Please read also the following instruction manual (electronic version on PDF file). For further details refer to the installation guide.
Veuillez lire aussi le manuel d’instruction suivant (version électronique sur fichier PDF). Pour d’autres détails référez-vous au guide d’installation.
Lea también el siguiente manual de instrucciones (versión electrónica en archivo PDF). Para mayores detalles, refiérase a la guía de instalación.

• Digital Video Software
Cleaning the Video Heads

Digital video camcorders record video signals on the tape in very thin lines (as thin as 1/8 of the width of a hair). The following symptoms may appear if the video heads become dirty even a little.

- Mosaic or other blocky video artifacts (Fig. 1) or banding (Fig. 2) appear on the picture during playback.
- Sound becomes distorted, or there is no sound during playback.
- The message “HEADS DIRTY, USE CLEANING CASSETTE” appears.

If such symptoms appear, clean the video heads with the Canon DVM-CL Digital Video Head Cleaning Cassette* or a commercially available dry cleaning cassette. If the symptoms reappear shortly after the cleaning, the videocassette may be defective. Stop using it.

* Availability differs from area to area.

Video heads may become dirty under the following conditions:

- When using the camcorder in humid or hot places.
- When using cassettes with damaged or dirty tape.
- When using the camcorder in dusty places.
- When using the video heads without cleaning them for a long time.

NOTES

- Before you make important recordings, clean the video heads and make a test recording first. We also recommend cleaning the video heads after use, before storing the camcorder.
- Do not use wet type cleaning cassettes as this may damage the camcorder.
- Even after cleaning the video heads you may not be able to play back correctly tapes that were recorded with dirty video heads.
Important Usage Instructions

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

For Canada only:
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO DRIPPING OR SPLASHING.

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

COPYRIGHT WARNING:
Unauthorized recording of copyrighted materials may infringe on the rights of copyright owners and be contrary to copyright laws.

Digital Video Camcorder, ZR850/ZR830 A systems

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

Use of shielded cable is required to comply with class B limits in Subpart B of Part 15 of FCC Rules. Do not make any changes or modifications to the equipment unless otherwise specified in the manual. If such changes or modifications should be made, you could be required to stop operation of the equipment.

Canon U.S.A. Inc.
One Canon Plaza, Lake Success, NY 11042, U.S.A.
Tel No. (516)328-5600

Important Warning

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

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.
In these safety instructions the word “apparatus” or “product” refers to the Canon Digital Video Camcorder ZR850/ZR830 A and all its accessories.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
9. Unplug this apparatus during lightning storms or when unused for long periods of time.
10. Read instructions — All the safety and operating instructions should be read before the product is operated.
11. Retain instructions — The safety and operating instructions should be retained for future reference.
12. Heed Warnings — All warnings on the product and in the operating instructions should be adhered to.
13. Follow instructions — All operating and maintenance instructions should be followed.
14. Cleaning — Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. The product should be cleaned only as recommended in this manual.
15. Avoid magnetic or electric fields — Do not use the camera close to TV transmitters, portable communication devices or other sources of electric or magnetic radiation. They may cause picture interference, or permanently damage the camera.
16. Water and Moisture — Hazard of electric shock — Do not use this product near water or in rainy/moist situations.
17. Placing or Moving — Do not place on an unstable cart, stand, tripod, bracket or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.
18. Power Sources — The product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. Regarding other power sources such as battery power, refer to instructions in this manual.
19. Overloading — Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
20. Objects and Liquid Entry — Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Be careful not to spill liquid of any kind onto the product.
21. Servicing — Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
22. Power Sources — The CA-590 Compact Power Adapter should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. Regarding other power sources such as battery power, refer to instructions in this manual.
23. Lightning — For added protection of this product during a lightning storm, or when it is left unattended and unused for long periods of time, disconnect it from the wall outlet and disconnect the antenna. This will prevent damage to the product due to lightning and power-line surges.
24. Overloading — Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
**25** Damage Requiring Service — Disconnect this product from the wall outlet and all power sources including battery, and refer servicing to qualified service personnel under the following conditions:
- a. When the plug is damaged.
- b. If any liquid has been spilled onto, or objects have fallen into, the product.
- c. If the product has been exposed to rain or water.
- d. If the product does not operate normally even if you follow the operating instructions. Adjust only those controls that are covered by the operation instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
- e. If the product has been dropped or the cabinet has been damaged.
- f. When the product exhibits a distinct change in performance. This indicates a need for service.

