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

Notes on the VTR/CAMERA lamp

• The VTR/CAMERA lamp will remain lit for a while even if the unit is unplugged after use. This is normal.
• If the VTR/CAMERA lamp does not light, disconnect the power cord. After about one minute, reconnect the power cord.

This mark indicates that this product is a genuine accessory for Sony video products.
When purchasing Sony video products, Sony recommends that you purchase accessories with this "GENUINE VIDEO ACCESSORIES" mark.

Advanced operations

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Changing the mode settings

You can change the mode settings in the menu system to further enjoy the features and functions of the digital camcorder.

(1) Open the cover, then press MENU to display the menu.
(2) Press ⌄ or ⌃ to select the desired item, then press EXECUTE.
(3) Press ⌄ or ⌃ to select the desired setting, then press EXECUTE.
For some items, you may need to repeat steps 2 and 3.
(4) Press MENU to erase the menu display.
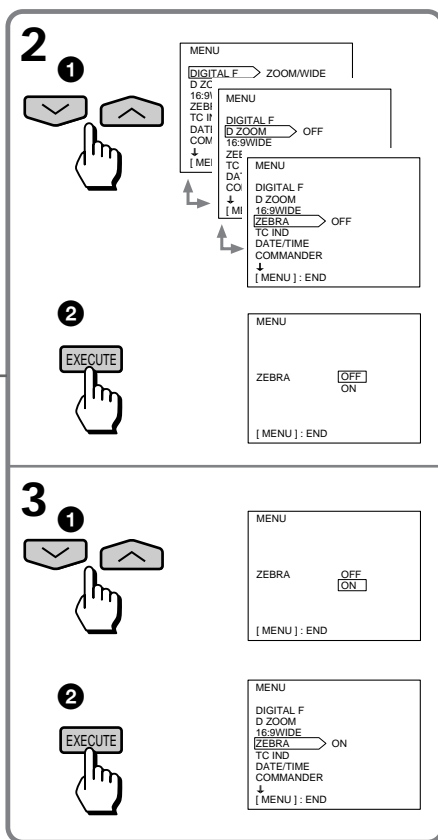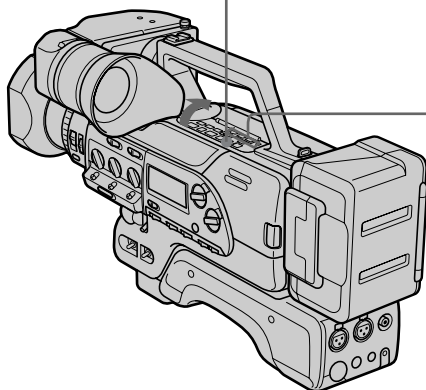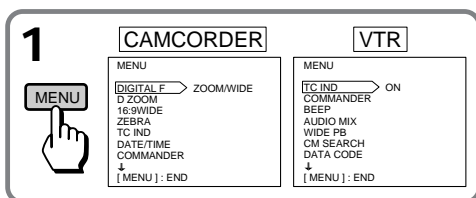
Selecting the mode setting of each item

Items for both CAMCORDER and VTR modes
TC IND* <ON/OFF>
• Normally select ON.
• Select OFF to erase the time code indicator.

COMMANDER* <VTR4/OFF/ID/ID SET>
• Normally select VTR4.
• Select OFF when not using the Remote Commander.
• Select ID when using the Remote Commander with the ID number set.
• Select ID SET when setting the ID number of the Remote Commander.

BEEP* <ON/OFF>
• Select ON so that beeps sound when you start/stop recording, etc.
• Select OFF when you do not want to hear the beep sound.

CLOCK SET*
Reset the date and time.

Items for CAMCORDER mode only
DIGITAL F* <ZOOM/WIDE or OVERLAP>
• Select ZOOM/WIDE before using the wide mode function, digital zoom or slow shutter.
• Select OVERLAP before using the overlap function.

D ZOOM* <OFF/ON>
Before turning on D ZOOM, set DIGITAL F to ZOOM/WIDE.
• Select OFF to not use the digital zoom.
• Select ON to activate digital zooming. More than 10x zoom is performed digitally.

16:9WIDE* <OFF/ON>
Before turning on 16:9WIDE, set DIGITAL F to ZOOM/WIDE.
• Normally select OFF.
• Select ON to record a 16:9 wide picture to watch on a wide-screen TV.

ZEBRA* <OFF/ON>
• Normally select OFF.
• Select ON to shoot with the zebra pattern displayed in the viewfinder.

DATE/TIME* <OFF/ON>
• Normally select OFF.
• Select ON to display the date and time indicators.

FRAME REC <OFF/ON>
• Normally select OFF.
• Select ON for cut recording.

INT REC <RETURN> <SET> <INTERVAL*/REC TIME*>
• Select RETURN to return to the menu to change other menu items.
• Select SET to set interval recording ON or OFF.
• Select INTERVAL to set or change the interval time for interval recording.
• Select REC TIME to set or change the recording time for interval recording.

Advanced operations

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SLOW SHTR* <4/8/15/30>
Before setting, turn the SHUTTER SPEED dial to SLOW.
Select a slow shutter speed.

S PRESET* <60/100/250/500/1000/2000/4000/10000>
Before setting, turn the SHUTTER SPEED dial to USER PRESET.
Select a shutter speed.

G PRESET* <–3dB/0dB/3dB/6dB/9dB/12dB/15dB/18dB>
Before setting, turn the GAIN dial to USER PRESET.
Select a gain level.

AGC LIMIT* <OFF/ON>
• Normally select OFF.
• Select ON when shooting a bright subject on a dark background.
  This function prevents the digital camcorder from creating picture noise by
  controlling excessive automatic gain level.

**CUSTOM* <RETURN> <SET> <COLOR LEV/SHARPNESS/WB SHIFT/AE SHIFT>
<RESET>**
• Select RETURN to return to the menu to change other menu items.
• Select SET to set custom preset ON or OFF.
• Select COLOR LEV⁄SHARPNESS⁄WB SHIFT⁄AE SHIFT to preset the color intensity
  (COLOR LEV), sharpness (SHARPNESS), white balance (WB SHIFT), and brightness
  (AE SHIFT) of the picture.
• Select RESET to restore the default settings.

Items for VTR mode only
AUDIO MIX*
When playing back a tape recorded with Fs 32k, select this item to adjust the volume
balance between audio mode ST1 and ST2.

WIDE PB* <OFF/ON>
• Normally select OFF.
• Select ON to playback a picture recorded in the 16:9 wide mode to watch on a
  monitor.

CM SEARCH* <ON/OFF>
• Normally select ON to turn on the cassette memory search function.
• Select OFF to search without using the cassette memory function.

DATA CODE* <DATE/CAM or DATE>
• Select DATE⁄CAM to display date and time, as well as various settings data, of your
  recordings.
• Select DATE to display date and time of your recordings.

When DIGITAL F is set to OVERLAP
You cannot set 16:9WIDE and D ZOOM to ON. When you set DIGITAL F to OVERLAP,
16:9WIDE and D ZOOM settings are changed to OFF automatically.

About FRAME REC and INT REC setting
Both settings are automatically set to off when:
• The POWER switch is set to OFF.
• CAMCORDER⁄VTR is set to VTR.
• Turn STANDBY up to PHOTO STANDBY.

* These settings are retained even when the battery is removed, as long as the lithium
  battery is in place.

42

Fade-in and fade-out

When fading in, the picture gradually fades in from black while the sound increases.
When fading out, the picture gradually fades to black while the sound decreases.
To use fade-in and fade-out, press FADER/OVERLAP to display FADER in the
viewfinder.

When fading in [a]
(1) While the digital camcorder is in Standby mode, press FADER/OVERLAP.
The fade indicator starts flashing.
(2) Press START/STOP to start recording. The fade indicator stops flashing.

When fading out [b]
(1) During recording, press FADER/OVERLAP. The fade indicator starts flashing.
(2) Press START/STOP to stop recording. The fade indicator stops flashing, and
then recording stops.
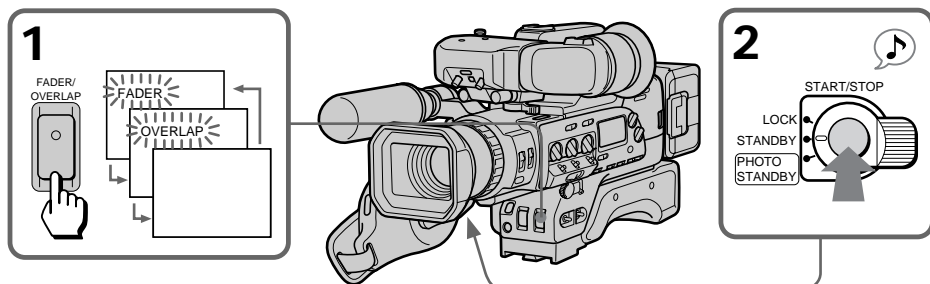
To cancel the fade-in/fade-out function
Before pressing START/STOP, press FADER/OVERLAP until the indicator disappears.

Note on the fade-in/fade-out function
You can not fade-in or fade-out while recording with interval recording, cut recording,
or photo recording.

43

Overlapping two pictures

When using the overlap function, the picture gradually fades in over a still picture of the last scene recorded.

(1) While the digital camcorder is in Standby mode, open the cover, then press MENU to display the menu in the viewfinder.
(2) Press ⌄ or ⌃ to select DIGITAL F, then press EXECUTE.
(3) Press ⌄ or ⌃ to select OVERLAP, then press EXECUTE.
(4) Press MENU to erase the menu display.
(5) Press FADER/OVERLAP repeatedly until "OVERLAP" appears in the viewfinder.
(6) Press START/STOP to start recording.
The scene being shot gradually fades in over the still picture of the last recorded scene.

STBY   REC

OVERLAP

1

MENU

MENU
DIGITAL F   ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[MENU] : END

2

MENU
DIGITAL F   ZOOM/WIDE
                OVERLAP

[MENU] : END

3

MENU
DIGITAL F   OVERLAP
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[MENU] : END

6

START/STOP

LOCK
STANDBY
PHOTO
STANDBY

5

FADER/
OVERLAP
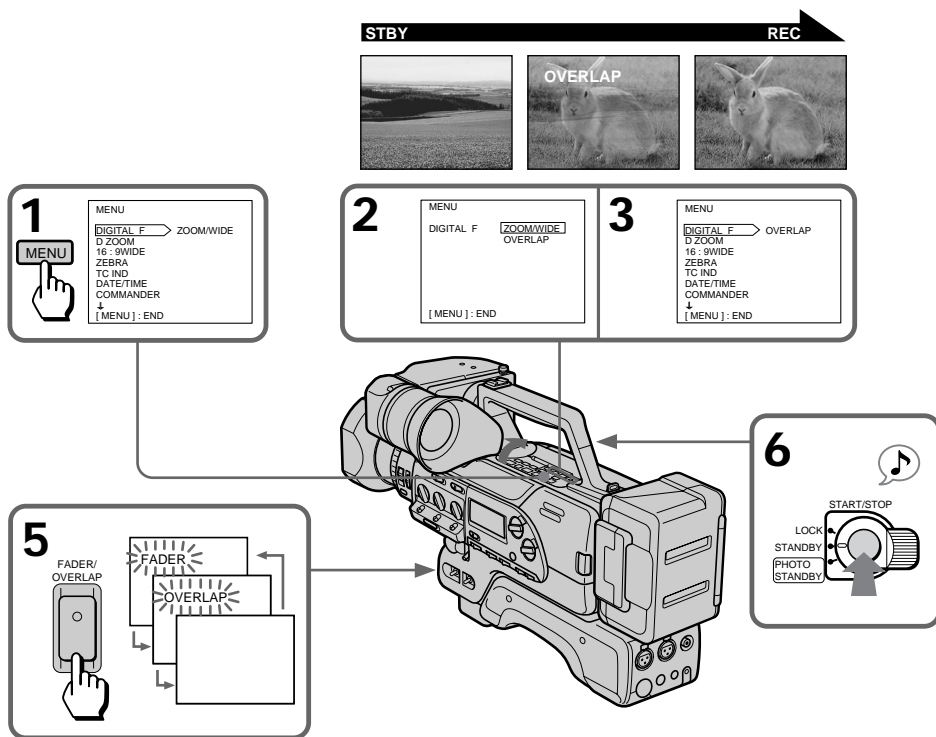
FADER

OVERLAP

To cancel the overlap function
Before pressing START/STOP, press FADER/OVERLAP until the indicator disappears.

Notes on the overlap function
• You cannot use the overlap function while recording with interval recording, cut recording, or photo recording.
• When in Standby mode select OVERLAP, the digital camcorder automatically goes into picture search, then the last recorded scene is stored for overlap.
• When you set DIGITAL F to OVERLAP, 16:9WIDE and D ZOOM settings are set to OFF automatically.

Using the wide mode function

You can record a 16:9 wide picture to watch on a 16:9 wide-screen TV.
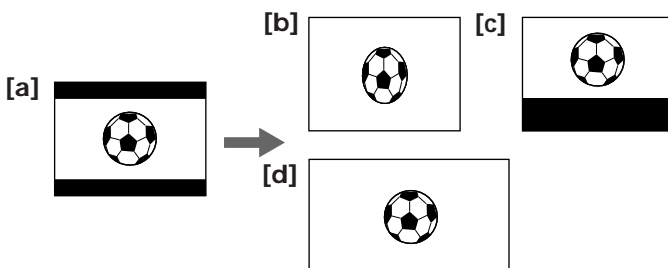
In the viewfinder black bands appear at the top and bottom of the screen **[a]**.
On a monitor screen, the picture appears horizontally compressed **[b]**.
When setting WIDE PB to ON in the menu system, you get a cinema-like picture with a black band at the bottom of the screen **[c]**.
You can watch the picture of normal images on a wide-screen TV **[d]**.

