Canon

PUB. DIE-316

XH G1S
XH A1S

HD Video Camera Recorder

Instruction Manual

HDV 1080i

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.

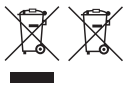
The Mains plug is used as the disconnect device. The Mains plug shall remain readily operable to disconnect the plug in case of an accident.

While using the compact power adapter, do not wrap it or cover it with a piece of cloth, and do not place it in confined narrow spaces. Heat may build up, the plastic case may deform and it could result in electric shock or fire.

CA-920 identification plate is located on the bottom.

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

European Union (and EEA) only.



These symbols indicate that this product is not to be disposed of with your household waste, according to the WEEE Directive (2002/96/EC), the Battery Directive (2006/66/EC) and/or your national laws implementing those Directives.

This product should be handed over to a designated collection point, e.g., on an authorized one-for-one basis when you buy a new similar product or to an authorized collection site for recycling waste electrical and electronic equipment (EEE) and batteries and accumulators. Improper handling of this type of waste could have a possible impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE.

Your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about the recycling of this product, please contact your local city office, waste authority, approved scheme or your household waste disposal service or visit www.canon-europe.com/environment.

(EEA: Norway, Iceland and Liechtenstein)

The XH G1S / XH A1S - A Broad Range of Capabilities

Ultimate HD Quality

Improved lens with 20x zoom The lens features not only 20x zoom but also improved operability thanks to the knurled focus, zoom, and iris rings. In addition, you can now manually focus while using the zoom.

3CCD system By using three 1/3-in. CCDs (each with a total of 1.67 mega pixels and 1,440x1,080 effective pixels), the camcorder offers a horizontal resolution of 800 TV lines, the highest in HDV standard.

DIGIC DV II image processor The next generation of Canon's video processing engine ensures optimal video quality and color reproduction for high-definition video.

Versatile Artistic Expression

HDV native 1080/25p recording Use the 25F mode for video recordings compliant with native recordings according to HDV specifications (📖 42). Whatever your video needs –TV programs, commercials, music videos or movies– you can shoot it with the XH G1S / XH A1S.

Custom presets Enjoy unparalleled image control to deliver the "look" you want. The camcorder offers 23 customizable parameters you can easily save and exchange as custom preset files (📖 87).

Advanced Professional Features

XHG1S **Pro level connectivity** An industry-standard HD/SD SDI terminal for uncompressed HD signal output, embedded audio and SMPTE time code (LTC) are just a few of the features of the XH G1S that give it the functionality of professional broadcast cameras.

XHG1S **Synchronization** Genlock synchronization, as well as a TIME CODE terminal, allow the XH G1S to be part of any multi-camera shooting setup.

Enhanced customization Custom functions (📖 95) and custom display (📖 101) options give you even more freedom to control many aspects of the camcorder's operation.

And More

Audio options The camcorder is equipped with two sets of XLR audio input terminals with phantom power supply. Record audio using both audio inputs or combine one audio input and the built-in microphone. You can also activate the audio peak limiter (📖 49) to avoid distortions during manual audio level adjustment.

Reduced audio noise Unwanted audio noise due to vibrations has been reduced as a result of an improvement to the external microphone holder's design.

Added and improved functionality Push AE (📖 57) • Gain fine-tuning in 0.5 dB increments (📖 62) • Focus limit (📖 40) • Eye cup attachment (📖 17) • Selective NR (📖 69) • Audio output level selection (📖 81) • and more!

About this Manual

Thank you for purchasing the Canon XH G1S / XH A1S. 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 *Troubleshooting* (📖 143).

Conventions Used in this Manual

- ❗: Precautions related to the camcorder's 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.
- Brackets [ ] and capital letters are used to refer to menu options as they are displayed on screen. In tables in the manual, menu options in boldface indicate the default setting.
- "Screen" refers to the LCD screen and the viewfinder screen.
- "Card" or "Memory card" refers to an SDHC memory card, an SD memory card or a MultiMedia Card (MMC).
- Photographs in the manual are simulated pictures taken with a still camera.
- XH G1S : Text that applies only to the model shown in the icon.
- Illustrations in the manual show the XH G1S.

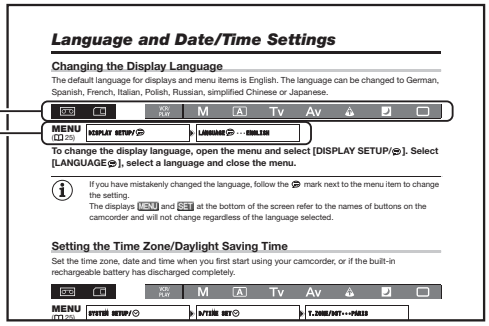
Operating modes

The availability of the various functions depends on the operating mode as indicated in the bar.

A , : Function can be used in this mode.

A , : Function cannot be used in this mode.

Menu item shown at its default position

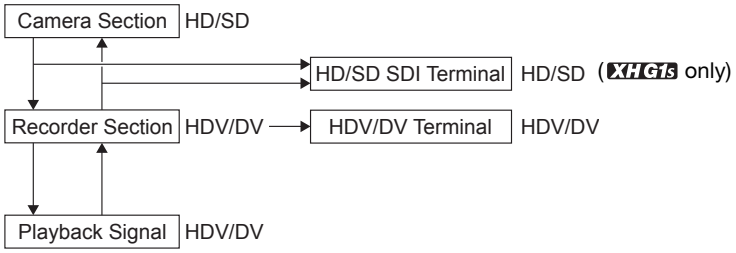


Trademark Acknowledgements

- 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.
- Other names and products not mentioned above may be trademarks or registered trademarks of their respective companies.
- ANY USE OF THIS PRODUCT OTHER THAN CONSUMER PERSONAL USE IN ANY MANNER THAT COMPLIES WITH THE MPEG-2 STANDARD FOR ENCODING VIDEO INFORMATION FOR PACKAGED MEDIA IS EXPRESSLY PROHIBITED WITHOUT A LICENSE UNDER APPLICABLE PATENTS IN THE MPEG-2 PATENT PORTFOLIO, WHICH LICENSE IS AVAILABLE FROM MPEG LA, L.L.C., 250 STEELE STREET, SUITE 300, DENVER, COLORADO 80206.

About the HD/HDV and SD/DV Specifications

In the manual, a distinction is made between video signal standards (camera section) and recording standards (recorder section). The video signal can be set to HD (high definition) or SD (standard definition) specifications; the recording standard on the tape will be HDV or DV, respectively.



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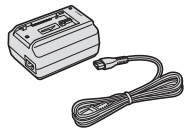
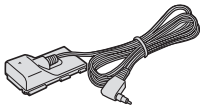
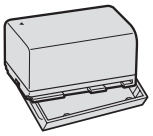
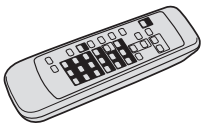
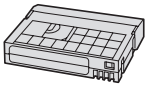
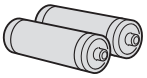
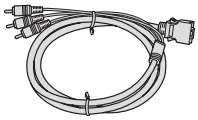
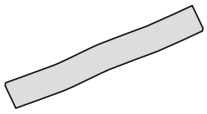
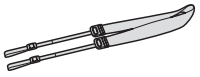
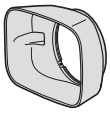
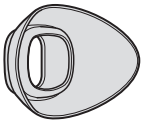
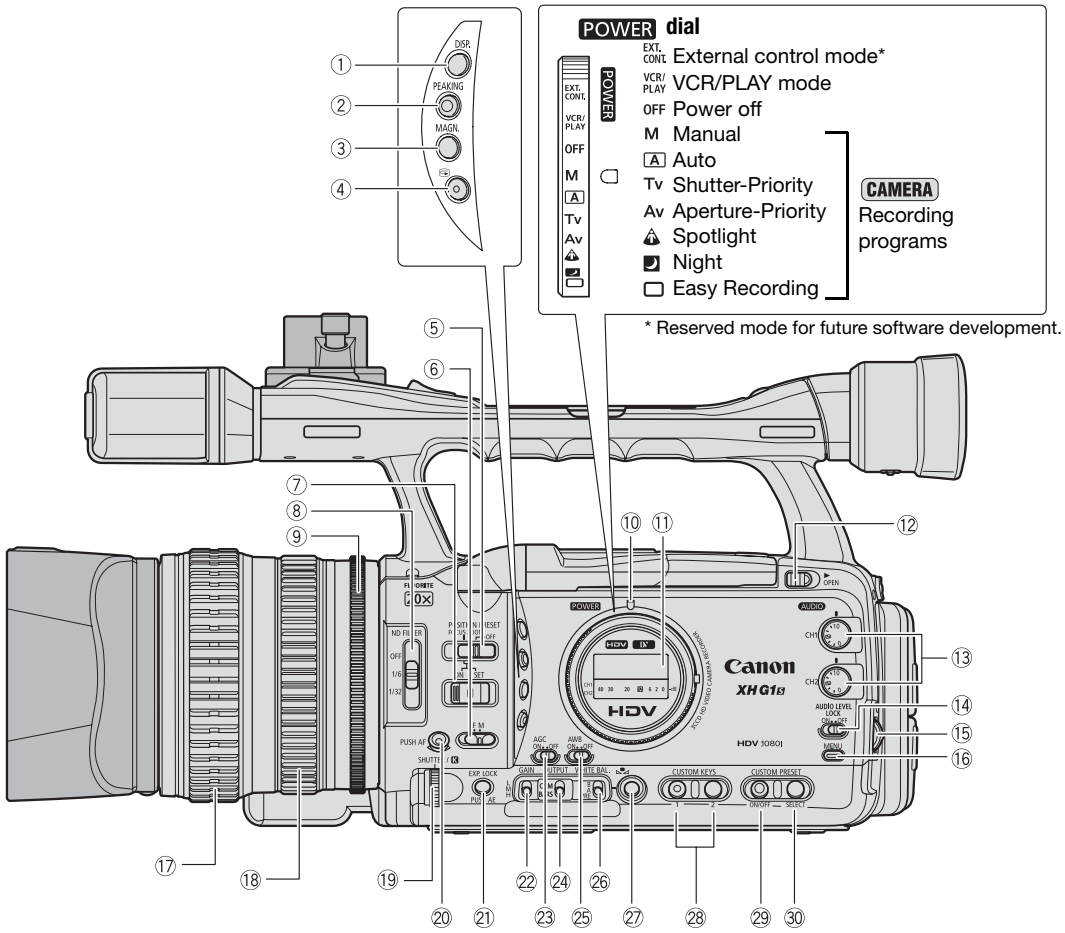
Checking the Supplied Accessories

CA-920 Compact Power Adapter 	DC-920 DC Coupler 	BP-950G Battery Pack 	WL-D5000 Wireless Controller 
SD Memory Card 	HDVM-E63PR Digital Videocassette 	2 x AA (R6) Batteries (for the wireless controller) 	STV-290N Stereo Video Cable 
DTC-1000 Component Video Cable 	Adjustment Band (for the external microphone holder) 	Tripod Adapter Base 	SS-1100 Shoulder Strap 
Lens Cap 	Lens Hood 	Eye Cup 	

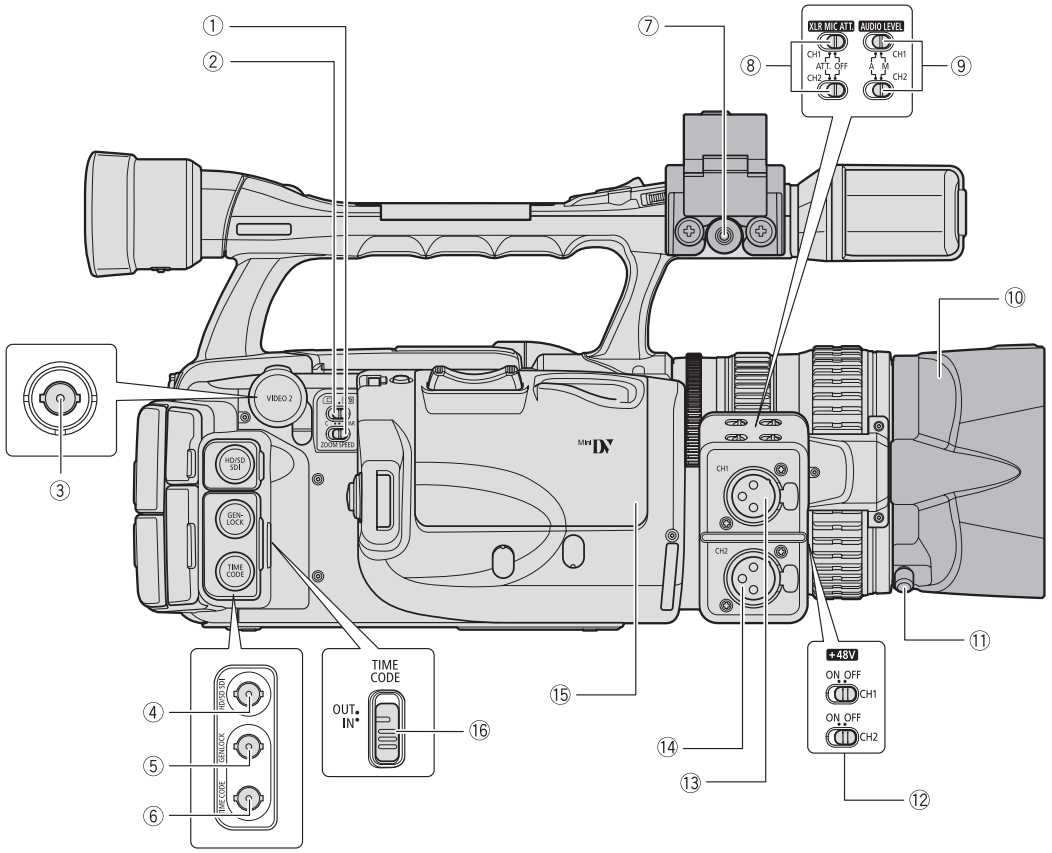
Components Guide

Left side view



① DISP. (display) button (📖 31)	⑯ MENU button (📖 25)
② PEAKING button (📖 38)	⑰ Focus ring (📖 36)
③ MAGN. (magnification) button (📖 38)	⑱ Zoom ring (📖 34)
④ ⮌ (record review) button (📖 31)	⑲ SHUTTER dial (📖 58)/K dial (📖 64)
⑤ POSITION PRESET switch (📖 35, 39)	⑳ PUSH AF button (📖 36)
⑥ Focus mode switch (📖 36)	㉑ EXP. LOCK button (📖 60)/PUSH AE button (📖 57)
⑦ POSITION PRESET ON/SET switch (📖 35, 39)	㉒ GAIN switch (📖 61)
⑧ ND FILTER switch (📖 41)	㉓ AGC (automatic gain control) switch (📖 61)
⑨ Iris ring (📖 56, 59)	㉔ OUTPUT switch (📖 75)
⑩ POWER indicator	㉕ AWB (automatic white balance) switch (📖 63)
⑪ Side panel (📖 136)	㉖ WHITE BAL. (white balance) switch (📖 63)
⑫ OPEN (open the LCD display) switch (📖 18)	㉗ WHITE BAL. button (📖 63)
⑬ AUDIO CH1/CH2 dials (📖 49)	㉘ CUSTOM KEYS (📖 71)
⑭ AUDIO LEVEL LOCK switch (📖 49)	㉙ CUSTOM PRESET ON/OFF button (📖 89)
⑮ SELECT/SET dial (📖 25)/🔊 (volume) dial (📖 106)	㉚ CUSTOM PRESET SELECT button (📖 89)

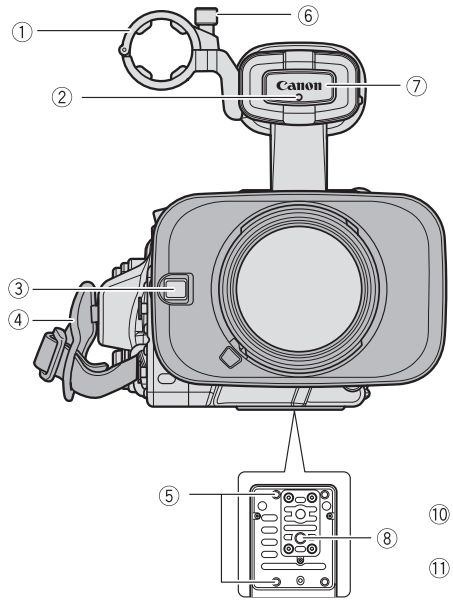
Right side view



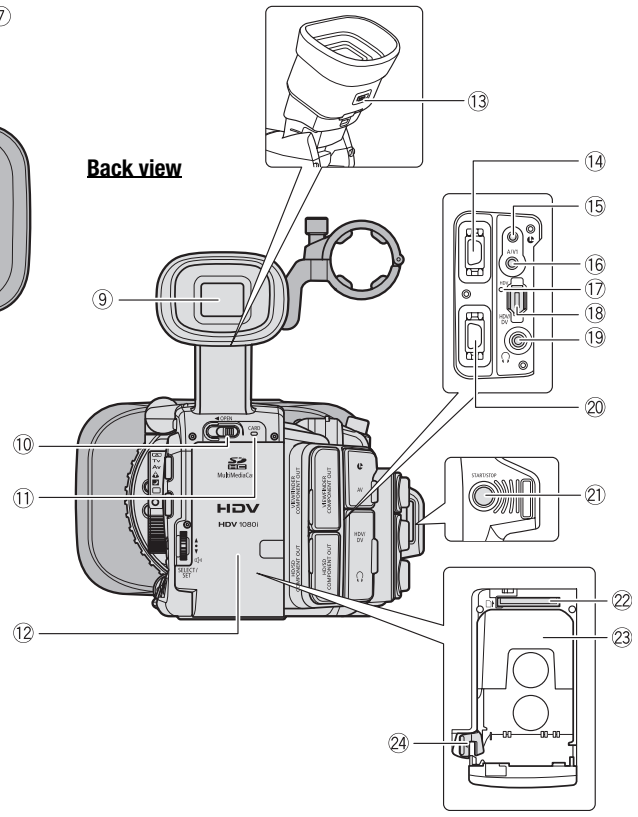
①ZOOM SPEED switch (📖 34)	⑨ AUDIO LEVEL switches (📖 50)
② 📇/📼 (card/tape) switch (📖 112)	⑩Lens hood (📖 20)
③VIDEO 2 terminal (📖 79)	⑪Lens hood locking screw (📖 20)
④HD/SD SDI terminal* (📖 77)	⑫ +48V switches (📖 49)
⑤GENLOCK terminal* (📖 44)	⑬CH1 input terminal (📖 48)
⑥TIME CODE terminal* (📖 44)	⑭CH2 input terminal (📖 48)
⑦MIC (external microphone) terminal (📖 47)	⑮Cassette compartment (📖 23)
⑧ XLR MIC ATT. switches (📖 48)	⑯TIME CODE switch* (📖 44)

* XHG1s only.

Front view



Back view



① External microphone holder (📖 48)	⑬ Dioptric adjustment lever (📖 17)
② Tally lamp (📖 100)	⑭ VIEWFINDER COMPONENT OUT terminal (📖 78)
③ External sensor for the Instant AF (📖 36)	⑮ terminal
④ Grip belt (📖 20)	⑯ A/V1 terminal (📖 77)
⑤ Attachment sockets for the optional TA-100 Tripod Adapter (📖 146) or the supplied tripod adapter base	⑰ HDV indicator
⑥ Microphone lock screw (📖 19)	⑱ HDV/DV terminal (📖 79, 84, 86)
⑦ Remote sensor (📖 22, 109)	⑲ (headphones) terminal
⑧ Tripod socket	⑳ HD/SD COMPONENT OUT terminal (📖 78)
⑨ Viewfinder (📖 17)	㉑ START/STOP button (📖 28)
⑩ OPEN (open the battery compartment) switch (📖 14)	㉒ Memory card slot (📖 24)
⑪ CARD access indicator (📖 112)	㉓ Battery attachment unit (📖 14)
⑫ Battery/memory card compartment (📖 14)	㉔ BATT. RELEASE latch (📖 14)

⑤, ⑧ **Using tripods**

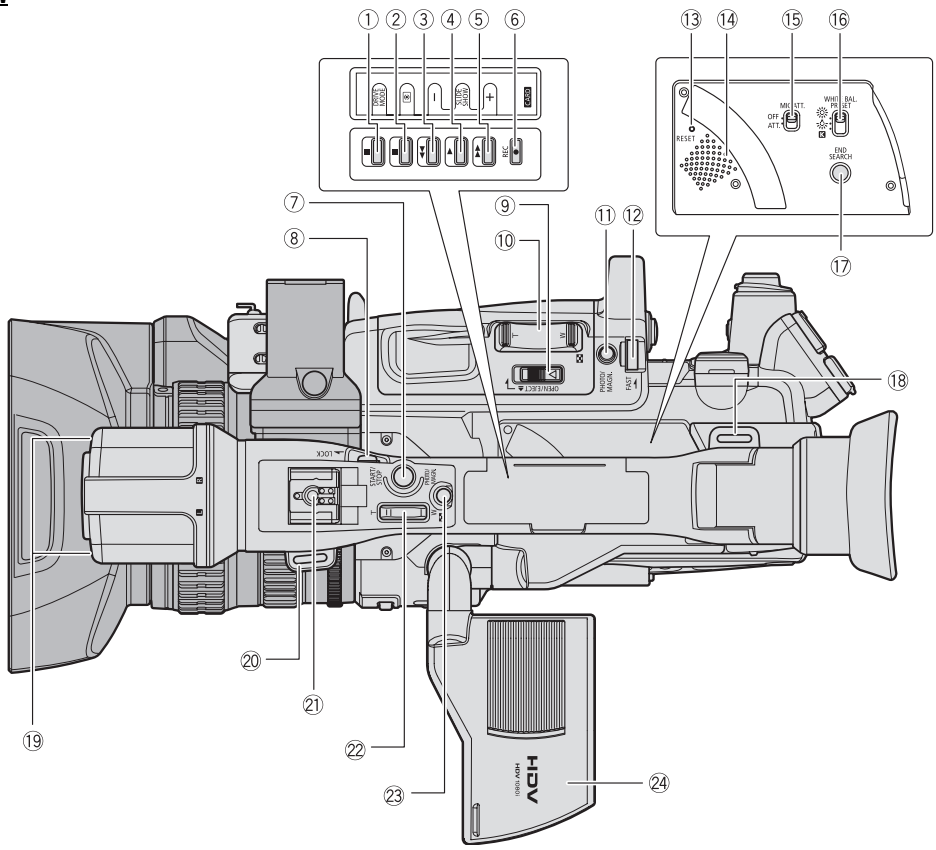
Do not use tripods with mounting screws longer than 5.5 mm as this may cause damage to the camcorder. To use tripods featuring 3/8" mounting screws, attach first the supplied tripod adapter base and attach the tripod to the adapter base.

⑮ **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.

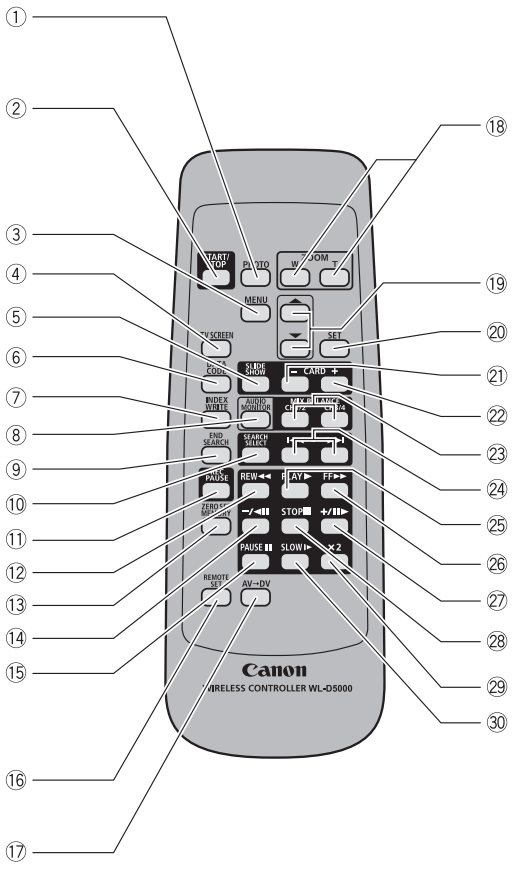
- Operation cannot be guaranteed for connections with devices not bearing the mark.
- Some buttons of connected devices may not operate or may operate differently than the buttons on the camcorder.

Top view



① ❚❚ (pause) button (📖 105) / DRIVE MODE button (📖 115)	⑪ PHOTO button (📖 112)/MAGN. button (📖 38)
② ■ (stop) button (📖 105) / ⊡ (metering mode) button (📖 116)	⑫ Zoom speed adjustment dial (📖 34)
③ ◀◀ (rewind) button (📖 105) / CARD – button (📖 118)	⑬ RESET button
④ ▶ (play) button (📖 105) / SLIDESHOW button (📖 118)	⑭ Speaker (📖 106)
⑤ ▶▶ (fast forward) button (📖 105) / CARD + button (📖 118)	⑮ MIC ATT. switch (📖 49)
⑥ ● REC (record) button (📖 84)	⑯ WHITE BAL. PRESET switch (📖 63)
⑦ START/STOP button (📖 28)	⑰ END SEARCH button (📖 33)
⑧ LOCK switch (📖 29)	⑱ Strap mount (📖 20)
⑨ OPEN/EJECT ▲ switch (📖 23)	⑲ Microphone (📖 47)
⑩ Grip zoom lever (📖 34)	⑳ Strap mount (📖 20)
	㉑ Hot shoe (📖 117)
	㉒ Handle zoom lever (📖 34)
	㉓ PHOTO button (📖 112)/MAGN. button (📖 38)
	㉔ LCD panel (📖 18)

WL-D5000 Wireless Controller

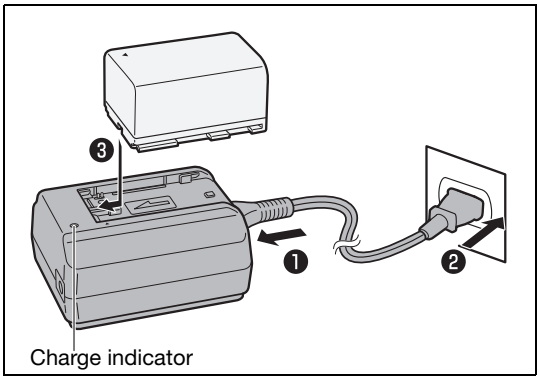


①PHOTO button (📖 112)	⑯REMOTE SET button (📖 109)
②START/STOP button (📖 28)	⑰AV→DV button (📖 85)
③MENU button (📖 25)	⑱Zoom buttons (📖 34)
④TV SCREEN button (📖 72)	⑲Menu selection buttons (📖 25)
⑤SLIDESHOW button (📖 118)	⑳SET button (📖 25)
⑥DATA CODE button (📖 108)	㉑CARD – button (📖 118)
⑦INDEX WRITE button (📖 72)	㉒CARD + button (📖 118)
⑧AUDIO MONITOR button (📖 81)	㉓MIX BALANCE buttons (📖 81)
⑨END SEARCH button (📖 33)	㉔⏮/⏭ buttons (📖 107, 108)
⑩SEARCH SELECT button (📖 107, 108)	㉕PLAY ▶ button (📖 105)
⑪REC PAUSE button (📖 84)	㉖FF▶▶ button (📖 105)
⑫REW◀◀ button (📖 105)	㉗+/⏸▶ button (📖 105)
⑬ZERO SET MEMORY button (📖 107)	㉘STOP ■ button (📖 105)
⑭−/◀⏸ button (📖 105)	㉙×2 button (📖 105)
⑮PAUSE ❚❚ button (📖 105)	㉚SLOW ▶❙ button (📖 105)

Preparing the Power Supply

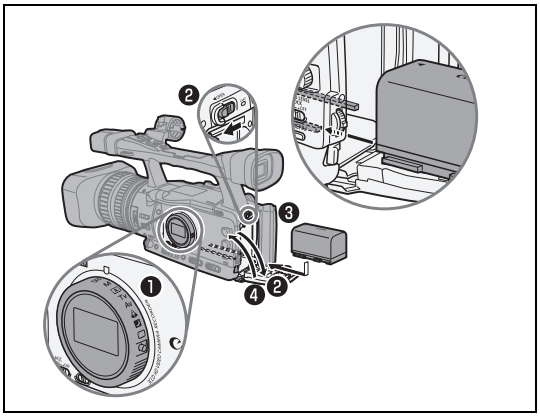
Charging the Battery Pack

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



1. **Connect the power cord to the compact power adapter.**
2. **Plug the power cord into a power outlet.**
3. **Attach the battery pack to the compact power 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 completed.
4. **When the charging is completed, remove the battery pack from the compact power adapter.**
5. **Unplug the power cord from the power outlet and disconnect it from the compact power adapter.**

Attaching the Battery Pack



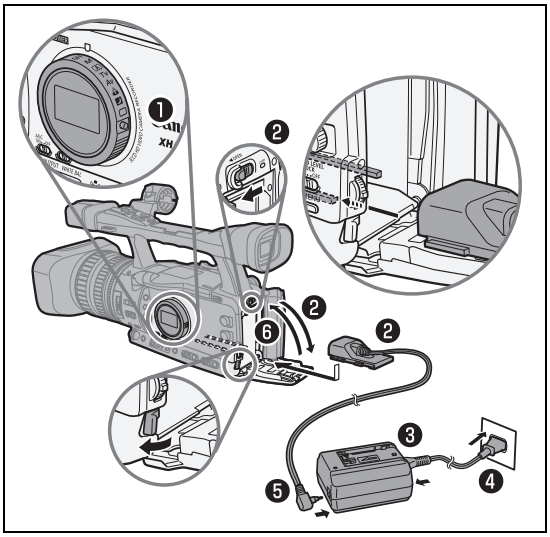
1. **Turn the POWER dial to OFF.**
2. **Push the ◀ OPEN switch in the direction of the arrow to open the battery compartment cover.**
3. **Insert the battery all the way into the compartment and press gently until it clicks.**
4. **Close the battery compartment cover.**

To Remove the Battery

1. **Turn the POWER dial to OFF.**
2. **Push the ◀ OPEN switch in the direction of the arrow to open the battery compartment cover.**
3. **Press the BATT.RELEASE latch left and pull out the battery.**
4. **Close the battery compartment cover.**

Using a Household Power Outlet

1. **Turn the POWER dial to OFF.**
2. **Attach the DC coupler to the camcorder.**
   Open the battery compartment cover and slide the DC coupler all the way into the compartment and press gently 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. **Pass the cable through the special slot and close battery compartment cover.**
7. **Detach the DC coupler after use.**
   Open the battery compartment cover, press the BATT.RELEASE latch left and pull out the DC coupler.



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 periods or do not use it for a period of over 3 months, it will discharge completely. 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 compact power adapter when charging a battery pack.
- ❍ Turn off the camcorder before connecting or disconnecting the compact power adapter.
- ❍ If the compact power adapter is used close to a TV, it may cause picture interference. Move the compact power adapter away from the TV or the antenna cable.
- ❍ Do not connect to the compact power adapter any products not expressly recommended for use with this camcorder.

- ❍ If you connect a faulty compact power adapter or battery pack, the charge indicator turns off and charging will stop.
- ❍ The charge indicator serves also as an indication about the charge status.
  0-50%: Flashes once per second
  50-75%: Flashes twice per second
  More than 75%: Flashes 3 times per second
  100%: Continuously on
- ❍ We recommend charging the battery pack in temperatures between 10 °C and 30 °C. The charging time will vary depending on the surrounding temperature and the battery's initial charge condition.
- ❍ In cold places the effective usage time of the battery will decrease.
- ❍ 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.

❍ 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.
XH G1s					
(HDV) Recording and Playback Times		**BP-930**	**BP-945**	**BP-950G**	**BP-970G**
Maximum Recording Time	Viewfinder [NORMAL]	150 min.	220 min.	315 min.	430 min.
	Viewfinder [BRIGHT]	145 min.	215 min.	305 min.	430 min.
	LCD screen [NORMAL]	145 min.	215 min.	305 min.	430 min.
	LCD screen [BRIGHT]	140 min.	210 min.	295 min.	420 min.
Typical Recording Time*	Viewfinder [NORMAL]	90 min.	135 min.	190 min.	260 min.
	Viewfinder [BRIGHT]	90 min.	130 min.	185 min.	260 min.
	LCD screen [NORMAL]	85 min.	130 min.	185 min.	255 min.
	LCD screen [BRIGHT]	85 min.	125 min.	175 min.	245 min.
Playback Time	LCD screen [NORMAL]	160 min.	240 min.	335 min.	475 min.
(DV) Recording and Playback Times		**BP-930**	**BP-945**	**BP-950G**	**BP-970G**
Maximum Recording Time	Viewfinder [NORMAL]	165 min.	245 min.	345 min.	490 min.
	Viewfinder [BRIGHT]	160 min.	240 min.	340 min.	485 min.
	LCD screen [NORMAL]	160 min.	240 min.	335 min.	475 min.
	LCD screen [BRIGHT]	155 min.	230 min.	325 min.	460 min.
Typical Recording Time*	Viewfinder [NORMAL]	95 min.	145 min.	205 min.	295 min.
	Viewfinder [BRIGHT]	95 min.	145 min.	205 min.	295 min.
	LCD screen [NORMAL]	95 min.	140 min.	200 min.	275 min.
	LCD screen [BRIGHT]	90 min.	140 min.	195 min.	280 min.
Playback Time	LCD screen [NORMAL]	175 min.	265 min.	370 min.	530 min.
XH A1s					
(HDV) Recording and Playback Times		**BP-930**	**BP-945**	**BP-950G**	**BP-970G**
Maximum Recording Time	Viewfinder [NORMAL]	155 min.	230 min.	325 min.	465 min.
	Viewfinder [BRIGHT]	155 min.	230 min.	325 min.	460 min.
	LCD screen [NORMAL]	150 min.	225 min.	315 min.	445 min.
	LCD screen [BRIGHT]	145 min.	215 min.	305 min.	430 min.
Typical Recording Time*	Viewfinder [NORMAL]	95 min.	140 min.	200 min.	285 min.
	Viewfinder [BRIGHT]	95 min.	140 min.	200 min.	285 min.
	LCD screen [NORMAL]	90 min.	140 min.	195 min.	275 min.
	LCD screen [BRIGHT]	90 min.	135 min.	190 min.	260 min.
Playback Time	LCD screen [NORMAL]	165 min.	250 min.	350 min.	505 min.
(DV) Recording and Playback Times		**BP-930**	**BP-945**	**BP-950G**	**BP-970G**
Maximum Recording Time	Viewfinder [NORMAL]	170 min.	255 min.	360 min.	515 min.
	Viewfinder [BRIGHT]	170 min.	255 min.	355 min.	510 min.
	LCD screen [NORMAL]	165 min.	245 min.	350 min.	495 min.
	LCD screen [BRIGHT]	160 min.	240 min.	335 min.	485 min.
Typical Recording Time*	Viewfinder [NORMAL]	105 min.	155 min.	225 min.	315 min.
	Viewfinder [BRIGHT]	105 min.	155 min.	220 min.	315 min.
	LCD screen [NORMAL]	100 min.	150 min.	215 min.	305 min.
	LCD screen [BRIGHT]	95 min.	145 min.	205 min.	295 min.
Playback Time	LCD screen [NORMAL]	185 min.	275 min.	390 min.	565 min.

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

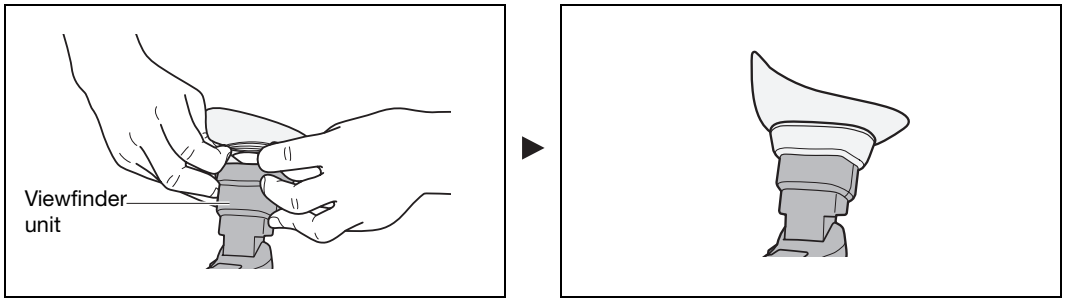
Preparing the Camcorder

Attaching and Detaching the Eye Cup

Attaching the Eye Cup

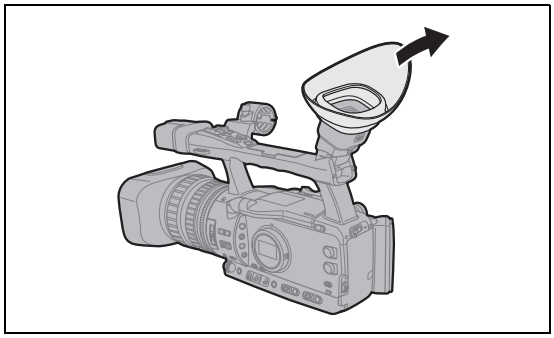
Attach the eye cup so that it covers the rubber portion of viewfinder unit.

