Canon

DIGITAL VIDEO CAMCORDER
Instruction Manual

English

XL H1

Introduction

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Using a
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Information
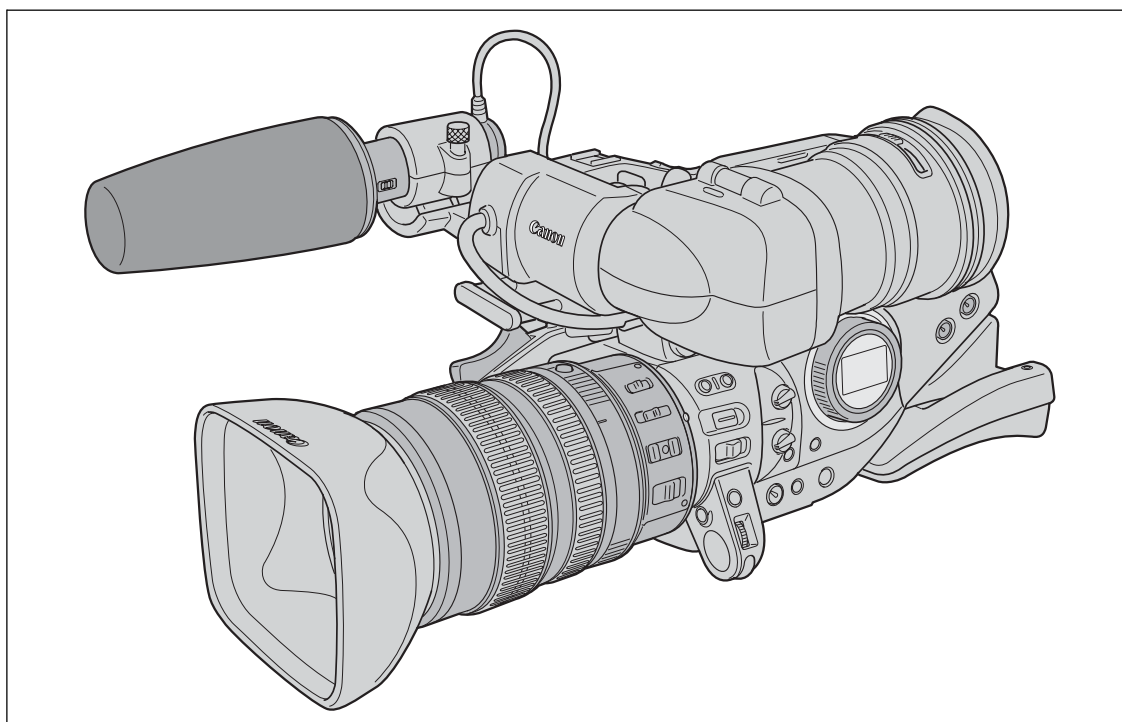
Mini **DV** **Digital Video Cassette**

PAL

Important Usage Instructions

WARNING:
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING:
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK AND TO REDUCE ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

CAUTION:
DISCONNECT THE MAINS PLUG FROM THE SUPPLY SOCKET WHEN NOT IN USE.

For Users in the UK
When replacing the fuse only a correctly rated approved type should be used and be sure to re-fit the fuse cover.

CA-920 identification plate is located on the bottom.

• Use of CV-150F/CV-250F DV cable is necessary to comply with the technical requirement of EMC Directive.

Using this Manual

Thank you for purchasing the Canon XL H1. Please read this manual carefully before you use the camcorder and retain it for future reference. Should your camcorder fail to operate correctly, refer to the *Troubleshooting* table (□ 141).

Conventions Used in this Manual

❍ 🔧: Precautions related to the camcorder operation.
❍ ✏: Additional topics that complement the basic operating procedures.
❍ □: Reference page number.
❍ Capital letters are used to refer to buttons on the camcorder or the wireless controller.
❍ [ ] are used to refer to menu items displayed on the screen.
❍ The Canon HD Video 5.4-108 mm L IS II Zoom Lens supplied with the Lens Kit is referred to as "HD 20x L IS Lens".
❍ The illustrations show the camcorder with the HD 20x L IS Lens attached.
❍ "Screen" refers to the viewfinder screen.
❍ "Card" or "Memory card" refers to an SD memory card or a MultiMediaCard (MMC).

Operating modes ———

Menu item showing at its default position ———
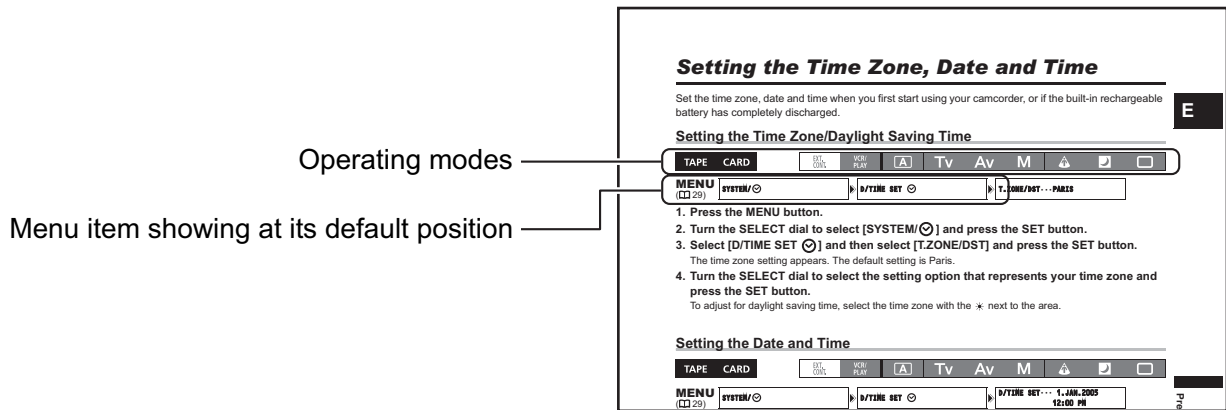
❍Available functions depend on the operating mode and are indicated as follows:

| A | : Function can be used in this mode. |

| A | : Function cannot be used in this mode. |

Trademark Acknowledgements
• Canon is a registered trademark of Canon Inc.
• Mini **DV** is a trademark.
• HDV and the **HDV** logo are trademarks of Sony Corporation and Victor Company of Japan, Ltd. (JVC).
• **⚡** is a trademark.
• Windows® is either a trademark or registered trademark of Microsoft Corporation in the United States and/or other countries.
• Other names and products not mentioned above may be trademarks or registered trademarks of their respective companies.

About the HD/HDV and SD/DV Specifications

Throughout the manual we will distinguish between the video signal standards used by the camera section of the XL H1, and the recording standards used by the recorder section of the XL H1. The video signal can be set to HD (high definition) or SD (standard definition) specifications. The recording standard on the tape will be HDV (high definition) or DV, respectively.
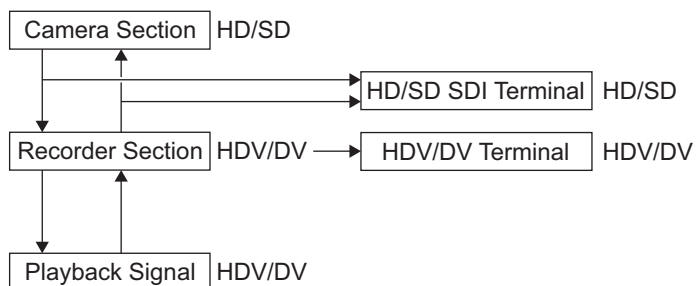
Camera Section	HD/SD

HD/SD SDI Terminal — HD/SD

| Recorder Section | HDV/DV | → | HDV/DV Terminal | HDV/DV |

| Playback Signal | HDV/DV |

Contents

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Checking the Supplied Accessories

Body Kit

CA-920 Compact Power Adapter	DC-920 DC Coupler	BP-950G Battery Pack	SDC-16M SD Memory Card	WL-D5000 Wireless Controller
Two AA (R6) Batteries	Color Viewfinder	Microphone Unit	Camcorder Dust Cap	SS-1000 Shoulder Strap
Adapter Holder	Stereo Cable	PC-A10 SCART Adapter*	DTC-1000 Component Video Cable	

* Not included in China and Oceania

Additional Accessories Supplied with the Lens Kit

Canon HD Video 5.4-108 mm L IS II Zoom Lens (with soft case)	Lens Cap	Lens Dust Cap	Lens Hood

Components Guide

XL H1
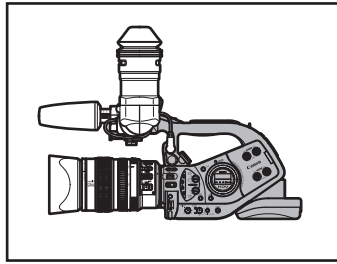
Left side view
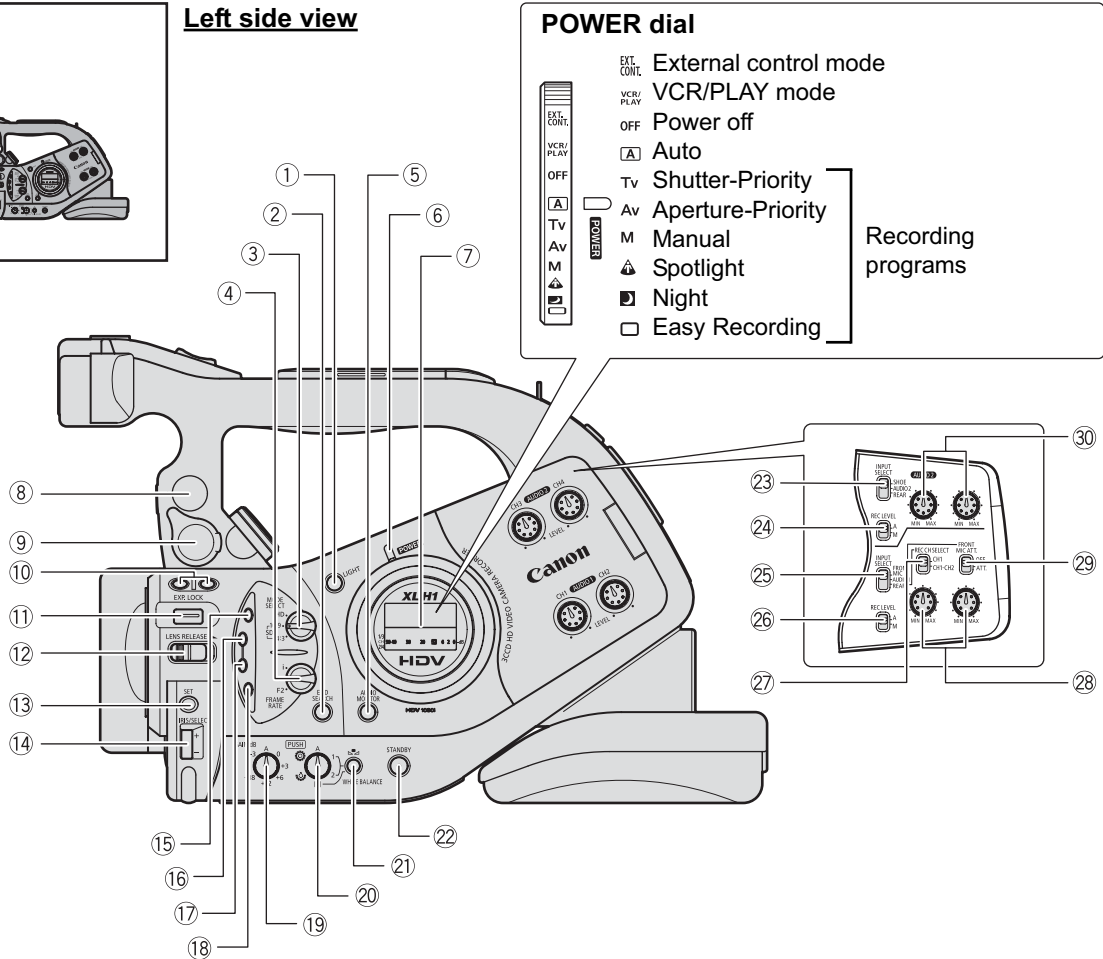
POWER dial

EXT. CONT.	External control mode
VCR/ PLAY	VCR/PLAY mode
OFF	Power off
A	Auto
Tv	Shutter-Priority
Av	Aperture-Priority
M	Manual
☀	Spotlight
◗	Night
□	Easy Recording

Recording programs

① LIGHT button		⑯ BARS/FADE SELECT button (□ 89)	
② END SEARCH button (□ 47)		⑰ BARS/FADE ON/OFF button (□ 89)	
③ MODE SELECT switch (□ 46)		⑱ MENU button (□ 29)	
④ FRAME RATE switch (□ 54)		⑲ GAIN dial (□ 71)	
⑤ AUDIO MONITOR button (□ 63, 101)		⑳ WHITE BALANCE dial (□ 74)	
⑥ POWER indicator		㉑ WHITE BALANCE ◣ button (□ 74)	
⑦ Side panel (□ 132)		㉒ STANDBY button (□ 41)	
⑧ Color viewfinder socket (□ 17)		㉓ INPUT SELECT switch (CH3, CH4) (□ 62)	
⑨ FU-1000 Monochrome Viewfinder socket (□ 147)		㉔ REC LEVEL switch (CH3, CH4) (□ 63)	
⑩ EVF PEAKING/EVF MAGNIFYING buttons (□ 51)		㉕ INPUT SELECT switch (CH1, CH2) (□ 60)	
⑪ EXP. LOCK button (□ 71)		㉖ REC LEVEL switch (CH1, CH2) (□ 63)	
⑫ LENS RELEASE switch (□ 22)		㉗ REC CH SELECT switch (CH1, CH2) (□ 60)	
⑬ SET button (□ 29)		㉘ CH1/CH2 dials (□ 63)	
⑭ IRIS dial (□ 69)/SELECT dial (□ 29)		㉙ FRONT MIC ATT. switch (CH1, CH2) (□ 60)	
⑮ ⤺ (record review) button (□ 44)		㉚ CH3/CH4 dials (□ 63)	

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① **LIGHT Button**
Press the LIGHT button to illuminate the side panel for approximately 10 seconds. Keep the button pressed for at least 3 seconds, to keep the panel illuminated until you press the LIGHT button once more to turn the backlight off.
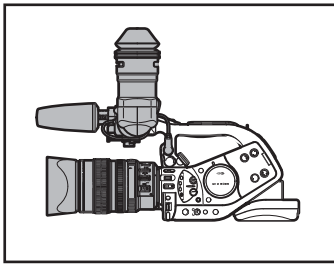
Left side view
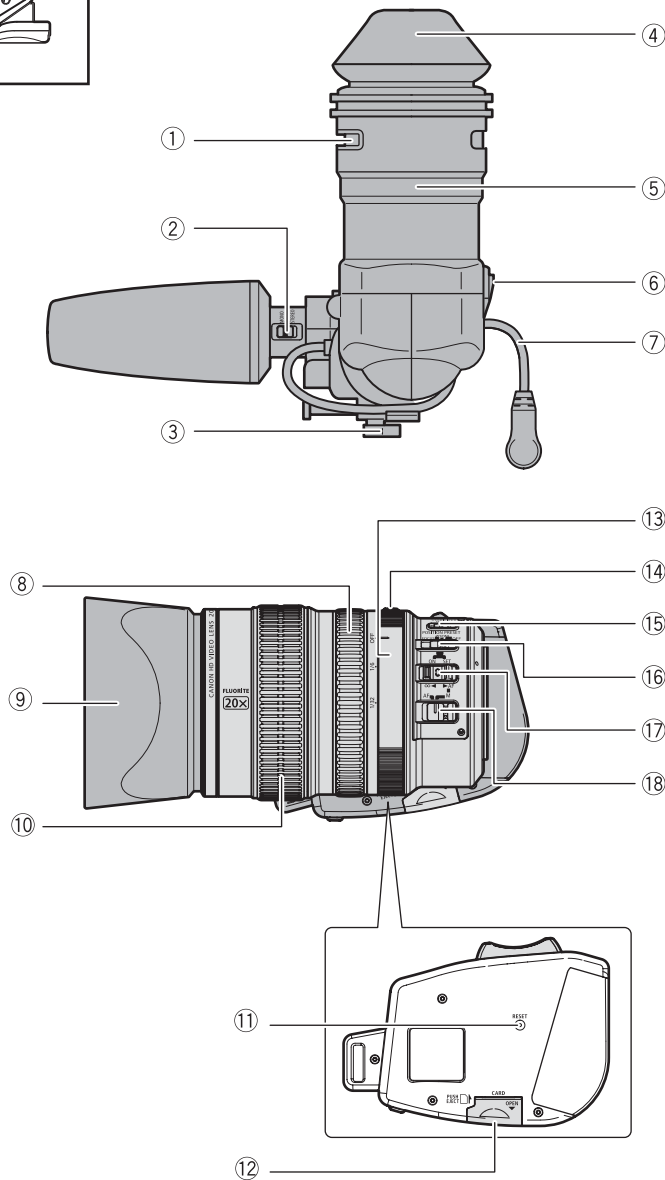
① Dioptric adjustment lever (□ 19)	⑪ RESET button
② STEREO/MONO microphone selector (□ 60)	⑫ Memory card slot (□ 28)
③ Lock lever (□ 18)	⑬ ND filter operating ring (□ 53)
④ Eye cup (□ 18)	⑭ ND filter unlock button (□ 53)
⑤ Color viewfinder (□ 17-20)	⑮ STABILIZER ON/OFF switch (□ 64)
⑥ Lock release button (□ 19)	⑯ POSITION PRESET switch (□ 49)
⑦ Viewfinder cable (□ 17)	⑰ ▶ AF switch (□ 50)/
⑧ Zoom ring (□ 48)	POSITION PRESET ON/SET switch (□ 49)
⑨ Lens hood (□ 23)	⑱ Focus selector (□ 51)
⑩ Focus ring (□ 50)	

Right side view
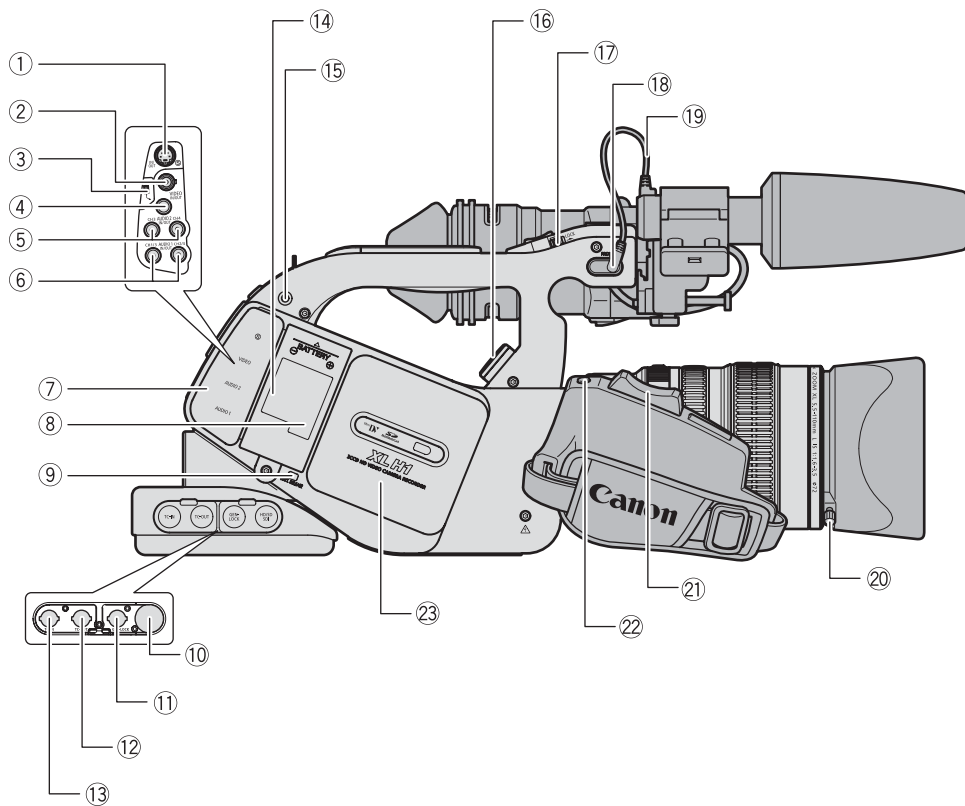
① S-video terminal (📖 98)

② Video terminal (BNC) (📖 98)

③ RCA/BNC selector (📖 98)

④ Video terminal (RCA) (📖 98)

⑤ AUDIO 2 terminals (RCA) (📖 62)

⑥ AUDIO 1 terminals (RCA) (📖 60)

⑦ Terminal cover

⑧ Battery attachment unit (📖 14)

⑨ BATT. RELEASE button (📖 14)

⑩ HD/SD SDI terminal (📖 96)

⑪ GEN.LOCK terminal (📖 56)

⑫ TC OUT terminal (📖 56)

⑬ TC IN terminal (📖 56)

⑭ Serial number

⑮ Screw hole for adapter holder (📖 21)

⑯ AE SHIFT dial (📖 72)

⑰ LOCK lever (📖 41)

⑱ FRONT MIC terminals (📖 20)

⑲ Microphone cable (📖 20)

⑳ Lens hood locking screw (📖 23)

㉑ Grip zoom lever (📖 48)

㉒ PHOTO button (📖 113)

㉓ Cassette compartment (📖 27)

Front view
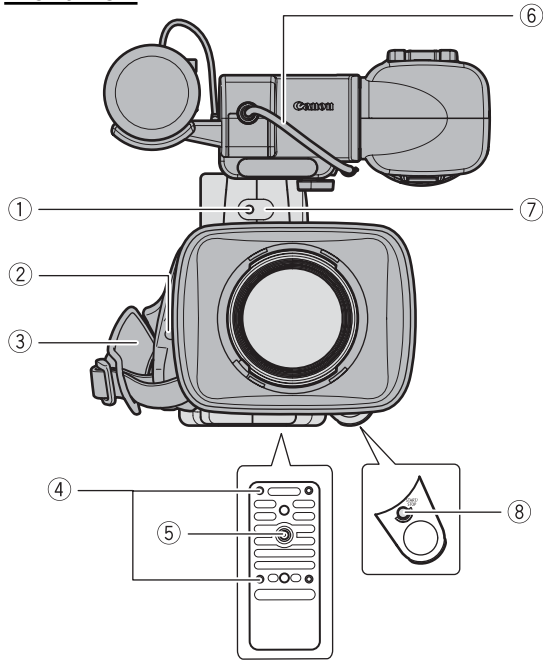
Back view
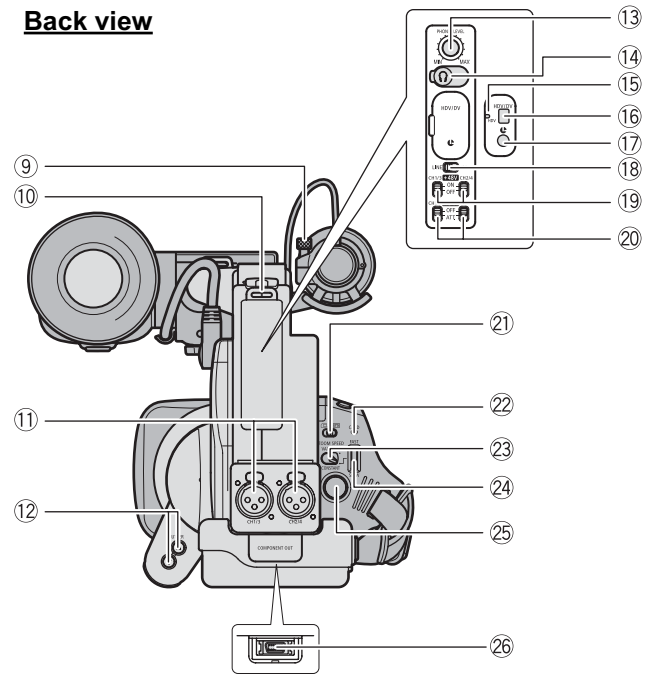
① Tally lamp (□ 93)	⑭ ◯ (phones) terminal
② Remote sensor (□ 26, 106)	⑮ HDV indicator (□ 45)
③ Grip belt (□ 21)	⑯ HDV/DV IN/OUT terminal (□ 98, 107, 110)
④ Attachment sockets for the optional TA-100 Tripod Adapter (□ 147)	⑰ ◖ terminal
⑤ Tripod socket*	⑱ LINE/MIC switch (□ 61, 62)
⑥ Viewfinder cable (□ 17)	⑲ +48V switch (□ 61, 62)
⑦ Remote sensor (□ 26, 106)	⑳ MIC ATT. switch (□ 60, 62)
⑧ Start/stop button (□ 40)	㉑ TAPE/CARD switch (□ 113)
⑨ Microphone locking screw (□ 20)	㉒ CARD access indicator (□ 113)
⑩ Strap mount (□ 21)	㉓ ZOOM SPEED switch (□ 48)
⑪ XLR input terminals (□ 61, 62)	㉔ ZOOM SPEED dial (□ 48)
⑫ SHUTTER ▲▼ buttons (□ 68)	㉕ Start/stop button (□ 40)
⑬ PHONES LEVEL dial	㉖ COMPONENT OUT terminal (□ 97)

* Do not use tripods with fastening screws longer than 5.5 mm as it may damage the camcorder.

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⑰**About the ◖ Terminal**
◖ (LANC) stands for Local Application Control Bus System. The ◖ terminal allows you to connect and control connected devices.
Connect only devices with the ◖ mark to the ◖ terminal.
○ Operation cannot be guaranteed for connections with devices not bearing the ◖ mark.
○ Some buttons of connected devices may not operate or may operate differently than the buttons on the camcorder.

Top view
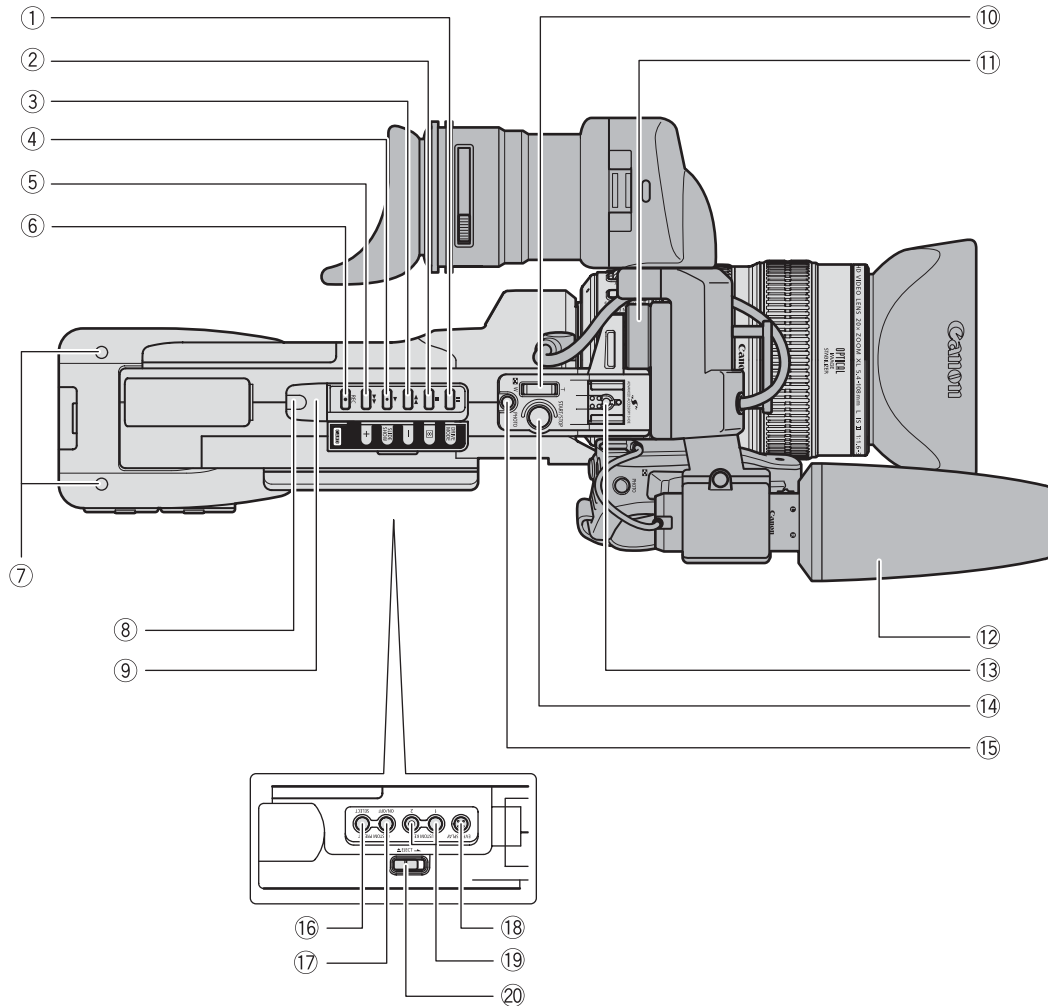
① ❚❚ (pause) button (□ 94) /
  DRIVE MODE button (□ 116)

② ■ (stop) button (□ 94,107) /
  ⊡ (metering mode) button (□ 118)

③ ◀◀ (rewind) button (□ 94) /
  CARD - button (□ 121)

④ ▶ (play) button (□ 94) /
  SLIDESHOW button (□ 121)

⑤ ▶▶ (fast forward) button (□ 94) /
  CARD + button (□ 83, 121)

⑥ ● REC (record) button (□ 107)

⑦ Screw holes for adapter holder (□ 21)

⑧ Tally lamp (□ 93)

⑨ Remote sensor (□ 26, 106)

⑩ Handle zoom lever (□ 48)

⑪ Viewfinder locking screw (□ 17)

⑫ Microphone (□ 20)

⑬ Advanced accessory shoe (□ 62, 119)

⑭ Start/stop button (□ 40)

⑮ PHOTO button (□ 113)

⑯ CUSTOM PRESET SELECT button (□ 81)

⑰ CUSTOM PRESET ON/OFF button (□ 81)

⑱ EVF DISPLAY button (□ 43)

⑲ CUSTOM KEYS (□ 86)

⑳ EJECT switch (□ 27)

WL-D5000 Wireless Controller
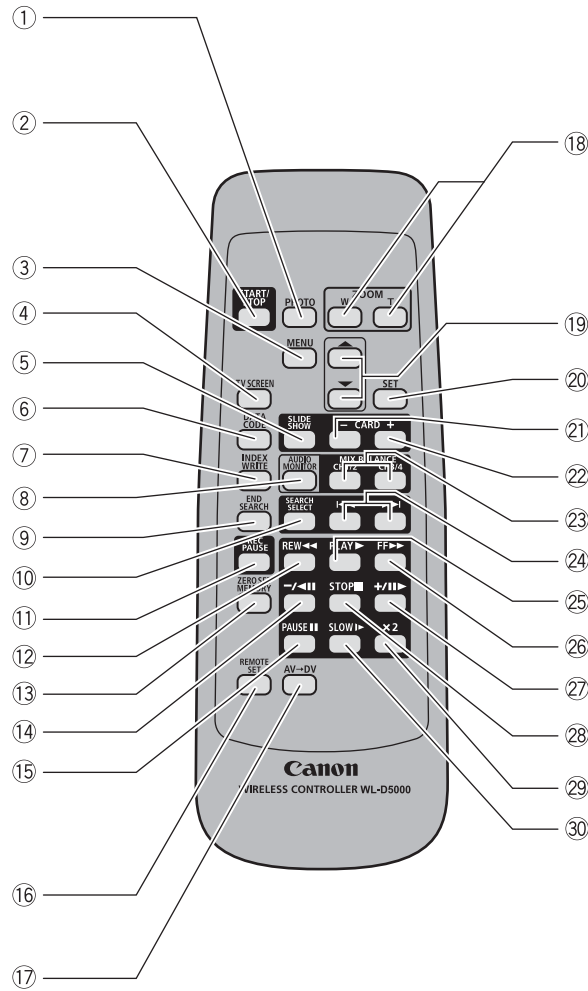
① PHOTO button (📖 113)

② START/STOP button (📖 40)

③ MENU button (📖 29)

④ TV SCREEN button (📖 129)

⑤ SLIDESHOW button (📖 121)

⑥ DATA CODE button (📖 105)

⑦ INDEX WRITE button (📖 87)

⑧ AUDIO MONITOR button (📖 63, 101)

⑨ END SEARCH button (📖 47)

⑩ SEARCH SELECT button (📖 103, 104)

⑪ REC PAUSE button (📖 107)

⑫ REW ◀◀ button (📖 94)

⑬ ZERO SET MEMORY button (📖 102)

⑭ −/◀❚❚ button (📖 94)

⑮ PAUSE ❚❚ button (📖 94)

⑯ REMOTE SET button (📖 106)

⑰ AV→DV button (📖 109)

⑱ Zoom buttons (📖 48)

⑲ Menu selection buttons (📖 29)

⑳ SET button (📖 29)

㉑ **CARD** − button (📖 121)

㉒ **CARD** + button (📖 83, 121)

㉓ MIX BALANCE buttons (📖 101)

㉔ ❙◀◀/▶▶❙ buttons (📖 103, 104)

㉕ PLAY ▶ button (📖 94)

㉖ FF ▶▶ button (📖 94)

㉗ +/❚❚▶ button (📖 94)

㉘ STOP ■ button (📖 94)

㉙ ×2 button (📖 94)

㉚ SLOW ❙▶ button (📖 94)

Preparing the Power Supply

Charging the Battery Pack

Disconnect the DC coupler from the power adapter before charging. Remove the terminal cover of the battery pack.

1. **Connect the power cord to the adapter.**
2. **Plug the power cord into a power outlet.**
3. **Attach the battery pack to the adapter.**
   - Press lightly and slide the battery pack in the direction of the arrow until it clicks.
   - The charge indicator starts flashing. The indicator will stay on when the charging is complete.
4. **When the charging is complete, remove the battery pack from the adapter.**
5. **Unplug the power cord from the power outlet and disconnect it from the adapter.**

Charge indicator
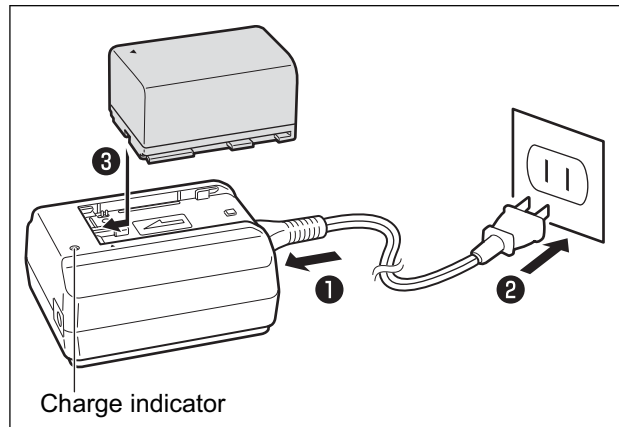
Attaching the Battery Pack

1. **Turn the POWER dial to OFF.**
2. **Attach the battery pack to the camcorder.**
   Press lightly and slide the battery pack up, in the direction of the arrow until it clicks.
3. **Remove the battery pack after use.**
   Holding the BATT.RELEASE button pressed down, slide the battery pack down to remove it.

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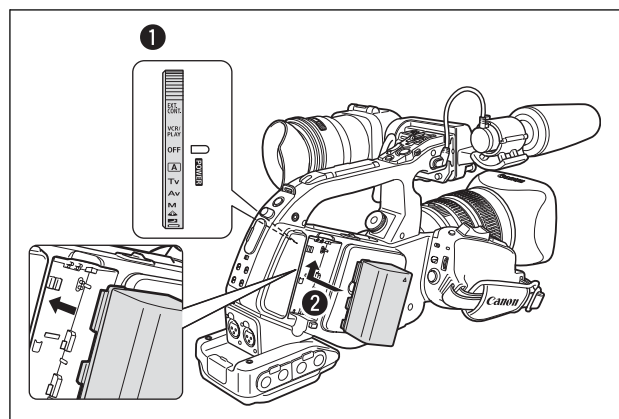
Using a Household Power Outlet

1. Turn the POWER dial to OFF.

2. Attach the DC coupler to the camcorder.
Press lightly and slide the DC coupler up, in the direction of the arrow until it clicks.

3. Connect the power cord to the power adapter.

4. Plug the power cord into a power outlet.

5. Connect the DC coupler to the adapter.

6. Detach the DC coupler after use.
Holding the BATT.RELEASE button pressed down, slide the DC coupler down to remove it.
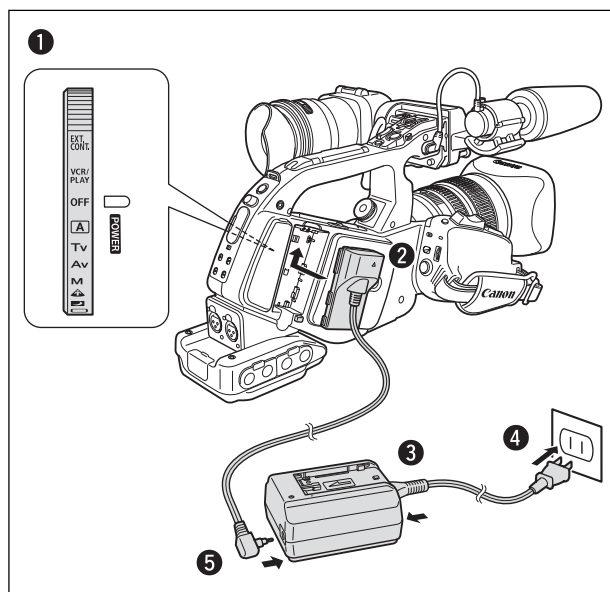
About the Built-in Rechargeable Lithium Battery

This camcorder has a built-in rechargeable lithium battery to retain the date, time and other settings. The built-in battery is recharged every time you use the camcorder. However, when you use the camcorder for only short times or do not use it for a period of over 3 months, it will become totally depleted. In that case, recharge the built-in battery by powering the camcorder from a power outlet and leaving it with the POWER dial set to OFF for at least 24 hours.

❍ Disconnect the DC coupler from the power adapter when charging a battery pack.
❍ Turn off the camcorder before connecting or disconnecting the power adapter.
❍ If the adapter is used close to a TV, it may cause picture interference. Move the adapter away from the TV or the antenna cable.
❍ Do not connect to the power adapter any products not expressly recommended.

❍ If you connect a faulty power adapter or battery pack, the charge indicator turns off and the charging will stop.
❍ The charge indicator informs you about the charge status.

0-50%:	Flashes once every second
50-75%:	Flashes twice every second
More than 75%:	Flashes 3 times every second
100%:	Continuously on

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❍ **Charging, Recording and Playback Times**

The following times are approximate and vary according to the charging, recording and playback conditions.

Battery Pack			BP-930	BP-945	BP-950G	BP-970G
Charging Time with the CA-920 Compact Power Adapter			145 min.	220 min.	235 min.	320 min.
HDV Recording and Playback Times						
Maximum Recording Time	HD 20x L IS Lens	Supplied color viewfinder	140 min.	210 min.	295 min.	405 min.
		Optional FU-1000 monochrome viewfinder	105 min.	165 min.	230 min.	315 min.
Typical Recording Time*	HD 20x L IS Lens	Supplied color viewfinder	80 min.	115 min.	155 min.	210 min.
		Optional FU-1000 monochrome viewfinder	60 min.	90 min.	125 min.	170 min.
Playback Time		Supplied color viewfinder	165 min.	250 min.	350 min.	480 min.
DV Recording and Playback Times						
Maximum Recording Time	HD 20x L IS Lens	Supplied color viewfinder	155 min.	230 min.	335 min.	455 min.
		Optional FU-1000 monochrome viewfinder	120 min.	180 min.	250 min.	350 min.
	20x L IS Lens	Supplied color viewfinder	140 min.	210 min.	300 min.	415 min.
		Optional FU-1000 monochrome viewfinder	110 min.	170 min.	235 min.	320 min.
	16x Manual Zoom Lens	Supplied color viewfinder	160 min.	250 min.	340 min.	465 min.
		Optional FU-1000 monochrome viewfinder	120 min.	190 min.	260 min.	360 min.
	3x Zoom Lens XL	Supplied color viewfinder	130 min.	195 min.	295 min.	400 min.
		Optional FU-1000 monochrome viewfinder	105 min.	165 min.	230 min.	315 min.
Typical Recording Time*	HD 20x L IS Lens	Supplied color viewfinder	85 min.	130 min.	175 min.	240 min.
		Optional FU-1000 monochrome viewfinder	65 min.	100 min.	135 min.	190 min.
	20x L IS Lens	Supplied color viewfinder	80 min.	115 min.	155 min.	215 min.
		Optional FU-1000 monochrome viewfinder	60 min.	95 min.	125 min.	175 min.
	16x Manual Zoom Lens	Supplied color viewfinder	90 min.	140 min.	175 min.	240 min.
		Optional FU-1000 monochrome viewfinder	70 min.	105 min.	140 min.	195 min.
	3x Zoom Lens XL	Supplied color viewfinder	75 min.	110 min.	150 min.	210 min.
		Optional FU-1000 monochrome viewfinder	60 min.	90 min.	125 min.	170 min.
Playback Time		Supplied color viewfinder	180 min.	275 min.	375 min.	510 min.

* Approximate times for recording with repeated operations such as start/stop, zooming, power on/off. Actual time may be shorter.

❍ We recommend charging the battery pack in temperatures between 10 °C and 30 °C.

❍ A lithium ion battery pack can be charged at any charge state. Unlike conventional battery packs, you do not need to completely use or discharge it before charging.

❍ We recommend that you prepare battery packs 2 to 3 times longer than you think you might need.

❍ To conserve battery power, turn off the camcorder instead of leaving it in record pause mode.

Preparing the Camcorder

Attaching and Detaching the Color Viewfinder Unit

Attaching the Color Viewfinder Unit

1. **Slide the viewfinder unit onto the bracket and tighten the locking screw.**
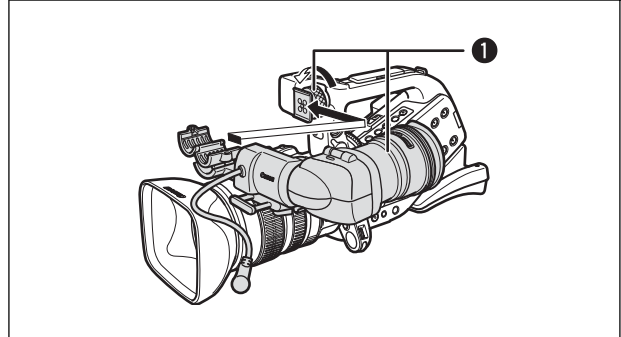
2. **Connect the viewfinder cable to the upper socket of the camcorder body.**
3. **Hook the viewfinder cable onto the cable clamp.**
   Insert the cable plug straight into the camcorder socket.
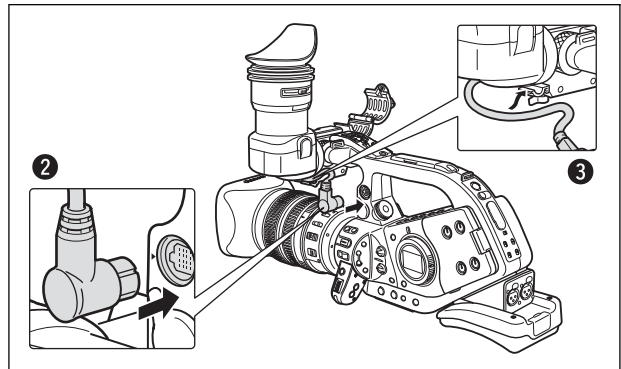
Detaching the Viewfinder Unit

1. **Detach the viewfinder cable.**
2. **Loosen the locking screw and slide the viewfinder unit off the bracket.**

Attaching and Detaching the Eye Cup

You can change the position of the eye cup for use with either the left or right eye. Detach the eye cup and reattach it when changing the position of the eye cup for right or left eye use.

Attaching the Eye Cup

Align the hole for the dioptric adjustment lever with the lever, and pull the eye cup into position.

Right eye use
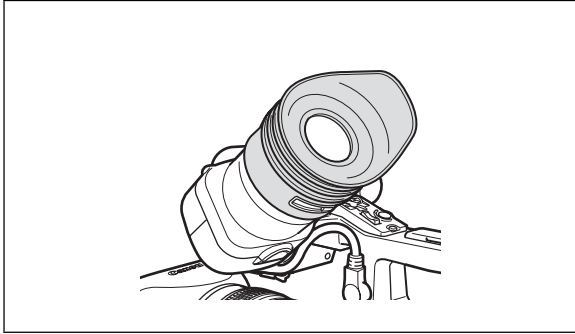
Left eye use
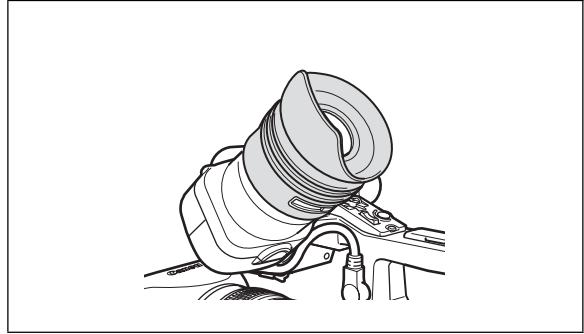
Detaching the Eye Cup

Detach the eye cup as shown in the illustration.
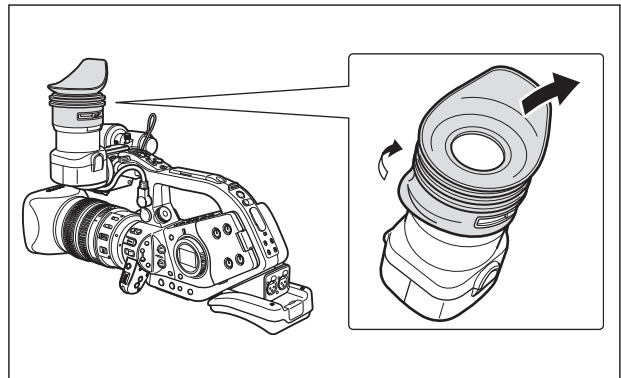
Adjusting the Position of the Viewfinder

The viewfinder position can be changed (right/left, forward/backward).
When storing the camcorder in the optional HC-3200 System Case, adjust the viewfinder to the right and lock it.

Right/Left Adjustment
Loosen the locking screw, move the viewfinder to the right/left and tighten the screw.
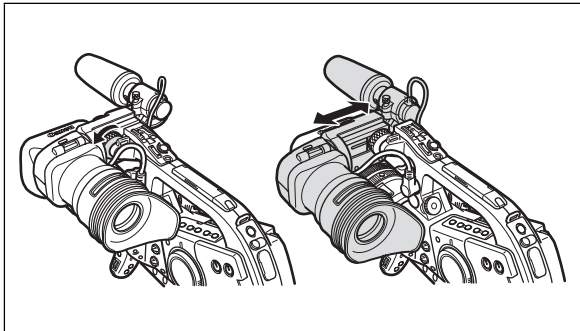
Forward/Backward Adjustment
Loosen the locking lever, move the viewfinder forward/backward and tighten the lever.
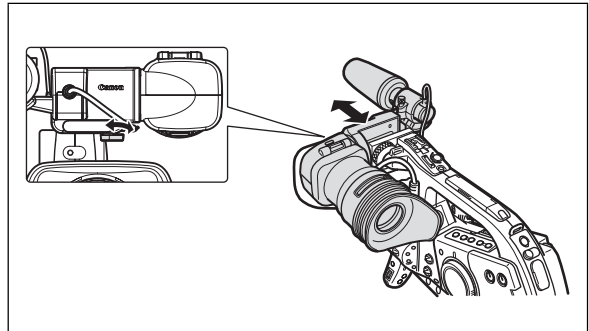
Dioptric Adjustment

Turn on the camcorder and adjust the dioptric adjustment lever.
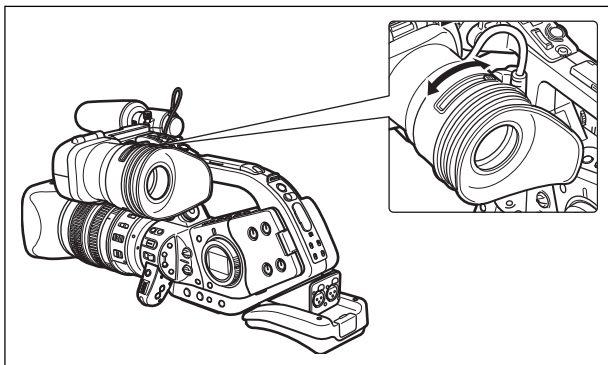
Prevent direct sunlight from getting in the viewfinder. The viewfinder LCD may become damaged due to concentration of the light by the lens. Pay special attention when mounting the camcorder on a tripod, or during transportation.