(1) While the digital camcorder is in Standby mode, open the cover, then press MENU to display the menu in the viewfinder.
(2) Press ⌃ or ⌄ to select DIGITAL F, then press EXECUTE.
(3) Press ⌃ or ⌄ to select ZOOM/WIDE, then press EXECUTE.
(4) Press ⌃ or ⌄ to select 16:9WIDE, then press EXECUTE.
(5) Press ⌃ or ⌄ to select ON, then press EXECUTE.
(6) Press MENU to erase the menu display.
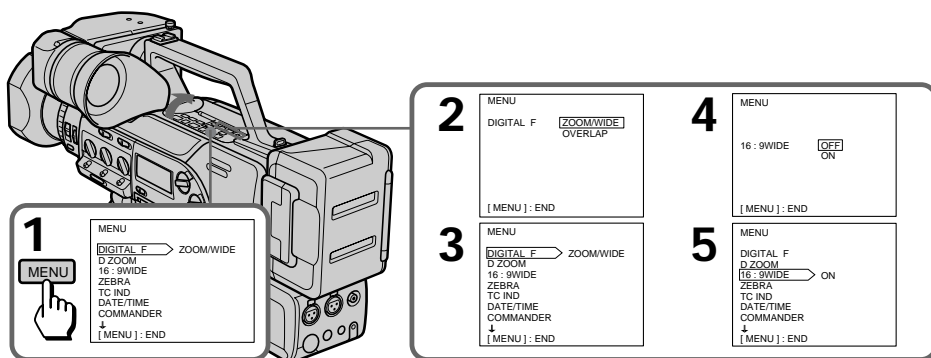
To cancel wide mode
Set 16:9WIDE to OFF in the menu system.

To watch a tape recorded in 16:9 wide mode on a wide-screen TV
Set the screen mode of the wide-screen TV to full mode. For details, refer to the instruction manual of your TV.

Notes on wide mode
• When you record in 16:9 wide mode, the date and time indicator will be widened on the wide-screen TV.
• If you dub a tape, the tape is copied in the same mode as the original recording.
• When you set DIGITAL F to OVERLAP, the 16:9WIDE setting is changed to OFF automatically.

45

Photo recording

You can record a still picture like a photograph for about seven seconds. This mode is useful when you want to enjoy a picture such as a photograph or when you print a picture using a video printer (not supplied).

(1) Turn STANDBY up to PHOTO STANDBY.
PHOTO appears in the viewfinder.
(2) Keep pressing PHOTO lightly until a still picture appears in the viewfinder.
To change the still picture, release PHOTO, select a still picture again, and then press and hold PHOTO lightly. PHOTO CAPTURE appears in the viewfinder.
(3) Press PHOTO deeper.
The still picture in the viewfinder is recorded for about seven seconds. The sound during those seven seconds is also recorded. If you change the POWER switch or STANDBY to other positions while recording, this operation is performed after recording.
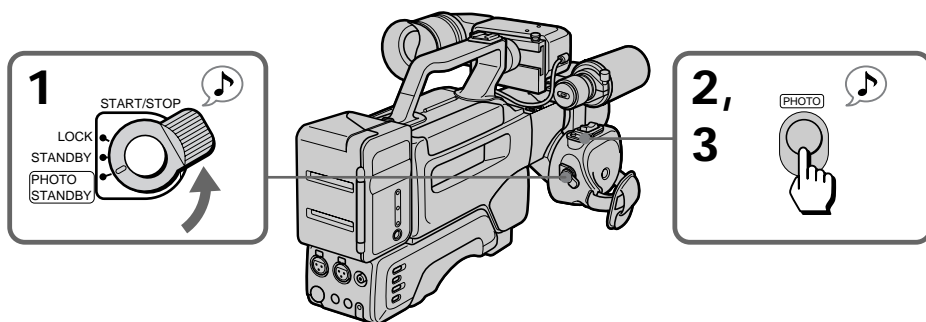
To use the remote commander to take a photo
If you press the PHOTO button on the Remote Commander when a still picture appears in the viewfinder, the digital camcorder will record that still picture. However, you cannot select other still pictures by using this button.

Note on automatic shutter speed adjustment
If AUTO LOCK is ON or AUTO/MANUAL is set to AUTO, the shutter speed is automatically adjusted up to 1/1000 depending on the environment.

To use a flash
Attach the HVL-F7 video flash unit (not supplied) to the accessory shoe, and then connect a LANC cable to the $\mathbf{\mathfrak{C}}$ LANC jack.

Note on using a flash
When using a flash, the shutter speed is automatically adjusted to 1/60 if using automatic adjustment, and if using manual adjustment, we recommend using a shutter speed of 1/60.

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Interval recording

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

(1) While the digital camcorder is in Standby mode, open the cover, then press MENU to display the menu in the viewfinder.

**(2)** Press ⌄ or ⌃ to select INT REC, then press EXECUTE.

(3) Press ⌄ or ⌃ to select SET, then press EXECUTE.

(4) Press ⌄ or ⌃ to select ON, then press EXECUTE.

(5) Press ⌄ or ⌃ to select INTERVAL, then press EXECUTE.

(6) Press ⌄ or ⌃ to select the desired waiting time, then press EXECUTE. The time: 30SEC ←→ 1MIN ←→ 5MIN ←→ 10MIN.

(7) Press ⌄ or ⌃ to select REC TIME, then press EXECUTE.

(8) Press ⌄ or ⌃ to select the desired recording time, then press EXECUTE. The time: 0.2SEC ←→ 0.5SEC ←→ 1SEC ←→ 2SEC.

(9) Press MENU to erase the menu display. You can also press ⌃ to select RETURN, then press EXECUTE to return to the menu display.

(10) Press START/STOP to start interval recording.

1

MENU

DIGITAL F   ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[MENU] : END

MENU

2

INTERVAL REC

RETURN
SET
INTERVAL
REC TIME

[RETURN] : MENU

3

INTERVAL REC

SET   OFF
             ON

[MENU] : END

4

INTERVAL REC

RETURN
SET   ON
INTERVAL
REC TIME

[RETURN] : MENU

5

INTERVAL REC

INTERVAL   30SEC
             1MIN
             5MIN
             10MIN

[MENU] : END

6

INTERVAL REC

RETURN
SET
INTERVAL   5MIN
REC TIME

[RETURN] : MENU

7

INTERVAL REC

REC TIME   0.2SEC
             0.5SEC
             1SEC
             2SEC

[MENU] : END

8

INTERVAL REC

RETURN
SET
INTERVAL
REC TIME   2SEC

[RETURN] : MENU

To stop interval recording
Press START/STOP twice.

To cancel interval recording
Set the INT REC mode to OFF in the menu system.

Note on interval recording
You cannot do interval recording with photo recording.

If you change the mode as follows, interval recording is cancelled
• Turn STANDBY down to LOCK.
• Set the POWER switch to OFF.
• Set CAMCORDER/VTR to VTR.

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Cut recording

You can make a recording with a stop-motion animated effect using cut recording. To create this effect, alternately move the subject a little and make a cut recording. Secure the digital camcorder and use the Remote Commander for effective cut recording.

(1) While the digital camcorder is in Standby mode, open the cover, then press MENU to display the menu in the viewfinder.
(2) Press $\smile$ or $\frown$ to select FRAME REC, then press EXECUTE.
(3) Press $\smile$ or $\frown$ to select ON, then press EXECUTE.
(4) Press MENU to erase the menu display.
(5) Press START/STOP on the digital camcorder or the Remote Commander to start cut recording.
The digital camcorder records about 6 frames, then enters recording Standby mode.
(6) Move the subject, and repeat step 5.

1

MENU

MENU

DIGITAL F   ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[MENU] : END

2

MENU

FRAME REC   OFF
ON

[MENU] : END

3

MENU
↑
ZEBRA
TC IND
DATE/TIME
COMMANDER
BEEP
FRAME REC   ON
INT REC
↓
[MENU] : END

5

START/STOP
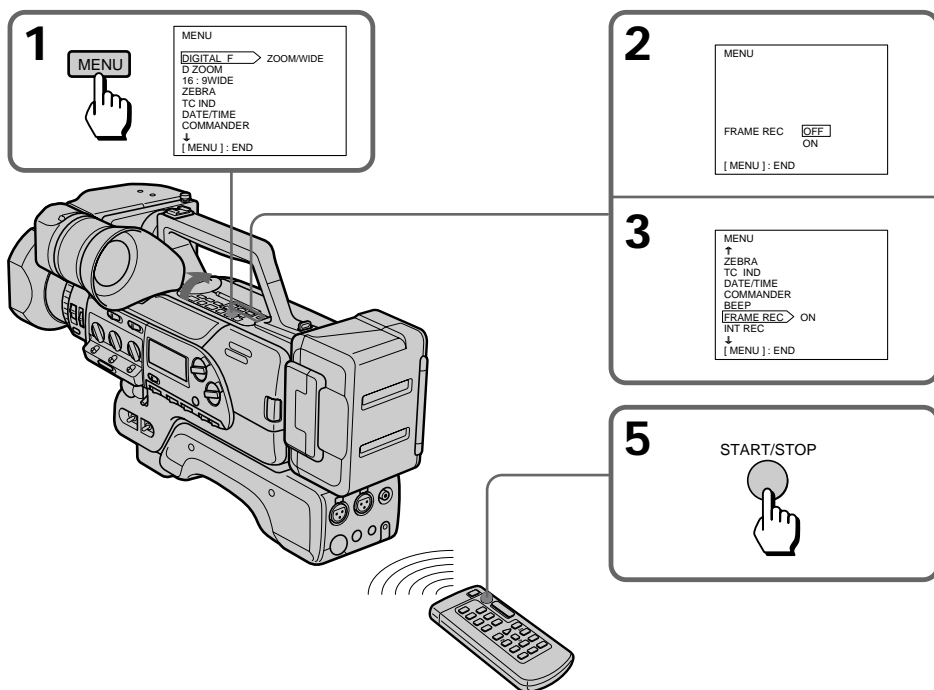
To cancel cut recording
Set the FRAME REC mode to OFF in the menu system.

Notes on cut recording
• The portion immediately after cut recording is completed may be longer than four frames.
• You cannot do cut recording with photo recording.
• The remaining tape indicator may not be accurate if you do cut recording repeatedly.

If you change the mode as follows, cut recording is cancelled
• Turn STANDBY down to LOCK.
• Set the POWER switch to OFF or CAMCORDER/VTR to VTR.

48

Selecting automatic or manual mode

The digital camcorder's automatic functions offer you worry-free operation under most shooting conditions. But in some circumstances, manual adjustment is better for creative recording.
You can adjust focus, aperture, shutter speed, gain, and white balance automatically or manually.
Here's the overview of each manual adjustment. See the following pages for detailed information.

To focus manually
Set FOCUS to MANU. You can adjust the focus regardless of the position of the AUTO LOCK switch. When you want to focus automatically, set FOCUS to AUTO.

To manually adjust aperture, shutter speed, gain, and white balance
Set AUTO LOCK to OFF. By setting AUTO (AGC, ATW)/MANUAL to MANUAL, you can adjust each item independently. When you want to adjust each item automatically, set AUTO/MANUAL to AUTO (AGC, ATW).

Advanced operations

When to adjust aperture, shutter speed, and gain manually

When selecting one of aperture, shutter speed, or gain to be adjusted manually and leaving the remaining two in automatic adjustment, the remaining two automatic settings adjust their values based on the value of that one manual setting.
In the following cases you should obtain better results by adjusting setting manually.

[a]

[b]

[c]

[a] Shooting portraits – adjust aperture manually.
To alter the depth of focus field, softening the background and making the subject stand out, portrait style.
[b] Shooting sporting events – adjust shutter speed manually.
• To record fast moving objects and protect against blurring of subject.
• To brighten subject in dark situations.
• To prevent the aperture from closing down in unusually bright situations.
[c] Shooting dark environments – adjust gain manually.
• To suppress color distortion when shooting bright objects in dark places.
• To protect against picture distortion when shooting bright objects.

Settings for each item

Item	Selectable steps	Variation of exposure	Brighter ↔ Darker
Aperture	13 steps	0.5 EV/step	F1.6 ↔ F11, CLOSE
Shutter speed	12 steps	1 – 2 EV/step	1/4 ↔ 1/10000
Gain	8 steps	0.5 EV / step	+18 dB ↔ –3 dB

Note on recording in manual mode
We recommend that you adjust the focus and white balance manually.

Relation of aperture, shutter speed and gain

While recording, a picture's brightness varies by exposure, you need to keep the exposure fixed to obtain a fixed brightness.

Total EV (exposure) = EV from aperture control
+ EV from shutter speed control
+ EV from gain control

Focusing manually

When to use manual focus

In the following cases you should obtain better results by adjusting the focus manually.
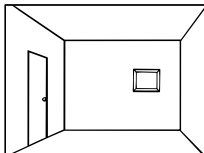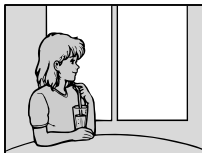
[a]   **[b]**   **[c]**   **[d]**
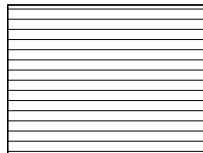
- Insufficient light **[a]**
- Subjects with little contrast - walls, sky, etc. **[b]**
- Too much brightness behind the subject **[c]**
- Horizontal stripes **[d]**
- Subjects through frosted glass
- Subjects beyond nets, etc.
- Bright subject or subject reflecting the light
- Shooting a stationary subject when using a tripod

Focusing manually

When focusing manually, first focus in telephoto before recording, and then reset the shot length.

(1) Set FOCUS to MANU. The 🖝 indicator appears in the viewfinder.

(2) Press the power zoom button on the "T" side so that the bar in the viewfinder moves all the way to the "T" side.

(3) Turn the focus ring to achieve a sharp focus.