- The dioptric adjustment lever can be operated even with the eye cup attached.
- For left eye use, attach the eye cup so that the protruding portion faces the opposite side.



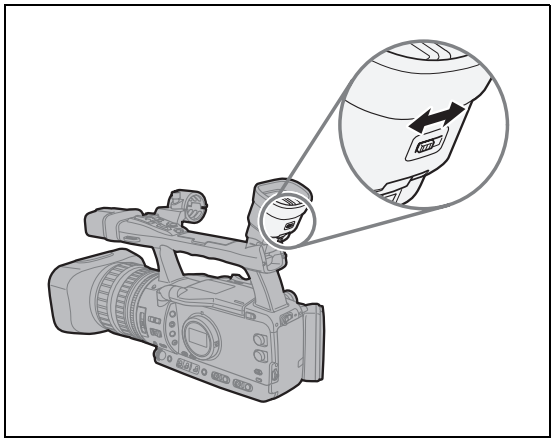
Detaching the Eye Cup

Detach the eye cup as shown in the illustration.



Dioptric Adjustment

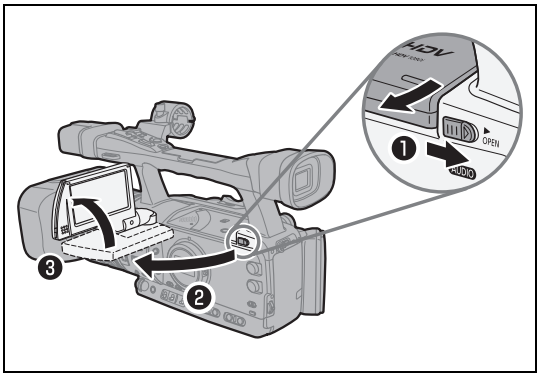
Turn on the camcorder and adjust the dioptric adjustment lever.



Do not let the viewfinder be exposed to direct sunlight or other strong light sources. 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 its transportation.

Using the LCD Display

1. **Slide the ▶ OPEN switch in the direction of the arrow to unlock the LCD panel.**
2. **Pull out the LCD panel.**
3. **Rotate the LCD panel and adjust it to the desired position.**

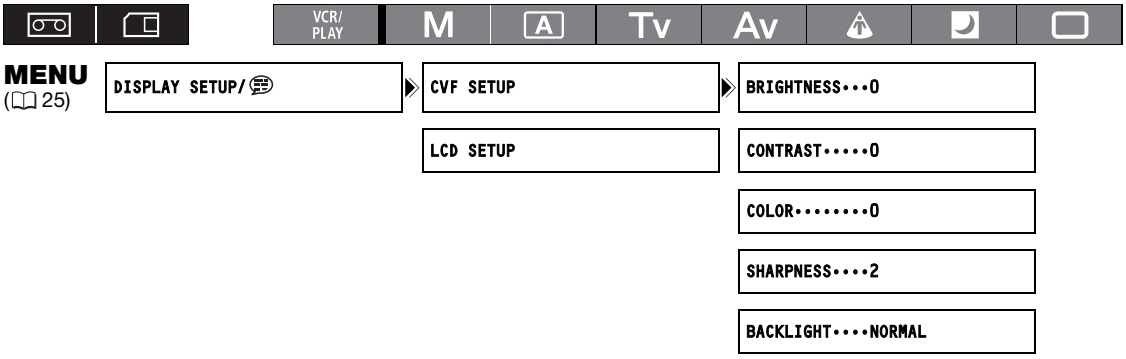


- ❍ You can change the LCD display to black & white (📖 19).
- ❍ By default, the viewfinder display is turned off while you use the LCD panel. However, you can change the settings to be able to use both displays simultaneously (📖 19).

Adjusting the Viewfinder/LCD Display

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

* The default value is [BRIGHT] while using the power adapter.

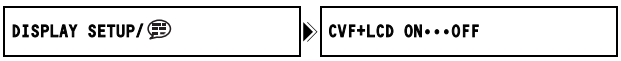


1. **Press the MENU button.**
2. **Turn the SELECT/SET dial to select [DISPLAY SETUP/] and press the dial.**
3. **Select [CVF SETUP] (to adjust the viewfinder) or [LCD SETUP] (to adjust the LCD display), and then select [BRIGHTNESS], [CONTRAST], [COLOR], [SHARPNESS] or [BACKLIGHT].**
4. **Adjust the setting with the SELECT/SET dial and press the dial.**
   After the adjustment you will return to the previous submenu. Change additional settings in the same way as necessary.
5. **Press the MENU button to close the menu.**

Using the Viewfinder and the LCD Display Simultaneously

By default, the viewfinder display is turned off while you use the LCD display. Follow the procedure below to use both of them simultaneously.

MENU (25)

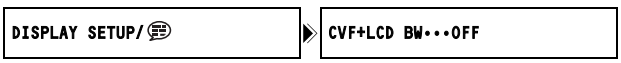


1. **Press the MENU button.**
2. **Turn the SELECT/SET dial to select [DISPLAY SETUP/] and press the dial.**
3. **Select [CVF+LCD ON], set it to [ON] and press the dial.**
4. **Press the MENU button to close the menu.**

Changing the Viewfinder and the LCD Display to Black & White Display

The LCD display and the viewfinder are both color displays. Follow the procedure below to turn both of them to black & white display mode.

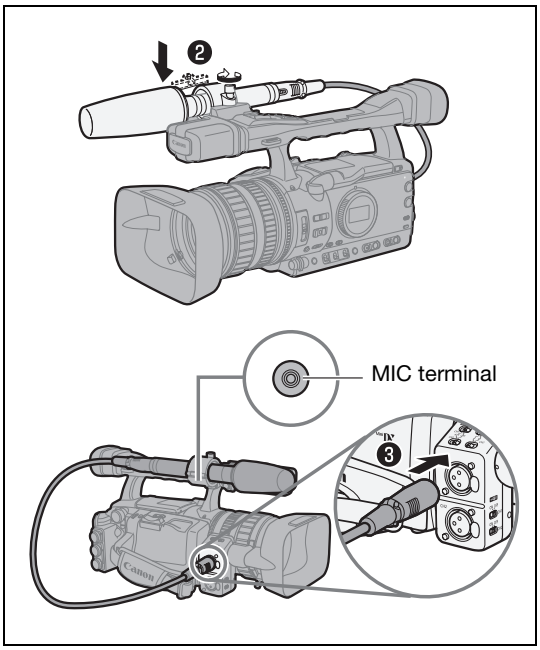
MENU (25)



1. **Press the MENU button.**
2. **Turn the SELECT/SET dial to select [DISPLAY SETUP/] and press the dial.**
3. **Select [CVF+LCD BW], set it to [ON] and press the dial.**
4. **Press the MENU button to close the menu.**

Attaching an External Microphone

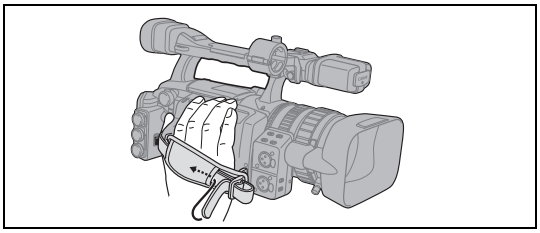
1. **Loosen the microphone lock screw on the viewfinder unit, open the microphone holder and insert the microphone.**
2. **Tighten the lock screw.**
3. **Plug the microphone cable to the camcorder's XLR terminal or MIC terminal.**



- The microphone must have a diameter of 25 mm or less.
- To use an external microphone with a diameter too small for the microphone holder to close securely, attach first the supplied adjustment band to the microphone holder and then insert the microphone.

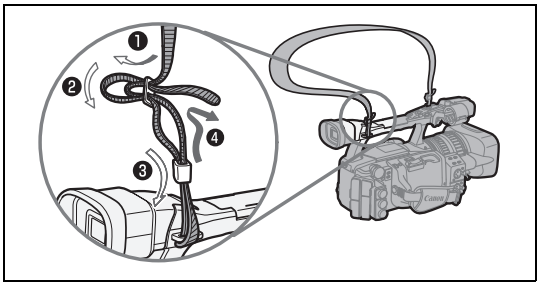
Fastening the Grip Belt

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.

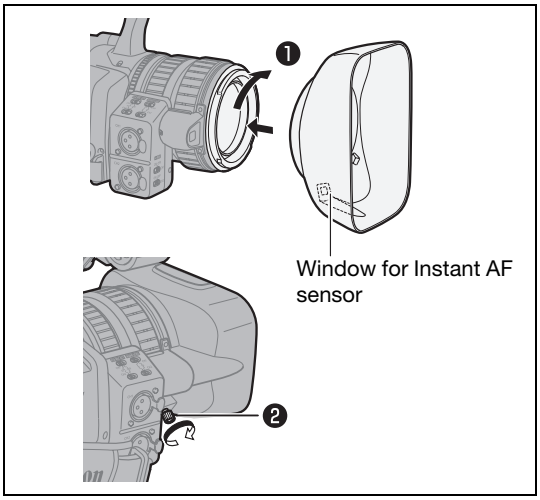


Be careful not to drop the camcorder when adjusting the strap or the grip belt.

Attaching the 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 so that the window for the external Instant AF sensor faces down and turn it 90 degrees clockwise.**
   - Be careful not to deform the lens hood.
   - Make sure that the lens hood is aligned with the thread.
2. **Tighten the locking screw.**



Opening and Closing the Terminal Covers

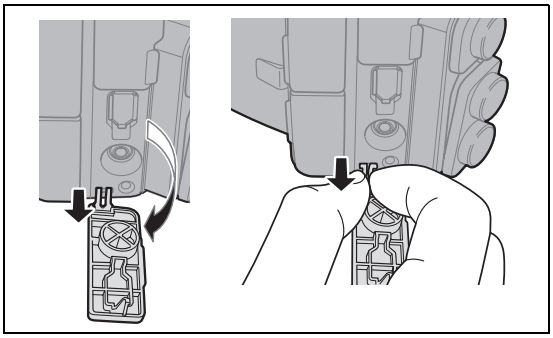
Open the covers for the following terminals in order to access them.

HD/SD SDI terminal*	HD/SD COMPONENT OUT terminal
GENLOCK terminal*	A/V1 and terminals
TIME CODE terminal*	HDV/DV and (headphones) terminals
VIEWFINDER COMPONENT OUT terminal	VIDEO 2 terminal

* XHG1S only.

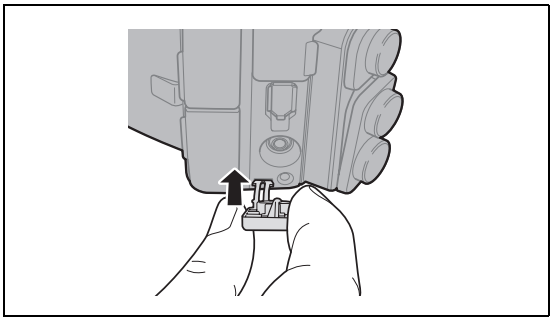
Opening the Terminal Covers

1. **Open the terminal cover and pull it out.**
2. **Grasp the strip connecting the cover to the camcorder and pull.**
   This step is not necessary for the HD/SD SDI terminal and VIDEO 2 terminal.



Closing the Terminal Covers

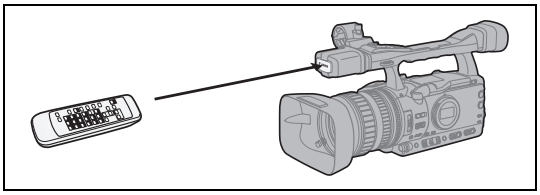
Insert into the opening the strip connecting the cover to the camcorder and close the terminal.



If the connecting strip is difficult to grasp, use a pair of tweezers or similar tool.

Using the Wireless Controller

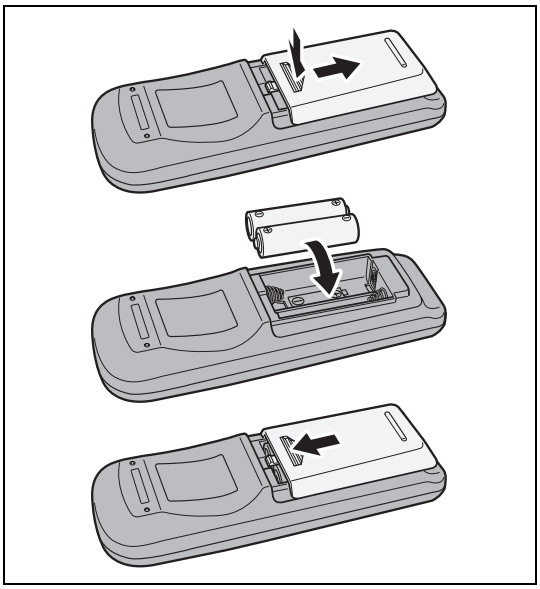
When you press the buttons on the wireless controller, point it at the camcorder's remote sensor.



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.**

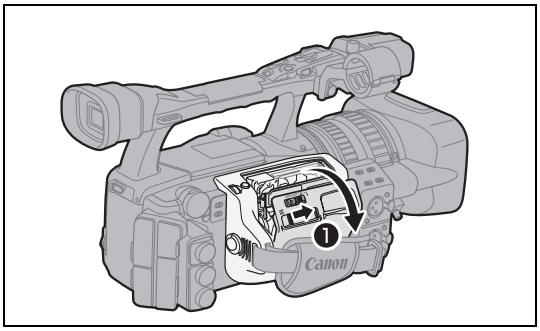


- ❍ The camcorder and wireless controller are equipped with 2 remote sensor modes (🕮 109). If the wireless controller does not work, verify that the camcorder and wireless controller are set to the same mode.
- ❍ When the camcorder cannot be operated with the wireless controller, or when it can only 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.

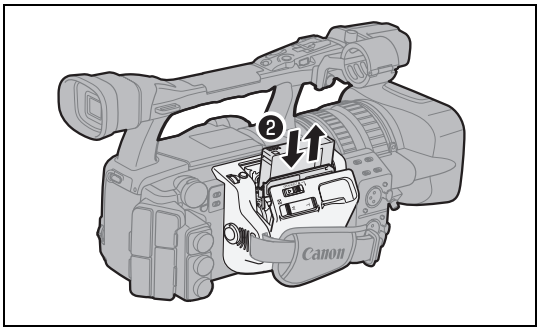
Loading/Removing a Cassette

Use only videocassettes marked with the Mini DV logo. For recording in HDV we recommend you use videocassettes designed for HDV recording.

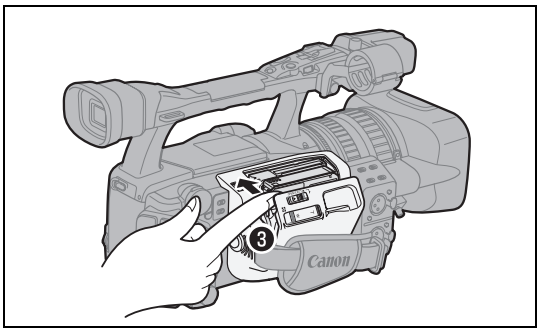
1. Slide the OPEN/EJECT ⏏ switch to open the cassette compartment cover.
The cassette compartment opens automatically.



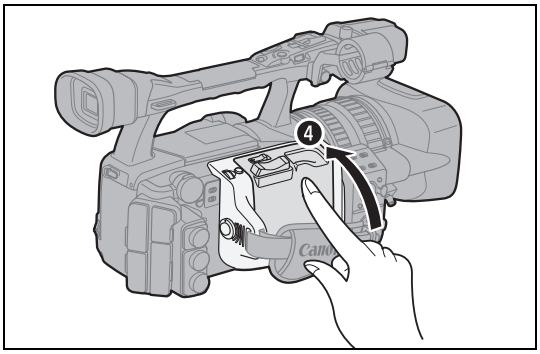
2. Load/remove the cassette.
- Insert the cassette straight, fully into the compartment with the window facing out.
- Remove the cassette by pulling it straight out.



3. Close the cassette compartment by pressing on the PUSH mark on the cover.
The cassette compartment will retract automatically.



4. Close the cassette compartment 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.

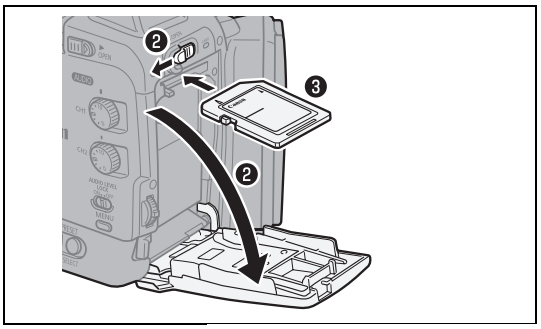
If the camcorder is connected to a power source, cassettes can be loaded/removed even if the POWER dial is set to OFF.

Inserting/Removing a Memory Card

You can use only SDHC (SD High Capacity) memory cards, SD memory cards or MultiMedia Cards (MMC) with this camcorder.

Inserting the Card

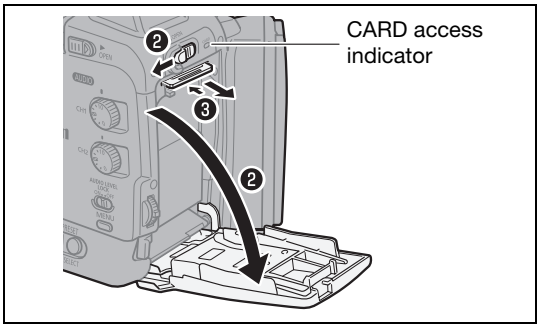
1. **Set the POWER dial to OFF.**
2. **Push the ◀ OPEN switch in the direction of the arrow to open the battery/memory card compartment cover.**
3. **Insert the memory card straight, all the way into the memory card slot.**
4. **Close the compartment.**
   Do not force the cover closed if the card is not correctly inserted.



Removing the Card

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

1. **Make sure that the CARD access indicator is not flashing and set the POWER dial to OFF.**
2. **Push the ◀ OPEN switch in the direction of the arrow to open the battery/memory card compartment cover.**
3. **Push the memory card once to release it and then remove the memory card.**
4. **Close the compartment.**



- ❍ If you use memory cards other than the supplied one, make sure to initialize them with the camcorder (📖 122).
- ❍ Turn off the camcorder before inserting or removing the memory card. Inserting/removing the memory card with the camcorder on may result in permanent data loss.

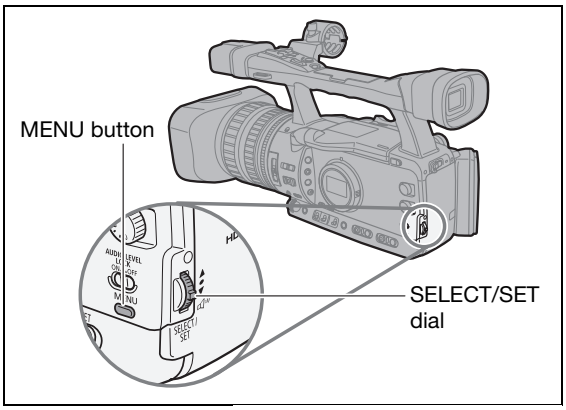
- ❍ SDHC and SD memory cards have a write-protect switch to prevent their accidental erasure. When this switch is set to the LOCK position, images cannot be recorded on or deleted from the memory card.
- ❍ Proper operation cannot be guaranteed for all memory cards.

Changing Settings with the MENU Button

Many of the camcorder's functions can be changed from the on-screen menu.

Selecting Menus and Settings

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



- ❍ The ▲▼, SET and MENU icons displayed at the bottom of the screen will give you additional indications about the function of these controls in specific situations.
- ❍ 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/SET dial, and press the SET button on the wireless controller to save the settings or make a selection.
- ❍ Unavailable items will appear grayed out.
- ❍ Pressing the MENU button at any time closes the menu.

Language and Date/Time Settings

Changing the Display Language

The default language for displays and menu items is English. The language can be changed to German, Spanish, French, Italian, Polish, Russian, simplified Chinese or Japanese.

MENU (📖 25)

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 names of buttons on the camcorder and will not change regardless of the language selected.

Setting the Time Zone/Daylight Saving Time

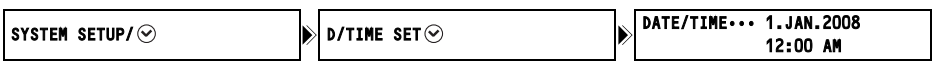
Set the time zone, date and time when you first start using your camcorder, or if the built-in rechargeable battery has discharged completely.

MENU (📖 25)

1. **Press the MENU button.**
2. **Turn the SELECT/SET dial to select [SYSTEM SETUP/⊛] and press the dial.**
3. **Select [D/TIME SET⊛] and then select [T.ZONE/DST] and press the dial.**
   The time zone setting appears. The default setting is Paris.
4. **Turn the SELECT/SET dial to select the setting option that matches your time zone and press the dial.**
   To adjust for daylight saving time, select the time zone marked with a ☀.

Setting the Date and Time

MENU (📖 25)



5. **Select [DATE/TIME] and press the dial.**
   The year display starts flashing.
6. **Turn the SELECT/SET dial to select the year, and press the dial.**
   - The month starts flashing.
   - Set the rest of the date and time in the same way.
7. **Press the MENU button to close the menu and start the clock.**

If you do not use the camcorder for a period of approximately 3 months, the built-in rechargeable battery will discharge completely 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.

Displaying the Date and Time while Recording

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

MENU (📖 25)

Open the menu and select [DISPLAY SETUP/]. Select [GUIDE INFO], set it to [D/T DISPLAY] and close the menu.

Changing the Date Format

You can select between three date formats: [JAN. 1, 2008], [1. JAN. 2008] and [2008. 1. 1].

MENU (📖 25)

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

Recording

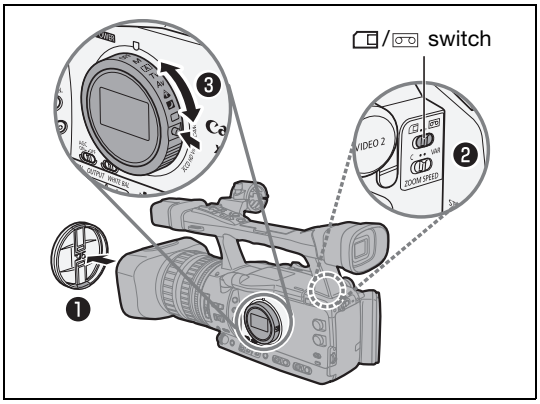
Before You Begin Recording
Make a test recording first to check if the camcorder operates correctly. If necessary, clean the video heads (📖 141).

The default recording standard is HDV. About the audio recording, refer to the relevant chapter (📖 47).

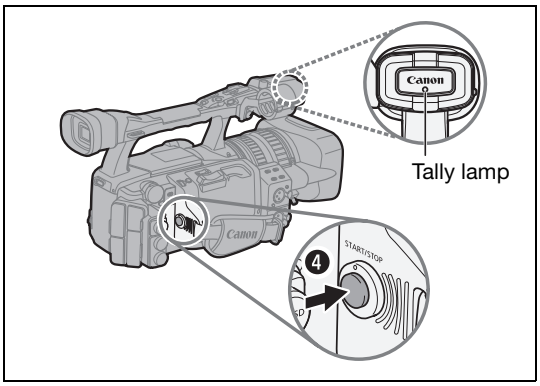
Recording

VCR/PLAY | M | A | Tv | Av

1. **Remove the lens cap.**
2. **Move the / (card/tape) switch to .**
3. **Press the lock button and set the POWER dial to a recording program.**



4. **Press the START/STOP button to begin recording.**
   - The tally lamp lights up and the recording indicator ● appears on the screen.
   - Press the START/STOP button again to pause recording.



When You Have Finished Recording

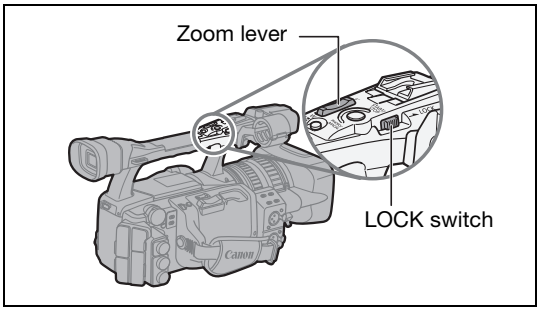
1. **Set the POWER dial to OFF.**
2. **Replace the lens cap.**
3. **Remove the cassette.**
4. **Disconnect the power source.**

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. We recommend not mixing recordings in different standards on the same tape.

- ❍ After inserting a cassette, wait until the tape counter stops completely before you start recording.
- ❍ Turn the POWER dial to OFF if you do not intend to use the camcorder for a long time.
- ❍ If you do not remove the cassette, you can record the next scene without any noise or blank sections between recordings even if you turn the camcorder off.

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 switch in the direction of the arrow ➘ to prevent the accidental operation of these controls.



Power Saving Mechanisms

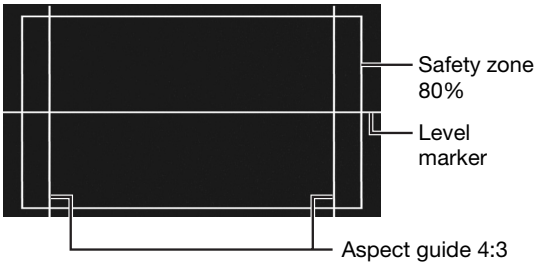
Power Save Function

In order to protect the tape and video heads, the camcorder will enter the power save mode (VCR stop) after 4 minutes 30 seconds (in low temperatures, this may be 3 minutes) in record pause mode. If left 30 more seconds without any operation, the camcorder will automatically shut off (when a battery pack is being used). Turn off the power save function with [SYSTEM SETUP/⊛] ▶ [POWER SAVE] setting (🕮 128) if you wish to make adjustments without worrying about losing your settings as a result of the automatic shut-off. Once the camcorder entered the power save mode, press the START/STOP button to start recording or press one of the custom keys (🕮 71) to which the [VCR STOP] function was assigned, to return to record pause mode. If the camcorder automatically shut off (after 5 minutes), turn the POWER dial to OFF and then back to one of the recording programs.

VCR Stop Function

You can assign the [VCR STOP] function to either custom key (🕮 71). In VCR stop mode the camcorder is only partially turned off: The camera section is powered normally while the recorder section is shut off. When you press the assigned custom key, you can make adjustments to the camera section as long as necessary without worrying about the 5-minute shut-off timer of the power save function. To return to record pause mode, press the assigned custom key again.

Screen Displays while Recording



①Time code

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

②Remaining tape

Indicates the remaining time on the tape in minutes.

"END" will appear 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 type of tape, the remaining time displayed may not be accurate. In any case, you will be able to record on the tape the number of minutes that appears on the cassette's label (for example, 85 minutes).

③Remaining battery charge

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

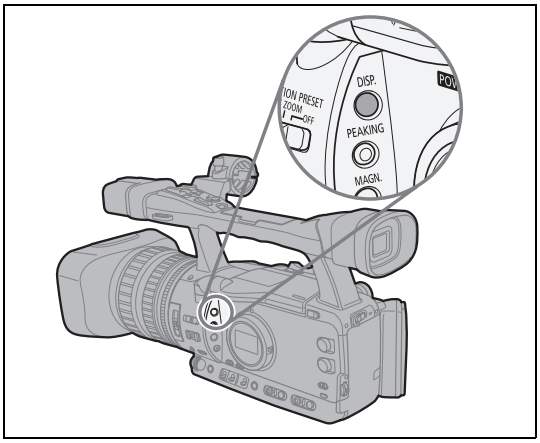
- starts flashing in red when the battery pack is empty.
- When you attach an empty battery pack, the power may turn off without displaying .
- The actual battery charge may not be indicated accurately depending on the condition under which the battery pack and camcorder are used.

Reference guides

With the [DISPLAY SETUP/] ▶ [MARKERS], [ASPECT GUIDE] and [SAFETY ZONE] settings you can display reference guides to help you frame the subject more accurately.

Selecting the On-Screen Displays

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



Level 1[1]: All screen displays

Level 2: Customized displays (📖 101), date/time[2]

Level 3[3]: Markers, safety zone guides, date/time[2]

Level 4: No displays

[1] This level cannot be selected if [SYSTEM SETUP/⊙] ▶ [ALL DISPLAY] is set to [DISABLE].
[2] If [DISPLAY SETUP/💬] ▶ [GUIDE INFO] is set to [D/T DISPLAY], the date and time will be displayed; if it is set to [CUSTOM KEYS], the functions currently assigned to the custom keys will be displayed instead.
[3] This level cannot be selected if [DISPLAY SETUP/💬] ▶ [MARKERS], [SAFETY ZONE] and [GUIDE INFO] are all set [OFF].

The camcorder's on-screen displays will also appear on a connected external TV or monitor.

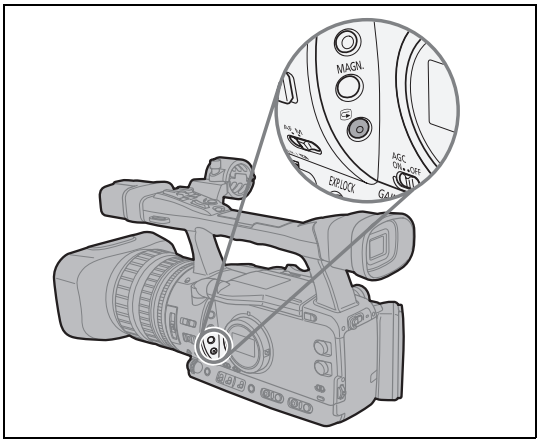
Reviewing the Recording

VCR/PLAY | M | A | Tv | Av

In record pause mode, this function allows you to review the last few seconds of your recording.

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.

Selecting the Signal Standard and Aspect Ratio

You can select the signal standard of your recording (high definition or standard definition) and, for standard definition recordings, also the aspect ratio of the recording. Since the displays on the camcorder have an aspect ratio of 16:9, when you select [SD4:3] the picture will appear in the center of the screen with black sidebars.


Open the menu and select [SIGNAL SETUP]. Select [SIGNAL STD], select a setting option and select [YES] to confirm the selection and close the menu.

- [HD]: To record on the tape in HDV standard or to use the camcorder as a high-definition (HD) camera.
- [SD16:9], [SD4:3]: 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.

❍ When you play back 16:9 recordings, the TV set will switch automatically to widescreen mode if it is compatible with the WSS system. Otherwise, change the aspect ratio of the TV manually.

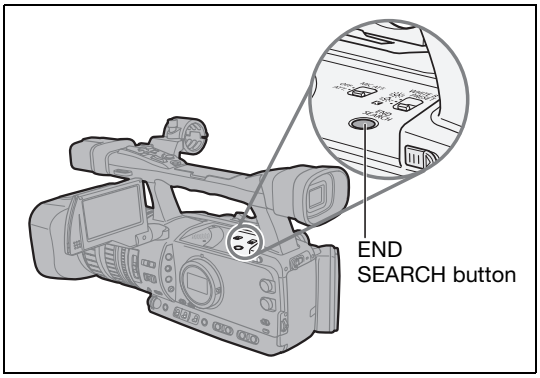
❍ To play back on a standard TV set with 4:3 aspect ratio, set [SIGNAL SETUP] ▶ [LETTERBOX] to [ON] (🕮 124).

Locating the End of the Last Scene

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

Press the END SEARCH button.

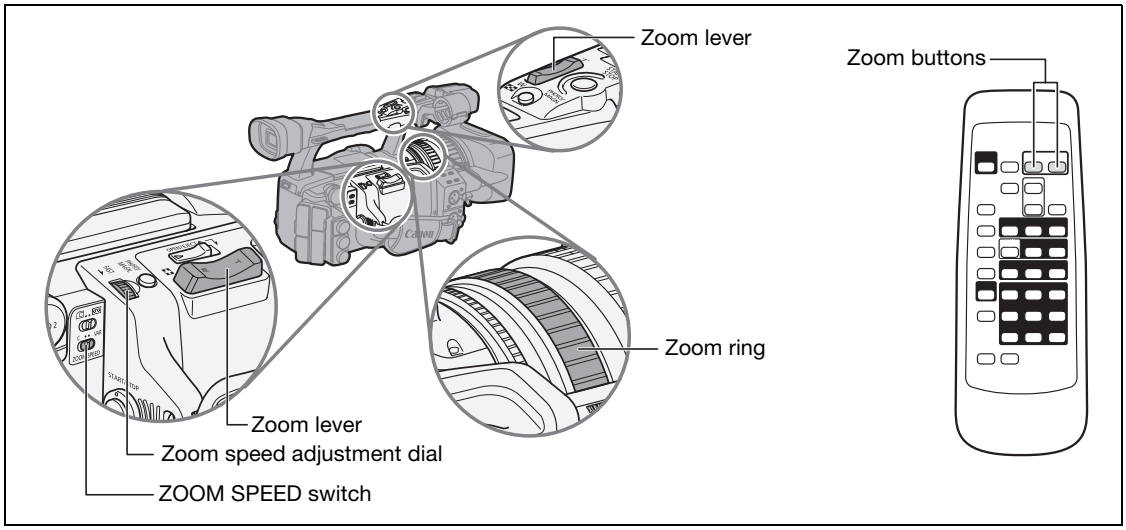
- ➔| appears.
- The camcorder rewinds/fast forwards the tape, plays back the last few seconds of the recording and stops the tape.
- Pressing the button again cancels the search.



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

Zooming

You can operate the zoom using the zoom lever on the side grip or the one on the carrying handle. You can also use the zoom ring on the lens or the zoom buttons on the wireless controller. With the customized functions (🕮 95) you can change the direction and response sensitivity of adjustment when the zoom ring is used, change the zoom speed and select the zoom indicator (graphic or numeric).



VCR/ PLAY | M | A | Tv | Av

Move the zoom lever toward W to zoom out (wide-angle). Move it toward T to zoom in (telephoto).

Zoom Speed

Zoom lever on the side grip:

When the ZOOM SPEED switch is set to C (constant), the zoom speed will be constant at one of 16 zoom speed levels (the current zoom speed level will appear next to the zoom indicator). Turn the zoom speed adjustment dial in the direction of the arrow (FAST ▬▸) to select a faster zoom speed level (higher number); turn it the other way to select a slower zoom speed level (lower number).
When the ZOOM SPEED switch is set to VAR (variable), the zoom speed will depend on how you operate the zoom lever: press gently for a slower zoom; press harder for faster zooms.

Approximate zoom speeds:

ZOOM SPEED switch	Zoom speed level	Custom function [ZOOM SPEED] setting		
		[SLOW]	[NORMAL][1]	[FAST]
C (constant)	Level 1	5 min.	3 min.	1 min.
	Level 16	4.5 sec.	2.5 sec.	1.4 sec.[2]
VAR (variable)	–	4.5 sec. to 5 min.	2.5 sec. to 3 min.	1.4 sec.[2] to 1 min.

[1] Default setting when recording movies in ▭ Easy Recording mode. When recording still images, the default setting is [FAST].
[2] When the zoom speed is too fast (less than 2 seconds end-to-end), the camcorder will have more trouble focusing automatically while zooming.

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

Zoom buttons on the carrying handle: The zoom speed is constant and can be set to one of 16 zoom speed levels. Set the ZOOM SPEED switch to C (constant) and change the zoom speed level as described previously.

Zoom buttons on the supplied wireless controller: The zoom speed is constant and cannot be adjusted.