Using the Viewfinder as LCD Panel

You can use the viewfinder as an LCD panel by opening the eyepiece adapter.

Press the lock release button and open the eyepiece adapter.
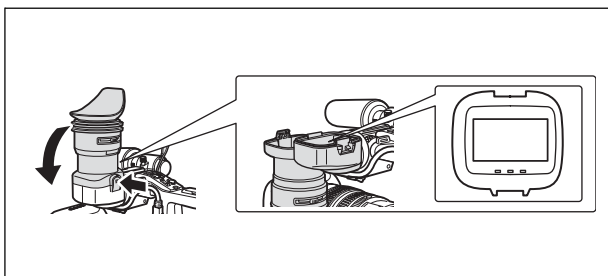
Make sure to close the eyepiece adapter when you are not using the viewfinder as an LCD panel.

The screen is slightly brighter when you open the eyepiece adapter.

Preparations

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Adjusting the Viewfinder

You can adjust the brightness, contrast, color and sharpness of the viewfinder. These adjustments will not affect your recording.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	[A]	Tv	Av	M	⚠	🌙	▢

MENU
(📖 29)

DISPLAY SETUP / 💬	▶	EVF SETUP	▶	BRIGHTNESS··· – ▮━▯━▮ +
				CONTRAST····· – ▮━▯━▮ +
				COLOR········ – ▮━▯━▮ +
				SHARPNESS···· – ▮━▯━▮ +
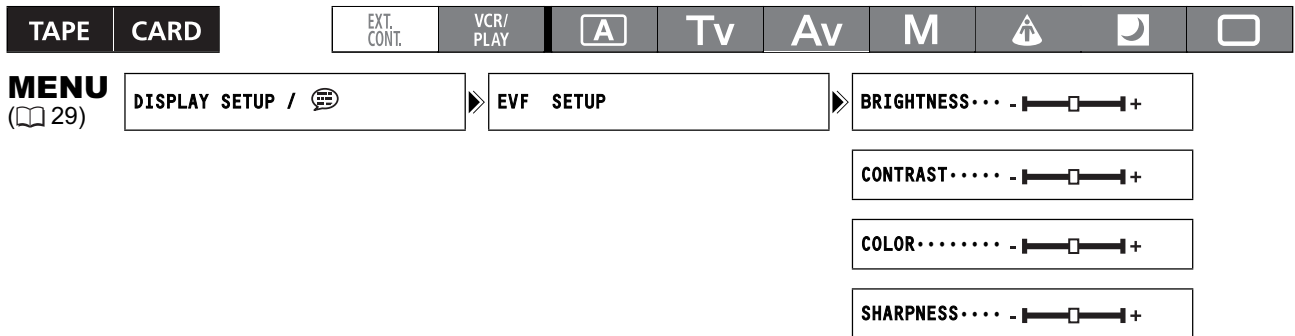
1. **Press the MENU button.**
2. **Turn the SELECT dial to select [DISPLAY SETUP/💬] and press the SET button.**
3. **Select [EVF SETUP] and then select [BRIGHTNESS], [CONTRAST], [COLOR] or [SHARPNESS].**
4. **Adjust the setting with the SELECT dial and press the SET button.**
   - After the adjustment you will return to the [EVF SETUP] submenu. Change additional settings in the same way as necessary.
   - For more details regarding the [EVF BW MODE] setting refer to (📖 88).
5. **Press the MENU button to close the menu.**

Attaching the Microphone Unit

1. **Loosen the microphone locking screw on the viewfinder unit, open the microphone clamp and insert the microphone into the microphone clamp.**
2. **Align the mark on the microphone with the mark on the clamp and tighten the screw.**
3. **Plug the microphone cable to the camcorder's FRONT MIC terminals.**
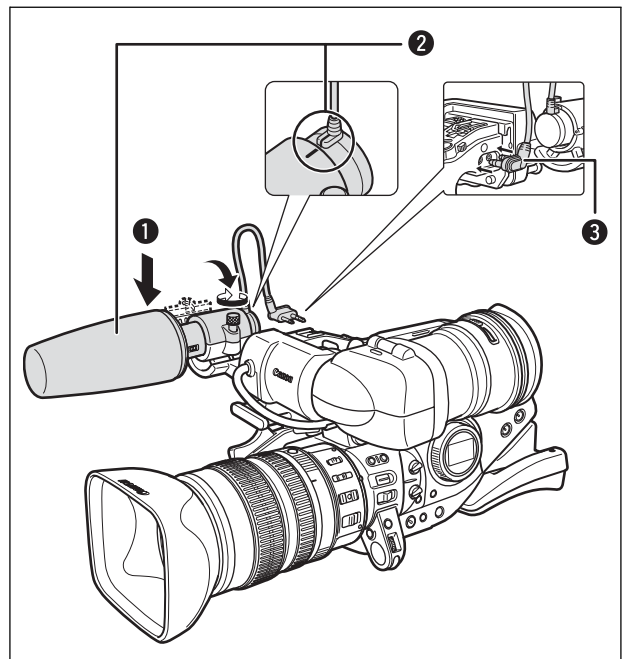
Fastening the Grip Belt

Adjust the grip belt so that you can reach the zoom lever with your index and middle finger, and the start/stop button with your thumb.
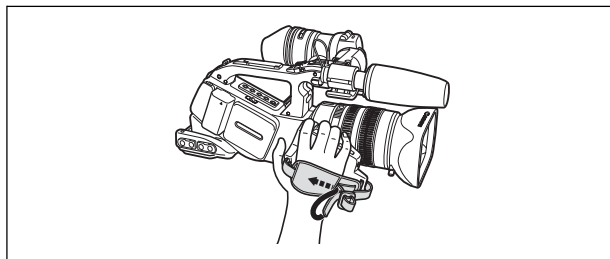
Attaching the Shoulder Strap

Pass the ends through the strap mount and adjust the length of the strap.
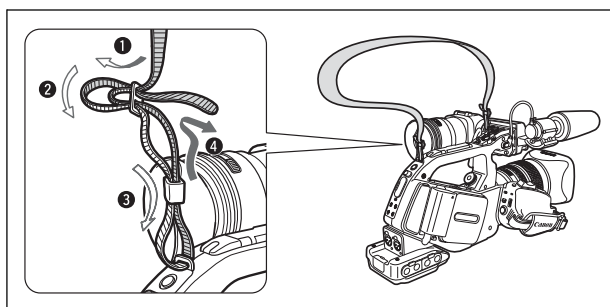
Be careful not to drop the camcorder when adjusting the strap or the grip belt.

Attaching the Adapter Holder

Attach the adapter holder to use the optional CH-910 Dual Battery Charger/Holder or a commercially available wireless microphone receiver.

1. **Attach the adapter holder and secure it by tightening the screws.**
2. **Adjust the position of the support bars.**
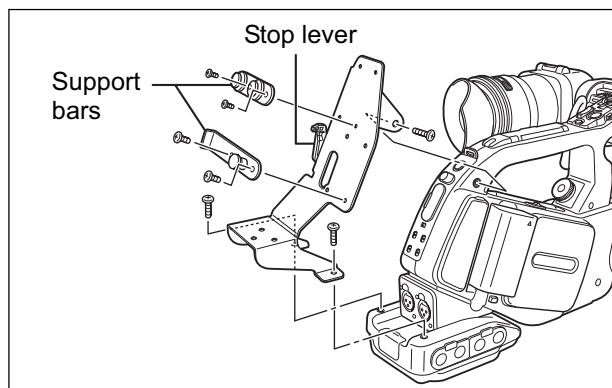
When using the optional CH-910, hook it onto the support bars and secure it with the stop lever. To detach the CH-910, press the stop lever in the direction of the arrow and pull it off the support bars.

Preparations

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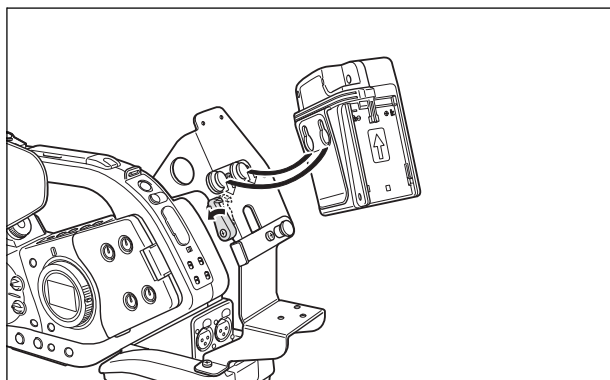
Preparing the Lens

Refer also to the instruction manual of the lens.

Mounting the Lens

1. **Set the POWER dial to OFF.**
2. **Remove the dust caps from the camcorder and the lens.**
3. **Align the red mark on the lens with the red mark on the camcorder and turn the lens clockwise until it clicks.**
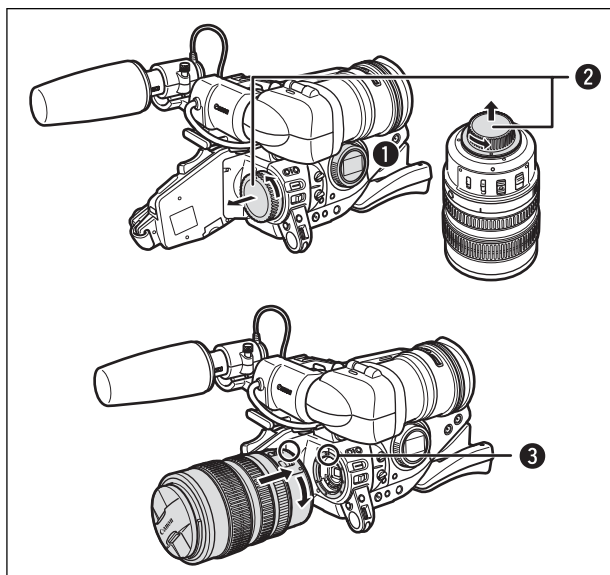
Removing the Lens

1. **Set the POWER dial to OFF.**
2. **Slide in the LENS RELEASE switch, turn the lens counter-clockwise until it stops and remove the lens.**
3. **Attach the dust caps to the camcorder and the lens.**
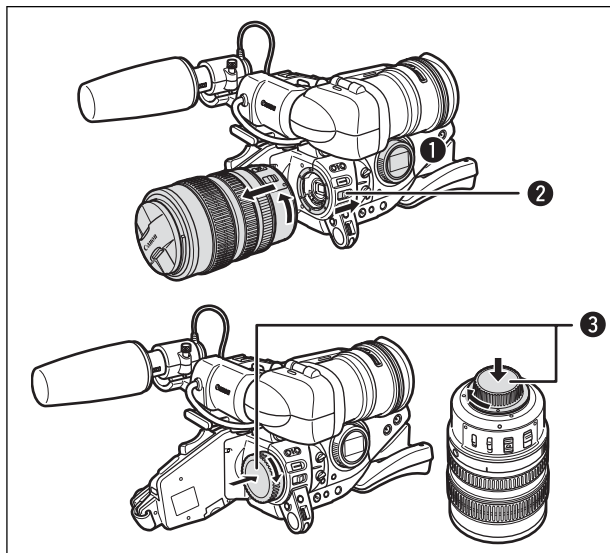
❍ Be careful not to drop the lens or camcorder when mounting or removing the lens.
❍ Avoid direct sunlight or strong light sources when mounting or removing the lens.
❍ The XL mount is not compatible with the VL mount.
❍ Do not touch the lens, lens mount and the interior of the mount, or expose them to dust or dirt. If necessary, clean the lens with a dry, soft lens-cleaning cloth. Make sure to turn off the camcorder while cleaning the lens.
❍ Proper operation cannot be guaranteed when recording in HDV standard with lenses that are not HDV compatible. If you attach to the camcorder a lens that is not HDV compatible, the messages "THIS LENS HAS NO STILL SHOOTING CAPABILITY" and "HD INCOMPATIBLE LENS" will appear.

❍ Proper operation cannot be guaranteed when recording in HDV standard with the optional Extender XL 1.6x. The message "HD INCOMPATIBLE LENS" will appear when using the extender, even with an HDV compatible lens.

Attaching the Lens Hood

Attach the lens hood to protect the lens and shade it from stray light.

1. **Place the lens hood on the front of the lens and screw it clockwise until the Canon logo appears on top.**
   • Be careful not to deform the lens hood.
   • Make sure that the lens hood is aligned with the thread.
2. **Tighten the locking screw.**
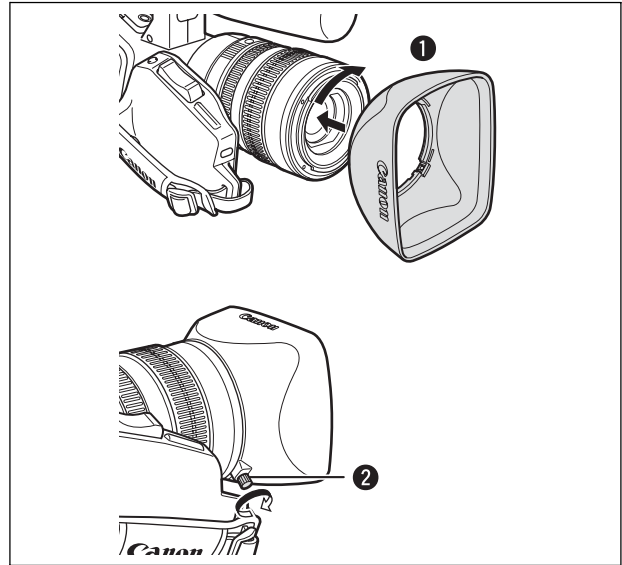
Adjusting the Flange Back
(Lenses without a built-in flange back adjustment function)

The flange back can be adjusted to correct the focus during telephoto and wide zooming. The flange back can be adjusted automatically by the camcorder (AF) or manually (MF). Different flange back adjustment values can be memorized and can also be saved as backup.

You can store flange back settings for up to 10 lenses.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	☐

Preparations

1. **Turn the camcorder facing the subject and secure it in place.**
   Place the camcorder at a distance of at least 1 m from the subject. Avoid subjects that are difficult to focus on at the widest angle.
2. **Zoom out to full wide angle.**
3. **Set the POWER dial to Av and set the aperture to full open.**
4. **Zoom in to full telephoto.**
   Make sure the subject remains in the center of the frame both, in full zoom out and full zoom in.
5. **Check that the exposure conditions are appropriate.**
   If necessary, use the ND filter.

AF Adjustment

1. **Press the MENU button.**
2. **Turn the SELECT dial to select [CAMERA SETUP] and press the SET button.**
3. **Select [FB] and then select [➡ AF ADJUST].**
4. **When the confirmation screen appears, press the SET button to begin the adjustment.**
5. **Once the message "FB ADJUSTMENT SUCCESSFUL" is displayed, press the MENU button to close the menu.**

MF Adjustment

1. **Press the MENU button.**
2. **Turn the SELECT dial to select [CAMERA SETUP] and press the SET button.**
3. **Select [FB] and then select [➡ MF ADJUST].**
4. **When the confirmation screen appears, press the SET button to begin the adjustment.**
5. **The camcorder will zoom in to full telephoto. When the message "ADJUST FOCUS & PUSH SET" appears, focus as necessary and press the SET button.**
6. **The camcorder will zoom out to full wide angle. When the message "ADJUST FOCUS & PUSH SET" appears, focus as necessary and press the SET button.**
7. **Once the message "FB ADJUSTMENT SUCCESSFUL" is displayed, press the MENU button to close the menu.**

Resetting the flange back adjustments

This procedure will reset the stored flange back adjustment value for the mounted lens.

1. **Press the MENU button.**
2. **Turn the SELECT dial to select [CAMERA SETUP] and press the SET button.**
3. **Select [FB] and then select [SET DEFAULT].**
4. **Select [YES] and press the SET button.**
5. **Press the MENU button to close the menu.**

In the following cases the flange back cannot be adjusted correctly and the camcorder will return to the flange back adjustment selection screen.
- In the AF adjustment the camcorder cannot focus.
- The lens was removed during the flange back adjustment.

Using the Wireless Controller

When you press the buttons on the wireless controller, point it at one of the camcorder's remote sensors.

The camcorder has three remote sensors: two at the front and one at the back.
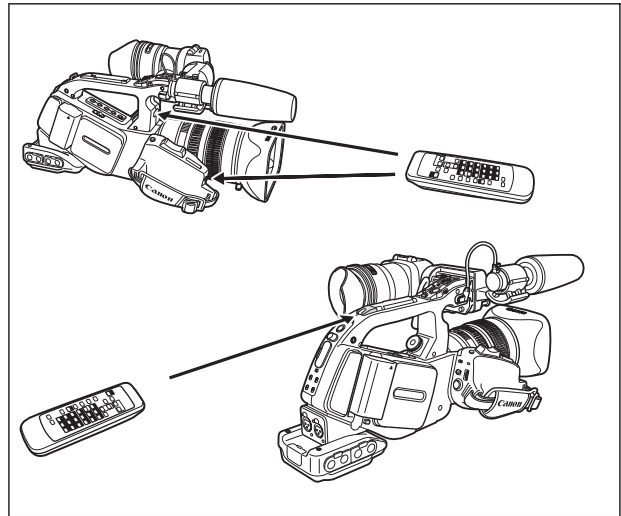
Inserting the Batteries

The wireless controller operates with two AA (R6) batteries.

1. **Open the battery cover.**
2. **Insert the batteries following the + and – markings.**
3. **Close the battery cover.**
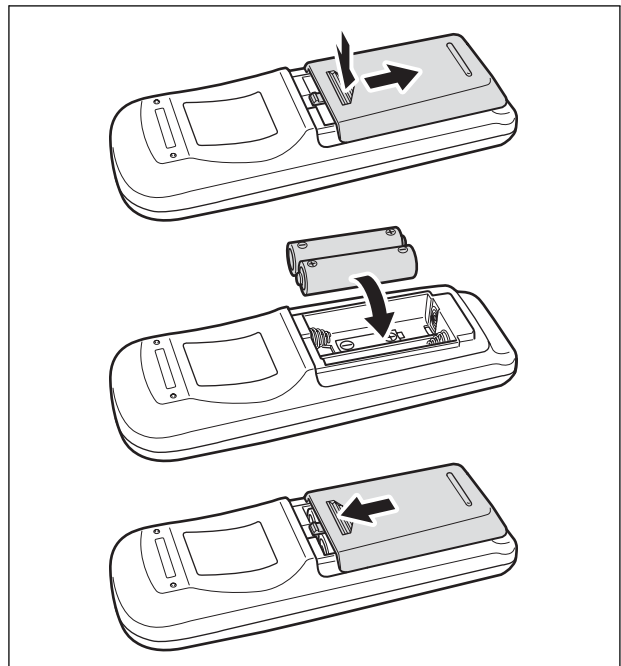
○ The camcorder and wireless controller are equipped with 2 remote sensor modes (□ 106). If the wireless controller does not work, check if the camcorder and wireless controller are set to the same mode.

○ When the camcorder cannot be operated with the wireless controller, or when it can only be operated at very close range, replace the batteries. Make sure to replace both batteries at the same time.

○ The wireless controller may not work properly when the remote sensor is located under strong light sources or direct sunlight.

Loading/Unloading a Cassette

Use only videocassettes marked with the ᴹⁱⁿⁱ**DV** logo. For recording in HDV we recommend you use videocassettes compatible with the HDV standard.

1. Slide the EJECT switch to open the cassette compartment cover.

The cassette compartment opens automatically.
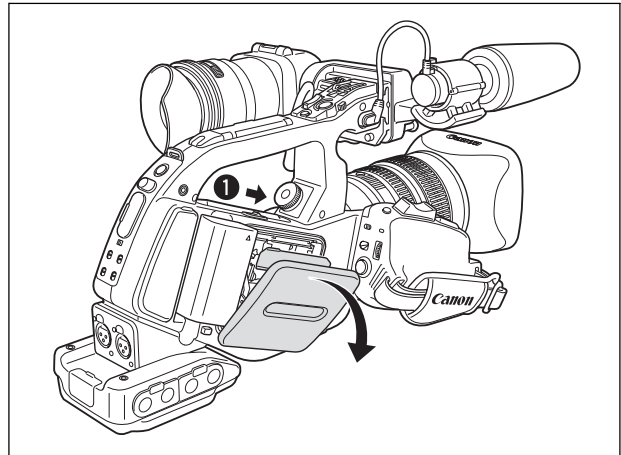
2. Load/unload the cassette.

• Insert the cassette straight, fully into the compartment with the window facing out.

• Unload the cassette by pulling it straight out.
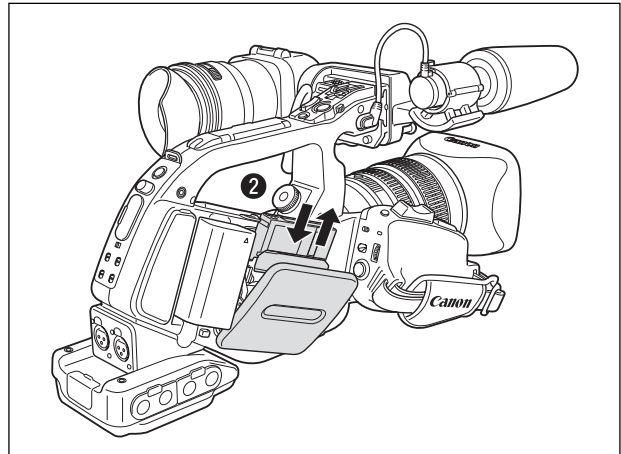
3. Close the cassette compartment cover.

Press the PUSH mark on the cover.
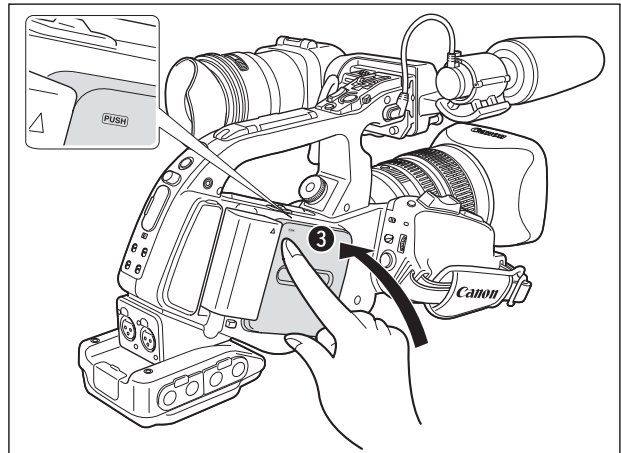
❍ Do not interfere with the cassette compartment while it is opening or closing automatically.

❍ Be careful not to get your fingers caught in the cassette compartment.

If the camcorder is connected to a power source, cassettes can be loaded/unloaded even if the POWER dial is set to OFF.

Inserting/Removing a Memory Card

You can use ⚡ SD memory cards or commercially available MultiMediaCards (MMC) with this camcorder. The SD memory card has a protect switch to prevent accidental erasure.

Inserting the Card

1. **Set the POWER dial to OFF.**
2. **Open the memory card slot cover.**
3. **Insert the memory card straight, all the way into the card slot.**
4. **Close the card slot cover.**
   Do not force the cover closed if the card is not correctly inserted.
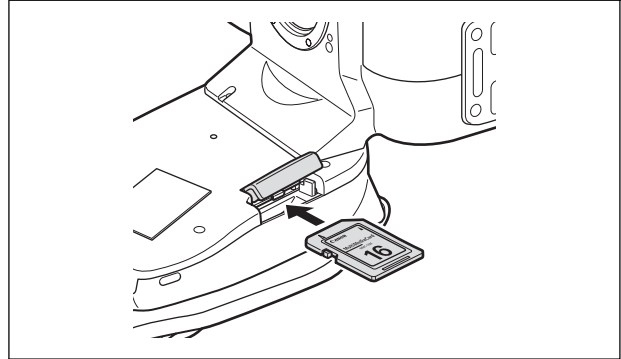
Removing the Card

Do not forcefully remove the memory card without first pushing it in to release it.

1. **Set the POWER dial to OFF.**
   Make sure that the CARD indicator is not flashing before you turn off the camcorder.
2. **Open the memory card slot cover.**
3. **Push the memory card to release it and then remove the memory card.**
4. **Close the card slot cover.**
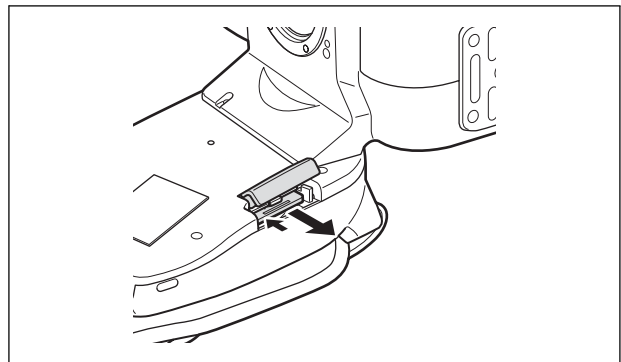
⚠ ❍ This camcorder is compatible with SD Memory Cards or MultiMediaCards (MMC) only. Do not use any other type of memory cards.
❍ Proper operation cannot be guaranteed for all memory cards.
❍ Turn off the camcorder before inserting or removing the memory card. Otherwise, it may result in lost data.
❍ If you use memory cards other than the supplied one, make sure to initialize them with the camcorder (📖 125).

Changing Settings with the MENU Button

Many of the camcorder's functions can be changed from the onscreen menu.

SELECT dial

SET button
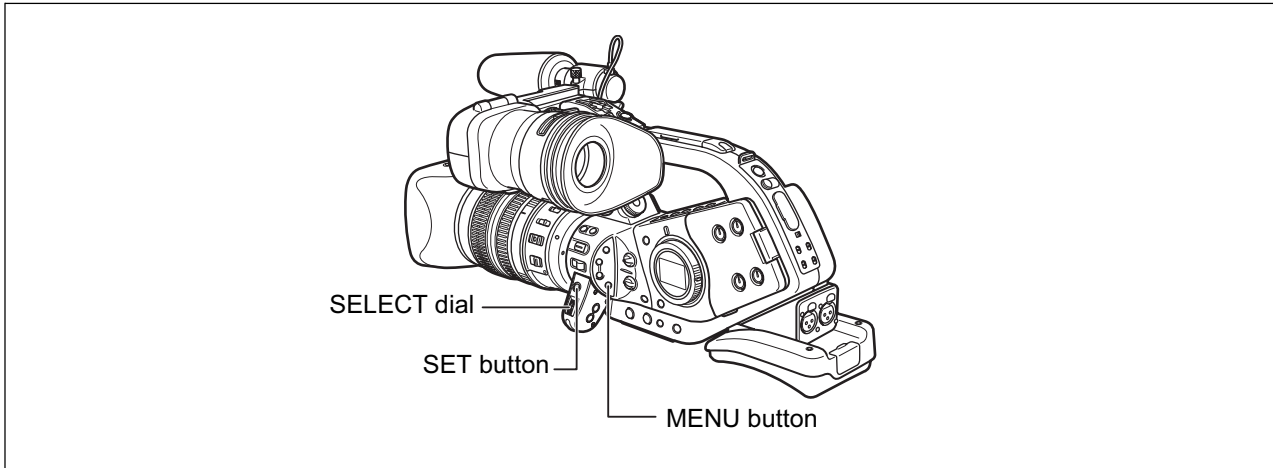
MENU button

Selecting Menus and Settings

1. **Press the MENU button to open the menu.**
2. **Turn the SELECT dial to select a submenu and press the SET button.**
3. **Turn the SELECT dial to select a menu item and press the SET button.**
4. **Turn the SELECT dial to select a setting option and press the SET button.**
5. **Press the MENU button to close the menu.**

❍ The ⬍, SET and MENU displays in green at the bottom of the screen will give you additional indications about what buttons to operate during each menu setting.
❍ Pressing the MENU button at any time closes the menu.
❍ Unavailable items will appear grayed out.
❍ You may find it more convenient to use the wireless controller to operate the menu. Press the MENU button on the wireless controller to open or close the menu. Use the menu selection buttons ▲▼ of the wireless controller instead of the SELECT dial, and press the SET button on the wireless controller to save the settings or make a selection.

Menu and Default Settings

Default settings are shown in boldface.

CAMERA MENU

Submenu	Menu Item	Setting Options		📖
SIGNAL SETUP	TIME CODE	COUNT-UP	**REC-RUN**, REC-RUN PS., FREE-RUN	55
		START VALUE	**SET**, RESET	55
	EXT.SYNC	**OFF**, GENLOCK, GENLOCK+TC		57
	GENLCK ADJUST	-1023 – +1023		57
	T.CODE OUT	ON, **OFF**		56
	COMP. OUT	576i, **1080i/576i**		97
	SDI OUTPUT	ON, **OFF**		97
	SDI SPEC.	**AUTO**, SD LOCKED		97
CAMERA SETUP	ZEBRA	ON, **OFF**		76
	ZEBRA LEVEL	70, 75, 80, **85**, 90, 95, 100		76
	SKIN D.SET	HUE		77
		CHROMA		
		AREA		
		Y LEVEL		
		SKIN DETAIL	**OFF**, LOW 🙂, MIDDLE 🙂, HIGH 🙂	77
	F SPEED PSET[1]	LOW, MIDDLE, **HIGH**		52
	CLEAR SCAN			85
	FB	➡ AF ADJUST		24
		➡ MF ADJUST		24
		SET DEFAULT		25

[1] Can only be selected when a lens with focus preset function is mounted.

CAMERA MENU

Submenu	Menu Item	Setting Options		📖
CUSTOM PRESET	📝 EDIT	SELECT CP	**1 PRESET_A**, 2 PRESET_B, 3 PRESET_C, 4 PRESET_D, 5 PRESET_E, 6 PRESET_E	78
		TUNE		
		RENAME		
		PROTECT		
		RESET		
		RETURN		
		GAMMA	**NORMAL**, CINE1, CINE2	
		KNEE	AUTO, LOW, **MIDDLE**, HIGH	
		BLACK	STRETCH, **MIDDLE**, PRESS	
		MASTER PED.	-9 ~ +9	
		SETUP LEVEL	-9 ~ +9	
		SHARPNESS	-9 ~ +9	
		H DTL FREQ	LOW, **MIDDLE**, HIGH	
		DTL HV BALANCE	-9 ~ +9	
		CORING	-9 ~ +9	
		NR1	**OFF**, LOW, MIDDLE, HIGH	
		NR2	**OFF**, LOW, MIDDLE, HIGH	
		COLOR MAT.	**NORMAL**, CINE1, CINE2	
		COLOR GAIN	-9 ~ +9	
		COLOR PHASE	-9 ~ +9	
		R GAIN	-9 ~ +9	
		G GAIN	-9 ~ +9	
		B GAIN	-9 ~ +9	
		RG MATRIX	-9 ~ +9	
		RB MATRIX	-9 ~ +9	
		GR MATRIX	-9 ~ +9	
		GB MATRIX	-9 ~ +9	
		BR MATRIX	-9 ~ +9	
		BG MATRIX	-9 ~ +9	
	🎥→🗂	SELECT CP		83
		SAVE POSITION		
		EXECUTE		
		RETURN		
	🗂→🎥	IMPORT		83
		SELECT POSITION		
		EXECUTE		
		RETURN		

Preparations

CAMERA MENU

*Only in Standard Definition (SD).

Submenu	Menu Item	Setting Options	📖
RECORDING SETUP	REC MODE*	**SP**, LP	92
	UB REC	**INT. USR-BIT**, EXT. USR-BIT	58
	UB SELECT	**00 00 00 00**, TIME, DATE	58
	IMG QUALITY	▨ SUPER FINE, ◢ **FINE**, ◣ NORMAL	111
	IMAGE SIZE	**L 1440x1080**, S 640x480	111
	STILL I. REC	**OFF**, ON, ON+CP DATA	84, 114
	FILE NOS.	RESET, **CONTINUOUS**	112
AUDIO SETUP	AUDIO MODE	(HDV) **2CH**, 4CH (DV) **48kHz 2CH**, 32kHz 2CH, 32kHz 4CH	59
	1kHz TONE	**OFF**, -12dB, -20dB	89
	AUD.M.SET	**NORMAL**, LINE OUT	63
	WIND SCREEN	ON ⩘/🎤, **OFF**	60
	R-XLR GAINUP	**OFF**, 12dB	60, 62
	AUDIO LOCK*	LOCK MODE, **UNLOCK MODE**	59
DISPLAY SETUP/🗨	EVF SETUP	EVF BW MODE | ON, **OFF**	88
		BRIGHTNESS	20
		CONTRAST	
		COLOR	
		SHARPNESS	
	LEV/CENT MRK	**OFF**, LEVEL MARK, CENT. MARK	43
	ASPECT GUIDE	**OFF**, 4:3, 13:9, 14:9, 1.66:1, 1.75:1, 1.85:1, 2.35:1	43
	SAFETY ZONE	**OFF**, 80%, 90%	43
	TV SCREEN	**ON**, OFF	129
	AUDIO LEVEL	**ON**, OFF	63
	LANGUAGE 🗨	**ENGLISH**, 中文, 日本語	93
	OBJ DST UNIT	**m (meter)**, ft (feet)	93
	ZOOM IND.	**BAR**, NUMBER	49
	GUIDE INFO	**OFF**, CUSTOM KEYS, D/T DISPLAY	39
	UB DISPLAY	**ON**, OFF	58
SYSTEM/⊙	CUSTOM KEY 1	**TIME CODE**, INDEX WRITE, ZEBRA, VCR STOP, TV SCREEN, TC HOLD, AUDIO LEVEL, EVF BW MODE, FB, FLIP EVF, (NONE)	87
	CUSTOM KEY 2	TIME CODE, **INDEX WRITE**, ZEBRA, VCR STOP, TV SCREEN, TC HOLD, AUDIO LEVEL, EVF BW MODE, CP BKWD KEY, FB, FLIP EVF, (NONE)	
	WL. REMOTE	⦅📺⦆**1**, ⦅📺⦆2, OFF ⦅📺⦆	106
	TALLY LAMP	**ON**, BLINK, OFF	93
	POWER SAVE	**ON**, OFF	41
	D/TIME SET ⊙	T.ZONE/DST	39
		DATE/TIME	39
		DATE FORMAT	93
	LED ON/OFF	**ON**, OFF	92
	CHAR. REC	ON, **OFF**	92
	DV CONTROL	ON DV⤵, **OFF**	91
	IRIS DIAL	**UP OPEN**, DOWN OPEN	69

VCR/PLAY MENU

Submenu	Menu Item	Setting Options		📖
SIGNAL SETUP	TIME CODE	COUNT-UP	**REC-RUN**, REC-RUN PS., FREE-RUN	55
		START VALUE	**SET**, RESET	55
	PLAYBACK STD	**AUTO**, HDV, DV		94
	T.CODE OUT	ON, **OFF**		56
	COMP. OUT	576i, **1080i/576i**		97
	SDI OUTPUT	ON, **OFF**		97
	SDI SPEC.	**AUTO**, SD LOCKED		97
	AV ➡ DV	ON, **OFF**		109
	HD DOWN-CONV	ON, **OFF**		98
RECORDING SETUP	REC MODE*	**SP**, LP		92
	UB SELECT	**00 00 00 00**, TIME, DATE		58
	IMG QUALITY	◢ **SUPER FINE**, ◢ FINE, ◢ NORMAL		111
	HD STILL SIZ	**LW 1920x1080**, SW 848x480		111
	FILE NOS.	RESET, **CONTINUOUS**		112
AUDIO SETUP	SEL AUDIO CH	**CH 1/3/CH 2/4**, CH 1/3/CH 1/3, CH 2/4/CH 2/4		101
	MIX SELECT	**VARIABLE**, FIXED		101
	AUDIO MODE	**48kHz 2CH,** 32kHz 2CH, 32kHz 4CH		59
	WIND SCREEN	ON ≋/🎤, **OFF**		60
	R-XLR GAINUP	**OFF**, 12dB		60, 62

HD DOWN CONVERT: Selects whether to down-convert the video signal output from the HDV/DV terminal while playing back a tape recorded in HDV standard.

Standard of the tape being played back	[HD DOWN-CONV] Setting	[PLAYBACK STD] Setting		
		[AUTO]	[HDV]	[DV]
HDV	[ON]	DV	DV	No output
	[OFF]	HDV	HDV	No output
DV	[ON]	DV	No output	DV
	[OFF]	DV	No output	DV

❍ The down-converted output video signal will always be 50 fps interlaced, regardless of the frame rate of the original recording.

❍ Even if the audio was recorded on all 4 channels, only channels 1 and 2 will be output.

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VCR/PLAY MENU

Submenu	Menu Item	Setting Options		📖
DISPLAY SETUP/🖲	EVF SETUP	EVF BW MODE	ON, **OFF**	88
		BRIGHTNESS		20
		CONTRAST		
		COLOR		
		SHARPNESS		
	TV SCREEN	**ON**, OFF		129
	AUDIO LEVEL	**ON**, OFF		63
	DISPLAYS	**ON**, OFF <PLAYBK>		129
	CUSTOM KEYS	ON, **OFF**		86
	DATA CODE	DATE, TIME, **DATE & TIME**, CAMERA DATA, CAM. & D/T		105
	LANGUAGE 🖱	**ENGLISH**, 中文, 日本語		93
	6 SEC.DATE	ON, **OFF**		105
	UB DISPLAY	**ON**, OFF		58
SYSTEM/✓	CUSTOM KEY 1	TIME CODE, **TV SCREEN**, DATA CODE, AUDIO LEVEL, TC HOLD, EVF BW MODE, (NONE)		87
	CUSTOM KEY 2	TIME CODE, TV SCREEN, **DATA CODE**, AUDIO LEVEL, TC HOLD, EVF BW MODE, (NONE)		
	WL. REMOTE	(((🖳 **1**, (((🖳 2, OFF (((🖳		106
	TALLY LAMP	**ON**, BLINK, OFF		93
	D/TIME SET ✓	T.ZONE/DST		39
		DATE/TIME		39
		DATE FORMAT		93
	LED ON/OFF	**ON**, OFF		92

CARD CAMERA MENU

Submenu	Menu Item	Setting Options		📖
SIGNAL SETUP	GENLOCK	ON, **OFF**		57
	GENLCK ADJUST	-1023 – +1023		57
	COMP. OUT	576i, **1080i/576i**		97
	SDI OUTPUT	ON, **OFF**		97
	SDI SPEC.	**AUTO**, SD LOCKED		97
CAMERA SETUP	ZEBRA	ON, **OFF**		76
	ZEBRA LEVEL	70, 75, 80, **85**, 90, 95, 100		76
	SKIN D.SET	HUE		77
		CHROMA		
		AREA		
		Y LEVEL		
		SKIN DETAIL	**OFF**, LOW 🦱, MIDDLE 🦱, HIGH 🦱	77
	F SPEED PSET[1]	LOW, MIDDLE, **HIGH**		52
	FB	➡ AF ADJUST		24
		➡ MF ADJUST		24
		SET DEFAULT		25
	FOCUS PRI.	**ON**, OFF		114
	REVIEW	OFF, **2 sec.**, 4 sec., 6 sec., 8 sec., 10 sec.		120

[1] Can only be selected when a lens with focus preset function is mounted.

CARD CAMERA MENU

Submenu	Menu Item	Setting Options		📖
CUSTOM PRESET	✏️ EDIT	SELECT CP	**1 PRESET_A**, 2 PRESET_B, 3 PRESET_C, 4 PRESET_D, 5 PRESET_E, 6 PRESET_E	78
		TUNE		
		RENAME		
		PROTECT		
		RESET		
		RETURN		
		KNEE	AUTO, LOW, **MIDDLE**, HIGH	
		BLACK	STRETCH, **MIDDLE**, PRESS	
		SHARPNESS	-9 ~ +9	
		H DTL FREQ	LOW, **MIDDLE**, HIGH	
		DTL HV BALANCE	-9 ~ +9	
		CORING	-9 ~ +9	
		COLOR GAIN	-9 ~ +9	
		COLOR PHASE	-9 ~ +9	
		R GAIN	-9 ~ +9	
		G GAIN	-9 ~ +9	
		B GAIN	-9 ~ +9	
		RG MATRIX	-9 ~ +9	
		RB MATRIX	-9 ~ +9	
		GR MATRIX	-9 ~ +9	
		GB MATRIX	-9 ~ +9	
		BR MATRIX	-9 ~ +9	
		BG MATRIX	-9 ~ +9	
	🎥 → 💾	SELECT CP		83
		SAVE POSITION		
		EXECUTE		
		RETURN		
	💾 → 🎥	IMPORT		83
		SELECT POSITION		
		EXECUTE		
		RETURN		
RECORDING SETUP	IMG QUALITY	📷 **SUPER FINE**, 📷 FINE, 📷 NORMAL		111
	IMAGE SIZE	**LW 1920x1080**, SW 848x480, L 1440x1080, S 640x480		111
	FILE NOS.	RESET, **CONTINUOUS**		112
AUDIO SETUP	WIND SCREEN	ON 〰️🎤, **OFF**		60
	R-XLR GAINUP	**OFF**, 12dB		60, 62

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CARD CAMERA MENU

Submenu	Menu Item	Setting Options		📖
DISPLAY SETUP/ 💬	EVF SETUP	EVF BW MODE	ON, **OFF**	88
		BRIGHTNESS		20
		CONTRAST		
		COLOR		
		SHARPNESS		
	LEV/CENT MRK	**OFF**, LEVEL MARK, CENT. MARK		43
	OBJ DST UNIT	**m (meter)**, ft (feet)		93
	ZOOM IND.	**BAR**, NUMBER		49
	TV SCREEN	**ON**, OFF		129
	GUIDE INFO	**OFF**, CUSTOM KEYS, D/T DISPLAY		39
	LANGUAGE 💬	**ENGLISH**, 中文, 日本語		93
SYSTEM/ ⊙	CUSTOM KEY 1	**ZEBRA**, TV SCREEN, EVF BW MODE, FB, FLIP EVF, (NONE)		87
	CUSTOM KEY 2	ZEBRA, **TV SCREEN**, EVF BW MODE, CP BKWD KEY, FB, FLIP EVF, (NONE)		
	WL. REMOTE	((📺1, ((📺2, OFF ((📺		106
	POWER SAVE	**ON**, OFF		41
	D/TIME SET ⊙	T.ZONE/DST		39
		DATE/TIME		39
		DATE FORMAT		93
	LED ON/OFF	**ON**, OFF		92
	IRIS DIAL	**UP OPEN**, DOWN OPEN		69

E

CARD VCR/PLAY MENU

Submenu	Menu Item	Setting Options	📖
SIGNAL SETUP	COMP. OUT	576i, 1080i/576i	97
	SDI OUTPUT	ON, **OFF**	97
	SDI SPEC.	**AUTO**, SD LOCKED	97
CARD OPERATIONS	🖨 PRINT ORDERS ALL ERASE	**NO**, YES	126
	ERASE ALL IMAGES	**NO**, YES	123
	INITIALIZE	**CANCEL**, EXECUTE	125
	After pressing the SET button while displaying a still image:		
	IMAGE ERASE	**CANCEL**, ERASE	123
	PROTECT	ON, **OFF**	124
	PRINT ORDER	**0** ~ 99 COPIES	126
	SLIDESHOW	**CANCEL**, START	121
META DATA CP	☐→🎥	IMPORT	78
		SELECT POSITION	
		EXECUTE	
		RETURN	
DISPLAY SETUP/ 💬	EVF	EVF BW MODE ON, **OFF**	88
		BRIGHTNESS	20
		CONTRAST	
		COLOR	
		SHARPNESS	
	TV SCREEN	ON, **OFF**	129
	DISPLAYS	**ON**, OFF <PLAYBK>	129
	CUSTOM KEYS	ON, **OFF**	86
	DATA CODE	DATE, TIME, **DATE & TIME**, CAMERA DATA, CAM. & D/T	105
	LANGUAGE 💬	**ENGLISH**, 中文, 日本語	93
SYSTEM/ ⊙	CUSTOM KEY 1	**TV SCREEN**, DATA CODE, EVF BW MODE, (NONE)	87
	CUSTOM KEY 2	TV SCREEN, **DATA CODE**, EVF BW MODE, (NONE)	
	WL. REMOTE	((📺1, ((📺2, OFF ((📺	106
	D/TIME SET ⊙	T.ZONE/DST	39
		DATE/TIME	39
		DATE FORMAT	93
	LED ON/OFF	**ON**, OFF	92
	FIRMWARE UPDATE	-	-

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Setting the Time Zone, Date and Time

Set the time zone, date and time when you first start using your camcorder, or if the built-in rechargeable battery has completely discharged.

Setting the Time Zone/Daylight Saving Time

TAPE	CARD		EXT. CONT.	VCR/ PLAY	Ⓐ	Tv	Av	M	⚠	🌙	☐

MENU (📖 29)   `SYSTEM/ ⊙`   ▶   `D/TIME SET ⊙`   ▶   `T.ZONE/DST···PARIS`
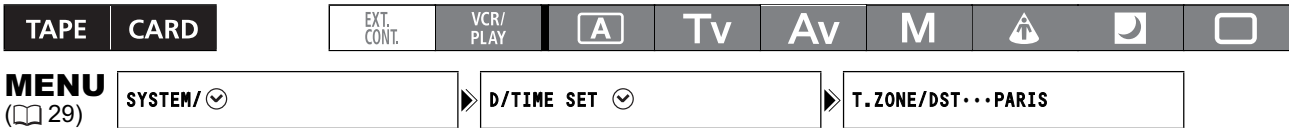
1. **Press the MENU button.**
2. **Turn the SELECT dial to select [SYSTEM/ ⊙] and press the SET button.**
3. **Select [D/TIME SET ⊙] and then select [T.ZONE/DST] and press the SET button.**
   The time zone setting appears. The default setting is Paris.
4. **Turn the SELECT dial to select the setting option that represents your time zone and press the SET button.**
   To adjust for daylight saving time, select the time zone with the ☀ next to the area.

Setting the Date and Time

TAPE	CARD		EXT. CONT.	VCR/ PLAY	Ⓐ	Tv	Av	M	⚠	🌙	☐

MENU (📖 29)   `SYSTEM/ ⊙`   ▶   `D/TIME SET ⊙`   ▶   `D/TIME SET··· 1.JAN.2005` `12:00 PM`
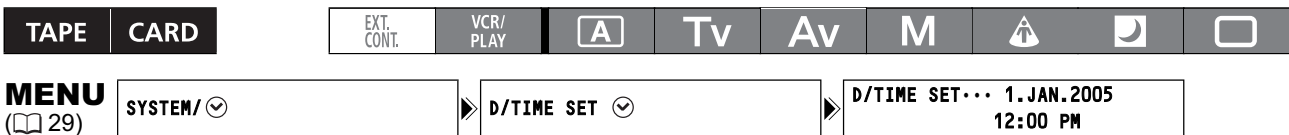
5. **Select [D/TIME SET ⊙] and press the SET button.**
   The year display starts flashing.
6. **Turn the SELECT dial to select the year, and press the SET button.**
   • The next part of the display starts flashing.
   • Set the month, day, hours and minutes in the same way.
7. **Press the MENU button to close the menu and to start the clock.**

Displaying the Date and Time during Recording

You can display the date and time in the lower left corner of the screen.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	Ⓐ	Tv	Av	M	⚠	🌙	☐

MENU (📖 29)   `DISPLAY SETUP/ 💬`   ▶   `GUIDE INFO···OFF`
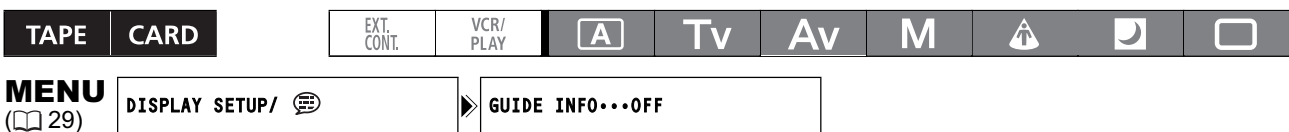
Open the menu and select [DISPLAY SETUP/ 💬]. Select [GUIDE INFO], set it to [D/T DISPLAY] and close the menu.