**26** Replacement Parts — When replacement parts are required, be sure the service technician has used replacement parts that are specified by Canon or that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

**27** Safety Check — Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating order.

When replacement of the power supply is required, please return it to the responsible nearest Canon Service Center and please replace it with the same type number CA-590.

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

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.

The adapter can be used with a power supply between 100 and 240 V AC. For areas where 120 V AC power is not used, you will need a special plug adapter. Contact your nearest Canon Service Center for further information.

The adapter is not intended to be serviced. Should the product cease to function in its intended manner, it should be returned to the manufacturer or be discarded.
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About this Manual

Thank you for purchasing the Canon ZR850/ZR830. Please read this manual carefully before you use the camcorder and retain it for future reference. Should your camcorder fail to operate correctly, refer to the Troubleshooting table ( 77).

Conventions Used in the Manual

• IMPORTANT: Precautions related to the camcorder’s operation.
• NOTES: Additional topics that complement the basic operating procedures.
• POINTS TO CHECK: Restrictions that apply if the function described is not available in all operating modes (the operating mode to which the camcorder should be set, etc.).
• : Reference page number.
• : Option or feature that applies to or is available only with a specific model.
• “Screen” refers to the LCD and the viewfinder screen.
• The photos included in the manual are simulated pictures taken with a still camera. Note that unless indicated otherwise, illustrations in this manual refer to the model.

About the Joystick and the Joystick Guide

The mini joystick allows you to control many of the camcorder’s operations and to make selections and changes in the camcorder’s menus.

- Push the joystick up, down, left or right ( , ) to select an item or change settings.
- Press the joystick itself ( ) to save the settings or confirm an action. On menu screens, this is indicated by the joystick icon .

First Time Settings

Changing the Language

The language for on-screen and menu displays can be changed. The list of available languages depends on the region where you purchased the camcorder.

Language Set A
- English, German, Spanish, Italian, Polish, Russian, Simplified Chinese and Japanese.

Language Set B

**Default value**

1 Press ( ).
2 Select ( ) the icon and press ( ) to open the setup menus.
3 Select ( ) [DISPLAY SETUP/ ] and press ( )
4 Select ( ) [LANGUAGE] and press ( ).
5 Select ( ) the desired option and press ( ).
6 Press ( ) to close the menu.

NOTES

If you changed the language by mistake, follow the mark next to the menu item to return the language to the default value.

Brackets [ ] and capital letters are used to refer to menu options as they are displayed on screen. Menu options in boldface indicate the default setting (for example [ON], [OFF]).

Names of buttons and switches other than the joystick are indicated within a “button” frame (for example [FUNC.]).
The functions assigned to the joystick change according to the operation mode. You can display the joystick guide to remind you of the joystick’s functions in each operating mode.

<table>
<thead>
<tr>
<th>Recording movies:</th>
<th>Playing back movies:</th>
<th>Recording still images:</th>
<th>Playing back still images:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Joystick Image" /></td>
<td><img src="image2.png" alt="Joystick Image" /></td>
<td><img src="image3.png" alt="Joystick Image" /></td>
<td><img src="image4.png" alt="Joystick Image" /></td>
</tr>
</tbody>
</table>

**About the Operating Modes**

The camcorder’s operating mode is determined by the positions of the **POWER** switch and the **/** switch. In the manual, **CAMERA** indicates that a function is available in the operating mode shown and **PLAY** indicates that the function is not available. When no operating mode icons are given, the function is available in all operating modes.