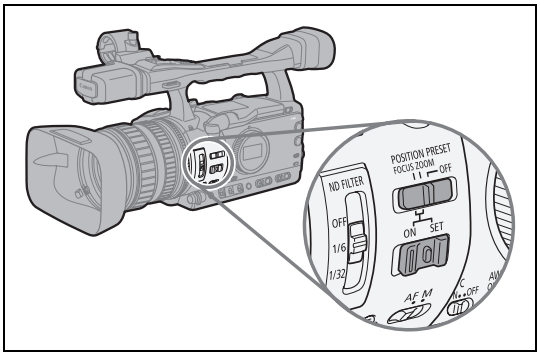
Zoom Preset

This function enables any given zoom position to be memorized. Later, you can return to the preset zoom position instantly.

Presetting the Zoom

VCR/PLAY | M | A | Tv | Av

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.

To return to the preset zoom position the camcorder uses the speed set for the constant zoom speed (when the ZOOM SPEED switch is set to C (constant)).

Adjusting the Focus

The camcorder can be set to Autofocus or Manual Focus.

Autofocus

The autofocus can be set to Normal AF or Instant AF*. The camcorder has also a Push AF function to allow for a temporary autofocus while focusing manually.

Manual Focus

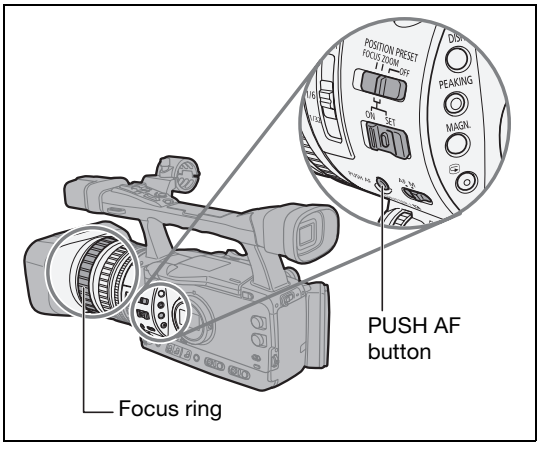
With the customized functions (🕮 95) you can change the direction and response sensitivity of adjustment when the focus ring is used. To make it easier to focus manually, you can also make use of the Peaking and Magnifying functions (🕮 38).

* The Instant AF function can also be used combined with the Push AF function so you can obtain a very fast initial automatic focus even while focusing manually.

Autofocus

The autofocus is activated when the focus mode switch is set to AF. The camcorder uses the TTL autofocus system with a focusing range of 2 cm (at full wide-angle, measured from the front of the lens barrel) to ∞.

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



Follow the procedure below to change the autofocus mode.

MENU (🕮 25) → CAMERA SETUP → AF MODE ••• INSTANT AF

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

[INSTANT AF]: The focus is adjusted at the highest speed. This mode is useful even when recording in very bright or low-light surroundings. The TTL system and the external sensor are both used for focusing.

[NORMAL AF]: The autofocus adjustment is made at a stable speed. Only the TTL system is used in this mode making it appropriate for use also with the optional Wide Converter attached.

Temporary Focus Override

Even while in autofocus mode, turn the focus ring to temporarily focus manually.

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

Push AF

During manual focus or Normal AF, press the PUSH AF button and hold it pressed down.

The autofocus (Instant AF) is activated as long as you hold the PUSH AF button pressed down.

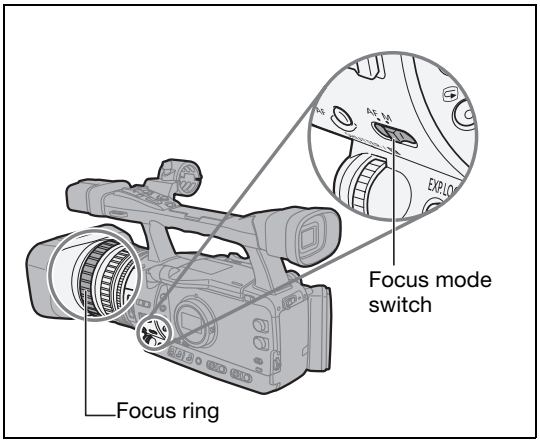
When recording under bright conditions, the camcorder closes down the aperture. When the aperture value used is too large, the picture may appear blurred. Turn the built-in ND filter on/off according to the screen display (📖 41).

- ❍ When you attach the optional Wide Converter to the camcorder, set the camcorder to a recording mode other than ▭ Easy Recording and set the autofocus mode to Normal AF. Also, avoid using the Push AF function.
- ❍ In 25F mode, autofocus takes longer than in 50i mode.
- ❍ When recording under dark conditions, the focusing range narrows and the picture may appear blurred.
- ❍ 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

VCR/PLAY | M | A | Tv | Av | ▭

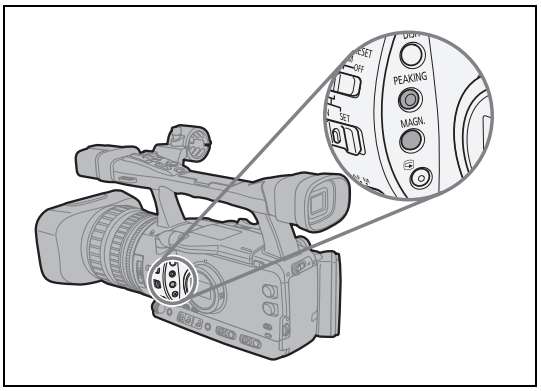
1. **Set the focus mode switch to M.**
   "MF" appears.
2. **Zoom in to telephoto.**
3. **Turn the focus ring to adjust the focus.**
   With the customized functions (📖 95) you can change the direction and response sensitivity of adjustment when the focus ring is used.
4. **Operate the zoom to reframe the subject.**
   If you focus manually and then leave the camcorder with the power turned on, the focus on the subject may be lost after a while. This possible slight shift in focus is a result of the internal temperature rising in the camcorder and lens. Check the focus before resuming shooting.



- ❍ Manual focus cannot be selected in ▭ Easy Recording mode. Even if you set the focus mode switch to M, the autofocus (Instant AF) will still be activated.
- ❍ The focusing 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 manual focus mode. It will also be displayed with the focus preset. With the custom function [OBJ DST UNIT] (📖 95) you can change the units for the distance display (meters or feet) and with the custom display (📖 101) you can select when to display this information (always, never, or only upon the operation of the focus ring).
  - Use the focusing distance display as an estimate; when the distance reading is not considered very precise it will be displayed in gray. ∞: Infinity focus ∞-: Over infinity focus.
  - The correct distance will not be displayed when the optional Wide Converter is attached.
- ❍ You can simultaneously zoom and focus manually. If the camcorder is in AF mode, the autofocus will be reactivated when you finish the operation.

Using the Focus Assist Functions (Peaking and Magnifying)

In order to make manual focusing easier, you can use two assist functions: Peaking emphasizes the outlines of the subject creating a clearer contrast, and Magnifying enlarges the image on the screen. You can also combine both for greater effect.
With the custom function [F.AST BW-MOD] (🕮 95) you can set the display to change automatically to black & white while using the focus assist functions.
The screen of an external monitor connected to the VIEWFINDER COMPONENT OUT terminal will show the exact same picture as displayed on the camcorder's viewfinder screen.



VCR/PLAY | M | A | Tv | Av

Peaking

While recording or in record pause, press the PEAKING button.

- PEAK 1 appears and the outlines of the subject will be emphasized.
- Press the button again to change the Peaking level to PEAK 2 ; press once more to cancel the function.

❍ The Peaking function will not affect your recordings.
❍ The gain and frequency of peak levels PEAK 1 and PEAK 2 can be set independently with the [DISPLAY SETUP/] ▶ [PEAKING SETUP] setting.

Magnifying

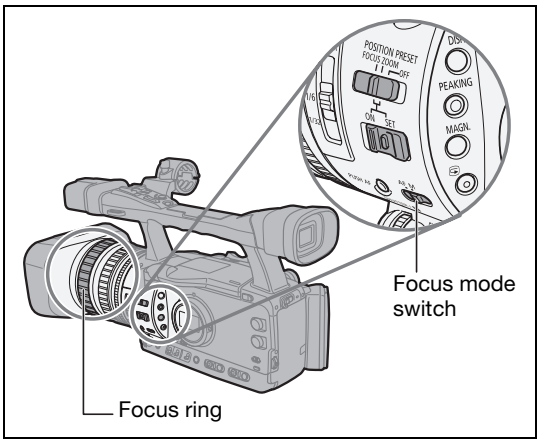
In record pause, press the MAGN. button.

- "MAGN." appears and the central part of the screen will be magnified approximately 2x.
- Press the button again to cancel the function.

❍ The magnified picture will be output as is to the HD/SD SDI terminal (XH G1s only) and the HDV/DV terminal.
❍ With the custom function [CUSTOM REC] (🕮 95) you can select to have the magnified picture recorded on the tape (CAMERA mode only) as it is, or to cancel the Magnifying function when you start recording video or record a still image on the memory card. In CAMERA·CARD mode, the Magnifying function will always be canceled when you press the PHOTO button.
❍ You can use the custom keys (🕮 71) or the [SYSTEM SETUP/] ▶ [MAGN.B.LOCK] setting to prevent the accidental operation of the MAGN. button. With the custom function [BUTTONS OPER.1] (🕮 95) you can also change the operation of the MAGN. button (normal or long press).
❍ With the custom function [PHOTO BUTTON] (🕮 95) you can assign the magnifying function also to the PHOTO/MAGN. buttons.

Focus Preset

This function enables a focus position to be memorized. Later, you can return to the preset focus position instantly. You can also select the speed at which the camcorder returns to the preset focus position.



VCR/PLAY | M | A | Tv | Av

Presetting the Focus

1. **Set the focus mode switch 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 (📖 25) CAMERA SETUP ▶ F SPEED PSET: 4

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

4 is the fastest speed; 1 is the slowest.

Returning to the Preset Focus position

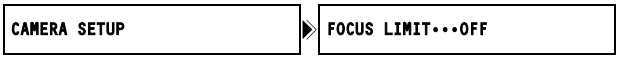
Move the POSITION PRESET ON/SET switch to ON.

The camcorder returns to the preset focus position.

Focus Limit and Macro Shooting

Usually the camcorder's focus range allows macro shooting. You can activate the focus limit to restrict the focus range. The focus range 2 cm - ∞ (at full wide-angle) is limited to 1 m - ∞ (throughout the entire zoom range).

MENU (📖 25)

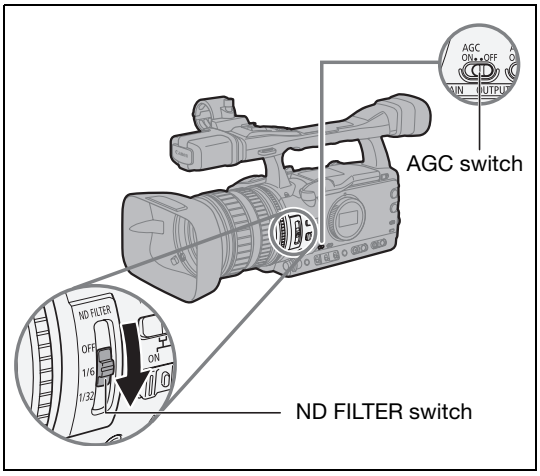


Open the menu and select [CAMERA SETUP]. Select [FOCUS LIMIT], set it to [ON F.LMT] and close the menu.

F.LMT appears.

Using the ND Filter

When recording under bright conditions, the camcorder closes down the aperture. When the aperture value used is too large, the picture may appear blurred. Turn the built-in ND filter on/off according to the screen display.



When using a recording program other than **M** Manual and if the AGC switch is set to ON, 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 ON" flashes	ND filter required	Turn on the ND filter
ND "ON" flashes	Higher density setting or external ND filter required.	Set the ND filter to a higher density setting or attach an external ND filter to the lens*
ND "OFF" flashes	Built-in ND filter not required	Turn off the ND filter
"ND" flashes in red	Incorrect setting of the built-in ND filter	Set the ND filter to an appropriate density

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

Depending on the scene, the color may change when turning the ND filter on/off. Setting a custom white balance may be effective in such case (📖 64).

Selecting the Frame Rate

You can set the frame rate to 50i or 25F, regardless of the recording mode.

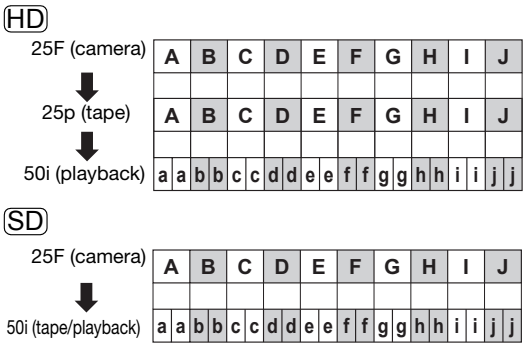
50i Mode

Records 50 interlaced fields per second, the same as standard-definition TV signals.

25F Mode

HD Records 25 frames per second according to HDV native 1080/25p specifications. For playback, the signal is converted to 50i but video output from the HDV/DV terminal will be 25p.

SD The picture captured by the camera at 25 frames per second is converted and recorded on the tape as 50i.



MENU (📖 25)

SIGNAL SETUP ▶ FRAME RATE•••50i

Open the menu and select [SIGNAL SETUP]. Select [FRAME RATE], select a setting option and select [YES] to confirm the selection and close the menu.

The selected frame rate appears on-screen.

Video recorded in 25F can only be played back with compatible devices and can only be edited with software that supports 25F. For software and hardware compatibility consult the relevant customer support center.

Setting the Time Code

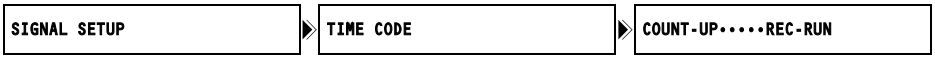
You can select the running mode of the camcorder's time code. You can enter the initial value for the [FREE-RUN] and the [REC-RUN PS.] settings.

[REC-RUN]: The time code runs only when recording.

[REC-RUN PS.]: The time code runs only when recording, starting from a preset value.

[FREE-RUN]: The time code runs regardless of the operation of the camcorder.

MENU (📖 25)



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 to set the initial value.

2. Select [SET].

The hours display flashes.

3. Set the time code's initial value.

Turn the SELECT/SET dial to set the value for the hours and press the dial. 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 with an **H** next to it.
- Playback: No time code display.

❍ When you select [FREE-RUN], the time code starts to run the moment you press the MENU button in the middle of the setting, or when you press the SELECT/SET dial after setting the value for frames (F) 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 well.

❍ As long as the built-in rechargeable lithium battery is charged, the free-run time code continues to run even if you disconnect all other power sources.

XHG1s

Synchronizing the Camcorder's Time Code

You can synchronize this camcorder's time code to an external time code generator. You can also include in the recording the user bit signal received from the TIME CODE terminal (📖 46). The camcorder offers the following synchronization options.

Genlock
When a reference sync signal (analog blackburst or tri-level signal) is input through the GENLOCK terminal, the V and H phases of the camcorder's time code will automatically be synchronized to it.

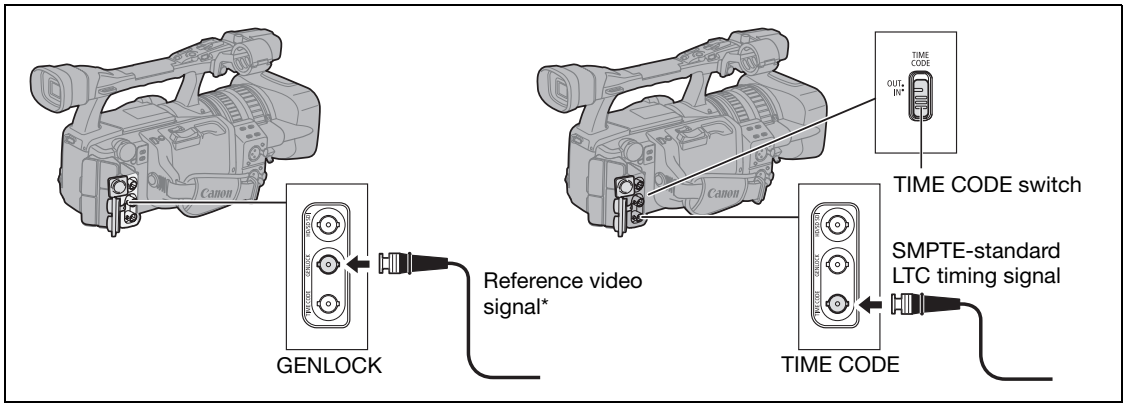
Time Code IN
Set the TIME CODE switch to IN to start the Time Code IN mode. An external SMPTE-standard LTC timing signal received from the TIME CODE terminal will be recorded as the time code on the tape. The user bit of the external timing signal can also be recorded on tape.

Time Code OUT
Set the TIME CODE switch to OUT to start the Time Code OUT mode. The camcorder's internal time code is sent out from the TIME CODE terminal as a standard LTC timing signal.
When [SIGNAL SETUP] ▶ [SDI OUTPUT] is set to [ON(OSD)] or [ON], the time code signal will be output also through the HD/SD SDI terminal.

	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD
Genlock	●	–	●	–
Time Code/User bit IN	●	–	–	–
Time Code OUT	●	●	–	–

Connection Diagram

When synchronizing the camcorder to an external signal, input a reference video signal through the GENLOCK terminal or a time code signal through the TIME CODE terminal. To input a time code signal through the TIME CODE terminal, set the TIME CODE switch to IN. To output a time code signal, set the switch to OUT.



* As a reference video signal input you can use either an HD Y signal or a PAL composite video signal when recording in HD.

❍ While a time code signal is being received, the [COUNT-UP] setting of the camcorder will be ignored and the external time code's drop-frame bit will be used instead.
❍ The Genlock synchronization stabilizes after approx. 10 seconds. After that, the synchronization will be maintained even if you disconnect the cable from the GENLOCK terminal.
❍ When an external time code signal is received, the camcorder's own time code will be synchronized to it and the synchronization will be maintained even if you disconnect the cable from the TIME CODE terminal. However, performing any of the following actions while the cable is not connected will cause the time code to lag slightly; the correct time code will be restored once you reconnect the cable.
- Turning the camcorder off/on.
- Changing the position of the POWER dial to or from VCR/PLAY.
- Changing the position of the / (card/tape) switch.
- Changing the [SIGNAL STD] or [FRAME RATE] setting.

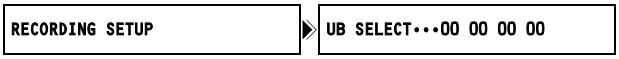
❍ If the external time code signal is incorrect or there is no input signal, the internal time code (according to the [TIME CODE]/[COUNT-UP] settings) will be recorded on the tape instead.
❍ If the external Genlock signal is incorrect or there is no input signal, the external time code being recorded on tape may be incorrect.
❍ When the camcorder is set to HD standard, Genlock synchronization is possible even if the external Genlock signal is in SD standard. However, Genlock synchronization will not be possible if the external Genlock signal is in HD standard but the camcorder is set to SD standard.
❍ 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. ±0.4H (-1023 to +1023) with the [SIGNAL SETUP] ▶ [GENLCK ADJST] setting (📖 124).
❍ Genlock synchronization is not possible when [SIGNAL STD] is set to [HD] and [SDI SPEC.] is set to [SD LOCKED].
❍ **About the Side Panel Indications**
- "GENLOCK" will flash until the synchronization stabilizes and will stay on once the phase synchronization has stabilized.
- "TC-(IN OUT)" indicates that the Time Code IN or Time Code OUT synchronization is available with the TIME CODE switch.
- "EXT- LOCK" indicates that the camcorder has locked on to an external time code signal.

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.

XHG1s If user bit information is being received along with an external time code, you can also record the external user bit on the tape.

MENU (📖 25)



1. Open the menu and select [RECORDING SETUP]. Select [UB SELECT], select a setting option and press the SELECT/SET dial.

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 character of the user bit flashes.

3. Turn the SELECT/SET dial to select a number or letter and press the dial.

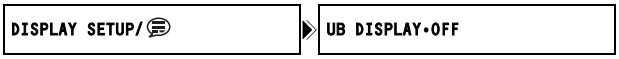
The next character of the user bit starts flashing. Set the rest of the user bit in the same way.

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 (HDV or DV).

Displaying the User Bit

MENU (📖 25)



Open the menu and select [DISPLAY SETUP/]. Select [UB DISPLAY], set it to [ON] and close the menu.

XHG1s Recording an External User Bit

MENU (📖 25)

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, audio is recorded on two channels.

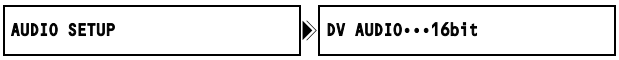
(HDV) The audio transfer rate is 384 kbps and the sampling frequency is 48 kHz.

(DV) You can record audio in 16-bit mode (sampling frequency 48 kHz), or 12-bit mode (sampling frequency 32 kHz).

- Audio is recorded on channels 1 and 2, leaving the other channels unused.
- Audio cannot be dubbed using this camcorder.
- Audio recorded with this camcorder is locked audio except for audio recorded from an analog input, or from a digital input if you select the Unlock mode.
- XHG1S While recording, the sampling frequency of the output signal from the HD/SD SDI terminal will be 48 kHz regardless of the audio input.

(SD) Selecting the DV Audio Mode

MENU (📖 25)

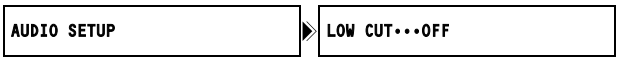


Open the menu and select [AUDIO SETUP]. Select [DV AUDIO], select a setting option and close the menu.

Selecting the Microphone's Audio Recording Mode

You can select the most appropriate setting, given your recording conditions, for recording audio with the built-in microphone.

MENU (📖 25)



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

[OFF]: To record audio under usual conditions.

[LC1]: To record mainly people's voices.

[LC2]: To reduce the background sound of wind when recording outdoors in windy surroundings (for example, on a beach or close to buildings). Note that when you use this setting some low-frequency sounds may be suppressed along with the sound of wind.

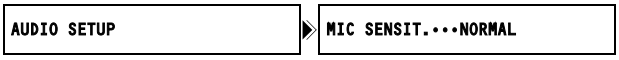
Selecting the Sensitivity of the Built-in Microphone

You can change the sensitivity of the built-in microphone to [NORMAL] or [HIGH] (+6 dB) to match the recording conditions.

[NORMAL]: To record audio under usual conditions.

[HIGH]: To record audio at a higher volume.

MENU (📖 25)



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

Recording Audio

Select the audio input from the built-in microphone or external microphone (MIC terminal), XLR MIC (XLR terminals) or XLR LINE (XLR terminals). You can select the audio input independently for channel 1 and channel 2.

Selecting the Audio Channel

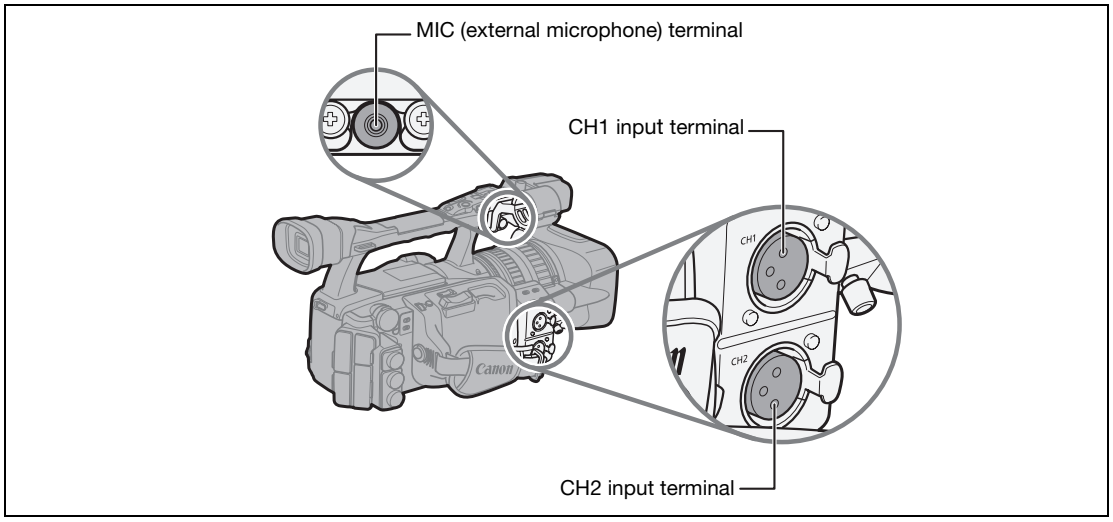
MENU (📖 25)

AUDIO SETUP ▶ CH1 INPUT•••INT/EXT MIC

CH2 INPUT•••INT/EXT MIC

Open the menu and select [AUDIO SETUP]. Select [CH1 INPUT] or [CH2 INPUT], select a setting option and close the menu.

Using an External Microphone



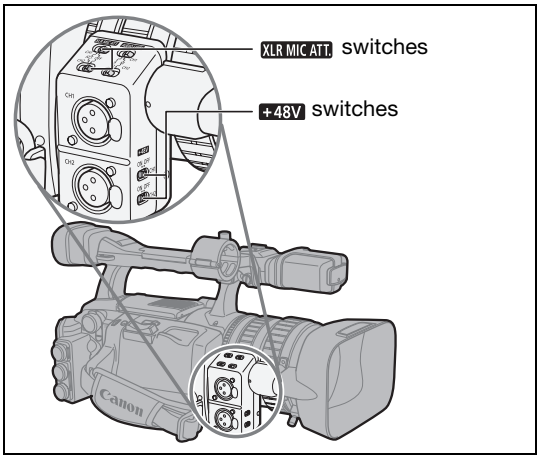
When you connect an external microphone to the MIC terminal, the built-in microphone will automatically be turned off. If necessary, you can use the microphone holder.

External Microphones that can be Connected

Microphone Type: Condenser microphones with independent power supply.
Type of Plug: ∅ 3.5 mm
Input Impedance: 600 ohms
Sensitivity: -66 dBV (manual volume center)
Maximum microphone diameter: ∅ 25 mm
Use commercially available microphones with a cable no longer than 3 m.

Using the XLR terminals

1. **Connect a microphone to one of the XLR terminals.**
   To supply a microphone with phantom power, set the corresponding +48V switch to ON. Make sure to connect the microphone first, before turning the phantom power on. Keep the microphone connected when turning off the phantom power.
2. **Open the menu and select [AUDIO SETUP]. Select [CH1 INPUT] or [CH2 INPUT], and select a setting option.**
   - Select [XLR MIC] or [XLR LINE] for channel 1 or channel 2.
   - When using the XLR terminal to record to only one channel, use the CH1 input terminal and set [CH1 INPUT] to [XLR MIC] or [XLR LINE].

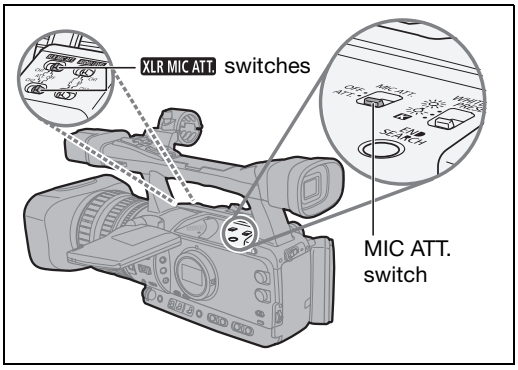


3. **From the [AUDIO SETUP] menu, select [XLR REC CH], select a setting option and close the menu.**
   Select [CH1] to record on channel 1 the audio from the CH1 input terminal or [CH1/CH2] to record the audio on both channels.
4. **If necessary, turn on the microphone attenuator (20 dB) by setting the corresponding XLR MIC ATT. switch to ATT.**
   The microphone attenuator will only be effective when the input is set to [XLR MIC].
5. **If necessary, adjust the gain of the input signal. Open the menu and select [AUDIO SETUP]. Select [XLR 1 TRIM] or [XLR 2 TRIM], depending on the audio input you want to adjust. Select a setting option and close the menu.**
   The gain adjustment will only be effective when the input is set to [XLR MIC].

❍ When connecting a microphone that does not support phantom power, make sure to set the corresponding +48V switch to OFF. Otherwise the microphone may be damaged.
❍ When [XLR REC CH] is set to [CH1/CH2], audio from the CH2 input terminal will not be recorded.

Adjusting the Audio Recording Level

If the audio level is too high and the sound sounds distorted, activate the microphone attenuator (12 dB for the built-in microphone, 20 dB for an external microphone), by setting the MIC ATT. switch (built-in microphone/external microphone connected to the MIC terminal) or the corresponding XLR MIC ATT. switch (external microphone connected to the XLR terminal) to ATT.



Hiding/Displaying the Audio Level Indicator

VCR/PLAY | M | A | Tv | Av

MENU (📖 25) DISPLAY SETUP/💬 ▶ AUDIO LEVEL··ON

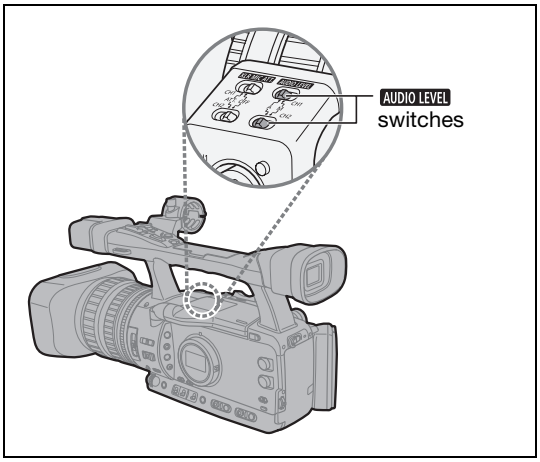
Open the menu and select [DISPLAY SETUP/💬]. Select [AUDIO LEVEL], select a setting option and close the menu.

The audio level indicator can also be turned on/off with a custom key (📖 71).

Automatic Audio Adjustment

VCR/PLAY | M | A | Tv | Av

Set the corresponding AUDIO LEVEL switch to A.

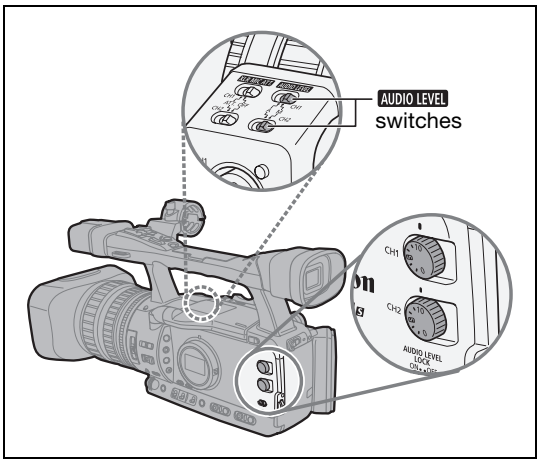


- ❍ When [CH1 INPUT] and [CH2 INPUT] are set to [INT/EXT MIC], if the AUDIO LEVEL switch for CH1 is set to A, the automatic audio adjustment setting will automatically apply to CH2 as well.
- ❍ When [CH1 INPUT] and [CH2 INPUT] are set to [XLR MIC] or [XLR LINE], you can select if the audio adjustment setting for CH2 will be linked to that of CH1 ([LINK]), or if the settings will be separated ([SEP]).
  Open the menu and select [AUDIO SETUP]. Select [XLR ALC LINK], select a setting option and close the menu.

Manual Audio Adjustment

VCR/PLAY | M | A | Tv | Av

1. **Set the corresponding AUDIO LEVEL switch to M.**
2. **Turn the corresponding AUDIO dial (CH1 or CH2) to adjust each channel's audio level.**
   Adjust the audio recording level so that the audio level meter will go to the right of the 12 mark on the side panel's audio level meter (or the larger dot on the level meter displayed on the screen) only occasionally.



- ❍ 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 shows an appropriate level. Use commercially available headphones with a cable no longer than 3 m.
- ❍ When [CH1 INPUT] and [CH2 INPUT] are set to [INT/EXT MIC], if the AUDIO LEVEL switch for CH1 is set to M, the audio level adjusted with the CH1 dial will automatically apply to CH2 as well.

❍ You can activate the audio peak limiter to prevent audio distortions. When activated, the audio peak limiter will limit the amplitude of audio input signals when they exceed -4 dBFS. The audio peak limiter can be activated if at least one of the channels is set to manual audio adjustment. Open the menu and select [AUDIO SETUP]. Select [AUD.LIMITER], set it to [ON] and close the menu.

❍ 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 [MONITOR SEL.], set it to [LINE OUT] and close the menu. If you wish to monitor audio in real time, select [NORMAL] instead. With either setting, the audio and video signals recorded on the tape will be synchronized.

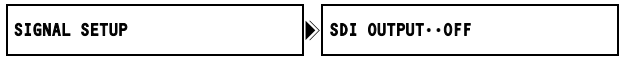
❍ In Easy Recording mode, even if one or both AUDIO LEVEL switches are set to M, audio adjustment occurs automatically and cannot be set manually.

XHG1s Embedded Audio

Embedded audio refers to the superimposing of the audio signal along with the video signal being output from the HD/SD SDI terminal.

[ON]: To embed the audio.
[ON(OSD)]: To embed the audio and on-screen displays.

MENU (📖 25)



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

CAMERA: The embedded audio output depends on the signal standard and the sampling frequency settings.

Signal standard	Sampling frequency	Locked/unlocked audio	Embedded audio output
HD	48 kHz	Locked	●
SD	32 kHz (12bit)	Locked	●*
	48 kHz (16bit)	Locked	●

VCR/PLAY: Embedded audio output from a tape that was originally recorded with unlocked audio is not guaranteed. 🔇, 🔇 3/4 or 🔇 1/2 will appear on the screen.

Signal standard	Sampling frequency	Locked/unlocked audio	Embedded audio output
HD	48 kHz	Locked	●
SD	32 kHz (12bit)	Locked	●*
		Unlocked	–
	48 kHz (16bit)	Locked	●
		Unlocked	–

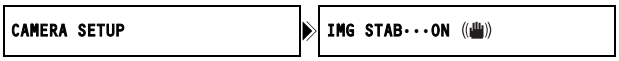
* The sampling rate will be 48 kHz.

When [SDI OUTPUT] is set to [ON(OSD)], SDI will appear on the screen and on-screen displays will be included in the video signal output from the SDI terminal.

Image Stabilizer

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

MENU (📖 25)



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

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

- We recommend turning off the image stabilizer when the camcorder is mounted on a tripod.
- The image stabilizer is designed to compensate for a normal degree of camcorder shake.
- CAMERA·CARD: The image stabilizer will have increased effectiveness 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.

M Manual (📖 56)

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

A Auto

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

Tv Shutter-Priority (📖 58)

Use this mode to select the shutter speed. The camcorder automatically sets the appropriate aperture value.

Av Aperture-Priority (📖 59)

Use this mode to select the aperture value from F/1.6 to F/9.5 (or full iris close) and let the camcorder automatically set the appropriate shutter speed. This mode allows for the best control of depth of field.

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 slower 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.

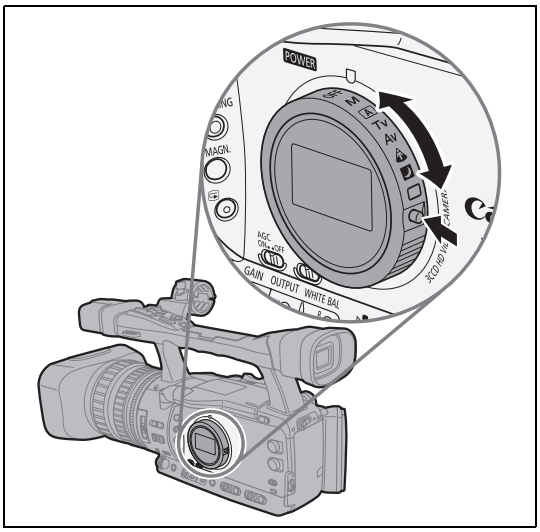
Easy Recording

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

Selecting the Programmed AE Modes

Press the lock button and turn the POWER dial.

The symbol of the selected mode appears.



- Do not change the position of the POWER dial while recording as the brightness of the image may change abruptly.
- The Easy Recording, Spotlight and Night modes are all-automatic modes. In the A Auto, **Tv** Shutter-Priority, **Av** Aperture-Priority and **M** Manual modes you can change some settings manually according to the recording conditions.