If you do not use the camcorder for a period of approximately 3 months, the built-in rechargeable battery will become totally depleted and the date and time settings will be lost. In that case, recharge the built-in battery (📖 15) and set the time zone, date and time again.

Recording

> **Before You Begin Recording**
> Make a test recording first to check if the camcorder operates correctly. If necessary, clean the video heads (📖 135).

The camcorder ships with the following factory settings:

Recording mode - HDV; Audio mode - 2 channels

About the audio recording, refer to the relevant chapter (📖 59).

Recording

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☾ | ▭ |

1. **Remove the lens cap.**
2. **Press the lock button and set the POWER dial to a recording program.**
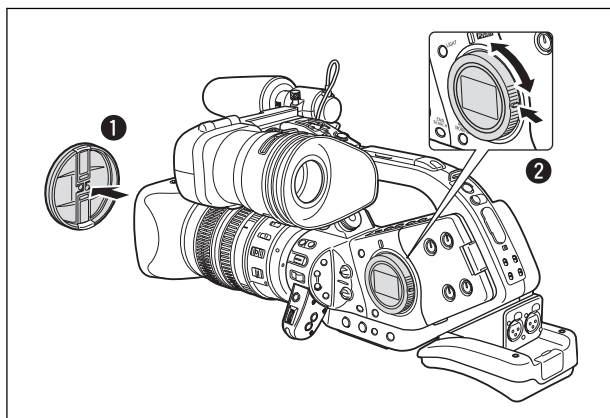
3. **Press the start/stop button to begin recording.**
   - The camcorder is equipped with 3 start/stop buttons: one on the carrying handle, one on the side grip and one at the front.
   - The tally lamp and the REC lamp on the viewfinder will light up.
   - Press the start/stop button again to pause recording.
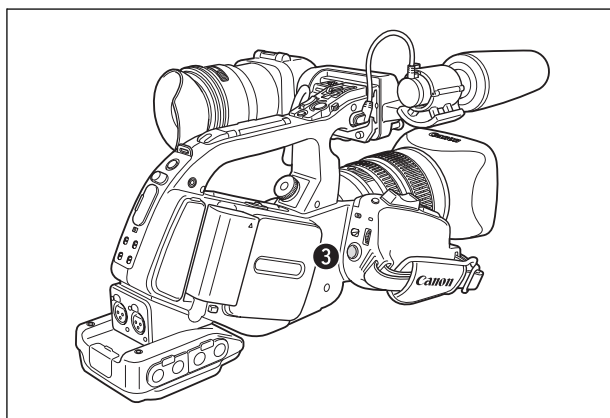
When You Have Finished Recording

1. **Set the POWER dial to OFF.**
2. **Replace the lens cap.**
3. **Unload the cassette.**
4. **Disconnect the power source.**

❍ Wait until the tape counter stops completely before you start recording.
❍ If you do not remove the cassette, you can record the next scene without any noise or blank sections between the recordings even if you turn the camcorder off.

⚠ The end search, date search and index search functions may not work correctly if you mix recordings in HDV and DV standards on the same tape.

Low-angle Recording

The carrying handle is equipped with a duplicate set of recording and zoom controls, ideal for low-angle recording. Slide the LOCK lever towards the lens to prevent accidental operation.

LOCK lever
Start/stop button
Zoom lever
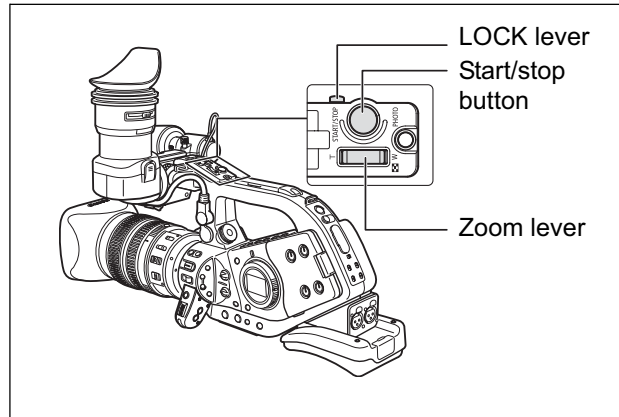
Power Saving Mechanisms

STANDBY Button

Pressing the STANDBY button for more than 1 second in record pause or VCR STOP mode activates the power save mode (The message "ENTERING POWER STANDBY" will be displayed). This shuts the power down to the camera and VCR sections while maintaining the camera settings. The camcorder retains the exposure lock and color bars settings. Press the STANDBY button again to turn the camcorder back on.

Power Save Function

In order to protect the tape and video heads, the camcorder will enter the power save mode (VCR STOP) after 3 minutes in record pause mode. If left 2 more minutes without any operation, the camcorder will automatically shut off. However, you can activate or deactivate the camcorder's automatic shut-off with the [POWER SAVE] option in the [SYSTEM/⊙] submenu. Even if the power save is set to [ON], the camera section will still be powered, so the camcorder will retain camera settings such as aperture and shutter speed. Therefore, you can adjust the camera section without worrying about the automatic shut-off. This mode, where only the VCR is shut off (VCR STOP) can also be assigned to a custom key (□ 86).

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	🔅	🌙	▭

MENU (□ 29) | SYSTEM/⊙ | ▶ | POWER SAVE···ON |

Open the menu and select [SYSTEM/⊙]. Select [POWER SAVE], select a setting option and close the menu.

✎ ○ When set to [ON]: To turn the camcorder on, press the STANDBY button or set the POWER dial to OFF and then back to a recording program.
○ When set to [OFF]: To start recording, press the start/stop button. To go into record pause mode, use the custom key (□ 86).

Screen Displays during Recording
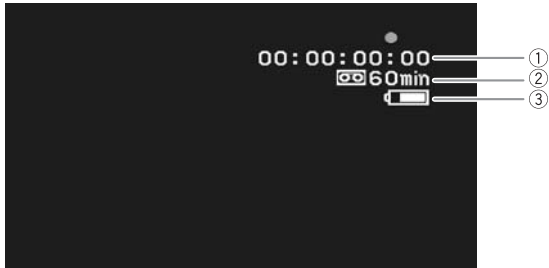
①Time code

Indicates the recording time in hours, minutes, seconds and frames.

②Remaining tape

Indicates the remaining time of the tape in minutes.
"⊙⊙ END" flashes when the tape reaches the end.
• When the time left is less than 15 seconds, the remaining tape time may not appear.
• Depending on the tape, the indication may not be displayed correctly.

③Remaining battery charge

The battery symbol indicates the charge status of the battery pack.

• "▱" starts flashing in red when the battery pack is empty.
• When you attach an empty battery pack, the power may turn off without displaying "▱".
• The actual battery charge may not be indicated accurately depending on the condition under which the battery pack and camcorder are used.
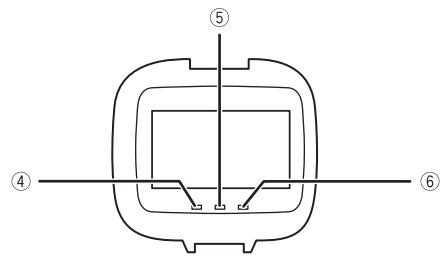
④SHUTTER lamp

Lights up when the shutter speed is changed from the following:

50i	1/50 of a second
25F	1/25 of a second
CAMERA CARD	1/50 of a second

⑤REC lamp

Lights up during recording.
The REC lamp starts flashing when the remaining tape is less than 5 minutes (it does not flash when the remaining tape information is not displayed on the screen.)

⑥GAIN lamp

Lights up when the AGC (auto gain control) is set to -3 dB or +3 dB or higher.

You can select the amount of information shown on the screen from full, partial or no display. Repeatedly pressing the EVF DISPLAY button will cycle through the options in the following sequence.

Normal screen display

Audio level indicator, zoom indicator, center and level markers, aspect ratio guides, safety zone guides, EVF peaking/magnifying, recording program, EXP lock, ND filter, custom preset, shutter speed, aperture, AE shift, gain, white balance, color bars, faders, skin detail, Speedlite flash charge indicator, warning, date/time*

Center and level markers, safety zone guides, date/time*
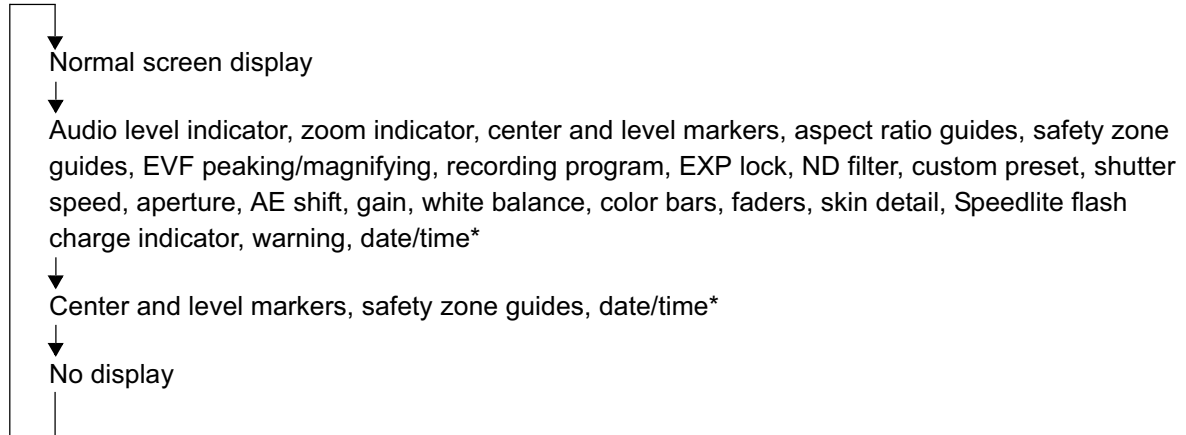
No display

* When [GUIDE INFO] is set to [D/T DISPLAY].

Displaying the Center and Level Markers

Use the center and level markers to accurately frame subjects.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU (📖 29)   DISPLAY SETUP / 🔘   ▷ LEV/CENT MRK···CENT. MARK

Open the menu and select [DISPLAY SETUP/🔘]. Select [LEV/CENT MRK], set it to [CENT. MARK] or [LEVEL MARK] and close the menu.

Displaying the Aspect Ratio Guides

Use the aspect ratio guides as an indication to accurately frame subjects. You can select to display the aspect guides for 4:3, 13:9, 14:9, 1.66:1, 1.75:1, 1.85:1 or 2.35:1 (Cinemascope).

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU (📖 29)   DISPLAY SETUP / 🔘   ▷ ASPECT GUIDE····OFF
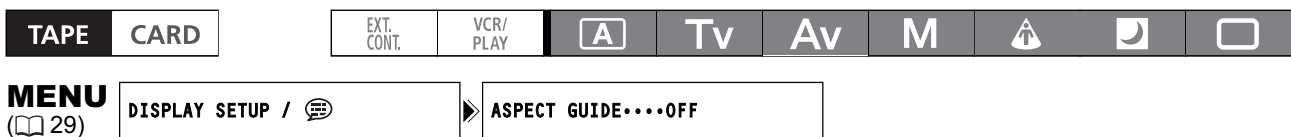
Open the menu and select [DISPLAY SETUP/🔘]. Select [ASPECT GUIDE], select a setting option and close the menu.

Displaying the Safety Zone Guide

The safety zone guide shows a frame including 80% or 90% of the screen area. Use it as an indication to accurately frame subjects.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU (📖 29)   DISPLAY SETUP / 🔘   ▷ SAFETY ZONE······OFF
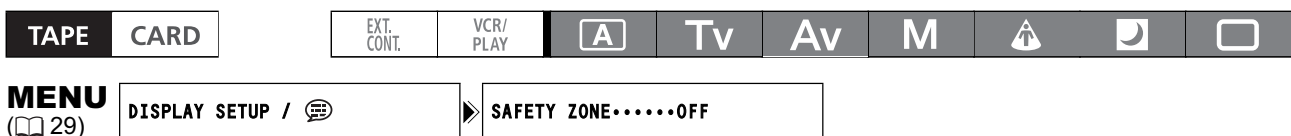
Open the menu and select [DISPLAY SETUP/🔘]. Select [SAFETY ZONE], set it to [80%] or [90%] and close the menu.

Reviewing the Recording

⬑ (record review) button

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	🔆	🌙	▢
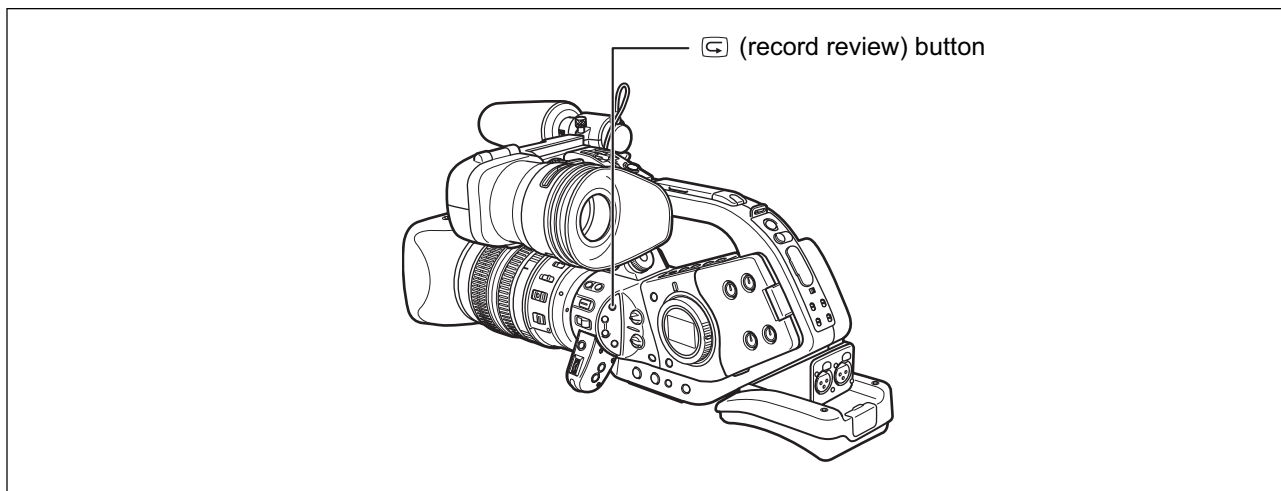
In record pause mode, this function allows you to review the last few seconds of your recording to check if it has been recorded properly.

Press and release the ⬑ (record review) button.

The camcorder rewinds the tape, plays back the last few seconds, and returns to record pause mode.

If the current video signal standard is different from the signal standard in which the tape was recorded, the recording will not be played back correctly.

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Selecting the Signal Standard (HD/SD)

MODE SELECT switch

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | 🌙 | ▭ |
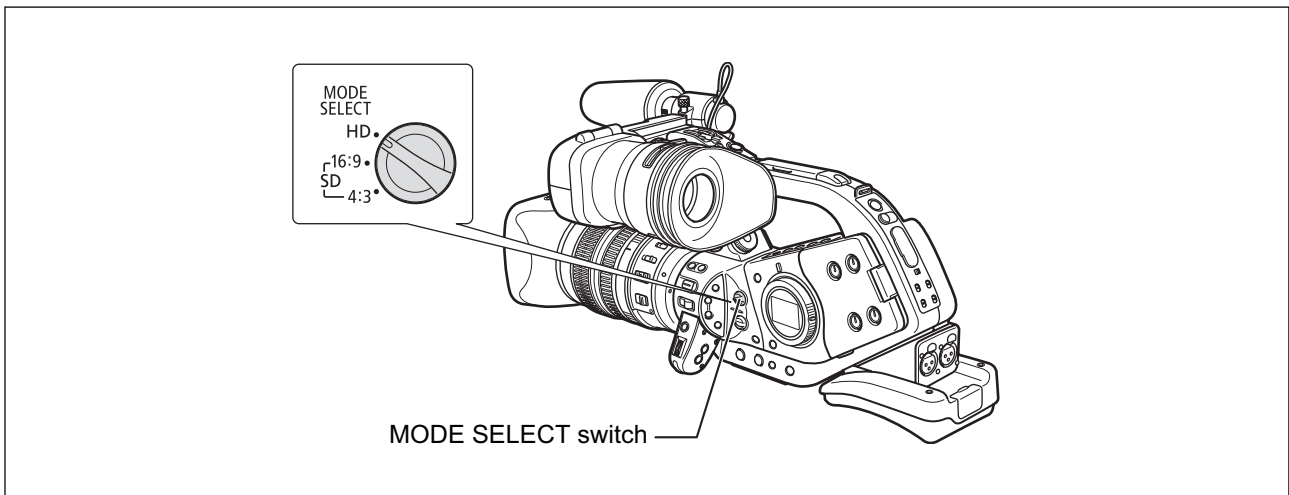
Set the MODE SELECT switch to the desired position.

- HD: To record on the tape in HDV standard or to use the camcorder as a high-definition (HD) camera.
- SD 16:9, SD 4:3: To record on the tape in DV standard or to use the camcorder as a standard-definition (SD) camera. Select the aspect ratio as desired.

If you set the [LED ON/OFF] option in the [SYSTEM/ ⊙] submenu to [ON], the MODE SELECT switch will light on in blue when you set the MODE SELECT switch to HD.

SD *Changing the Aspect Ratio*

When recording in standard definition (SD), you can change the aspect ratio of your recording to 16:9 or 4:3.

MODE SELECT switch

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	☐
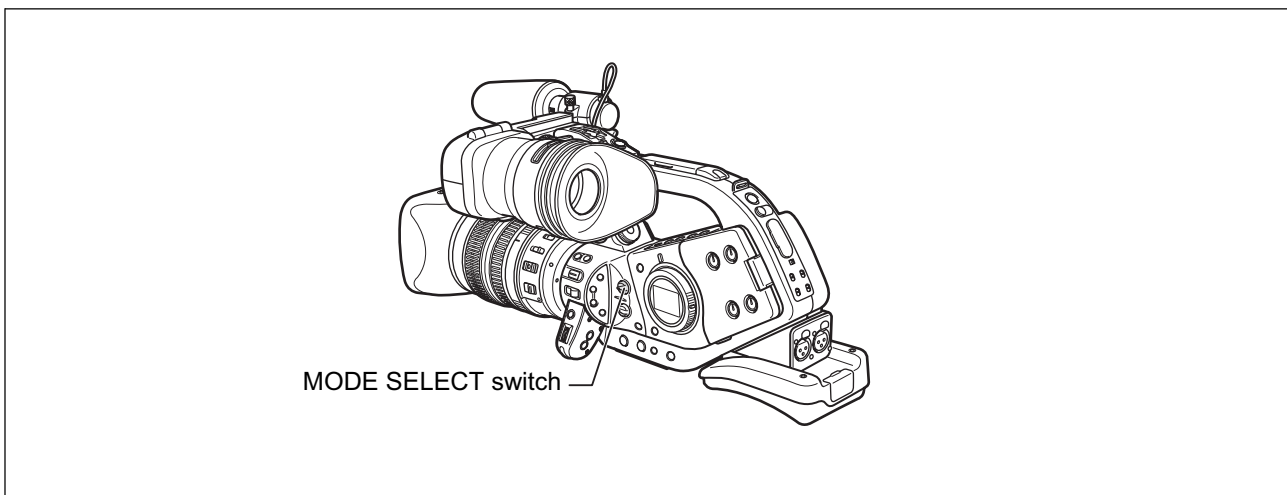
Set the MODE SELECT switch to SD 16:9 or SD 4:3.

The camcorder's viewfinder has a 16:9 aspect ratio. If you select the 4:3 aspect ratio, the picture will appear in the center of the screen with black side panels.

- ❍ If you change the position of the MODE SELECT switch while recording, the aspect ratio will not change immediately. It changes once you pause recording.
- ❍ When recording in 4:3, you can attach the optional RC-72 Ratio Converter (0.8x) to achieve the same angle of view of the 16:9 aspect ratio.

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End Search

You can use this function to locate the end of the last recorded scene.

END SEARCH button

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	☐
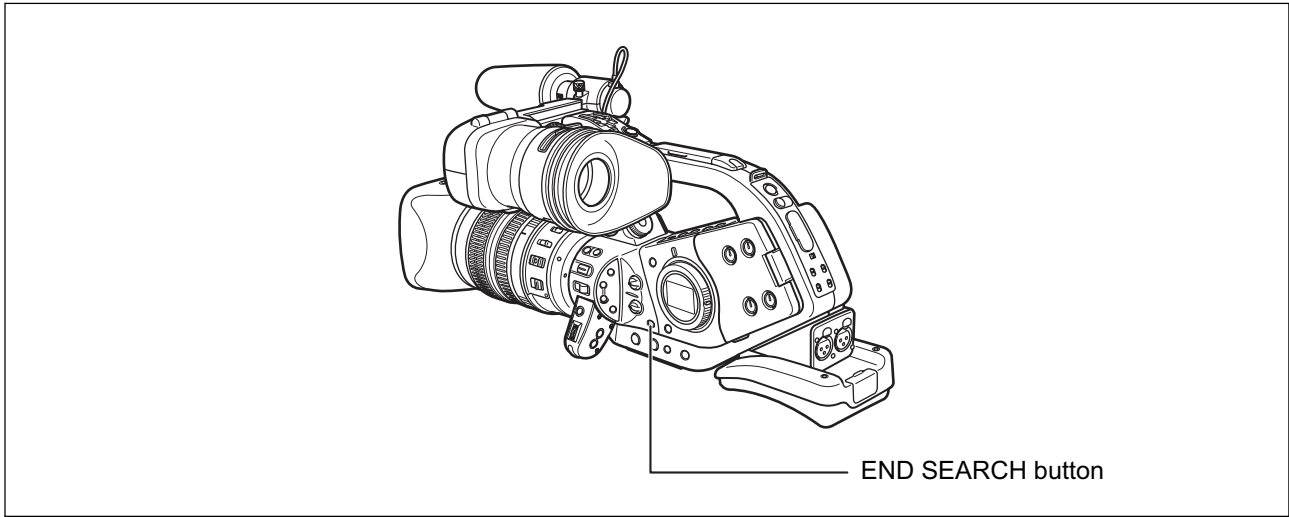
Press the END SEARCH button.

- " ➔ı " appears.
- The camcorder rewinds/fast forwards the tape, plays back the last few seconds of the recording and stops the tape.
- Pressing the button again cancels the search.

- ❍ End search cannot be used once you unload the cassette.
- ❍ End search may not work properly if there is a blank section between recordings on the tape.
- ❍ The end search function may not work correctly if you mix recordings in HDV and DV standards on the same tape.

Zooming

You can operate the zoom from either the side grip or the carrying handle. You can also use the zoom ring on the zoom lens or the zoom buttons on the wireless controller.

Zoom lever

Zoom buttons

Zoom ring

ZOOM SPEED dial

ZOOM SPEED switch

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	☐
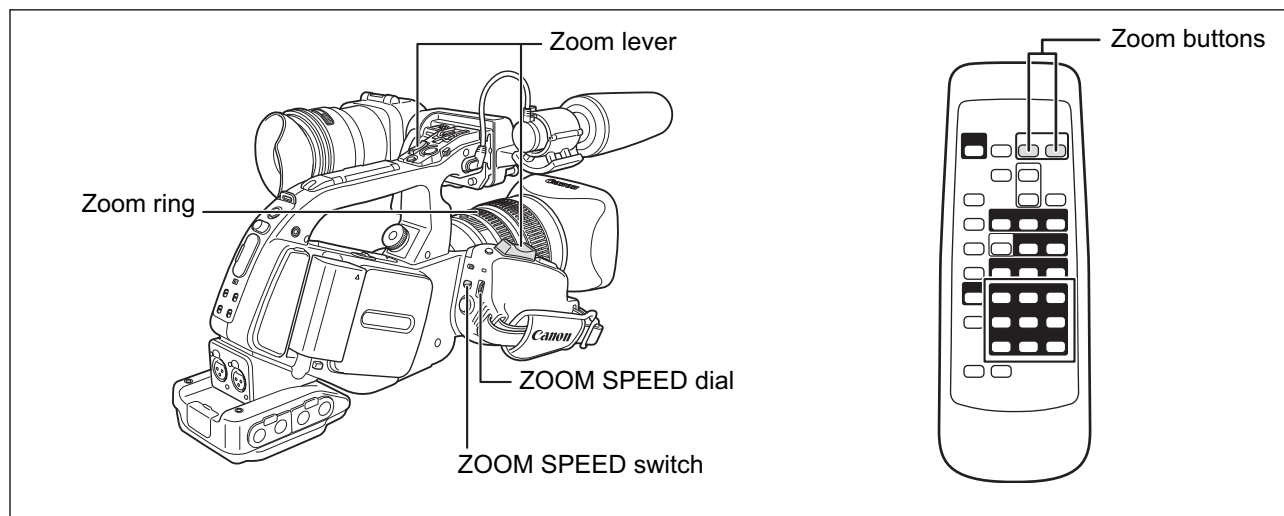
Move the zoom lever toward W to zoom out (wide-angle). Move it toward T to zoom in (telephoto).

About the Variable Zoom Speeds

Zoom lever on the side grip:

When the ZOOM SPEED switch is set to CONSTANT, the zoom speed itself does not change, but you can select one of 16 levels of zoom speed with the ZOOM SPEED dial (a number indicating the level will be displayed next to the zoom indicator).
When the ZOOM SPEED switch is set to VARIABLE, the zoom speed will depend on how you operate the zoom lever: Pressing softly will result in a slower zoom; pressing harder in a faster zoom.

Zoom speed with the HD 20x L IS Lens (from wide-angle to telephoto):

CONSTANT: Level 1: approx. 60 seconds

                    Level 16: approx. 3.5 seconds

VARIABLE: approx. 3.5–60 seconds

The actual zoom speed varies depending on the lens.

Zoom ring:

The zoom speed depends on how fast you turn the zoom ring.

Zoom buttons on the carrying handle:

The zoom speed itself does not change, but it can be set to one of 16 levels with the ZOOM SPEED dial. This is the same zoom speed setting as when the ZOOM SPEED switch is set to CONSTANT.

Zoom buttons on the supplied wireless controller:

The zoom speed is constant and cannot be adjusted.

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E

Zoom Preset (Lenses equipped with the zoom preset function)

This function enables any given zoom setting to be memorized and to return to that zoom setting instantly.

POSITION PRESET switch

POSITION PRESET ON/SET switch

Presetting the Zoom
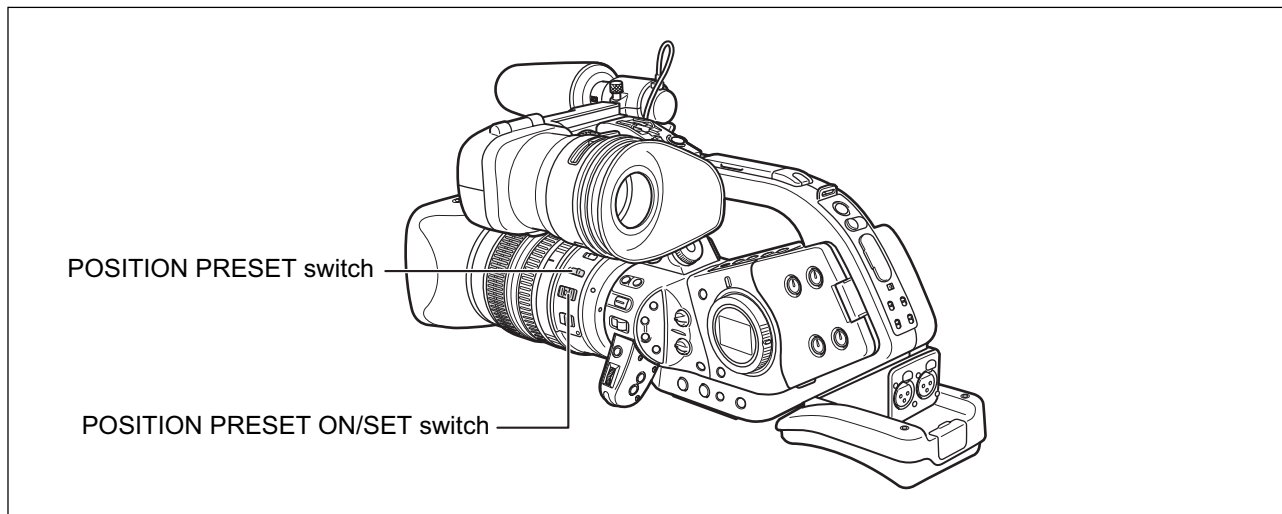
TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	⬚

1. Set the POSITION PRESET switch to ZOOM.

2. Move the POSITION PRESET ON/SET switch to SET.
   The preset zoom position appears in yellow on the zoom indicator.

Returning to the Preset Zoom Position

Move the POSITION PRESET ON/SET switch to ON.

The camcorder returns to the preset zoom position.

○ The preset setting is canceled when you attach the optional Extender XL 1.6x or mount a lens with a different magnification.
○ The camcorder uses the zoom speed of the CONSTANT setting when returning to the preset zoom position.

Changing the Zoom Bar Display

You can select to display the zoom position as a normal zoom bar or to display a numeric value instead.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	⬚

MENU
(□ 29)

| DISPLAY SETUP / 🗭 | ▷ | ZOOM IND. ····· BAR |

Open the menu and select [DISPLAY SETUP/🗭]. Select [ZOOM IND.], set it to [BAR] or [NUMBER] and close the menu.

Recording

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Adjusting the Focus

The camcorder can be set to Autofocus or Manual Focus. To make it easier to focus manually, you can also make use of the Peaking and Magnifying display functions (□ 51). If you are not using the HD 20x L IS Lens, refer also to the instruction manual of the lens you are using.

▶ AF switch

Focus ring

Focus selector

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☽ | ☐ |
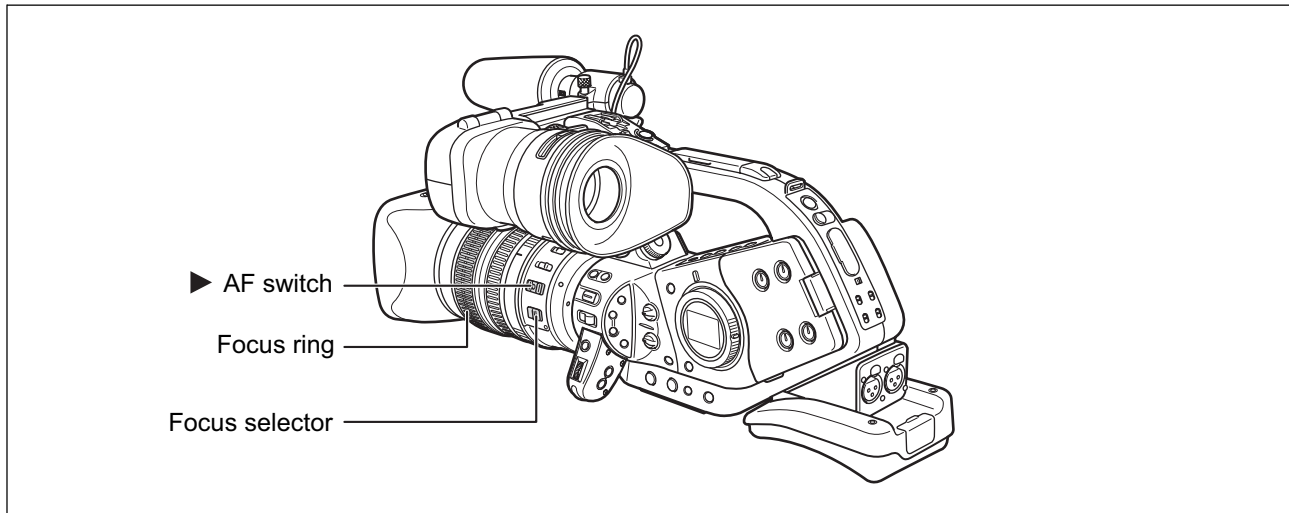
Autofocus (Lenses equipped with the autofocus function)

Autofocus is set when the focus selector on the lens is set to AF. The camcorder uses the TTL autofocus system with a focusing range of 2 cm (at wide-angle from the front of the lens barrel) to ∞.

The camcorder focuses on the subject in the center of the screen.

Temporary Focus Override (with the HD 20x L IS Lens)
Turn the focus ring during autofocus to focus manually.

The camcorder will return to autofocus as soon as you release the focus ring.

When recording under bright conditions, the camcorder sets a small aperture value, and the picture may appear blurred. This may be more noticeable at wide-angle. When you are using a lens with built-in ND filter, turn it on/off according to the screen display (□ 53).

○ When recording under dark conditions, the focusing range narrows and the picture may appear blurred.
○ In 25F mode, autofocus takes longer than in the 50i mode.
○ Autofocus may not work well on the following subjects. In that case, focus manually.
  -Reflective surfaces
  -Subjects with low contrast or without vertical lines
  -Fast moving subjects
  -Through dirty or wet windows
  -Night scenes

Manual focus

EVF PEAKING/
EVF MAGNIFYING buttons

▶ AF switch/POSITION
PRESET ON/SET switch

Focus selector

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |
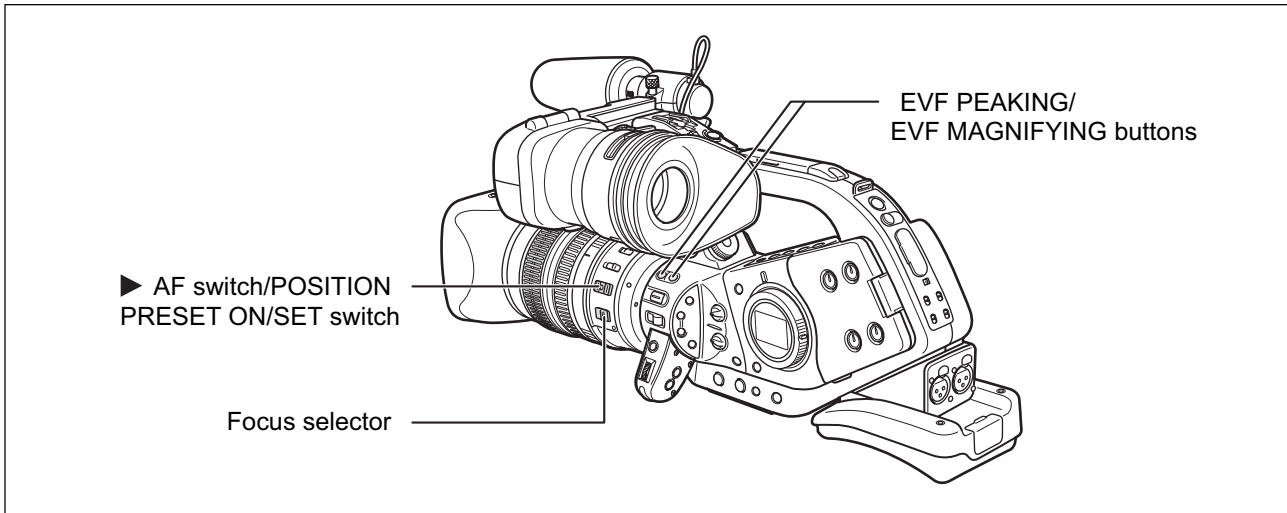
1. **Lenses equipped with autofocus function: Slide the focus selector on the lens to M.**
   "MF" is displayed on screen.

2. **Zoom in to telephoto.**

3. **Turn the focus ring to adjust the focus.**

4. **Operate the zoom to reframe the subject.**
   If you focus manually and then leave the camcorder with the power turned on, you may lose the focus on your subject. This possible slight shift in focus is due to a rise in temperature in the camcorder interior and the lens. Check the focus before resuming shooting or adjust the flange back as necessary (📖 24).

Temporary Autofocus

Press the ▶ AF switch on the lens in the direction of AF and hold it.

The autofocus is activated as long as you hold the ▶ AF switch.

⚠ When using the ▶ AF switch, make sure the POSITION PRESET switch is set to OFF.

○ When using an HDV compatible lens: The focal distance to the subject will be displayed for approx. 3 seconds when you switch from autofocus to manual focus or when you operate the focus ring in the manual focus mode. It will also be displayed with the focus preset. You can select to display the focal distance in meter or ft. The focal distance will not be displayed when the optional Extender XL 1.6x is attached to the camcorder.

○ Use the distance display as an estimate. When using a lens with a limited zoom range, the accuracy display will appear grayed out.
   ∞: Infinity focus   ∞⁻: Over infinity focus

○ The manual focus cannot be selected in the ☐ Easy Recording mode. Even if you set the focus selector on the lens to M, the autofocus will still be activated.

Peaking and Magnifying Display Functions

In order to make manual focusing easier, you can use two display functions: Peaking emphasizes the outlines of the subject creating a clearer contrast, and Magnifying enlarges the viewfinder image. You can also combine both for a greater effect.

Peaking
. . . .

While recording or in record pause, press the EVF PEAKING button.
- The outlines of the subject will be emphasized.
- Press the button again to cancel the function.

Magnifying
. . . .

In record pause, press the EVF MAGNIFYING button.
- The central part of the screen will be magnified approximately 2x.
- Press the button again to cancel the function.

❍ The Peaking and Magnifying functions will not affect your recordings but the magnified picture will be output as is to the HD/SD SDI terminal and the HDV/DV terminal.

❍ The Magnifying function will be canceled as you start recording.

Focus Preset (Lenses equipped with the focus preset function)

This function enables a focus setting to be memorized and to return to that focus setting instantly. You can also select the speed at which the camcorder returns to the preset focus setting.

Presetting the Focus
. . . .

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☾	☐

1. **Set the focus selector to M.**
   "MF" appears.
2. **Set the POSITION PRESET switch to FOCUS.**
   The focus preset speed currently selected appears.
3. **Adjust the focus with the focus ring.**
4. **Move the POSITION PRESET ON/SET switch to SET.**
   "MF" and the focus preset speed display turn yellow.

Setting the Focus Preset Speed
. . . .

MENU
(📖 29)

CAMERA SETUP	▶	F SPEED PSET· HIGH

Open the menu and select [CAMERA SETUP]. Select [F SPEED PSET], select a setting option and close the menu.

The selected speed appears next to "MF".

Returning to the Preset Focus Setting
. . . .

Move the POSITION PRESET ON/SET switch to ON.

The camcorder returns to the preset focus setting.

The preset setting resets to OFF when you turn the camcorder off or remove the lens.

Using the ND Filter (Lenses with Built-in ND Filter)

When recording in bright surroundings, the camcorder will set a small aperture value and the picture may appear blurred.When you are using a lens with built-in ND filter, turn it on/off according to the screen display.

ND filter unlock button

ND filter operating ring
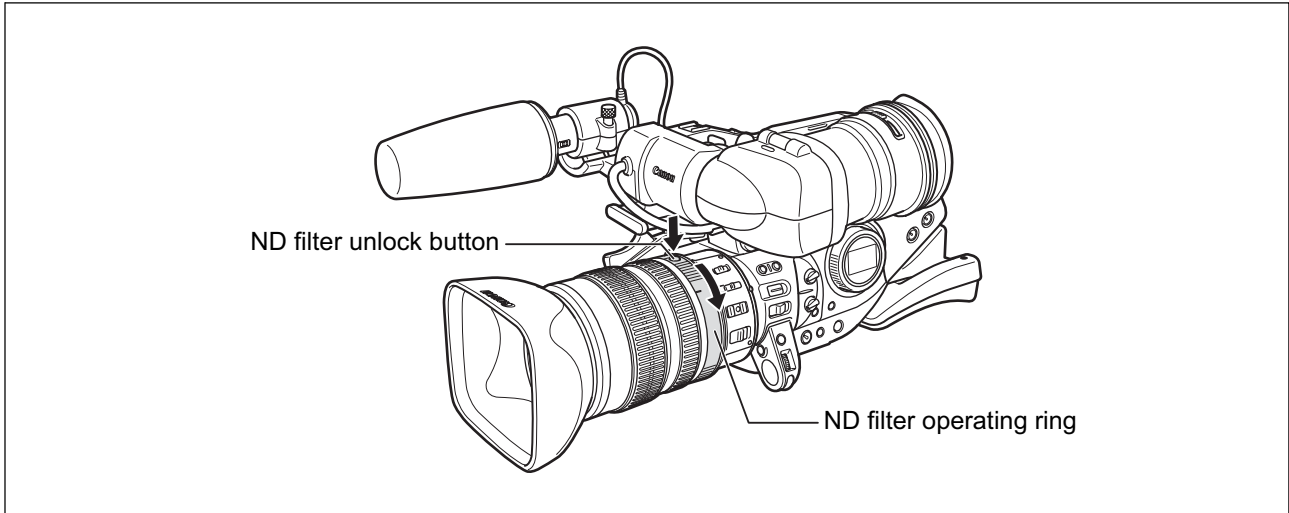
With the HD 20x L IS Lens: Press the ND filter unlock button and turn the ND filter operating ring.

In recording programs other than **M** Manual and if the gain is not set to automatic, the following displays appear:

Screen display	What it means	What you should do
No display	ND filter is not activated	-
"ND"	ND filter is activated	-
"ND" flashes in red	Built-in ND filter incorrect setting	Turn the ND filter operating ring to select a suitable setting
"ND ON" flashes	ND filter required	Turn on the ND filter
ND "ON" flashes	Lenses with ND filter on/off: External ND filter required Lenses with selectable ND filter density: Higher density or external ND filter required	Select a higher density built-in ND filter or attach an external ND filter to the lens*
ND "OFF" flashes	Built-in ND filter not required	Turn off the ND filter

* If you have no external ND filter available, use the Tv mode and set a high shutter speed, or use the Av mode and set a small aperture value.

Depending on the scene, the color may change when turning the ND filter on/off. In such case, setting a custom white balance may be effective (□ 75).

Selecting the Frame Rate

You can select from the standard 50i and 25F frame rates regardless of the recording mode.

50i Mode

Records in 50 fps interlaced mode, the same as TV signals.

25F Mode

Records in 25 fps progressive mode and outputs signals converted into 50 fps interlaced.

25F (camera)

A	B	C	D	E	F	G	H	I	J

50i (tape)

a	a	b	b	c	c	d	d	e	e	f	f	g	g	h	h	i	i	j	j

FRAME RATE switch

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ▢ |
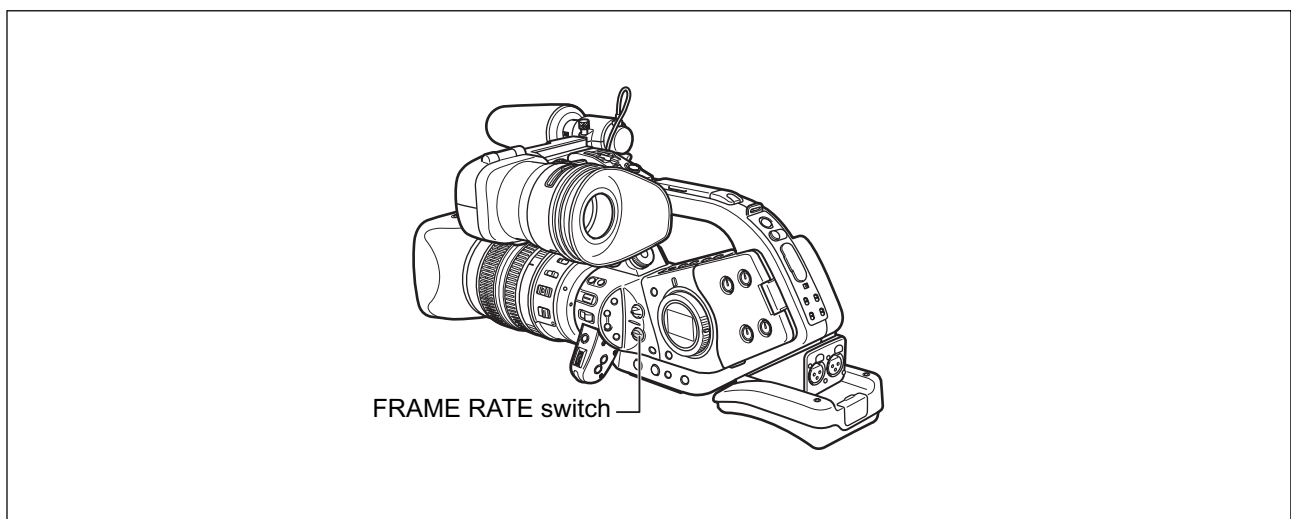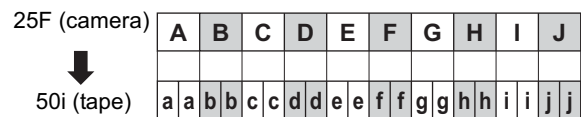
Set the FRAME RATE switch to the desired position.

• i: 50i Mode, F1 or F2: 25F Mode.
• The selected frame rate appears on-screen.

If you change the position of the FRAME RATE switch while recording, the frame rate will not change immediately. It changes once you pause recording.

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Setting the Time Code

Selecting the Run Options

You can select from record run (REC-RUN), record run preset (REC-RUN PS.) and free-run (FREE-RUN) time codes. With record run, the time code runs only when you are recording. With free run, the time code runs regardless of the operation of the camcorder.

You can select the start point for the free-run and the record run preset time codes.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	▢

MENU
(📖 29)

SIGNAL SETUP	▶	TIME CODE	▶	COUNT-UP·····REC-RUN
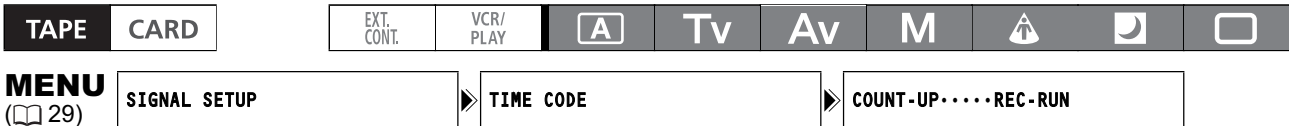
1. **Open the menu and select [SIGNAL SETUP]. Select the [TIME CODE] submenu and then [COUNT-UP]. Select a setting option and close the menu.**
   [REC-RUN]: Close the menu.
   [REC-RUN PS.], [FREE-RUN]: Continue the procedure below to set the start point.

2. **Select [SET].**
   The hours display flashes.

3. **Set the time code's starting value.**
   Turn the SELECT dial to set the value for the hours and press the SET button. The next field of the display starts flashing. Set the value for the minutes, seconds and frames in the same way.

4. **Close the menu.**

○ **About the time code display**
  - [REC-RUN]:   The time code will be displayed with an **R** next to it.
  - [REC-RUN PS.]:   The time code will be displayed in blue with a **P** next to it.
  - [FREE-RUN]:   The time code will be displayed in blue with an **F** next to it.
  - External Time Code: The time code will be displayed in blue with an **E** next to it.
  - Time Code Hold: The time code will be displayed in blue with an **H** next to it.
  - Playback: No time code display.
○ When setting the free-run time code, the time code starts to run the moment you press the MENU button in the middle of the setting, or when you press the SET button after setting the value for "frames" in step 3.
○ To reset the time code to [00:00:00:00], select [RESET] in step 2.
○ When recording over existing scenes: When a time code discontinuity occurred near the recording start point, the time code at the point where the recording starts may be discontinuous.
○ As long as the built-in rechargeable lithium battery is charged, the free-run time code continues to run even if you disconnect the battery pack.

Synchronizing the Camcorder's Time Code

You can synchronize this camcorder's time code to an external time code generator. Also you can include in the recording the user bit signal received from the TC IN terminal (□ 58). The camcorder offers the following synchronization options.

Genlock
The V phase and H phase of the camcorder's time code generator will be synchronized to the external signal being received from the GEN.LOCK terminal.

Time Code IN
An external SMPTE-standard LTC timing signal received from the TC IN terminal will be recorded as the time code on the tape. The user bit of the external timing signal can also be recorded on tape.

Time Code OUT
The camcorder's internal time code is sent out from the TC OUT terminal as a standard LTC timing signal. Select whether to send out the camcorder's time code signal with the [T.CODE OUT] option in the [SIGNAL SETUP] submenu. When you set [T.CODE OUT] to [ON], "TC OUT" will appear on the side panel display.

	CAMERA	VCR/PLAY	CAMERA CARD	VCR/PLAY CARD
Genlock	○	✕	○	✕
Time Code/User bit IN	○	✕	✕	✕
Time Code OUT	○	○ *	✕	✕

* The time code sent out will be the time code as recorded on the tape.