(4) Set the desired shot length using the power zoom button.
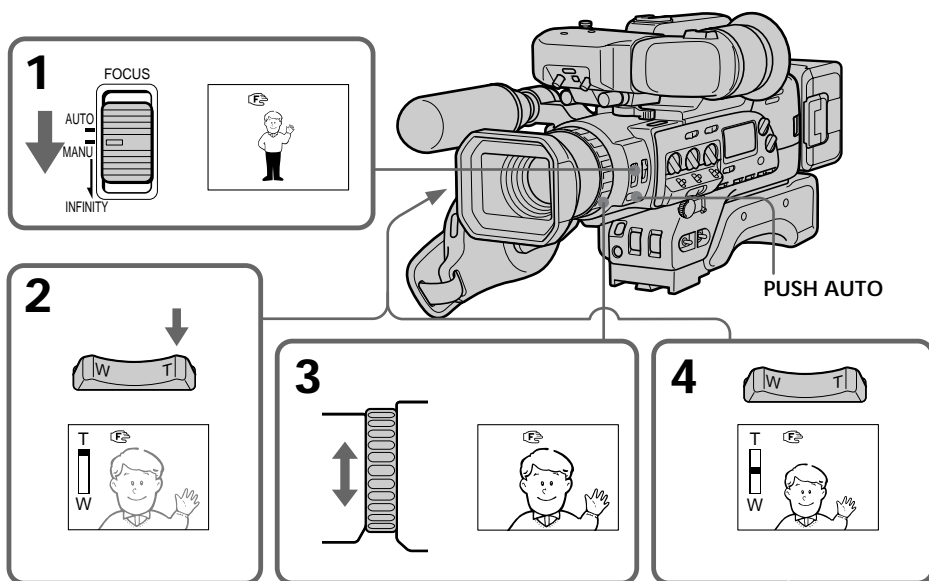
Shooting with auto focusing momentarily

Press PUSH AUTO while focusing manually.
Auto focus functions while you are pressing PUSH AUTO.
When you release PUSH AUTO, manual focusing returns.
You can use this feature to switch between two subjects cleanly.

To return to autofocus mode
Set FOCUS to AUTO. The 🖝 indicator in the viewfinder disappears.

Shooting in relatively dark places
Shoot at wide-angle after focusing in the telephoto position.

Shooting in fast-moving subjects relatively bright places
Shoot at wide-angle.

To record a very distant subject
Push FOCUS down to INFINITY. The lens focuses on the most distant subject while
FOCUS is held down. When it is released, manual focus mode is resumed.
Use this function when shooting through a window or a screen, to focus on a most
distant subject.

Notes on manual focusing
The following indicators may appear:
  ▲ when recording a very distant subject.
  ♠ when the subject is too close to focus on.

When you shoot close to the subject
Shoot at wide-angle.

Advanced operations

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Adjusting the aperture

If the difference between the brightness of the subject and the background is too great, adjust the aperture manually.

When the aperture opens (lowering the F value), focal point becomes smaller (reducing depth of field) so that the background will blur and the subject will be in focus **[a]**. When the aperture closes (raising the F value), focal point becomes greater (increasing depth of field) so that both background and subject will focus clearly **[b]**.

[a]   **[b]**
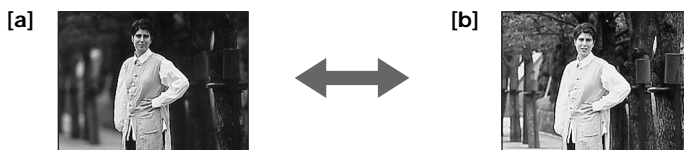
(1) Set AUTO LOCK to OFF.
(2) Set AUTO/MANUAL at the right of the IRIS dial to MANUAL.
The current aperture setting appears in the viewfinder.
(3) Turn IRIS to adjust the aperture.
Using the dial, you can select F1.6, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, and CLOSE. The aperture indicator appears in the viewfinder.
If you select CLOSE, the aperture closes completely, and the picture becomes black (the effect is the same as trying to record with the lens cover attached).

1

ON● ●OFF
AUTO LOCK

2

AUTO
MANUAL

3

OPEN
●IRIS
CLOSE
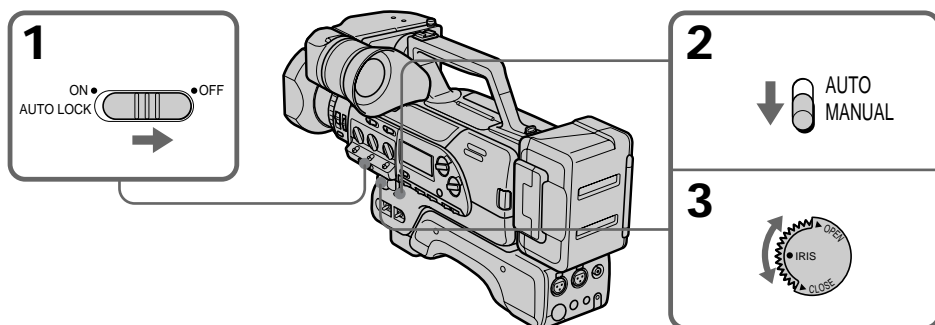
To return to automatic aperture mode
Set AUTO/MANUAL at the right of the IRIS dial to AUTO.

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

Note on the aperture
When zoom is in telephoto, you can open the aperture as far as F2 (not to F1.6).

54

Adjusting the shutter speed

Adjust the shutter speed to control the picture quality. When recording sports events, for example, use a high speed shutter to record fast moving objects clearly.

You can select from 6 different shutter speeds SLOW, 60, 100, 250, 1000 and USER PRESET. SLOW and USER PRESET have their own menus. Refer to "To adjust the SLOW SHTR (shutter) or S (shutter) PRESET menu items".

Shutter speed numbers that appear in the viewfinder are inverted. For example, "250" means 1/250 sec.

(1) Set AUTO LOCK to OFF.
(2) Set AUTO/MANUAL under the SHUTTER SPEED dial to MANUAL.
(3) Turn SHUTTER SPEED to select a shutter speed. Using the dial, you can select SLOW, 60, 100, 250, 1000, or USER PRESET. The shutter speed indicator appears in the viewfinder screen.
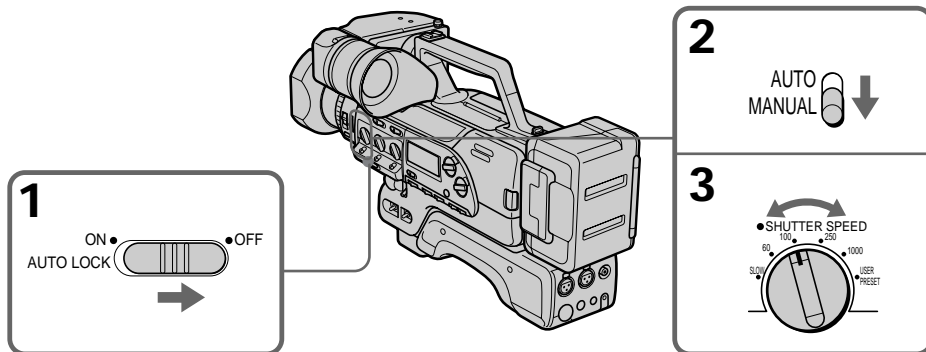
To return to automatic shutter speed mode
Set AUTO/MANUAL below the SHUTTER SPEED dial to AUTO.

To adjust the SLOW SHTR (shutter) or S (shutter) PRESET menu items

When you want to make a dark scene look brighter or give an object the appearance of motion, use a slow shutter. Set the dial to SLOW, then select speed from SLOW SHTR menu.

When you want to choose a shutter speed, set dial to USER PRESET, then select the appropriate shutter speed from the S PRESET menu.

The chosen speed data is set into memory. When you dial another setting, (e.g. 100), then return to USER PRESET or SLOW, the previous speed is selected automatically.

(1) Open the cover, then press MENU to display the menu.

(2) Press ⌄ or ⌃ to select SLOW SHTR or S PRESET, then press EXECUTE.

(3) Press ⌄ or ⌃ to select a setting, then press EXECUTE.

You can select the following shutter speeds:

SLOW SHTR — 4, 8, 15, 30

S PRESET — 60, 100, 250, 500, 1000, 2000, 4000, 10000

(4) Press MENU to erase the menu display.

2
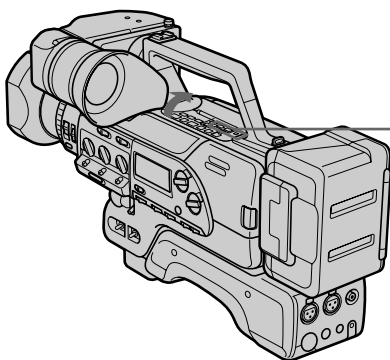
SLOW SHTR	S PRESET

```
MENU




                    4
                    8
                   15
SLOW SHTR          30

[ MENU ] : END
```

```
MENU


                    ↑
                  500
                 1000
                 2000
                 4000
S PRESET        10000

[ MENU ] : END
```

3

```
MENU
↑
DATE/TIME
COMMANDER
BEEP
FRAME REC
INT REC
SLOW SHTR  >  4
S PRESET
↓
[ MENU ] : END
```

```
MENU
↑
COMMANDER
BEEP
FRAME REC
INT REC
SLOW SHTR
S PRESET  >    500
G PRESET
↓
[ MENU ] : END
```

To select the Best Shutter Speed
Concerning shooting conditions and brightness, refer to the following chart to adjust shutter speed accordingly.

Subject	Shutter speed
• A golf swing or tennis match in fine weather	1/500 – 1/10000
• A landscape shot from a moving car or train • A moving roller coaster in overcast days • An athletic scene, marathon, etc.	1/100 – 1/500

• Indoor sports
• Replacement for the ND2 filter (to halve the exposure)
  in situations of glare a sunny beach
  or a snow covered mountain.
• Recording pictures with less flicker under a
  fluorescent lamp
• In sunny weather (to avoid an out-of-focus picture
  due to a small aperture)
	1/100

Notes on the slow shutter speed
• You cannot use the slow shutter when DIGITAL F in the menu is set to OVERLAP.
• When using slow shutter, focusing can become difficult. In this case set focus to manual and put the digital camcorder on a tripod.

Note on the high shutter speed
Using high shutter speed can cause the image to darken. So check brightness using the viewfinder.

Advanced operations

Adjusting the gain

If the picture is too dark even with the aperture fully open, and using the slowest acceptable shutter speed, adjust the gain to make the picture as bright as necessary. When shooting night scenes in automatic setting, the picture may become dark. To brighten the picture the digital camcorder will automatically turn the gain value up, and picture noise can develop. In this case, adjust the gain in accordance with the atmosphere of the subject.

(1) Set AUTO LOCK to OFF.
(2) Set AGC/MANUAL under the GAIN dial to MANUAL.
(3) Turn GAIN to adjust the gain.
   Using the dial, you can select –3, 0, 3, 6, 9, or USER PRESET. The gain indicator appears in the viewfinder.
   If you turn the dial to USER PRESET (preset gain), the setting you selected in the menu activates.
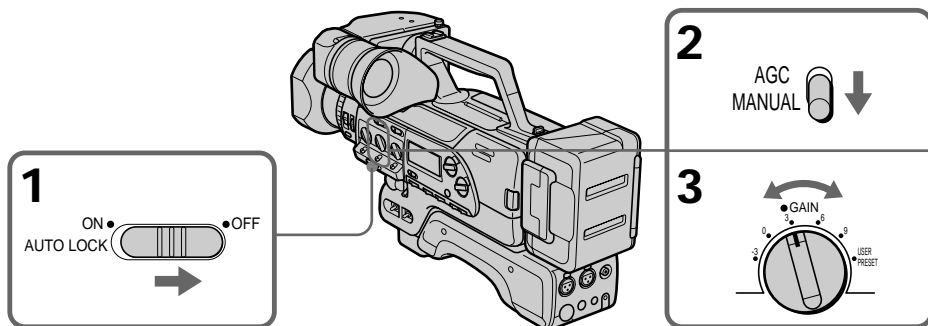
To return to automatic gain mode
Set AGC/MANUAL below the GAIN dial to AGC.

To use the AGC LIMIT function
The AGC LIMIT function prevents the digital camcorder from creating picture noise by controlling excessive automatic gain level. To use this function, set to ON in the menu system.

To adjust the G (gain) PRESET menu item

When you want to choose a gain setting higher than 9, select the appropriate level from the G PRESET menu.

The setting data is set into memory. When you dial another setting, (e.g. 9), then return to USER PRESET, the previous setting is selected automatically.

(1) Open the cover, then press MENU to display the menu.

**(2)** Press $\vee$ or $\wedge$ to select G PRESET, then press EXECUTE.

(3) Press $\vee$ or $\wedge$ to select a setting, then press EXECUTE.
    You can select the following settings: –3, 0, 3, 6, 9, 12, 15, 18 dB.

(4) Press MENU to erase the menu display.

1

MENU

```
DIGITAL  F        ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[ MENU ] : END
```

2

```
MENU
                    ↑
                   6dB
                   9dB
                   12dB
                   15dB
G PRESET           18dB

[ MENU ] : END
```

3

```
MENU
↑
BEEP
FRAME REC
INT REC
SLOW SHTR
S PRESET
G PRESET          15dB
AGC LIMIT
↓
[ MENU ] : END
```

Advanced operations
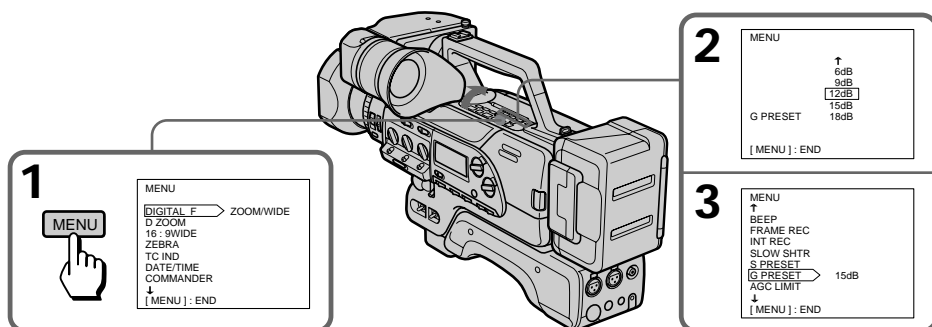
Note on the gain
If you set gain too high, picture noise results.