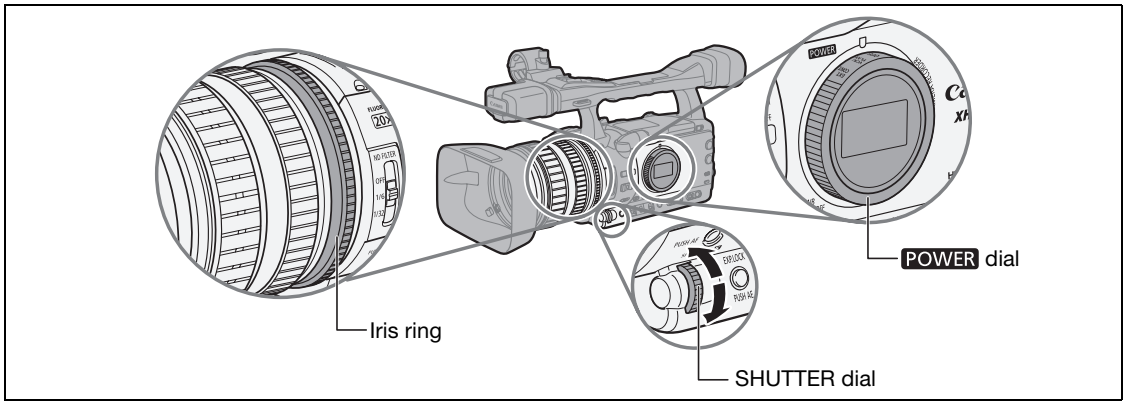
Available controls/functions by programmed AE mode

	M	A	Tv	Av			
EXP. LOCK button	–		●			–	
PUSH AE button	●	–					
Iris ring	●	–[1]	–[1]	●		–	
SHUTTER dial	●	–[1]	●	–[1]		–	
AE shift adjustment	–		●			– (0)	
GAIN adjustment	●		●		– (0 dB)	– (AGC ON)	
WHITE BALANCE adjustment	●			●			– (auto)
Custom preset adjustments	●			●			–
CUSTOM PRESET SELECT button	●			●			–
CUSTOM PRESET ON/OFF button	●			●			–
Skin detail	●			●			–
Selective NR	●			●			–
Color correction	●			●			–
Clear scan	●[2]	–	●[2]	–			–
Frequency selection for clear scan	●	–	●	–			–

[1] Available during exposure lock.
[2] Available during clear scan.

Recording in Manual Mode

You can set the exposure at any combination of shutter speed and aperture. The aperture value can be adjusted in 1/8 EV stops; however, the aperture value displayed on the screen will change only in 1/4 EV stops.



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		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, F10*, F11*, F12*, F14*, F15*, F16*, F17*, F19*, F21*, F22*, CLOSE*

* Can only be selected if the custom function [IRIS LIMIT] is set to [OFF].

VCR/PLAY | M | A | Tv | Av

1. Set the POWER dial to M.

- The exposure indicator appears. Use the exposure indicator as an estimate.
- The ▼ mark above the indicator indicates the standard exposure (calculated by the camcorder). The ▮ mark of the indicator indicates the current exposure level within ± 2 EV stops of the standard exposure (beyond 2 stops, the marker will blink).

2. Select the aperture using the iris ring.

With the custom function [RINGS DIRECTION] (🕮 95) you can change the direction of the adjustment when you turn the iris ring.

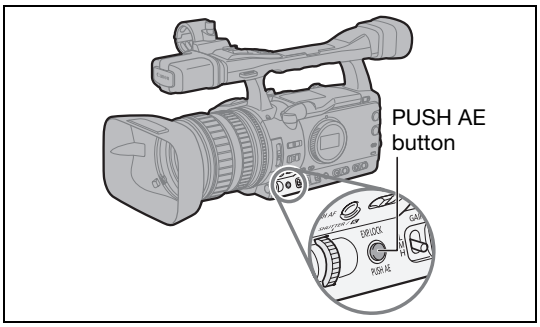
3. Select the shutter speed with the SHUTTER dial.

With the custom function [OPER.DIRECTION] (🕮 95) you can change the direction of the adjustment when you operate the SHUTTER dial.

- ❍ You can use the custom keys (🕮 71) or the [SYSTEM SETUP/⊛] ▶ [SHTR D.LOCK] setting (🕮 128) to prevent the accidental operation of the SHUTTER dial.
- ❍ With the custom function [IRIS LIMIT] (🕮 95) you can activate the iris limit to prevent the aperture from closing below the diffraction limit of the lens. If the iris limit is not activated, aperture values that exceed the diffraction limit will appear in gray when selecting the aperture. Using aperture values displayed in gray will cause diffraction blur.
- ❍ With the custom function [LANC AE SHIFT] (🕮 95), you can change the function of the AE SHIFT dial on the optional ZR-2000 Zoom Remote Controller and use it to change the aperture value.

Push AE

In **M** Manual mode you can use the Push AE function when you want the camcorder to re-establish optimal exposure settings by automatically adjusting the aperture and gain (if the AGC switch is set to ON).



Press the PUSH AE button and hold it pressed down.

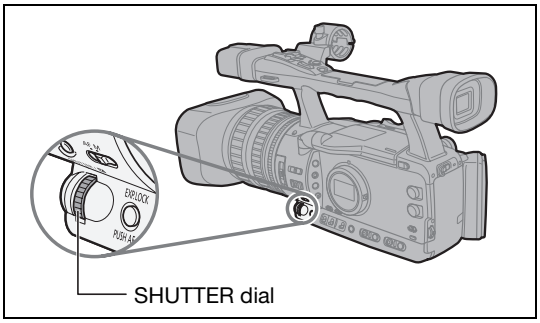
- The camcorder will adjust the aperture value and gain to achieve optimal exposure (▼ mark above the exposure indicator).
- After you release the button, the aperture value and gain (if the AGC switch is set to ON) set by the camcorder will override the previous settings made in **M** Manual mode.

You can use the custom keys (📖 71) or the [SYSTEM SETUP/⊙] ▶ [E.LCK B.LCK] setting to prevent the accidental operation of the PUSH AE button.

Recording in Shutter-Priority (Tv) Mode

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

1. **Set the POWER dial to Tv.**
2. **Select the shutter speed with the SHUTTER dial.**
   With the custom function [OPER.DIRECTION] (📖 95) you can change the direction of the adjustment when you use the SHUTTER dial.



- Settings other than the shutter speed (aperture, etc.) are adjusted automatically.
- Using exposure lock to adjust the exposure manually will change the shutter speed, overriding the shutter speed selected in **Tv** mode.
- When the AGC switch is set to ON, the numeric value on the screen flashes 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.
- Image quality may decrease to some extent when using slow shutter speeds.
- You can use the custom keys (📖 71) or the [SYSTEM SETUP/⊛] ▶ [SHTR D.LOCK] setting (📖 128) to prevent the accidental operation of the SHUTTER dial.

Recording in Aperture-Priority (Av) Mode

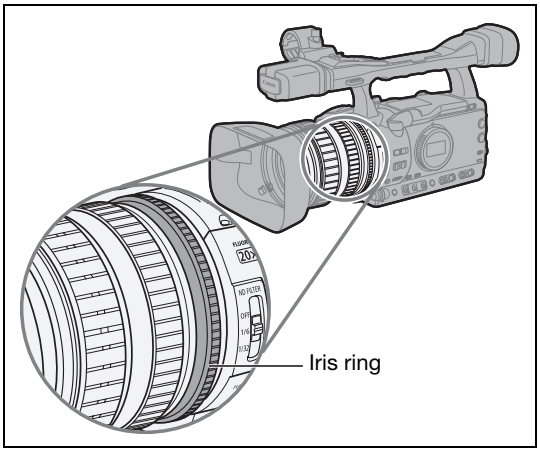
The aperture value can be adjusted in 1/8 EV stops; however, the aperture value displayed on the screen will change only in 1/4 EV stops.

Available aperture values

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, F10*, F11*, F12*, F14*, F15*, F16*, F17*, F19*, F21*, F22*, CLOSE*

* Can only be selected if the custom function [IRIS LIMIT] is set to [OFF].

1. **Set the POWER dial to Av.**
2. **Select the aperture with the iris ring.**
   With the custom function [RINGS DIRECTION] (🕮 95) you can change the direction of the adjustment when you turn the iris ring.



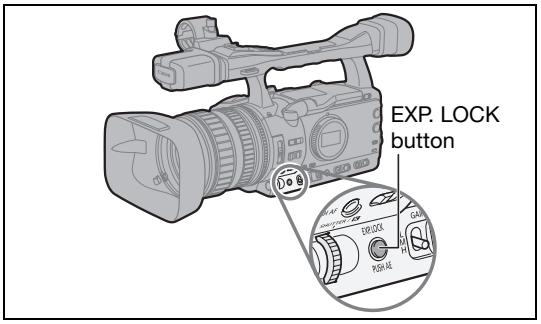
- ❍ Settings other than the aperture value (shutter speed, etc.) are adjusted automatically.
- ❍ Using exposure lock to adjust the exposure manually will change the aperture, overriding the value selected in **Av** mode.
- ❍ When the AGC switch is set to ON, the numeric value on the screen flashes when the selected aperture is not appropriate for the recording condition. In such case, readjust the aperture.
- ❍ When the built-in ND filter is activated, the picture may become dark when you set a high aperture value. In such case, turn off the ND Filter first and readjust the aperture.
- ❍ With the custom function [IRIS LIMIT] (🕮 95) you can activate the iris limit to prevent the aperture from closing below the diffraction limit (F9.5) of the lens. If the iris limit is not activated, aperture values that exceed the diffraction limit will appear in gray when selecting the aperture. Using aperture values displayed in gray will cause diffraction blur.
- ❍ With the custom function [LANC AE SHIFT] (🕮 95), you can change the function of the AE SHIFT dial on the optional ZR-2000 Zoom Remote Controller and use it to change the aperture value.

Adjusting the Exposure

Exposure Lock

VCR/PLAY | M | A | Tv | Av

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 indicates the standard exposure (calculated by the camcorder). The ▮ mark of the indicator indicates the current exposure level within ± 2 EV stops of the standard exposure (beyond 2 stops, the marker will blink).
   - You can use the custom keys (🕮 71) or the [SYSTEM SETUP/⊛] ▶ [E.LCK B.LCK] setting to prevent the accidental operation of the EXP. LOCK button.



AE Shift

You can use the AE Shift control to manually override the automatic exposure system in order to darken or lighten the image. Select from 15 AE levels (+2.0, +1.5, +1.25, +1.0, +0.75, +0.5, +0.25, ±0, -0.25, -0.5, -0.75, -1.0, -1.25, -1.5, -2.0).

VCR/PLAY | M | A | Tv | Av

MENU (🕮 25) CAMERA SETUP ▶ AE SHIFT•••±0

1. **Set the POWER dial to A, Tv or Av.**
2. **Open the menu and select [CAMERA SETUP]. Select [AE SHIFT], select a setting option and close the menu.**

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 one of 3 preset gain levels (L: low, M: middle, H: high) to which you can independently assign gain values from -3 dB to +36 dB (CAMERA) or +18 dB (CAMERA·CARD). You can also fine-tune the gain in 0.5 dB increments.

AGC switch set to ON: Automatic gain control.
AGC switch set to OFF: Manual gain level selection (L, M or H) with the GAIN switch.

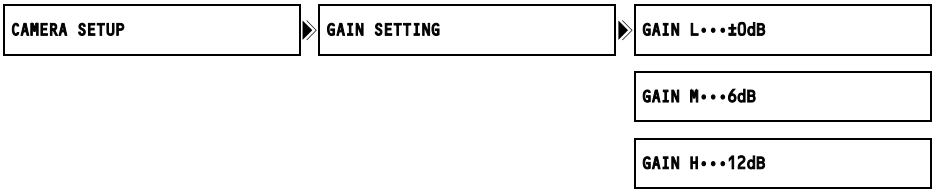
Available gain levels that can be assigned to each GAIN switch position

Gain level	Use
-3 dB	For the lowest noise recording for indoor, low light or low contrast scenes.
±0 dB	For lifelike night scenes or scenes under artificial lighting.
3 dB/6 dB/12 dB/18 dB/36 dB*	Increases the brightness in indoor or low-light scenes. Increases the depth of field.
TUNE (0 db – 18 db)	Gain fine tuning.

* CAMERA only.

Assigning Gain Values to the GAIN Switch Positions

MENU (📖 25)



1. **Set the POWER dial to M, A, Tv or Av.**
2. **Open the menu and select [CAMERA SETUP]. Select the [GAIN SETTING] submenu and then one of the GAIN switch options.**
3. **Select a setting option and press the SELECT/SET dial.**
   - After the adjustment you will return to the [GAIN SETTING] submenu. Assign the gain values to the other GAIN switch options in the same way.
   - [36dB] is available only in CAMERA mode.
4. **Close the menu.**

Gain Fine Tuning

MENU (25)

CAMERA SETUP ▸ GAIN SETTING ▸ GAIN L•••±0dB ▸ TUNE•••0.0dB

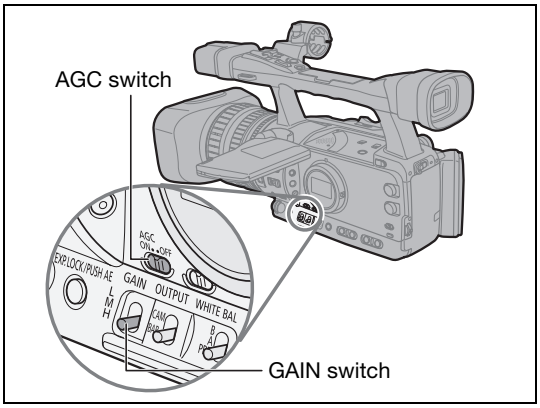
GAIN M•••6dB

GAIN H•••12dB

1. **Set the POWER dial to M, A, Tv or Av.**
2. **Open the menu and select [CAMERA SETUP]. Select the [GAIN SETTING] submenu and then one of the GAIN switch options.**
3. **Select [TUNE 0.0dB] and press the SELECT/SET dial.**
4. **Turn the SELECT/SET dial to select the desired gain level and press the dial.**
   After the setting, you will return to the [GAIN SETTING] submenu. Assign the gain values to the other GAIN switch options in the same way.
5. **Close the menu.**

Selecting the Gain Level

1. **Set the POWER dial to M, A, Tv or Av.**
2. **Set the AGC switch to OFF.**
3. **Set the GAIN switch to the desired gain position.**



- ❍ When you select high gain levels, the picture may flicker slightly. The 36.0 dB gain level in particular, allows you to shoot video with a higher sensitivity but is more prone to the appearance of noise and artifacts (white dots, vertical streaks or blocking).
- ❍ When the AGC switch is set to ON you can activate the gain limit to prevent the camcorder from setting a level higher than a preset limit between 3 dB and 15 dB.
  Open the menu and select [CAMERA SETUP]. Select [AGC LIMIT], set the maximum gain level and close the menu.

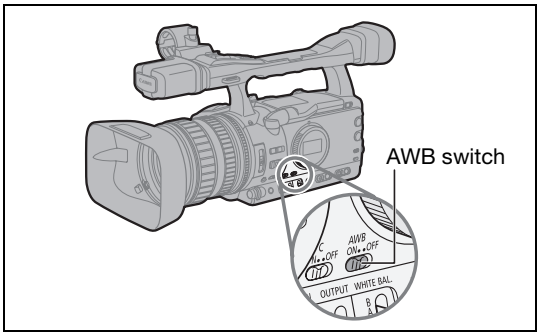
White Balance

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-defined custom preset values.

White balance setting	Use
AWB	Automatic adjustment of white balance.
☼ (outdoor)	Bright sunlight (5,600 K).
☼ (indoor)	Incandescent light (3,200 K).
K (color temperature)	Setting depending on the hue of a specific lighting (2,000 - 15,000 K in 100 K increments).
Custom Preset A, B	Custom preset (3,200 - 5,600 K).

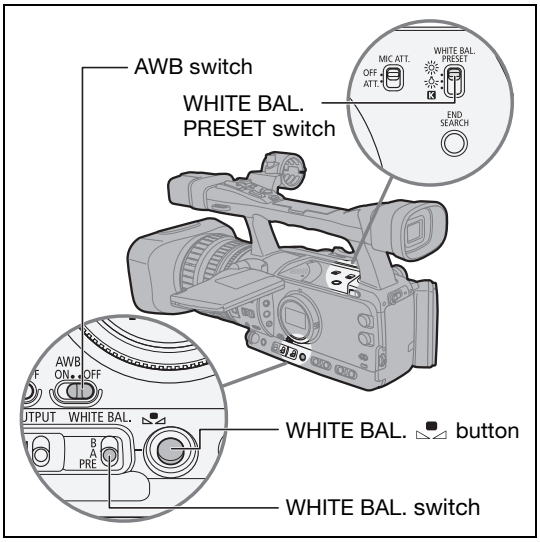
Selecting the Automatic White Balance

Set the AWB switch to ON.



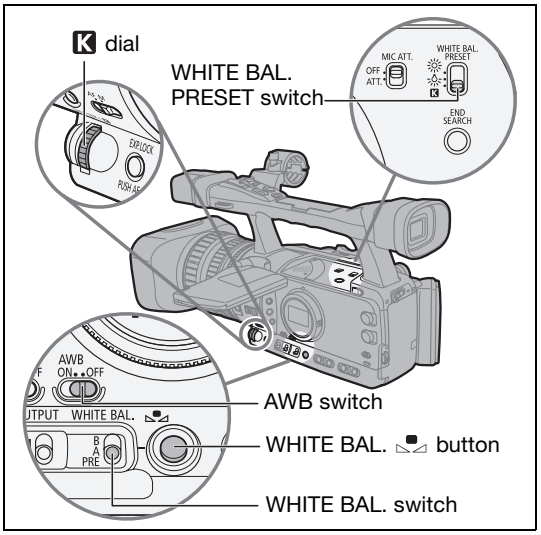
Selecting One of the Preset Modes

1. **Set the POWER dial to a recording mode other than ▭.**
2. **Set the AWB switch to OFF and the WHITE BAL. switch to PRE.**
3. **Set the WHITE BAL. PRESET switch to ☼ or ☼.**
   You can also fine-tune the preset ☼/☼ settings. Press the WHITE BAL. button so the preset icon starts flashing and the neutral value ±0 appears next to it. Adjust the white balance with the K dial to a value between -9 and +9 and press the WHITE BAL. button again.



Setting the Color Temperature

1. **Set the POWER dial to a recording program other than ▭.**
2. **Set the AWB switch to OFF and the WHITE BAL. switch to PRE.**
3. **Set the WHITE BAL. PRESET switch to K.**
   The color temperature currently set will be displayed.
4. **Press the WHITE BAL. button.**
   The color temperature display will start flashing.
5. **Turn the K dial to set the desired color temperature.**
6. **Press the WHITE BAL. 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. **Set the AWB switch to OFF and the WHITE BAL. switch to one of the custom presets, A or B.**
   and the corresponding letter will flash on the screen.
3. **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 4 is completed.
4. **Press the WHITE BAL. button.**
   and the corresponding letter will stop flashing and stay on when the setting is completed.

- ❍ 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 automatic white balance.
- ❍ 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.
- ❍ 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 (🕮 93).
- ❍ 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
- ❍ Perform the custom white balance setting procedure in a sufficiently well lit place.
- ❍ Readjust the custom white balance if you turn the ND filter on/off or when the light source has changed.

Recording with a Custom White Balance Previously Set

1. **Set the POWER dial to a recording program other than ▭.**
2. **Set the AWB switch to OFF and the WHITE BAL. switch to the desired custom preset, A or B.**
   The custom white balance is activated.

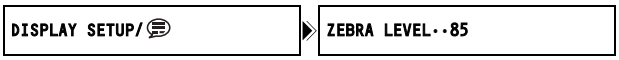
Zebra Pattern

This camcorder has a zebra pattern feature that shows black and white diagonal stripes over the areas that are overexposed. The zebra pattern is only displayed on the screen and will not affect your recordings. The zebra pattern will not be displayed while the Peaking function is activated (📖 38).

Available zebra pattern settings: 70 IRE, 75 IRE, 80 IRE, 85 IRE, 90 IRE, 95 IRE, and 100 IRE.

Selecting the Zebra Pattern Level

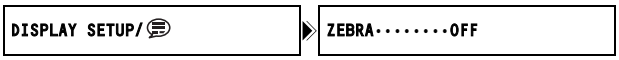
MENU (📖 25)



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

Activating the Zebra Pattern

MENU (📖 25)

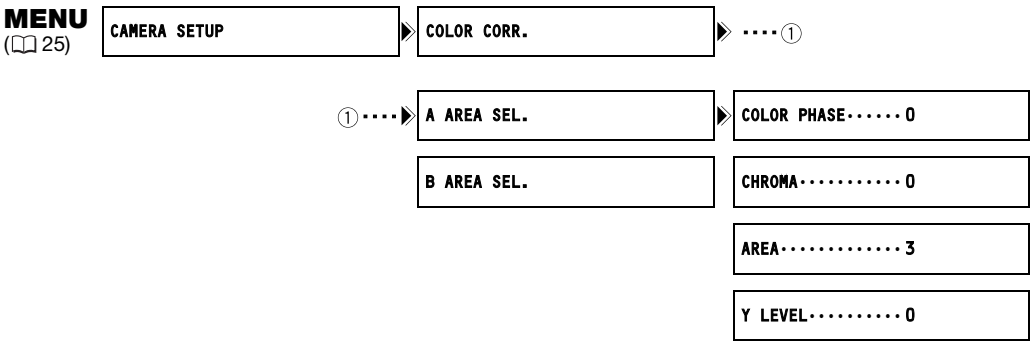


Open the menu and select [DISPLAY SETUP/]. Select [ZEBRA], set it to [ON] and close the menu.

Color Correction

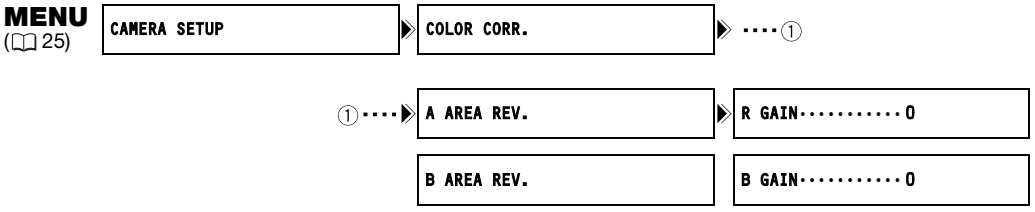
With the color correction function you can set the camcorder to detect the characteristics of a certain color or pattern (color phase, chroma, area and Y level) and correct them automatically when recording. You can set the color correction for up to two different colors (A and B).
When determining the color to be corrected, targeted areas will be identified on the screen by zebra pattern alternating with the normal picture. On a connected monitor or computer, targeted areas will be identified by white areas alternating with the normal picture.

Determining the Color to be Corrected



1. **Open the menu and select [CAMERA SETUP]. Select the [COLOR CORR.] submenu and then select [A AREA SEL.] or [B AREA SEL.].**
2. **Select each setting option, adjust the levels as necessary and close the menu.**
   [COLOR PHASE]: Select the basic color phase (0-15) of the color to be detected. Use the following values as an approximate reference: 0=purple, 3=red, 6=orange, 9=green, 12=blue.
   [CHROMA]: Adjust the color saturation for the color to be detected. 13 levels (-6 to 6) are available; set higher levels to detect areas with richer colors.
   [AREA]: Adjust the color range for the color to be detected. 4 levels (1 to 4) are available; set higher levels to detect a wider color range.
   [Y LEVEL]: Adjust the brightness for the color to be detected. 13 levels (-6 to 6) are available; set higher levels to detect brighter areas.

Adjusting the Color Correction



1. **Open the menu and select [CAMERA SETUP]. Select the [COLOR CORR.] submenu and then select [A AREA REV.] or [B AREA REV.].**
2. **Select the color gain options, adjust the levels as necessary and close the menu.**
   [R GAIN]: Adjust the red gain of the detected area. 13 levels (-6 to 6) are available; set [+] values to increase red tones or [-] values to increase cyan tones.
   [B GAIN]: Adjust the blue gain of the detected area. 13 levels (-6 to 6) are available; set [+] values to increase blue tones or [-] values to increase yellow tones.

Activating the Color Correction

MENU (📖 25) CAMERA SETUP ▶ COLOR CORR. ▶ CORRECT·····OFF

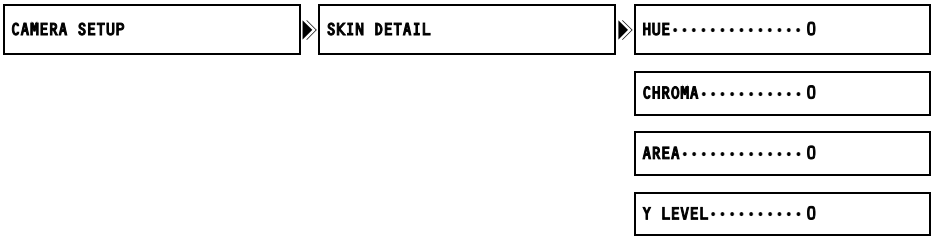
1. **Open the menu and select [CAMERA SETUP] and select the [COLOR CORR.] submenu.**
2. **Select [CORRECT], select a correction mode and close the menu.**
   - You can correct only the predefined A area, only the predefined B area or both.
   - 🖊 appears.

Skin Detail Function

With the skin detail function you can set the camcorder to detect the characteristics of a certain color or tone. Detail in the targeted areas will be softened in order to conceal skin imperfections. Targeted areas will be identified on the screen by a zebra pattern alternating with the normal picture. On a connected monitor or computer, targeted areas will be identified by white areas alternating with the normal picture. You can adjust the hue, chroma, area and Y level as required, to determine the areas that will be detected as skin areas.

Determining the Tone to be Detected as Skin Area

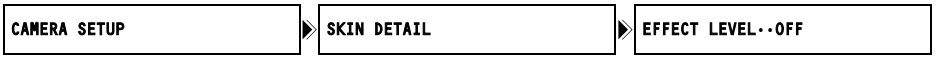
MENU (📖 25)



1. **Open the menu, select [CAMERA SETUP] and then select the [SKIN DETAIL] submenu.**
2. **Select each setting option, adjust the levels as necessary and close the menu.**
   - [HUE]: Adjust the hue for detection of the skin area. 13 levels (-6 to 6) are available; set [+] values to detect hues closer to green or [-] values to detect hues closer to red.
   - [CHROMA]: Adjust the color saturation for detection of the skin area. 13 levels (-6 to 6) are available; set higher levels to detect areas with richer colors.
   - [AREA]: Adjust the color range for detection of the skin area. 13 levels (-6 to 6) are available; set higher levels to detect a wider color range.
   - [Y LEVEL]: Adjust the brightness for detection of the skin area. 13 levels (-6 to 6) are available; set higher levels to detect brighter areas.

Activating the Skin Detail Function

MENU (📖 25)



1. **Open the menu and select [CAMERA SETUP]. Select the [SKIN DETAIL] submenu and then select [EFFECT LEVEL].**
2. **Select a setting option and close the menu.**
   - You can select the strength of the effect from low, middle or high.
   - appears.

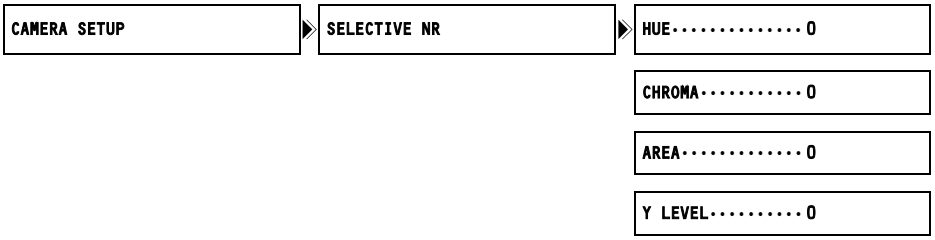
S-NR Selective Noise Reduction

With the selective noise reduction function you can set the camcorder to detect the characteristics of a certain color or tone and automatically reduce noise in the targeted areas. This is particularly useful for chroma keying, as targeting the selective noise reduction to the color of the background green or blue screen will result in a smoother composite picture.

Targeted areas will be identified on the screen by a zebra pattern alternating with the normal picture. On a connected monitor or computer, targeted areas will be identified by white areas alternating with the normal picture.

Determining the Area to be Corrected

MENU (📖 25)



1. **Open the menu, select [CAMERA SETUP] and then select the [SELECTIVE NR] submenu.**
2. **Select each setting option, adjust the levels as necessary and close the menu.**
   - [HUE]: Select the base hue (-6 to 6) of the color to be detected. Use the following values as an approximate reference: -6=blue-violet, 0=cyan, 6=yellowish green.
   - [CHROMA]: Adjust the color saturation for the color to be detected. 13 levels (-6 to 6) are available; set higher levels to detect areas with richer colors.
   - [AREA]: Adjust the color range for the color to be detected. 13 levels (-6 to 6) are available; set higher levels to detect a wider color range.
   - [Y LEVEL]: Adjust the brightness for the color to be detected. 13 levels (-6 to 6) are available; set higher levels to detect brighter areas.

Activating the Selective Noise Reduction

MENU (📖 25)

1. **Open the menu and select [CAMERA SETUP]. Select the [SELECTIVE NR] submenu and then select [EFFECT LEVEL].**
2. **Select a setting option and close the menu.**
   - You can select the strength of the effect from low, middle or high.
   - S-NR appears.

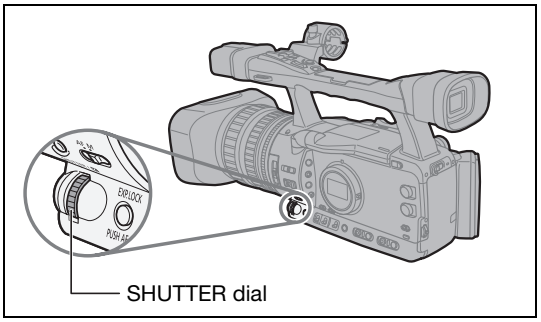
Clear Scan

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.

MENU (📖 25)

CAMERA SETUP ▶ CLEAR SCAN···50.2Hz

1. **Set the POWER dial to M or Tv.**
2. **Turn the SHUTTER dial to set the shutter speed to "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.



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 operating 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	CVF+LCD BW

To check the current custom key settings:

In a recording mode: Open the menu and select [DISPLAY SETUP/]. Select [GUIDE INFO], set it to [CUSTOM KEYS] and close the menu.

In a playback mode: Open the menu and select [DISPLAY SETUP/]. Select [CUSTOM KEY], set it to [ON] and close the menu.

The following functions can be assigned to the custom keys:

CAMERA

- Time code
- Index write [2]
- Zebra pattern
- VCR stop [2]
- TV screen
- Time code hold [2]
- Audio level
- Viewfinder and LCD B&W mode
- MAGN. button lock
- SHUTTER dial lock
- EXP. LOCK button lock
- CP backward key [1,2]
- SDI output [3]
- Focus limit
- Image stabilizer
- Output channel

VCR/PLAY

- Time code
- TV screen
- Data code
- Audio level
- Time code hold [2]
- Viewfinder and LCD B&W mode
- SDI output [3]
- Output channel

CAMERA·CARD

- Zebra pattern
- TV screen
- Viewfinder and LCD B&W mode
- MAGN. button lock
- SHUTTER dial lock
- EXP. LOCK button lock
- CP backward key [1,2]
- SDI output [3]
- Focus limit
- Image stabilizer
- Output channel

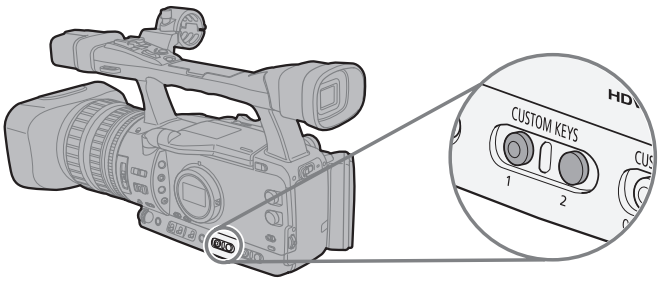
VCR/PLAY·CARD

- TV screen
- Viewfinder and LCD B&W mode
- SDI output [3]

[1] Can only be assigned to Custom Key 2.

[2] This function can only be operated with a custom key. (Index write can also be operated with the wireless controller.)

[3] XHG1 only.



Changing the Custom Keys Setting

MENU (📖 25) SYSTEM SETUP/⊛ ▶ CUSTOM KEY 1·TIME CODE*

* Default value in CAMERA mode.

Open the menu and select [SYSTEM SETUP/⊛]. 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] Time Code (📖 43) CAMERA VCR/PLAY

Press the CUSTOM KEY (1 or 2) button.

The time code setting menu appears.

[INDEX WRITE] Index Write CAMERA

You can add an index signal to your recording for easy search in VCR/PLAY mode (📖 107).

Press the CUSTOM KEY (1 or 2) button.

- appears while the index signal is being recorded (approx. 6.5 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] Zebra Pattern (📖 65) CAMERA CAMERA·CARD

Press the CUSTOM KEY (1 or 2) button.

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

[VCR STOP] VCR Stop (📖 29) CAMERA

When the camcorder is in record pause mode, you can turn off the recorder section. Even if [SYSTEM SETUP/⊛] ▶ [POWER SAVE] is set to [OFF], you can take your time adjusting the camera settings, while the recorder section of the camcorder is powered off so you do not need to worry 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] TV Screen CAMERA VCR/PLAY CAMERA·CARD VCR/PLAY·CARD

You can show the camcorder's displays on a connected external monitor or TV.

Press the CUSTOM KEY (1 or 2) button.

[DATA CODE] Data Code (📖 108) VCR/PLAY

Press the CUSTOM KEY (1 or 2) button.

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

[TC HOLD] 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” will appear on the side panel.
- The time code being output from the TIME CODE*, HD/SD SDI*, (LANC) and HDV/DV terminals will not be put on hold. The time code superimposed on the video signal output from the A/V1 and VIDEO 2 terminals will be put on hold. (* XHG1s only.)
- The time code hold will be canceled when you turn the camcorder on/off, change the operating mode between recording and playback or change the position of the 🖴/📼 (card/tape) switch.

[AUDIO LEVEL] Audio Level Indicator (📖 50) 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.

[CVF+LCD BW] Viewfinder and LCD Screen’s Black & White Display

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.

[MAGN.B.LOCK] MAGN. Button Lock CAMERA CAMERA·CARD

Press the CUSTOM KEY (1 or 2) button.

Pressing the button will lock the MAGN. button to prevent its accidental operation. Press the button again to reactivate the MAGN. button.

[SHTR D.LOCK] SHUTTER Dial Lock CAMERA CAMERA·CARD

Press the CUSTOM KEY (1 or 2) button.

Pressing the button will lock the SHUTTER dial to prevent its accidental operation. Press the button again to reactivate the SHUTTER dial.

[E.LCK B.LCK] EXP. LOCK Button Lock CAMERA CAMERA·CARD

Press the CUSTOM KEY (1 or 2) button.

Pressing the button will lock the EXP. LOCK button to prevent its accidental operation. Press the custom key button again to reactivate the EXP. LOCK button.

[CP BKWD KEY] Custom Preset 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. Pressing the custom key button instead will cycle backwards to the preceding custom preset file.
CP backward key can only be operated with the custom keys.

XHG1s [SDI OUTPUT] SDI Output CAMERA VCR/PLAY CAMERA·CARD VCR/PLAY·CARD

Press the CUSTOM KEY (1 or 2) button.

The SDI output setup menu appears.

[FOCUS LIMIT] Focus Limit (📖 40) CAMERA CAMERA·CARD

Press the CUSTOM KEY (1 or 2) button.

The focus limit is activated. Press the button again to cancel it.

[IMAGE STAB] Image Stabilizer (📖 52) CAMERA CAMERA·CARD

Press the CUSTOM KEY (1 or 2) button.

The image stabilizer is activated. Press the button again to cancel it.