<table>
<thead>
<tr>
<th>Operating Mode</th>
<th><strong>POWER</strong> Switch</th>
<th><strong>/</strong> Switch</th>
<th>Icon Display</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMERA (Tape)</td>
<td>CAMERA</td>
<td><img src="image5.png" alt="Tape Icon" /></td>
<td><img src="image6.png" alt="Recording Icon" /></td>
<td>Recording movies on the tape 28</td>
</tr>
<tr>
<td>PLAY</td>
<td>PLAY</td>
<td><img src="image7.png" alt="Movie Icon" /></td>
<td><img src="image8.png" alt="Playing Icon" /></td>
<td>Playing movies from the tape 32</td>
</tr>
<tr>
<td>CAMERA (Memory card)</td>
<td>CAMERA</td>
<td><img src="image9.png" alt="Memory Card Icon" /></td>
<td><img src="image6.png" alt="Recording Icon" /></td>
<td>Recording still images or movie clips on the memory card 29</td>
</tr>
<tr>
<td>PLAY</td>
<td>PLAY</td>
<td><img src="image9.png" alt="Memory Card Icon" /></td>
<td><img src="image8.png" alt="Playing Icon" /></td>
<td>Playing back still images or movie clips from the memory card 34</td>
</tr>
</tbody>
</table>

**Trademark Acknowledgements**

- **MiniDV** is a trademark.
- The SD logo is a trademark. The SDHC logo is a trademark.
- Windows® is a registered trademark of Microsoft Corporation in the United States and/or other countries.
- Macintosh and Mac OS are trademarks of Apple Computer, Inc., registered in the United States and other countries.
- Other names and products not mentioned above may be trademarks or registered trademarks of their respective companies.
Supplied Accessories

- CA-590 Compact Power Adapter
- BP-2L5 Battery Pack
- Lithium Button Battery CR1616
- STV-250N Stereo Video Cable
- WL-D85 Wireless Controller
- Lithium Button Battery CR2025 for Wireless Controller
- IFC-300PCU USB Cable
- DIGITAL VIDEO SOLUTION DISK Software CD-ROM*


Online product registration for U.S.A. Customers only.
Register your product online at www.registercanon.com

✓ Protect your product
We will keep the model number and date of purchase of your new Canon product on file to help you refer to this information in the event of an insurance claim such as loss or theft.

✓ Receive information on new products and promotions
Upon your request, we will send you information on Canon new products and promotions.

The serial number of this product can be found at the battery attachment unit of the camcorder. Write down the number and other information here and retain this book as a permanent record of your purchase to aid identification in case of theft.

- Date of Purchase: Model Name: ZR850/ZR830 A
- Purchased From: Serial No.:
- Dealer Address:
- Dealer Phone No.:
Components Guide

Left side view

1. Lens cover switch (open, closed)
2. CARD access indicator/CHARGE indicator
3. Speaker
4. Memory card slot
5. AV terminal
6. USB terminal
7. DV terminal
8. Terminal cover
9. Grip belt
10. Strap mount
11. Lock button
12. POWER switch
13. QUICK START button
14. Remote sensor
15. LED light (assist lamp)
16. Stereo microphone

Names of buttons and switches other than the joystick are indicated within a “button” frame (for example, FUNC.).
Introduction

Names of buttons and switches other than the joystick are indicated within a "button" frame (for example [FUNC.]).

1. Viewfinder (22)
2. Dioptic adjustment lever (22)
3. BATT. (battery release) switch (19)
4. LCD screen (23)
5. Backup battery compartment (30)
6. Start/stop button (28, 29)
7. Serial number, Battery attachment unit (19)
8. DC IN terminal (19)
9. D.EFFECTS button (56)/P.SET button (72)
10. FUNC. button (24, 37)
11. Joystick (9)
12. PHOTO button (29)
13. Zoom lever (31)
14. Mode switch (45)

EASY: Easy recording
P: Recording programs
15. (tape/card) switch (10)
16. Cassette compartment (21)
17. OPEN/EJECT switch (21)
18. Cassette compartment cover (21)
19. Tripod socket (29)
Wireless Controller WL-D85

1. START/STOP button (28)
2. CARD –/+ buttons (34)
3. DATE SEARCH buttons (34)
4. REW button (32)
5. – button (32)
6. PAUSE button (32)
7. SLOW button (32)
8. AUDIO DUB. button (66)
9. ZERO SET MEMORY button (33)
10. PHOTO button (29)
11. Zoom buttons (31)
12. PLAY button (32)
13. FF button (32)
14. STOP button (32)
15. + button (32)
16. X2 button (32)
17. TV SCREEN button (42)
Screen Displays