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Adjusting the white balance

White balance is the adjustment to make white subjects look white and to obtain a more natural color balance. You can obtain better results by adjusting the white balance manually when lighting conditions change quickly or when recording outdoors, e.g. neon signs, fireworks.

Selecting the appropriate mode
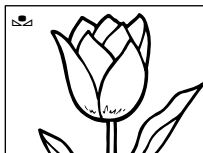
[a]　　　　[b]　　　　[c]　　　　[d]
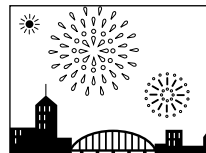
⚒ one-push white balance mode
• Shooting with lighting condition on the subject set and with the white balance set in a particular condition
• Monochromatic subject or background **[a]**

☀ (3200K) indoor mode
• Lighting conditions change quickly **[b]**
• A bright place such as a photography studio
• Under sodium or mercury lamps

☀ (5800K) outdoor mode
• Under a color matching fluorescent lamp
• Recording a sunset/sunrise, just after sunset, just before sunrise **[c]**, neon signs, or fireworks **[d]**

Adjusting the white balance

Adjusting white balance manually

(1) Set AUTO LOCK to OFF.
(2) Set ATW/MANUAL under the WHT BAL dial to MANUAL.
(3) Turn WHT BAL to select a white balance.
 Usually select ⚡ (3200K) (indoor mode) or ☀ (5800K) (outdoor mode). To fix the white balance by using one-push white balance, select ◻ and see "Locking the white balance setting".
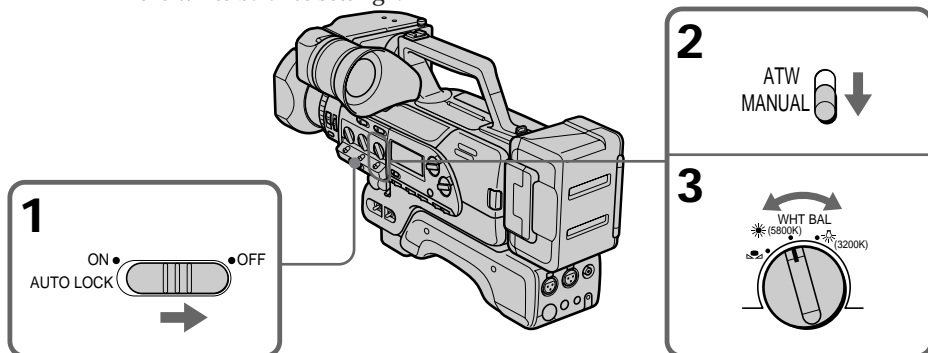
To return to automatic white balance mode
Set ATW/MANUAL below the dial to ATW.

Locking the white balance setting (One-push white balance mode)

When you set the white balance to one-push white balance mode, the setting is locked and maintained even if lighting conditions change. In addition, if the lithium battery is installed, the setting is saved for one hour if you remove the power source.
(1) While in Standby mode, set AUTO LOCK to OFF.
(2) Set ATW/MANUAL under the WHT BAL dial to MANUAL.
(3) Turn WHT BAL to ◻. The ◻ indicator appears in viewfinder.
(4) Shoot a white object, such as paper, fully in the viewfinder.
(5) Press WHITE BALANCE ◻ on the front of the digital camcorder.
 The ◻ indicator flashes rapidly. When the white balance has been adjusted and stored in memory, the indicator stops flashing.

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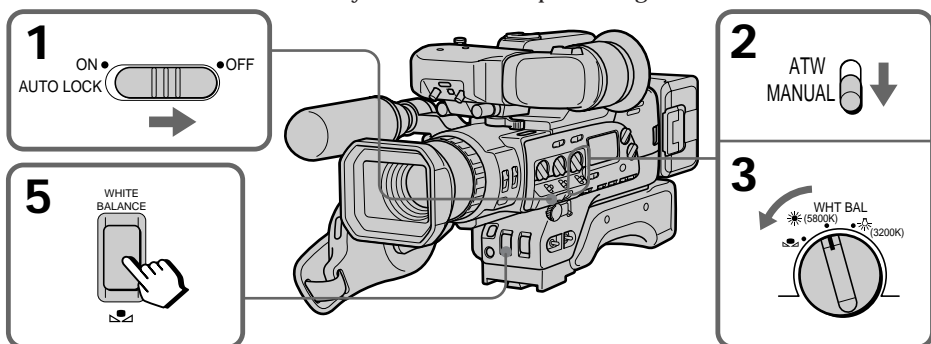
Notes on the ☕ indicator in the viewfinder
• The indicator means:
  Slow flashing: white balance is not adjusted.
  Fast flashing: white balance is being adjusted (after you pressed WHITE BALANCE
  ☕).
  Lit steady: white balance has been adjusted.
• If the ☕ indicator keeps flashing even when you press WHITE BALANCE ☕, shoot
  in automatic white balance mode. Set AUTO LOCK to ON and slide ATW/MANUAL
  under the WHT BAL dial to ATW.

Notes on white balance
• When you shoot with studio lighting or video lighting, use ☀ (3200K) (indoor) mode.
• When you shoot under fluorescent lighting, use automatic white balance mode.

Shooting when the lighting condition changes
• After the lighting condition changes, readjust the white balance using the WHITE
  BALANCE ☕ button while the digital camcorder is in Standby mode. The WHITE
  BALANCE ☕ button does not function during recording.
• If you are adjusting the aperture (iris) and shutter speed manually, then when you
  move from indoors to outdoors or vice-versa, set AUTO LOCK to ON and then set it
  to OFF again.
• After you move from indoors to outdoors or vice-versa, or detach the battery to
  replace it, while shooting in automatic white balance mode, point the digital
  camcorder at a white subject for about 10 seconds before you start recording.

Using the ND filter

The digital camcorder automatically senses the need for the ND filter, in such a case, ND ON/OFF flashes in the display.
Using the ND filter (to filter down to one-tenth the quantity of light), you can prevent the picture from going out of focus under bright conditions.

When ND ON flashes in the viewfinder
Set ND FILTER to ON [a].
The flashing indicator disappears, and the ND indicator remains.

When ND OFF flashes in the viewfinder
Set ND FILTER to OFF [b].
The indicator disappears.
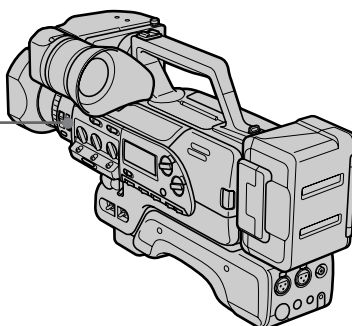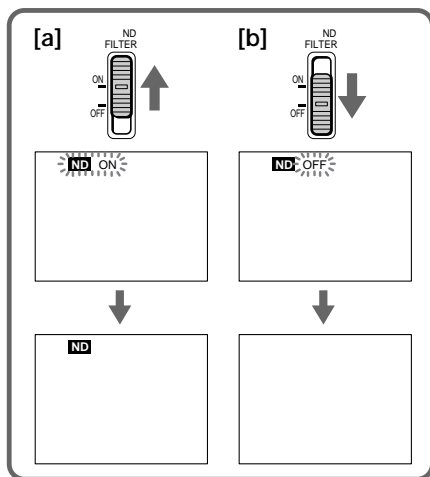
Using the zebra pattern

You can set the digital camcorder to display a zebra pattern (diagonal stripes) **[a]** in the portion of the picture in the viewfinder where the brightness exceeds a certain level.
The portion of the picture where the zebra pattern appears is an area of high brightness and overexposure. You can check the picture level of a subject by displaying the zebra pattern.
Before you start recording, use the zebra pattern as a guide for adjusting the aperture, gain, and shutter speed.

(1) Open the cover, then press MENU to display the menu in the viewfinder.
(2) Press $\vee$ or $\wedge$ to select ZEBRA, then press EXECUTE.
(3) Press $\vee$ or $\wedge$ to select ON, then press EXECUTE.
(4) Press MENU to erase the menu display.

[a]

1

MENU

```
MENU

DIGITAL  F    ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[ MENU ] : END
```

2

```
MENU


ZEBRA         OFF
              ON



[ MENU ] : END
```

3

```
MENU

DIGITAL  F
D ZOOM
16 : 9WIDE
ZEBRA        ON
TC IND
DATE/TIME
COMMANDER
↓
[ MENU ] : END
```
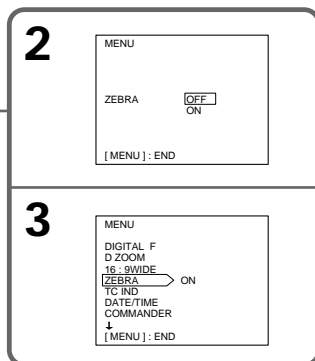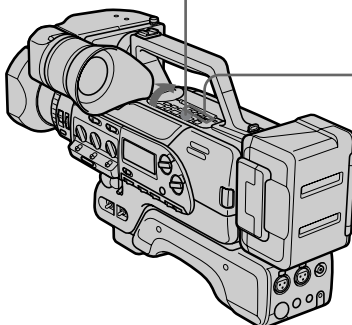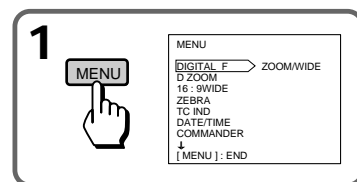
Note on shooting with the zebra pattern
Even though you see the zebra pattern in the viewfinder, the zebra pattern is not recorded.

Adjusting the recording sound

You can adjust the recording sound level. Use headphones (not supplied) to monitor the sound when you adjust.

Selecting and setting audio mode

You can record sound using channel 1 and channel 2.
Select sound input using the LINE/MIC switch as follows:

MIC FRONT: When recording from the built-in microphone or external microphone connected to MIC (PLUG IN POWER) jack.
MIC REAR: When recording from external microphone connected to AUDIO IN CH-1 or/and CH-2.
LINE: When recording from line-in connected to AUDIO IN CH-1 or/and CH-2.

LINE/MIC switches setting and recording sound

LINE/MIC switch position		Microphone type*	Recording sound	
CH-1	CH-2		CH-1	CH-2
MIC FRONT	MIC FRONT	— Stereo Monaural	Built-in mic: L External mic: L External mic: Mono	Built-in mic: R External mic: R External mic: Mono
	LINE	— Stereo Monaural	Built-in mic: L+R External mic: L+R External mic: Mono	XLR LINE
	MIC REAR	— Stereo Monaural	Built-in mic: L+R External mic: L+R External mic: Mono	XLR MIC
MIC REAR	MIC REAR	—	XLR MIC	XLR MIC
	LINE	—	XLR MIC	XLR LINE
	MIC FRONT	— Stereo Monaural	XLR MIC	Built-in mic: L+R External mic: L+R External mic: Mono
LINE	LINE	—	XLR LINE	XLR LINE
	MIC FRONT	— Stereo Monaural	XLR LINE	Built-in mic: L+R External mic: L+R External mic: Mono
	MIC REAR	—	XLR LINE	XLR MIC

* External microphone connected to MIC (PLUG IN POWER) jack. This "–" means no connection.

Notes on recording
• Be sure to set LINE/MIC setting properly, otherwise no sound will be recorded.
• When nothing is connected to the XLR connector and you set the LINE/MIC switch to MIC REAR, a noise may occur.
• When both CH-1 and CH-2 LINE/MIC switches are set to FRONT, adjust the sound level using the REC LEVEL dial and switch for CH-1 only.

MIC (PLUG IN POWER)
Built-in microphone
CH-1 AUDIO IN
CH-2 AUDIO IN
CH-1 LINE/MIC
CH-2 LINE/MIC
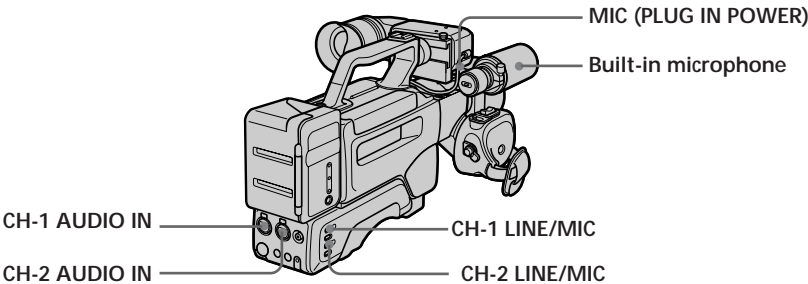
Checking the recording level

Use the level indicator in the display window.
If the input level is excessive, the PEAK indicator lights. If the PEAK indicator remains lit, adjust the recording sound manually.
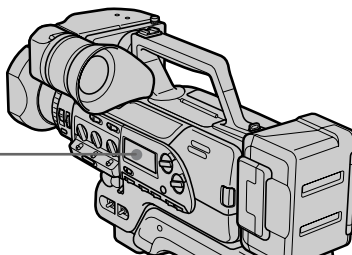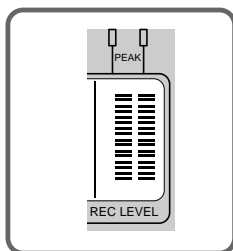
Adjusting the recording level automatically

Set REC LEVEL to AUTO.
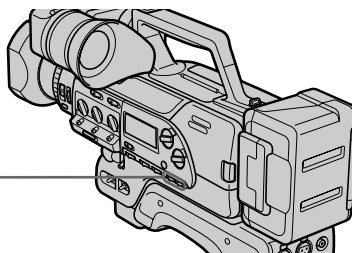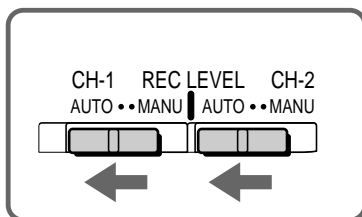
Adjusting the recording level manually

(1) Set the REC LEVEL switch to MANU.
(2) Turn the REC LEVEL dials to adjust the sound level so that the PEAK indicator does not light up. You can adjust the level of each channel separately.
We recommend using headphones (not supplied) to monitor the sound when you adjust.
Select the sound you want to monitor (CH-1, CH-2 or MIX) using the AUDIO MONITOR switch.