[OUTPUT CH] Output Channel (📖 81) CAMERA VCR/PLAY CAMERA·CARD

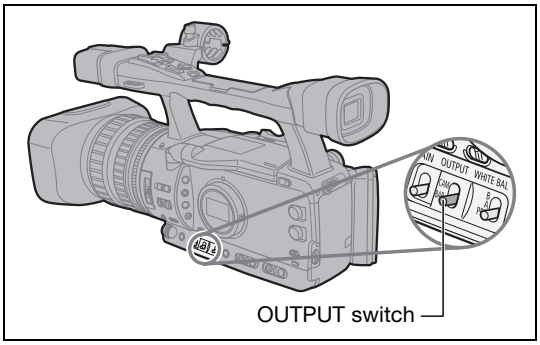
Press the CUSTOM KEY (1 or 2) button.

The audio channel being output (A/V1 terminal, 🎧 headphone terminal) will change each time the button is pressed.

Color Bars/Audio Reference Signal

You can generate and record color bars signals and a 1 kHz audio reference signal.
With the customized functions (🕮 95) you can choose between EBU ([TYPE 1]) and SMPTE color bars ([TYPE 2]) and you can also select the strength of the audio signal (-12 dB, -18 dB, or -20 dB).

1. **Select the standard of the color bars signal [COLOR BARS] and the strength of the audio reference signal [1kHz TONE] with the customized functions (🕮 95).**
2. **Set the OUTPUT switch to BARS.**
   - The color bars appear and the audio reference signal is emitted (if activated). Press the START/STOP button to record the signal.
   - If you set [1kHz TONE] to [OFF] the current audio input (microphone, line in, etc.) will be recorded as the audio signal.



Video Signal Output Standards

The standard of the video signal output from the HD/SD SDI (XHG1s only), HD/SD COMPONENT OUT and HDV/DV terminals depends on the standard used for recording (or the standard of the recording on the tape being played back) and on various menu settings. Video output from the VIEWFINDER COMPONENT OUT, A/V1, or VIDEO 2 terminal will always be in 576/50i standard.

Standard of Video Output while Recording

XHG1s While recording in high definition, video output from the HD/SD SDI terminal will be an uncompressed HD, YPbPr signal. You can down-convert the video output with the respective menu settings.

Recording standard and frame rate	HD/SD SDI terminal[1]		HD/SD COMPONENT OUT terminal		HDV/DV terminal
	Unchanged	Down-converted[2, 5, 6]	Unchanged	Down-converted[3, 5]	
HD 50i	1080/50i	576/50i	1080/50i	576/50i	1080/50i
HD 25F	1080/50i	576/50i[8]	1080/50i	576/50i[8]	1080/25p
SD (50i, 25F)	576/50i		576/50i		576/50i

Standard of Video Output during Playback

XHG1s When playing back a tape recorded in HDV standard, video output from the HD/SD SDI terminal will be a signal modified from the HDV video. You can down-convert the video output with the respective menu settings.

Standard of the tape	[LETTERBOX] setting	HD/SD SDI terminal[1]		HD/SD COMPONENT OUT terminal		HDV/DV terminal	
		Unchanged	Down-converted[2, 5]	Unchanged	Down-Converted[3, 5]	Unchanged	Down-Converted[4, 7]
HDV 1080/50i	[OFF]	1080/50i	576/50i	1080/50i	576/50i	1080/50i	576/50i
	[ON]	576/50i		576/50i			
HDV 1080/25p	[OFF]	1080/50i[8]	576/50i	1080/50i[8]	576/50i	1080/25p	576/50i
	[ON]	576/50i[8]		576/50i[8]			
DV 576/50i	[OFF]/[ON]	576/50i		576/50i		576/50i	

1 XHG1s only.
2 [SIGNAL SETUP] ▶ [SDI SPEC.] set to [SD LOCKED].
3 [SIGNAL SETUP] ▶ [COMP.OUT] set to [576i].
4 [SIGNAL SETUP] ▶ [HD DOWN-CONV] set to [ON].
5 16:9 picture is horizontally squeezed to a 4:3 aspect ratio.
6 On-screen displays will not be embedded in the video output even if [SIGNAL SETUP] ▶ [SDI OUTPUT] is set to [ON(OSD)].
7 On-screen displays will not be embedded in the video output even if [DISPLAY SETUP/💬] ▶ [TV SCREEN] is set to [ON].
8 Converted to 50i.

Connecting to a Monitor/TV

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

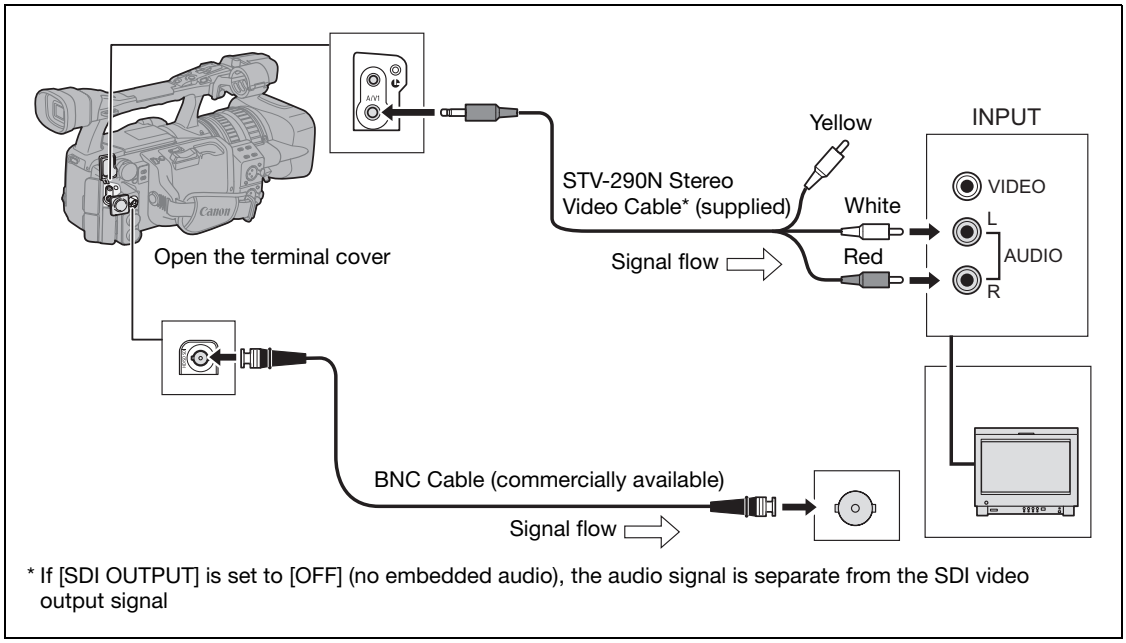
		HD/SD SDI Terminal[1]	HD/SD COMPONENT OUT and VIEWFINDER COMPONENT OUT Terminals	HDV/DV Terminal	A/V1 and VIDEO 2 Terminals
HD	[LETTERBOX] set to [OFF]	1920x1080	D3 (1440x1080)[2]	MPEG TS	
	[LETTERBOX] set to [ON]	SD SDI	D1 (SD)	MPEG TS	
SD 16:9	[LETTERBOX] set to [OFF]	640x480	D1 (SD)	DV (SD)	
	[LETTERBOX] set to [ON]	SD SDI	D1 (SD)	DV (SD)	
SD 4:3		640x480	D1 (SD) Normal	DV (SD)	

[1] XHG1S only.

[2] The VIEWFINDER COMPONENT OUT terminal is output as 576i.

Connection to a High Definition Monitor or HDTV

1 XHG1S Using the HD/SD SDI Terminal



* If [SDI OUTPUT] is set to [OFF] (no embedded audio), the audio signal is separate from the SDI video output signal

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

1. **Set the POWER dial to VCR/PLAY.**
2. **Open the menu and select [SIGNAL SETUP]. Select [SDI OUTPUT] and set it to [ON] or [ON(OSD)].**
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.**

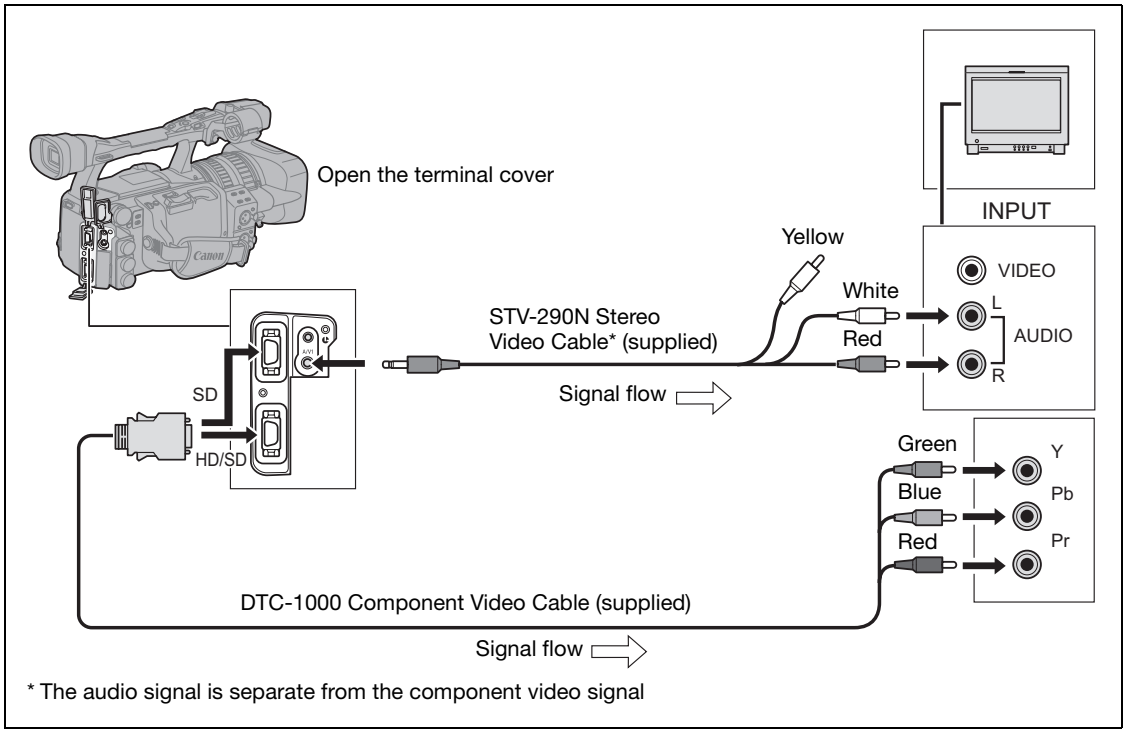
When [SDI OUTPUT] is set to [ON(OSD)], SDI will appear on the screen and on-screen displays will be included in the video signal output from the SDI terminal.

When [SDI OUTPUT] is set to [ON(OSD)]:

- The on-screen displays included in the video output signal are determined by the display level selected with the DISP. button (📖 31). Markers (safety zone guide, level/grid markers, etc.) are never included in the video signal output.
- The [SIGNAL SETUP] ▶ [COMP.OUT] setting is not available.

2 Using the HD/SD COMPONENT OUT or VIEWFINDER COMPONENT OUT Terminal

Use the HD/SD COMPONENT OUT terminal to monitor the video that the camcorder is recording and use the VIEWFINDER COMPONENT OUT terminal to monitor the picture on the viewfinder screen.

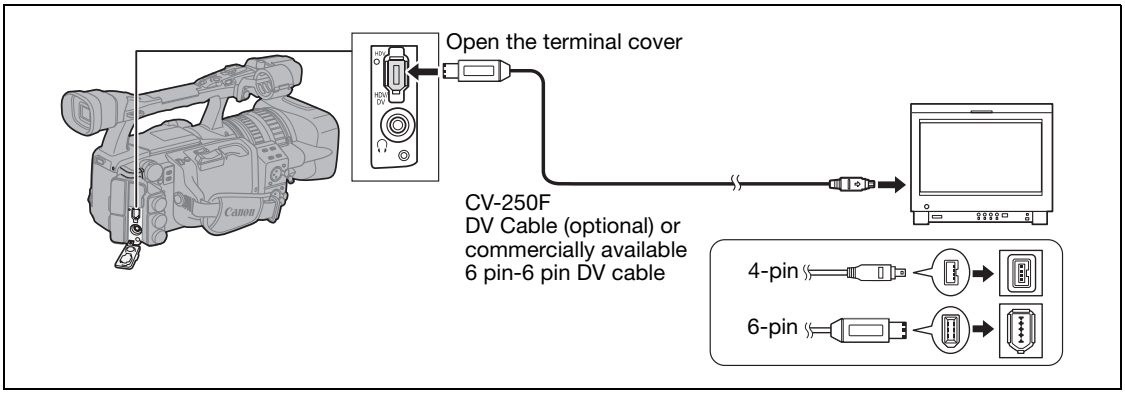


* The audio signal is separate from the component video signal

When using the HD/SD COMPONENT OUT terminal, 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.

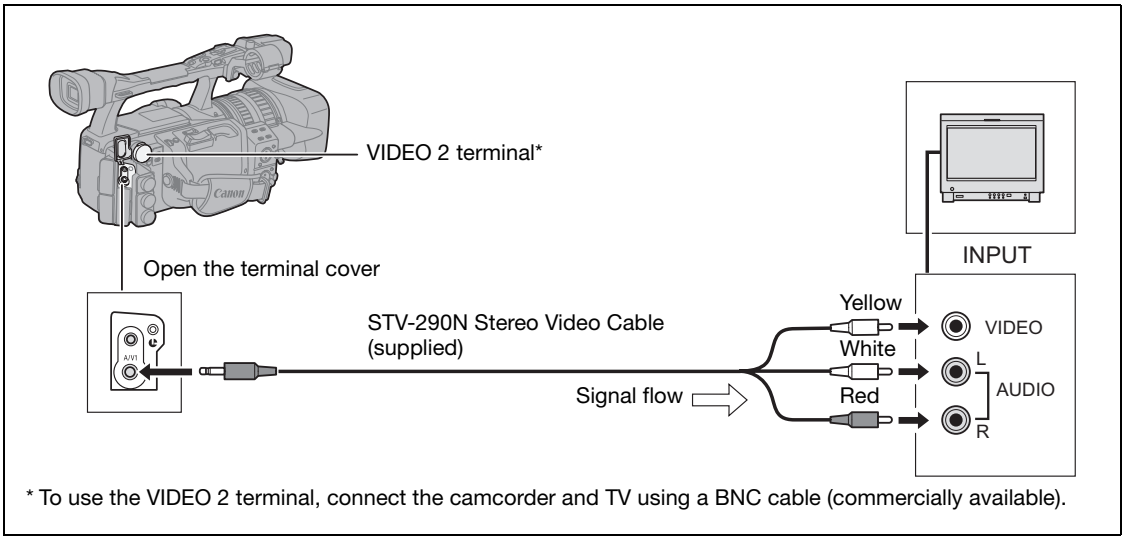
3 Using the HDV/DV Terminal



- When connecting the camcorder to a monitor or TV that supports DV input, you may need to carry out a procedure on the monitor or TV to recognize the camera.
- If necessary, turn on the DV conversion and select whether to convert a tape recorded in HD to SD with the following procedure (VCR/PLAY mode only).

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

4 Using the A/V1 or VIDEO 2 Terminal



* To use the VIDEO 2 terminal, connect the camcorder and TV using a BNC cable (commercially available).

- We recommend powering the camcorder from a household power outlet.
- **TV sets equipped with the WSS System**: Recordings made with a 16:9 aspect ratio (32) will be played automatically in widescreen mode whether you connect the camcorder to the TV using the A/V1 terminal or the VIDEO 2 terminal.
- During fast forward playback, rewind playback and reverse playback of a tape recorded in HDV standard, the picture may be distorted.

Connection to a Standard Definition TV or Monitor

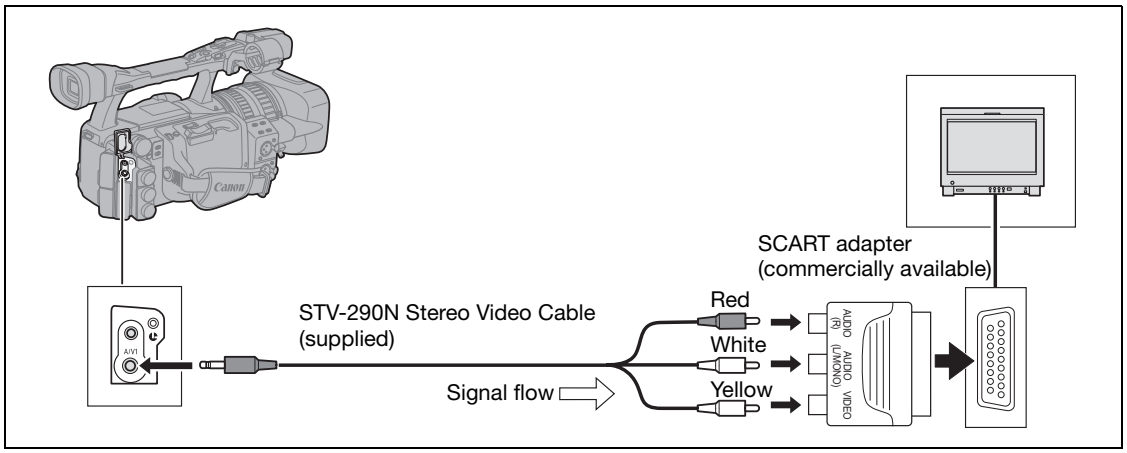
1 Using the HD/SD COMPONENT OUT or VIEWFINDER COMPONENT OUT Terminal

- Refer to the connection diagram in the previous section (🕮 78).
- 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 A/V1 or VIDEO 2 Terminal

- Refer to the connection diagram in the previous section (🕮 79).
- If connecting to a TV set with a 4:3 aspect ratio, change the [LETTERBOX] setting appropriately.
  Open the menu and select [SIGNAL SETUP]. Select [LETTERBOX], set it to [ON] and close the menu.

3 Using the SCART Adapter



- If connecting to a TV set with a 4:3 aspect ratio, change the [LETTERBOX] setting appropriately.
  Open the menu and select [SIGNAL SETUP]. Select [LETTERBOX], set it to [ON] and close the menu.

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

❍ **TV sets equipped with the WSS System**: Recordings made with a 16:9 aspect ratio (🕮 32) will be played automatically in widescreen mode whether you connect the camcorder to the TV using the A/V1 terminal or VIDEO 2 terminal.

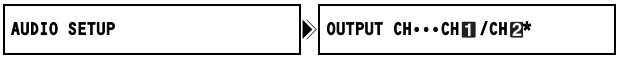
❍ During fast forward playback, rewind playback and reverse playback of a tape recorded in HDV standard, the picture may be distorted.

Audio Output

Selecting the Audio Channel

You can select the channel for audio signal output from the A/V1 terminal.

MENU (📖 25)



* Default value in CAMERA mode.

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

While recording external video with 4-channel audio from the HDV/DV terminal, the available options will be [CH1/CH2], [CH1/CH1], [CH2/CH2], and [ALL CH/ALL CH]. During playback, the audio output differs according to the setting option and audio input.

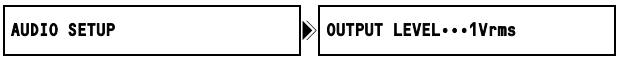
Setting Option → / Audio Input ↓		[CH 1 3/CH 2 4]	[CH 1 3/CH 1 3]	[CH 2 4/CH 2 4]	[ALL CH/ALL CH]
HDV/DV input	2 channels	CH1/CH2	CH1/CH1	CH2/CH2	ALL CH/ALL CH
	4 channels[1]	Operates according to the [AUD.M.SET] setting (📖 81).			
Analog input		CH1/CH2	CH1/CH1	CH2/CH2	ALL CH/ALL CH

[1] Playback of a tape recorded with 4-channel audio (using another device)

Selecting the Audio Output Level

You can boost the level of the audio output signal from the A/V1 terminal from 1 Vrms to 2 Vrms (+6 dB).

MENU (📖 25)



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

The output level from the 🎧 headphone terminal does not change.

Selecting the Audio Monitor

MENU (📖 25)

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

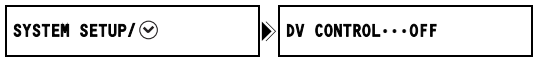
- You can also select the audio monitor using the wireless controller.
- If you selected [MIX/VAR.], adjust the mix balance with the [MIX BALANCE] setting or using the MIX BALANCE buttons on the wireless controller.

Audio Monitor [AUD.M.SET]	Audio Output Selected	Output Signal				
		Audio Recordings on 2 Channels		Audio Recordings on 4 Channels		
		Left Output	Right Output	Left Output	Right Output	Mix Balance
CH 1/2	CH 1 3/CH 2 4	CH1	CH2	CH1	CH2	–
	CH 1 3/CH 1 3	CH1	CH1	CH1	CH1	–
	CH 2 4/CH 2 4	CH2	CH2	CH2	CH2	–
	ALL CH/ALL CH	CH1+CH2	CH1+CH2	CH1+CH2	CH1+CH2	–
CH 3/4	CH 1 3/CH 2 4	–	–	CH3	CH4	–
	CH 1 3/CH 1 3	–	–	CH3	CH3	–
	CH 2 4/CH 2 4	–	–	CH4	CH4	–
	ALL CH/ALL CH	–	–	CH3+CH4	CH3+CH4	–
MIX/FIXED	CH 1 3/CH 2 4	–	–	CH1+CH3	CH2+CH4	Fixed (1:1)
	CH 1 3/CH 1 3	–	–	CH1+CH3	CH1+CH3	
	CH 2 4/CH 2 4	–	–	CH2+CH4	CH2+CH4	
	ALL CH/ALL CH	–	–	CH1+CH2+CH3+CH4	CH1+CH2+CH3+CH4	
MIX/VAR.	CH 1 3/CH 2 4	–	–	CH1+CH3	CH2+CH4	Variable
	CH 1 3/CH 1 3	–	–	CH1+CH3	CH1+CH3	
	CH 2 4/CH 2 4	–	–	CH2+CH4	CH2+CH4	
	ALL CH/ALL CH	–	–	CH1+CH2+CH3+CH4	CH1+CH2+CH3+CH4	

Digital Video Control

This feature enables the camcorder to control the record and stop functions of an external digital device connected to the camcorder through the HDV/DV terminal. The device must comply with the IEEE1394 AV/C protocol. Use the optional CV-250F (4 pin-6 pin) DV cable or a commercially available 6 pin-6 pin DV cable to connect the external device.

MENU (📖 25)



1. **Open the menu and select [SYSTEM SETUP/ ⊛]. Select [DV CONTROL], set it to [ON DV⇝] and close the menu.**
2. **Press the START/STOP button.**

   If the button was pressed while the camcorder was in record pause mode:

   Camcorder and external device: start recording.

   If the button was pressed while the camcorder was recording:

   Camcorder and external device: stop recording (record pause mode).

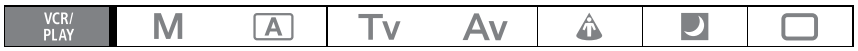
   If the button was pressed while the camcorder was not ready to start recording:

   Camcorder: no change; External device: starts/stops recording following the camcorder's control. If you press the START/STOP button again after solving the problem on the camcorder (inserting a cassette, etc.), the camcorder will start recording as the external device continues recording.

- ❍ While both this camcorder and a connected device are recording, if this camcorder 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 this camcorder stops recording you may notice a brief interruption of the audio on the connected device.
- ❍ 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 DV⇝], but no external device is connected
- ❍ 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.
- ❍ When connecting two DV Control-compatible Canon camcorders with a DV cable, make sure to set [DV CONTROL] on the other connected camcorder to [OFF].
- ❍ Up to 2 other devices can be connected to this camcorder for DV control.
- ❍ With some non-Canon devices the DV control may not work properly depending on the connected device.

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

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



HDV/DV In

When recording from an external digital device you can select the time code to be used for the recording made with this camcorder. Select [COPY] to keep the original time code of the video source, or [REGEN.] to use instead this camcorder's internal time code.

1. **Open the menu, select [SIGNAL SETUP] and then select the [TIME CODE] submenu.**
2. **Select [HDV/DV IN], select a setting option and close the menu.**
3. **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* (📖 79).
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. **Press the ❚❚ button (or the PAUSE ❚❚ button on the wireless controller) when the scene you wish to record appears.**
   Recording starts.
6. **Press the ■ button to stop recording.**

Analog Line-In

1. **Open the menu and select [AUDIO SETUP]. Select [DV AUDIO], select a setting option and close the menu.**
2. **Connect the camcorder to the output terminals of the analog video device.**
   For the connection diagram to an analog device refer to Section 4 of *Connecting to a Monitor/TV* (📖 79).
3. **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.
4. **Press the ❚❚ button (or the PAUSE ❚❚ button on the wireless controller) when the scene you wish to record appears.**
   Recording starts.
5. **Press the ■ button to stop recording.**

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.

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.

MENU
(📖 25)

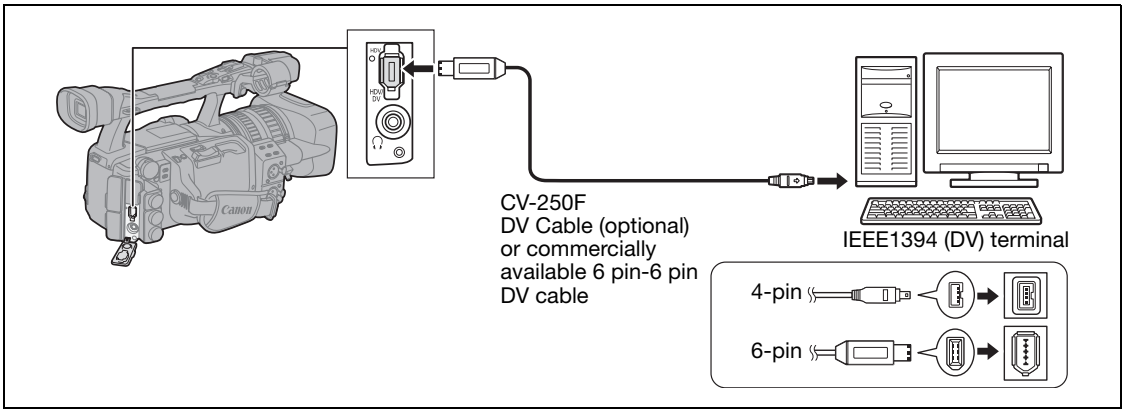
Open the menu and select [SIGNAL SETUP]. Select [AV➡DV], set it to [ON] and close the menu.

- ❍ 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 protection 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. Pressing the button will toggle the AV➡DV conversion on and off.

Connecting to a Computer

To connect the camcorder to a computer you will need a computer equipped with an IEEE1394 (DV) terminal and video editing software with video capturing capability installed. Use the optional CV-250F (4 pin-6 pin) DV cable or a commercially available 6 pin-6 pin DV cable. For the minimum system requirements for video editing, refer to the instruction manual of the video editing software.



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

- ❍ Refer also to the instruction manual of the computer and the editing software.
- ❍ Adjust the [SIGNAL SETUP] ▶ [PLAYBACK STD] and [HD DOWN-CONV] settings in accordance with the video signal standards of the connected computer.
- ❍ For video output from the camcorder to the computer:
  - HDV output: Set [PLAYBACK STD] to [HDV] and [HD DOWN-CONV] to [OFF].
  - DV output: Set [PLAYBACK STD] to [DV].
  - DV output of a recording originally made in HDV standard: Set [PLAYBACK STD] to [HDV] and [HD DOWN-CONV] to [ON].
- ❍ For video input from the computer to the camcorder:
  - HDV input: Set [PLAYBACK STD] to [HDV] and [HD DOWN-CONV] to [OFF].
  - DV input: Set [PLAYBACK STD] to [DV].

Custom Preset Settings

You can select preset level for a number of picture-related parameters (23 parameters when recording movies, 17 when recording still images). A list of the parameters is given in the following table and you can find more detailed descriptions on page 92. After changing individual parameters to your preference, you can save the whole set as a custom preset file. You can also embed the data of the custom preset parameters currently in use within a still image recorded on the memory card.

Up to 9 different custom preset files can be saved on the camcorder* and up to 20 custom preset files can be saved on a memory card. Custom preset files can be copied between the camcorder and memory card.

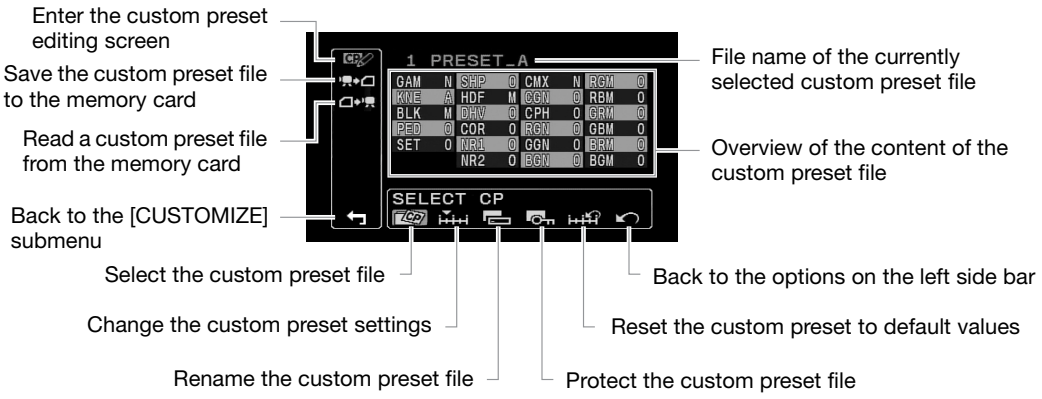
Custom preset files saved with a Canon XL H1S, XL H1A, XH G1 or XH A1 can be used with this camcorder. Custom preset files saved with this camcorder can be used on a Canon XL H1S, XL H1A, XH G1 or XH A1.

* Custom preset files 7 to 9 on the camcorder are predefined custom preset files, especially designed for specific scenes.

Custom Preset Parameters

GAM	Gamma curve**	Group 1 Parameters related to light and gradation
KNE	Knee point	
BLK	Black stretch/Black press	
PED	Master pedestal**	
SET	Setup level**	
SHP	Sharpness	Group 2 Parameters related to noise and definition of outlines
HDF	Horizontal detail frequency	
DHV	Horizontal/vertical detail frequency	
COR	Coring	
NR1	Noise reduction 1**	
NR2	Noise reduction 2**	
CMX	Color matrix**	Group 3 Parameters related to color direction and intensity
CGN	Color gain	
CPH	Color phase	
RGN	Red gain	
GGN	Green gain	
BGN	Blue gain	
RGM	R-G matrix	Group 4 Parameters related to change in color
RBM	R-B matrix	
GRM	G-R matrix	
GBM	G-B matrix	
BRM	B-R matrix	
BGM	B-G matrix	

** Available only when recording movies.



Changing Custom Preset Parameters

MENU (📖 25) → CUSTOMIZE → CUSTOM PRESET → EDIT → ①

① → SELECT CP

TUNE

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM PRESET] submenu.**
   The custom preset submenu appears.
2. **Select [EDIT] from the column on the left.**
   The cursor will move to the bottom bar of the custom preset editing screen. To return one level back to the options on the column on the left, select [↶ RETURN] and press the SELECT/SET dial.
3. **From the bottom bar, select [SELECT CP] and then select the name of the custom preset file you want to change.**
   The overview display shows in shortened form the current settings of the parameters of the custom preset file selected.
4. **From the bottom bar, select [TUNE].**
   The first parameter ([GAM]) of the custom preset file will be highlighted in blue.
5. **Turn the SELECT/SET dial to select a parameter you want to adjust and press the dial. Make the adjustment or the selection as necessary and press the dial.**
   - During the adjustment you can verify the effect on the screen.
   - Repeat this step to adjust all the parameters you want to change.
6. **When you finish adjusting all the parameters you want to change in the custom preset file, select [⬅ RETURN], press the dial and close the menu.**

- ❍ The custom preset parameters appear in one screen as 3-letter abbreviations followed by the current setting value. As you move between the items with the SELECT/SET dial, the full name of the currently selected item and its current value will be displayed at the bottom of the screen.
- ❍ Protected custom preset files cannot be changed. If you attempt to change a protected file, 🔑 will start flashing.

Renaming a Custom Preset File

Follow steps 1-3 in *Changing Custom Preset Parameters* (📖 88) to select the custom preset file you want to rename.

1. **From the bottom bar, select [RENAME].**
   The first character of the custom preset file name will start flashing.
2. **Turn the SELECT/SET dial to select a number, letter or punctuation mark and press the dial.**
   - The next character of the custom preset file name will start flashing.
   - Set the rest of the custom preset file name in the same way.
3. **When you finish renaming the custom preset file, press the dial.**
   You will return to the custom preset editing screen.
4. **Close the menu.**

Protecting a Custom Preset File

Follow steps 1-3 in *Changing Custom Preset Parameters* (📖 88) to select the custom preset file you want to protect.

1. **From the bottom bar, select [PROTECT].**
   - The protection mark 🔑 will appear next to the custom preset file name.
   - To cancel the protection, repeat the procedure for a custom preset file with the 🔑 mark.

Resetting a Custom Preset File

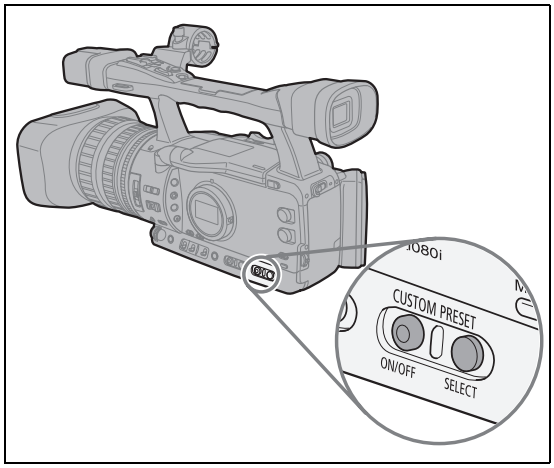
Follow steps 1-3 in *Changing Custom Preset Parameters* (📖 88) to select the custom preset file you want to reset to default values.

1. **From the bottom bar, select [RESET].**
   A confirmation screen will appear.
2. **Select [EXECUTE] and press the SELECT/SET dial.**
   You will return to the custom preset editing screen.
3. **Close the menu.**

Protected custom preset files cannot be reset. If you attempt to reset a protected file, 🔑 will start flashing.

Activating the Custom Preset Settings

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 custom preset files in reverse order (from last to first) (📖 71).
   - When you are not using the custom preset settings, set the camcorder to CP OFF.
   - CP and the name of the selected custom preset file will flash on the screen. After 4 seconds, the file name will be replaced by the custom preset file number.



2. **Press the CUSTOM PRESET ON/OFF button.**
   CP and the name of the selected custom preset file will stay on and the custom settings will be activated. After 4 seconds, the file name will be replaced by the custom preset file number.

Copying a Custom Preset File to the Memory Card

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM PRESET] submenu.**
2. **Select [CAMERA ➡ CARD] from the column on the left.**
3. **From the bottom bar, select [SELECT CP] and then select the name of the custom preset file you want to copy to the card.**
4. **Select [SAVE POSITION] and select the file name 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 default file name will be “NEW_FILE”.
5. **Select [➡ EXECUTE] and in the confirmation screen select [EXECUTE] to copy the file.**
6. **Close the menu.**

Reading a Custom Preset File from the Memory Card

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM PRESET] submenu.**
2. **Select [CARD ➡ CAMERA] from the column on the left.**
3. **From the bottom bar, select [IMPORT] and then select the name of the custom preset file you want to read to the camcorder.**
4. **Select [SELECT POSITION] and select the preset number under which you want to store the file in the camcorder.**
5. **Select [➡ EXECUTE] and in the confirmation screen select [EXECUTE] to load the file.**
6. **Close the menu.**

Reading a Custom Preset File from a Still Image

With the custom function [PHOTO BUTTON] (📖 95) you can select to save the custom preset settings currently in use along with a still image recorded in CAMERA mode (simultaneous recording, 📖 113). This is very useful when you want to load the custom preset file later by selecting the still image taken at a specific scene.

1. **Select the still image that contains the custom preset file you want to read.**
   Use the CARD + / – buttons to move between the still images. If a still image contains a custom preset file, CP appears.
2. **Open the menu, select [CUSTOMIZE] and then select [META DATA CP].**
3. **Select [CARD ➡ CAMERA] from the column on the left.**
4. **From the bottom bar, select [SELECT POSITION] and select the preset number under which you want to store the file on the camcorder.**
5. **Select [➡ EXECUTE] and in the confirmation screen select [EXECUTE] to load the file.**
6. **Close the menu.**

Custom preset files 7 to 9 are predefined settings designed for specific scenes.