Connection Diagram

GENLOCK IN
Reference video signal*

TC IN
SMPTE-standard LTC timing signal
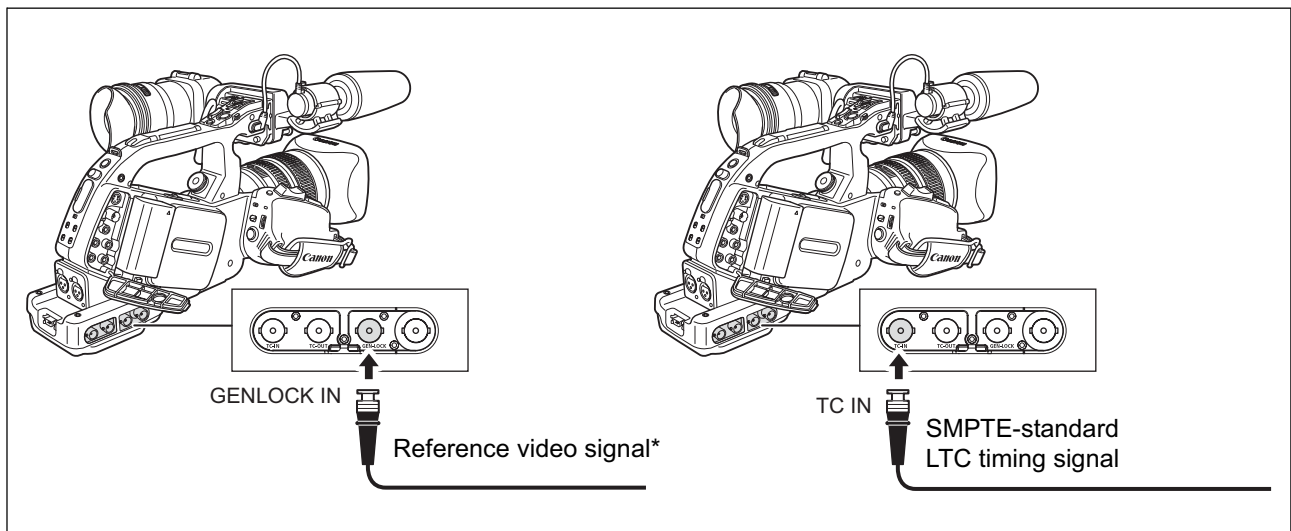
* As a reference video signal input you can use either an HD Y signal or a PAL composite video signal.

Selecting the Synchronization Method

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	☐

MENU
(📖 29)   SIGNAL SETUP   ▶   EXT. SYNC•••OFF
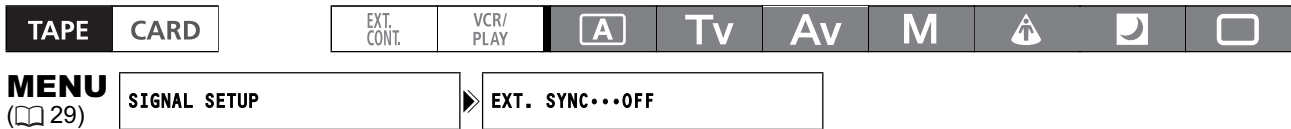
Open the menu and select [SIGNAL SETUP]. Select [EXT. SYNC], select a setting option and close the menu.

○ If you select the [GENLOCK+TC] synchronization method, the [FRAME SETTNG] and [COUNT-UP] settings of the camcorder will be ignored and the external time code's drop-frame bit will be used instead .

○ Once the Genlock and Time Code IN synchronization stabilizes (after approx. 10 seconds), the external time code lock will be retained even if you disconnect the cable from the TC IN terminal. However, the external time code lock will be lost if you turn the camcorder off, set the camcorder to VCR/PLAY mode or change the position of the FRAME RATE switch.

○ If during [GENLOCK+TC] synchronization the Genlock input signal is not appropriate or there is no Genlock input signal, the external time code being recorded on tape may be incorrect.

○ Genlock synchronization is not possible when the signal standard of the camcorder (HD/SD) is different from that of the external Genlock signal.

○ The phase difference between the external Genlock signal and the camcorder is initially set to 0; it can be adjusted within the range of approx. ±0.4 H (-1023 to +1023) with the [GENLCK ADJUST] option in the [SIGNAL SETUP] submenu.

○ [GENLOCK] will not be available if the MODE SELECT switch is set to HD and the [SDI SPEC.] option is set to [SD LOCKED].

○ When you select [GENLOCK] or [GENLOCK+TC], "GENLOCK" will flash on the side panel display. It will keep flashing even when an external Genlock signal is being received. The "GENLOCK" display will stop flashing and stay on when the phase synchronization stabilizes.

○ When you select [GENLOCK+TC], "TC IN" will appear on the side panel display.

○ When "TC IN" appears on the side panel: While an external time code is being received, "EXT LOCK" will appear on the side panel display.

Setting the User Bit

The user bit display can be selected from the date or the time of recording, or an identification code consisting of 8 characters in the hexadecimal system that is useful for labeling tapes. There are sixteen possible characters: the numbers 0 to 9 and the letters A to F.

If a user bit is being received along with an external time code, you can also choose to record the external user bit on tape.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU
(□ 29)

| RECORDING SETUP | ▶ | UB SELECT···00 00 00 00 |
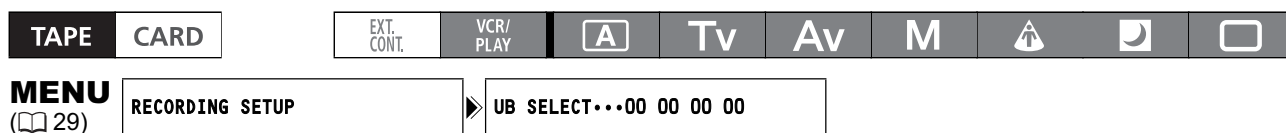
1. **Open the menu and select [RECORDING SETUP]. Select [UB SELECT], select a setting option and press the SET button.**
   If you selected [00 00 00 00], the user bit set/reset options appear; continue with the procedure below. Otherwise, close the menu.

If you selected [00 00 00 00]:

2. **Select [SET].**
   The first part of the display flashes.

3. **Turn the SELECT dial to select a number or letter and press the SET button.**
   • The next character of the user bit starts flashing.
   • Set the rest of the user bit in the same way.

4. **Close the menu.**

❍ To reset the user bit to [00 00 00 00], select [CLEAR] in step 2.
❍ The user bit can be recorded when recording with the camcorder or from analog devices. The user bit set in the camcorder cannot be recorded when recording from digital devices (DV or HDV).

Displaying the User Bit

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU
(□ 29)

| DISPLAY SETUP/ 🗩 | ▶ | UB DISPLAY·OFF |
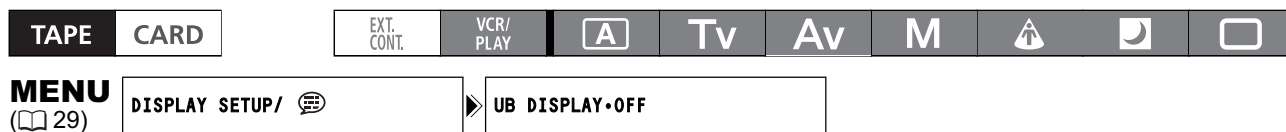
Open the menu and select [DISPLAY SETUP/ 🗩]. Select [UB DISPLAY], set it to [ON] and close the menu.

Recording an External User Bit

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU
(□ 29)

| RECORDING SETUP | ▶ | UB REC···INT.USR-BIT |

Open the menu and select [RECORDING SETUP]. Select [UB REC], select [EXT.USR-BIT] and close the menu.

Audio Recording

When recording on the tape in either HDV or DV standard, you can select to record audio in only two channels or all four channels simultaneously.

HDV

The audio transfer rate is 384 Kbps when recording on 2 channels, and 384 Kbps (192 Kbps / 2 channels) when recording on all 4 channels. The sampling frequency is 48 kHz in all modes.

DV

You can choose to record in 16 bit audio mode (sampling frequency 48 kHz), or 12 bit audio mode (sampling frequency 32 kHz). When recording in 12 bit audio mode, you can further select to record on only 2 channels — leaving two channels free for audio dubbing later; or to record on all 4 channels simultaneously.

Tape Recording Standard	Setting Option	Audio Recording Mode	Sampling Frequency
HDV	2CH	MPEG1 Audio Layer2 (384 kbps)	48 kHz
	4CH	MPEG2 Audio Layer2 (384 kbps)	
DV	48kHz 2CH	PCM 16 bit	
	32kHz 2CH	PCM 12 bit	32 kHz
	32kHz 4CH		

SD Audio Lock

You can select to lock the sampling rates of audio and video to record them in a synchronized fashion (LOCK MODE), or to record them independently of each other (UNLOCK MODE).

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	▢

MENU
(□ 29)

AUDIO SETUP ▷ AUDIO LOCK•••UNLOCK MODE
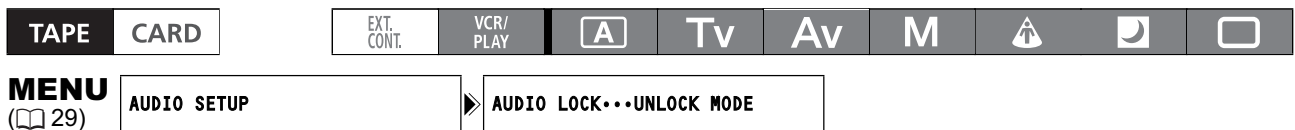
Open the menu and select [AUDIO SETUP]. Select [AUDIO LOCK], select a setting option and close the menu.

Selecting the Audio Mode

HDV 2CH, 4CH
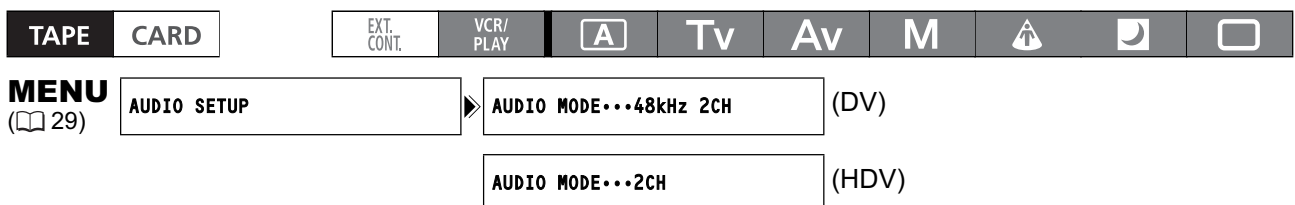
DV 48kHz 2CH, 32kHz 2CH, 32kHz 4CH

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	▢

MENU
(□ 29)

AUDIO SETUP ▷ AUDIO MODE•••48kHz 2CH (DV)

AUDIO MODE•••2CH (HDV)

Open the menu and select [AUDIO SETUP]. Select [AUDIO MODE], select a setting option and close the menu.

Using the Wind Screen

With the supplied microphone (only), you can reduce the sound of wind recorded from the front microphone.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	[A]	Tv	Av	M	⚠	🌙	▢

MENU
(□ 29)

AUDIO SETUP	▶	WIND SCREEN···ON ≋/🎤
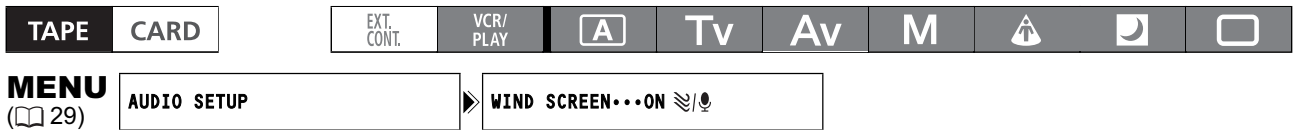
Open the menu and select [AUDIO SETUP]. Select [WIND SCREEN], select a setting option and close the menu.

Recording on Channels 1 and 2

Select the audio input from FRONT MIC (supplied microphone), AUDIO1 (RCA terminals) or REAR (XLR terminals). Refer also to the *Audio Block Diagram* (□ 154).
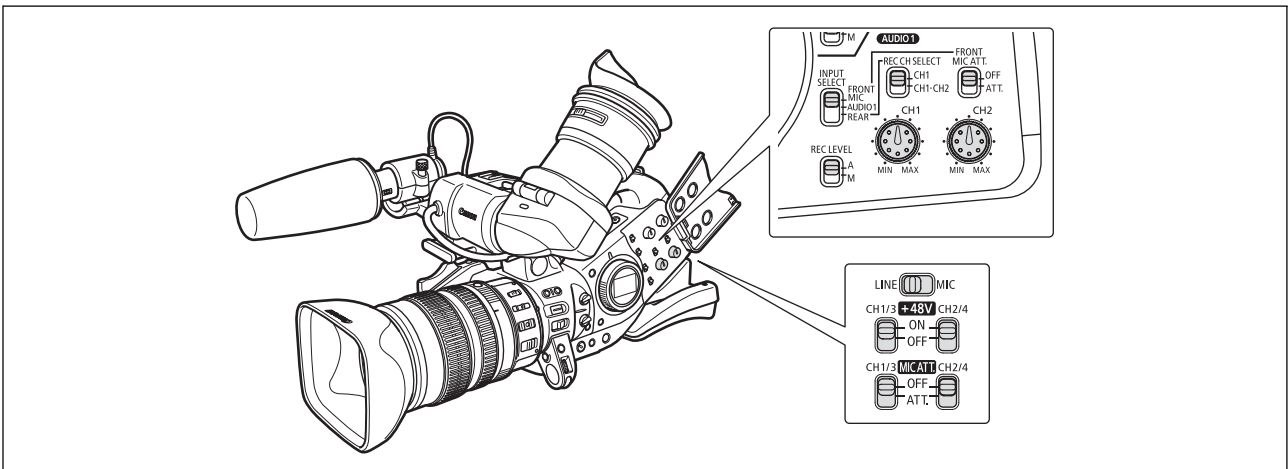
When Using the Front Microphone
....
Set the INPUT SELECT switch to FRONT MIC.

• You can select the microphone setting with the STEREO/MONO switch on the microphone itself. In the MONO position, the same monaural audio signal will be recorded on channels 1 and 2.
• If necessary, turn on the microphone attenuator (20 dB) by setting the FRONT MIC ATT. switch to ATT.

When Connecting to the RCA terminals of AUDIO1 (Line-in Recording)
....
1. **Connect the device to the RCA terminals of AUDIO1.**
2. **Set the INPUT SELECT switch to AUDIO1.**

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When Connecting to the XLR terminals
....

1. Connect a microphone to the XLR terminals.

To supply a microphone with phantom power, set the +48V switch to ON. Make sure to connect the microphone first, before turning on the phantom power. Keep the microphone connected when turning off the phantom power.

2. Set the INPUT SELECT switch to REAR.

3. Set the REC CH SELECT switch to CH1 or CH1·CH2.

Input terminal	Position of the REC CH SELECT switch	Recorded channel
CH1/3	CH1	Channel 1
	CH1·CH2	Channel 1+ Channel 2
CH2/4	CH1	Channel 2
	CH1·CH2	– – –

4. Set the LINE/MIC switch to the appropriate position depending on the input signal.

The setting of the LINE/MIC switch applies simultaneously to channels 1 and 2.

5. If necessary, turn on the microphone attenuator (20 dB) by setting the MIC ATT. switch to ATT.

The microphone attenuator will only be effective when the LINE/MIC switch is set to MIC.

6. For 12dB gain-up: Open the menu and select [AUDIO SETUP]. Select [R-XLR GAINUP], set it to [12dB] and close the menu.

⚠ When connecting a microphone that does not support phantom power, make sure to set the +48V switch to OFF. Otherwise the microphone may be damaged.

Recording on Channels 3 and 4

Select the audio input from SHOE (optional MA-300 Microphone Adapter), AUDIO2 (RCA terminals) or REAR (XLR terminals). Refer also to the *Audio Block Diagram* (154).

Make sure to set [AUDIO MODE] to [4 CH] when recording on the tape in HDV standard, or [32kHz 4CH] when recording in DV standard.
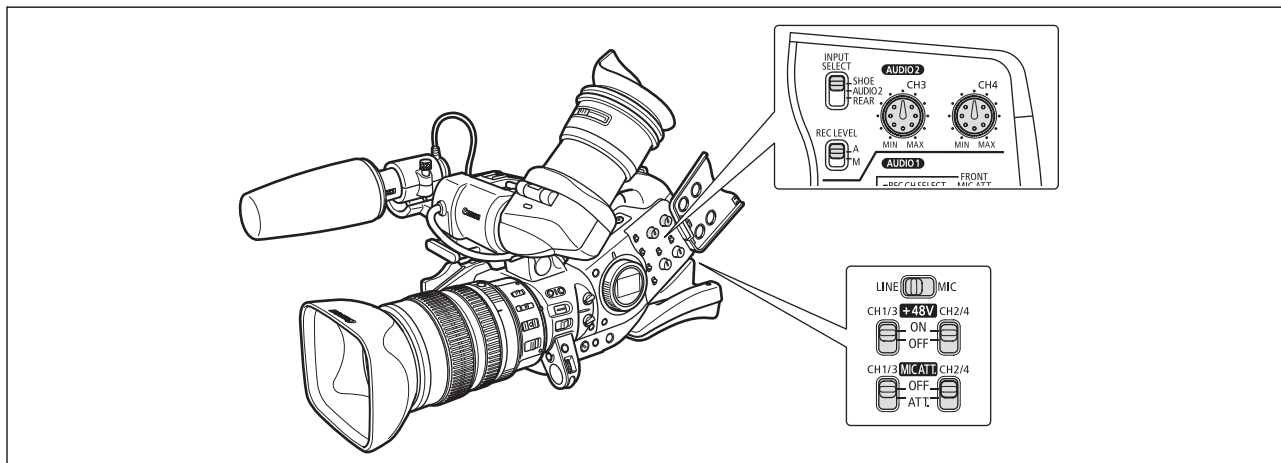
When Connecting to the Advanced Accessory Shoe

1. Attach the optional MA-300 Microphone Adapter to the advanced accessory shoe.
  • With the MA-300, you can use balanced microphones on all 4 channels.
  • Refer also to the MA-300 instruction manual.

2. Set the INPUT SELECT switch to SHOE.

❍ The MA-300 does not support phantom power.
❍ When using the MA-300 only the MIC LEVEL signal can be input.
❍ The MA-100 and MA-200 microphone adapters cannot be used with this camcorder.

When Connecting to the RCA terminals of AUDIO2 (Line-in Recording)

1. Connect the device to the RCA terminals of AUDIO2.

2. Set the INPUT SELECT switch to AUDIO2.

When Connecting to the XLR terminals

1. Connect a microphone to the XLR terminals.
To supply a microphone with phantom power, set the +48V switch to ON. Make sure to connect the microphone first, before turning on the phantom power. Keep the microphone connected when turning off the phantom power.

2. Set the INPUT SELECT switch to REAR.

3. Set the LINE/MIC switch to the appropriate position depending on the input signal.
The setting of the LINE/MIC switch applies simultaneously to channels 3 and 4.

4. If necessary, turn on the microphone attenuator (20 dB) by setting the MIC ATT. switch to ATT.
The microphone attenuator will only be effective when the LINE/MIC switch is set to MIC.

5. For 12 dB gain-up: Open the menu and select [AUDIO SETUP]. Select [R-XLR GAINUP], set it to [12dB] and close the menu.

When connecting a microphone that does not support phantom power, make sure to set the +48V switch to OFF. Otherwise the microphone may be damaged.

Adjusting the Audio Recording Level

CH1, CH2, CH3, CH4 dials

REC LEVEL switch

AUDIO MONITOR button
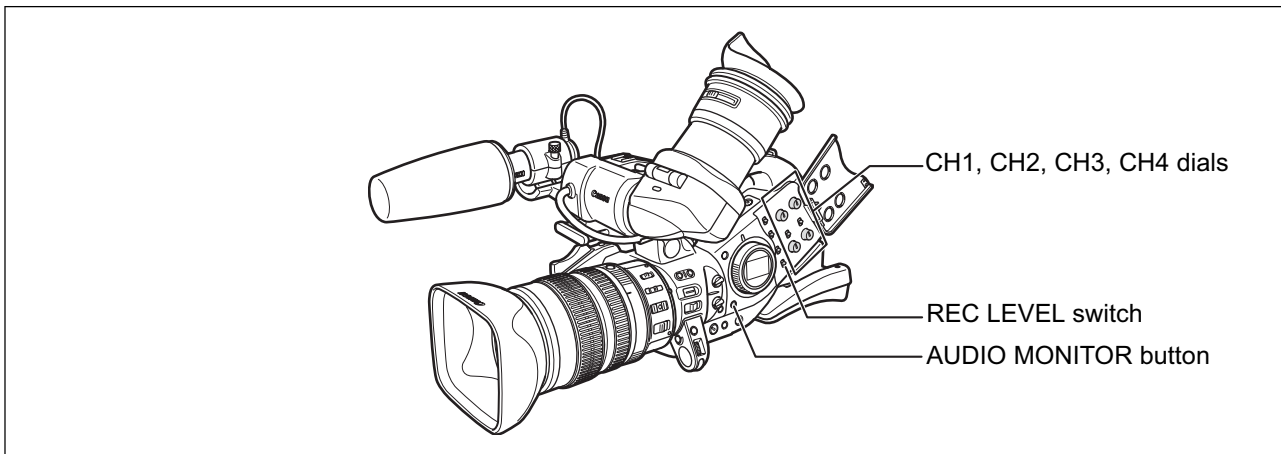
Hiding/Displaying the Audio Level Indicator on the Screen

MENU
(□ 29)

| DISPLAY SETUP/ 💬 | ▶ | AUDIO LEVEL··ON |
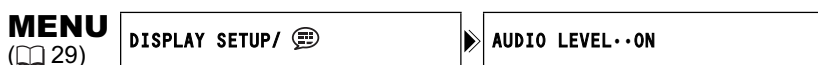
Open the menu and select [DISPLAY SETUP/ 💬]. Select [AUDIO LEVEL], select a setting option and close the menu.

The audio level indicator can also be turned on/off with the custom key (□ 86).

Automatic Audio Adjustments

Set the REC LEVEL switch to A.

Manual Audio Adjustments

1. **Set the REC LEVEL switch to M.**
2. **When recording on 4 channels, press the AUDIO MONITOR button and select CH1/2 or CH3/4.**
   Repeatedly pressing the button will cycle through the settings in the following order: CH1/2, CH3/4, CH1+3/2+4. Do not select CH1+3/2+4 when adjusting the level.
3. **Turn the respective CH1, CH2, CH3 or CH4 dial to adjust the audio level.**

○ We recommend using headphones when adjusting the audio level. If the input level is too high, audio may become distorted even if the audio level indicator is displaying an appropriate level.
○ You can select to synchronize the audio signal with the video signal by adding an equal amount of delay to the audio. Open the menu and select [AUDIO SETUP]. Select [AUD.M.SET], set it to [LINE OUT] and close the menu. If you wish to monitor audio in real time, select [NORMAL]. In either setting, the audio and video signals recorded on tape will be synchronized.

Image Stabilizer
(Lenses Equipped with Image Stabilizer)

You can select to activate or turn off the image stabilizer depending on the recording conditions.

STABILIZER ON/OFF switch

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	▢
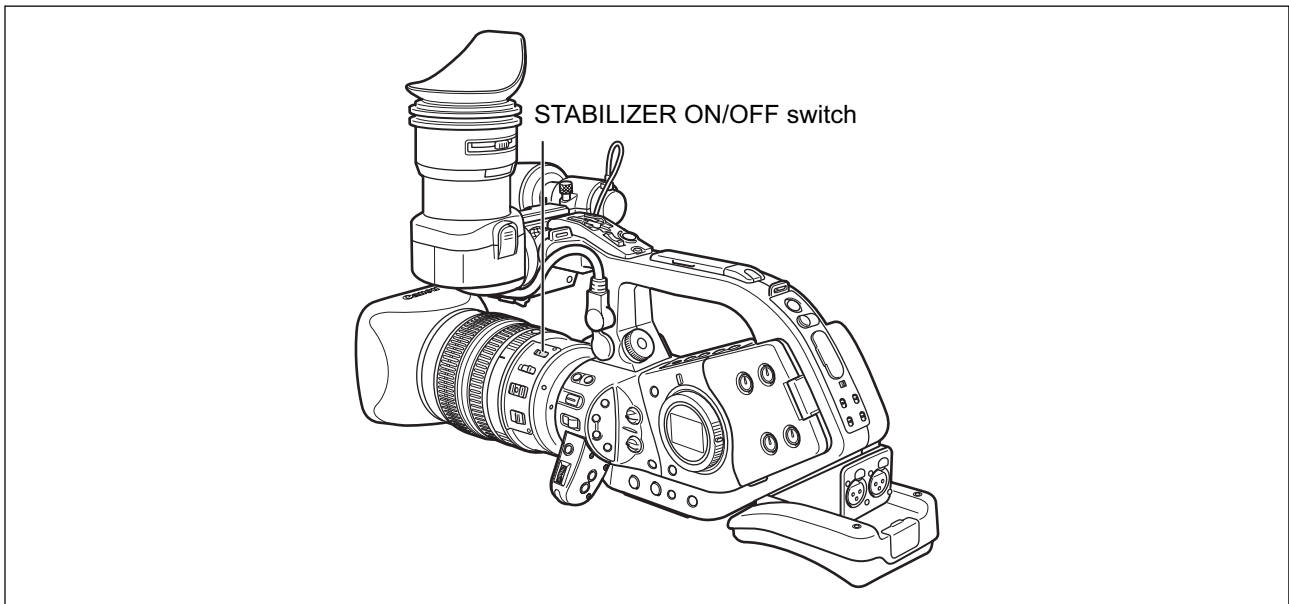
Move the STABILIZER ON/OFF switch to OFF.

The image stabilizer cannot be turned off in the ▢ Easy Recording mode.

- ❍ We recommend turning off the image stabilizer when mounting the camcorder on a tripod.
- ❍ The image stabilizer is designed to compensate for a normal degree of camcorder shake.
- ❍ The image stabilizer may not be effective when attaching an optional Extender.
- ❍ **CAMERA CARD**: The image stabilizer will be activated while half-pressing the PHOTO button to lock the autofocus.

Using the Programmed AE Modes

Programmed auto exposure modes provide advanced automated recording techniques ensuring professional results in various shooting conditions.

Selecting the Programmed AE Modes

Press the button and turn the POWER dial.
The symbol of the selected mode appears.

POWER dial
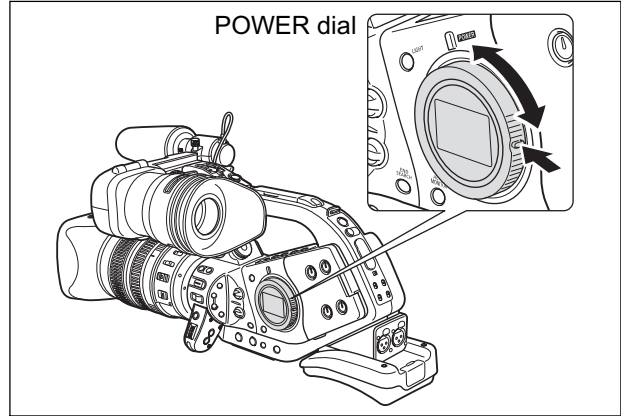
Do not change the mode during recording as the brightness of the image may change abruptly.

□Easy Recording

The camcorder automatically controls the focus, shutter speed, aperture, gain, white balance, and AE Shift allowing you to simply point and shoot. This mode locks all of these features and options, making them fixed and unadjustable.

ⒶAuto

Like the Easy Recording mode, the camcorder automatically controls camera adjustments allowing you to simply point and shoot. However, in the Auto mode, you have the option of adjusting the settings manually.

Tv Shutter-Priority (□ 68)

Use this mode to select the shutter speed. The camcorder automatically sets a matching aperture setting.

Recording

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Av **Aperture-Priority (📖 69)**

Use this mode to select between 7 aperture settings–from f/1.6 to f/9.5 (or to full iris close)–and the camcorder automatically sets a matching shutter speed. This mode allows for the best control of depth of field.

M **Manual (📖 70)**

This mode offers the creative freedom of a complete range of manual controls. In the Manual mode, you have the option to set the exposure at any combination of shutter speed and aperture levels.

⚠ **Spotlight**

The Spotlight mode automatically adjusts the exposure to effectively record images and/or subjects lit by a spotlight or other concentrated light source.

Night

This mode allows you to continue recording even when light levels begin to fall. The camcorder uses lower shutter speeds (1/3–1/500) to deliver proper exposure.

❍Moving subjects may leave a trailing afterimage.

❍Picture quality may not be as good as in other modes.

❍White points may appear on the screen.

❍Autofocus may not work as well as in other modes. In such case, adjust the focus manually.

Availability of functions in each recording program

Recording programs	🔲	Ⓐ	Tv	Av	M	⚠	🌙
EXP. LOCK button	×		○		×	×	×
IRIS dial	×	×¹	×¹	○	○	×	×
SHUTTER button	×	×¹	○	×¹	○	×	×
AE SHIFT dial	× (0)		○		×	×	× (0)
GAIN dial	× (auto)		○			× (0 dB)	× (auto)
WHITE BALANCE dial	× (auto)		○				
Custom preset adjustments	×		○				
CUSTOM PRESET SELECT button	×		○				
CUSTOM PRESET ON/OFF button	×		○				
Skin detail	×		○				
Clear Scan	×	×	○	×	○	×	×
Frequency selection of Clear Scan	×	×	○²	×	○²	×	×

○: Available   ×: Not available

¹: Available when the exposure is locked.
²: Available during clear scan.

HD 20x L IS, 20x L IS, 16x IS II and 3x zoom lens

Recording program	🔲	Modes other than 🔲
Manual focus ring		○
Zoom ring		○
Image Stabilizer*	× (on)	○
ND filter		○
Focus mode	× (autofocus)	○
▶ AF switch/PUSH AF button	×	○

* Not available with the 3x zoom lens.

Recording in the Shutter-Priority (Tv) Mode

POWER dial

SHUTTER ▲ button

SHUTTER ▼ button
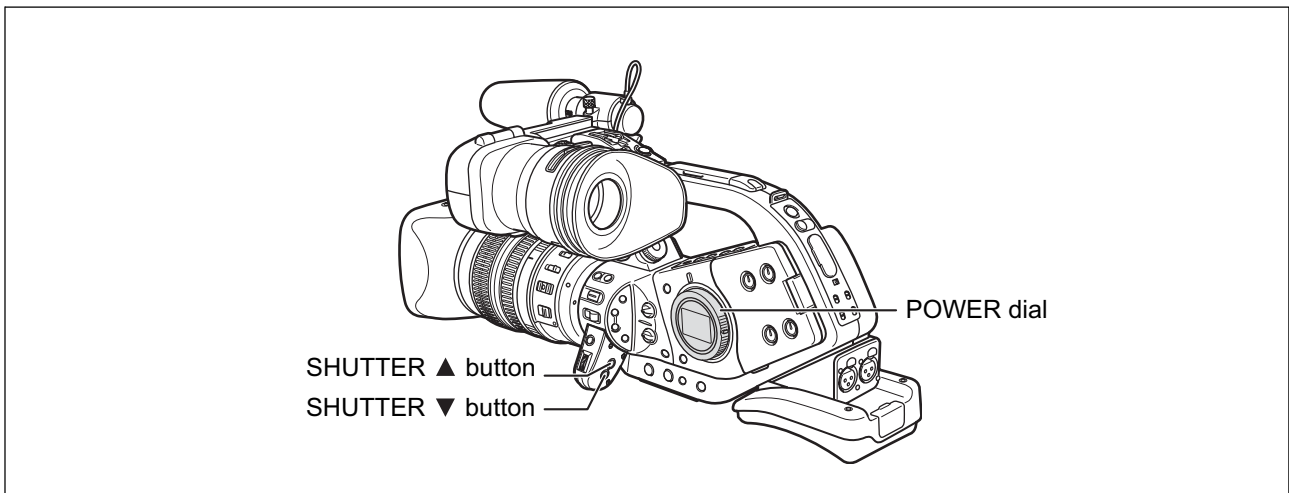
Available shutter speeds when recording movies:
1/3*, 1/6, 1/12, 1/25, 1/50, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/4000, 1/8000, 1/16000, CS (clear scan)

Available shutter speeds when recording still images:
1/3*, 1/6, 1/12, 1/25, 1/50, 1/120, 1/250, 1/500

* Only with the HD 20x L IS Lens.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ▢ |

1. Set the POWER dial to Tv.

2. Select the shutter speed with the SHUTTER ▲ or ▼ button.

❍ Other settings such as the aperture are set automatically.

❍ The shutter speed changes when you lock and change the exposure.

❍ When the gain is set to automatic, the shutter speed number flashes on the screen if the selected shutter speed is not suitable for the recording conditions. In such case, readjust the shutter speed. If you are using an ND filter, turn it off first and readjust the shutter speed.

❍ The image quality may decrease to some extent when using slow shutter speeds.

❍ Autofocus may not work when using slow shutter speeds.

Recording in the Aperture-Priority (Av) Mode

IRIS dial
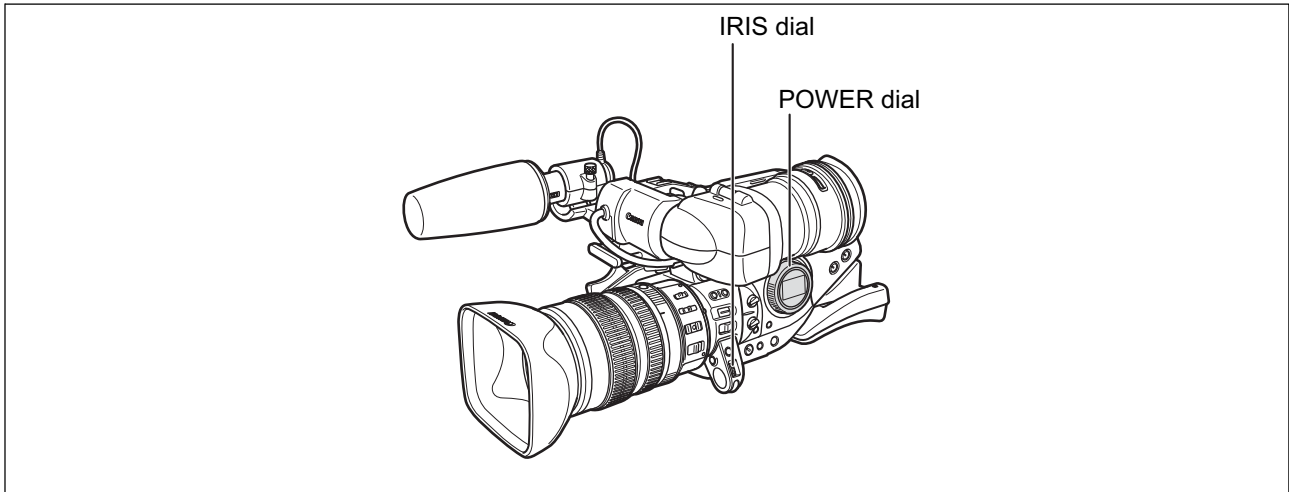
POWER dial

Available aperture values (with the HD 20x L IS lens)
F1.6, F2.0, F2.8, F4.0, F5.6, F8.0, F9.5, CLOSE

TAPE	**CARD**		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	▢

1. **Set the POWER dial to Av.**

2. **Select the aperture with the IRIS dial.**
   You can select the direction in which turning the IRIS dial will adjust the aperture values, using the [IRIS DIAL] option of the [SYSTEM/ ⌄] submenu.

❍ Other settings such as the shutter speed are set automatically.
❍ The aperture changes when you lock and change the exposure.
❍ When the gain is set to automatic, the aperture number flashes on the screen when the selected aperture is not appropriate for the recording condition. In such case, readjust the aperture.
❍ When the built-in ND filter of a lens is activated, the picture may become dark when you set a high F number. In such case, turn the ND Filter off first and readjust the aperture.

Recording

Recording in the Manual Mode

You can set the exposure at any combination of shutter speed and aperture levels.

POWER dial

IRIS dial

SHUTTER ▲ button

SHUTTER ▼ button
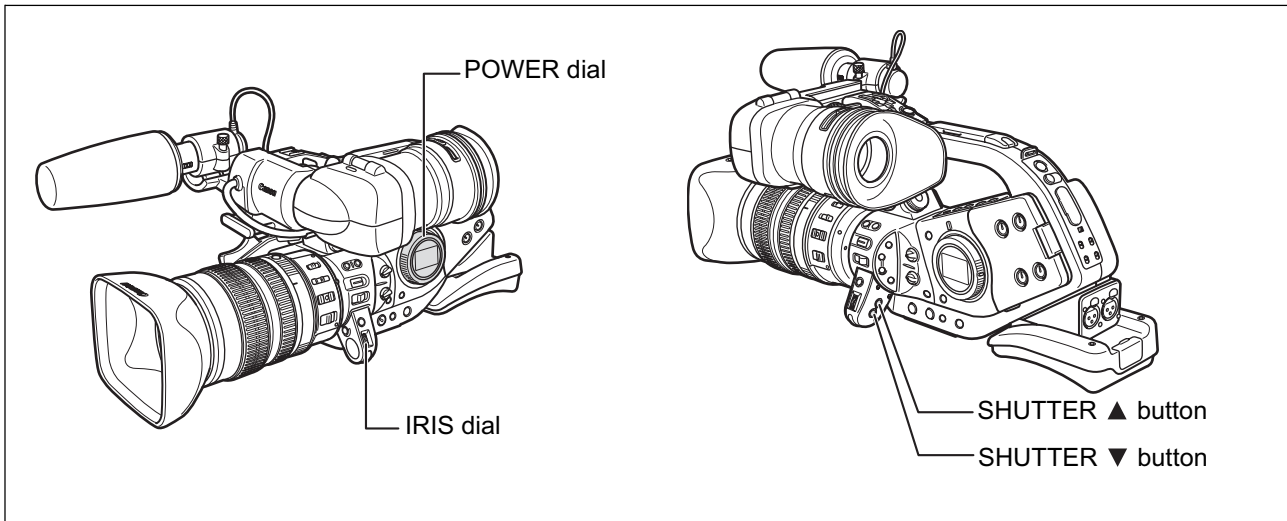
Available settings

Shutter speed	CAMERA	1/3*, 1/6, 1/12, 1/25, 1/50, 1/60, 1/75, 1/90, 1/100, 1/120, 1/150, 1/180, 1/210, 1/250, 1/300, 1/350, 1/400, 1/500, 1/600, 1/700, 1/800, 1/1000, 1/1200, 1/1400, 1/1600, 1/2000, 1/2400, 1/2800, 1/3200, 1/4000, 1/8000, 1/16000, CS (clear scan)
	CAMERA CARD	1/3*, 1/6, 1/12, 1/25, 1/50, 1/60, 1/75, 1/90, 1/100, 1/120, 1/150, 1/180, 1/210, 1/250, 1/300, 1/350, 1/400, 1/500
Aperture (with the HD 20x L IS lens)		F1.6, F1.8, F2.0, F2.2, F2.4, F2.6, F2.8, F3.2, F3.4, F3.7, F4.0, F4.4, F4.8, F5.2, F5.6, F6.2, F6.7, F7.3, F8.0, F8.7, F9.5, CLOSE

* Only with the HD 20x L IS Lens.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☾	☐
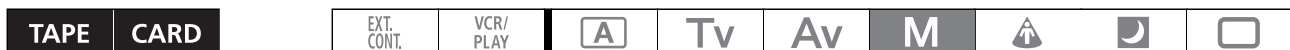
1. **Set the POWER dial to M.**

   The exposure indicator appears.

2. **Select the aperture with the IRIS dial.**

   You can select the direction in which turning the IRIS dial will adjust the aperture values, using the [IRIS DIAL] option of the [SYSTEM/ ⌄] submenu.

3. **Select the shutter speed with the SHUTTER ▲ or ▼ button.**

Adjusting the Exposure

EXP. LOCK button — POWER dial

GAIN dial

IRIS dial

SHUTTER ▲ button

SHUTTER ▼ button

Exposure Lock

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ▢ |
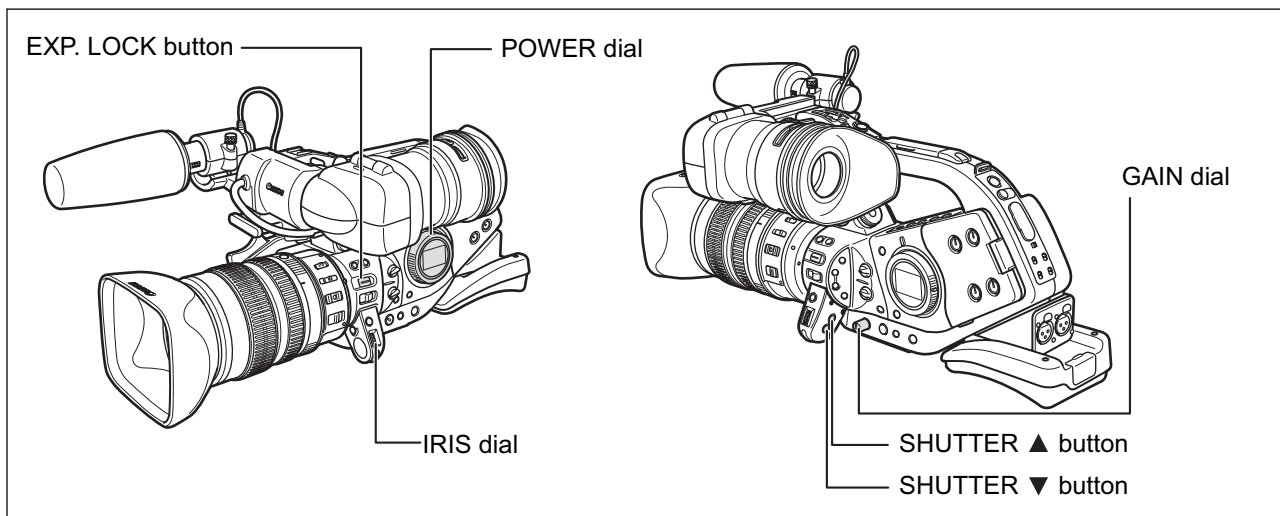
1. **Set the POWER dial to [A], Tv or Av.**
2. **Press the EXP. LOCK button.**
   - The exposure indicator appears. Use the exposure indicator as an estimate.
   - The ▼ mark above the indicator denotes the automatic exposure setting. The ▌ mark of the indicator denotes the current exposure setting within ±2 stops (beyond 2 stops, the marker will blink).

Changing the Aperture after Exposure Lock

You can select from 21 aperture settings (with the HD 20x L IS lens). The setting can be adjusted in 1/4 stop steps. However, only the following numbers are displayed on the screen: F1.6, F2.0, F2.8, F4.0, F5.6, F8.0, F9.5, CLOSE.

Select the aperture with the IRIS dial.

Changing the Shutter Speed after Exposure Lock

You can select from 13 shutter speeds (with the HD 20x L IS lens).

Select the shutter speed with the SHUTTER ▲ or ▼ button.

Changing the Gain after Exposure Lock

You can select from 6 gain levels.

1. **Press the GAIN dial so that it pops out.**
2. **Turn the GAIN dial to adjust the level.**
   The selected level appears.

Using AE Shift

You can use the AE Shift control to manually override the automatic exposure system to darken or lighten the image. Select from 13 AE levels (+2.0, +1.5, +1.0, +0.75, +0.5, +0.25, ±0, -0.25, -0.5, -0.75, -1.0, -1.5, -2.0).

POWER dial

AE SHIFT dial

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	☐
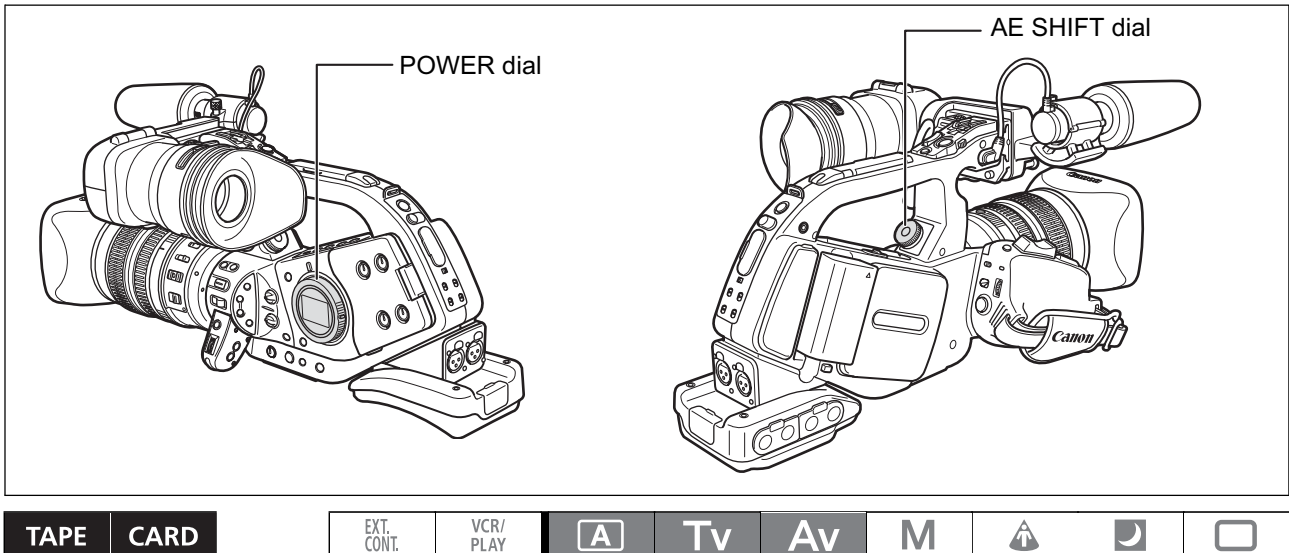
1. **Set the POWER dial to A, Tv or Av.**
2. **Turn the AE SHIFT dial to adjust the level.**
   The selected level appears.

Adjusting the Gain

The gain control adjusts the level of the video signal generated depending on the lighting and shooting conditions. You can select from automatic gain control or preset levels that range from -3 to +18 dB.

-3 dB	For the lowest noise recording for indoor, low light or low contrast scenes.
Auto	Automatic adjustment of gain.
0 dB	For lifelike night scenes or scenes under artificial lighting.
+3 dB/+6 dB/ +12 dB/+18 dB	Increases the brightness in indoor or low-light scenes. Increases the depth of field.

POWER dial

GAIN dial

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ▭ |
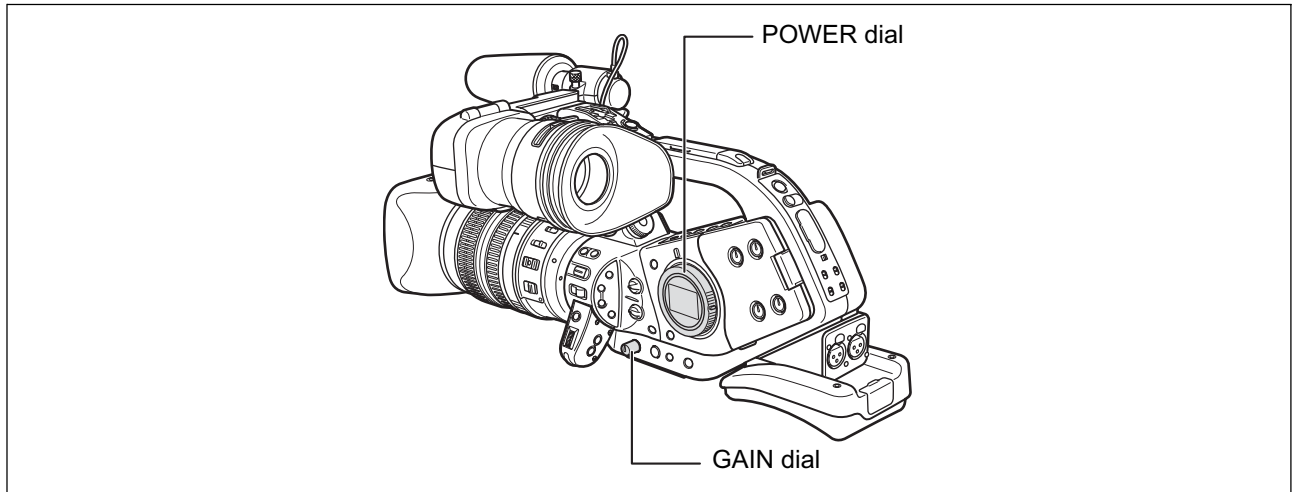
1. **Set the POWER dial to** A **, Tv, Av or M.**

2. **Press the GAIN dial so that it pops out.**

3. **Turn the GAIN dial to adjust the level.**
   The selected level appears.