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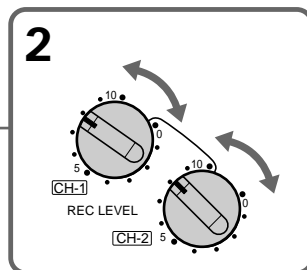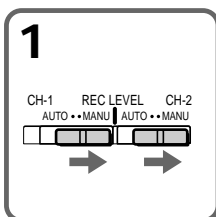
To attenuate the recording level

Attenuate the recording level when recording very loud sounds.
• When using the built-in microphone or external microphone.
  Set the MIC switch to ATT. Normally set off (green position).
• When connecting an external microphone to AUDIO IN (CH-1/CH-2) input
  connector.
  Set ATT (REAR) to ON.

To reduce wind noise of the built-in microphone

If there is a loud wind, set the BUILT-IN MIC switch to WIND. Note that low frequency
input signal will weaken.

To change the directionality of the built-in microphone

Set DIRECTION SELECT to the desired position (0°/90°/120°).
When set to 0° the sound is in monaural.

MIC (PLUG IN POWER)

DIRECTION SELECT

MIC

BUILT-IN MIC

AUDIO IN

CH-1 LINE/MIC

CH-1 ATT (REAR)

CH-2 LINE/MIC

CH-2 ATT (REAR)

Advanced operations

67
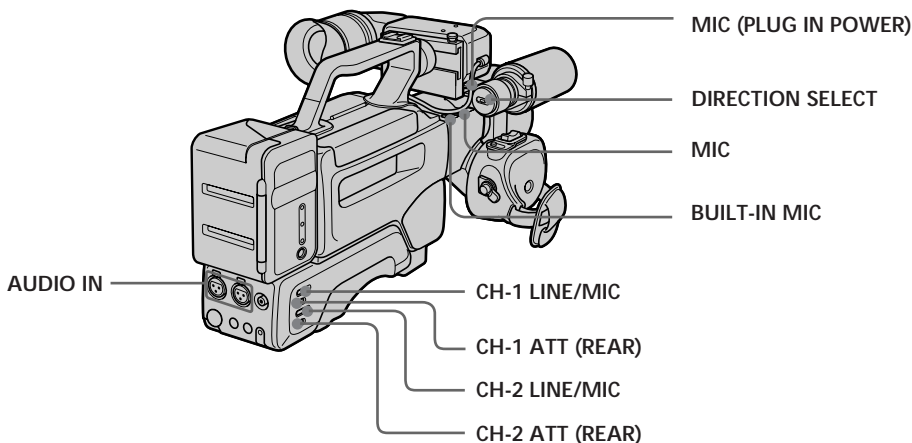
Releasing the STEADY SHOT function

When you shoot, the 《🖐》 indicator appears in the viewfinder. This indicates that the Steady Shot function is working and the digital camcorder compensates for camera-shake.

When you attach the digital camcorder to a tripod, you need not worry about camera-shake.
Release the Steady Shot function.

Set STEADY SHOT to OFF.

STEADY SHOT

ON ● ● OFF

《🖐》
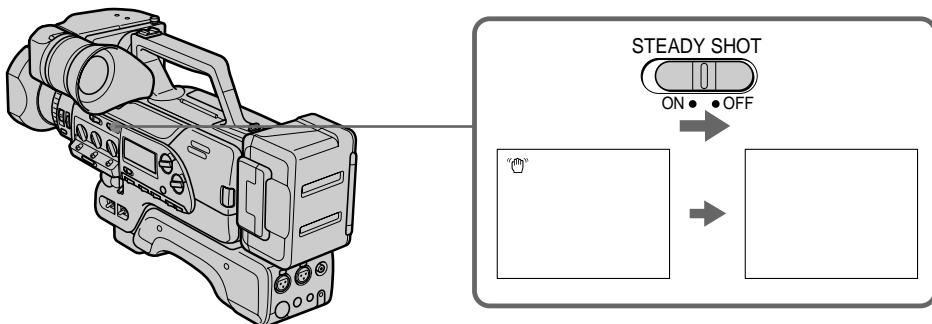
To activate the Steady Shot function again
Set STEADY SHOT to ON.

Note on the Steady Shot function
The Steady Shot function will not correct excessive camera-shake.

Making a custom preset

Use this menu setting to achieve consistent picture quality. This feature lets you customize the picture quality.

Item	Adjusts	Adjustment value
COLOR LEV	Color intensity	Decreases color intensity ←→ Increases color intensity
SHARPNESS	Sharpness	Softer ←→ Sharper
WB SHIFT	White balance	Bluish ←→ Reddish
AE SHIFT*	Brightness	Darker ←→ Brighter

* When the aperture, shutter speed and gain are set manually, AE SHIFT level does not change.

(1) Open the cover, then press MENU to display the menu in the viewfinder.
(2) Press ⌄ or ⌃ to select CUSTOM, then press EXECUTE.
 The custom preset menu appears.
(3) Press ⌄ to select SET, then press EXECUTE.
(4) Press ⌄ to select ON, then press EXECUTE.
(5) Press ⌄ or ⌃ to select the desired item, then press EXECUTE.
(6) Press ⌄ or ⌃ to adjust the selected mode, then press EXECUTE.
(7) Press MENU to erase the menu display and display CP in the viewfinder.
 To perform other menu settings, press ⌃ to select RETURN, then press EXECUTE.

1

MENU

MENU
DIGITAL F   ⊃ ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[MENU] : END

2

CUSTOM PRESET

RETURN
SET
COLOR LEV
SHARPNESS
WB SHIFT
AE SHIFT
RESET

[RETURN] : MENU

4

CUSTOM PRESET

RETURN
SET   ON
COLOR LEV
SHARPNESS
WB SHIFT
AE SHIFT
RESET

[RETURN] : MENU

3

CUSTOM PRESET

SET   OFF
            ON

[MENU] : END

5

CUSTOM PRESET

COLOR LEV   ▬

[MENU] : END
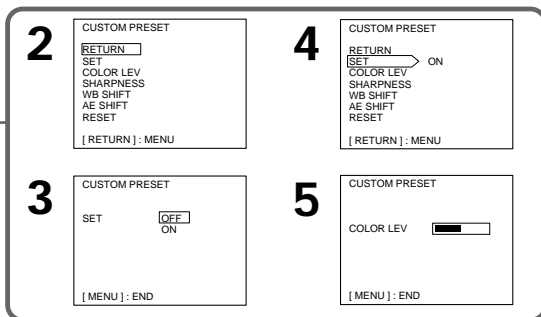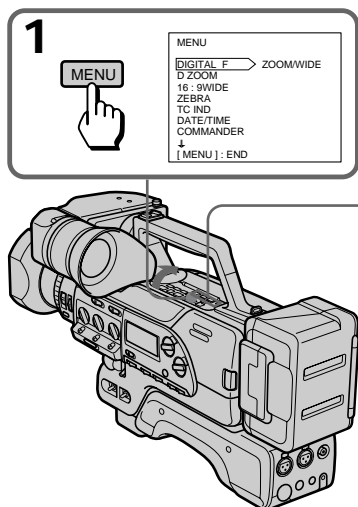
To turn off custom preset

(1) While the digital camcorder is in Standby mode, press MENU.
(2) Press $\smile$ or $\frown$ to select CUSTOM, then press EXECUTE.
(3) Press $\smile$ to select SET, then press EXECUTE.
(4) Press $\smile$ to select OFF, then press EXECUTE.
CP goes off in the viewfinder.
(5) Press MENU to erase the menu display.

To turn on custom preset again

(1) While the digital camcorder is in Standby mode, press MENU.
(2) Press $\smile$ or $\frown$ to select CUSTOM, then press EXECUTE.
(3) Press $\smile$ to select SET, then press EXECUTE.
(4) Press $\smile$ to select ON, then press EXECUTE.
(5) Press MENU to display CP in the viewfinder.

To restore the standard settings

(1) While the digital camcorder is in Standby mode, press MENU.
(2) Press $\smile$ or $\frown$ to select CUSTOM, then press EXECUTE.
(3) Press $\smile$ to select RESET, then press EXECUTE.
FINISHED appears in the viewfinder.
(4) Press MENU to erase the menu display.

To check the custom preset settings

You can display and check the custom preset settings in the viewfinder while recording.
Press CP CHECK on the front of the digital camcorder while the digital camcorder is in Standby mode or recording mode.
The custom preset settings are displayed in the viewfinder.
Press CP CHECK again to make the display disappear.

Note on custom preset
You can turn on custom preset when in automatic mode and also when in manual mode.

Searching the recorded picture

When you use a cassette memory-mounted DVCAM cassette (Ⅽ|Ⅱ logo*) which can store the recorded date and time, etc., you can search the recorded picture with the date or time using the Remote Commander (**Cassette memory search**). You can also search the photo-recorded pictures only, or the recorded picture in the backward and forward direction from the present position without cassette memory.

* Ⅽ|Ⅱ is a trademark.

Searching the recorded picture with the date or time – Cassette memory search

(1) Set the POWER switch to ON, then set CAMCORDER/VTR to VTR.
(2) Open the cover, press MENU to display the menu in the viewfinder.
(3) Set CM SEARCH to ON in the menu system.
(4) Press MENU to erase the menu display.
(5) Press SEARCH MODE on the Remote Commander to select date search (search with the date) or photo search (search the photo recorded-pictures only).
(6) On the Remote Commander, press ▶▶▎ to search forward or ▎◀◀ to search backward.

Advanced operations
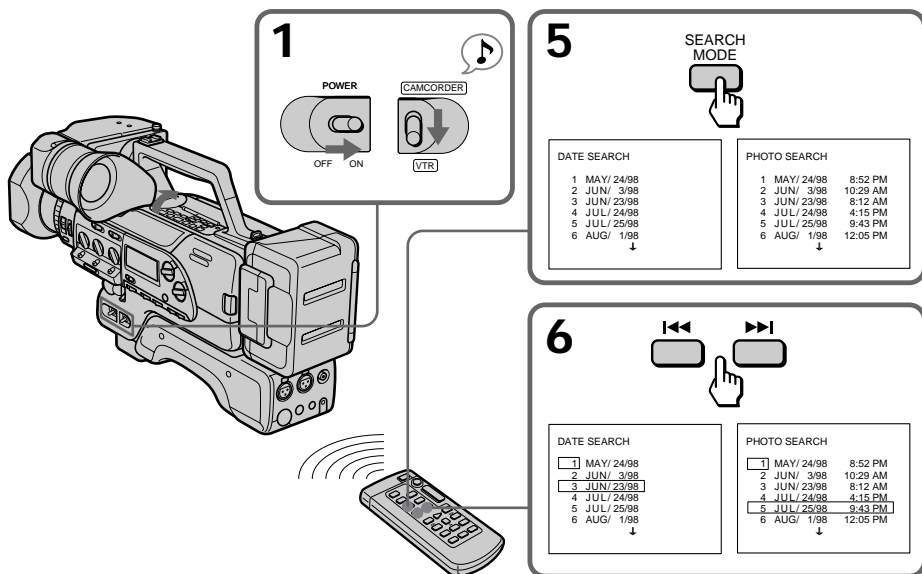
Notes on cassette memory search
• You can search up to 24 days for date search and 179 pictures for photo search when you use the 16k-bit cassette memory.
• Make sure that the lithium battery is installed if using cassette memory.

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Searching the recorded picture without using cassette memory

(1) Set the POWER switch to ON, then set CAMCORDER/VTR to VTR.
(2) Open the cover, press MENU to display the menu in the viewfinder.
(3) Set CM SEARCH to OFF in the menu system.
(4) Press MENU to erase the menu display.
(5) Press SEARCH MODE on the Remote Commander to select date search (search with the date) or photo search (search the photo-recorded pictures only).
(6) On the Remote Commander, press ►►I to search forward or I◄◄ to search backward.
Each time you press ►►I or I◄◄, the digital camcorder searches for the next scene.

To stop searching
Press □.

If your tape has blank portions between pictures
The digital camcorder may not search for the recorded picture or data may not be stored.

Notes on searching
• The digital camcorder may not search correctly if the beginning of the search portion is too close to the tape head position.
• When you use date search, the digital camcorder plays back the search picture, and when you use photo search, the digital camcorder enters playback pause when it finds the point it was searching for.

Displaying recording data

You can display the date and time as well as system data and when you recorded (**Data Code**), on the TV during playback or editing. The Data Code is also displayed in the viewfinder and the display window.

Press DATA CODE on the Remote Commander while playing back. Each time you press DATA CODE, the indicator cycles in the viewfinder as follows:
When you select DATE/CAM from the menu **[a]**:
recorded date and time → various settings → no indication
When you select DATE from the menu **[b]**:
recorded date and time → no indication

Press DATA CODE repeatedly to erase the display.