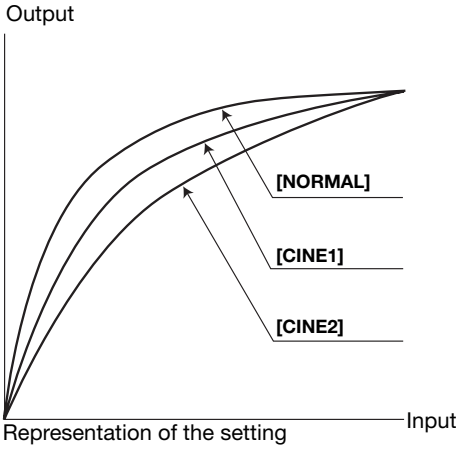
- These 3 custom preset files are protected and, as long as the protection is not removed, cannot be overwritten.
- Even if you deleted or changed the sample custom preset files, you can reset them to the original values by resetting all the camcorder's settings. Open the menu and select [SYSTEM SETUP/]. Select [RESET ALL] and select [YES] in the confirmation screen.
- After resetting custom preset files 1 to 6 with the [RESET] option, they will all contain the same default settings.

Custom Preset [7 VIDEO.C]	For playback on a consumer-level monitor. [BLK] = [PRESS], [PED] = -2, [SET] = -2
Custom Preset [8 CINE.V]	For playback on a monitor TV with a film-like feel. [GAM] = [CINE1], [KNE] = [LOW], [BLK] = [STRETCH], [SHP] = -4, [CMX] = [CINE1], [CGN] = -20, [CPH] = 5, [RBM] = -5, [GRM] = -5 [GBM] = -5, [BRM] = 5, [BGM] = 12
Custom Preset [9 CINE.F]	For video transfer to film. [GAM] = [CINE2], [KNE] = [LOW], [BLK] = [STRETCH], [SHP] = 6, [CMX] = [CINE2], [RGN] = -8

*All other settings are left at their neutral values.

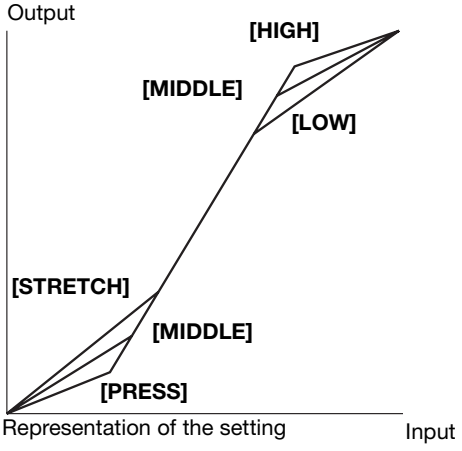
[GAM] Gamma Curve

The gamma curve changes the overall look of the image. You can select from **[NORMAL]**, [CINE1] or [CINE2].
[NORMAL]: standard gamma setting suitable for video.
[CINE1]: appropriate for video telecined from film.
[CINE2]: appropriate for transfer to film.



[KNE] Knee Point Adjustment

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].



[BLK] Black Stretch/Black Press

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

[PED] Master Pedestal

Adjust the master pedestal level in the range -9 to +9. The master pedestal lowers or raises the baseline of the luminance signal affecting only the shadow areas. Set [-] values to subdue the dark areas, or set [+] values to get more detail in the shadows.

[SET] Setup Level

Adjust the setup level in the range -9 to +9. The setup level lowers or raises the whole gamma curve controlling the darkest level of black in the image. Set [-] values to get a darker image, or set [+] values to get a brighter image.

- Depending on the value set for the master pedestal [PED], the setup level may not be able to take a negative value. As a result, adjusting the setup value within a certain value range will have no effect.

[SHP] Sharpness

Adjust the sharpness level in the range -9 to +9. Noise artifacts caused by too-high sharpness settings can be reduced using the coring setting.

[HDF] Horizontal Detail Frequency

Select the horizontal definition of the image from [HIGH], **[MIDDLE]** or [LOW].

[DHV] Horizontal/Vertical Detail Balance

Adjust the balance between horizontal and vertical definition of the image in the range -9 (only horizontal) to +9 (only vertical).

[COR] Coring

Adjust the coring level in the range -9 to +9. Set higher coring values to help reduce the noise artifacts caused by high sharpness levels.

[NR1] Noise Reduction 1

You can select from **[OFF]**, [HIGH], [MIDDLE] or [LOW] to reduce the noise caused by shooting in dark places or by increasing the gain too much.

- When picture noise is already low due to the gain settings, the noise reduction function may not be noticeable.

When activated (settings other than [OFF]), moving subjects may leave a trailing afterimage.

[NR2] Noise Reduction 2

You can select from **[OFF]**, [HIGH], [MIDDLE] or [LOW] to reduce the noise caused by shooting fast moving objects. Results in an effect similar to applying the skin detail function over the whole picture.

- Unlike with the [NR1] setting, a trailing afterimage will not appear.

[CMX] Color Matrix

Color mix affects the fundamental color settings and affects the feel of the whole image. You can select from **[NORMAL]**, [CINE1] or [CINE2].

[CGN] Color Gain

Adjust the color intensity in the range -50 to +50.

[CPH] Color Phase

Adjust the color phase in the range -9 to +9. Color phase affects the overall balance of the colors in the picture. Set [-] values to adjust the colors toward violet/red tones, or set [+] values to adjust the colors toward green/blue tones.

[RGN] R Gain

Adjust the intensity of red tones in the range -50 to +50.

[GGN] G Gain

Adjust the intensity of green tones in the range -50 to +50.

[BGN] B Gain

Adjust the intensity of blue tones in the range -50 to +50.

[RGM] R-G Matrix

The R-G matrix changes the tint of the picture along the cyan/green and red/magenta gradations without affecting blues. Adjust the level in the range -50 to +50.

[RBM] R-B Matrix

The R-B matrix changes the tint of the picture along the cyan/blue and red/yellow gradations without affecting greens. Adjust the level in the range -50 to +50.

[GRM] G-R Matrix

The G-R matrix changes the tint of the picture along the magenta/red and green/cyan gradations without affecting blues. Adjust the level in the range -50 to +50.

[GBM] G-B Matrix

The G-B matrix changes the tint of the picture along the magenta/blue and green/yellow gradations without affecting reds. Adjust the level in the range -50 to +50.

[BRM] B-R Matrix

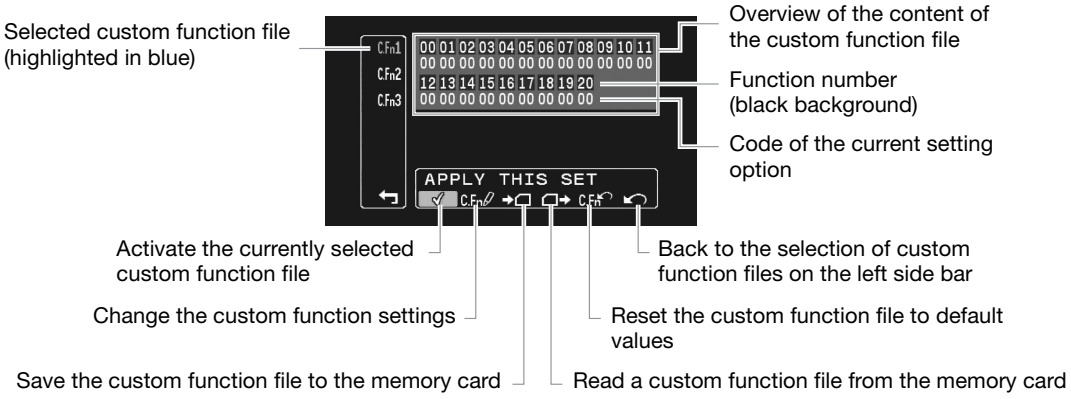
The B-R matrix changes the tint of the picture along the yellow/red and blue/cyan gradations without affecting greens. Adjust the level in the range -50 to +50.

[BGM] B-G Matrix

The B-G matrix changes the tint of the picture along the yellow/green and blue/magenta gradations without affecting reds. Adjust the level in the range -50 to +50.

Customized Functions

You can customize to your personal preferences many aspects of the operation of the camcorder, most of them governing how the camcorder operates in CAMERA mode. You can adjust up to 3 different custom function files and save them on the camcorder or to a memory card. By just reading the custom function file saved on the memory card with another XH G1S / XH A1S, you will instantly get a camcorder configured to operate in the same familiar manner you prefer.



Changing the Custom Function Settings

MENU (25)

CUSTOMIZE ▶ CUSTOM FUNCTION ▶ C.Fn1 / C.Fn2 / C.Fn3

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM FUNCTION] submenu.**
   The custom function editing screen appears.
2. **From the column on the left, select one of the 3 custom function files [C.Fn1] - [C.Fn3].**
   - The overview display shows the current settings of the custom function file currently selected.
   - The cursor will move to the bottom bar of the custom function editing screen. To return one level back to the options on the column on the left, select [↶ RETURN] and press the SELECT/SET dial.
3. **From the bottom bar, select [C.Fn TUNE].**
   The first function (00) of the custom function file will be highlighted in blue.
4. **Turn the SELECT/SET dial to select a function you want to adjust and press the dial. Make the selection as necessary and press the dial.**
   Repeat this step to adjust all the functions you want to change.
5. **When you finish adjusting all the functions in the custom function file, select [↶ RETURN], press the dial and close the menu.**

Custom functions appear in one screen represented only by the function number on the top (numbers 00 - 20 with a black background), and the code of the current setting immediately under it.

Resetting a Custom Function File

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM FUNCTION] submenu.**
2. **From the column on the left select the custom function file you want to reset.**
3. **From the bottom bar select [C.Fn RESET].**
4. **Select [OK], press the SELECT/SET dial and close the menu.**

Activating a Custom Function File

Even if you define a custom function file, as long as you do not activate it, the camcorder will function according to default settings.

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM FUNCTION] submenu.**
2. **From the column on the left select the custom function file you want to activate.**
3. **From the bottom bar select [✓ APPLY THIS SET].**
4. **Select [ACTIVE] and press the SELECT/SET dial.**
   ✓ will appear next to the custom function file currently activated.

Copying a Custom Function File to the Memory Card

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM FUNCTION] submenu.**
2. **From the column on the left select the custom function file you want to copy to the memory card.**
3. **From the bottom bar select [➔ SAVE TO CARD].**
4. **Select the destination file on the memory card [➔ 1] - [➔ 3].**
5. **Select [OK], press the SELECT/SET dial and close the menu.**
   When the operation is finished, “TASK COMPLETED” will appear on the screen.

Reading a Custom Function File from the Memory Card

1. **Open the menu, select [CUSTOMIZE] and then select the [CUSTOM FUNCTION] submenu.**
2. **From the column on the left select the custom function file to which you want to read the settings from the memory card.**
3. **From the bottom bar select [➔ READ FROM CARD].**
4. **Select the source file on the memory card [1 ➔] - [3 ➔].**
5. **Select [OK], press the SELECT/SET dial and close the menu.**
   When the operation is finished, “TASK COMPLETED” will appear on the screen.

Custom function files saved with a Canon XL H1S, XL H1A, XH G1 or XH A1 cannot be used with this camcorder.

Availability of custom functions in each recording program/playback mode (Video)

Custom Function			M	A	Tv	Av				VCR/ PLAY
00	SHCKLSS WB/GN	WHITE BALANCE	●			●			–	–
		GAIN	●		●			–		–
01	AE RESPONSE		●		●			– (MIDDLE)		–
02	ZOOM RING CTRL		●			●			– (NORMAL)	–
03	ZOOM SPEED		●			●			– (NORMAL)	–
04	FOCUS RING CTRL		●				●			–
05	BUTTONS OPER.1	MAGN.	●			●			–	–
		WB SET	●			●			–	–
		PUSH AF	●			●			–	–
06	BUTTONS OPER.2	REC REVIEW	●				●			–
		END SEARCH	●				●			–
07	RINGS DIRECTION	ZOOM	●				●			–
		FOCUS	●				●			–
		IRIS	●	●[1]	●[1]	●		–		–
08	OPER.DIRECTION	CURSOR	●				●			●
		SHUTTER	●	●[1]	●	●[1]		–		–
09	IRIS LIMIT		●	●[1]	●[1]	●		–		–
10	PHOTO BUTTON	PHOTO + CP DATA	●			●			– (PHOTO only)	–
		PHOTO	●				●			–
		MAGNIFYING	●			●			–	–
11	MARKER LEVEL	MARKER	●				●			–
		ASPECT	●				●			–
		SAFETY	●				●			–
12	F.AST BW-MOD	MAGN.	●			●			–	–
		PEAKING	●			●			–	–
13	OBJ DST UNIT		●				●			–
14	ZOOM INDICATOR		●				●			–
15	COLOR BARS		●				●			–
16	1kHz TONE		●				●			–
17	LANC AE SHIFT	AE SHIFT	–		●			–		–
		IRIS	●		●			–		–
18	TALLY LAMP		●[2]				●[2]			●[2]
19	LED		●				●			●
20	CUSTOM REC	CHARACTER REC	●				●			–
		MAGNIFYING REC	●			●			–	–

[1] Only during exposure lock.

[2] Only if [LED] is set to a setting other than [OFF]. When [LED] is set to [OFF], this function will be set to [OFF] as well.

Availability of custom functions in each recording program/playback mode (Still Images)

Custom Function			M	A	Tv	Av				VCR/ PLAY
00	SHCKLSS WB/GN	WHITE BALANCE	–	–						–
		GAIN	–	–						–
01	AE RESPONSE		– (MIDDLE)							–
02	ZOOM RING CTRL	REC REVIEW	●	●					– (NORMAL)	–
03	ZOOM SPEED		– (FAST)	– (FAST)						–
04	FOCUS RING CTRL		●	●						–
05	BUTTONS OPER.1	MAGN.	●	●					–	–
		WB SET	●	●					–	–
		PUSH AF	●	●					–	–
06	BUTTONS OPER.2	REC REVIEW	–	–						–
		END SEARCH	–	–						–
07	RINGS DIRECTION	ZOOM	●	●						–
		FOCUS	●	●						–
		IRIS	●	●*	●*	●		–		–
08	OPER.DIRECTION	CURSOR	●	●						●
		SHUTTER	●	●*	●	●*		–		–
09	IRIS LIMIT		●	●*	●*	●		–		–
10	PHOTO BUTTON		–	–						–
11	MARKER LEVEL	MARKER	●	●						–
		ASPECT	–	–						–
		SAFETY	–	–						–
12	F.AST BW-MOD	MAGN.	●	●					–	–
		PEAKING	●	●					–	–
13	OBJ DST UNIT		●	●						–
14	ZOOM INDICATOR		●	●						–
15	COLOR BARS		–	–						–
16	1kHz TONE		–	–						–
17	LANC AE SHIFT	AE SHIFT	–		●			–		–
		IRIS	●		●			–		–
18	TALLY LAMP		–	–						–
19	LED		●	●						●
20	CUSTOM REC		–	–						–

* Only during exposure lock.

List of Custom Functions and Setting Options

The default value for all items is the option assigned to 00.

00 [SHCKLSS WB/GN] Shockless White Balance/Gain

The shockless setting will ensure a softer transition when changing the white balance or gain.

CAMERA mode: Shockless gain will not function when changing the gain setting from/to -3 dB or +36 dB.

Setting Options: [WHITE BALANCE] Shockless white balance: **[OFF]**, [ON]

[GAIN] Shockless gain: **[OFF]**, [ON]

01 [AE RESPONSE] AE Response

Selects the camcorder's response when you change the automatic exposure setting.

Setting Options: **[MIDDLE]**, [HIGH], [LOW]

02 [ZOOM RING CTRL] Zoom Ring Control

Selects the sensitivity of the response when operating the zoom ring.

Setting Options: **[NORMAL]**, [SLOW], [FAST]

03 [ZOOM SPEED] Zoom Speed

Selects the set of zoom speeds that will be available when using the zoom lever on the side grip or carrying handle.

- When the zoom speed is too fast (less than 2 seconds end-to-end), the camcorder will have more trouble focusing automatically while zooming.

Setting Options: **[NORMAL]**, [SLOW], [FAST]

04 [FOCUS RING CTRL] Focus Ring Control

Selects the sensitivity of the response when operating the focus ring.
Setting Options: **[NORMAL]**, [SLOW], [FAST].

05 [BUTTONS OPER.1] Buttons Operation (1/2)

You can set that a long press be required to activate various buttons to prevent their accidental operation. When you select [LONG PUSH], keep the button pressed for more than 1 second.
Setting Options: [MAGN.] MAGN. button: **[ONE PUSH]**, [LONG PUSH]
[WB SET] WHITE BAL. button: **[ONE PUSH]**, [LONG PUSH]
[PUSH AF] PUSH AF button: **[ONE PUSH]**, [LONG PUSH]

06 [BUTTONS OPER.2] Buttons Operation (2/2)

You can set that a long press be required to activate various buttons to prevent their accidental operation. When you select [LONG PUSH], keep the button pressed for more than 1 second.
Setting Options: [REC REVIEW] (record review) button: **[ONE PUSH]**, [LONG PUSH]
[END SEARCH] END SEARCH buton: **[ONE PUSH]**, [LONG PUSH]

07 [RINGS DIRECTION] Rings Direction

Changes the direction of the adjustment when turning the camcorder's rings.
Setting Options: [ZOOM] Zoom ring:
[NORMAL] - turn up for wide angle **W**, [REVERSE] - turn down for wide angle **W**.
[FOCUS] Focus ring:
[NORMAL] - turn up to focus closer, [REVERSE] - turn down to focus closer.
[IRIS] Iris ring:
[NORMAL] - turn up to close the aperture, [REVERSE] - turn down to close the aperture.

08 [OPER.DIRECTION] Operation Direction

Changes the direction of the adjustment when turning the SHUTTER dial or when operating the SELECT/SET dial as a cursor (for example, while selecting setting options in the menu screens or in the index screen).
Setting Options: [CURSOR] SELECT/SET dial for menu navigation:
[NORMAL] - turn up to move left in the menu, [REVERSE] - turn down to move left in the menu.
[SHUTTER] Shutter dial:
[NORMAL] - turn up for a faster shutter speed, [REVERSE] - turn down for a faster shutter speed.

09 [IRIS LIMIT] Iris Limit

Activates the iris limit. When set to [ON] you can close the aperture down to F9.5; when set to [OFF] you can close the aperture down to F22 (or completely -[CLOSE]- in **M** Manual mode, **Av** mode or during exposure lock).
Setting Options: **[OFF]**, [ON]

10 [PHOTO BUTTON] Photo Button

Selects the function of the PHOTO button in CAMERA mode. You can enable recording still images while recording video (simultaneous recording) or assign to the PHOTO button the same function as the MAGN. button. When set to [PHOTO + CP DATA] the custom preset settings currently in use will be recorded along with the still image.
Setting Options: **[PHOTO + CP DATA]**, [PHOTO], [MAGNIFYING], [OFF]

11 [MARKER LEVEL] Markers' Intensity Level

Changes the intensity of the markers displayed on the screen to 40% (gray) or 100% (white).
Setting Options: [MARKER] Level/center/grid markers: **[100%]**, [40%]
[ASPECT] Aspect ratio guides: **[100%]**, [40%]
[SAFETY] Safety zone guides: **[100%]**, [40%]

12 [F.AST BW-MOD] Focus Assist Function B&W Display Mode

Changes the display mode to black & white while the focus assist functions are activated.
Setting Options: [MAGN.] While the Magnifying function is active: **[OFF]**, [ON]
[PEAKING] While the Peaking function is active: **[OFF]**, [ON]

13 [OBJ DST UNIT] Object Distance Units Display

Selects the units (meters or feet) for the display of the distance to the object.
Setting Options: **[m (meter)]**, [ft (feet)]

14 [ZOOM INDICATOR] Zoom Indicator Display

Selects the display of the zoom indicator between a graphic bar and a numeric display.
Setting Options: **[BAR]**, [NUMBER]

15 [COLOR BARS] Color Bars Signal

Selects the type of signal to use to produce the color bars: EBU color bars (type 1) or SMPTE color bars (type 2).
Setting Options: **[TYPE 1]**, [TYPE 2]

16 [1kHz TONE] 1 kHz Reference Audio Signal

Selects the strength of the audio signal.
Setting Options: **[OFF]**, [-12dB], [-18db], [-20dB]

17 [LANC AE SHIFT] AE SHIFT Dial on a Controller

Selects the function of the AE SHIFT dial on the optional ZR-2000 Zoom Remote Controller so you can use it to adjust the exposure compensation or the aperture value.
Setting Options: **[AE SHIFT]**, [IRIS]

18 [TALLY LAMP] Tally Lamp

Selects the operation of the tally lamp. Even if set to [OFF], the tally lamp will turn on when receiving a command from the wireless controller.
Setting Options: **[ON]**, [BLINK], [OFF]

19 [LED] LED Indicators

Selects the operation of the LED indicators on the camcorder. When set to [TYPE 1], all LED indicators (including that of the HDV/DV terminal) will be on. When set to [TYPE 2] all LED indicators will be on, except for that of the HDV/DV terminal.
Setting Options: **[TYPE 1]**, [TYPE 2], [OFF]

20 [CUSTOM REC] Custom Recording

Selects whether to embed the on-screen character displays (date and time) as part of the video recording and whether to record on the tape the enlarged image when using the Magnifying focus assist function.
- When [CHARACTER REC] is set to [ON], the menu option [TV SCREEN] will not be available and [COMP.OUT] will automatically be set to [1080i/576i] and you will not be able to select [576i].

Setting Options: [CHARACTER REC] Recording of superimposed on-screen displays: **[OFF]**, [ON]
[MAGNIFYING REC] Recording of enlarged image while the Magnifying function is active: **[OFF]**, [ON]

Customized On-Screen Displays

You can customize which icons to display on the screen according to your personal preferences and needs. You can save your personal settings as a custom display file on the camcorder or on the memory card. To activate the on-screen displays at the level that you customized, repeatedly press the DISP. button (📖 31).

Changing the Custom Display Settings

MENU (📖 25) → CUSTOMIZE → CUSTOM DISPLAY

1. **Open the menu, select [CUSTOMIZE] and then select [CUSTOM DISPLAY].**
   The custom display editing screen appears. The overview display shows the current settings of the custom display file.
2. **From the column on the left, select [DISP. TUNE].**
   The first item (00) of the custom display file will be highlighted in blue.
3. **Turn the SELECT/SET dial to select a display item you want to change and press the dial. Make the selection as necessary and press the dial.**
   Repeat this step to adjust all the items you want to change.
4. **When you finish changing all the items in the custom display file, select [↶ RETURN], press the dial and close the menu.**
5. **Repeatedly press the DISP. button to select the display level you customized.**

Custom display items appear in one screen represented only by the item number on the top (numbers 00 – 21 with a black background), and the code of the current setting immediately under it.

Resetting a Custom Display File

1. **Open the menu, select [CUSTOMIZE] and then select [CUSTOM DISPLAY].**
2. **From the column on the left select [DISP.↶RESET].**
3. **Select [OK], press the SELECT/SET dial and close the menu.**

Copying a Custom Display File to the Memory Card

1. **Open the menu, select [CUSTOMIZE] and then select [CUSTOM DISPLAY].**
2. **From the column on the left select [→SAVE TO CARD].**
3. **Select [OK], press the SELECT/SET dial and close the menu.**
   When the operation is finished, “TASK COMPLETED” will appear on the screen.

Reading a Custom Display File from the Memory Card

1. **Open the menu, select [CUSTOMIZE] and then select [CUSTOM DISPLAY].**
2. **From the column on the left select [→READ FROM CARD].**
3. **Select [OK], press the SELECT/SET dial and close the menu.**
   When the operation is finished, "TASK COMPLETED" will appear on the screen.

Custom display files saved with a Canon XL H1S, XL H1A, XH G1 or XH A1 cannot be used with this camcorder.

List of Custom Display Items and Setting Options

00 [REC PROGRAMS] Recording Mode Icon
Setting Options: [OFF], **[ON]**

01 [CAMERA DATA1] Camera Data (1/2)
Setting Options: [F NUMBER] Aperture value display: [OFF], **[ON]**
[SHUTTER SPEED] Shutter speed display: [OFF], **[ON]**

02 [CAMERA DATA2] Camera Data (2/2)
Setting Options: [EXPOSURE] Exposure indicator and exposure displays: [OFF], **[ON]**
[WHITE BALANCE] White balance icons and displays: [OFF], **[ON]**
[GAIN] Gain icons and displays: [OFF], **[ON]**

03 [ZOOM] Zoom Indicator
You can select to display the zoom indicator permanently or only when operating the zoom.
Setting Options: [OFF], **[ON(NORMAL)]**, [ON(ALWAYS)]

04 [FOCUS] Focus Distance Display
You can select to display the focusing distance permanently or only when operating the focus.
Setting Options: [OFF], **[ON(NORMAL)]**, [ON(ALWAYS)]

05 [ND] ND Filter displays
Setting Options: [OFF], **[ON]**

06 [IMAGE EFFECTS] Image Effects
Setting Options: [SKIN DETAIL] Skin detail icon: [OFF], **[ON]**
[SELECTIVE NR] Selective NR icon: [OFF], **[ON]**
[COLOR CORRECTION] Color correction icon: [OFF], **[ON]**

07 [F.ASSIST FUNC.] Focus Assist Functions
Setting Options: [PEAKING] Peaking function icon: [OFF], **[ON]**
[MAGNIFYING] Magnifying function icon: [OFF], **[ON]**

08 [CUSTOMIZE] Customized Functions
Setting Options: [CUSTOM PRESET] Icon of the custom preset file currently active: [OFF], **[ON]**
[CUSTOM FUNCTION] Icon of the custom function file currently active: [OFF], **[ON]**

09 [RECORDING STD] HD Standard Icon
Setting Options: [OFF], **[ON]**

10 [DV REC MODE] Recording Mode in Standard Definition
Setting Options: **[OFF]**, [ON]

11 [FRAME RATE] Frame Rate Display
Setting Options: [OFF], **[ON]**

12 [TAPE] Tape-Related Icons and Displays

Setting Options: [TIME CODE] Time code display: [OFF], **[ON]**
[OPERATION MODE] Icon of the current tape operation: [OFF], **[ON]**
[DV CONTROL] DV control icon: **[OFF]**, [ON]

13 [TAPE REMAINDER] Remaining Time on the Tape

You can select to display the tape remainder permanently or only the warning when the tape is about to end.
Setting Options: [OFF], [NORMAL], **[WARNING]**

14 [TAPE/CARD] Tape/Card-Related Displays

Setting Options: [EXT CONTROL] Icon of the external control mode (POWER dial set to EXT. CONT.): **[OFF]**, [ON]
[IMG STAB] Icon of the image stabilizer: **[OFF]**, [ON]
[IMG SIZE/QUALITY] Icon of the size and quality of the still image: **[OFF]**, [ON]

15 [LIGHT METERING] Light Metering-Related Displays

Setting Options: [SPOT AE POINT] Bracketing frames when Spot AE metering is active: [OFF], **[ON]**
[LIGHT METERING] Icon of the metering mode currently active: [OFF], **[ON]**

16 [CARD] Icons Related to Recording Still Images

Setting Options: [DRIVE MODE] Icon of the drive mode currently active: [OFF], **[ON]**
[FLASH] Icon of the flash mode currently active: [OFF], **[ON]**

17 [CARD REMAINDER] Remaining Still Images on the Memory Card

You can select to display the information regarding the number of still images available on the memory card permanently or only the warning when the memory card is about to get full.
Setting Options: [OFF], [NORMAL], **[WARNING]**

18 [AUDIO] Audio-Related Displays

Setting Options: [LOW CUT] Icon of the low cut filter: **[OFF]**, [ON]
[DV AUDIO] Icon of the DV audio mode: **[OFF]**, [ON]
[OUTPUT CH] Icon of the audio channel output: **[OFF]**, [ON]

19 [WARNING/STATUS] Warning and Status Icons

Setting Options: [CONDENSATION] Condensation warning icon: [OFF], **[ON]**
[CHARACTER REC] Character recording warning icon: [OFF], **[ON]**
XHGS [SDI] Warning icon when on-screen displays are embedded in the SDI output: [OFF], **[ON]**

20 [BATTERY] Battery-Related Displays

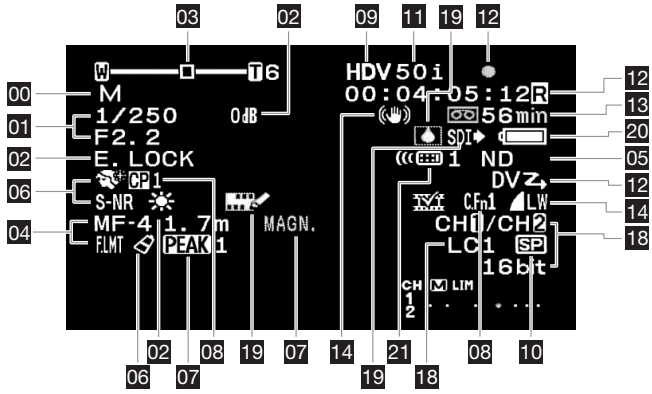
You can select to display the information regarding the battery pack permanently or only the warning when the battery is almost empty.
Setting Options: [OFF], [NORMAL], **[WARNING]**

21 [WIRELESS REMOTE] Wireless Remote Display

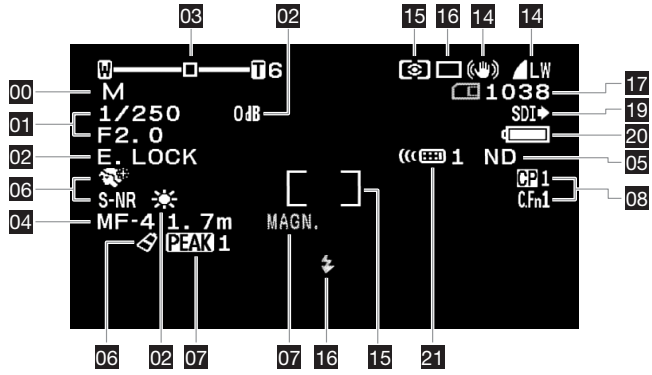
You can select to display the information regarding the wireless controller permanently or only related warnings.
Setting Options: [OFF], [NORMAL], **[WARNING]**

Location of the Custom Displays

CAMERA / EXT. CONT.



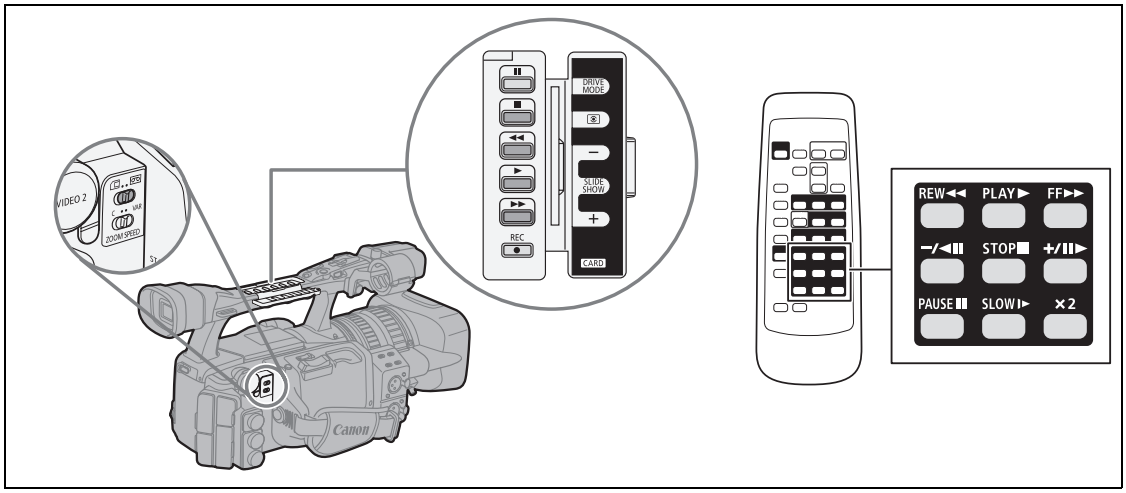
CAMERA · CARD



Playing Back a Tape

If the playback picture is distorted, clean the video heads using a Canon DVM-CL video head cleaning cassette or a commercially available digital video head cleaning cassette (📖 141).

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



VCR/PLAY | M | A | Tv | Av

MENU (📖 25)
SIGNAL SETUP ▶ PLAYBACK STD····AUTO

1. **Turn the POWER dial to VCR/PLAY and set the 📼/💿 (card/tape) switch to 📼.**
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

All special playback modes except for fast forward playback, rewind playback and playback pause can only be operated with the wireless controller.

HDV

▶II (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.

◀ x1 (reverse playback)

Press the −/◀II 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 11.5x 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.

◀▮▮ (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.

◀ x1 (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) / x2 ▶ (forward x2 playback)
Plays back at 2x normal speed. Press the ✕2 button on the wireless controller during normal or reverse playback. Press the ▶ (play) button to return to normal playback.

Adjusting the Volume of Headphones or the Built-in Speaker

Turn the SELECT/SET dial to adjust the volume.
To turn off the volume, keep the dial turned down until the volume icon changes to [OFF 🔇].

- ❍ The sound will be muted during special playback modes.
- ❍ The picture may become distorted during some special playback modes.
- ❍ The camcorder stops the tape automatically after 4 minutes 30 seconds in playback pause mode to protect the tape and video heads.
- ❍ During fast forward playback, rewind playback and reverse playback of a tape recorded in HDV standard, 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.

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.

1. **During playback, 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 M mark appears.
   - To cancel, press the ZERO SET MEMORY button again.
2. **Stop the playback.**
3. **Rewind the tape.**
   - If the tape counter shows a negative value, fast forward the tape instead.
   - The tape stops automatically at “0:00:00” and the M 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 (📖 72). This function is operated with the wireless controller.

1. **Press the SEARCH SELECT button to display the ➧ icon.**
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.

1. Press the SEARCH SELECT button to display the ➔ icon.

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.

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).

Selecting the Data Code

MENU (📖 25)

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.

If you turn off the camcorder, the data code will not appear the next time you turn it on.

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 in the recording has changed.

MENU (📖 25)

DISPLAY SETUP/💬 ▶ 6SEC.DATE····OFF

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

Remote Sensor Mode

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

To change the remote sensor mode of the camcorder

Open the menu and select [SYSTEM SETUP/ ⊛]. Select [WL.REMOTE], select a setting option and close the menu.

To change the remote sensor mode of the wireless controller

While holding the REMOTE SET button pressed down, press and hold the ZOOM T button for more than 2 seconds to change the wireless controller to mode 2.

To change the wireless controller to mode 1, press and hold the REMOTE SET and ZOOM **W** buttons instead.

- ❍ 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.
- ❍ The wireless controller returns to mode 1 when you replace the batteries. Change the mode if necessary.

Selecting the Still Image Quality/Size

Changing the Still Image Quality

You can choose from Super fine, Fine and Normal.

VCR/ * PLAY | M | A | Tv | Av

* Only when playing back a tape.

MENU (📖 25) → 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

Available image sizes will depend on the operating mode and the recording standard settings.

Recording still images in CAMERA·CARD mode	Simultaneous recording of a still image in CAMERA mode	Capturing a still image in VCR/PLAY mode
LW 1920x1080	[HD] or [SD16:9]: **LW** 1920x1080 **SW** 848x480	From a recording made in [HD]: **LW** 1920x1080 **SW** 848x480
SW 848x480		
L 1440x1080	[SD4:3]: **L** 1440x1080 **S** 640x480	From a recording made in [SD16:9]: **SW** 848x480
S 640x480		From a recording made in [SD4:3]: **S** 640x480

VCR/ * PLAY | M | A | Tv | Av

* Only when playing back a tape.

MENU (📖 25) → RECORDING SETUP → IMAGE SIZE···LW 1920x1080 (CAMERA) (CAMERA·CARD)

HD IMG SIZE···LW 1920x1080 (VCR/PLAY)

Open the menu and select [RECORDING SETUP]. Select [IMAGE SIZE] ([HD IMG SIZE] in VCR/PLAY mode), 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

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

Image size	Image quality	Memory card			File size per image
		32 MB	1 GB	2 GB	
LW 1920 x 1080	Super Fine	20	710	1,460	1360 kB
	Fine	30	1,055	2,190	910 kB
	Normal	60	2,080	4,385	460 kB
SW 848 x 480	Super Fine	105	3,550	7,680	280 kB
	Fine	150	5,030	10,240*	190 kB
	Normal	305	10,070*	20,485*	100 kB
L 1440 x 1080	Super Fine	25	940	1,915	1020 kB
	Fine	40	1,400	2,925	690 kB
	Normal	80	2,745	5,585	350 kB
S 640 x 480	Super Fine	140	4,645	10,240*	215 kB
	Fine	205	6,710	15,360*	149 kB
	Normal	370	12,080*	30,725*	82 kB

* Approximate number of still images that can actually be recorded on the memory card.
(The maximum number of remaining still images displayed on the screen is 9999.)