With some gain level settings the picture may flicker slightly.

Setting the White Balance

The camcorder uses an electronic white balance process to calibrate the picture for accurate color display under different lighting conditions.

In addition to the fully automated mode, white balance modes include an indoor mode, an outdoor mode, a color temperature setting and two user presets that can be memorized.

Auto	Automated adjustment of white balance
☀ (Outdoor)	Bright sunlight (5,600ºK)
☼ (Indoor)	Incandescent light (3,200ºK)
K (Color temperature)	Setting depending on the hue of a specific lighting (2,800 - 12,000ºK in 100ºK increments)
Preset 1, 2	Custom preset (3,200 - 5,600ºK)
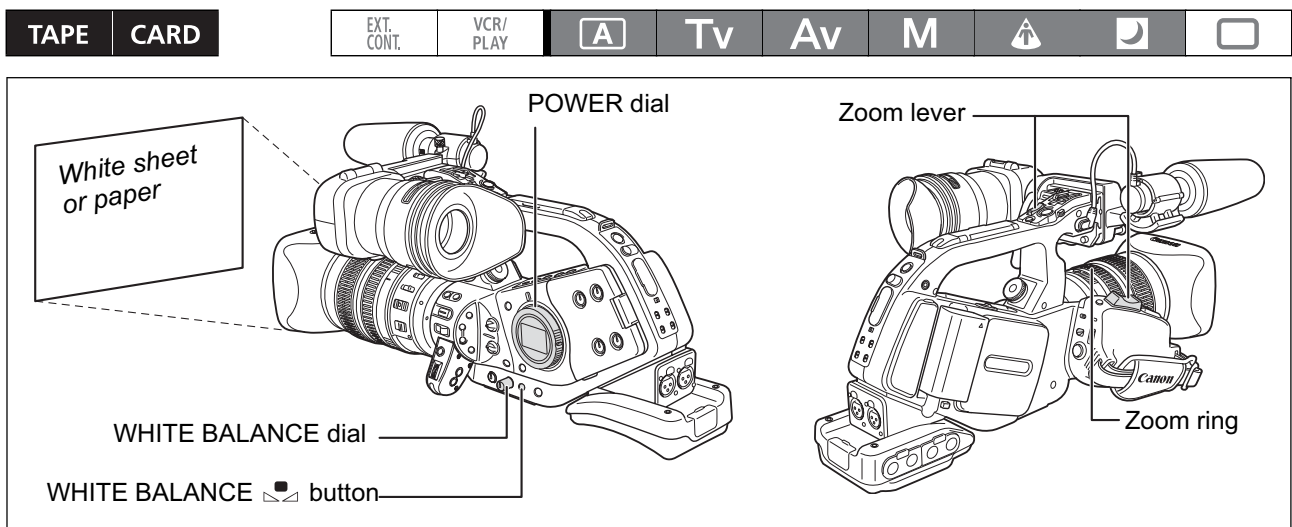
Selecting an Automated White Balance Setting

1. **Set the POWER dial to a recording program other than ▢.**
2. **Press the WHITE BALANCE dial so that it pops out.**
3. **Set the WHITE BALANCE dial to A, ☀ or ☼.**

Setting the Color Temperature

1. **Set the POWER dial to a recording program other than ▢.**
2. **Set the WHITE BALANCE dial to K.**
   The color temperature currently set will be displayed.
3. **Press the WHITE BALANCE ✎ button.**
   The color temperature display will start flashing.
4. **Turn the SELECT dial to set the desired color temperature.**
5. **Press the WHITE BALANCE ✎ button again.**
   The color temperature display stops flashing and stays on.

Setting a Custom White Balance

1. Set the POWER dial to a recording program other than ▢.

2. Press the WHITE BALANCE dial so that it pops out.

3. Set the WHITE BALANCE dial to one of the custom preset numbers.

4. Point the camcorder at a white object and zoom in until it fills the whole screen.
Keep the camcorder zoomed at the white object until step 5 is completed.

5. Press the WHITE BALANCE ◿ button.
The "◿" symbol and the selected preset number flash on the screen and stop flashing when the setting is complete.

❍ As long as the built-in rechargeable lithium battery is charged, the camcorder retains the custom white balance setting even if you turn it off.

❍ When you set the custom white balance: very rarely and depending on the light source, "◿" may keep flashing. The result will still be better than with the auto setting.

❍ Perform the custom white balance setting procedure in a sufficiently well lit place.

❍ Readjust the custom white balance if you turn the built-in ND filter on/off or when the light source has changed.

❍ The following custom preset settings take precedence, and will override the white balance set with the procedure above: The Color Matrix [CMX] setting, the 3 R/G/B Gain settings, and the 6 R/G/B Matrix settings (□ 79).

❍ The custom white balance may provide better results in the following cases:
- Changing lighting conditions
- Close-ups
- Subjects in a single color (sky, sea or forest)
- Under mercury lamps or certain types of fluorescent lights

Recording with Preset Custom White Balance

1. Set the POWER dial to a recording program other than ▢.

2. Turn the WHITE BALANCE dial to select a preset number.
The preset custom white balance is activated.

Using the Zebra Pattern

This camcorder has a zebra pattern feature that shows black and white diagonal stripes over the area that is overexposed. The zebra pattern is only displayed on the screen and will not affect your recordings. The zebra pattern will not be displayed while using the EVF Peaking and EVF Magnifying functions. Use this feature to guide the adjustment of the aperture and shutter speed.
Available zebra pattern settings: 70 IRE, 75 IRE, 80 IRE, 85 IRE, 90 IRE, 95 IRE, and 100 IRE.

POWER dial

SET button

MENU button

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |
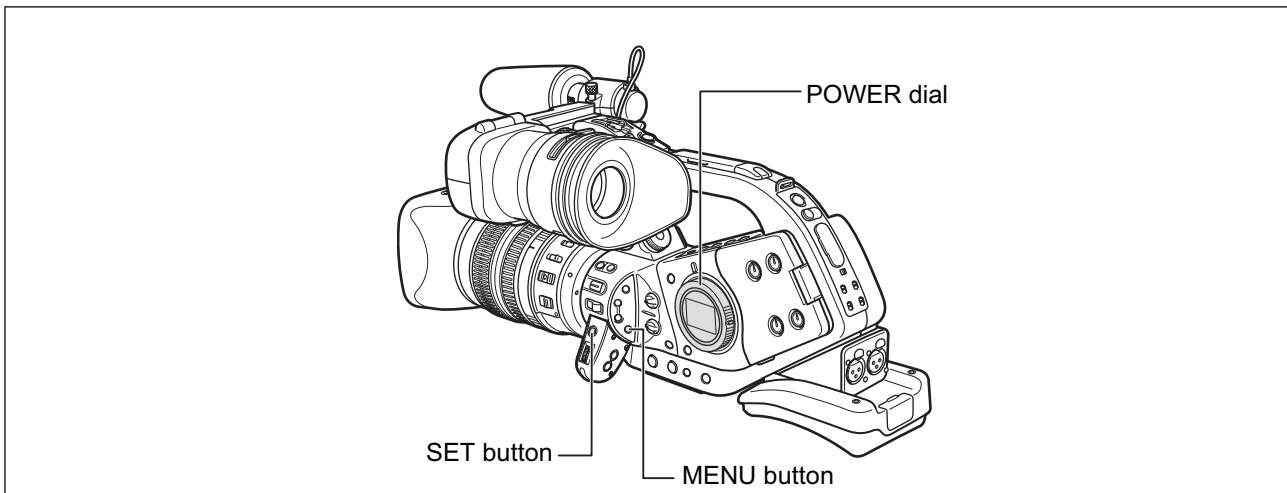
Selecting the Zebra Pattern Level

MENU
(📖 29)

| CAMERA SETUP | ▶ | ZEBRA LEVEL··75 |

Open the menu and select [CAMERA SETUP]. Select [ZEBRA LEVEL], select a setting option and close the menu.

Activating the Zebra Pattern

MENU
(📖 29)

| CAMERA SETUP | ▶ | ZEBRA········OFF |
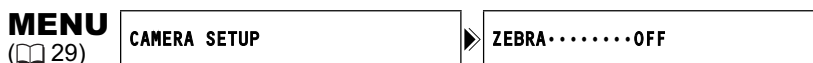
Open the menu and select [CAMERA SETUP]. Select [ZEBRA], set it to [ON] and close the menu.

Using the Skin Detail Function

With the skin detail function, areas in the picture that have skin-tone characteristics will be detected, and the details in these areas will be softened in order to conceal skin imperfections. On the viewfinder, those skin areas will be identified by a zebra pattern alternating with the normal picture (on a connected TV or computer screen a white pattern will appear instead).

You can adjust the hue, chroma, area and Y level as required, to determine the areas that will be detected as skin areas.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	Ⓐ	Tv	Av	M	⚠	☾	☐

Activating the Skin Detail Function

MENU
(🕮 29)

CAMERA SETUP	▶	SKIN D.SET	▶	SKIN DETAIL··OFF

Open the menu and select [CAMERA SETUP] and [SKIN D.SET]. Select [SKIN DETAIL], set it to [HIGH 🖼], [MIDDLE 🖼] or [LOW 🖼] and close the menu.

" 🖼 " appears.

Determining the Skin Area

MENU
(🕮 29)

CAMERA SETUP	▶	SKIN D.SET	▶	HUE············· G┣━━□━━┫R
				CHROMA··········· -┣━━□━━┫+
				AREA··············· -┣━━□━━┫+
				Y LEVEL··········· -┣━━□━━┫+
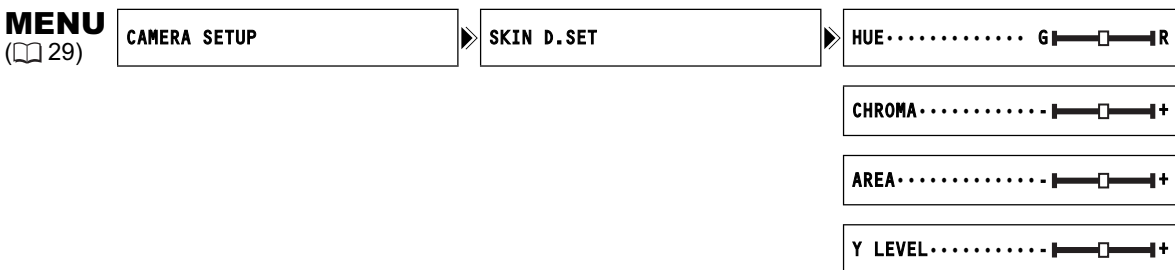
Open the menu and select [CAMERA SETUP] and [SKIN D.SET]. Select [HUE], [CHROMA], [AREA] or [Y LEVEL], adjust the levels and close the menu.

- HUE: Adjust the hue for detection of the skin area. Adjusting to [R] detects reddish skin color, and to [G] detects greenish skin color.
- CHROMA: Adjust the color saturation for detection of the skin area. Adjusting to [+] detects more vivid skin tones, and to [-] detects paler skin tones.
- AREA: Adjust the color range for detection of the skin area. Adjusting to [+] detects a wide color range, and to [-] detects a narrow color range.
- Y LEVEL: Adjust the brightness for detection of the skin area. Adjusting to [+] detects brighter skin color, and to [-] detects darker skin color.

Using the Custom Preset

You can define preset levels for 23 recording specifications used when recording on tape (17 when recording still images on the memory card). Up to 6 custom presets can be stored on the camcorder, and up to 20 can be stored on the memory card. You can copy the camcorder's custom presets to the memory card. Also, while you are recording on the tape and simultaneously record a still image on the memory card, the current recording specifications can be saved as a custom preset on the card. Later you can load that custom preset from the memory card to the camcorder.

The recording specifications that can be saved in a custom preset:

Gamma curve*, knee, black stretch/press, master pedestal*, setup level*, sharpness, horizontal detail frequency, horizontal/vertical detail balance, coring, NR1*, NR2*, color matrix*, color gain, color phase, R gain, G gain, B gain, R-G matrix, R-B matrix, G-R matrix, G-B matrix, B-R matrix and B-G matrix.

* Available only when recording on the tape.

Gamma Curve [GAM] (only in CAMERA mode)

You can select from [NORMAL], [CINE1] or [CINE2].
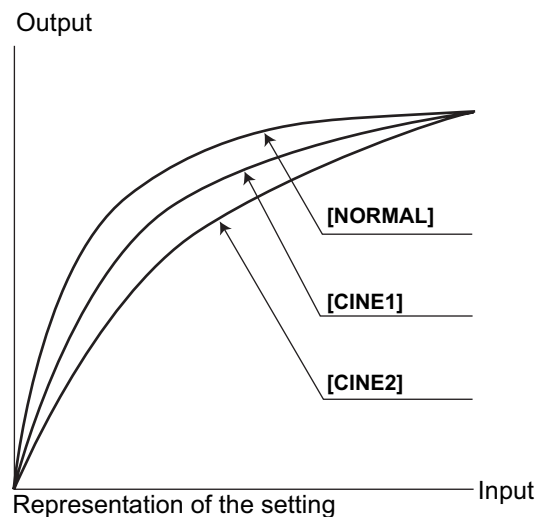
Knee Point Adjustment [KNE]

Adjust the dynamic range (knee point) in the highlight area of the image to prevent overexposure. You can select from [AUTO], [HIGH], [MIDDLE] or [LOW].
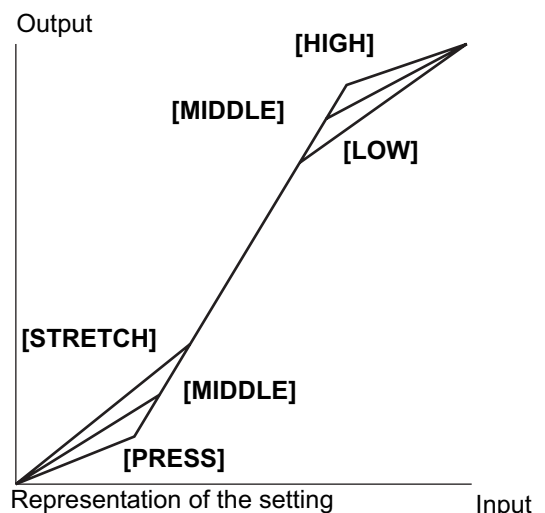
Black Stretch/Black Press [BLK]

Adjust the dynamic range in the black area of the image. You can select from [STRETCH], [MIDDLE] or [PRESS]. [STRETCH] emphasizes contrast in the dark area, while [PRESS] enhances or deepens darkness.

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Master Pedestal [PED] (only in CAMERA mode)

Adjust the master pedestal level in the range -9 to +9.

Setup Level [SET] (only in CAMERA mode)

Adjust the setup level in the range -9 to +9.
• Depending on the value set for the master pedestal [PED], the setup level may not be able to take a negative value. In that case, adjusting the setup value within a certain value range will have no effect.

Sharpness [SHP]

Adjust the sharpness level in the range -9 to +9.

Horizontal Detail Frequency [HDF]

You can select from [HIGH], [MIDDLE] or [LOW].

Horizontal/Vertical Detail Balance [DHV]

Adjust the horizontal/vertical detail balance in the range -9 (only horizontal) to +9 (only vertical).

Coring [COR]

Adjust the detail noise level in the range -9 to +9.

Noise Reduction 1 [NR1] (only in CAMERA mode)

You can select from [OFF], [HIGH], [MIDDLE] or [LOW].

• With the [HIGH] setting moving subjects may leave a trailing afterimage.
• When picture noise is already low due to the gain settings, the noise reduction function may not be noticeable.

Noise Reduction 2 [NR2] (only in CAMERA mode)

Results in an effect similar to applying the skin detail function over the whole picture. You can select from [OFF], [HIGH], [MIDDLE] or [LOW].
• Unlike with the NR1 setting, a trailing afterimage will not appear.

Color Matrix [CMX] (only in CAMERA mode)

You can select from [NORMAL], [CINE1] or [CINE2].

Color Gain [CGN]

Adjust the color saturation level in the range -9 to +9.

Color Phase [CPH]

Adjust the color phase in the range -9 to +9.

R Gain [RGN]

Adjust the red level in the range -9 to +9.

G Gain [GGN]

Adjust the green level in the range -9 to +9.

B Gain [BGN]

Adjust the blue level in the range -9 to +9.

R-G Matrix [RGM]

Adjust the level in the range -9 to +9.

R-B Matrix [RBM]

Adjust the level in the range -9 to +9.

G-R Matrix [GRM]

Adjust the level in the range -9 to +9.

G-B Matrix [GBM]

Adjust the level in the range -9 to +9.

B-R Matrix [BRM]

Adjust the level in the range -9 to +9.

B-G Matrix [BGM]

Adjust the level in the range -9 to +9.

CUSTOM PRESET ON/OFF button
CUSTOM PRESET SELECT button

SELECT dial

MENU button

Setting the Custom Preset Settings

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☽ | ☐ |
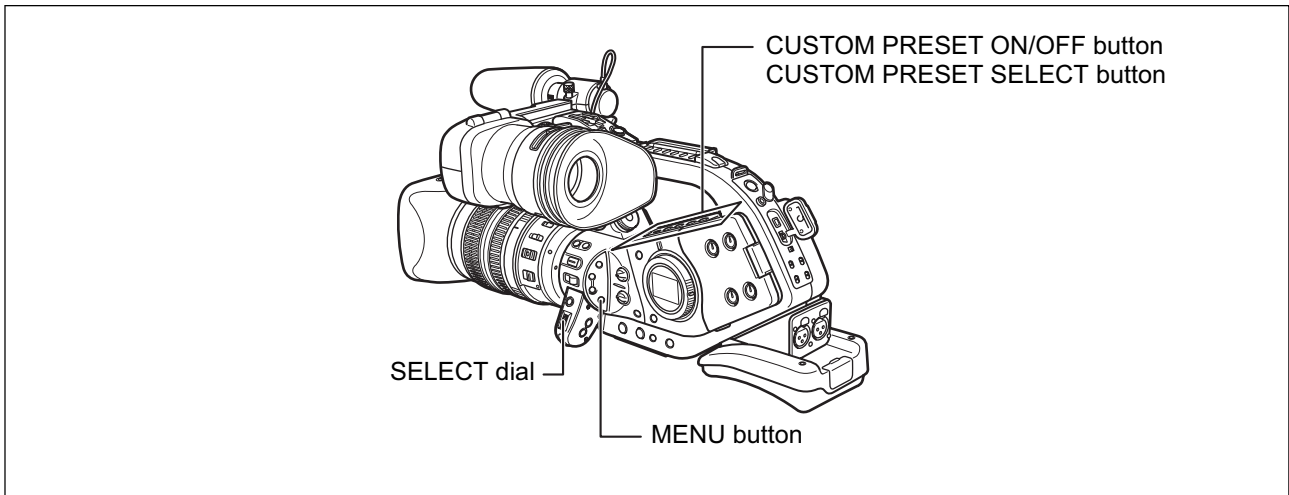
MENU
(☐ 29)

CUSTOM PRESET ▶ 🎬 EDIT ▶ SELECT CP
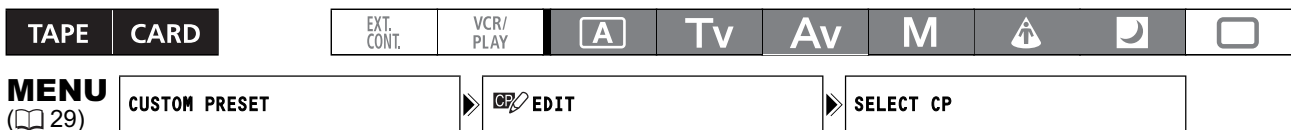
1. Open the menu and select [CUSTOM PRESET].

2. Select [🎬 EDIT].
The custom preset submenu appears.

3. Select [SELECT CP] and then select the name of the custom preset file where you want to store the settings.
After making the selection you will return to the custom preset edit submenu.

4. From the edit submenu, select [TUNE].
The custom preset items list appears.

5. From the list, select an item you want to adjust and press the SET button. Make the adjustment or the selection as necessary and press the SET button.
• During the adjustment you can verify the effect of each item on the screen.
• Repeat this step to adjust all the items you want to adjust.

6. When you finish adjusting all the items in the custom preset, select [⬅ RTN].
You will return to the custom preset submenu.

7. Close the menu.

○ The custom preset items appear in one screen as 3-letter abbreviations followed by the current setting value. As you move between the items with the SELECT dial, the full name of the currently selected item and its current value will be displayed at the bottom of the screen.
○ When you attempt to change a protected setting, "⛔" starts flashing.

Renaming a Custom Preset File

1. Open the menu and select [CUSTOM PRESET], followed by [🎬 EDIT].

2. From the edit submenu, select [RENAME].
The first character of the custom preset file name will start flashing.

3. **Turn the SELECT dial to select a number, letter or punctuation mark and press the SET button.**
   - The next character of the custom preset file name will start flashing.
   - Set the rest of the custom preset file in the same way.
4. **When you finish renaming the custom preset file, press the SET button.**
   You will return to the custom preset submenu.
5. **Close the menu.**

Protecting a Custom Preset File

1. **Open the menu and select [CUSTOM PRESET], followed by [⌴ EDIT].**
2. **From the edit submenu, select [PROTECT].**
   - Next to the custom preset number the protect mark ⃜ will appear.
   - To cancel the protection, repeat the procedure for a custom preset file with the ⃜ mark.

Resetting a Custom Preset File

1. **Open the menu and select [CUSTOM PRESET], followed by [⌴ EDIT].**
2. **From the edit submenu, select [RESET].**
   A confirmation screen will appear.
3. **Turn the SELECT dial to select [YES] and press the SET button.**
   You will return to the custom preset submenu.
4. **Close the menu.**

   A protected preset file cannot be reset.

Activating the Custom Preset Settings

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☽ | ☐ |

1. **Press the CUSTOM PRESET SELECT button.**
   - Repeatedly pressing the button will cycle through the available custom preset files. You can also set a custom key as [CP BKWD KEY] to cycle through the options in reverse order (from last to first) (ⵀ 86).
   - When you are not using the custom preset setting, set the camcorder to "CP OFF".
2. **Press the CUSTOM PRESET ON/OFF button.**
   The setting is activated.

Copying a Custom Preset File to the Memory Card

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ☐ |

1. **Open the menu and select [CUSTOM PRESET], followed by ['🎥→☐].**
2. **From the copy submenu, select [SELECT CP] and then select the name of the custom preset file you want to copy to the card.**
3. **Select [SAVE POSITION] and select the filename under which you want to store the file on the memory card.**
   - Up to 20 custom preset files can be stored on the memory card. If you try to save more than 20 custom preset filed one of the files on the card will be overwritten (you can select which file to overwrite).
   - If there are no custom preset files saved on the memory card the file name will become NEW_FILE.
4. **Select [EXECUTE] and in the confirmation screen select [YES] to copy the file.**
5. **Close the menu.**

Loading a Custom Preset File from the Memory Card

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ☐ |

1. **Open the menu and select [CUSTOM PRESET], followed by [☐→'🎥].**
2. **From the copy submenu, select [IMPORT] and then select the name of the custom preset file you want to load to the camcorder.**
3. **Select [SELECT POSITION] and select the preset number under which you want to store the file in the camcorder.**
4. **Select [EXECUTE] and in the confirmation screen select [YES] to load the file.**
5. **Close the menu.**

Loading a Custom Preset File from a Still Image to the Camcorder

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ☐ |

1. **Select the still image that contains the custom preset file you want to load.**
   Use the **CARD** + / - buttons to move between the still images.
2. **Open the menu and select [META DATA CP], followed by [☐→'🎥].**
3. **Select [SELECT POSITION] and select the preset number under which you want to store the file on the camcorder.**
4. **Select [EXECUTE] and in the confirmation screen select [YES] to load the file.**
5. **Close the menu.**

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Saving the Custom Preset Settings in Use with a Still Image on the Memory Card

In CAMERA mode, you can save the custom preset settings currently being used on the memory card along with a still image of the recording. This is very useful when you want to load the custom preset file later by selecting the still image of that specific scene.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	☐

Open the menu and select [RECORDING SETUP]. Select [STILL I. REC], set it to [ON + CP DATA] and close the menu.

While you are recording on the tape, press the PHOTO button.

The custom preset currently in effect will be saved to the memory card along with a still image of the current scene. When saving the custom preset currently in use embedded in a still image, the number of custom preset files you can save is not limited to 20 files but you can record as many still images/CP files as the free available memory on the memory card will allow you.

Using Clear Scan

This feature allows you to record a computer's CRT screen or other equipment without displaying black band or flicker on the screen. You can adjust the frequency from 50.2 Hz to 200.3 Hz.

POWER dial

SHUTTER ▲▼ buttons

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	▭

MENU
(□ 29)

CAMERA SETUP	▶	CLEAR SCAN···50.2Hz
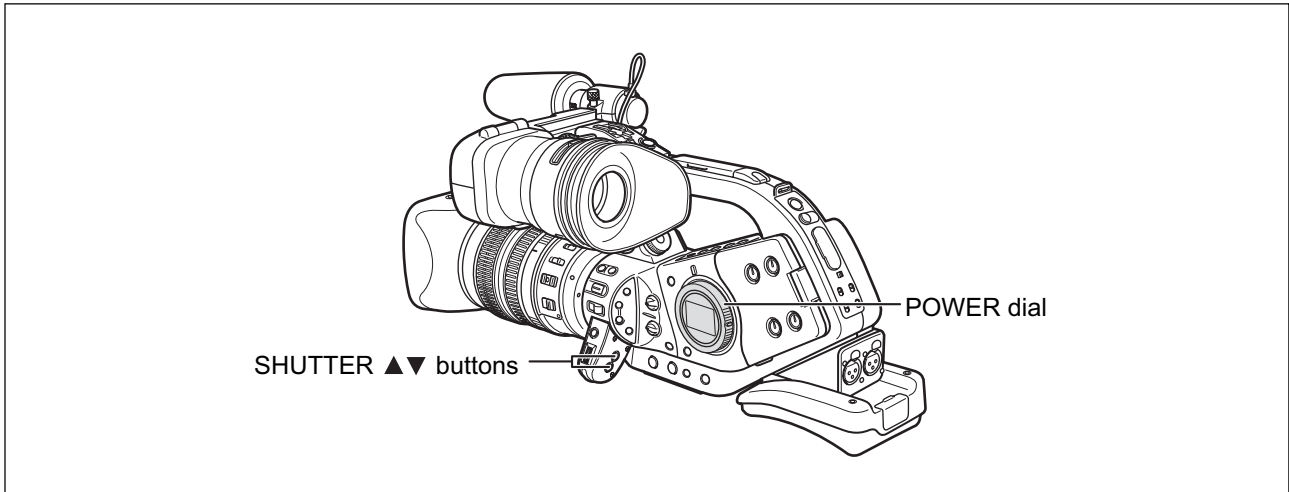
1. Set the POWER dial to Tv or M.

2. Press the SHUTTER ▲ button to display "CS".

3. Open the menu and select [CAMERA SETUP]. Select [CLEAR SCAN], adjust the frequency and close the menu.

Adjust the frequency so that the black band does not appear.

Using the Custom Keys

You can assign frequently used functions to the custom keys. The custom keys can have different functions assigned to them in each of the different operation modes.

Default settings:

	CAMERA	VCR/PLAY	CAMERA CARD	VCR/PLAY CARD
CUSTOM KEY 1	TIME CODE	TV SCREEN	ZEBRA	TV SCREEN
CUSTOM KEY 2	INDEX WRITE	DATA CODE	TV SCREEN	DATA CODE

The following functions can be assigned to the custom keys:

CAMERA		VCR/PLAY
Time code	Time code hold [2]	Time code
Index write	Audio level	TV screen
Zebra pattern	EVF B&W mode	Data code
VCR stop [2]	CP backward key [1,2]	Audio level
TV screen	Flip EVF [2]	Time code hold [2]
		EVF B&W mode
CAMERA CARD		**VCR/PLAY CARD**
Zebra pattern		TV screen
TV screen		Data code
EVF B&W mode		EVF B&W mode
CP backward key [1,2]		
Flange back		
Flip EVF [2]		

[1] Can only be assigned to Custom Key 2.
[2] This function can only be operated with a custom key.

To check the current custom key settings:
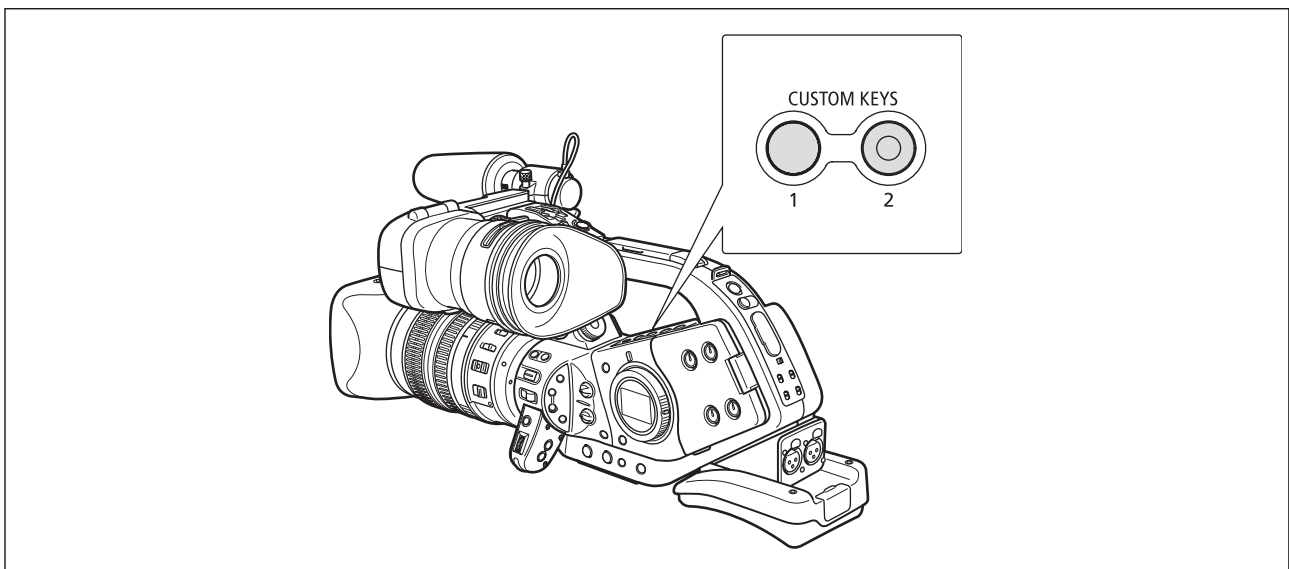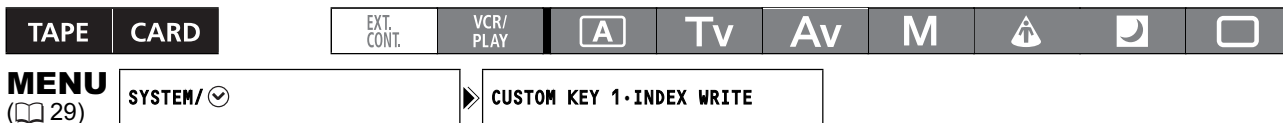In recording mode: Open the menu and select [DISPLAY SETUP/⊞]. Select [GUIDE INFO], set it to [CUSTOM KEYS] and close the menu.
In VCR/PLAY mode: Open the menu and select [DISPLAY SETUP/⊞]. Select [CUSTOM KEYS], set it to [ON] and close the menu.

Changing the Custom Keys Setting

E

Open the menu and select [SYSTEM/⊘]. Select [CUSTOM KEY 1] or [CUSTOM KEY 2], select the function you wish to assign to the custom key and close the menu.

When you do not wish to use the custom keys, select [(NONE)].

Activating the Functions with the Custom Key

Time Code (□ 55) CAMERA   VCR/PLAY
....
Press the CUSTOM KEY (1 or 2) button.

The time code setting menu appears.

Index Write CAMERA
....
You can add an index signal to your recording for easy search in VCR/PLAY mode.

Press the CUSTOM KEY (1 or 2) button.

• The index signal will be recorded for approx. 6 seconds.
• When the camcorder is in record pause mode, the index signal will be written when you start recording.

An index signal cannot be added or erased later.

Zebra Pattern (□ 76) CAMERA   CAMERA CARD
....
Press the CUSTOM KEY (1 or 2) button.

The zebra pattern is activated. Press the button again to deactivate it.

VCR STOP (□ 41) CAMERA
....
When the camcorder is in record pause mode, you can turn off the recorder section. If the [POWER SAVE] option in the [SYSTEM/⊘] submenu is set to OFF, even in VCR STOP mode, the camera section is still powered, allowing you to adjust the camera settings without worrying about the tape or the video heads. VCR STOP can only be operated with the custom keys.

Press the CUSTOM KEY (1 or 2) button.

The VCR STOP mode is activated. Press the button again to return to record pause mode. You can also start recording by pressing the start/stop button directly in VCR STOP mode.

TV Screen (□ 129) CAMERA   VCR/PLAY   CAMERA CARD   VCR/PLAY CARD
....
You can show the camcorder display on a connected TV.

Press the CUSTOM KEY (1 or 2) button.

Recording

Time Code Hold (CAMERA) (VCR/PLAY)

You can press the custom key button to freeze the display of the time code. The time code will continue running normally even while the time code display is on hold.

Time Code Hold can only be operated with the custom keys.

Press the CUSTOM KEY (1 or 2) button.

- Pressing the custom key button again will reactivate the normal display of the time code.
- While on hold, the time code will be displayed with an **H** next to it and "HOLD" appears on the side panel display.
- The time code being output from the TC OUT, SDI, LANC and HDV/DV terminals will not be put on hold. The time code superimposed on the video signal output from the COMPONENT OUT (D-) Terminal or the Video/S-Video terminals will be put on hold.
- The time code hold will be canceled when you turn the camcorder on/off, change the operation mode CAMERA/VCR/PLAY or change the position of the TAPE/CARD switch.

Audio Level Indicator (📖 63) (CAMERA) (VCR/PLAY)

Press the CUSTOM KEY (1 or 2) button.

The audio level indicator appears. Press the button again to hide the audio level indicator.

EVF Black & White Mode (CAMERA) (VCR/PLAY) (CAMERA CARD) (VCR/PLAY CARD)

Press the CUSTOM KEY (1 or 2) button.

The image on the screen will be shown in black & white (on-screen displays and indicators will still be displayed in color). Press the button again to return to color display.

Flange Back Adjustment (CAMERA) (CAMERA CARD)

Press the CUSTOM KEY (1 or 2) button.

The flange back adjustment menu appears.

CP Backward Key (CAMERA) (CAMERA CARD)

Press the CUSTOM KEY 2 button.

Usually, pressing the CUSTOM PRESET SELECT button will cycle forwards to the following custom preset file. After activating the Custom Preset Direction, pressing the button will instead cycle backwards to the preceding custom preset file.
The Custom Preset Direction can only be operated with the custom keys.

Flip EVF (CAMERA) (CAMERA CARD)

Press the CUSTOM KEY (1 or 2) button.

Activating the function will reverse the displayed image both upside/down and right/left. This affects only the display and the video signal being output from all terminals will not change. With HDV compatible XL lenses, the FLIP EVF function will be deactivated while displaying the menu screens.
FLIP EVF can only be operated with the custom keys.

Data Code (📖 105) (VCR/PLAY) (VCR/PLAY CARD)

Press the CUSTOM KEY (1 or 2) button.

The data code appears. Press the button again to hide the data code.

Recording Color Bars/Audio Reference Signal

Color Bars

You can generate and record SMPTE (Society of Motion Picture and Television Engineers) color bars.

BARS/FADE SELECT button

BARS/FADE ON/OFF button

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☽ | ▢ |
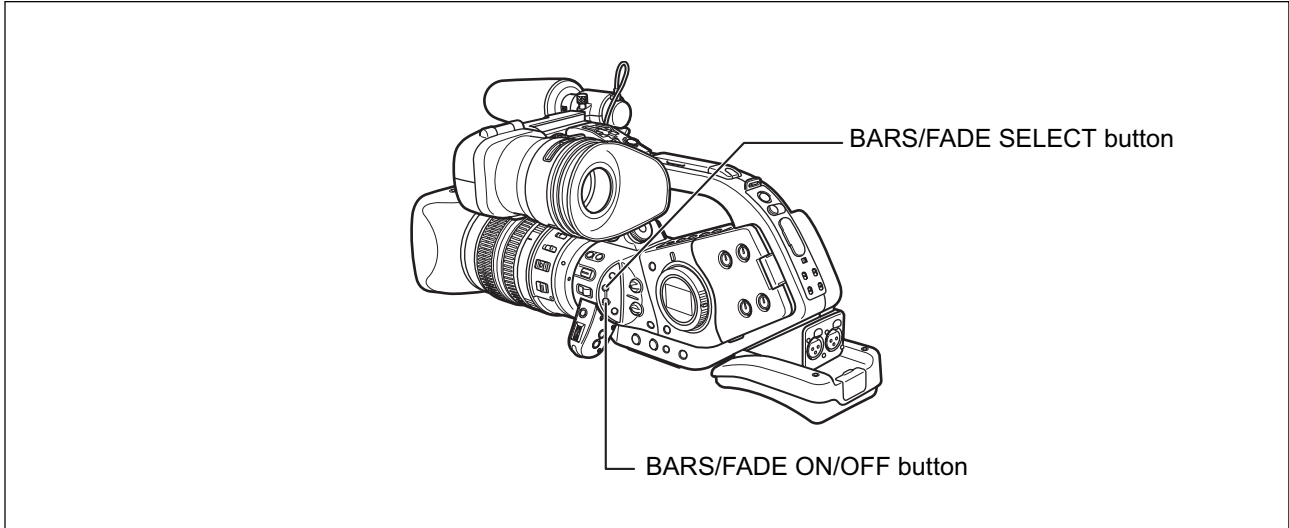
1. **Press the BARS/FADE SELECT button to display "COLOR BARS".**
   - Repeatedly pressing the button will cycle through the options in the following order: COLOR BARS, WHITE FADE, BLACK FADE, no display.
   - "COLOR BARS" starts flashing.
2. **Press the BARS/FADE ON/OFF button.**
   "COLOR BARS" stops flashing, and the color bars appear. Press the button again to deactivate the color bars.

Audio Reference Signal

You can record a 1 kHz audio reference signal (-12 dB or -20 dB) along with the color bars.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(□ 29)

| AUDIO SETUP | ≫ | 1 kHz TONE····OFF |

Open the menu and select [AUDIO SETUP]. Select [1kHz TONE], select the audio signal and close the menu.

- The selected audio reference signal sounds.
- If you select [OFF] the current audio input (microphone, line in, etc.) will be recorded as the audio signal.

Recording

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Using the Faders

You can choose to fade to/from white or to/from black.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	☝	☾	▭

1. **While recording or in record pause mode, press the BARS/FADE SELECT button to display "WHITE FADE" or "BLACK FADE".**
   - Repeatedly pressing the button will cycle through the options in the following order: COLOR BARS, WHITE FADE, BLACK FADE, no display.
   - The selected fader display starts flashing.

2. **Press the BARS/FADE ON/OFF button.**
   The selected fader display stops flashing.

3. **Press the start/stop button.**
   - Record pause: the recording will fade in and start.
   - During recording: the recording will fade out and stop.
   - After the fade-in/out the fader display will start flashing again. To activate the fader again, press the BARS/FADE ON/OFF so the fader display will stay continuously on.

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Using the Digital Video Control

This feature enables the XL H1 to control the record and stop functions of a connected IEEE1394 storage/recording device. The device must comply with the IEEE1394 AV/C protocol.

Windows XP (SP2) users can use the CONSOLE software (sold separately) to download video and audio recordings (in HDV or DV standards) from the camcorder to the computer's hard disk. For details refer to the software's help modules.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	▢
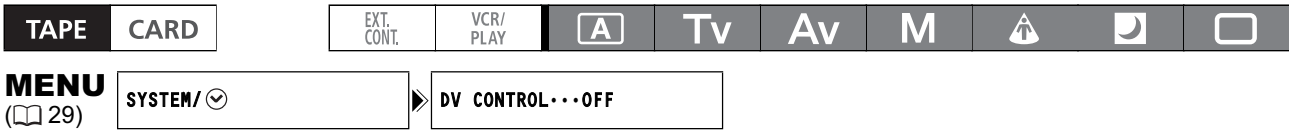
MENU
(🔲 29)   SYSTEM/⊘   ▶   DV CONTROL···OFF

1. **Open the menu and select [SYSTEM/⊘]. Select [DV CONTROL], set it to [ON] and close the menu.**
2. **Press the start/stop button.**

   When the XL H1 is in record pause mode:

   XL H1: Recording   Connected device: Recording

   When the XL H1 is recording:

   XL H1: Record pause mode   Connected device: Record pause mode

   When the XL H1 is not ready for recording (no cassette loaded etc.)

   Connected device: Recording/record pause mode

   After loading a cassette while the connected device is recording:

   XL H1: Recording   Connected device: Continues recording
   Pressing the start/stop button again:
   XL H1: Record pause mode   Connected device: Record pause mode

○ The status of the connected device is indicated as follows:
 DV⤳ ●   Connected device is recording
 DV⤳ ■   Connected device is in record pause or stop mode
 DV⤳ – – –   Connected device is in a mode other than record pause or stop
 DV⤳   [DV CONTROL] is set to [ON], but no DV device is connected
 DV⤳ ● xxx min Recording on the computer's hard disk
○ While both the XL H1 and a connected device are recording, if the XL H1 stops recording because of a condition other than pressing the start/stop button (e.g., if the tape has reached its end), the connected device will continue recording.
○ When connecting two XL H1s with a DV cable, make sure to set [DV CONTROL] of the connected device to [OFF].
○ Up to 2 other devices can be connected to the XL H1 for DV control.
○ With some non-Canon devices: The DV control may not work properly depending on the connected device.
○ As long as the built-in rechargeable lithium battery is charged, the camcorder retains the DV control setting even if you turn the power off. Make sure to check the setting after using the DV control function, as the tape in the connected device may be overwritten.

Other Camcorder Functions/Settings

Changing the Recording Mode (SP/LP)

When recording in Standard Definition (SD mode) only, you can choose between SP (standard play) and LP (long play). LP extends the tape usage by 1.5 times.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☾ | ▢ |

MENU
(📖 29) | RECORDING SETUP ▶ | REC MODE·····SP |
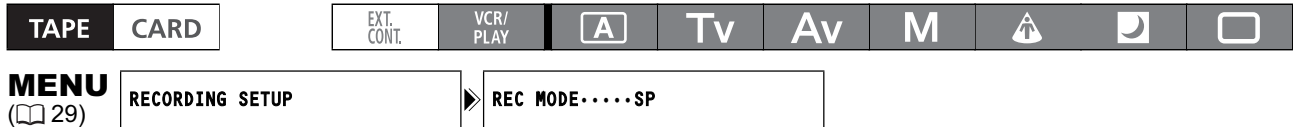
To change to LP mode, open the menu and select [RECORDING SETUP]. Select [REC MODE], set it to [LP] and close the menu.


⚠ **Depending on the tape and its usage condition, the picture and sound recorded in LP mode may be distorted. We recommend using the SP mode for important recordings.**

○ If you record in both SP and LP modes on the same tape, the playback picture may become distorted, and the time code may not be written correctly.
○ If you play back a tape that has been recorded in LP mode with another digital device on this camcorder, or vice versa, the picture and sound may become distorted.

Superimposing the Screen Displays

Character recording is a feature that allows for the superimposition of meta data - year, month, day, hour and minute - permanently burned on to the video. This is ideal for surveillance and law enforcement use.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☾ | ▢ |
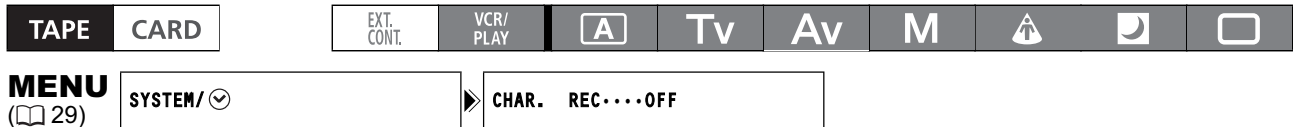
MENU
(📖 29) | SYSTEM/⊘ ▶ | CHAR. REC····OFF |

Open the menu and select [SYSTEM/⊘]. Select [CHAR. REC], set it to [ON] and close the menu.

○ Make sure to set [CHAR. REC] to [OFF] when you do not wish to superimpose the screen displays.
○ Superimposed screen displays cannot be erased later.
○ When you activate the superimposed screen displays you cannot change the [TV SCREEN] setting; Also, the [COMP. OUT] setting will change to [1080i/576i] and the [576i] setting option cannot be selected.

Turning Off the LED Indicators

This option will turn off the POWER, CARD access, HD selection and HDV/DV Terminal indicators as well as the tally lamp, even when the camcorder is operating.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☾ | ▢ |
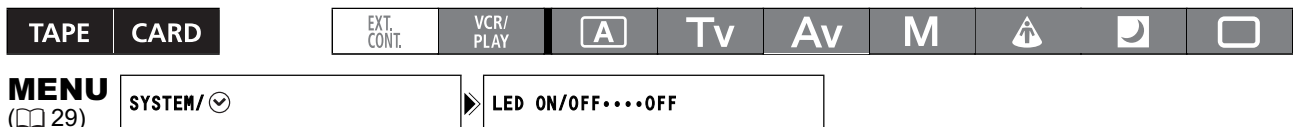
MENU
(📖 29) | SYSTEM/⊘ ▶ | LED ON/OFF····OFF |

Open the menu and select [SYSTEM/⊘]. Select [LED ON/OFF], set it to [OFF] and close the menu.

Turning Off the Tally Lamps

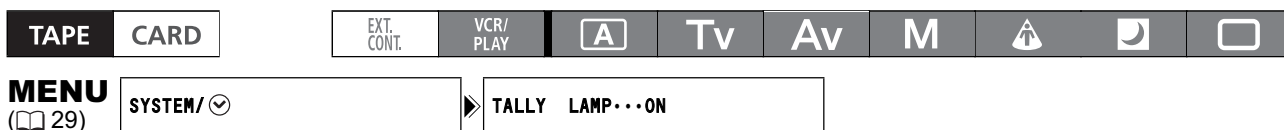| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(🕮 29)　SYSTEM/ ⊙　▶　TALLY LAMP···ON

Open the menu and select [SYSTEM/ ⊙]. Select [TALLY LAMP], set it to [OFF] and close the menu.

The tally lamps still light up when the camcorder receives a signal from the wireless controller.

Changing the Display Language

The language used in the camcorder displays and menu items can be changed to Simplified Chinese or Japanese.
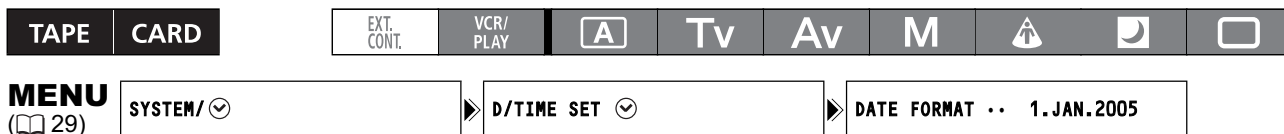
| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(🕮 29)　DISPLAY SETUP / 🗩　▶　LANGUAGE 🗩 ···ENGLISH

To change the display language, open the menu and select [DISPLAY SETUP/🗩]. Select [LANGUAGE 🗩], select a language and close the menu.

- ❍ If you have mistakenly changed the language, follow the 🗩 mark next to the menu item to change the setting.
- ❍ The displays "MENU" and "SET" at the bottom of the screen refer to the button names on the camcorder and will not change when you change the language.

Changing the Date Format

You can select between three date formats. For example, [JAN. 1, 2005], [1. JAN. 2005] and [2005. 1. 1].

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(🕮 29)　SYSTEM/ ⊙　▶　D/TIME SET ⊙　▶　DATE FORMAT ·· 1.JAN.2005

Open the menu and select [SYSTEM/ ⊙]. Select the [D/TIME SET ⊙] submenu and then select [DATE FORMAT]. Select a date format and close the menu.