[a]   **[b]**

DATA CODE

JUL. 4 1998
10:13:02 AM

JUL. 4 1998
10:13:02 AM

AUTO
6 0   ATW
F1.6   0dB
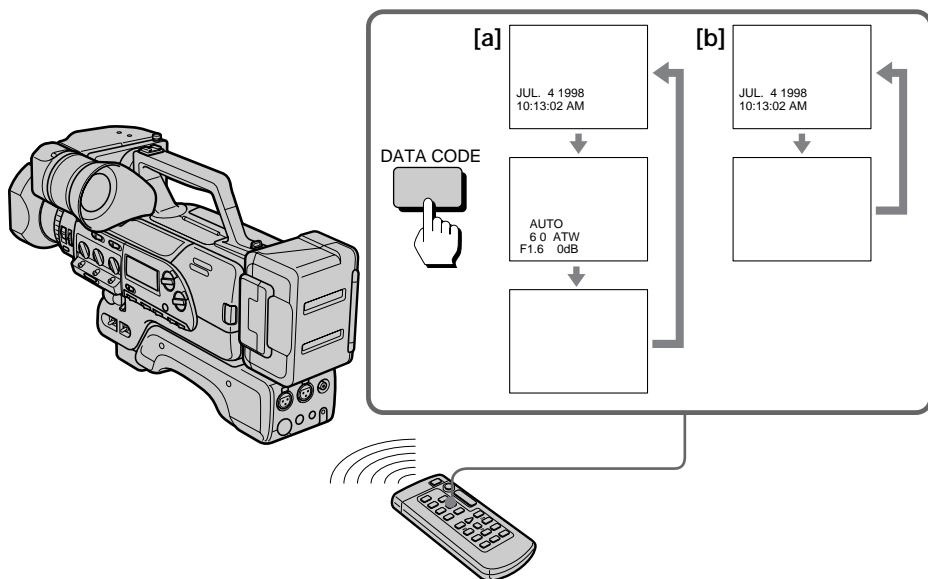
When bars (--:--:--) appear
• A blank portion of the tape is being played back.
• The tape was recorded by a digital camcorder without the Data Code function.
• The tape was recorded by a digital camcorder without having date and time set.

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Editing onto another tape

You can create your own video programs by editing with any other VCRs that have DV IN or video/audio inputs. Note that cassette memory data is not recorded on the edited tape.

You can edit with little deterioration of picture and sound quality when using the DV connecting cable (not supplied). Data code of the source tape is dubbed on the edited tape at the same time.

Before editing

Connect DV IN/OUT of the digital camcorder and the DV IN (or DV IN/OUT) jack of the VCR using the VMC-2DV DV connecting cable (not supplied).

You can use this digital camcorder either as a player or as a recorder without changing the connection. The direction of signal flow changes automatically.

When this digital camcorder is used as a recorder, the "DV IN" appears in the viewfinder.

Recorder with DV IN

DV·IN/OUT

VMC-2DV

DV IN

: Signal flow
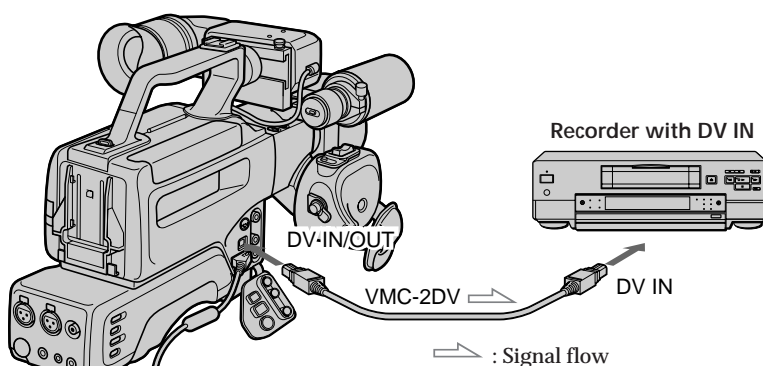
Notes on editing using the DV connecting cable
• When the tape is carried out DV dubbing using a domestic DV equipment to playback, you might not to be able to edit the tape with editing equipment for business use such as the DSR-80/85. If you want to edit using such equipment, carry out dubbing again using it to record.
• Depending on signal conditions, DVCAM-formatted tapes may not be able to edit using the DV connecting cable. Edit using the supplied A/V connecting cable in this case.
• You can connect one VCR only.
• If you edit playback pause picture, the edited picture becomes rough.
• Connect a LANC cable (not supplied) to control the playback VCR from the recording VCR.

To connect the VCR without DV IN jack
Connect the digital camcorder to the VCR using the supplied A/V connecting cable.
Set the TV/VCR input selector on the VCR to LINE.
If your VCR is a monaural type, connect only the white plug for audio on both the digital camcorder and the VCR. With this connection, the sound is monaural.

Starting editing

(1) Set the POWER switch to ON and then set CAMCORDER/VTR to VTR.
(2) Insert a blank tape (or a tape you want to record over) into the recording VCR.
    Then insert your recorded tape into the digital camcorder.
(3) Play back the recorded tape on the digital camcorder until you locate the point
    where you want to start editing. Then set the digital camcorder to playback
    pause mode.
(4) Set the recording VCR to recording pause mode.
(5) Press **II** on the digital camcorder and VCR simultaneously to start editing.
    To edit more scenes, repeat steps 3 to 5.

To stop editing
Press □ on the digital camcorder and VCR.

Note on editing when using the A/V connecting cable
Press DISPLAY on the Remote Commander while editing onto another tape to turn off
the display indicators. Otherwise, the indicators will be recorded on the tape.

Note on Fine Synchro Edit
If you connect a video deck that has the Fine Synchro Edit feature to the ⌷ LANC jack
of the digital camcorder using a LANC cable (not supplied), the edit will be even more
precise.

Advanced operations

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Audio dubbing

If you recorded in Fs 32k (12 bit) recording mode, you can add stereo narration or music to the recording.

Making connections

To use additional audio line in [a]
Connect the LINE OUT jacks of an audio source to the rear AUDIO IN jacks of the digital camcorder using an audio connecting cord with the XLR connector (not supplied) and then set LINE/MIC to LINE.

To use an additional microphone
• Use the built-in microphone **[b]** or connect an external microphone (not supplied) **[c]** to the MIC (PLUG IN POWER) jack, then set LINE/MIC to MIC FRONT.
• Use an external microphone (not supplied) with the XLR connector **[d]**, connect the rear AUDIO IN jack of the digital camcorder, then set LINE/MIC to MIC REAR.

Audio source

MIC [c]

[a]

[b]

MIC [d]

⟶ : Signal flow

Audio dubbing
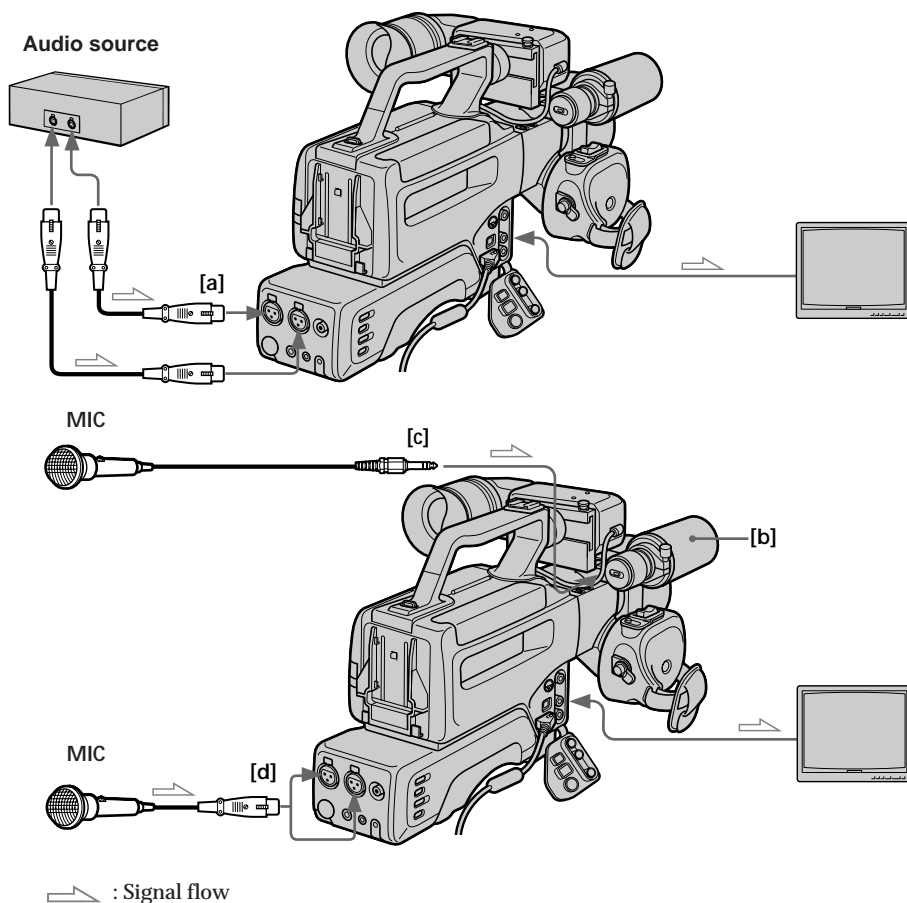
Recording

(1) Set the POWER switch to ON and then set CAMCORDER/VTR to VTR.
(2) Open the cover, press ▷, then ►► or ◄◄, to search for the start and end points of the recording.
(3) Press **II** at the start point of the recording.
(4) Press AUDIO DUB ⚬.
(5) Adjust the recording volume.
(6) Press **II**.
    Audio dubbing begins.
    If you are using an audio source input, press **II** on the stereo at the same time.

2

REW ◄◄ — PLAY — ►► FF

REC LEVEL

4
AUDIO DUB

3, 6
PAUSE

Audio source

⟹ : Signal flow
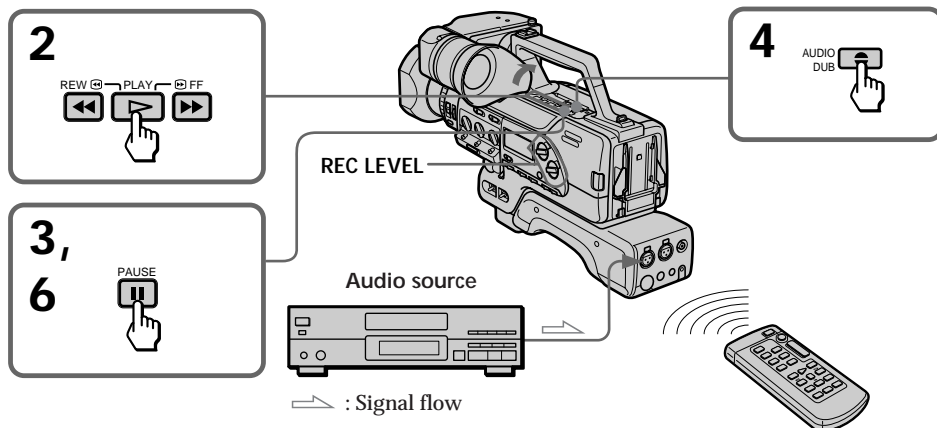
To stop recording
Press □.

To pause recording
Press **II**. To start recording again, press **II**.

To adjust the volume
If you set REC LEVEL to AUTO, the volume is automatically adjusted.
To adjust the volume manually, set REC LEVEL to MANU, and turn the REC LEVEL dials.

Note on audio dubbing
You cannot operate audio dubbing on DV-formatted tapes. Depending on signal conditions, you may not be able to operate audio dubbing even on DVCAM-formatted tapes.

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Changing the lithium battery in the digital camcorder

Your digital camcorder is supplied with a lithium battery installed. When the battery becomes weak or dead, the ⛃ indicator flashes in the viewfinder for about 5 seconds when you set the digital camcorder to CAMCORDER mode with the POWER switch ON. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion**. The lithium battery for the digital camcorder lasts for about 1 year under normal operation. (The lithium battery that comes installed at the factory may not last 1 year.)
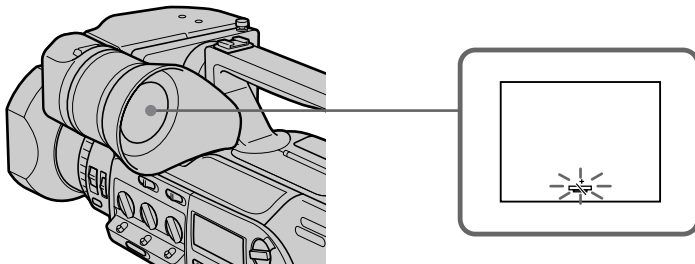
Notes on lithium battery
• **Keep the lithium battery out of the reach of children.**
  Should the battery be swallowed, immediately consult a doctor.
• Wipe the battery with a dry cloth to assure a good contact.
• Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
• The lithium battery has positive (+) side and negative (–) side as illustrated. **Be sure to insert the lithium battery with the positive side facing out.**
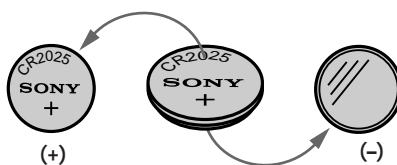
WARNING
The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

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Changing the lithium battery

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date, time and other items in the menu system retained by the lithium battery.

(**1**) Open the lid of the lithium battery compartment.

(**2**) Push the lithium battery down once and pull it out from the holder.

(**3**) Install the lithium battery with the positive (+) side facing out. Close the lid.