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]: Image numbers will restart from 101-0101 every time you insert a new memory card.

[CONTINUOUS]: Image numbers will continue from the number following that of the last image recorded with the camcorder. If the memory card you insert already contains an image with a larger number, a new image will be assigned a number one higher than that of the last image on the memory card. There will be no duplication of file numbers. This is useful for organizing images on a computer.

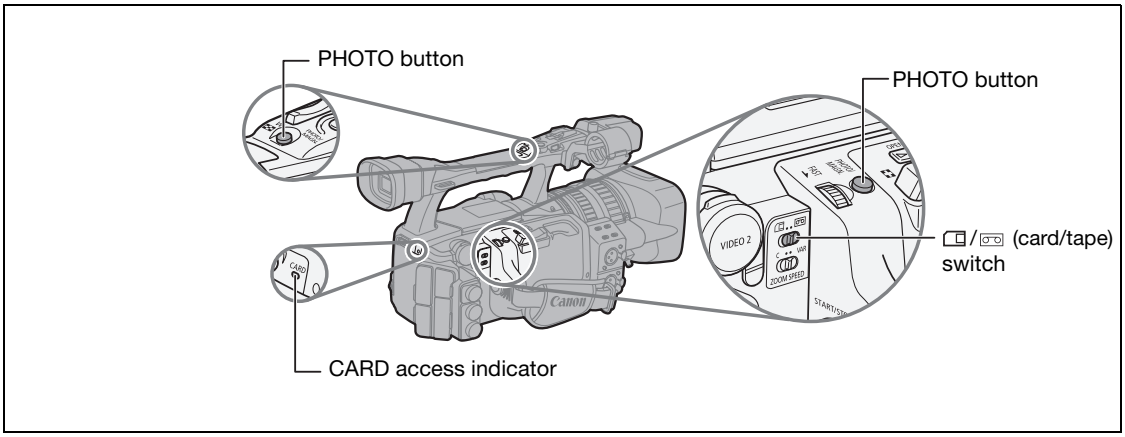
* Only when playing back a tape.

MENU (📖 25)

To change the setting, open the menu and select [RECORDING SETUP]. Select [FILE NOS.], select a setting option and close the menu.

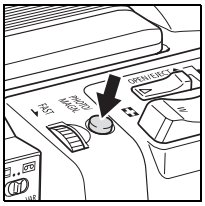
Recording Still Images on a Memory Card

You can record still images directly on the memory card. You can also record still images on the memory card simultaneously while recording video on the tape and capture still images while playing back a tape.

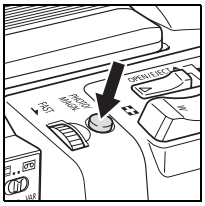


VCR/PLAY | M | A | Tv | Av

1. **Turn the POWER dial to a recording program and set the / (card/tape) switch to .**
2. **Press the PHOTO button halfway.**
   - turns green once the focus is adjusted and exposure is locked. 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 focus ring to adjust the focus.
   - When you press the PHOTO button on the wireless controller, the still image is recorded immediately.



3. **Press the PHOTO button fully.**
   - disappears.
   - The CARD access indicator flashes and the card access display appears.



❍ When you are using an SDHC or SD memory card, make sure that the protect switch is set to allow recording. If you attempt to record a still image on a write-protected memory card the message “THE CARD IS SET FOR ERASURE PREVENTION” will be displayed.

❍ Observe the following precautions while the card access display (▶) appears on the screen or the CARD access indicator is on or flashing. Failing to do so may result in permanent data loss.
- Do not remove the memory card.
- Do not change the position of the / (card/tape) switch or the POWER dial.
- Do not turn off the camcorder, remove the battery pack or disconnect the power supply.

❍ **If [CAMERA SETUP] ▶ [FOCUS PRI.] is set to [ON]:**
When you press the PHOTO button fully, before ● turns green, it may take up to 2 seconds (4 seconds in Night mode) 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 focus ring.

❍ **If [CAMERA SETUP] ▶ [FOCUS PRI.] is set to [OFF]:**
In step 2, ● turns green and the 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. You can turn off the power save function with the [SYSTEM SETUP] ▶ [POWER SAVE] setting (📖 128). To resume recording if the camcorder shut off automatically because of the power save function, turn the POWER dial to OFF and then back to a recording mode.

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

With the custom function [PHOTO BUTTON] (📖 95) you can select to activate the simultaneous recording of a still image while recording movies on the tape. If you select [PHOTO + CP DATA] you can also save the custom preset settings currently in use embedded within the still image. This is very useful when you want to read the custom preset file later by selecting the still image taken at a specific scene.

1. **Activate the simultaneous recording of still images with the custom function [PHOTO BUTTON] (📖 95).**
2. **Press the PHOTO button.**

OFF appears if you press the PHOTO button when the custom function [PHOTO BUTTON] is set to [OFF].

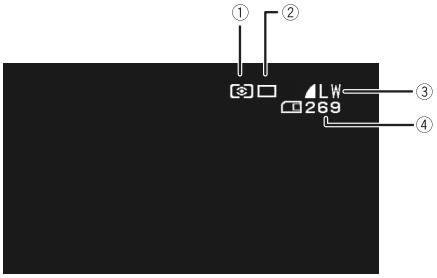
Capturing a Still Image from a Tape

With the custom function [PHOTO BUTTON] (📖 95) you can select to activate the capturing of a still image during playback pause.

1. **Activate the capturing of still images with the custom function [PHOTO BUTTON] (📖 95).**
2. **In playback pause, press the PHOTO button to record the frame as a still image on the memory card.**

Still images cannot be captured from a tape when [SIGNAL SETUP] ▶ [LETTERBOX] is set to [ON].

Screen Displays during Still Image Recording



① Metering Mode Icon (📖 116)

Indicates the metering mode currently selected for recording still images.

② Drive Mode Icon (📖 115)

Indicates the drive mode currently selected for recording still images.

③ Image Quality and Size

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

④ Remaining Number of Still Images that can be Recorded on the Memory Card

- 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.

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.

VCR/ PLAY | M | A | Tv | Av

MENU (📖 25) → CAMERA SETUP → REVIEW ·····2sec

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

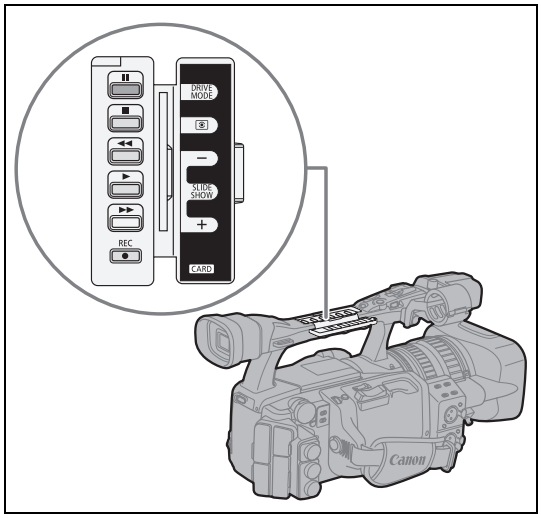
- ❍ Regardless of the [REVIEW] setting, a still image is displayed as long as you hold the PHOTO button after recording.
- ❍ The still image operations menu appears when you press the SELECT/SET dial while you are reviewing a still image or right after recording one. In this menu, you can protect (📖 121) or erase (📖 120) the image.
- ❍ The [REVIEW] setting is only available when the drive mode is set to □ (single).

Drive Mode

Drive mode	Use
Continuous Shooting	Captures a quick series of still images while you hold the PHOTO button pressed down. For the number of shots per second, refer to the table below.
High-Speed Continuous	
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.

Changing the Drive Mode

1. **Set the POWER dial to a recording program other than ▭ and move the 🎞/📼 (card/tape) switch to 🎞.**
2. **Press the DRIVE MODE button to switch between the drive modes.**
   Pressing the button will cycle through the drive modes. The icon of the selected drive mode will appear on the screen.



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:

Shots per second		Maximum number of continuous shots
Normal speed	High speed	
2.5 images	4.1 images	60 images

- These figures are approximate and vary depending on the recording conditions and subject.
- Sufficient space on the memory card is required. Continuous shooting will stop when the card is full.

Auto Exposure Bracketing

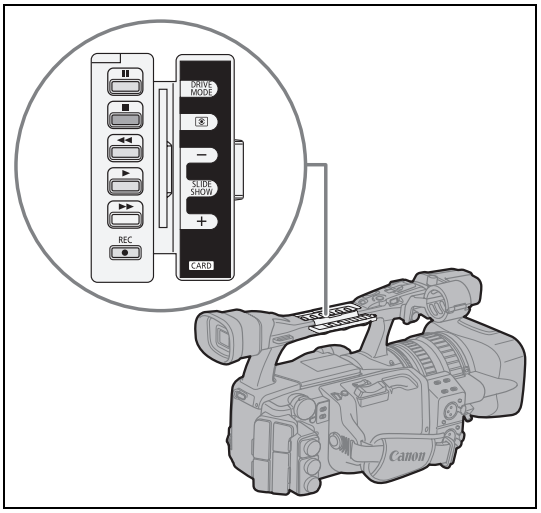
Press the PHOTO button.

Three still images in different exposures are recorded on the memory card. Make sure that there is sufficient space on the memory card.

Metering Mode

Metering mode	Use
Evaluative	Appropriate for standard shooting conditions, including backlit scenes. The camcorder divides images into several metering zones. It evaluates the position and brightness of the subject, background, direct light or backlight, and adjusts the exposure of the main subject accordingly.
Center-weighted average	Averages the light metered from the entire screen, giving more weight to the subject in the center.
Spot AE	Meters the area within the Spot AE frame.

1. **Set the POWER dial to M, A, Tv or Av, and set the / (card/tape) switch to .**
2. **Press the button.**
   - Pressing the button will cycle through the metering modes. The icon of the selected metering mode will appear on the screen.
   - If you selected Spot AE, the Spot AE 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/430EX II/550EX/580EX/580EX II models, to record natural still images under low light conditions. Refer also to the instruction manual of the Speedlite flash.

The following procedures are explained using a Canon 580EX II 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 removing the flash.

1. Slip the flash's mounting foot all the way into the camcorder's hot shoe.

2. Slide the lock lever on the mounting foot to the right until it clicks in place.

To remove the flash:

Press and hold the lock-release button and slide the lock lever to the left and then remove the flash form the hot shoe.

Using the Flash

1. Set the POWER dial to a recording mode other than M and turn on the flash.

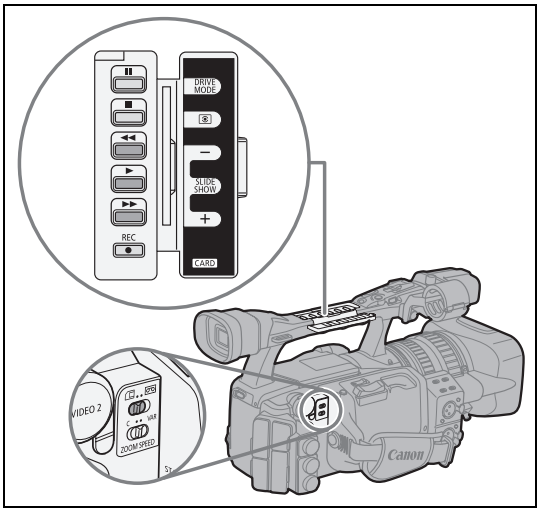
- While the Speedlite flash is charging, the ⚡ indicator will flash in white. Once charged, the ⚡ indicator will stay on in green.
- If the ⚡ indicator keeps flashing in white for a long time, replace the flash's batteries.

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 and in the **M** Manual mode.
- ❍ 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/430EX II/550EX/580EX/580EX II 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/430EX II/550EX/580EX/580EX II 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 up (only when recording using autofocus and with [CAMERA SETUP] ▶ [FOCUS PRI.] set to [ON]).
- ❍ The Speedlite flash will not go off when the drive mode is set to Auto Exposure Bracketing.

Playing Back Still Images from a Memory Card

1. **Turn the POWER dial to VCR/PLAY and set the /(card/tape) switch to .**
2. **Press the CARD + or – button to move between images.**
   Pressing the CARD + button displays the next image and the CARD - button displays the previous image.



- ❍ Still images not recorded with this camcorder, uploaded from a computer, edited on a computer and still images whose file names have been changed, may not be played back correctly.
- ❍ Observe the following precautions while the card access display (▶) appears on the screen or the CARD access indicator is on or flashing. Failing to do so may result in permanent data loss.
  - Do not remove the memory card.
  - Do not change the position of the /(card/tape) switch or the POWER dial.
  - Do not turn off the camcorder, remove the battery pack or disconnect the power supply.

Slideshow

Press the SLIDESHOW button.

- Still 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 still images appear.
2. **Turn the SELECT/SET dial to select an image.**
   - Move to the still image you wish to view.
   - You can switch between index pages by pressing the CARD + or – button.
3. **Move the zoom lever toward T or press the dial.**
   The selected still image is displayed.

Image Jump Function

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

Press and hold the CARD + or – button.

When you release the button, the still image corresponding to the number that appears on the screen is displayed.

Displaying the Recording Data

You can select whether to display all the recording data stored when the still image was recorded (histogram, Exif camera information, etc.).

Repeatedly press the DISP. button to display the recording data.

Erasing Still images

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

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

Protected still images (🕮 121) cannot be erased.

Erasing a Single Still Image

1. **Select the still image you wish to erase.**
2. **Press the SELECT/SET dial to open the still image operations menu.**
   In CAMERA·CARD mode, the menu appears when you press the dial while you are reviewing a still image, or immediately after recording a still image.
3. **Select [IMAGE ERASE].**
4. **Select [ERASE].**
   The image is erased and the previous image appears.
5. **Select [CLOSE] to close the menu.**

Erasing All Images

MENU (🕮 25)

1. **Open the menu and select [CARD OPERATIONS].**
2. **Select [ERASE ALL IMAGES].**
3. **Select [YES] and close the menu.**
   All still images except the protected ones are erased.

Protecting Still images

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

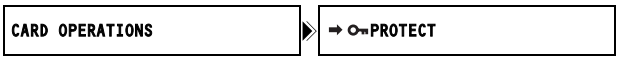
If a memory card is initialized, all still images, even protected ones, will be erased permanently.

Protecting a Single Still Image

1. **Select the still image you wish to protect.**
2. **Press the SELECT/SET dial to open the still image operations menu.**
   In CAMERA·CARD mode, the menu appears when you press the dial while you are reviewing a still image, or immediately after recording a still image.
3. **Select [PROTECT].**
4. **Select [ON].**
   To remove the protection select [OFF] instead.
5. **Select [↵CLOSE] to close the menu.**
   appears and now the image cannot be erased.

Protecting Still Images from the Index Screen

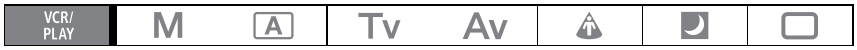
MENU (📖 25)



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

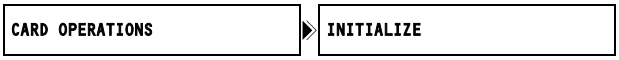
Initializing a Memory Card

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. The regular initialization option [INITIALIZE] will clear the file allocation table but will not physically erase the stored data. If you need to completely erase all the data, select instead the complete initialization option [COMPL.INIT.].

- ❍ Initializing a memory card erases all data, including protected still images and custom preset files.
- ❍ Still images and custom preset files erased as a result of initializing the card cannot be recovered.
- ❍ We recommend using the [COMPL.INIT.] option when you feel that the time it takes to record an image on or read an image from the memory card has become too long.
- ❍ Depending on the memory card, the complete initialization may take up to a few minutes.
- ❍ If you use a memory card other than the supplied one, initialize it with the camcorder.

MENU (📖 25)



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

2. Select [INITIALIZE] and select the initialization method.

3. [INITIALIZE]: Select [YES].
[COMPL.INIT.]: Select [YES] and, in the confirmation screen, select [YES] again.

- The card initialization starts.
- The complete initialization can be canceled while still in progress by pressing the SELECT/SET dial. All the image files will be erased and the memory card can be used without any problem.

Print Order Settings

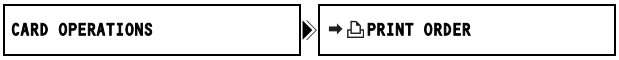
You can select still images for printing and set the number of copies. These print order settings are compatible with the Digital Print Order Format (DPOF) standards and can be used for printing on DPOF-compatible printers. A maximum of 998 still images can be selected.

Selecting Still Images for Printing (Print Order)

1. **Select the still image you wish to print.**
2. **Press the SELECT/SET dial to open the still image operations menu.**
3. **Select [PRINT ORDER].**
4. **Select the number of copies.**
   To cancel the print order, set the number of copies to 0.
5. **Select [↵CLOSE] to close the menu.**

Setting Print Orders from the Index Screen

MENU (📖 25)



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

Erasing All Print Orders

MENU (📖 25)

1. **Open the menu and select [CARD OPERATIONS].**
2. **Select [ERASE ALL PRINT ORD] and select [YES].**
   All disappear.
3. **Close the menu.**

Menu Options and Default Settings

In the following tables, default settings are shown in boldface and the availability of menu settings in different operating modes is indicated with the following icons:

CAMERA: CAMERA MENU (POWER dial set to one of the recording modes, 🎞/📼 switch set to 📼)

VCR/PLAY: VCR/PLAY MENU (POWER dial set to VCR/PLAY, 🎞/📼 switch set to 📼)

CAMERA·CARD: CARD CAMERA MENU (POWER dial set to one of the recording modes, 🎞/📼 switch set to 🎞)

VCR/PLAY·CARD: CARD PLAY MENU (POWER dial set to VCR/PLAY, 🎞/📼 switch set to 🎞)

■ SIGNAL SETUP

Menu item	(Submenu item and) Setting options		CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	📖
TIME CODE	COUNT-UP	**REC-RUN**, REC-RUN PS., FREE-RUN	●	●	–	–	43
	START VALUE	**00:00:00:00** (SET, RESET)	●	●	–	–	43
	HDV/DV IN	**REGEN.**, COPY	–	●	–	–	84
GENLCK ADJST[1]	**0000** (-1023 to 1023)		●	–	●	–	44
SIGNAL STD	**HD**, SD16:9, SD4:3		●	–	–	–	32
FRAME RATE	**50i**, 25F		●	–	–	–	42
PLAYBACK STD	**AUTO**, HDV, DV		–	●	–	–	105
COMP.OUT	576i, **1080i/576i**		●	●	●	●	78
SDI OUTPUT[1]	ON(OSD), ON, **OFF**		●	●	●	●	77
SDI SPEC.[1]	**AUTO**, SD LOCKED		●	●	●	●	77
AV ➡ DV	ON, **OFF**		–	●	–	–	85
HD DOWN-CONV	ON, **OFF**		–	●	–	–	79
LETTERBOX	ON, **OFF**		–	●	–	–	77

[1] XHG1S only.

[HD DOWN-CONV]: 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 50i, regardless of the frame rate of the original recording.

❍Even if the audio was originally recorded using all 4 channels (with another camcorder), only channels 1 and 2 will be output.

■ CAMERA SETUP

Menu item	(Submenu item and) Setting options		CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	📖
AE SHIFT	-2.0, -1.5, -1.25, -1.0, -0.75, -0.5, -0.25, **±0**, +0.25, +0.5, +0.75, +1.0, +1.25, +1.5, +2.0		●	–	●	–	60
AGC LIMIT	**OFF(18dB)**, 15dB, 12dB, 9dB, 6dB, 3dB		●	–	●	–	61
GAIN SETTING	GAIN L	-3dB, **±0dB**, 3dB, 6dB, 12dB, 18dB, 36dB, TUNE (0.0dB to 18.0dB)	●	–	●[1]	–	61
	GAIN M	-3dB, ±0dB, 3dB, **6dB**, 12dB, 18dB, 36dB, TUNE (0.0dB to 18.0dB)					
	GAIN H	-3dB, ±0dB, 3dB, 6dB, **12dB**, 18dB, 36dB, TUNE (0.0dB to 18.0dB)					
AF MODE	**INSTANT AF**, NORMAL AF		●	–	●	–	36
IMG STAB	**ON** ((✋)), OFF		●	–	●	–	52
SKIN DETAIL	EFFECT LEVEL	**OFF**, LOW, MIDDLE, HIGH	●	–	●	–	68
	HUE	**0** (-6 to 6)					
	CHROMA	**0** (-6 to 6)					
	AREA	**0** (-6 to 6)					
	Y LEVEL	**0** (-6 to 6)					
SELECTIVE NR	EFFECT LEVEL	**OFF**, LOW S-NR, MIDDLE S-NR, HIGH S-NR	●	–	●	–	69
	HUE	**0** (-6 to 6)					
	CHROMA	**0** (-6 to 6)					
	AREA	**0** (-6 to 6)					
	Y LEVEL	**0** (-6 to 6)					
COLOR CORR.	CORRECT	**OFF**, A, B, A&B	●	–	●	–	66
	A AREA SEL., B AREA SEL.	COLOR PHASE: **0** (0 to 15)					
		CHROMA: **0** (-6 to 6)					
		AREA: **3** (1 to 4)					
		Y LEVEL: **0** (-6 to 6)					
	A AREA REV., B AREA REV.	R GAIN: **0** (-6 to 6)					
		B GAIN: **0** (-6 to 6)					
F SPEED PSET	**4** (4 to 1)		●	–	●	–	39
CLEAR SCAN	**50.2Hz** (50.2Hz to 200.3Hz)		●	–	–	–	70
FOCUS PRI.	**ON**, OFF		–	–	●	–	112
REVIEW	OFF, **2sec**, 4sec, 6sec, 8sec, 10sec		–	–	●	–	114
FOCUS LIMIT	ON FLMT, **OFF**		●	–	●	–	40

[1] In CAMERA·CARD mode, [36dB] is not available.

■ RECORDING SETUP

Menu item	Setting options	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	🕮
DV REC MODE	**SP**, LP	●[1]	●	–	–	102
UB REC[2]	**INT.USR-BIT**, EXT.USR-BIT	●	–	–	–	46
UB SELECT	**00 00 00 00**, TIME, DATE	●	●	–	–	46
IMG QUALITY	SUPER FINE, **FINE**, NORMAL	●	●	●	–	110
IMAGE SIZE	[SIGNAL STD.] is set to [HD] or [SD16:9]: **LW 1920x1080**, **SW** 848X480 [SIGNAL STD.] is set to [SD4:3]: **L 1440x1080**, **S** 640X480	●	–	–	–	110
	LW 1920x1080, **SW** 848X480, **L** 1440x1080, **S** 640X480	–	–	●	–	
HD IMG SIZE	**LW 1920x1080**, **SW** 848X480	–	●	–	–	113
FILE NOS.	RESET, **CONTINUOUS**	●	●	●	–	111

[1] Available only when recording in standard definition (SD).
[2] XHG1S only.

[DV REC MODE]: 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.

- ❍Depending on the tape and its usage condition, picture and sound recorded in LP mode may be distorted. We recommend using 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 on this camcorder, a tape that was recorded in LP mode with another digital device or vice versa, the picture and sound may become distorted.

■ AUDIO SETUP

Menu item	Setting options	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	🕮
AUD.M.SET	**CH 1/2**, CH 3/4, MIX/FIXED, MIX/VAR.	–	●	–	–	50
MIX BALANCE	1/2 ⊢——■——⊣ 3/4	–	●	–	–	81
DV AUDIO	**16bit**, 12bit	●[1]	●	–	–	47
MONITOR SEL.	**NORMAL**, LINE OUT	●	–	–	–	81
OUTPUT LEVEL	**1Vrms**, 2Vrms	●	●	●	–	81
OUTPUT CH	**CH1/CH2**, CH1/CH1, CH2/CH2, ALL CH/ALL CH	●	–	●	–	81
	CH1 3/CH2 4, CH1 3/CH1 3, CH2 4/CH2 4, ALL CH/ALL CH	–	●	–	–	
CH1 INPUT	**INT/EXT MIC**, XLR MIC, XLR LINE	●	–	●	–	48
CH2 INPUT		●	–	●	–	48
XLR REC CH	**CH1**, CH1/CH2	●	–	●	–	49
LOW CUT	**OFF**, LC1, LC2	●	–	●	–	47
MIC SENSIT.	**NORMAL**, HIGH	●	–	●	–	47
XLR 1 TRIM	+12dB, +6dB, **0dB**, -6dB, -12dB	●	–	●	–	49
XLR 2 TRIM						
XLR ALC LINK	LINK, **SEP**	●	–	●	–	49
AUD.LIMITER	ON, **OFF**	●	–	●	–	49

[1] Available only when recording in standard definition (SD).

[OUTPUT LEVEL]: Select the amplitude of the audio output signal.

■ CARD OPERATIONS

Menu item	Setting options	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	📖
ERASE ALL 🖶 PRINT ORD	NO, YES	–	–	–	●	123
ERASE ALL IMAGES	NO, YES	–	–	–	●	120
INITIALIZE	CANCEL, INITIALIZE, COMPL.INIT.	–	–	–	●	122
After opening the menu from the index screen:						
➡ 🔑 PROTECT	–	–	–	–	●	121
➡ 🖶 PRINT ORDER	–	–	–	–	●	123
After pressing the SELECT/SET dial:						
IMAGE ERASE	CANCEL, ERASE	–	–	●[1]	●	120
PROTECT	OFF, ON	–	–	●[1]	●	121
PRINT ORDER	0 COPIES	–	–	–	●	123
SLIDESHOW	CANCEL, START	–	–	–	●	118

[1] Available only when you press the SELECT/SET dial within the time set for the [CAMERA SETUP] ▶ [REVIEW] setting (or immediately after recording if it is set to [OFF]).

■ DISPLAY SETUP/💬

Menu item	(Submenu item and)	Setting options	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	📖
CVF SETUP	BRIGHTNESS	**0** (-23 to 22)	●	●	●	●	18
	CONTRAST	**0** (-23 to 22)					
	COLOR[1]	**0** (-3 to 3)					
	SHARPNESS[1]	**2** (1 to 4)					
	BACKLIGHT	BRIGHT, **NORMAL**					
LCD SETUP	BRIGHTNESS	**0** (-23 to 22)	●	●	●	●	18
	CONTRAST	**0** (-23 to 22)					
	COLOR	**0** (-3 to 3)					
	SHARPNESS	**2** (1 to 4)					
	BACKLIGHT	**BRIGHT**, NORMAL					
CVF+LCD BW[1]	ON, **OFF**		●	●	●	●	19
CVF+LCD ON	ON, **OFF**		●	●	●	●	19
PEAKING SETUP[1]	PEAKING1	GAIN: **8** (OFF to 15)	●	–	●	–	38
		FREQUENCY: **2** (1 to 4)					
	PEAKING2	GAIN: **15** (OFF to 15)					
		FREQUENCY: **1** (1 to 4)					
LANGUAGE 💬	DEUTSCH, **ENGLISH**, ESPAÑOL, FRANÇAIS, ITALIANO, POLSKI, РУССКИЙ, 简体中文, 日本語		●	●	●	●	26
MARKERS	**OFF**, LEVEL MARK., CENT.MARK., GRID MARKER		●	–	●	–	–
ASPECT GUIDE	**OFF**, 4:3, 13:9, 14:9, 1.66:1, 1.75:1, 1.85:1, 2.35:1		●	–	–	–	–
SAFETY ZONE	**OFF**, 80%, 90%		●	–	–	–	–
ZEBRA	ON, **OFF**		●	–	●	–	65
ZEBRA LEVEL	70, 75, 80, **85**, 90, 95, 100		●	–	●	–	65
TV SCREEN[2]	**ON**, OFF		●	●	●	●	72
AUDIO LEVEL	**ON**, OFF		●	●	–	–	49
GUIDE INFO	**OFF**, CUSTOM KEYS, D/T DISPLAY		●	–	●	–	31
CUSTOM KEY	ON, **OFF**		–	●	–	●	71
DATA CODE	DATE, TIME, **DATE & TIME**, CAMERA DATA, CAM.& D/T		–	●	–	–	108
6SEC.DATE	ON, **OFF**		–	●	–	–	108
UB DISPLAY	ON, **OFF**		●	●	–	–	46

[1] This setting affects also the signal output from the VIEWFINDER COMPONENT OUT terminal.

[2] In playback modes the default setting is [OFF].

[MARKERS]: You can display the on-screen markers to help you accurately frame your subject. Select from a center marker, a horizontal level marker or a grid. You can also adjust the intensity of the markers display (📖 100).

[ASPECT GUIDE]: Use the aspect ratio guides as a reference 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).

[SAFETY ZONE]: The safety zone guide shows a frame including 80% or 90% of the screen area. Use it as a reference to accurately frame subjects.

■ SYSTEM SETUP/ ⊛

Menu item	(Submenu item and) Setting options	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	📖
CUSTOM KEY 1	**TIME CODE**, INDEX WRITE, ZEBRA, VCR STOP, TV SCREEN, TC HOLD, AUDIO LEVEL, CVF+LCD BW, MAGN.B.LOCK, SHTR D.LOCK, E.LCK B.LCK, SDI OUTPUT[1], FOCUS LIMIT, IMAGE STAB, OUTPUT CH, (NONE)	●	–	–	–	71
	TIME CODE, **TV SCREEN**, DATA CODE, AUDIO LEVEL, TC HOLD, CVF+LCD BW, SDI OUTPUT[1], OUTPUT CH, (NONE)	–	●	–	–	71
	ZEBRA, TV SCREEN, CVF+LCD BW, MAGN.B.LOCK, SHTR D.LOCK, E.LCK B.LCK, SDI OUTPUT[1], FOCUS LIMIT, IMAGE STAB, OUTPUT CH, (NONE)	–	–	●	–	71
	TV SCREEN, CVF+LCD BW, SDI OUTPUT[1], (NONE)	–	–	–	●	71
CUSTOM KEY 2	TIME CODE, **INDEX WRITE**, ZEBRA, VCR STOP, TV SCREEN, TC HOLD, AUDIO LEVEL, CVF+LCD BW, MAGN.B.LOCK, SHTR D.LOCK, E.LCK B.LCK, CP BKWD KEY, SDI OUTPUT[1], FOCUS LIMIT, IMAGE STAB, OUTPUT CH, (NONE)	●	–	–	–	71
	TIME CODE, TV SCREEN, **DATA CODE**, AUDIO LEVEL, TC HOLD, CVF+LCD BW, SDI OUTPUT[1], OUTPUT CH, (NONE)	–	●	–	–	71
	ZEBRA, **TV SCREEN**, CVF+LCD BW, MAGN.B.LOCK, SHTR D.LOCK, E.LCK B.LCK, CP BKWD KEY, SDI OUTPUT[1], FOCUS LIMIT, IMAGE STAB, OUTPUT CH, (NONE)	–	–	●	–	71
	TV SCREEN, **CVF+LCD BW**, SDI OUTPUT[1], (NONE)	–	–	–	●	71
WL.REMOTE	**1**, 2, OFF	●	●	●	●	109
POWER SAVE	**ON**, OFF	●	–	●	–	29

[1] XHG1S only.

■ SYSTEM SETUP/ ⊛ (cont.)

Menu item	(Submenu item and)	Setting options	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	🕮
D/TIME SET ⊛	T.ZONE/DST	**PARIS** (list of world time zones)	●	●	●	●	26
	DATE/TIME	–					
	DATE FORMAT	YMD (2008.1.1 AM12:00), MDY (JAN.1.2008 12:00AM) **DMY (1.JAN.2008 12:00AM)**					
BEEP	HIGH VOLUME, LOW VOLUME, **OFF**		●	●	●	●	–
DV CONTROL	ON DV⇨, **OFF**		●	–	–	–	83
MAGN.B.LOCK	**DISABLED**, ACTIVE		●	–	●	–	38
SHTR D.LOCK	**DISABLED**, ACTIVE		●	–	●	–	58
E.LCK B.LCK	**DISABLED**, ACTIVE		●	–	●	–	60
ALL DISPLAY	**ENABLE**, DISABLE		●	–	●	–	31
RESET ALL	NO, YES		●	●	●	●	143
CAM.F.VER.	Current version of the camcorder's firmware.		–	–	–	●	–

■ CUSTOMIZE

Menu item	Submenu item	CAMERA	VCR/PLAY	CAMERA·CARD	VCR/PLAY·CARD	🕮
CUSTOM PRESET	EDIT	●	–	●	–	87
	CAMERA ➡ CARD					
	CARD ➡ CAMERA					
	⬅ RETURN					
META DATA CP	CARD ➡ CAMERA	–	–	–	●	87
	⬅ RETURN					
CUSTOM FUNCTION[1]	C.Fn1	●	●	●	●	95
	C.Fn2					
	C.Fn3					
	⬅ RETURN					
CUSTOM DISPLAY	Refer to the table on page 132.	●	–	●	–	101

[1] In VCR/PLAY mode, this will appear on the main menu and not under the [CUSTOMIZE] menu.

■ Custom Preset Submenu (CUSTOMIZE ▶ CUSTOM PRESET)

Submenu item	Action	(Parameter and) Setting Options	
EDIT	SELECT CP	**1 PRESET_A**, 2 PRESET_B, 3 PRESET_C, 4 PRESET_D, 5 PRESET_E, 6 PRESET_F, 7 VIDEO.C, 8 CINE.V, 9 CINE.F	
	TUNE	[GAM] GAMMA*	**NORMAL**, CINE1, CINE2
		[KNE] KNEE	**AUTO**, LOW, MIDDLE, HIGH
		[BLK] BLACK	STRETCH, **MIDDLE**, PRESS
		[PED] MASTER PED.*	**0** (-9 to 9)
		[SET] SETUP LEVEL*	**0** (-9 to 9)
		[SHP] SHARPNESS	**0** (-9 to 9)
		[HDF] H DTL FREQ	LOW, **MIDDLE**, HIGH
		[DHV] DTL HV BAL	**0** (-9 to 9)
		[COR] CORING	**0** (-9 to 9)
		[NR1] NR1*	**OFF**, LOW, MIDDLE, HIGH
		[NR2] NR2*	**OFF**, LOW, MIDDLE, HIGH
		[CMX] COLOR MAT.*	**NORMAL**, CINE1, CINE2
		[CGN] COLOR GAIN	**0** (-50 to 50)
		[CPH] COLOR PHASE	**0** (-9 to 9)
		[RGN] R GAIN	**0** (-50 to 50)
		[GGN] G GAIN	**0** (-50 to 50)
		[BGN] B GAIN	**0** (-50 to 50)
		[RGM] RG MATRIX	**0** (-50 to 50)
		[RBM] RB MATRIX	**0** (-50 to 50)
		[GRM] GR MATRIX	**0** (-50 to 50)
		[GBM] GB MATRIX	**0** (-50 to 50)
		[BRM] BR MATRIX	**0** (-50 to 50)
		[BGM] BG MATRIX	**0** (-50 to 50)
	RENAME	–	
	PROTECT	–	
	RESET	CANCEL, EXECUTE	
CAMERA ➡ CARD	SELECT CP	**1 PRESET_A**, 2 PRESET_B, 3 PRESET_C, 4 PRESET_D, 5 PRESET_E, 6 PRESET_F, 7 VIDEO.C, 8 CINE.V, 9 CINE.F	
	SAVE POSITION	–	
	EXECUTE	CANCEL, EXECUTE	
CARD ➡ CAMERA	IMPORT	–	
	SELECT POSITION	**1 PRESET_A**, 2 PRESET_B, 3 PRESET_C, 4 PRESET_D, 5 PRESET_E, 6 PRESET_F, 7 VIDEO.C, 8 CINE.V, 9 CINE.F	
	EXECUTE	CANCEL, EXECUTE	

* Available only when recording movies.