Changing the Distance Units

When using an HDV compatible lens the focal distance to the subject will be displayed for approx. 3 seconds when you switch from autofocus to manual focus or when you operate the focus ring in the manual focus mode. You can select to display the distance in metric or imperial units.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(🕮 29)　DISPLAY SETUP / 🗩　▶　OBJ DST UNIT ··· m (meter)
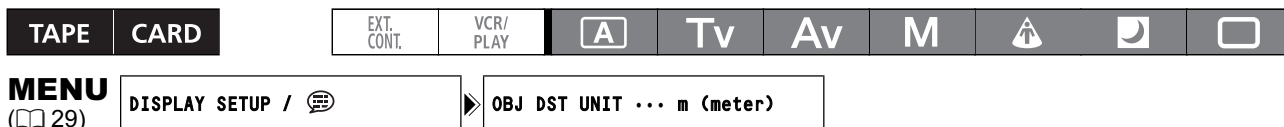
Open the menu and select [DISPLAY SETUP/🗩]. Select [OBJ DST UNIT], set it to [m (meter)] or [ft (feet)] and close the menu.

The focal distance will not be displayed when the optional Extender XL 1.6x is attached to the camcorder.

Playing Back a Tape
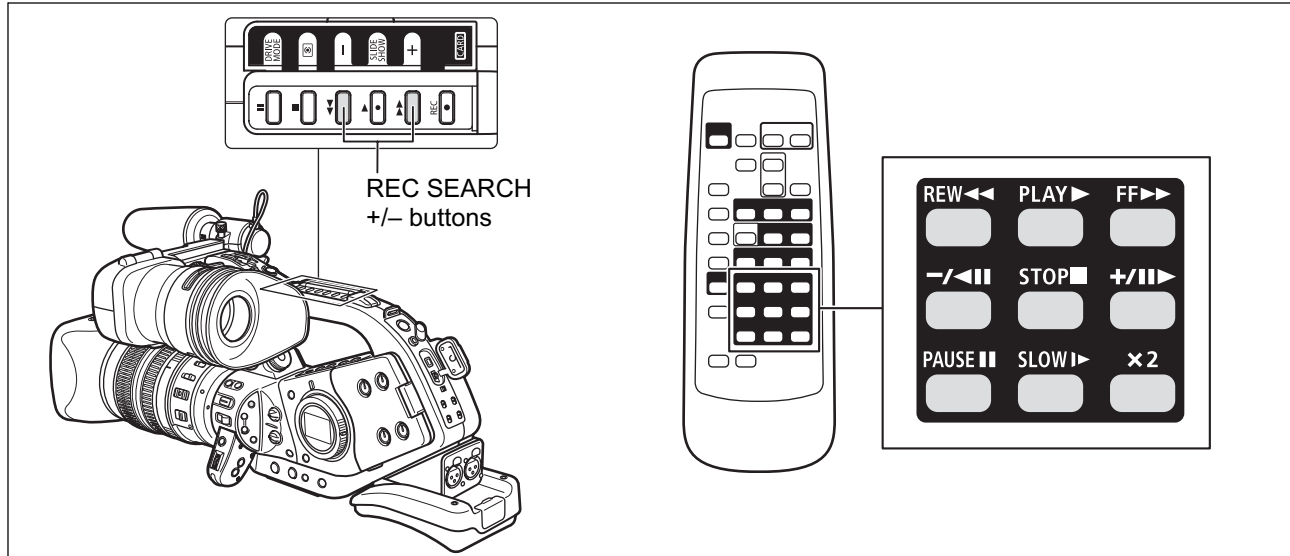
If the playback picture is distorted, clean the video heads using a Canon Head Cleaning Cassette or a commercially available digital video head-cleaning cassette (📖 135).

Select a playback standard according to the tape you wish to play back.

REC SEARCH
+/– buttons

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ☐ |

1. **Set the POWER dial to** $^{VCR/}_{PLAY}$ **.**
2. **Open the menu and select [SIGNAL SETUP]. Select [PLAYBACK STD] and set it to [AUTO], [HDV] or [DV] to match the tape you wish to playback.**
3. **Close the menu.**

Special Playback Modes

HDV

▶❚❚ (Playback Pause)
To pause playback, press the ❚❚ button on the camcorder or the PAUSE ❚❚ button on the wireless controller during normal playback.

◄◄ (Rewind Playback) / ►► (Fast Forward Playback)
Press down and hold the ◄◄ or ►► button on the camcorder or the REW ◄◄ or FF ►► button on the wireless controller during normal playback, rewind or fast forward to enter the fast playback at 8x the normal playback speed.

◄×1 (Reverse Playback)
Press the –/◄❚❚ button on the wireless controller during normal playback. Press the ► (play) button to return to normal playback.

⏸▶ (Frame Advance)

Plays back frame-by-frame. Repeatedly press the button on the +/⏸▶ wireless controller during playback pause. Hold the button pressed down to enter the continuous frame advance playback.

▮▶ (Slow Forward)

Plays back at about 1/3 normal speed. Press the SLOW ▮▶ button on the wireless controller during normal or reverse playback. Press the ▶ (play) button to return to normal playback.

DV

▶⏸ (Playback Pause)

To pause playback, press the ⏸ button on the camcorder or the PAUSE ⏸ button on the wireless controller during normal playback.

◀◀ (Rewind Playback) / ▶▶ (Fast Forward Playback)

Plays back the tape at 11.5 times normal speed (forward or reverse). Press down and hold the ◀◀ or ▶▶ button on the camcorder or the REW ◀◀ or FF ▶▶ button on the wireless controller during normal playback, rewind or fast forward to enter the fast playback at 8x the normal playback speed.

◀⏸ (Frame Reverse) / ⏸▶ (Frame Advance)

Plays back frame-by-frame. Press the −/◀⏸ or +/⏸▶ button on the wireless controller repeatedly during playback pause. Hold the button pressed down to enter the continuous frame advance/reverse playback.

◀▮ (Slow Reverse) / ▮▶ (Slow Forward)

Plays back at about 1/3 normal speed. Press the SLOW ▮▶ button on the wireless controller during normal or reverse playback. Press the ▶ (play) button to return to normal playback.

◀×1 (Reverse Playback)

Press the −/◀⏸ button on the wireless controller during normal playback. Press the ▶ (play) button to return to normal playback.

◀ x2 (Reverse x2 Playback) / 2x ▶ (Forward x2 Playback)
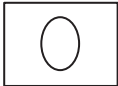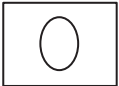
Plays back at 2 times normal speed. Press the ✕2 button on the wireless controller during normal or reverse playback. Press the ▶ (play) button to return to normal playback.

❍ The sound will be muted during special playback.
❍ The picture may become distorted during some special playback modes.
❍ The camcorder stops the tape automatically after 3 minutes in playback pause mode to protect the tape and video heads.
❍ In fast forward playback, rewind playback and reverse playback of a tape recorded in HDV mode, the picture may be distorted.
❍ The picture may be slightly distorted at the switch point between recordings in HDV and DV standards on the tape.

Connecting to a Monitor/TV

The different recording modes and the corresponding output terminals are given in the table below:

	HD/SD SDI Terminal	COMPONENT OUT (D-) Terminal	HDV/DV Terminal	(S-) VIDEO Terminals
HD	1920x1080	D3 (1440x1080)	MPEG TS	
SD in 4:3	640x480	D1 (SD) Normal	DV (SD)	
SD in 16:9	640x480	D1 (SD)	DV (SD)	

Connection to a High Definition TV or Monitor (HDTV/HiVision)

1 Using the SD/HD SDI Terminal

The audio signal is separate from the component video signal

Open the terminal cover

Stereo Cable (supplied)

Signal flow

BNC Cable (commercially available)

Signal flow

INPUT

VIDEO

L AUDIO R

S (S1)-VIDEO
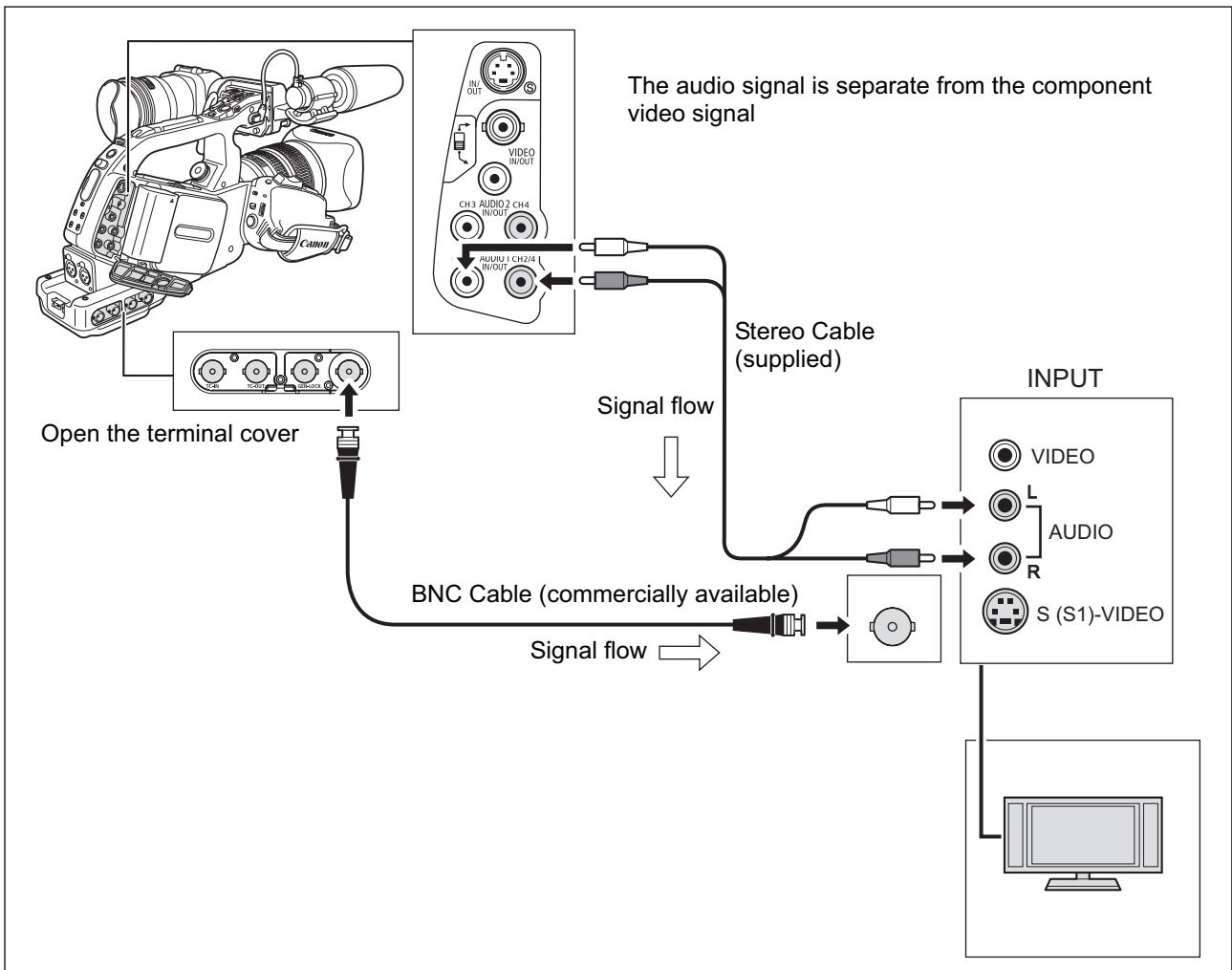
Activate the HD/SD SDI output and select the appropriate video output option (HD or SD).

1. **Set the POWER dial to** $\overset{\text{VCR/}}{\text{PLAY}}$ **.**
2. **Open the menu and select [SIGNAL SETUP]. Select [SDI OUTPUT] and set it to [ON].**
3. **From the same [SIGNAL SETUP] submenu select [SDI SPEC.]. Select [AUTO] or [SD LOCKED] to match the video output you wish to use.**
4. **Close the menu.**

② Using the COMPONENT OUT (D-) Terminal
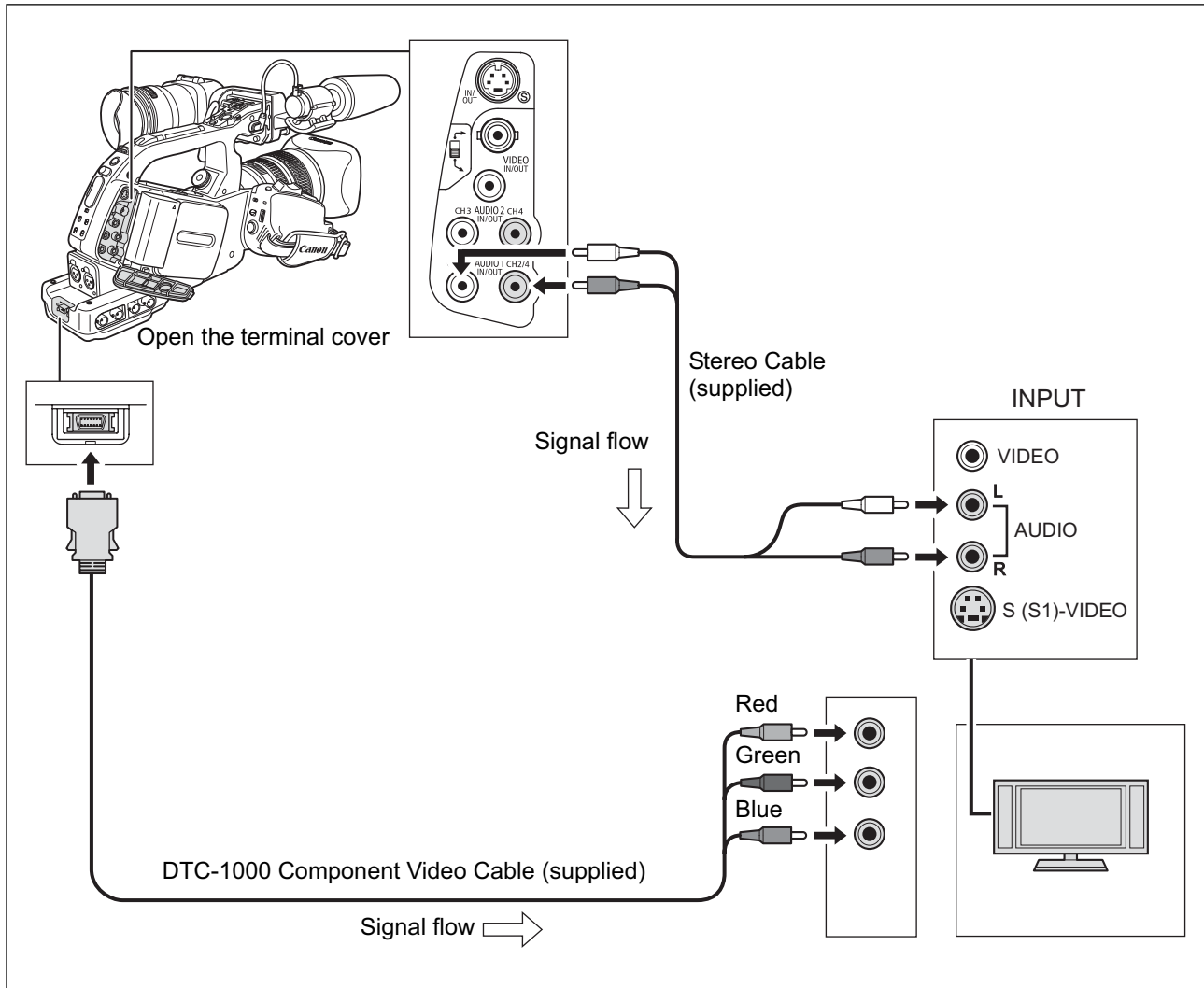
Open the terminal cover

Stereo Cable (supplied)

Signal flow

INPUT

VIDEO

L
AUDIO
R

S (S1)-VIDEO

Red
Green
Blue

DTC-1000 Component Video Cable (supplied)

Signal flow ⟹

Select the appropriate component video signal depending on the TV or monitor you connect.

Open the menu and select [SIGNAL SETUP]. Select [COMP. OUT], select a setting option and close the menu.

3 Using the HDV/DV Terminal

DV Cable
(commercially available)

4-pin

6-pin
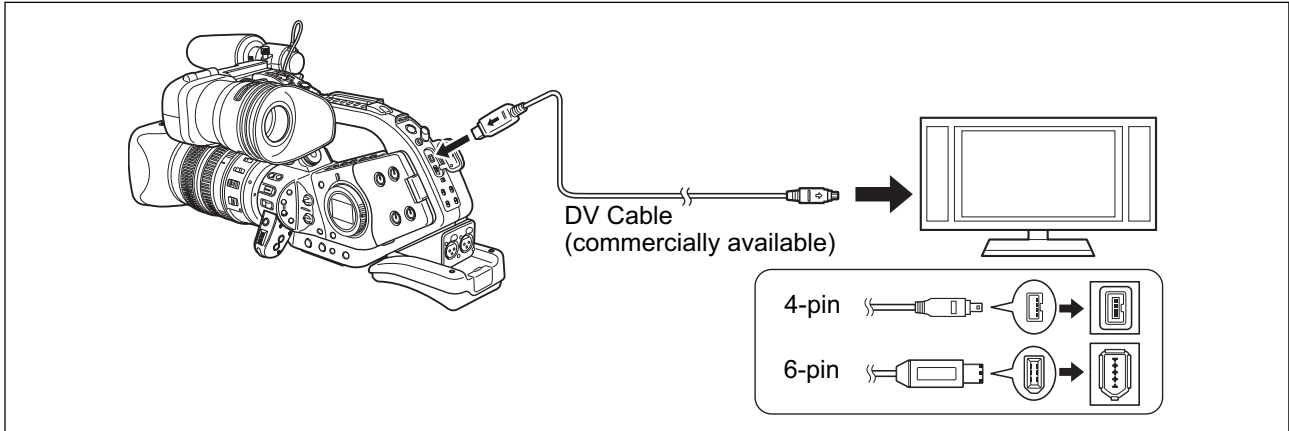
- When connecting the camcorder to a monitor TV that supports DV, you may need to carry out a procedure on the TV to recognize the camera. Refer to the instruction manual of the TV or monitor.
- If necessary, turn on the DV conversion and select whether to convert a tape recorded in HD to SD with the following procedure.

Open the menu and select [SIGNAL SETUP]. Select [HD DOWN-CONV], select a setting option and close the menu.

4 Using the S-VIDEO or VIDEO Terminal

If connecting to a TV, set the input selector to VIDEO. If connecting to a VCR, set the input selector to LINE. Refer also to the instruction manual of the TV or VCR.

Open the terminal cover

INPUT

Stereo Cable (supplied)

Signal flow

VIDEO

L

AUDIO

R

Signal flow

S (S1)-VIDEO

S-Video Cable
(commercially available)

○ We recommend powering the camcorder from a household power outlet.
○ When connecting to the RCA terminal, set the RCA/BNC selector down to RCA. When connecting to the BNC terminal, set the RCA/BNC selector up to BNC.
○ In fast forward playback, rewind playback and reverse playback of a tape recorded in HDV mode, the picture may be distorted.

Connection to a Normal TV or Monitor (Non-HDTV/HiVision)

① Using the COMPONENT OUT (D-)Terminal

Refer to the connection diagram in the previous section (📖 97).

Select the appropriate component video signal depending on the TV or monitor you connect.

Open the menu and select [SIGNAL SETUP]. Select [COMP. OUT], select a setting option and close the menu.

② Using the S-VIDEO or VIDEO Terminal

Refer to the connection diagram in the previous section (📖 98).

If connecting to a TV set the input selector to VIDEO. If connecting to a VCR, set the input selector to LINE.

Refer also to the instruction manual of the TV or VCR.

③ Using the SCART Adapter

Signal flow

Stereo Cable (supplied)

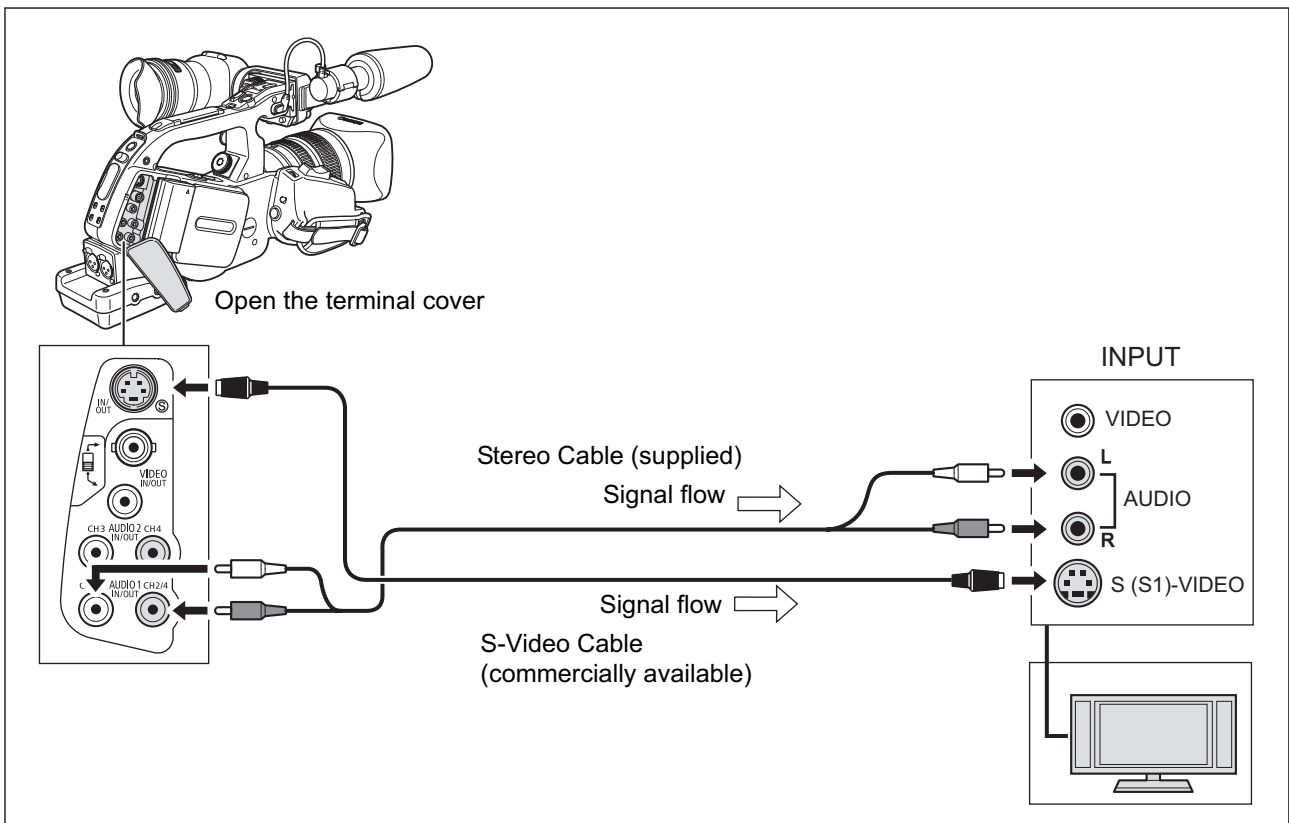PC-A10 SCART Adapter

RCA cable (commercially available)
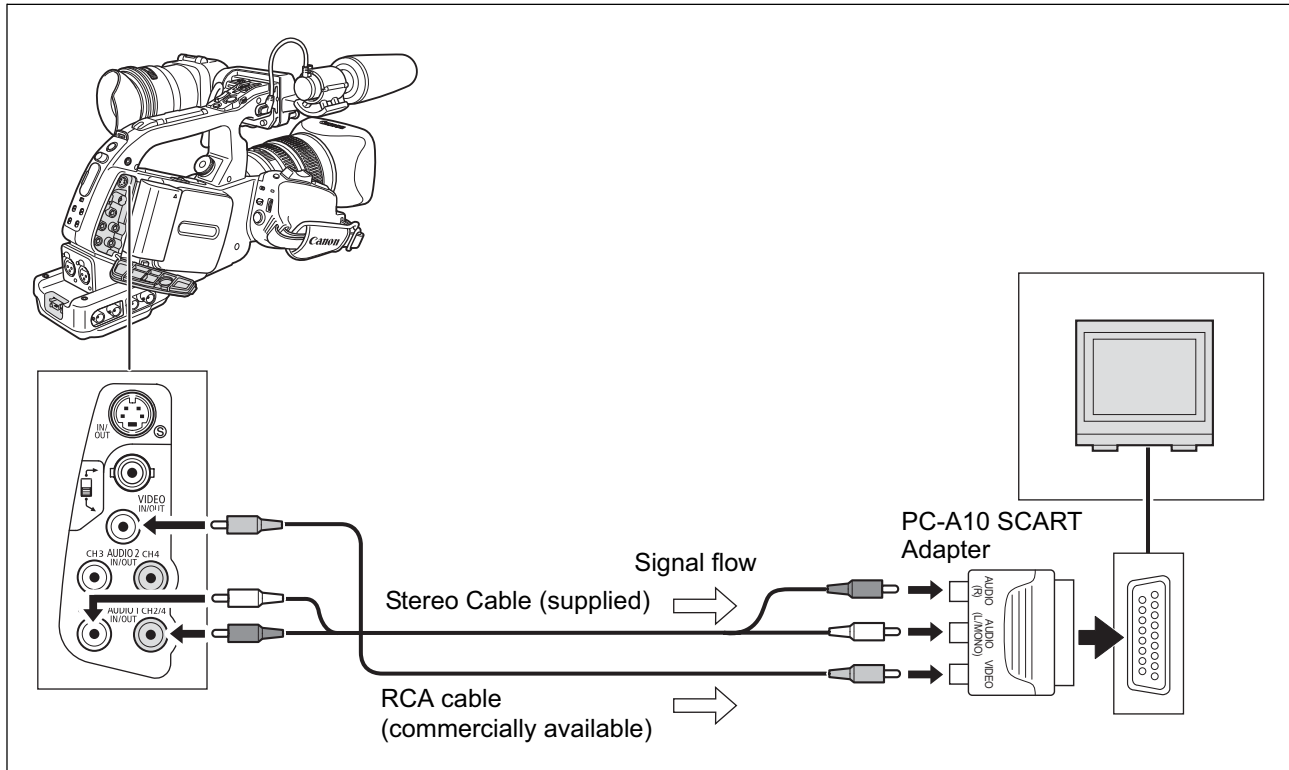
Connect the supplied stereo cable to the camcorder's AUDIO1 terminals and the audio connections on the SCART adapter. Connect the video connection on the SCART adapter using an RCA video cable (commercially available) to the camcorder's VIDEO IN/OUT - RCA Terminal and set the RCA/BNC selector down to RCA.

If connecting to a TV set the input selector to VIDEO. If connecting to a VCR, set the input selector to LINE. The supplied PC-A10 SCART Adapter is for output only. For analog line-in recording or analog-digital conversion, use a commercially available SCART adapter with input capability.

Refer also to the instruction manual of the TV or VCR.

❍ We recommend powering the camcorder from a household power outlet.
❍ When connecting to the RCA terminal, set the RCA/BNC selector down to RCA. When connecting to the BNC terminal, set the RCA/BNC selector up to BNC.
❍ In fast forward playback, rewind playback and reverse playback of a tape recorded in HDV mode, the picture may be distorted.

Audio Output

AUDIO2 RCA terminals

SET button
SELECT dial
MENU button
AUDIO MONITOR button

AUDIO1 RCA terminals

| **TAPE** | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ☐ |
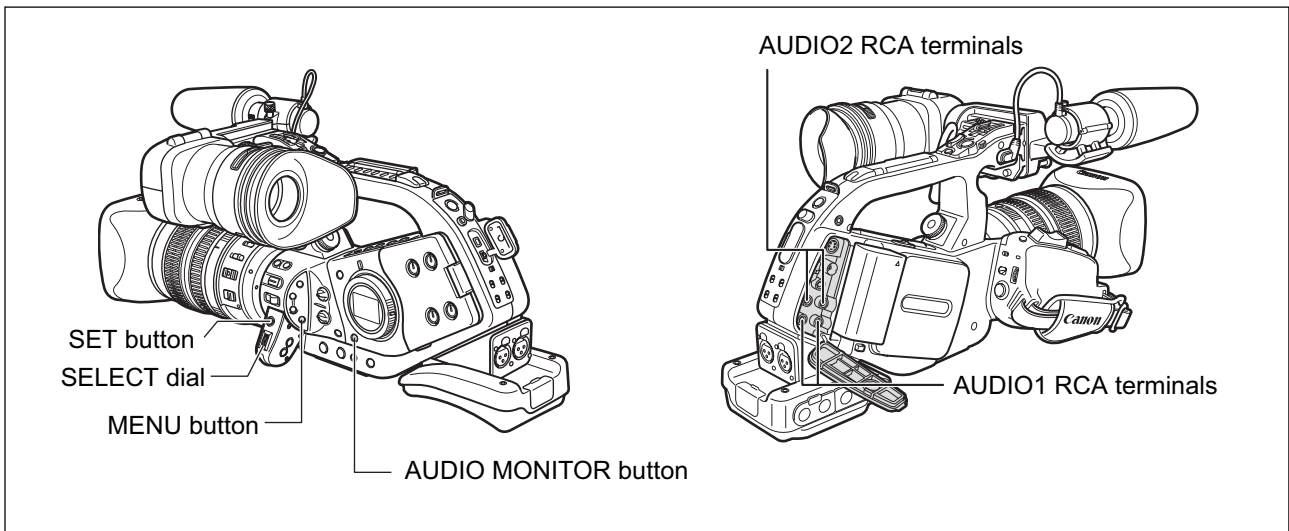
Selecting the Audio Output of the RCA Terminals

Press the AUDIO MONITOR button.

Repeatedly pressing the button will cycle through the options in the following sequence: CH **1/2**, CH **3/4** and CH **1/2** / CH **3/4**.

Selecting the Audio Channels

MENU
(📖 29) | AUDIO SETUP | ▶ | SEL AUDIO CH·CH **1/3** / CH **2/4** |

Open the menu and select [AUDIO SETUP]. Select [SEL AUDIO CH], select a setting option and close the menu.

Selecting the Audio Mix

MENU
(📖 29) | AUDIO SETUP | ▶ | MIX SELECT···VARIABLE |

1. **Open the menu and select [AUDIO SETUP]. Select [MIX SELECT], set it to [VARIABLE] or [FIXED] and close the menu.**
2. **If you selected [VARIABLE], adjust the mix balance with the MIX BALANCE CH1/2 and CH3/4 buttons on the wireless controller.**

Returning to a Pre-marked Position

If you wish to return to a particular scene later, mark the point with the zero set memory, and the tape will stop at that point when you rewind/fast forward the tape.

This function is operated with the wireless controller.

REW ◀◀ button
ZERO SET MEMORY button
STOP ■ button

| **TAPE** | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | 🌙 | ▢ |
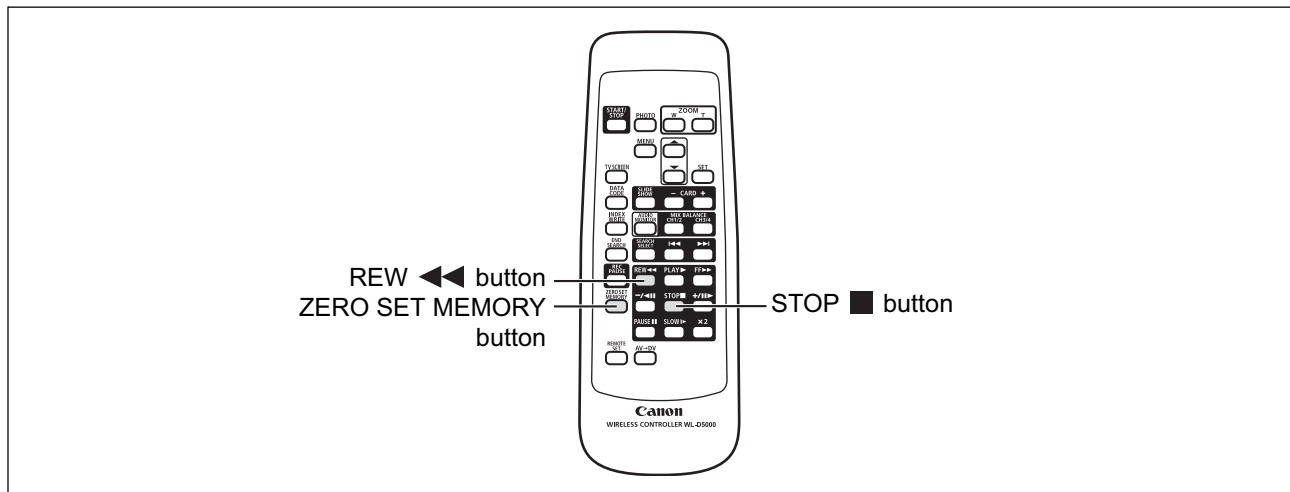
1. Press the ZERO SET MEMORY button at the point you wish to return to later.

- The tape counter is reset to 0:00:00 and the Ⓜ mark appears.
- To cancel, press the ZERO SET MEMORY button again.

2. After you finish playing back the tape, rewind the tape.

- "◀◀ RTN" appears.
- The tape stops automatically at "0:00:00" and the Ⓜ mark disappears.
- The tape counter changes to time code.

- ❍ The zero set memory may not function correctly if the time code has not been recorded consecutively.
- ❍ The zero set memory function may not work correctly if you mix recordings in HDV and DV standards on the same tape.

Index Search

With the index search you can locate any point you have marked beforehand with an index signal
(□ 87). This function is operated with the wireless controller.

SEARCH SELECT button

|◄◄ / ►►| buttons

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☾ | ▢ |
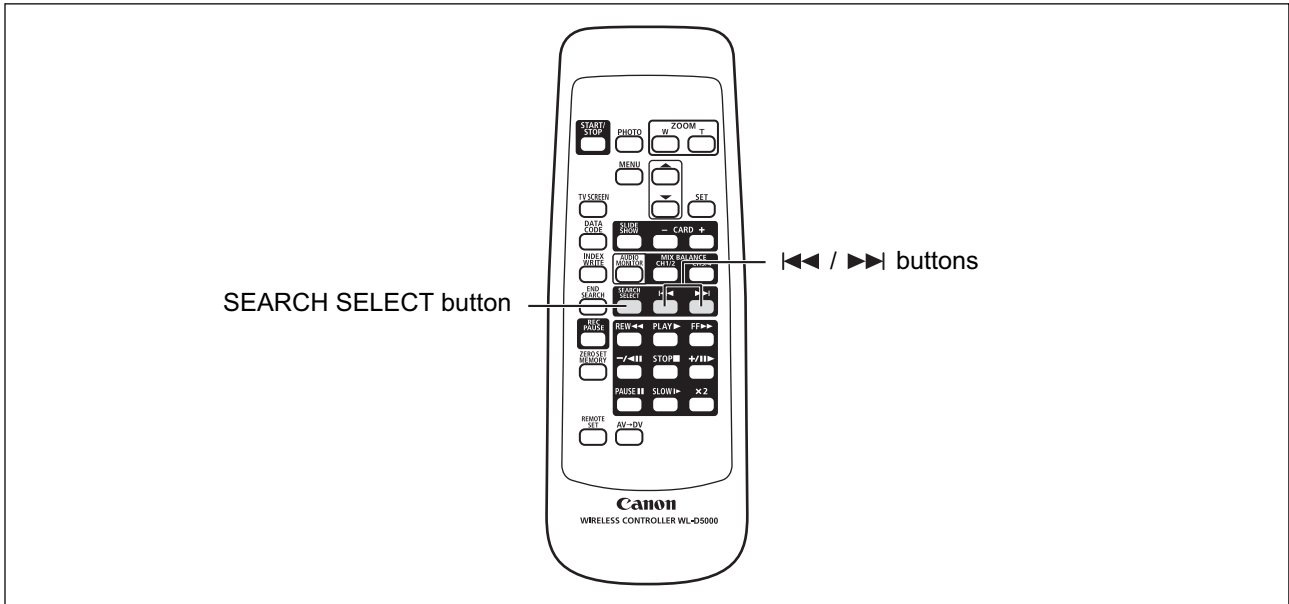
1. Press the SEARCH SELECT button to display "INDEX SEARCH".

" ➔ 🎞 " appears.

2. Press the |◄◄ or ►►| button to begin searching.

• Press more than once to search for further index signals (up to 10 times).
• Press the STOP ■ button to stop searching.

○ Playback may start slightly before or after the index signal.
○ The index search function may not work correctly if you mix recordings in HDV and DV standards
on the same tape.

Date Search

You can locate the change of the date/time zone with the date search function.

This function is operated with the wireless controller.

SEARCH SELECT button

|◄◄ / ►►| buttons

| **TAPE** | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | 🌙 | ☐ |

1. Press the SEARCH SELECT button to display "DATE SEARCH".

"➜🗓" appears.

2. Press the |◄◄ or ►►| button to begin searching.

- Press more than once to search for further date changes (up to 10 times).
- Press the STOP ■ button to stop searching.

○ A recording of longer than a minute per date/time zone is required.
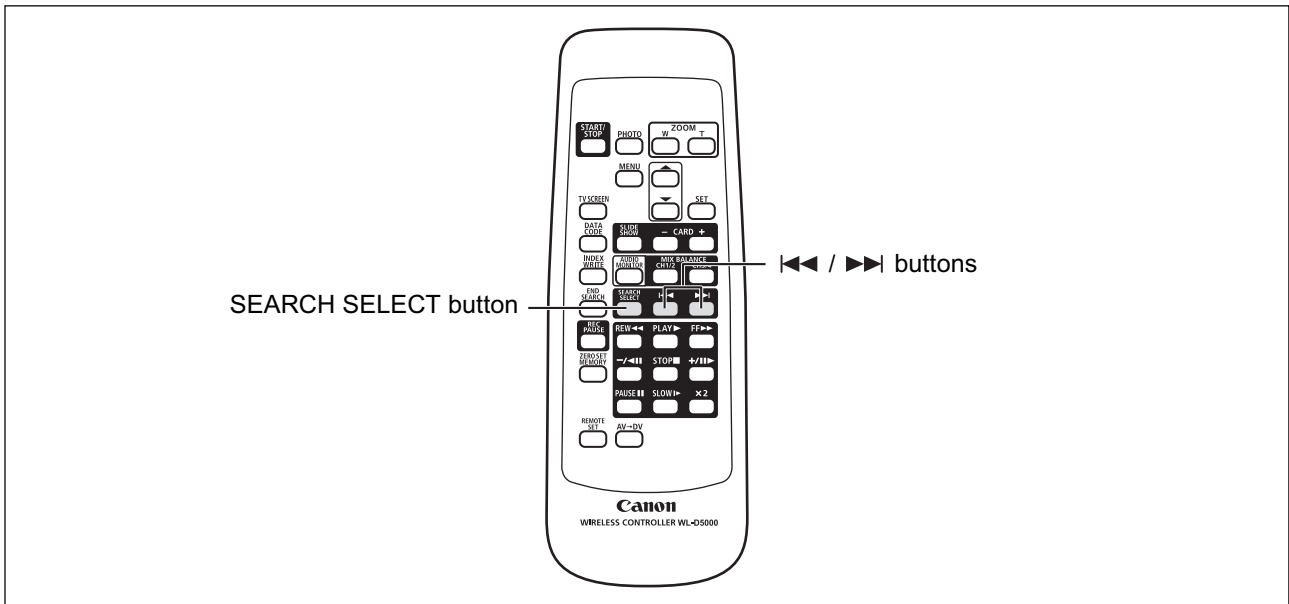
○ The date search may not function if the data code is not correctly displayed.

○ The date search function may not work correctly if you mix recordings in HDV and DV standards on the same tape.

Displaying the Data Code

The camcorder maintains a data code containing the recording date and time and other camera data such as shutter speed, gain and exposure (f-stop).

| MENU button |
| DATA CODE button |
| SELECT dial |
| MENU button |
| SET button |

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ☐ |
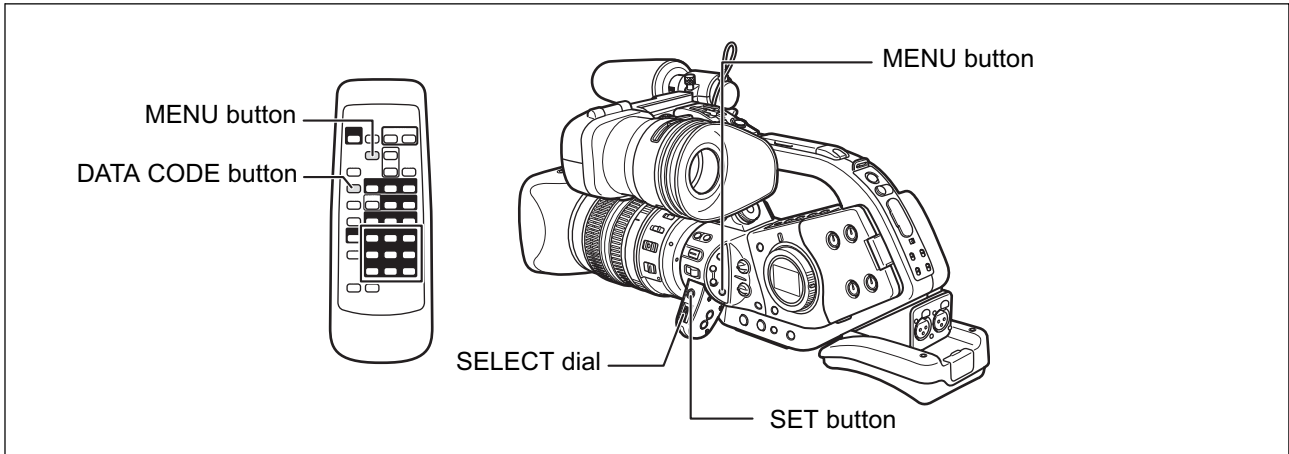
Selecting the Data Code Display Combination

MENU
(📖 29)

| DISPLAY SETUP / 🗩 | ▷ | DATA CODE····DATE & TIME |

Open the menu and select [DISPLAY SETUP/🗩]. Select [DATA CODE], select a setting option and close the menu.

Displaying the Data Code

Press the DATA CODE button on the wireless controller.

> The data code will not display the next time you turn on the camcorder.

Six-Second Auto Date

The date and time appear for 6 seconds when you begin playback, or to indicate that the date or time zone has changed.

MENU
(📖 29)

| DISPLAY SETUP / 🗩 | ▷ | 6SEC.DATE····OFF |

Open the menu and select [DISPLAY SETUP/🗩]. Select [6SEC.DATE], set it to [ON] and close the menu.

Changing the Remote Sensor Mode

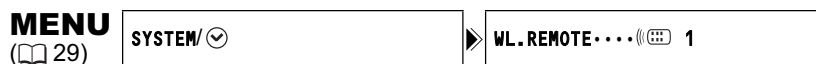Two remote sensor modes and an off setting are available to prevent interference from other Canon wireless controllers being used nearby.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	[A]	Tv	Av	M	⚠	🌙	▢

Turning the Remote Sensor Off

MENU
(📖 29) | SYSTEM/ ⊘ | ▶ | WL.REMOTE · · · · ((⬚ 1 |

Open the menu and select [SYSTEM/ ⊘]. Select [WL.REMOTE], set it to [OFF ((⬚]] and close the menu.

"((⬚]" appears.

Changing the Remote Sensor Mode

MENU
(📖 29) | SYSTEM/ ⊘ | ▶ | WL.REMOTE · · · · ((⬚ 1 |
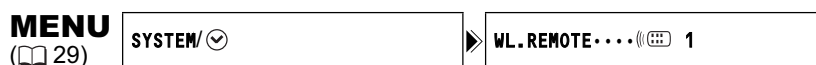
1. **On the camcorder, open the menu and select [SYSTEM/ ⊘]. Select [WL.REMOTE], set it to [((⬚ 2] and close the menu.**
   The selected mode appears for a few seconds.
2. **On the wireless controller, press and hold the REMOTE SET button. Press the ZOOM T button for mode 2. Keep the button pressed for over 2 seconds.**
   If you have set the camcorder to mode 1, press the ZOOM **W** button for mode 1.

○ The wireless controller returns to mode 1 when you replace the batteries. Change the mode if necessary.
○ Make sure that the camcorder and wireless controller are set to the same mode. Display the camcorder's mode by pressing any button on the wireless controller (except the REMOTE SET button) and set the wireless controller's mode to the same mode. Change the batteries if the wireless controller still does not work.

Recording an External Video Signal (Analog Line-In, HDV/DV In)

You can record on the tape an external video signal, either from the analog video input (SD standard) or from the HDV/DV input (SD or HD standard).

TAPE **CARD** | EXT. CONT. | VCR/ PLAY | [A] | Tv | Av | M | ⚠ | ☾ | ▭

Analog Line-In

You can select the audio channels to be recorded along with the video signal.

1. **Connect the camcorder to the analog video device.**
   For the connection diagram to an analog device refer to Section ④ of *Connecting to a Monitor/TV* (◻ 98).

2. **Set the POWER dial to VCR/PLAY and load a blank cassette.**

3. **Open the menu and select [AUDIO SETUP]. Select [AUDIO MODE], select a setting option and close the menu.**

4. **Select the audio input.**
   Select the input with the INPUT SELECT switch of AUDIO1 (for analog line-in, set it to AUDIO1 or REAR).

5. **Connected device: Load the recorded cassette.**

6. **Press the ● and ‖ buttons (or the REC PAUSE button on the wireless controller).**
   • The camcorder enters the record pause mode. In this mode you can monitor the picture on the screen.
   • If you press only the ● button, recording will start immediately.

7. **Connected device: Play back the tape.**

8. **Press the ‖ button (or the PAUSE ‖ button on the wireless controller) when the scene you wish to record appears.**
   Recording starts.

9. **Press the ■ button to stop recording.**

10. **Connected device: Stop playback.**

HDV/DV In

1. **Connect the camcorder to the external video device.**
   For the connection diagram to a digital device refer to Section ③ of *Connecting to a Monitor/TV* (◻ 98).

2. **Set the POWER dial to VCR/PLAY and load a blank cassette.**

3. **Connected device: Load the recorded cassette or disc.**

4. **Press the ● and ‖ buttons (or the REC PAUSE button on the wireless controller).**
   • The camcorder enters the record pause mode. In this mode you can monitor the picture on the screen.
   • If you press only the ● button, recording will start immediately.

5. **Connected device: Start the playback.**

6. **Press the ‖ button (or the PAUSE ‖ button on the wireless controller) when the scene you wish to record appears.**
   Recording starts.

7. **Press the ■ button to stop recording.**

8. **Connected device: Stop playback.**

Recording is not possible unless the [PLAYBACK STD] option is set to [AUTO] (□ 33).

Concerning Copyright

Copyright Precaution

Certain pre-recorded video tapes, films and other materials, as well as some television programs are copyrighted. Unauthorized recording of these materials may violate copyright protection laws.

Copyright Signals

During playback: If you try to play back a tape that contains copyright control signals for protection of software, "COPYRIGHT PROTECTED PLAYBACK IS RESTRICTED" appears for a few seconds and the camcorder displays a blank blue screen. You cannot playback the contents of the tape.

During recording: If you try to record from software that contains copyright control signals for protection of software, "COPYRIGHT PROTECTED DUBBING RESTRICTED" appears. You cannot record the contents of the software.
You cannot record copyright protection signals to a tape using this camcorder.

○ We recommend powering the camcorder from a household power outlet.
○ The supplied PC-A10 SCART Adapter is for output only. For analog line-in recording or analog-digital conversion, use a commercially available SCART adapter with input capability.

Converting Analog Signals into Digital Signals (Analog-Digital Converter)

Using the camcorder you can convert analog video input signals to a digital video signal (SD standard) and output it through the HDV/DV terminal.

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	▢

MENU
(□ 29)

SIGNAL SETUP	▶	AV➡DV········OFF

Open the menu and select [SIGNAL SETUP]. Select [AV➡DV], set it to [ON] and close the menu.

⚠ ❍ Depending on the signal sent from the connected device, the conversion from analog to digital signals might not work properly (e.g., signals that include copyright protective signals or anomalous signals such as ghost signals).

❍ For normal use, set [AV➡DV] to [OFF]. If it is set to [ON], digital signals cannot be input via the camcorder's HDV/DV terminal.

❍ Depending on the software and the specifications of your computer, you may not be able to transfer converted signals via the HDV/DV terminal.

✎ ❍ We recommend powering the camcorder from a household power outlet.