Additional Information

1

2

3

79
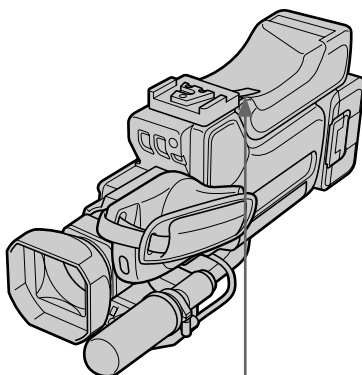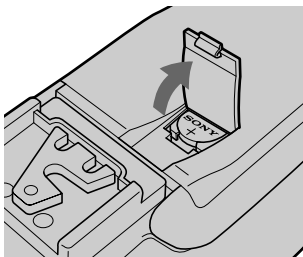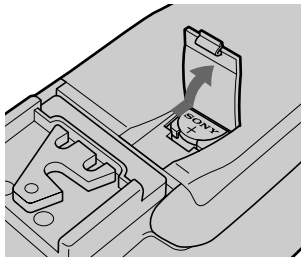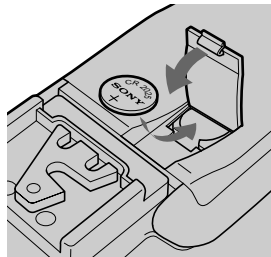
Resetting the date and time

You can reset the date and time in the menu system.
(1) Open the cover, then press MENU to display the menu.
(2) Press $\vee$ to select CLOCK SET, then press EXECUTE.
(3) Press $\vee$ or $\wedge$ to select the desired year, then press EXECUTE. Set the day, month, hour, and minutes by pressing $\vee$ / $\wedge$ and then pressing EXECUTE.
(4) Press MENU to erase the menu display.

1

MENU

```
MENU
DIGITAL F        ZOOM/WIDE
D ZOOM
16 : 9WIDE
ZEBRA
TC IND
DATE/TIME
COMMANDER
↓
[ MENU ] : END
```

2

```
MENU
↑
INT REC
SLOW SHTR
S PRESET
G PRESET
AGC LIMIT
CUSTOM
CLOCK SET        - - : - - : - -
[ MENU ] : END
```

```
MENU

                 ↑  ↑  ↑
                1998  JAN  1
                 ↓  ↓  ↓
CLOCK SET      12  00 AM
[ MENU ] : END
```

3

❶
```
                 ↑  ↑  ↑
                1999  JAN  1
                 ↓  ↓  ↓
                  ↑  ↑
CLOCK SET      12  00 AM
                  ↓  ↓
[ MENU ] : END
```
```
                 ↑  ↑  ↑
                1999  JAN  1
                 ↓  ↓  ↓
                  ↑  ↑
CLOCK SET      12  00 AM
                  ↓  ↓
[ MENU ] : END
```

❷
```
                 ↑  ↑  ↑
                1999  JUL  1
                 ↓  ↓  ↓
                  ↑  ↑
CLOCK SET      12  00 AM
                  ↓  ↓
[ MENU ] : END
```
```
                 ↑  ↑  ↑
                1999  JUL  1
                 ↓  ↓  ↓
                  ↑  ↑
CLOCK SET      12  00 AM
                  ↓  ↓
[ MENU ] : END
```
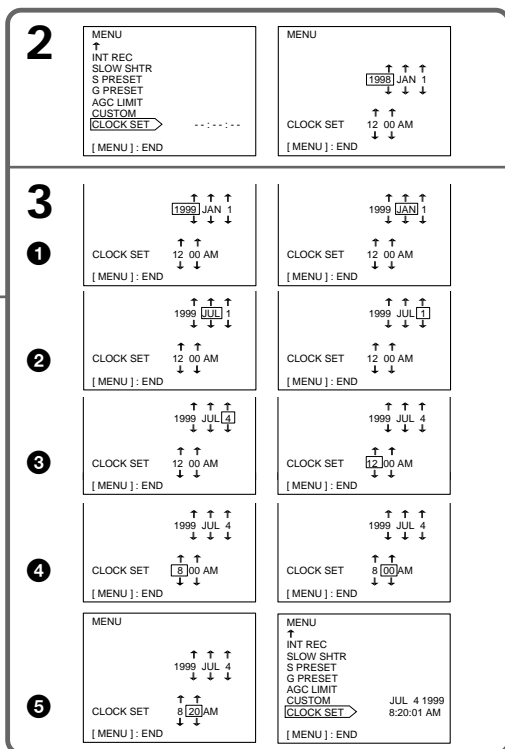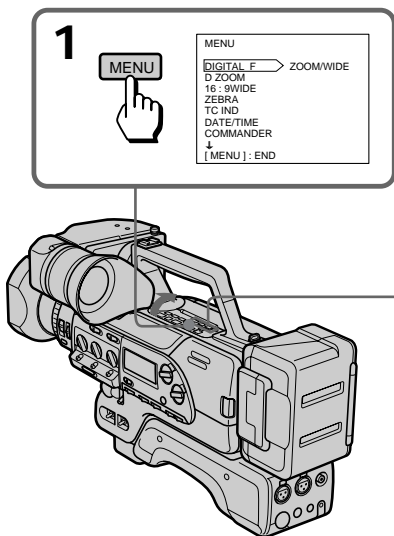
❸
```
                 ↑  ↑  ↑
                1999  JUL  4
                 ↓  ↓  ↓
                  ↑  ↑
CLOCK SET      12  00 AM
                  ↓  ↓
[ MENU ] : END
```
```
                 ↑  ↑  ↑
                1999  JUL  4
                 ↓  ↓  ↓
                  ↑
CLOCK SET      12  00 AM
                  ↓
[ MENU ] : END
```

❹
```
                 ↑  ↑  ↑
                1999  JUL  4
                 ↓  ↓  ↓
                  ↑
CLOCK SET       8  00 AM
                  ↓
[ MENU ] : END
```
```
                 ↑  ↑  ↑
                1999  JUL  4
                 ↓  ↓  ↓
                     ↑
CLOCK SET       8  00 AM
                     ↓
[ MENU ] : END
```

❺
```
MENU

                 ↑  ↑  ↑
                1999  JUL  4
                 ↓  ↓  ↓
                     ↑
CLOCK SET       8  20 AM
                     ↓
[ MENU ] : END
```
```
MENU
↑
INT REC
SLOW SHTR
S PRESET
G PRESET
AGC LIMIT
CUSTOM                JUL  4 1999
CLOCK SET             8:20:01 AM
[ MENU ] : END
```
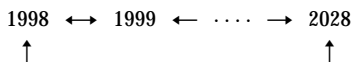
To correct the date and time setting
Repeat the above procedure.

To check the preset date and time
The date and time are shown in the display window. They can only be seen when the power is on.

The year changes as follows:

1998 ⟷ 1999 ← · · · · → 2028

Note on the time indicator
The internal clock of this digital camcorder operates on a 12-hour cycle.
• 12:00 AM stands for midnight.
• 12:00 PM stands for noon.

Compatibility of DVCAM and DV formats

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

Differences between DVCAM and DV formats

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

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

DVCAM and DV cassettes

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

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

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

Compatibility on playback

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

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

Compatibility on editing using DV connectors

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

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

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

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

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

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

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

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

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

Limitations on editing

You will find the following limitations when editing.
• Due to the difference of a track pitch, you cannot record or edit on DV-formatted tapes using DVCAM video equipment.
• Depending on signal conditions, you may not be able to record or edit on DVCAM-formatted tapes.
In these cases, do the following:
• Edit using audio/video jacks.
• Dub a DV-formatted tape using audio/video jacks, then use the dubbed tape as a source tape.

Notes on video cassettes

Usable cassettes

We recommend using a standard DVCAM cassette
You can get the highest quality pictures with this digital camcorder using a standard DVCAM cassette which is the highest quality cassette.
You may not get as good a quality with lesser cassettes.

You cannot use any other <u>DVCAM</u>, mini DVCAM, ^{Mini}**DV** mini DV, **8** 8 mm, **Hi8** Hi8, **VHS** VHS, **S VHS** S-VHS, **VHSC** VHSC, **S VHSC** S-VHSC, **B** Betamax or **ED Beta** ED Betamax type cassettes.

Copyright signal

When you play back
Using this digital camcorder, you cannot play back a tape that has recorded copyright control signals for copyright protection of software. "COPY INHIBIT" appears on the monitor screen or in the viewfinder if you try to play back such a tape. This digital camcorder does not record copyright control signals on the tape when it records.

When you record
You cannot use this digital camcorder and the DV connecting cable to copy a tape that has recorded the copyright control signals for copyright protection of software. "COPY INHIBIT" appears in the viewfinder or on the monitor screen if the playback signal of such a tape is input to this digital camcorder.

Notes on the DVCAM cassette

Gold-plated connector of the standard DVCAM cassette
If the gold-plated connector of the DVCAM cassette gets dirty or dust sticks to the connector, the digital camcorder may malfunction when using the cassette memory functions such as cassette memory search.
Clean the connector with the swab once every ten times you eject the cassette **[a]**.

To prevent accidental erasure
Slide the protect tab on the cassette so that the red portion is visible **[b]**.

When affixing a label on the standard DVCAM cassette
Be sure to affix a label on only the location illustrated below so as not to cause malfunction of the digital camcorder **[c]**.

After using the standard DVCAM cassette
After use, please be sure to rewind the tape completely (to prevent picture and sound distortion).
Return to its case and store in an upright position.

REC
SAVE

[b]

[a]

[c]
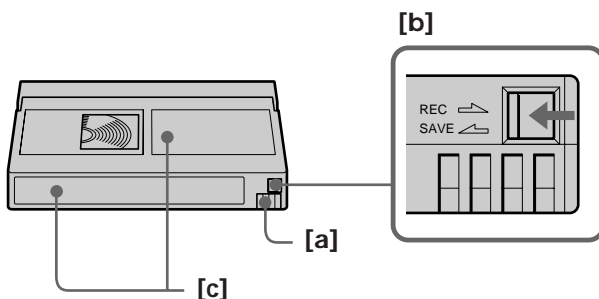
Tips for using the battery pack

This section shows you how you can get the most out of your battery pack.

Preparing the battery pack

Always carry additional batteries
Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery life is shorter in a cold environment
Battery efficiency is decreased, and the battery will be used up more quickly, if you are recording in a cold environment.

To save battery power
Turn STANDBY down to LOCK when not recording to save battery power.
A smooth transition between scenes can be made even if recording is stopped and started again. While you are positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.

When to replace the battery pack

While you are using your digital camcorder, the remaining battery indicator in the viewfinder decreases gradually as battery power is used up.

When the remaining battery indicator reaches the lowest point, the ⮂ indicator may appear and start flashing in the viewfinder.
When the ⮂ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, set the POWER switch to OFF on the digital camcorder and replace the battery pack. Leave the tape in the digital camcorder to obtain a smooth transition between scenes after the battery pack has been replaced.

Notes on the rechargeable battery pack

Caution
Never leave the battery pack in temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight.
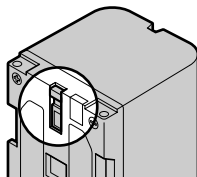
The battery pack heats up
During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern and is normal.

Battery pack care
• Remove the battery pack form the digital camcorder after using it, and keep it in a cool place. When the battery pack is installed to the digital camcorder, a small amount of current flows to the digital camcorder even if the POWER switch is set to OFF. This shortens battery life.
• The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery pack right before using the digital camcorder.

The switch on the battery pack

This switch is provided so that you can mark the charged battery pack. Set the switch to the "green mark" position when charging is completed. (When removed from the charging adaptor, the switch exposes the green mark. When removed from your digital camcorder, no mark is indicated.)

The life of the battery pack

If the battery indicator flashes rapidly just after turning on the digital camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperatures require a longer charging time.

Notes on charging

A brand-new battery pack

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Recharge the battery pack whenever you like

You do not have to discharge it before recharging. If you charged the battery pack fully but you did not use it for a long time, it becomes discharged. Then recharge the battery pack before use.

Notes on the terminals

If the terminals (metal parts on the back) are not clean, the battery charge duration will be shortened.

When the terminals are not clean or when the battery pack has not been used for a long time, repeatedly install and remove the battery pack a few times. This improves the contact condition. Also, wipe the + and – terminals with a soft dry cloth or paper.

Be sure to observe the following

• Keep the battery pack away from fire.
• Keep the battery pack dry.
• Do not open nor try to disassemble the battery pack.
• Do not expose the battery pack to any mechanical shock.

Additional information

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Maintenance information and precautions

Moisture condensation

If the digital camcorder is brought directly from a cold place to a warm place, moisture may condense inside the digital camcorder, on the surface of the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the digital camcorder is furnished with moisture sensors. Please, take the following precautions.

Inside the digital camcorder
If there is moisture inside the digital camcorder, the beep sounds and the ▣ indicator flashes. If this happens, none of the functions except cassette ejection will work. Open the cassette compartment, turn off the digital camcorder, and leave it about 1 hour. When ▲ indicator flashes at the same time, the cassette is inserted in the digital camcorder. Eject the cassette, turn off the digital camcorder, and leave also the cassette about 1 hour. You can continue use of digital camcorder when the ▣ indicator does not appear when the power is turned on again.

On the lens
If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the digital camcorder for about 1 hour.

How to prevent moisture condensation
When bringing the digital camcorder from a cold place to a warm place, put the digital camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.
(1) Be sure to tightly seal the plastic bag containing the digital camcorder.
(2) Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about 1 hour).

Video head cleaning

To ensure normal recording and clear pictures, clean the video heads.
The video heads may be dirty when:
• mosaic-pattern noise appears on the playback picture
• playback pictures do not move
• playback pictures are hardly visible
• the playback picture does not appear
• the ⊗ indicator flashes in the viewfinder.

[a]   **[b]**

or

If the picture becomes like **[a]** or **[b]**, clean the video heads with the Sony DV-12CL cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the cleaning. (Do not repeat cleaning more than 5 times.)

Note
If the DV-12CL cleaning cassette (not supplied) is not available in your area, consult your nearest Sony dealer.

Removing dust from inside the viewfinder

(1) While pressing PUSH, open the viewfinder.
(2) Clean the surface with a commercially available blower.
(3) Close the viewfinder until it clicks.