■ Custom Function Submenu (CUSTOMIZE ▶ CUSTOM FUNCTION)

Submenu item	Action	(Custom Function and) Setting Options	
C.Fn1, C.Fn2, C.Fn3	APPLY THIS SET	DISABLED, ACTIVE	
	TUNE	00 SHCKLSS WB/GN	**00** (00 to 03)
		01 AE RESPONSE	**00 MIDDLE**, 01 HIGH, 02 LOW
		02 ZOOM RING CTRL	**00 NORMAL**, 01 SLOW, 02 FAST
		03 ZOOM SPEED	**00 NORMAL**, 01 SLOW, 02 FAST
		04 FOCUS RING CTRL	**00 NORMAL**, 01 SLOW, 02 FAST
		05 BUTTONS OPER.1	**00** (00 to 07)
		06 BUTTONS OPER.2	**00** (00 to 03)
		07 RINGS DIRECTION	**00** (00 to 07)
		08 OPER.DIRECTION	**00** (00 to 03)
		09 IRIS LIMIT	**00 OFF**, 01 ON
		10 PHOTO BUTTON	**00 PHOTO + CP DATA**, 01 PHOTO, 02 MAGNIFYING, 03 OFF
		11 MARKER LEVEL	**00** (00 to 07)
		12 F.AST BW-MOD	**00** (00 to 03)
		13 OBJ DST UNIT	**00 m(meter)**, 01 ft(feet)
		14 ZOOM INDICATOR	**00 BAR**, 01 NUMBER
		15 COLOR BARS	**00 TYPE 1**, 01 TYPE 2
		16 1kHz TONE	**00 OFF**, 01 –12dB, 02 –18dB, 03 –20dB
		17 LANC AE SHIFT	**00 AE SHIFT**, 01 IRIS
		18 TALLY LAMP	**00 ON**, 01 BLINK, 02 OFF
		19 LED	**00 TYPE 1**, 01 TYPE 2, 02 OFF
		20 CUSTOM REC	**00** (00 to 03)
	SAVE TO CARD	CANCEL, OK	
	READ FROM CARD	CANCEL, OK	
	RESET	CANCEL, OK	

■ Custom Displays

Menu item	Action	(Custom Display and) Setting Options	
CUSTOM DISPLAY	TUNE	00 REC PROGRAMS	00 OFF, **01 ON**
		01 CAMERA DATA1	**03** (00 to 03)
		02 CAMERA DATA2	**07** (00 to 07)
		03 ZOOM	00 OFF, **01 ON(NORMAL)**, 02 ON(ALWAYS)
		04 FOCUS	00 OFF, **01 ON(NORMAL)**, 02 ON(ALWAYS)
		05 ND	00 OFF, **01 ON**
		06 IMAGE EFFECTS	**07** (00 to 07)
		07 F.ASSIST FUNC.	**03** (00 to 03)
		08 CUSTOMIZE	**03** (00 to 03)
		09 RECORDING STD	00 OFF, **01 ON**
		10 DV REC MODE	**00 OFF**, 01 ON
		11 FRAME RATE	00 OFF, **01 ON**
		12 TAPE	**03** (00 to 07)
		13 TAPE REMAINDER	00 OFF, 01 NORMAL, **02 WARNING**
		14 TAPE/CARD	**00** (00 to 07)
		15 LIGHT METERING	**03** (00 to 03)
		16 CARD	**03** (00 to 03)
		17 CARD REMAINDER	00 OFF, 01 NORMAL, **02 WARNING**
		18 AUDIO	**00** (00 to 07)
		19 WARNING/STATUS	XHG1s **07** (00 to 07) XHA1s **03** (00 to 03)
		20 BATTERY	00 OFF, 01 NORMAL, **02 WARNING**
		21 WIRELESS REMOTE	00 OFF, 01 NORMAL, **02 WARNING**
	SAVE TO CARD	CANCEL, OK	
	READ FROM CARD	CANCEL, OK	
	RESET	CANCEL, OK	

Settings Memorized and Retained

The following lists show the settings that are memorized and retained under different circumstances like turning off the camcorder or changing operating modes. If the built-in lithium button battery discharges completely, all settings will be erased.

CAMERA / CAMERA·CARD Modes	Power Off	Changing between HD and SD*
Shutter speed setting in **Tv** mode	●	
Aperture setting in **Av** mode	●	
Aperture, shutter speed setting in **M** Manual mode	●	
Custom white balance	●	
Exposure lock	Returns to off	●
Aperture, shutter speed setting during exposure lock	Reset	●
CAMERA , CAMERA·CARD MENU settings	●	
TV SCREEN on/off	●	
On-screen display settings	●	
Gain fine tuning	●	
Gain limit	●	
Iris limit	●	

CAMERA / CAMERA·CARD Modes	Changing from Easy Recording to other programmed AE mode	Changing the programmed AE mode to Easy Recording	Changing the frame rate*
Shutter speed setting in **Tv** mode	●		
Aperture setting in **Av** mode	●		
Aperture, shutter speed setting in **M** Manual mode	●		
Custom white balance	●	Reset	●
Exposure lock	Returns to off		
Aperture, shutter speed setting during exposure lock	Reset		
CAMERA , CAMERA·CARD MENU settings	●		
TV SCREEN on/off	●		
On-screen display settings	●		
Gain fine tuning	●		
Gain limit	●		
Iris limit	●		

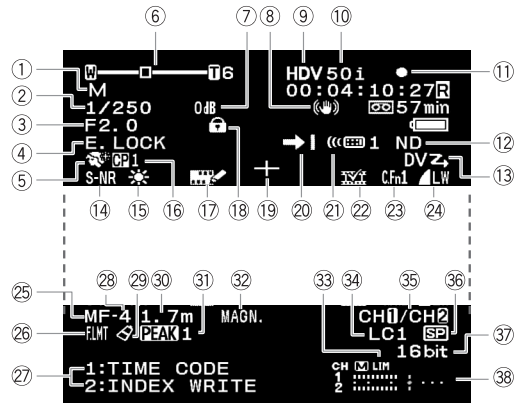
* CAMERA mode only.

Screen Displays

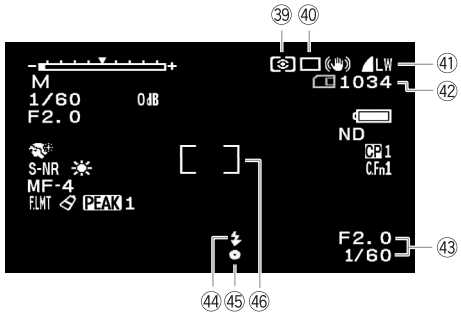
Screen Displays during Recording

You can find additional explanations on pages 30 and 114. Most of the on-screen displays and icons can be customized using the custom displays (📖 101).

CAMERA



CAMERA·CARD

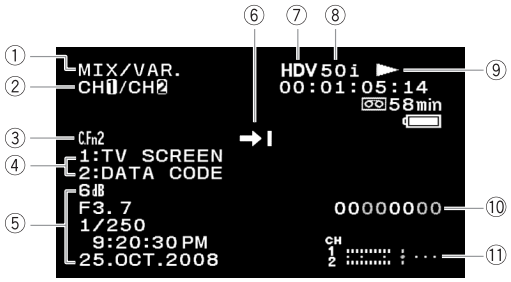


① Programmed AE (📖 53)
② Shutter speed* (📖 56, 58)
③ Aperture* (📖 56, 59)
④ Exposure lock (📖 60)/ AE shift (📖 60)
⑤ Skin detail (📖 68)
⑥ Zoom position/Zoom speed (📖 34)/ Exposure level (📖 60)
⑦ Gain (📖 61)
⑧ Image stabilizer (📖 52)
⑨ Recording standard (📖 32)
⑩ Frame rate (📖 42)
⑪ Tape operation
● Recording ■ Stop
●❚❚ Record pause ⏏ Eject
⑫ ND filter (📖 41)
⑬ DV control (📖 83)
⑭ Selective noise reduction (📖 69)
⑮ White balance (📖 63)
⑯ Custom preset file (📖 87)
⑰ Superimposed character recording (📖 100)
⑱ Button/dial used is locked
⑲ Center marker (📖 128)
⑳ End search (📖 33)
㉑ Remote sensor mode (📖 109)
㉒ Index write (📖 72)
㉓ Custom function (📖 95)
㉔ Still image size/quality (simultaneous recording) (📖 110)
㉕ Manual focus (📖 37)
㉖ Focus limit (📖 40)
㉗ Custom keys (📖 71)/ Date and time (📖 26)
㉘ Focus preset speed (📖 39)
㉙ Color correction (📖 66)
㉚ Focusing distance (📖 37)
㉛ Peaking (📖 38)
㉜ Magnifying (📖 38)
㉝ Audio peak limiter (📖 49)
㉞ Low cut filter (📖 103)
㉟ Audio output (📖 81)
㊱ (SD) Recording mode (📖 126)
㊲ (SD) Audio mode (📖 47)
㊳ Audio level indicator (📖 49)
㊴ Metering mode (📖 116)
㊵ Drive mode (📖 115)
㊶ Still image size/quality (📖 110)
㊷ Available still images on the card (📖 110)
㊸ Aperture value and shutter speed
㊹ Flash (📖 117)
㊺ Focus and exposure lock (📖 112)
㊻ Spot AE frame (📖 116)

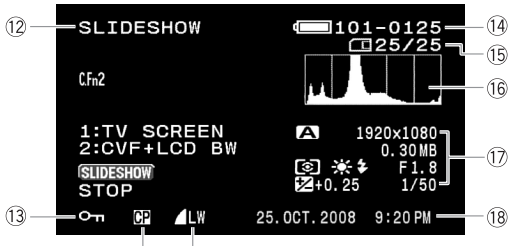
* In **M** Manual mode.

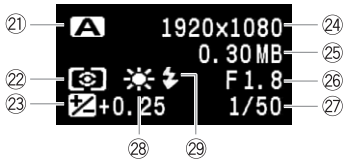
Screen Displays during Playback

VCR/PLAY

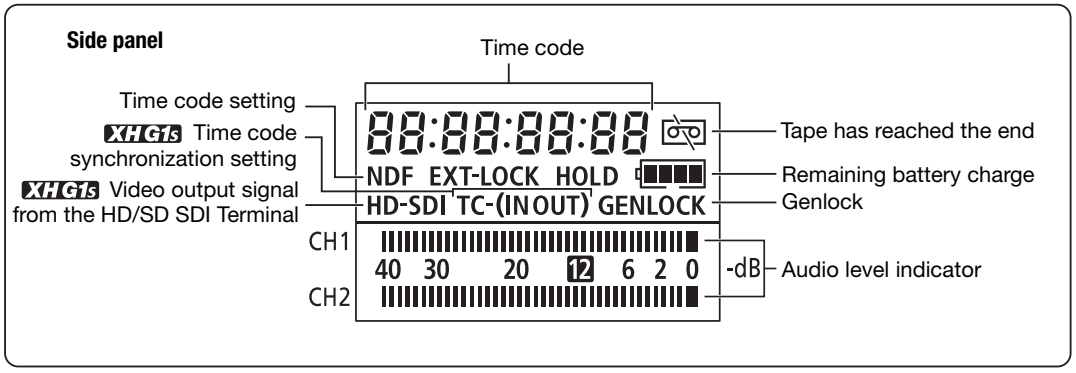


VCR/PLAY·CARD





①	Audio monitor (📖 81)
②	Audio output (📖 81)
③	Custom function (📖 95)
④	Custom keys (📖 71)
⑤	Data code (📖 108)
⑥	Date search (📖 108)/ Index search (📖 107)/ End search (📖 33)
⑦	Recording standard (📖 32)
⑧	Frame rate (📖 42)
⑨	Tape operation (📖 105) ● Recording ●❚❚ Record pause ■ Stop ⏏ Eject ▶ Playback ▶❚❚ : Playback pause ▶▶ : Fast forward ◀◀ : Rewind ▶▶/◀◀ : Fast forward playback/rewind playback ×2▶/◀×2: Playback (double speed) ×1▶/◀×1: Playback (normal speed) ▮▶/◀▮ : Frame advance/reverse
⑩	User bit (📖 46)
⑪	Audio level indicator (📖 49)
⑫	Slideshow (📖 118)
⑬	Image protected (📖 121)
⑭	Image number (📖 111)
⑮	Current image/total number of still images (📖 110)
⑯	Histogram (📖 119)
⑰	Exif information icons (📖 119)
⑱	Date and time of recording
⑲	Custom preset data embedded with the still image (📖 90)
⑳	Still image quality/size
㉑	Programmed AE (📖 53)
㉒	Metering mode (📖 116)
㉓	AE shift (📖 60)
㉔	Still image size (📖 110)
㉕	File size
㉖	Aperture (📖 56, 59)
㉗	Shutter speed (📖 56, 58)
㉘	White balance (📖 63)
㉙	Flash (📖 117)


Side panel
Time code
Time code setting
XHGTS Time code synchronization setting
XHGTS Video output signal from the HD/SD SDI Terminal
88:88:88:88
NDF EXT-LOCK HOLD
HD-SDI TC-(IN OUT) GENLOCK
CH1
40 30 20 12 6 2 0
-dB
CH2
Tape has reached the end
Remaining battery charge
Genlock
Audio level indicator

List of Messages *(in alphabetical order)*

Message	Explanation	🕮
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 and flashes in 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.	–
CHANGE THE BATTERY PACK	Battery pack is exhausted. Replace or charge the battery pack.	14
CHECK THE HDV/DV INPUT	DV cable is not connected, or the connected digital device is turned off.	84
CONDENSATION HAS BEEN DETECTED	Condensation has been detected in the camcorder.	142
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.	85
COPYRIGHT PROTECTED PLAYBACK IS RESTRICTED	You attempted to play back a copyright protected tape.	85
HEADS DIRTY, USE CLEANING CASSETTE	Video heads are dirty. Clean the video heads.	141
INCORRECT TAPE SPECIFICATION PLAYBACK IS RESTRICTED	You attempted to play back a tape recorded in a standard different than the one to which the camcorder is set.	–
INPUT SIGNAL NOT SUPPORTED	You attempted to input a video signal incompatible with the camcorder (for example 720p).	84
NAMING ERROR	The folder and file numbers have reached their maximum value.	–
NO CARD	Memory card is not inserted into the camcorder.	24
NO IMAGES	No images are recorded on the memory card.	–
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.	84
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.	105
REMOVE THE CASSETTE	Camcorder stopped operating to protect the tape. Remove the cassette and reinsert it.	23
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.	26
TAPE END	Tape reached the end. Rewind the tape or replace the cassette.	–
THE CARD IS SET FOR ERASURE PREVENTION	SD/SDHC memory card is set for erasure prevention. Replace the card or change the position of the LOCK switch.	24
THE TAPE IS SET FOR ERASURE PREVENTION	Cassette is protected. Replace the cassette or change the position of the protect switch.	140
UNIDENTIFIABLE IMAGE	Image is not recorded with JPEG compression, or with a compression not compatible with the camcorder, or the image file is corrupted.	–

Maintenance/Others

Camcorder Handling Precautions

- ❍Do not carry the camcorder by the viewfinder, the LCD panel, or the microphone.
- ❍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 strong electromagnetic fields such as near TV sets, plasma TVs, radio transmitters or portable communication devices.
- ❍Do not point the lens or viewfinder lens at the sun or other strong light sources. Do not leave the camcorder pointed at a bright subject. Internal components may become damaged due to concentration of the light by the lens.
- ❍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 (🕮 142).

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 °C.
- ❍Before using the camcorder after a long storage period, check the functions of your camcorder to make sure that the camcorder is still working properly.

Cleaning

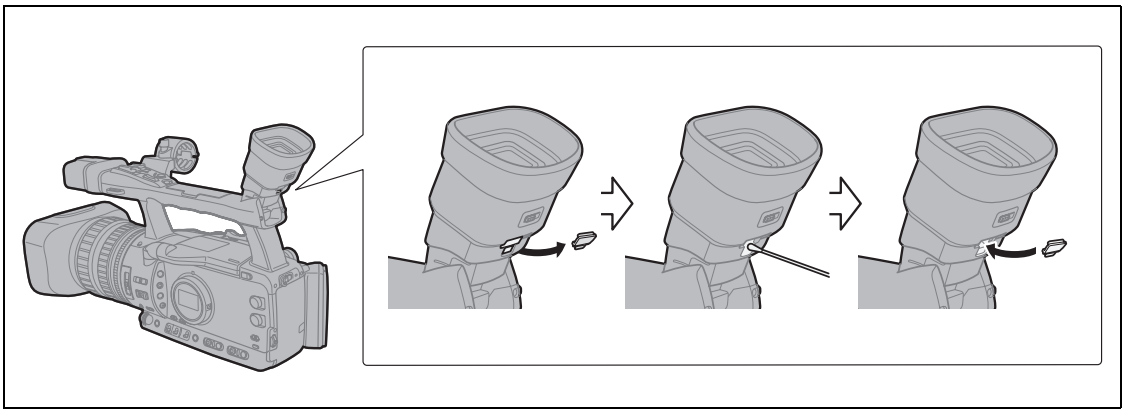
Camcorder Body and Lens

- ❍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 lens 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 protecting cover (e.g. using a flathead screwdriver).**
2. **Clean the glass with a cotton swab.**
3. **Reattach the protecting cover.**

Be careful not to scratch the glass when cleaning it.

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 it or subject it to shocks.
- 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 one 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

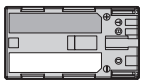
The battery terminal cover has a [▭]-shaped hole. This is useful when you wish to differentiate between charged and uncharged battery packs. For example, with charged battery packs, attach the terminal cover so that the [▭]-shaped hole shows the blue label.

Back side of the battery pack

Terminal cover attached

Charged

Uncharged

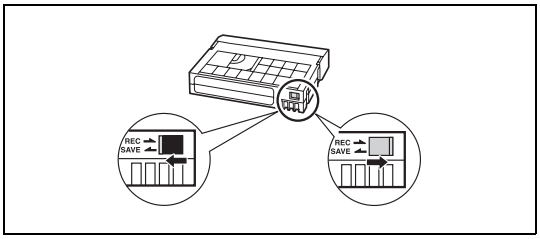


Cassette Handling Precautions

- ❍Rewind tapes after use. If the tape is loose 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 card 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 backing up memory card images to 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 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 or 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 attach other labels to the memory card.
❍When you erase image files or initialize the memory card, only the file allocation table is altered and the data itself is not actually deleted. Take the necessary precautions when you dispose of the memory card, for example by physically damaging it to prevent the leakage of private data.
❍SD/SDHC memory cards have a physical switch to prevent writing on the card so as to avoid the accidental erasure of the card's content. To write-protect the memory card set the switch to the LOCK position.

Built-in Rechargeable Lithium Battery

The camcorder has a built-in rechargeable lithium battery to keep the date/time and other settings. The built-in lithium battery is recharged while you use the camcorder; however, it will become totally discharged if you do not use the camcorder for about 3 months.

To recharge the built-in lithium battery:

Connect the compact power adapter to the camcorder and leave it connected for 24 hours with the camcorder off.

Video Heads

❍When the message "HEADS DIRTY, USE CLEANING CASSETTE" appears, when the playback picture becomes distorted, or if during playback of a tape recorded 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 after cleaning 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 “CONDENSATION HAS BEEN DETECTED 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.

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 a 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 compatible with the PAL system. PAL (or the compatible SECAM system) is used in the following regions/countries:
Europe: All of Europe and Russia. **Americas:** Only in Argentina, Brazil, Uruguay and French territories (French Guiana, Guadeloupe, Martinique, etc.). **Asia:** Most of Asia (except in Japan, the Philippines, South Korea, Taiwan and Myanmar). **Africa:** All of Africa and African islands. **Australia/Oceania:** Australia, New Zealand, Papua New Guinea; most Pacific islands (except for Micronesia, Samoa, Tonga and US territories like Guam and American Samoa).

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.	29
The screen switches on and off.	Battery pack is exhausted.	Replace or charge the battery pack.	14

Recording/Playback

Problem	Cause	Solution	🕮
Buttons will not work.	Cassette is not loaded.	Load a cassette.	23
💧 flashes on the screen.	Condensation is detected.	See reference page.	142
"REMOVE THE CASSETTE" appears on the screen.	Camcorder stopped operating to protect the tape.	Remove the cassette and reinsert it.	23
The wireless controller will not work.	Camcorder and wireless controller are not set to the same remote sensor mode.	Change the remote sensor mode.	109
	Batteries of the wireless controller are exhausted.	Replace the batteries.	22
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 reset all the camcorder's settings to default values using the [SYSTEM SETUP/ ⊛] ▶ [RESET ALL] setting.	–

Recording

Problem	Cause	Solution	🕮
The POWER dial is not in the OFF position but the POWER indicator is off.	The LED indicators option in the customized functions is set to [OFF].	Set the [LED] setting to one of the other types.	100
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.	28
"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.	26
Pressing the START/STOP button will not start recording.	Cassette is not loaded.	Load a cassette.	23
	The POWER dial is not set to a recording program.	Set the POWER dial to a recording program.	28
	The LOCK switch is set to prevent the operation of the controls on the carrying handle.	Slide the LOCK switch to the left to enable the operation of the carrying handle controls.	29
Camcorder will not focus.	Autofocus does not work on that subject.	Focus manually.	37
	Viewfinder is not adjusted.	Adjust the viewfinder with the dioptric adjustment lever.	17
	Lens is dirty.	Clean the lens.	138
The tally lamp will not light up.	The tally lamp option in the customized functions is set to [OFF].	Set the [TALLY LAMP] setting to [ON] or [BLINK].	100

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 **Av** mode with an aperture value in the range F5.6–F8.0.	59
Viewfinder picture is blurred.	Viewfinder is not adjusted.	Adjust the viewfinder with the dioptric adjustment lever.	17
Audio is not recorded.	The input channel is not set correctly.	Set the appropriate input channel.	49
	Microphone connected to the XLR terminal needs to be powered by the phantom power.	Set the +48V switch to ON.	49
Audio is recorded in a very low level.	The AUDIO LEVEL switch is set to M, and recording level is set too low.	Adjust the audio level correctly.	49
	Microphone attenuator is turned on.	Set the FRONT MIC ATT. switch or the XLR MIC ATT. switch to OFF.	49

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.	105
	Cassette is not loaded.	Load a cassette.	23
Tape is running, but image will not appear on the TV screen.	Video heads are dirty.	Clean the video heads.	141
	You attempted to play back or dub a copyright protected tape.	Stop playback/dubbing.	–
	The video output cable is not connected correctly.	Verify that the video cable is connected properly.	–
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 with a dry cleaning cassette.	141

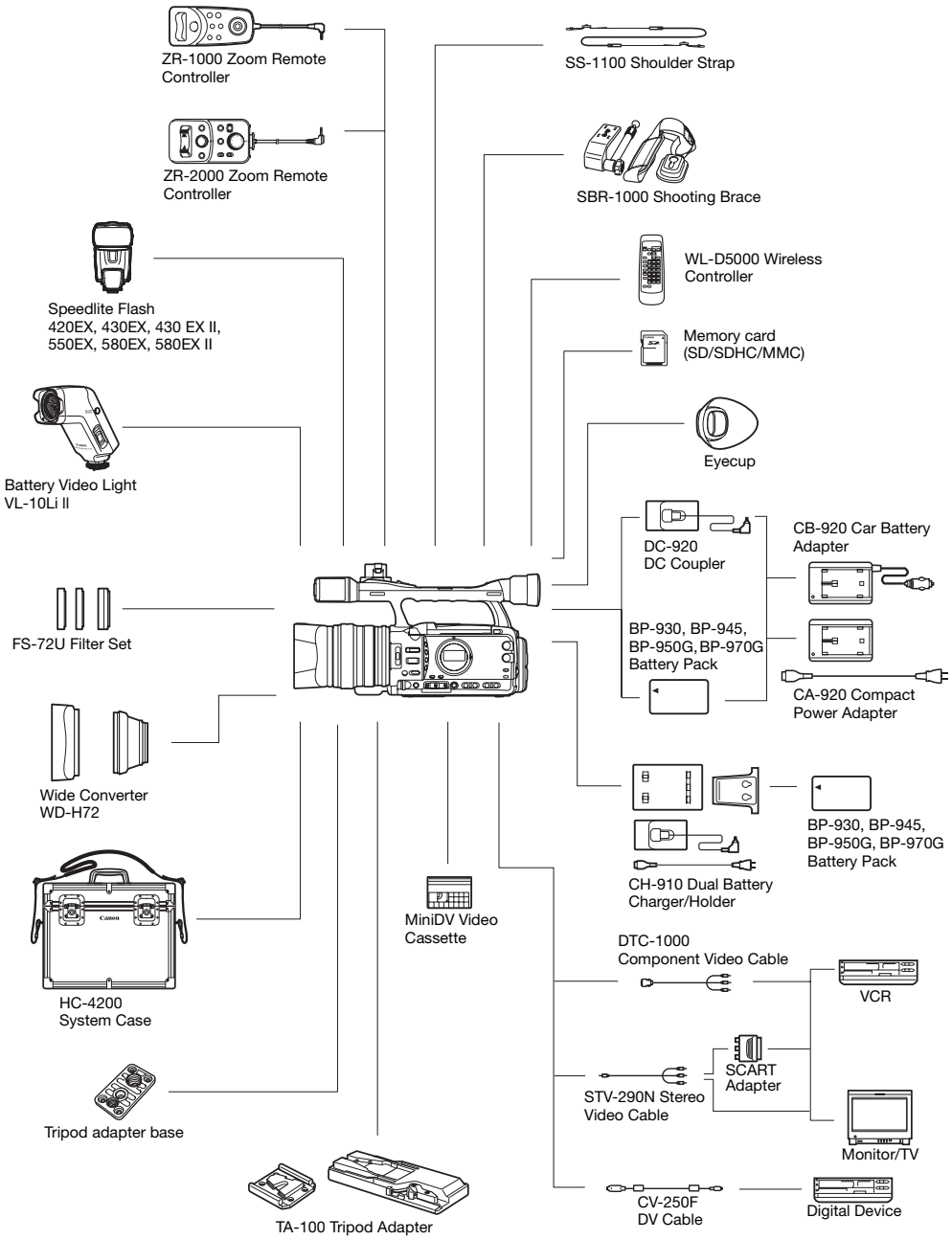
Memory Card Operations

Problem	Cause	Solution	📖
Memory card cannot be inserted.	Memory card was not facing the correct direction.	Turn the memory card over and try inserting it again.	24
Memory card cannot be recorded.	No memory card.	Insert a memory card.	24
	Memory card is full.	Replace the memory card or erase images.	120
	Memory card is not initialized.	Initialize the memory card.	122
	The folder and file numbers have reached their maximum value.	Set [FILE NOS.] to [RESET] and insert a new memory card.	111
Memory card cannot be played back.	The POWER dial or 🎴/📼 (card/tape) switch are not set to the correct position.	Set the POWER dial to VCR/PLAY and the 🎴/📼 (card/tape) switch to 🎴.	118
Image cannot be erased.	Image is protected.	Cancel the protection.	121
	On an SDHC or SD memory card, the write-protect switch is set to the locked position.	Change the position of the write-protect switch on the memory card to unlock it.	141
🎴 flashes red.	Card error occurred.	Turn off the camcorder. Remove and reinsert the memory card. Initialize the memory card if flashing persists.	122

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, red, green or blue dots. This has no effect on the recorded image and does not constitute a malfunction.

System Diagram *(Availability differs from area to area)*

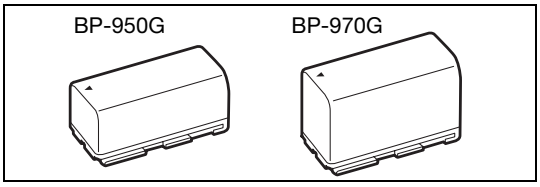


Optional Accessories

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.

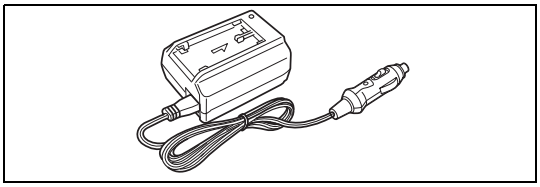
Battery Packs

The BP-950G is also available as an optional accessory. The optional BP-970G provides over 35% more recording time than the BP-950G.



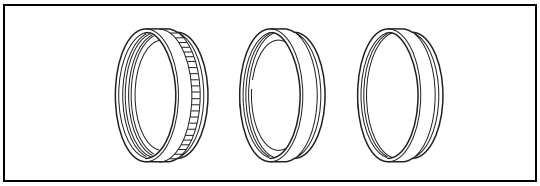
Car Battery Adapter CB-920

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.



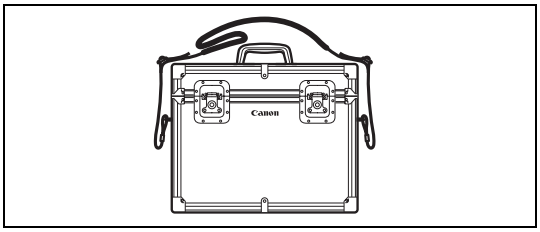
FS-72U Filter Set

Ultraviolet, neutral density and circular polarizing filters to help you take control of difficult lighting conditions.



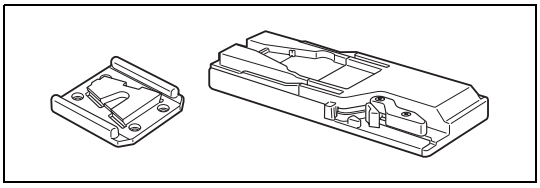
HC-4200 System Case

A solid, lockable case that provides safe and stylish protection for the camcorder during transportation and storage.



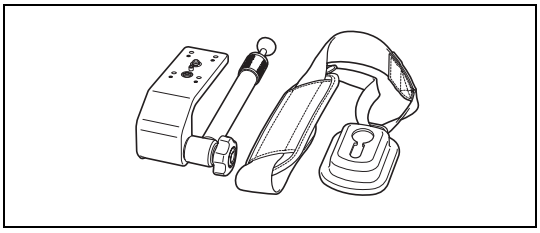
TA-100 Tripod Adapter

The TA-100 allows you to quickly mount/unmount the XH G1S / XH A1S on/from a tripod.

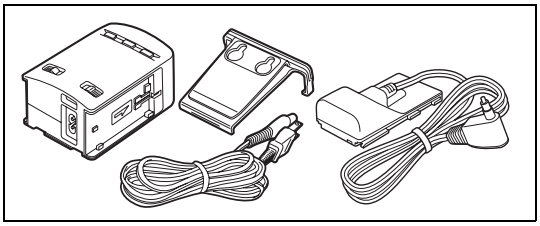


SBR-1000 Shooting Brace

Using the SBR-1000 for additional support of the camcorder with the neck strap will significantly lighten the load of the camcoder's weight while shooting.



CH-910 Dual Battery Charger/Holder

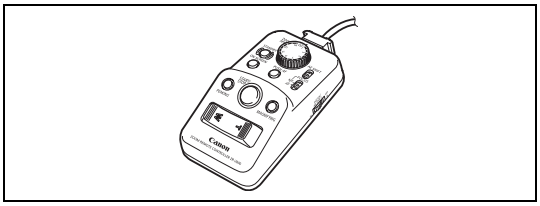


The CH-910 can charge two battery packs consecutively. You can also power the camcorder by connecting the CH-910 with charged battery packs to the camcorder. When you attach two battery packs, a battery pack can be exchanged without interrupting the power supply.

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.

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

XH G1S / XH A1S

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, 16 bit (48 kHz), Transfer rate: 384 kbps (2CH) (DV) PCM digital sound, 16 bit (48 kHz) or 12 bit (32 kHz)
Television System	(HD) High Definition Video (HDV) 1080/50i (SD) CCIR standard (625 lines, 50 fields) PAL color signal
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 (60 min. cassette)	(HDV) 60 min. (DV) SP: 60 min., LP: 90 min.
Fast Forward/Rewind Time	Approx. 2 min. 20 sec. (with a 60 min. cassette)
Image Sensor	1/3-inch CCD x 3 (horizontal pixel shift), approx. 1,670,000 pixels Effective pixels: HD approx. 1,560,000 SD16:9 approx. 1,560,000 SD4:3 approx. 1,170,000
Viewfinder	0.57 in. wide, 16:9 aspect ratio TFT color, approx. 269,000 dots
LCD Screen	2.8 in. wide, 16:9 aspect ratio TFT color, approx. 207,000 dots
Microphone	Stereo electret, Cross-layout microphone
Lens	f=4.5-90 mm, F/1.6-3.5, 20x power zoom 35 mm equivalent: [HD], [SD16:9], 16:9 still images: approx. 32.5-650 mm [SD4:3], 4:3 still images: approx. 39.8-796 mm
Lens Configuration	16 elements in 11 groups (1 aspheric element)
Filter Diameter	72 mm
AF System	Autofocus, manual focusing with focus ring
White Balance	Auto white balance, pre-set white balance (indoor, outdoor), custom white balance, or color temperature setting
Minimum Illumination	0.3 lx (50i/25F mode, Manual mode, Shutter speed 1/3, F1.6, Gain 18 dB)
Recommended Illumination	More than 100 lx
Subject Illumination Range	0.3 to 100,000 lx (50i/25F)
Image Stabilization	Optical Shift Image Stabilizer

Memory Card	
Recording media	SDHC (SD High Capacity) memory card, 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/SDHC memory cards up to 16 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.

Terminals

Video Terminals	**A/V1**: ⌀ 3.5 mm mini jack (audio and video), **VIDEO 2**: BNC jack (video only) 1 Vp-p/75 ohms unbalanced
Audio Out Terminals	**A/V1**: ⌀ 3.5 mm mini jack (audio and video) -12 dBV (47 kohm load, output level 1Vrms, full-scale -12 dB) / 3 kohms or less
Audio In Terminals	**MIC**: ⌀ 3.5 stereo mini jack (unbalanced), ATT: 20 dB Sensitivity: -66 dBV (manual volume center, full scale -12 dB) / 600 ohms **A/V1**: ⌀ 3.5 mm mini jack (audio and video) Sensitivity: -12 dBV (47 kohm load, full scale -12 dB) **XLR**: XLR jack (pin1: shield, pin2: hot, pin3: cold), ATT: 20 dB, 2 sets Sensitivity: XLR MIC: -60 dBu (manual volume center, normal sensitivity, full scale -18 dB) / 600 ohms XLR LINE: 4 dBu (manual volume center, normal sensitivity, full scale -18 dB) / 10 kohms
HDV/DV Terminal	6-pin connector (IEEE1394 compliant), input/output
Headphone Terminal	⌀ 3.5 mm stereo mini-jack, -∞ to -12 dBV (16 ohm load, volume range Min to Max) / 50 ohms or less
LANC Terminal	⌀ 2.5 mm stereo mini-jack
XHG1s GENLOCK Terminal	BNC jack, input: 1 Vp-p/75 ohms
XHG1s TIME CODE Terminal	BNC jack, input: 0.5 V–18 Vp-p/10 kohms output: 1 Vp-p/75 ohms
XHG1s HD/SD-SDI Terminal	BNC jack, output only, 0.8 Vp-p/75 ohms, unbalanced SDI 576/50i: ITU-R BT.656, SMPTE 272M, SMPTE RP 188 (LTC) HD-SDI: SMPTE 292M, SMPTE 299M, SMPTE RP 188 (LTC)
Component Terminals	**HD/SD COMPONENT OUT**: 1080i (D3)/576i (D1) compatible **VIEWFINDER COMPONENT OUT**: 576i (D1) compatible

Power/Others

Power supply (rated)	7.4 V (battery pack)
Power consumption	Recording with autofocus, HD mode, viewfinder/LCD screen set to [NORMAL]: XHG1s Viewfinder: 7.4 W, LCD screen: 7.6 W XHA1s Viewfinder: 7.0 W, LCD screen: 7.2 W
Operating temperature	0 – 40 °C
Dimensions (W x H x D)	163 x 192 x 394 mm, including the lens hood and eyecup
Weight	XHG1s 2,200 g XHA1s 2,135 g

CA-920 Compact Power Adapter

Power supply	100 – 240 V AC, 50/60 Hz
Rated output	Adapter: 7.2 V DC, 2.0 A, 35 VA (100 V AC) - 47 VA (240 V AC) Charger: 8.4 V DC, 1.5 A, 29 VA (100 V AC) - 40 VA (240 V AC)
Operating temperature	0 – 40 °C
Dimensions	75 x 99 x 51 mm
Weight	215 g excluding the 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.

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* XHGIs only.

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DIE-316

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