❍ You can also press the AV➡DV button on the wireless controller. Repeatedly pressing the controller's button will toggle the AV➡DV conversion on and off.

❍ When connecting to a TV/video with SCART terminal, use a SCART adapter with input capability (commercially available). The supplied SCART Adapter PC-A10 is for output only.

Connecting to a Computer (IEEE1394)

To connect the camcorder to a computer you need to ensure the following requirements: a computer equipped with an IEEE1394 (DV) terminal and video editing software with video capturing capability installed. For the minimum system requirements for video editing, refer to the instruction manual of the video editing software.

Windows XP (SP2) users can use the CONSOLE software (sold separately) to download video and audio recordings (in HDV or DV standards) from the camcorder to the computer's hard disk. For details refer to the software's help modules.

IEEE1394 terminal

DV cable (commercially available)

4-pin

6-pin
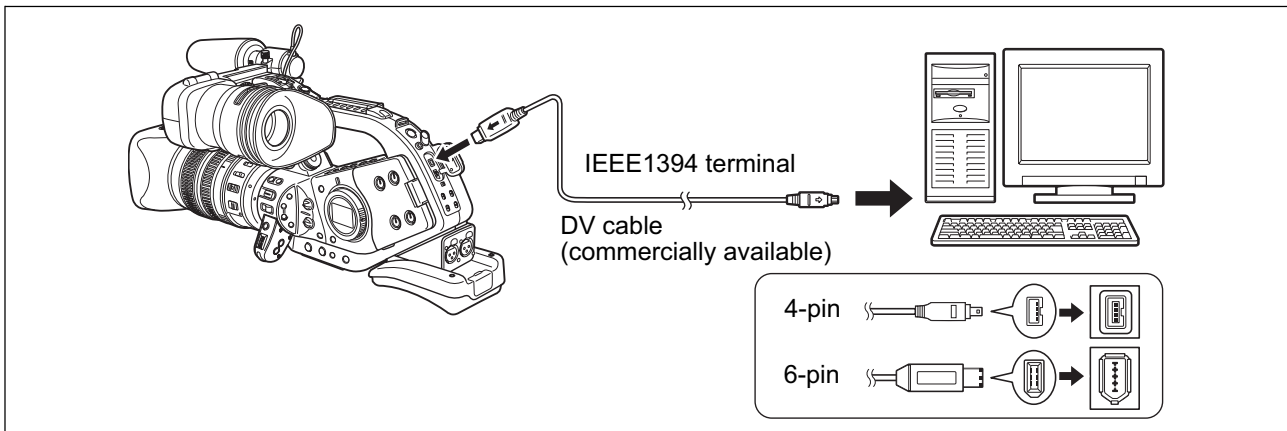
- ○ Operation may not work correctly depending on the software and the specifications/settings of your computer.
- ○ If the computer freezes while you have connected the camcorder, disconnect and reconnect the DV cable. Should the problem persist, disconnect the cable, turn both the camcorder and the computer off and the on again and reconnect them.
- ○ Make sure that the computer video capturing system is compatible with the video signal standard you are using. If the computer is not compatible with the signal standard of the camcorder's video output, the camcorder may not be correctly detected or may not operate properly.

- ○ Refer also to the instruction manual of the computer.
- ○ Adjust the [PLAYBACK STD] and [HD DOWN-CONV] settings in the SIGNAL SETUP submenu in accordance with the video signal standards of the connected computer.
- ○ When outputting the camcorder's video signal to the computer:
    - HDV video output: In the SIGNAL SETUP menu set the [PLAYBACK STD] setting to [HDV] and the [HD DOWN-CONV] setting to [OFF].
    - DV video output: In the SIGNAL SETUP menu set the [PLAYBACK STD] setting to [DV].
    - DV video output of a recording originally made in HDV standard: In the SIGNAL SETUP menu set the [PLAYBACK STD] setting to [HDV] and the [HD DOWN-CONV] setting to [ON].
- ○ When inputting a video signal from the computer to the camcorder:
    - HDV video input: In the SIGNAL SETUP menu set the [PLAYBACK STD] setting to [HDV] and the [HD DOWN-CONV] setting to [OFF].
    - DV video input: In the SIGNAL SETUP menu set the [PLAYBACK STD] setting to [DV].

Selecting the Image Quality/Size
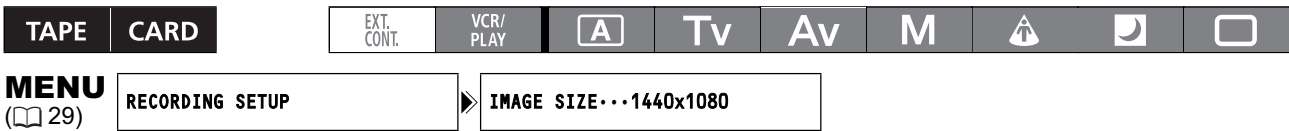
Changing the Still Image Quality

You can choose from Superfine, Fine and Normal.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | [A] | Tv | Av | M | ☝ | 🌙 | ▢ |

MENU
(□ 29)   RECORDING SETUP   ▶   IMG QUALITY··FINE

Open the menu and select [RECORDING SETUP]. Select [IMG QUALITY], select a setting option and close the menu.

Changing the Still Image Size

You can choose from 1920 x 1080, 848 x 480, 1440 x 1080 and 640 x 480 pixels.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | [A] | Tv | Av | M | ☝ | 🌙 | ▢ |

MENU
(□ 29)   RECORDING SETUP   ▶   IMAGE SIZE···1440x1080

Open the menu and select [RECORDING SETUP]. Select [IMAGE SIZE], select a setting option and close the menu.

○ Still images are recorded on the memory card using JPEG compression.
○ Number of still images 📷 that can be recorded on a memory card:

Image Size	Image Quality	Number of Images			File Size per Image
		16MB	128MB	512MB	
LW 1920 x 1080	Super Fine	9	90	365	1390kB
	Fine	14	135	550	930kB
	Normal	25	265	1080	480kB
SW 848 x 480	Super Fine	45	455	1845	280kB
	Fine	70	645	2615	200kB
	Normal	140	1295	5230	100kB
L 1440 x 1080	Super Fine	10	120	485	1050kB
	Fine	15	180	725	710kB
	Normal	35	350	1425	360kB
S 640 x 480	Super Fine	65	595	2410	210kB
	Fine	95	865	3485	150kB
	Normal	170	1555	6280	80kB

- These figures are approximate. They vary according to the recording condition and the subject.
- The total number of still images that can be recorded will decrease if you store custom preset files on the card.

File Numbers

Still images are automatically assigned file numbers from 0101 to 9900, and stored in folders containing up to 100 images. Folders are numbered from 101 to 998.

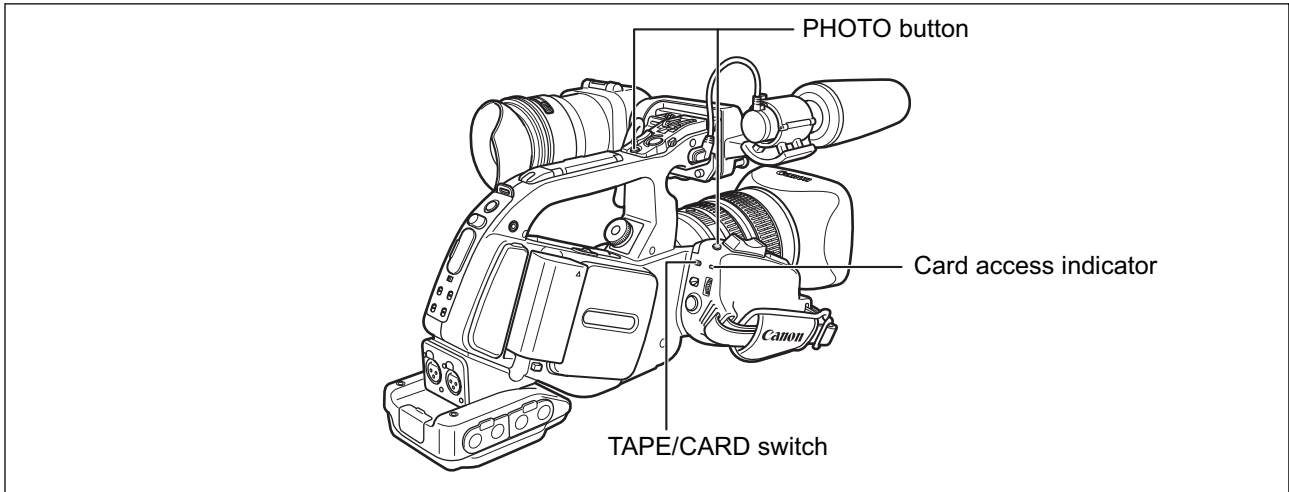| RESET	The file number will be reset each time a new memory card is inserted. If the memory card already contains image files, the consecutive file number will be assigned.
CONTINUOUS	The camcorder memorizes the file number of the last image and assigns the consecutive file number to the next image, even when a new memory card is inserted. (If a higher file number already exists on the memory card, the consecutive number will be assigned.) There will be no duplication of file numbers. This is useful for organizing images on a computer.

TAPE	CARD		EXT. CONT.	VCR/ * PLAY	A	Tv	Av	M	⚠	☽	▢

* Only when playing back a tape.

MENU
(📖 29)

RECORDING SETUP	▶	FILE NOS.·····CONTINUOUS

To change the setting, open the menu and select [RECORDING SETUP]. Select [FILE NOS.], set it to [RESET] and close the menu.

Recording Still Images on a Memory Card

You can record still images with the camcorder, from a tape in the camcorder. You can also record a still image on the memory card while you record a movie on the tape.

PHOTO button

Card access indicator

TAPE/CARD switch

TAPE	CARD		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	☽	☐

1. **Turn the POWER dial to a recording program and move the TAPE/CARD switch to ☐.**

2. **Press the PHOTO button halfway.**
   - The ◉ symbol turns green once the focus is adjusted. The picture may appear out of focus for a moment while the camcorder is focusing.
   - While the PHOTO button is half-pressed you can also use the focusing ring to adjust the focus.
   - Exposure is locked.
   - When you press the PHOTO button on the wireless controller, recording starts immediately.
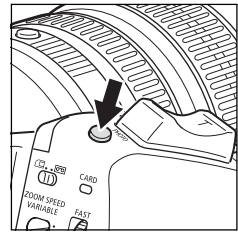
3. **Press the PHOTO button fully.**
   - The ◉ symbol disappears.
   - The CARD access indicator flashes and the card access display appears.
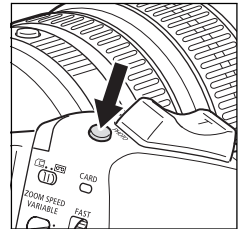
○ Do not turn off the camcorder, change the position of the TAPE/CARD switch or the POWER dial, open the memory card cover or remove the memory card while the CARD access indicator is flashing. Doing so could result in data damage.

○ When you are using an SD Memory Card, make sure that the protect switch is set to allow recording.

- ○ **When the Focus-Priority mode is set to [ON]:**

  When you press the PHOTO button fully before the ⦿ symbol turns green, it may take up to 2 seconds (4 seconds in the Night recording program) until the focus is adjusted.

  If the subject is not suitable for autofocus, the camcorder locks the focus. In that case, adjust the focus manually with the focusing ring.
- ○ **When the Focus-Priority mode is set to [OFF]:**

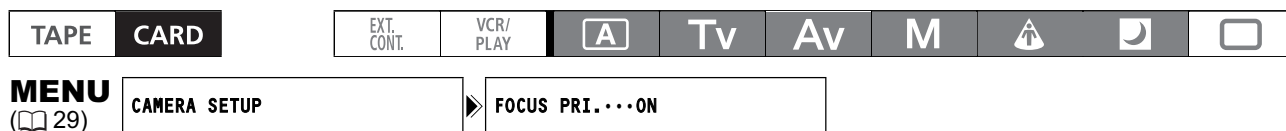 In step 2, ⦿ turns green, and focus and exposure are locked.
- ○ **About the Power Save function:**

  In `CAMERA CARD` mode: In order to save power when the camcorder is powered with a battery pack, the camcorder will automatically enter the power save mode if you do not operate it for 5 minutes. With the [POWER SAVE] option in the [SYSTEM/⊘] menu you can select if the power will be turned off (set it to [ON]) or not (set it to [OFF]).

  If you set the power save option to [ON] and the computer automatically powered off, in order to resume recording press the STANDBY button or turn the POWER dial to OFF and then back to a recording mode.

Turning Off the Focus-Priority Mode

Turn off the Focus Priority mode if you wish to record a still image as soon as you press the PHOTO button.

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(📖 29)

| CAMERA SETUP | ▶ | FOCUS PRI.···ON |

Open the menu and select [CAMERA SETUP]. Select [FOCUS PRI.], set it to [OFF] and close the menu.

Recording a Still Image on a Memory Card While Recording Movies on a Tape

When you are recording a movie on a tape, you can simultaneously record the same picture as a still image on the memory card. If you select [ON+CP DATA] as the still image recording setting, you can embed the custom preset settings currently in use embedded in a still image of the current picture. This is useful if you later want to load the custom preset settings you used when recording a specific scene.
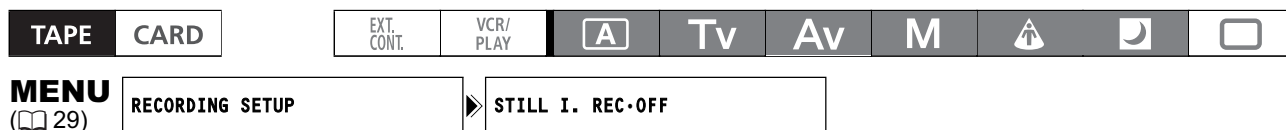
| **TAPE** | CARD | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | ☽ | ▢ |

MENU
(📖 29)

| RECORDING SETUP | ▶ | STILL I. REC·OFF |

1. **Open the menu and select [RECORDING SETUP]. Select [STILL I. REC], set it to [ON] or [ON+CP DATA] and close the menu.**
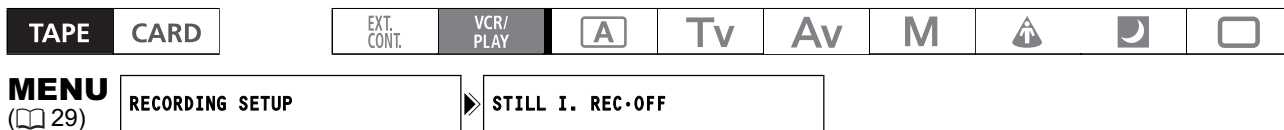2. **While you are recording a movie, press the PHOTO button.**

- ○ The still image cannot be recorded on a memory card when a fader is activated.
- ○ "🚫" appears if you press the PHOTO button while [STILL I. REC] is set to [OFF].

Capturing a Still Image from a Tape

While you are playing back a tape, you can capture the same picture as a still image on the memory card.

| TAPE | CARD | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | ☾ | ☐ |

MENU
(📖 29)

| RECORDING SETUP | ▶ | STILL I. REC·OFF |

1. **Open the menu and select [RECORDING SETUP]. Select [STILL I.REC], set it to [ON] or [ON+CP DATA] and close the menu.**
2. **While you are playing back the tape, press the PHOTO button.**

Screen Displays during Still Image Recording

①② ③314 🔋LW ④
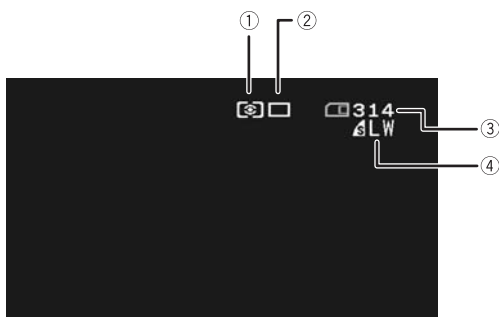
① Metering Method Icon

Indicates the metering mode currently selected for recording still images.

② Drive Mode Icon

Indicates the drive mode currently selected for recording still images.

③ Remaining Card Capacity for Still Images

🔲 flashing in red: No card
🔲 in green: 6 or more images
🔲 in yellow: 1 to 5 images
🔲 in red: No more images

• The indication may not decrease even though a recording has been made, or may decrease by 2 images at once.
• All indicators are displayed in green when a memory card is played back.

"▶" Card Access Display

Indicates that the camcorder is writing on the memory card.

④ Image Quality and Size

Indicates the quality and size currently selected for recording still images.

Selecting the Drive Mode

🖳 Continuous Shooting 🖳 High-Speed Continuous	Captures a quick series of still images while you hold the PHOTO button pressed down. For the number of frames per second, refer to the table below.
🖳 AEB (Auto Exposure Bracketing)	The camcorder records a still image in three different exposures (dark, normal, light in 1/2 EV steps).
☐ Single	Records a single still image when you press the PHOTO button.

DRIVE MODE button

PHOTO button

TAPE	**CARD**		EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	☐
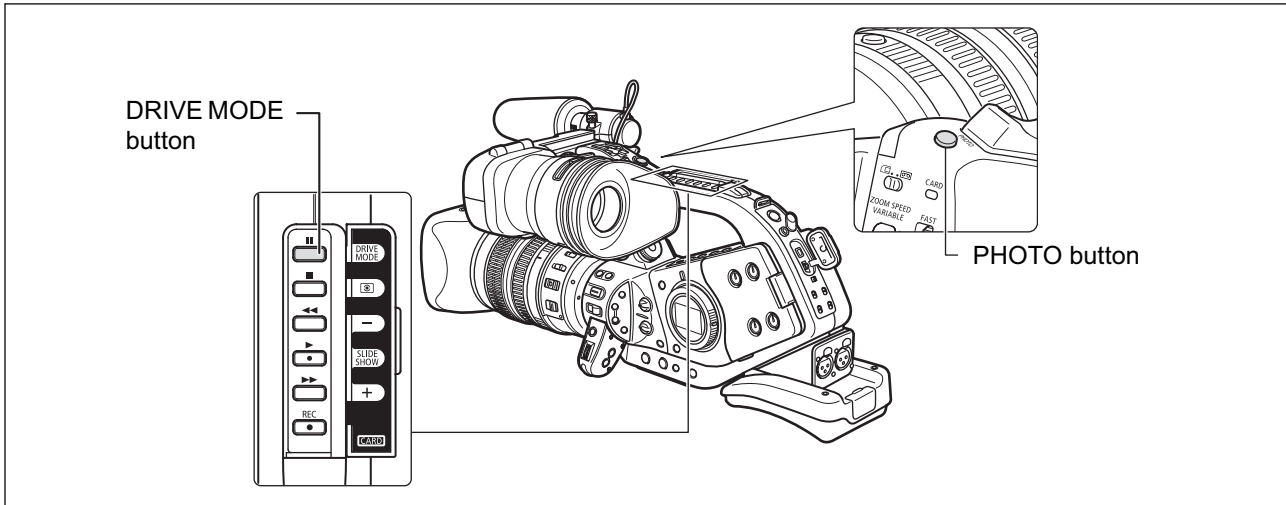
Changing the Drive Mode

1. **Set the POWER dial to a recording program other than ☐ and move the TAPE/CARD switch to ▭.**
2. **Press the DRIVE MODE button to switch between the drive modes.**
   The setting changes with each press of the button.

Continuous Shooting/High-Speed Continuous Shooting

Press and hold the PHOTO button.

A series of still images will be recorded as long as you hold the PHOTO button pressed down.

Maximum number of continuous shots at one time:

Still Image Size	Frames per Second		Maximum Number of Continuous Shots
	Normal speed	High speed	
LW 1920 x 1080	3 frames	5 frames	30 images
SW 848 x 480	3 frames	5 frames	60 images
L 1440 x 1080	3 frames	5 frames	30 images
S 640 x 480	3 frames	5 frames	60 images

These figures are approximate and vary with the recording conditions and subjects.
Sufficient space on the memory card is required. Continuous shooting stops when card is full.

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Auto Exposure Bracketing

Press the PHOTO button.

Three still images in different exposures are recorded to the memory card.

Make sure that there is sufficient space on the memory card.

Selecting the Metering Method

⊛ EVALUATIVE	Appropriate for standard shooting conditions, including backlit scenes. The camcorder divides images into several zones for light metering. It evaluates the position and brightness of the subject, background, direct light or backlight, and adjusts the exposure of the main subject accordingly.
⊡ CENT.WEIGHT.AVERAGE	Averages the light metered from the entire screen, giving more weight to the subject in the center.
⊡ SPOT	Meters the area within the spot AE point frame.

⊛ button

PHOTO button

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | 🌙 | ▢ |
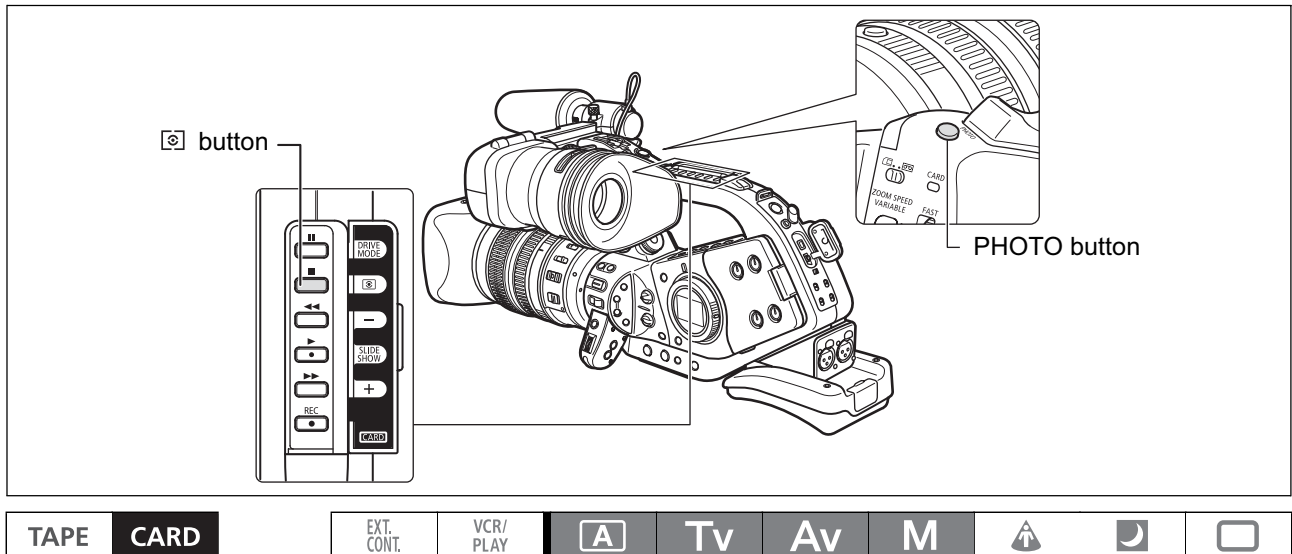
1. **Set the POWER dial to** Ⓐ**,** **Tv**, **Av or** **M, and move the TAPE/CARD switch to** ▭**.**

2. **Press the** ⊛ **button.**
   - The setting changes with each press of the button.
   - The symbol of the currently selected setting is displayed.
   - If you selected ⊡ (SPOT), the AE point frame ⊡ appears in the center of the screen.

Using an Optional Flash

You can use E-TTL II compatible Canon Speedlite flashes designed for use with Canon SLR cameras, including the 420EX/430EX/550EX/580EX models, to record natural still images under low light conditions. Refer also to the instruction manual of the Speedlite flash.

Connecting a Speedlite Flash

⊘ When connecting a Canon Speedlite flash you cannot use the Off-Camera Shoe Cord designed for Canon EOS SLR cameras.
⊘ Always turn off the camcorder when connecting or detaching the flash.

1. **Insert the mounting foot of the flash straight, fully into the advanced accessory shoe.**
2. **Tighten the locking ring.**
   As you turn the locking ring, the locking pin will come out and lock the flash in position.

To detach the flash:
   Turn the locking ring all the way to the opposite direction. Verify that the locking pin was released and only then detach the flash from the advanced accessory shoe.

Using the Flash

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚡ | 🌙 | ⬚ |

1. **Set the POWER dial to a recording mode other than M and turn on the flash.**
   • While the Speedlite flash is charging, the ⚡ indicator will flash in white. Once charged, the ⚡ indicator will stay on in green.
   • If the ⚡ indicator keeps flashing in white for a long time, replace the flash's batteries.
2. **Press the PHOTO button to record a still image.**

⊘ Wait until the flash is charged before recording the still image. You can record a still image while the flash is charging, but the flash will not go off.
⊘ Turn off the Speedlite flash when you are not using it.
⊘ The flash will not go off during exposure lock.
⊘ While using the flash, the shutter speeds that can be set in Tv mode are 1/4 - 1/500.
⊘ The camcorder does not support the Bounce Flash function or the Wireless Multiple Flash System function of the Speedlite 420EX/430EX/550EX/580EX flashes.
⊘ The camcorder does not support the ST-E2 Wireless Speedlite Flash Transmitter or the Wireless Master/Slave Control function of the Speedlite 420EX/430EX/550EX/580EX flashes.
⊘ When recording under very dark conditions, as you keep the PHOTO button pressed halfway the AF assist lamp of the Speedlite flash may light on (if recording with autofocus).
⊘ The Speedlite flash will not go off when the drive mode is set to Auto Exposure Bracketing.

Reviewing a Still Image Right after Recording

You can select to display a still image for 2, 4, 6, 8 or 10 seconds after it has been recorded.

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ☝ | ☽ | ☐ |

MENU
(📖 29)

| CAMERA SETUP | ▶ | REVIEW ·······2SEC |
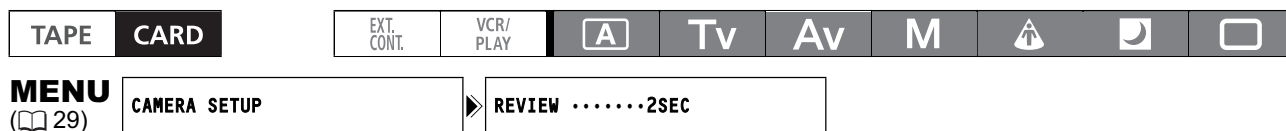
Open the menu and select [CAMERA SETUP]. Select [REVIEW], select a setting option and close the menu.

○ A still image is displayed as long as you hold the PHOTO button after recording.
○ The still image operations menu appears when you press the SET button while you are reviewing a still image, or when you press the SET button right after recording. In this menu, you can protect (📖 124) or erase (📖 123) the image.
○ [REVIEW] cannot be selected when ▯ (continuous shooting), ▯ (high-speed continuous shooting) or ▥ (auto exposure bracketing) is selected.

Playing Back Still Images from a Memory Card

CARD - button
SLIDE SHOW button
CARD + button
POWER dial
TAPE/CARD switch

TAPE	**CARD**		EXT. CONT.	**VCR/ PLAY**	A	Tv	Av	M	⚠	☾	☐
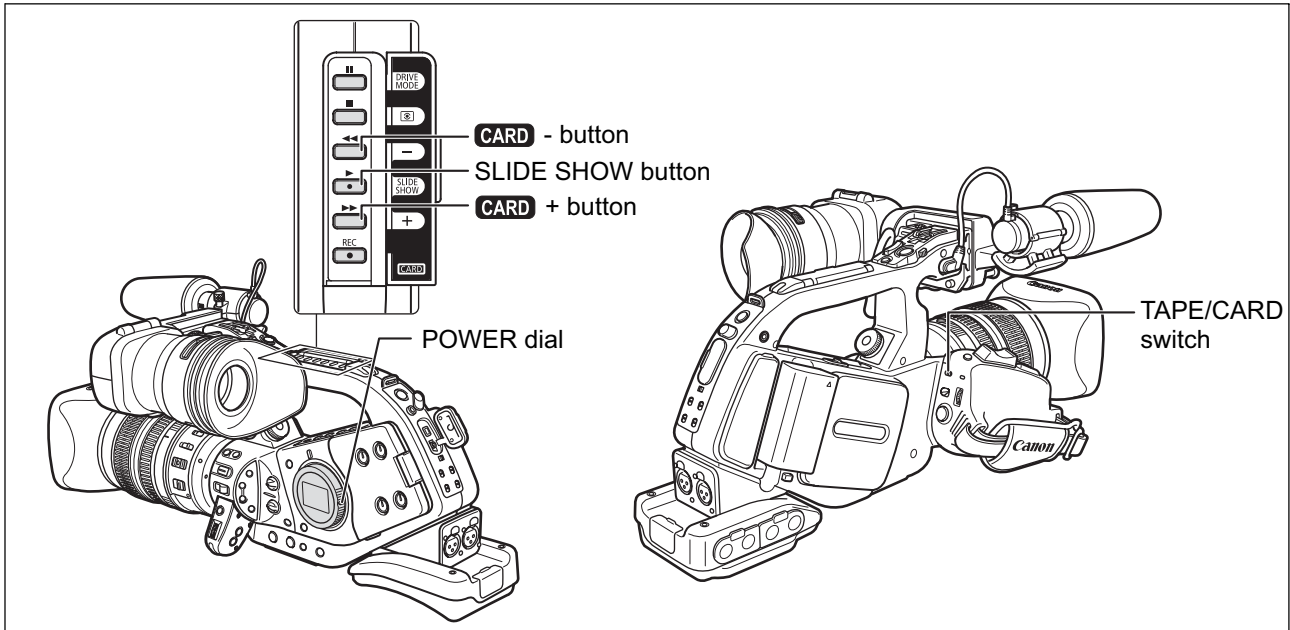
1. **Turn the POWER dial to $_{PLAY}^{VCR/}$ and move the TAPE/CARD switch to ☐.**
2. **Press the CARD +/– button to move between images.**

- ❍ Images not recorded with this camcorder, uploaded from a computer, edited on a computer and images whose file names have been changed may not be played back correctly.
- ❍ Do not turn off the camcorder, change the position of the TAPE/CARD switch or the POWER dial, open the memory card cover or remove the memory card while the card access indicator is flashing. Doing so could result in data damage.

Slide Show

Press the SLIDE SHOW button.

- Images are played back one after another.
- Press the button again to stop the slideshow.

Index Screen

1. Move the zoom lever toward W.

Up to 6 images appear.

2. Turn the SELECT dial to select an image.

- Move the "☞" to the image you wish to view.
- You can switch between the index pages by pressing the **CARD** + / – button.

3. Move the zoom lever toward T.

The index screen is cancelled and the selected image is displayed.

Card Jump Function

You can locate images without displaying them one by one. The number in the upper right of the screen indicates the image number of the current image out of the total number of images.

Press and hold the CARD + / – button.

When you release the button, the image of the displayed image number appears.

Erasing Images

You can erase images one at a time or all at once.

- ❍ Be careful when erasing images. Erased images cannot be recovered.
- ❍ Erasing a still image that had a custom preset file embedded (recorded with the [ON+CP DATA] setting) will erase the image and the embedded custom preset file.

Protected images cannot be erased.

Erasing a Single Image

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | 🌙 | ▢ |

1. Select the image you wish to erase.

2. Press the SET button to open the still image operations menu.

In `CAMERA CARD` mode, the menu appears when you press the SET button while you are reviewing a still image, or if you press the SET button immediately after recording an image.

3. Select [IMAGE ERASE].

4. Select [YES].

- • The image is erased and the previous image appears.
- • If an image is protected, [YES] will appear grayed out.

Erasing All Images

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | Ⓐ | Tv | Av | M | ⚠ | 🌙 | ▢ |

MENU
(📖 29) | CARD OPERATIONS | ▶ | ERASE ALL IMAGES |

1. Open the menu and select [CARD OPERATIONS].

2. Select [ERASE ALL IMAGES].

3. Select [YES] and close the menu.

All still images with exception of the protected ones are erased.

Protecting Images

You can protect important images from accidental erasure when displaying a single image or the index screen.

⚠️ If a memory card is initialized, all still images, even protected ones, will be erased permanently.

| TAPE | **CARD** | | EXT. CONT. | **VCR/ PLAY** | Ⓐ | Tv | Av | M | ⚠ | ☽ | ☐ |

1. **Select the image you wish to protect.**
2. **Press the SET button to open the still image operations menu.**
   In **CAMERA CARD** mode, the menu appears when you press the SET button while you are reviewing a still image, or if you press the SET button immediately after recording an image.
3. **Select [⊶PROTECT].**
   "⊶" appears and now the image cannot be erased.

Protecting during Index Screen Display

| TAPE | **CARD** | | EXT. CONT. | **VCR/ PLAY** | Ⓐ | Tv | Av | M | ⚠ | ☽ | ☐ |

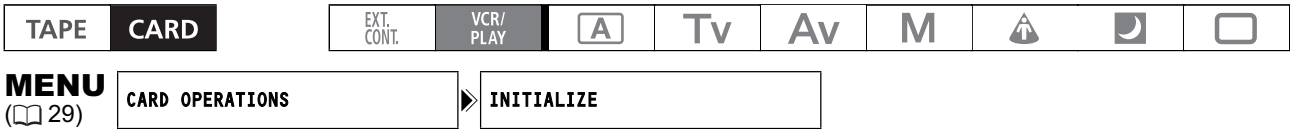**MENU**
(📖 29)

| CARD OPERATIONS | ▶▶ | ➡ ⊶ PROTECT |

1. **Move the zoom lever toward W.**
   • Up to 6 images appear.
   • Select the image you wish to protect.
2. **Open the menu and select [CARD OPERATIONS]. Select [➡ ⊶PROTECT] and press the SET button.**
   • "⊶" appears on the image.
   • Select additional images with the SELECT dial and protect them in the same way.
3. **Close the menu.**

Initializing a Memory Card

Initialize new memory cards, or when you get the message "CARD ERROR". You can also initialize a memory card to erase all data recorded on it.

❍ Initializing a memory card erases all data, including protected images and custom preset files.
❍ Images and custom preset files erased through the card initialization cannot be recovered.
❍ If you use a memory card other than the supplied one, initialize it with the camcorder.

TAPE	**CARD**		EXT. CONT.	VCR/ PLAY	Ⓐ	Tv	Av	M	⚠	🌙	⬜

MENU
(□ 29) | `CARD OPERATIONS` ▶ `INITIALIZE`

1. **Open the menu and select [CARD OPERATIONS].**
2. **Select [INITIALIZE].**
3. **Select [EXECUTE].**
4. **In the confirmation screen select [YES].**
   The card initialization starts.

Using a Memory Card

Print Order Settings

You can select still images for printing and set the number of copies. These print order settings are compatible with the Digital Print Order Format (DPOF) standards and can be used for printing on DPOF compatible printers. A maximum of 998 still images can be selected.

Selecting Still Images for Printing (Print Order)

| TAPE | **CARD** | | EXT. CONT. | VCR/ PLAY | A | Tv | Av | M | ⚠ | 🌙 | ⬜ |

1. **Select the still image you wish to print.**
2. **Press the SET button to open the still image operations menu.**
3. **Select [⎙ PRINT ORDER].**
4. **Select the number of copies.**
   - "⎙" appears on the image.
   - To cancel the print order, set the number of copies to 0.

Selecting in Index Screen Display

MENU
(📖 29) | CARD OPERATIONS | ▶ | ➡ ⎙PRINT ORDER |

1. **Move the zoom lever toward W.**
   - Up to 6 images appear.
   - Select the image you wish to print.
2. **Open the menu and select [CARD OPERATIONS]. Select [➡ ⎙ PRINT ORDER].**
3. **Press the SET button and set the number of copies with the SELECT dial.**
   - "⎙" appears on the image.
   - To cancel the print order, set the number of copies to 0.
4. **Close the menu.**

Erasing All Print Orders

MENU
(📖 29) | CARD OPERATIONS | ▶ | ⎙PRINT ORDERS ALL ERASE |
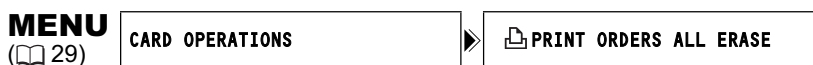
1. **Open the menu and select [CARD OPERATIONS].**
2. **Select [⎙ PRINT ORDERS ALL ERASE] and Select [YES].**
   All "⎙" disappear.
3. **Close the menu.**

Settings Retained at Power Off or STANDBY Mode

The following list shows the settings that are retained when you turn the power off or press the STANDBY button. If the built-in lithium button battery has become depleted, all settings will be erased.

Recording Mode

	Power Off	STANDBY Mode	Changing the MODE SELECT switch between HD and SD
Aperture setting in Av mode	◯		Reset
Shutter speed setting in Tv mode	◯		Reset
Aperture, shutter speed setting in Manual mode	◯		Reset
Custom white balance	◯		
Exposure lock on/off	Returns to off	◯	Reset
Aperture, shutter speed setting during exposure lock	Reset	◯	Reset
Color bars setting*	Reset	◯	
Color bars on/off*	Reset	◯	
Faders setting*	Reset	◯	
Faders on/off*	Reset		◯
CAMERA MENU settings	◯		
CAMERA CARD MENU settings	◯		
TV SCREEN on/off	◯		
EVF display	Returns to normal display		◯
Side panel light	Returns to off		
Zero set memory*	◯		

* Not available for recording still images on the memory card.

The following list shows the settings that are retained when you change the programmed AE mode or frame rate.

Recording Mode

	When you change to a recording program other than ☐Easy Recording	When you change to ☐Easy Recording	When you change the frame rate*
Aperture setting in Av mode	○		Reset
Shutter speed setting in Tv mode	○		Reset
Aperture, shutter speed setting in Manual mode	○		Reset
Custom white balance	○		
Exposure lock on/off	Returns to off		
Aperture, shutter speed setting during exposure lock	Reset		
Color bars setting*	○		
Color bars on/off*	○		
Faders setting*	○	Reset	○
Faders on/off*	○	Reset	○
[CAMERA] MENU setting	○		
[CAMERA CARD] MENU settings	○		
TV SCREEN on/off	○		
EVF display	○		
Side panel light	○		
Zero set memory*	○		

* Not available for recording still images on the memory card.

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Screen Displays

Hiding the Displays on the Camcorder Screen

You can hide the displays on the screen to have a clear screen for playback.

TAPE	CARD	EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	▭
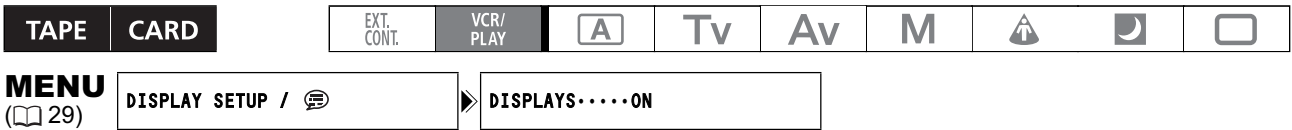
MENU (📖 29) | DISPLAY SETUP / 🗩 ▶ DISPLAYS·····ON

Open the menu and select [DISPLAY SETUP/🗩]. Select [DISPLAYS], set it to [OFF <PLAYBK>] and close the menu.

- Warning messages still appear, and the data code appears if turned on.
- Tape operation displays appear for 2 seconds.

Hiding/Showing the Displays on the TV Screen

When you connect a TV for recording, you can select to hide the camcorder displays on the TV screen. For playback, you can show the camcorder displays on the TV screen.
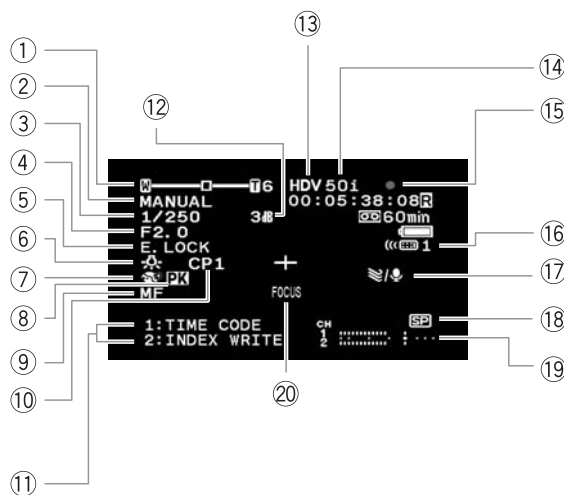
TAPE	CARD	EXT. CONT.	VCR/ PLAY	A	Tv	Av	M	⚠	🌙	▭
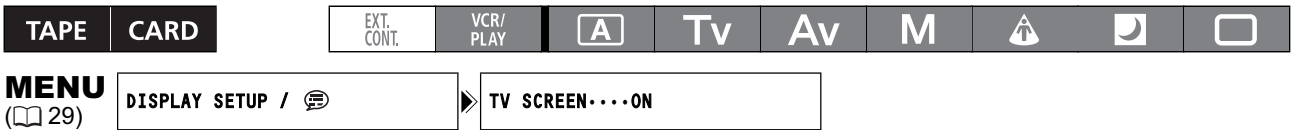
MENU (📖 29) | DISPLAY SETUP / 🗩 ▶ TV SCREEN····ON

Open the menu and select [DISPLAY SETUP/🗩]. Select [TV SCREEN], set it to[ON] or [OFF] and close the menu.

The displays appear on or disappear from the TV screen, according to the setting selected.
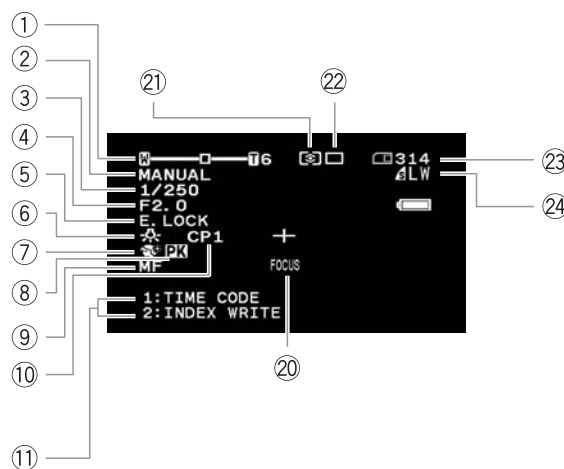
Screen Displays during Recording

See also 📖 42.

CAMERA

CAMERA CARD

① Zoom position/ Zoom speed (📖 48)/ Exposure level (📖 70)	⑮ Tape operation
② Programmed AE (📖 65)	● REC
③ Shutter speed* (📖 68, 70)	●❚❚ PAUSE
④ Aperture* (📖 69, 70)	■ STOP
⑤ Exposure lock (📖 71)/ AE shift (📖 72)	▲ EJECT
⑥ White balance (📖 74)	⑯ Remote sensor mode (📖 106)
⑦ Skin detail (📖 77)	⑰ Wind screen (📖 60)
⑧ Peaking (📖 51)	⑱ Recording mode (📖 92)
⑨ Manual focus (📖 51)	⑲ Audio level indicator (📖 63)
⑩ Custom preset (📖 78)	⑳ Magnifying (📖 51)
⑪ Custom keys (📖 86)/ Date and time (📖 39)	㉑ Metering method (📖 118)
⑫ Gain (📖 73)	㉒ Drive mode (📖 116)
⑬ Recording standard (📖 45)	㉓ Available still images on the card (📖 111)
⑭ Frame rate (📖 54)	㉔ Still image size/quality (📖 111)

*   In Manual mode.

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Screen Displays during Playback

VCR/PLAY
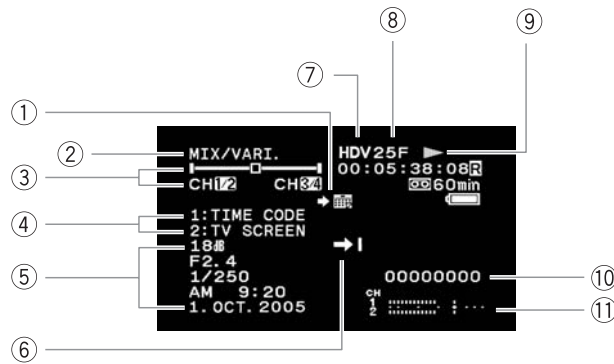
VCR/PLAY CARD
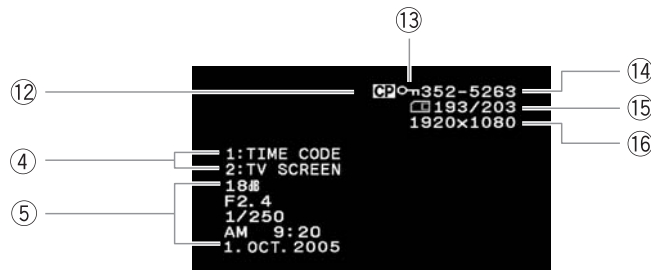
① Date search (📖 104)/ Index search (📖 103)	⑩ User bit (📖 58)
② Audio output (📖 101)	⑪ Audio level indicator (📖 63)
③ Mix balance (📖 101)	⑫ Custom preset data embedded with the still image (📖 84)
④ Custom keys (📖 86)	⑬ Image protected (📖 124)
⑤ Data code (📖 105)	⑭ Image number (📖 112)
⑥ End search (📖 47)	⑮ Total number of still images (📖 111)
⑦ Recording standard (📖 45)	⑯ Still image size (📖 111)
⑧ Frame rate (📖 54)	

⑨ Tape operation (📖 94)

● REC

●❚❚ PAUSE

■ STOP

▲ EJECT

▶ PLAY

▶▶ : Fast forward

◀◀ : Rewind

▶ / ◀ : Fast forward playback/rewind playback

×2▶ / ◀×2 : ×2 playback

×1▶ / ◀×1 : ×1 playback

❚▶ / ◀❚ : Frame advance playback

Side panel

Time code

Video signal standard ────

Time code setting ────

Video output signal from the HD/SD SDI Terminal ────

[AUDIO LEVEL] is set to [MANUAL] ────

HDV
DV **88:88:88:88**

NDF EXT·LOCK HOLD 🎞 ▮ **▮▮▮▮**

HD·SDI TC·IN TC·OUT GENLOCK

Ⓜ **CH1/2▸MIX◂CH3/4 🗄CH**

1/3 |||||||||||||||||||||||||||||||||||||||▮
CH **50 40   30   20   🔢 6 2 0** -dB
2/4 |||||||||||||||||||||||||||||||||||||||▮

Tape has reached the end
Remaining battery charge
Time code synchronization setting

Audio level indicator

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List of Messages

Message	Explanation	📖
SET THE TIME ZONE, DATE AND TIME	You have not set the time zone, date and time. This message appears each time you turn the power on until you set the time zone, date and time.	39
CHANGE THE BATTERY PACK	Battery pack is exhausted. Replace or charge the battery pack.	14
THE TAPE IS SET FOR ERASURE PREVENTION	Cassette is protected. Replace the cassette or change the position of the protect switch.	138
REMOVE THE CASSETTE	Camcorder stopped operating to protect the tape. Unload and reload the cassette.	27
CHECK THE HDV/DV INPUT	DV cable is not connected, or the connected digital device is turned off.	107
CONDENSATION HAS BEEN DETECTED	Condensation has been detected in the camcorder.	136
TAPE END	Tape reached the end. Rewind the tape or replace the cassette.	–
HEADS DIRTY, USE CLEANING CASSETTE	Video heads are dirty. Clean the video heads.	135
ENTERING "POWER STANDBY"	Appears for 1 second when you press the STANDBY button.	41
CHECK THE LENS	Lens is not correctly mounted. Turn the lens until it clicks. If the message does not disappear, unmount and remount the lens.	22
NO CARD	Memory card not is inserted into the camcorder.	28
NO IMAGES	No images are recorded on the memory card.	–
CARD ERROR	A memory card error occurred. The camcorder cannot record or play back the image. The error may be temporary. If the message disappears after 4 seconds an "🗔" flashes red, turn the camcorder off, remove the card and reinsert the card. If "🗔" changes to green, you can continue recording/playback.	–
CARD FULL	No remaining capacity on the memory card. Replace with another card or erase images.	–
NAMING ERROR	The folder and file numbers have reached their maximum value.	–
UNIDENTIFIABLE IMAGE	Image is not recorded with JPEG compression, or with a compression not compatible with the camcorder, or the image file is corrupted.	–
THE CARD IS SET FOR ERASURE PREVENTION	SD memory card is set for erasure prevention. Replace the card or change the position of the protect switch.	28
INCORRECT TAPE STANDARD PLAYBACK IS RESTRICTED	You attempted to play back a tape recorded in a standard different than the one to which is the camcorder is set.	–
THE MEMORY CARD COVER IS OPEN	Close the memory card cover.	28
HD INCOMPATIBLE LENS	You mounted a lens that does not support HDV recording.	22
THIS LENS HAS NO STILL SHOOTING CAPABILITY	You mounted a lens that does not support still images recording.	22
INCOMPATIBLE INPUT SIGNAL	You attempted to input a video signal incompatible with the camcorder (for example 720p).	107
PLAYBACK STD LOCKED PLAYBACK IS RESTRICTED	When the playback standard is already set in the camcorder, you attempted to play back a tape in a video standard different from that set.	94
PLAYBACK STD LOCKED INCOMPATIBLE VIDEO INPUT	When the playback standard is already set in the camcorder, you attempted to input a video signal in a standard different from that set.	107
COPYRIGHT PROTECTED PLAYBACK IS RESTRICTED	You attempted to play back a copyright protected tape.	108
COPYRIGHT PROTECTED DUBBING RESTRICTED	You attempted to dub a copyright protected tape. May also appear when an anomalous signal is received during analog line-in recording, or during analog-digital conversion of a copyright protected tape.	108

Additional Information

Maintenance/Others

Camcorder Handling Precautions

❍Do not carry the camcorder by the viewfinder, the microphone or its cable.