Additional information
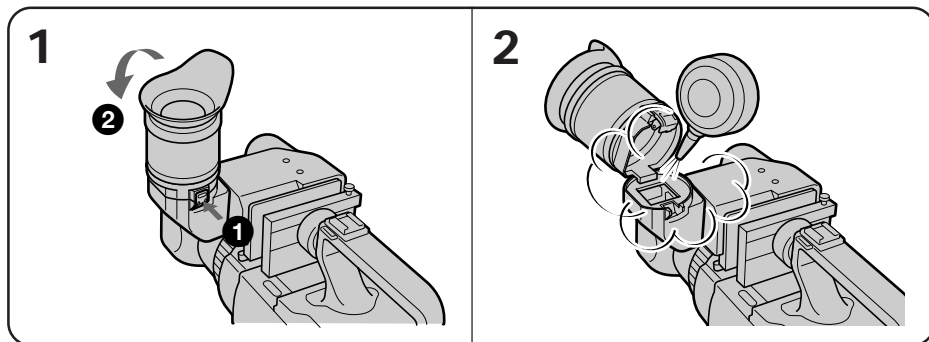
Precautions

Digital camcorder operation
• Operate the digital camcorder on 7.2 V (battery pack) or 8.4 V (AC power adaptor).
• For DC or AC operation, use the accessories recommended in this manual.
• Should any solid object or liquid get inside the casing, unplug the digital camcorder and have it checked by a Sony dealer before operating it any further.
• Avoid rough handling or mechanical shock. Be particularly careful of the lens.
• Keep the POWER switch set to OFF when not using the digital camcorder.
• Do not wrap up the digital camcorder and operate it since heat may build up internally.
• Keep the digital camcorder away from strong magnetic fields or mechanical vibration.

On Handling Tapes
• Do not insert anything into the small holes on the cassette.
• Do not open the tape protect cover or touch the tape.
• Avoid touching or damaging the terminals.
  To remove dust, clean the terminals with a soft cloth.

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Digital camcorder care
• When the digital camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.
• Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.
• Clean the digital camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

AC power adaptor
Charging
• Use only a lithium ion type battery pack.
• Place the battery pack on a flat surface without vibration during charging.
• The battery pack will get hot during charging. This is normal.

Others
• Unplug the unit from the wall outlet when not in use for a long time. To disconnect the power cord, pull it out by the plug. Never pull the power cord itself.
• Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
• Do not bend the power cord forcibly, or put a heavy object on it. This will damage the cord and may cause a fire or electrical shock.
• Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
• Always keep the metal contacts clean.
• Do not disassemble the unit.
• Do not apply mechanical shock or drop the unit.
• While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
• The unit becomes warm while in use. This is normal.
• Do not place the unit in locations that are:
  – Extremely hot or cold
  – Dusty or dirty
  – Very humid
  – Vibrating

If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Using your digital camcorder abroad

Each country has its own electric and TV color systems. Before using your digital camcorder abroad, check the following points.

Power sources

You can use your digital camcorder in any country with the AC-V615 AC power adaptor within 100 V to 240 V AC, 50/60 Hz.

Difference in color systems

This digital camcorder is an NTSC system based digital camcorder. If you want to view the playback picture on a monitor, it must be an NTSC system based monitor.
Check the following list.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

PAL system countries
Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, Germany, Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Thailand, etc.

PAL-M system country
Brazil

PAL-N system countries
Argentina, Paraguay, Uruguay

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

Additional information

Trouble check

If you run into any problem using the digital camcorder, use the following table to troubleshoot the problem. Should the difficulty persist, disconnect the power source and contact your Sony dealer or local authorized Sony service facility.

Digital camcorder

Power

Symptom	Cause and/or Corrective Actions
The power is not on.	• The battery pack is not installed. → Install the battery pack. (p. 23) • The battery is dead. → Use a charged battery pack. (p. 21) • The AC power adaptor is not connected to a wall outlet. → Connect the AC power adaptor to a wall outlet. (p. 38)
The power goes off.	• While being operated in CAMCORDER mode, the digital camcorder has been in Standby mode for more than 5 minutes. → Turn STANDBY down once and then up again. (p. 26) • The battery is dead. → Use a charged battery pack. (p. 21)
The battery pack is quickly discharged.	• The ambient temperature is too low. (p. 85) • The battery pack has not been charged fully. → Charge the battery pack again. (p.21) • The battery pack is completely dead, and cannot be recharged. → Use another battery pack. (p. 85)

Operation

Symptom	Cause and/or Corrective Actions
START/STOP does not operate.	• The tape is stuck to the drum. → Eject the tape. (p. 25) • The tape has run out. → Rewind the tape or use a new one. (p. 36) • CAMCORDER/VTR is set to VTR. → Set it to CAMCORDER. (p. 26) • The tab on the cassette is out (red). → Use a new tape or slide the tab. (p. 25)
The cassette cannot be removed from the holder.	• The battery is dead. → Use a charged battery pack or the AC power adaptor. (p. 21, 38)
▣ and ▲ indicators flash and no function except for cassette ejection works.	• Moisture condensation has occurred. → Remove the cassette and leave the digital camcorder for at least 1 hour. (p. 86)
The time code is flashing in display window.	• The battery is weak or dead. → Replace the battery with a new one. (p. 79)

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Symptom	Cause and/or Corrective Actions
The tape does not move when a video control button is pressed.	• CAMCORDER/VTR is set to CAMCORDER. → Set it to VTR. (p. 36) • The tape has run out. → Rewind the tape or use a new one. (p. 36) • The digital camcorder is updating the cassette memory data (only for DVCAM cassettes with cassette memory). → Eject the cassette after the C MEMORY indicator disappears (p. 25).
The Steady Shot function does not activate.	• STEADY SHOT is set to OFF. → Set STEADY SHOT to ON. (p. 68)
The autofocusing function does not work.	• FOCUS is set to MANU. → Set it to AUTO. (p. 53) • Shooting conditions are not suitable for autofocus. → Set FOCUS to MANU to focus manually. (p. 52)
The microphone does not work while recording.	• LINE/MIC is set to LINE. → Set it to MIC FRONT or MIC REAR.
Built-in microphone sound does not record in stereo when monitoring by headphone or line out jacks.	• DIRECTION SELECT is set to 0°. → Set it to 90° or 120°. (p. 29)
Audio dubbing does not work.	• The signal of recording tape is no condition to operate audio dubbing. → Dub the tape into another DVCAM cassette in Fs 32k using A/V connecting cable. (p. 29)
Excessive high-pitched sound is heard when recording using the built-in microphone.	• The picture has been recorded with BUILT-IN MIC set to WIND. → When there is no wind, set it to off (green position). (p. 67)
The recording sound is weak or is not heard.	• AUDIO MIX in the menu is set to ST2. → Set it to ST1. (p. 40)
The date and time indicator disappears.	• Reset the date and time. (p. 80)
The overlap function does not work.	• Set DIGITAL F in the menu to OVERLAP. (p. 40)
D ZOOM or 16:9WIDE mode in the menu system cannot be set to ON.	• Set DIGITAL F in the menu to ZOOM/WIDE. (p. 40)
The slow shutter does not work.	• Set DIGITAL F in the menu to ZOOM/WIDE. (p. 40)

(to be contunued)

Additional information

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Picture

Symptom	Cause and/or Corrective Actions
The image on the viewfinder screen is not clear.	• The viewfinder lens is not adjusted. → Adjust the viewfinder lens. (p. 27)
A vertical band appears when a subject such as lights or a candle flame is shot against a dark background.	• The contrast between the subject and background is too high. The digital camcorder is not malfunctioning. → Change locations.
A vertical band appears when shooting a very bright subject.	• The digital camcorder is not malfunctioning.
The picture is "noisy" or hardly visible.	• The video heads may be dirty. → Clean the heads using the Sony DV-12CL cleaning cassette (not supplied). (p. 86)
⊗ indicator flashes in the viewfinder.	• The video heads may be dirty. → Clean the heads using the Sony DV-12CL cleaning cassette (not supplied). (p. 86)
Battery remaining indicator does not indicate full ▬ when you insert a charged battery pack.	• The ambient temperature is too low. • The battery pack is completely dead, and cannot be recharged. → Use another battery pack. (p. 85)
While editing using the DV connecting cable, recording picture cannot be monitored.	• Remove the DV connecting cable, and connect it again. • The player or the cassette are not DVCAM format.
The indicators in the viewfinder do not appear.	• VF DISPLAY is set to OFF. → Set it to ON. (p. 28)

Others

Symptom	Cause and/or Corrective Actions
The supplied Remote Commander does not work.	• COMMANDER is set to OFF in the menu system. → Set it to VTR4 or ID. (p. 40) • VTR4/ID/VTR2 on the Remote Commander is set to ID. → Register the ID of the Remote Commander to the digital camcorder. (p. 13) • Something is blocking the infrared rays. → Remove the obstacle. • The batteries are not inserted with the correct polarity. → Insert the batteries with the correct polarity. (p. 12) • The batteries are dead. → Insert new ones. (p. 12)
There is dust in the viewfinder.	• To lift the viewfinder press PUSH and while holding, open the viewfinder. Clean the viewfinder surface. (p. 87)

AC power adaptor

Symptom	Corrective Actions
The VTR/CAMERA or CHARGE lamp does not light.	• Disconnect the power cord. After about 1 minute, reconnect the power cord.
The CHARGE lamp flashes.	• See the following chart.

When the CHARGE lamp flashes

Check through the following chart.

Remove the battery pack from the AC power adaptor. Then install the same battery pack again.

When the CHARGE lamp flashes again
Install another battery pack.

When the CHARGE lamp does not flash again
If the CHARGE lamp lights up and goes out after a while, there is no problem.*

When the CHARGE lamp flashes again
The problem is with the AC power adaptor.

When the CHARGE lamp does not flash again
If the CHARGE lamp lights up and goes out after a while, the problem is with the battery pack installed first.

Please contact your nearest Sony dealer in connection with the problem.

* If you use a battery pack which you have just bought or which has been left unused for a long time, the CHARGE lamp may flash at the first charging. This does not indicate a problem. Repeat again to charge with the same battery pack.

Additional Information

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Specifications

System

Video recording system
Two rotary heads, Helical scanning system
Audio recording system
Two rotary heads, PCM system
Video signal
NTSC color, EIA standards
Usable cassette
DVCAM logo printed cassette
Recording / Playback time (using PDV-184ME cassette)
184 min.
Fastforward/rewind time
Approx. 7 min.
Image device
3 CCD (Charge Coupled Device 1/3")
Viewfinder
Electronic viewfinder: Monochrome
Lens
10x (optical), 20x (digital)
f = 1/4 to 2 5/16 inches (5.9 to 59 mm)
1 5/8 to 16 9/16 inches (42 to 420 mm) when converted into a 35-mm still camera
F = 1.6 to 2.1
Filter diameter 2 1/8 inches (52 mm)
Color temperature
Auto/Indoors (3200K)/Outdoors (5800K)
Minimum illumination
3 lux (F 1.6)
Illumination range
3 lux to 100,000 lux
Recommended illumination
More than 100 lux
Shutter speed control
1/4 to 1/10000
Gain control
−3 to 18 dB
Aperture control
F 1.6 to F 11, CLOSE

Input and output connectors

S video output
4-pin mini DIN
Luminance signal: 1 Vp-p, 75 ohm, unbalanced
Chrominance signal: 0.286 Vp-p, 75 ohm, unbalanced
Video output
Phono jack, 1 Vp-p, 75 ohm, unbalanced
BNC connector
Audio output
Phono jacks (2: stereo L and R)
327 mV, (at load impedance 47 kilohm) impedance less than 2.2 kilohm
RFU DC OUT
Special minijack, DC 5 V
Headphone jack
Stereo minijack (ø 3.5 mm)
LANC control jack
Stereo mini-minijack (ø 2.5 mm)
MIC jack
Stereo minijack, 0.388 mV low impedance with 2.5 to 3.0 V DC, output impedance 6.8 kilohm (ø 3.5 mm)
Audio input
XLR jacks (2: CH-1 and CH-2)
Speaker
Dynamic speaker
DC input
4-pin connector
DV IN/OUT
4-pin special connector
Viewfinder connector
8-pin connector

General

Power requirements
7.2 V (battery pack)
8.4 V (AC power adaptor)
Average power consumption
11.6 W during camera recording
Operating temperature
32°F to 104°F (0°C to 40°C)
Storage temperature
−4°F to +140°F (−20°C to +60°C)
Dimensions (Approx.)
8 5/8 x 9 3/8 x 18 3/4 inches (216 x 237 x 474 mm) (w/h/d)
(When the viewfinder is lying flat)
Mass (Approx.)
7 lb 14 oz (3.6 kg) excluding the battery pack, lithium battery, cassette, lens cover and shoulder strap
10 lb 5 oz (4.7 kg) including the battery adaptor NPA-10000, battery pack NP-F950 (x3), lithium battery CR2025, cassette PDV-184ME, lens cover
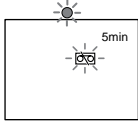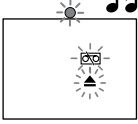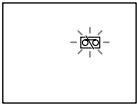**Microphone**
Stereo type
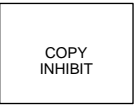**Supplied accessories**
See page 5.
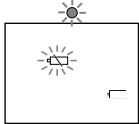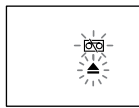
Design and specifications are subject to change without notice.

Warning indicators

If indicators flash in the viewfinder, or a caution lamp on the digital camcorder flashes, check the following:
♪: you can hear the beep sound when the BEEP is set to ON.

1 **The battery is weak or dead.**
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.

2 **The tape is near the end.**
The flashing is slow.

3 **The tape has run out.**
The flashing becomes rapid.

4 **No tape has been inserted.**

5 **The tab on the tape is out (red).**

6 **Moisture condensation has occurred.**

7 **The video heads may be contaminated.**
This indicator appears only in the viewfinder.

8 **Some other trouble has occurred.**
Disconnect the power source and contact your Sony dealer or local authorized facility.

9 **The lithium battery is weak or is not installed.**

10 **Updating the cassette memory data. Wait until C MEMORY disappears.**
The cassette compartment automatically lifts up and opens after the indicator disappears.

11 **You tried to playback or record a picture that has a copyright signal.**

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