❍Do not leave the camcorder in places subject to high temperatures, such as a sun-heated car, and high humidity.

❍Do not use the camcorder in places subject to magnetic or electric fields such as near TV sets, plasma TVs, radio transmitters or portable communication devices.

❍Do not point the lens or viewfinder at strong light sources. Do not leave the camcorder pointed at a bright subject.

❍Do not use the camcorder in dusty or sandy places. Dust or sand getting inside the cassette or camcorder may cause damage. Dust and sand can also damage the lens. Attach the lens cap after use.

❍The camcorder is not waterproof. Water, mud or salt getting inside the cassette or camcorder may cause damage.

❍Be careful of heat generated by lighting equipment.

❍Do not disassemble the camcorder. If the camcorder does not function properly, consult qualified service personnel.

❍Handle the camcorder with care. Do not subject the camcorder to shocks or vibration as this may cause damage.

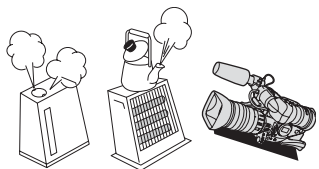❍Avoid sudden changes in temperature. Moving the camcorder rapidly between hot and cold temperatures may cause condensation to form on its internal surfaces (📖 136).

Storage

❍If you do not intend to use the camcorder for a long time, store it in a place free of dust, with low humidity, and at temperatures not higher than 30 ºC.

❍After storage, check the functions of your camcorder to make sure that the camcorder is still working properly.

Cleaning

Camcorder Body and Lens

❍Use a soft, dry cloth to clean the camcorder body and lens. Never use chemically treated cloth or volatile solvents such as paint thinner.

LCD Screen

❍Clean the LCD screen using a commercially available leans cleaning cloth.

❍Condensation may form on the surface of the screen when the temperature changes suddenly. Wipe it with a soft dry cloth.

Viewfinder
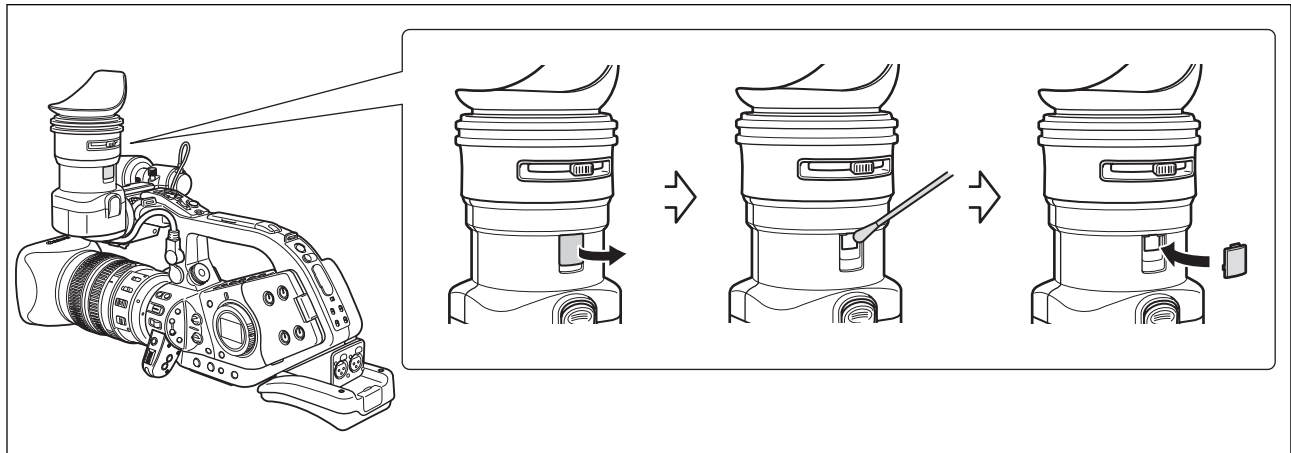
1. **Open the protect cover (e.g. using a flathead screwdriver).**

2. **Clean the glass with a cotton swab.**

3. **Reattach the protect cover.**

Be careful not to scratch the glass when cleaning.

Video Heads

❍When the message "HEADS DIRTY, USE CLEANING CASSETTE" appears, when the playback picture becomes distorted, or if, when playing back a tape in HDV standard, the picture and/or sound stops momentarily (about 0.5 seconds) the video heads need to be cleaned.

❍To maintain the best picture quality, we recommend cleaning the video heads frequently with the Canon DVM-CL Digital Video Head Cleaning Cassette or a commercially available dry cleaning cassette.

❍Tapes already recorded with dirty video heads may not be played back correctly even when you clean the video heads.

❍Do not use wet type cleaning cassettes as this may damage the camcorder.

❍If the playback picture does not improve after cleaning the video heads it may indicate a malfunction. Consult a Canon Service Center.

Condensation

Moving the camcorder rapidly between hot and cold temperatures may cause condensation (water droplets) to form on its internal surfaces. Stop using the camcorder if condensation is detected. Continued use may damage the camcorder.

Condensation may form in the following cases:

When the camcorder is moved from an air-conditioned room to a warm, humid place

When the camcorder is moved from a cold place to a warm room
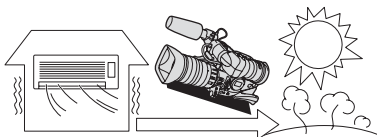
When the camcorder is left in a humid room
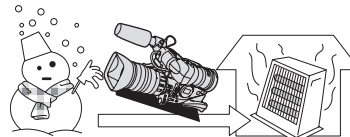
When a cold room is heated rapidly
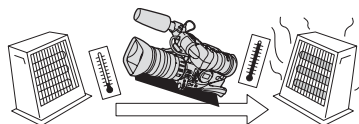
How to avoid condensation:
❍Unload the cassette, place the camcorder in an airtight plastic bag and let it adjust to temperature changes slowly before removing it from the bag.

When condensation is detected:
❍The camcorder stops operating, and the warning message "CONDENSATION HAS BEEN DETECTED" appears for approx. 4 seconds and "▨" starts flashing.
❍If a cassette is loaded, the warning message "REMOVE THE CASSETTE" appears and "▨" starts flashing. Remove the cassette immediately and leave the cassette compartment open. Leaving the cassette in the camcorder may damage the tape.
❍A cassette cannot be loaded when condensation is detected.

Resuming use:
❍It takes about 1 hour until the water droplets evaporate. After the condensation warning stops flashing, wait for 1 more hour before resuming use.

Battery Pack Handling Precautions

> **DANGER!**
> **Treat the battery pack with care.**
> • Keep it away from fire (or it might explode).
> • Do not expose the battery pack to temperature higher than 60 ºC. Do not leave it near a heater or inside a car in hot weather.
> • Do not try to disassemble or modify it.
> • Do not drop or knock it.
> • Do not get it wet.

❍Charged battery packs continue to discharge naturally. Therefore, charge them on the day of use, or the day before, to ensure a full charge.

❍Attach the terminal cover whenever a battery pack is not in use. Contact with metallic objects may cause a short circuit and damage the battery pack.

❍Dirty terminals may cause a poor contact between the battery pack and the camcorder. Wipe the terminals with a soft cloth.

❍Since storing a charged battery pack for a long time (about 1 year) can shorten its lifecycle or affect performance, we recommend to discharge the battery pack fully and to store it in a dry place at temperatures no higher than 30 ºC. If you do not use the battery pack for long periods, charge and discharge it fully at least once a year. If you have more than 1 battery pack, perform these precautions at the same time for all battery packs.

❍Although the battery pack's operating temperature range is from 0 ºC to 40 ºC, the optimal range is from 10 ºC to 30 ºC. At cold temperatures, performance will temporarily decline. Warm it in your pocket before use.

❍Replace the battery pack if the usable time after full charge diminishes substantially at normal temperatures.

About the battery terminal cover

The battery terminal cover has a [▭]-shaped hole. This is useful when you wish to differentiate between charged and uncharged battery packs. For example, with charged battery packs, attach the terminal cover so that the [▭]-shaped hole shows the blue label.
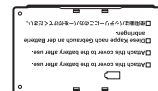
Back side of the battery pack
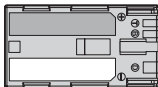
Terminal cover attached Charged

Uncharged

Cassette Handling Precautions

❍Rewind tapes after use. If the tape is lose or damaged, it may cause picture and sound distortion.

❍Return cassettes to their case and store them upright. Rewind tapes from time to time if they are stored for a long time.

❍Do not leave the cassette in the camcorder after use.

❍Do not use spliced tapes or nonstandard cassettes as they may damage the camcorder.

❍Do not use tapes that have been jammed as video heads may become dirty.

❍Do not insert anything into the small holes of the cassette, or cover them with cellophane tape.

❍Handle cassettes with care. Do not drop or subject them to severe impact as this may damage the cassettes.

❍With cassettes equipped with a memory function, metal plated terminals may become dirty with use. Clean the terminals with a cotton swab after about 10 times of loading/unloading. The memory function is not supported by the camcorder.

Protecting Tapes from Accidental Erasure

To protect your recordings from accidental erasure, slide the tab on the cassette to the left. (This switch position is usually labeled SAVE or ERASE OFF.)

If you load a protected cassette in recording mode, the message "THE TAPE IS SET FOR ERASURE PREVENTION" appears for approx. 4 seconds and "▨" starts flashing. If you wish to record on that cassette, slide the tab back to the right.
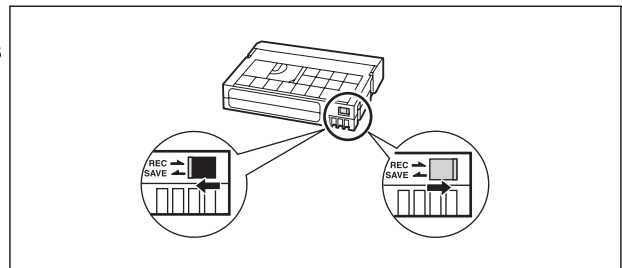
Memory Card

❍To transfer the still images recorded on the memory disc to a computer, use a commercially available card reader or PC/PCMCIA memory card adapter.

❍Initialize new memory cards with the camcorder. Memory cards initialized with other devices such as a computer may not operate correctly.

❍We recommend saving backups of memory card images on your computer's hard drive or other external memory device. Image data may be corrupted or lost due to memory card defects or exposure to static electricity. Canon Inc. makes no warranties for corrupted or lost data.

❍Do not use memory cards in places subject to strong magnetic fields.

❍Do not leave memory cards in places subject to high humidity and high temperature.

❍Do not disassemble memory cards.

❍Do not bend, drop, or subject memory cards to shocks and do not expose them to water.

❍Moving a memory card rapidly between hot and cold temperatures may cause condensation to form on its external and internal surfaces. If condensation forms on the card, put it aside until the droplets have evaporated completely.

❍Do not touch or expose the terminals to dust or dirt.

❍Check the direction before inserting the memory card. Forcing a memory card backwards into the slot may damage the memory card or the camcorder.

❍Do not remove the label from the memory card, or affix other labels on the memory card.

Using the Camcorder Abroad

Power Sources

You can use the compact power adapter to operate the camcorder and to charge battery packs in any country with power supply between 100 and 240 V AC, 50/60 Hz. Consult the Canon Service Center for information on plug adapters for overseas use.

Playback on a TV Screen

You can only play back your recordings on TVs with PAL system. The PAL system is used in the following countries/areas:

Algeria, Australia, Austria, Bangladesh, Belgium, Brunei, China, Denmark, Finland, Germany, Hong Kong Special Administrative Region, Iceland, India, Indonesia, Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Liberia, Malaysia, Malta, Mozambique, the Netherlands, New Zealand, North Korea, Norway, Oman, Pakistan, Portugal, Qatar, Serbia and Montenegro, Sierra Leone, Singapore, South Africa, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Tanzania, Thailand, Turkey, Uganda, United Arab Emirates, United Kingdom, Yemen, Zambia.

Recycling the Built-in Rechargeable Lithium Battery

If you should dispose of your camcorder, first remove the built-in rechargeable lithium battery for recycling according to the recycling system of your country.
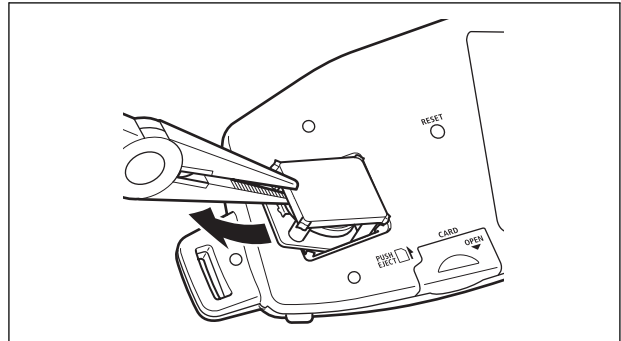
1. **Remove the labeled plate shown in the illustration using a flathead screwdriver.**
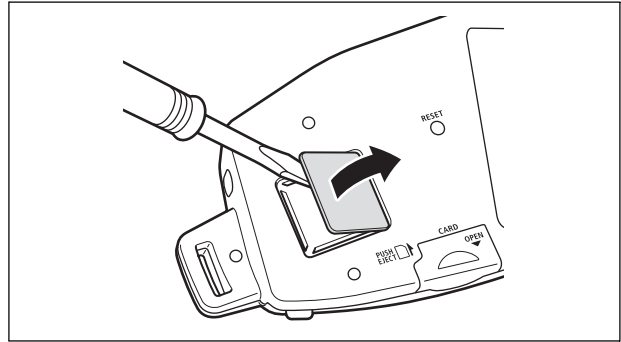
2. **Using a pair of cutters or tin snips, cut the 4 indicated plastic joints and remove the cover.**
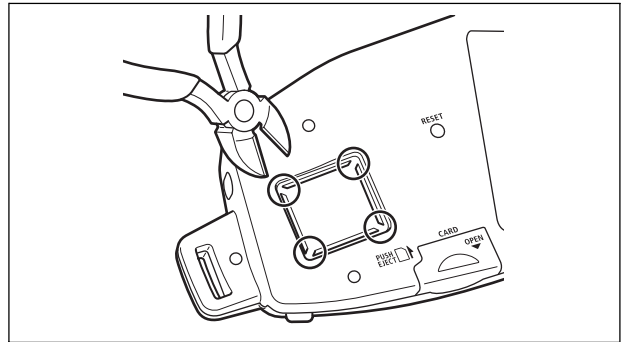
3. **Using a pair of pliers extract the flexible board on which the lithium battery is installed and pull to detach it.**

⚠️ ○ Do not remove the cover for any other purpose than removing the battery for recycling when disposing the camcorder.
   ○ When you have removed the battery, keep it out of reach of children. If it is swallowed, seek medical assistance immediately. The battery case may break and the battery fluids may damage the stomach and intestines.
   ○ When removing the built-in lithium battery, disconnect all power (compact adapter and battery pack) to the camcorder.

Troubleshooting

If you have a problem with your camcorder, refer to this checklist. Consult your dealer or a Canon Service Center if the problem persists.

Power Source

Problem	Cause	Solution	📖
Camcorder will not turn on.	Battery pack is not correctly attached.	Attach the battery pack correctly.	14
The camcorder switches off by itself.	Power save function has been activated.	Turn on the camcorder.	41
Viewfinder switches on and off.	Battery pack is exhausted.	Replace or charge the battery pack.	14

Recording/Playback

Buttons will not work.	Cassette is not loaded.	Load a cassette.	27
"▲" flashes on the screen.	Condensation is detected.	See reference page.	136
"REMOVE THE CASSETTE" appears on the screen.	Camcorder stopped operating to protect the tape.	Unload and reload the cassette.	27
The wireless controller will not work.	Camcorder and wireless controller are not set to the same remote sensor mode.	Change the remote sensor modes.	106
	Batteries of the wireless controller are exhausted.	Replace the batteries.	26
Abnormal characters appear on the screen. The camcorder does not operate properly.	This camcorder uses a microcomputer. External noise or static electricity may cause abnormal characters to appear on the screen.	Disconnect the power source and reconnect it after a short time. If the problem still persists, disconnect the power source and press the RESET button with a pointed item. Pressing the RESET button resets all settings.	–

Recording

The POWER dial is not in the OFF position but the POWER indicator is off.	The [LED ON/OFF] option is set to [OFF].	Set the [LED ON/OFF] option to [ON].	92
Image will not appear on the screen.	The POWER dial is not set to a recording program.	Set the POWER dial to a recording program.	40
"SET THE TIME ZONE, DATE AND TIME" appears on the screen.	Time zone, date and time are not set, or the built-in rechargeable lithium battery is exhausted.	Set the time zone, date and time. If necessary, power the camcorder with the compact power adapter and leave it connected with the POWER dial set to OFF for at least 24 hours to recharge the built-in battery before making the settings.	39
Pressing the start/stop button will not start recording.	Cassette is not loaded.	Load a cassette.	27
	The POWER dial is not set to a recording program.	Set the POWER dial to a recording program.	40
	The lock lever on the carrying handle is activated.	Slide the lock lever to the left and deactivate it.	41
Camcorder will not focus.	Autofocus does not work on that subject.	Focus manually.	51
	Viewfinder is not adjusted.	Adjust the viewfinder with the dioptric adjustment lever.	19
	Lens is dirty.	Clean the lens.	134
The tally lamp will not light up.	[TALLY LAMP] is set to [OFF] in the menu.	Set [TALLY LAMP] to [ON] or [BLINK].	93

Recording

Problem	Cause	Solution	📖
A vertical light bar appears on the screen.	Bright light in a dark scene may cause a vertical light bar (smear) to appear. This is not a malfunction.	Record in the Av mode with F5.6–F8.0.	69
Viewfinder picture is blurred.	Viewfinder is not adjusted.	Adjust the viewfinder with the dioptric adjustment lever.	19
Audio is not recorded.	The INPUT SELECT switch is not set to the correct position.	Set the INPUT SELECT switch to the correct position.	60 62
	The REC LEVEL switch is set to M, and recording level is set too low.	Adjust the audio level correctly.	63
Audio is recorded in a very low level.	Microphone connected to the XLR terminal needs to be powered by the phantom power.	Set the +48V switch to ON.	60 62
	Microphone attenuator is turned on.	Set the MIC ATT. switch to OFF.	60 62

Playback

Problem	Cause	Solution	📖
Pressing the playback button does not start playback.	Camcorder is turned off, or is not set to VCR/PLAY mode.	Set the camcorder to VCR/PLAY mode.	94
	Cassette is not loaded.	Load a cassette.	27
Tape is running, but image will not appear on the TV screen.	Video heads are dirty.	Clean the video heads.	135
	You attempted to play back or dub copyright protected tape.	Stop playback/dubbing.	–
While playing back a tape recorded in HDV standard there are brief stops in the playback picture.	Video heads are dirty	Clean the video heads.	135
While connected to a TV or monitor with the COMPONENT OUT (D-) Terminal all on-screen displays are turned off.	The [HD DOWN-CONV] option is set to [ON] or the [DISPLAYS] option is set to [OFF <PLAYBK>].	Set the [HD DOWN-CONV] option to [OFF] or set the [DISPLAYS] option to [ON].	33 129

Memory Card Operations

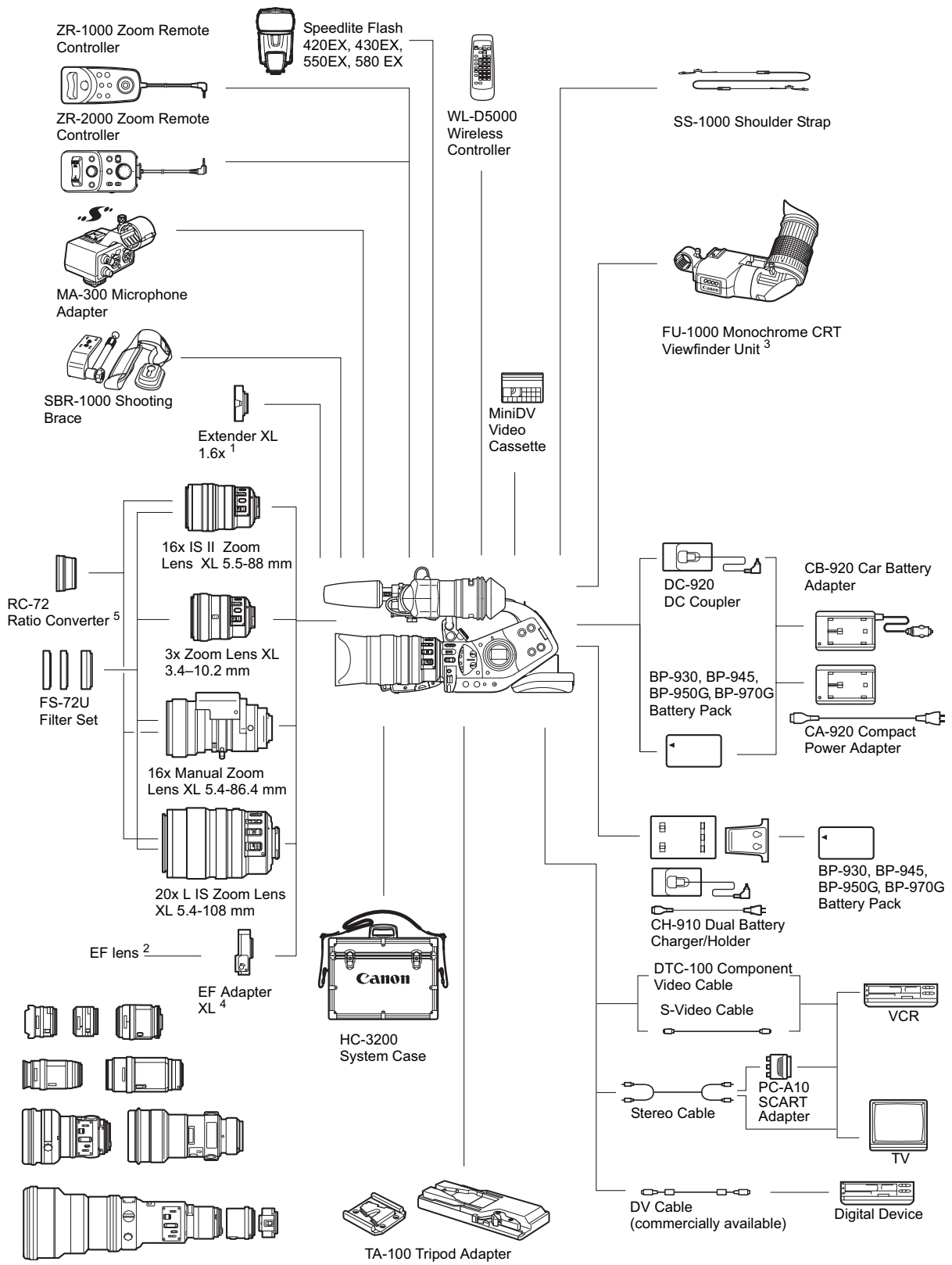| Problem	Cause	Solution	📖
Memory card cannot be inserted.	Memory card was not facing the correct direction.	Turn the memory card over and reinsert it.	28
Memory card cannot be recorded.	No memory card.	Insert a memory card.	28
	Memory card is full.	Replace the memory card or erase images.	123
	Memory card is not initialized.	Initialize the memory card.	125
	The folder and file numbers have reached their maximum value.	Set [FILE NOS.] to [RESET] and insert a new memory card.	112
Memory card cannot be played back.	The POWER dial or TAPE/CARD switch are not set to the correct position.	Set the POWER dial to VCR/PLAY and the TAPE/CARD switch to 🗀.	121
Image cannot be erased.	Image is protected.	Cancel the protection.	124
"🗀" flashes red.	Card error occurred.	Turn off the camcorder. Remove and reinsert the memory card. Initialize the memory card if flashing persists.	125

Others

Lenses with built-in image stabilizer: Detected air bubbles inside the lens.	Sometimes air bubbles may form inside the lens in airplanes or on high mountains. This is not a malfunction. The air bubbles disappear in about 1 week.	–

About the LCD screen

The LCD screen is produced with extremely high-precision manufacturing techniques, with more than 99.99% of the pixels operating to specification. Less than 0.01% of the pixels may occasionally misfire or appear as black or green dots. This has no effect on the recorded image and does not constitute a malfunction.

E

Additional Information

System Diagram *(Availability differs from area to area)*

ZR-1000 Zoom Remote Controller

Speedlite Flash 420EX, 430EX, 550EX, 580 EX

WL-D5000 Wireless Controller

SS-1000 Shoulder Strap

ZR-2000 Zoom Remote Controller

MA-300 Microphone Adapter

FU-1000 Monochrome CRT Viewfinder Unit [3]

SBR-1000 Shooting Brace

Extender XL 1.6x [1]

MiniDV Video Cassette

16x IS II Zoom Lens XL 5.5-88 mm

RC-72 Ratio Converter [5]

DC-920 DC Coupler

CB-920 Car Battery Adapter

3x Zoom Lens XL 3.4–10.2 mm

BP-930, BP-945, BP-950G, BP-970G Battery Pack

FS-72U Filter Set

CA-920 Compact Power Adapter

16x Manual Zoom Lens XL 5.4-86.4 mm

20x L IS Zoom Lens XL 5.4-108 mm

BP-930, BP-945, BP-950G, BP-970G Battery Pack

EF lens [2]

CH-910 Dual Battery Charger/Holder

EF Adapter XL [4]

DTC-100 Component Video Cable

S-Video Cable

VCR

HC-3200 System Case

Stereo Cable

PC-A10 SCART Adapter

TV

DV Cable (commercially available)

Digital Device

TA-100 Tripod Adapter

[1] Can be attached to the HD 20x L IS, 20x L IS, 16x IS II and 16x manual zoom lenses (only for recording in SD mode).

[2] EF-S lenses cannot be used.

[3] When you use the FU-1000 Monochrome CRT Viewfinder with the XL H1 you can use the compact power adapter or the optional CB-920 Car Battery Adapter as the power source. You cannot use the battery adapter supplied with the FU-1000; instead, connect the DC coupler directly to the XL H1 and connect it to the compact power adapter or the car battery adapter.

Also, you cannot use the microphone protector supplied with the FU-1000 when using it with the XL H1.

[4] When attaching EF lenses to the XL H1, the approximate 35 mm equivalent of the effective focal length is as follows: 4:3 - approx. 8.8x / 16:9 - approx. 7.2x.

[5] Only when recording in SD 4:3 mode.

E

Additional Information

Optional Accessories

> **Use of genuine Canon accessories is recommended.**
> This product is designed to achieve excellent performance when used with genuine Canon accessories. Canon shall not be liable for any damage to this product and/or accidents such as fire, etc., caused by the malfunction of non-genuine Canon accessories (e.g., a leakage and/or explosion of a battery pack). Please note that this warranty does not apply to repairs arising out of the malfunction of non-genuine Canon accessories, although you may request such repairs on a chargeable basis.

Battery Packs

The BP-950G is also available as an optional accessory. The optional BP-970G provides over 35% more recording time than the BP-950G.

BP-950G   BP-970G
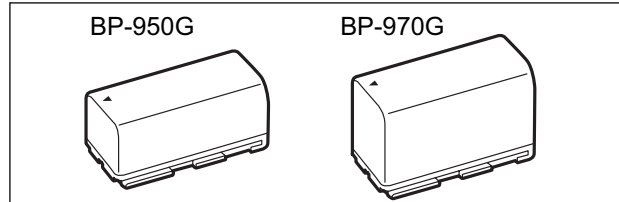
Car Battery Adapter CB-920

Use the car battery adapter to power the camcorder or charge battery packs on the move. The car battery adapter plugs into your car's cigarette lighter socket and runs off a 12-24V DC negative ground battery.
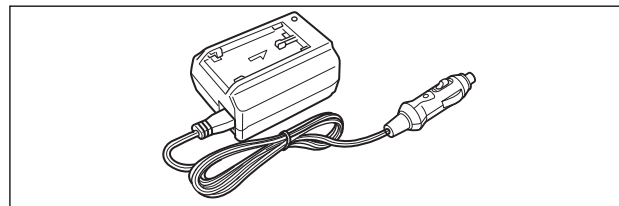
FS-72U Filter Set

Ultraviolet, neutral density and circular polarizing filters to help you take control of difficult lighting conditions.
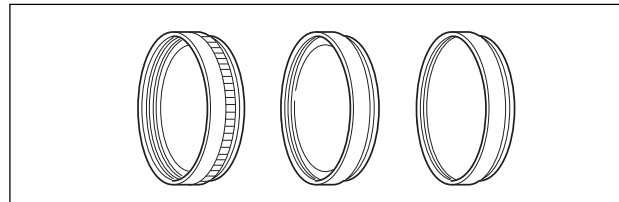
HC-3200 System Case

A solid, lockable case that provides safe and stylish protection for the camcorder during transportation and storage.

3x Zoom Lens XL 3.4–10.2 mm

A super wide-angle lens that gives a range of 24.5–73.5 mm (35 mm film equivalent).
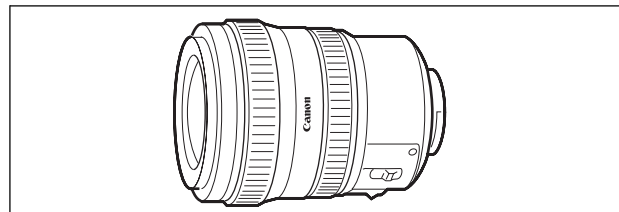
16x Manual Zoom Lens XL 5.4–86.4 mm

A high-resolution zoom lens with two zoom modes (manual and powered), built-in ND filter and AE functions.
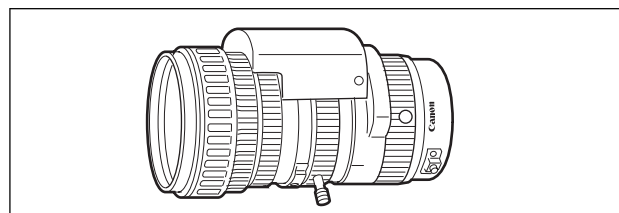
Extender XL 1.6x

Attach this extender between a Canon XL lens and the XL H1 to boost the focal length of the lens by 1.6x.
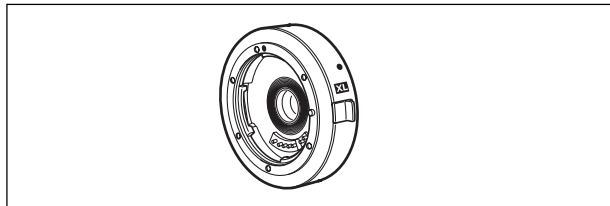
EF Adapter XL

This allows you to attach Canon EF lenses to the XL H1. The difference in size between the XL H1's 1/3-inch CCD's and 35 mm film means that the effective focal length of still camera lenses is multiplied by 8.8x (4:3)/ 7.2x (16:9).

• Consult your local service outlet to make sure there are no compatibility problems with your chosen lens.
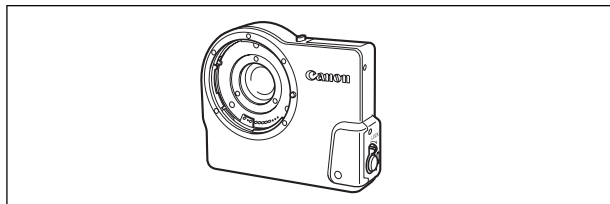
FU-1000 Monochrome CRT Viewfinder Unit

Professional quality B&W viewfinder with a 1.5-inch CRT.

• When you use the FU-1000 with the XL H1, you can supply power from the CA-920 or optional CB-920. The battery adapter supplied with the FU-1000 is not required. Attach the DC Coupler directly to the XL H1, and connect it with the CA920/CB-920.
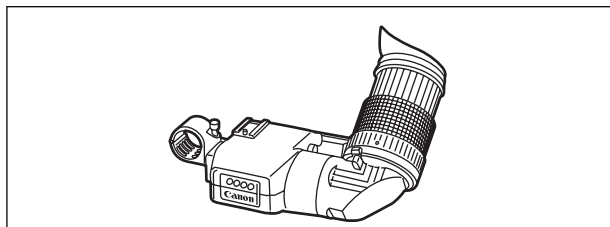
TA-100 Tripod Adapter

The TA-100 allows you to quickly mount/unmount the XL H1 on/from a tripod.
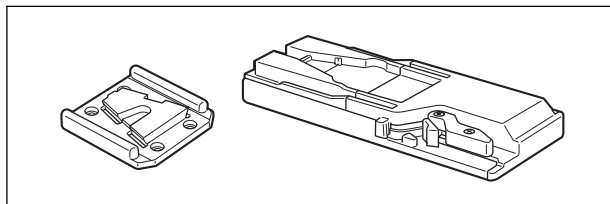
SBR-1000 Shooting Brace

Using the SBR-1000 for additional support of the video camera with the neck strap will significantly lighten the load of the camera's weight while shooting.
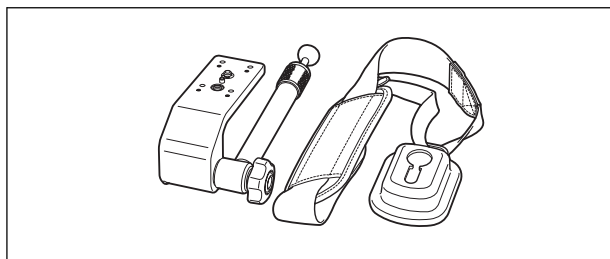
MA-300 Microphone Adapter

With the MA-300, you can use balanced microphones on all 4 channels.

• Phantom power cannot be used with the MA-300.
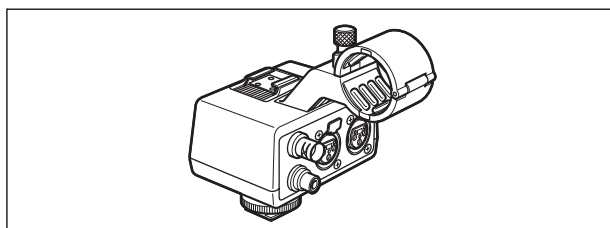
CH-910 Dual Battery Charger/Holder

The CH-910 can charge two battery packs consecutively. You can also power the camcorder by connecting the CH-910 with charged battery packs to the camcorder. When you attach two battery packs, a battery pack can be exchanged without interrupting the power supply.

Battery Pack	Charging Time
BP-950G	280 min.
BP-970G	380 min.

Charging time varies according to the charging condition.
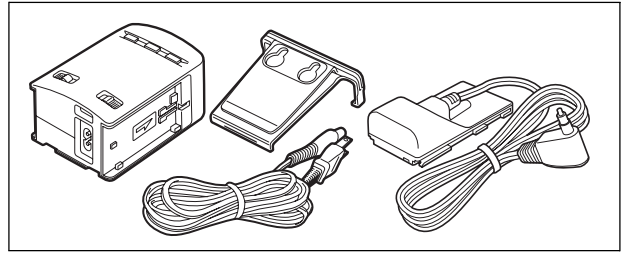
ZR-2000 Zoom Remote Controller

When the ZR-2000 is connected to the LANC ⚫ terminal of a Canon camcorder, it is possible to control functions such as the start and stop of recording, the zoom and the focus functions while reviewing the picture on the local display without touching the camcorder. This is particularly useful while the camcorder is mounted on a tripod and you want to ensure maximum stability of a shot.
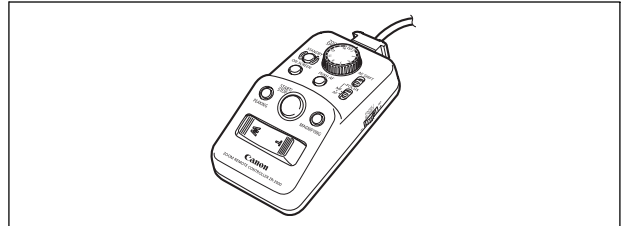
FU-2000 Color Viewfinder Unit

When the FU-2000 is connected to the color viewfinder socket of the camcorder, it is possible to review the on screen picture without having to be next to the camcorder. Also, by connecting the FU-2000 to the optional ZR-2000 Remote Zoom Controller you can have complete control of the main operations of the camcorder while reviewing the on-screen picture without touching the camcorder.
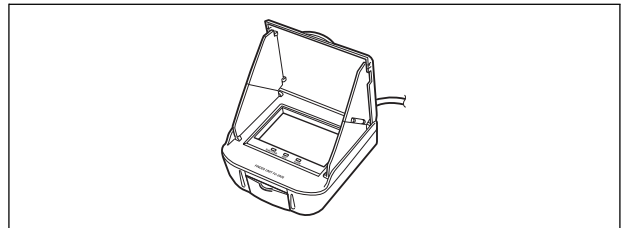
This mark identifies genuine Canon video accessories. When you use Canon video equipment, we recommend Canon-brand accessories or products bearing the same mark.

Specifications

XL H1

System

Video Recording System	Rotary head, helical scanning, digital component recording
	(HDV) High Definition Video 1080i
	(DV) Consumer digital VCR SD system
Audio Recording System	(HDV) MPEG-1 audio layer 2 / MPEG-2 audio layer 2, 16 bit (48 kHz)
	Transfer rate: 384 kbps (2CH)
	(DV) PCM digital sound, 16 bit (48 kHz/2CH) or 12 bit (32 kHz/4CH)
Television System	(HD) High Definition Video (HDV) 1080/50i
	(SD) CCIR standard (625 lines, 50 fields) PAL color signal
Image Sensor	1/3-inch CCD x 3 (horizontal pixel shift), approx. 1,670,000 pixels
	Effective pixels: (HDV) approx. 1,560,000
	(DV) 4:3 approx. 1,170,000
	(DV) 16:9 approx. 1,560,000
Tape Format	Videocassettes bearing the "MiniDV" mark.
Tape Speed	(HDV) 18.83 mm/s
	(DV) SP: 18.83 mm/s, LP: 12.57 mm/s
Maximum Recording Time	(HDV) 60 min.
(60 min. cassette)	(DV) SP: 60 min., LP: 90 min.
Fast Forward/Rewind Time	Approx. 2 min. 20 sec. (with a 60 min. cassette)
Viewfinder	2.4 in. wide, 16:9 aspect ratio TFT color, approx. 215,000 pixels, RGB delta configuration
Microphone	Stereo electret condenser microphone
Lens mount	XL interchangeable mount system
AF system	TTL autofocus, manual focusing with focus ring (with HD 20x L IS Lens)
White Balance	Auto white balance, pre-set white balance (indoor, outdoor), custom white balance, or color temperature setting
Minimum Illumination	0.4 lx (with HD 20x L IS Lens, 50i/25F mode, Manual mode, 1/3 shutter, F1.6, Gain 18 dB)
Recommended Illumination	More than 100 x (50i/25F)

Memory Card

Recording media	SD memory card, MultiMedia Card (MMC)*
Size of Images on the Card	1920 x 1080, 1440 x 1080, 848 x 480, 640 x 480 pixels
File Format	Design rule for Camera File system (DCF), Exif 2.2** compliant, DPOF compliant
Image Compression Method	JPEG compression (Super Fine, Fine, Normal)

* The camcorder's operations have been tested with SD memory cards up to 2 GB. Performance cannot be guaranteed for all memory cards.

** The camcorder supports Exif 2.2 (also called "Exif Print"). Exif Print is a standard for enhancing the communication between camcorders and printers. By connecting to an Exif Print-compliant printer, the camcorder's image data at the time of shooting is used and optimized, yielding extremely high quality prints.

Input/Output Terminals

S-video Terminal	1 Vp-p/75 ohms (Y signal), 0.3 Vp-p/75 ohms (C signal)
Video Terminal	RCA jack/BNC jack 1 Vp-p/75 ohms unbalanced
HD/SD-SDI Terminal	BNC jack, output only, 0.8 Vp-p/75 ohms, unbalanced SDI 576/50i: ITU-R BT.656 HD-SDI: SMPTE 292M
COMPONENT OUT Terminal	1080i (D3)/576i (D1) compatible
Audio Out Terminals	RCA jack (L, R) 2 sets -10 dBv (47 kohm load, full-scale -12 dB)/3 kohms or less, unbalanced

Audio In Terminals	FRONT MIC: ø3.5 stereo mini jack (unbalanced), ATT: 20 dB
	                    -55 dBv (Auto mode)/600 ohms
	                    Max: -67 dBv (Manual mode, max. volume)
	AUDIO 1, 2: RCA jack (unbalanced)
	                    -10 dBv/47 kohms
	REAR: XLR jack (pin1: shield, pin2: hot, pin3: cold), ATT: 20 dB
	                    -54 dBv (Auto mode)/600 ohms (LINE/MIC switch set to MIC)
	                    0 dBv (Auto mode)/600 ohms (LINE/MIC switch set to LINE)
	                    Max 1: -66 dBv (Auto mode, REAR MIC Gain Up 12 dB)
	                    Max 2: -66 dBv (Manual mode, max. volume)
	                    Max 3: -78 dBv (Manual mode, max. volume, REAR MIC Gain Up
	                    12 dB)

HDV/DV Terminal	Special 4-pin connector (IEEE1394 compliant) input/output
GENLOCK Terminal	BNC jack, input only, 1 Vp-p/75 ohms
TC-IN Terminal	BNC jack, input only, 0.5 V-1.8 Vp-p/10 kohms
TC-OUT Terminal	BNC jack, output only, 1 Vp-p/75 ohms
Headphone Terminal	ø3.5 mm stereo mini-jack -23.5 dBv (16 ohm load)/50 ohms
LANC Terminal	ø2.5 mm stereo mini-jack

Power/Others

Power supply (rated)	7.4 V (battery pack)
Power consumption	7.8 W (recording with autofocus, HD 20x L IS Lens mounted, HD mode)
Operating temperature	0 – 40 °C
Dimensions (W x H x D)	226 x 220 x 496 mm
Weight(camcorder body only)	2435 g
(fully loaded)	3750 g

Lens
Some lens specifications change as shown below when mounting on the XL H1.

	Angle of View		Field Size at Closest Focusing Distance	
	Wide Angle	Telephoto	Wide Angle	Telephoto
HD 20x L IS Lens	39° 51´ x 30° 29´ (4:3) 51° 36´ x 30° 29´ (16:9)	2° 05´ x 1° 34´ (4:3) 2° 46´ x 1° 34´ (16:9)	[20 mm] 47.7 x 35.4 mm (4:3) 64.8 x 35.4 mm (16:9)	[1 m] 52.9 x 39.7 mm (4:3) 70.5 x 39.7 mm (16:9)
20x L IS Lens	39° 51´ x 30° 29´ (4:3) 51° 36´ x 30° 29´ (16:9)	2° 05´ x 1° 34´ (4:3) 2° 46´ x 1° 34´ (16:9)	[20 mm] 47.7 x 35.4 mm (4:3) 64.8 x 35.4 mm (16:9)	[1 m] 52.9 x 39.7 mm (4:3) 70.5 x 39.7 mm (16:9)
16x Manual Zoom Lens	39° 51´ x 30° 29´ (4:3) 51° 36´ x 30° 29´ (16:9)	2° 36´ x 1° 57´ (4:3) 3° 28´ x 1° 57´ (16:9)	[50 mm] 60.1 x 44.6 mm (4:3) 81.9 x 44.6 mm (16:9)	[1 m] 42.0 x 31.7 mm (4:3) 55.8 x 31.7 mm (16:9)
16x IS II Zoom Lens	39° 11´ x 29° 57´ (4:3) 50° 46´ x 29° 57´ (16:9)	2° 33´ x 1° 55´ (4:3) 3° 24´ x 1° 55´ (16:9)	[20 mm] 45.3 x 33.7 mm (4:3) 61.7 x 33.7 mm (16:9)	[1 m] 59.4 x 44.7 mm (4:3) 79.3 x 44.7 mm (16:9)
3x Zoom XL Lens	59° 52´ x 46° 48´ (4:3) 75° 01´ x 46° 48´ (16:9)	21° 44´ x 16°25´ (4:3) 28° 42´ x 16° 25´ (16:9)	[20 mm] 58.8 x 44.2 mm (4:3) 78.2 x 44.2 mm (16:9)	[0.5 m] 203.0 x 152.7 mm (4:3) 270.2 x 152.7 mm (16:9)

CA-920 Compact Power Adapter

Power supply	100 – 240 V AC, 50/60 Hz
Power consumption	24 W
Rated output	Adapter: 7.2 V DC, 2.0 A, Charger: 8.4 V DC, 1.5 A
Operating temperature	0 – 40 °C
Dimensions	75 x 99 x 51 mm
Weight	215 g without power cable

BP-950G Battery Pack

Battery type	Rechargeable lithium ion battery
Rated voltage	7.4 V DC
Operating temperature	0 – 40 °C
Battery capacity	5,200 mAh
Dimensions	38.2 x 40.3 x 70.5 mm
Weight	210 g

Weight and dimensions are approximate. Errors and omissions excepted. Subject to change without notice.

Additional Information

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**Additional
Information**

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SD
2CH 48kHz : CH 1 / CH 2
32kHz : CH 1 / CH 2
4CH 32kHz : CH 1 / CH 2
HD
2CH 48kHz : CH 1 / CH 2
4CH 48kHz : CH 1 / CH 2

SD
2CH 48kHz : — / —
32kHz : CH 3 / CH 4
(REC_MODE_INVALID)
4CH 32kHz : CH 3 / CH 4
HD
2CH 48kHz : — / —
4CH 48kHz : CH 3 / CH 4

① ③ ② ④

Input
Output

Audio process 1

OUTPUT SELECT (MENU)

Filters
ALC
EVR

Digital Process

A / D

Pre Amp

Bilingual

D / A

Line Amp

VOL

PHONE OUT

XLR GAIN UP (menu)

INPUT SELECT SW

XLR GAIN UP

Filters
ALC
EVR

Digital Process

A / D

Pre Amp

Bilingual

D / A

Line Amp

VOL

PHONE OUT

INPUT SELECT SW

ATT : REAR ATT SW

balance to unbalance
balance to unbalance

Head Amp ATT
Head Amp ATT

ATT : FRONT ATT SW

Head Amp ATT
Head Amp ATT

Phone Amp
Phone Amp

Head Amp
Head Amp

Phantom 48V

MIC/LINE

CH1 ON/OFF CH2

REAR

CH 1 / CH 3
CH 2 / CH 4

PUSH

1 : shield
2 : hot
3 : cold

FRONT

Mic Power

PHONES

ADVANCED

CH 3
CH 1/3
CH 4
CH 2/4

Custom Keys

Make a copy of this page and carry it with you as a reminder of the functions that can be assigned to each of the two custom keys in each operation mode.

You can assign frequently used functions to the custom keys. The custom keys can have different functions assigned to them in each of the different operation modes.

Default settings:

	CAMERA	VCR/PLAY	CAMERA CARD	VCR/PLAY CARD
CUSTOM KEY 1	TIME CODE	TV SCREEN	ZEBRA	TV SCREEN
CUSTOM KEY 2	INDEX WRITE	DATA CODE	TV SCREEN	DATA CODE

The following functions can be assigned to the custom keys:

CAMERA		VCR/PLAY
Time code Time code hold [2]		Time code
Index write Audio level		TV screen
Zebra pattern EVF B&W mode		Data code
VCR stop [2] CP backward key [1,2]		Audio level
TV screen Flip EVF [2]		Time code hold [2]
		EVF B&W mode
CAMERA CARD		**VCR/PLAY CARD**
Zebra pattern		TV screen
TV screen		Data code
EVF B&W mode		EVF B&W mode
CP backward key [1,2]		
Flange back		
Flip EVF [2]		

[1] Can only be assigned to Custom Key 2.

[2] This function can only be operated with a custom key.

Canon

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