Recording Movies

1. Zoom (31), Exposure (47)
2. Recording program (45)
3. White balance (49)
4. Image effect (50)
5. LED light (56)
6. Digital effects (56)
7. Condensation warning (86)
8. Still image quality/size (simultaneous recording) (53)
9. Shutter speed (46)
10. Self timer (56)
11. Exposure adjustment (47)
12. Manual focus (48)
13. Image stabilizer (40)
14. Recording mode (40)
15. Tape operation
16. Time code (hours : minutes : seconds)
17. Remaining tape
18. Remaining battery charge
19. Widescreen 16:9 mode (40)
20. Wind screen off (41)
21. Audio recording mode (50)
22. Remote sensor off (43)
23. Backup battery warning
24. Level marker (42)
25. Recording reminder
26. Operating mode (10)
27. Audio playback mode (51)
28. Search function display
   END SEARCH (34)/DATE SEARCH (34)
29. Movie size for capturing video on the memory card (54)
30. Quality/size for capturing still images (54)
31. Playback time
   (hours : minutes : seconds : frames)
32. Joystick guide (9)
33. Data code (55)

Playing Movies

1. STEREO1
2. END SEARCH
3. 9:20 AM
4. OCT. 1:2007
15 **Tape operation**
- Record, ■ Record pause,
- Stop, ▲ Eject,
- ▶ Fast forward, ◀ Rewind,
- ▶ Playback, ▶ ◀ Playback pause,
- ◀ Reverse playback pause,
- x1 ▶ Playback (normal speed),
- ◀x1 Reverse playback (normal speed),
- x2 ▶ Playback (double speed),
- ◀x2 Reverse playback (double speed),
- ▶ Fast forward playback,
- ◀ Rewind playback,
- ▶ Slow playback,
- ◀ Slow reverse playback,
- ▶ Frame advance,
- ◀ Frame reverse,
- ▶/◀ Date search (34),
- ▶/◀ Zero set memory (33)

17 **Remaining tape**
Indicates the remaining time of the tape in minutes. “ □□ ” moves during recording. When the tape reaches its end, the display changes to “ □□ 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 correct. In any case, you will be able to record on the tape the number of minutes that appears on the videocassette’s label (for example, 85 minutes).

18 **Remaining battery charge**

![Battery Charge](image)

- When “ □□ ” starts flashing in red replace the battery pack with a fully charged one.
- When you attach an empty battery pack, the power may turn off without displaying “ □□ ”.
- Depending on the conditions under which the camcorder and the battery pack are used, the actual battery charge may not be indicated accurately.

23 **Backup battery warning**

![Backup Battery Warning](image)

Flash in red when the lithium button battery is not installed, or when it needs to be replaced.

25 **Recording reminder**
The camcorder counts from 1 to 10 seconds when you start recording. This is helpful to avoid scenes that are too short.
Recording Still Images

1. Zoom (31), Exposure (47)
2. Recording program (45)
3. White balance (49)
4. Image effect (50)
5. LED light (56)
6. Digital effects (56)
7. Movie clip size (movie recorded on the memory card) (29)
8. Still image quality/size (52)
9. Self timer (56)
10. Number of still images available on the memory card
11. Movie recording time available on the memory card
12. Wind screen off (41)
13. AF frame (54)
14. Joystick guide (9)
15. Camcorder shake warning (39)

Viewing Still Images

16. Slideshow (35)
17. Image protection mark (61)
18. Image number (44)
19. Current image /Total number of images
20. Still image size
21. Data code (55)
22. Movie clip length (movie recorded on the memory card)
**Number of still images available on the memory card**
Depending on the recording conditions, the number of available still images displayed may not decrease even after a recording has been made, or may decrease by 2 still images at once.

**Card Access Display**
“▶” is displayed next to the number of images available while the camcorder is writing on the memory card.

**Movie recording time on the memory card**
Indicates the remaining time in hours : minutes. At less than 1 minute, the remaining time will be displayed in 10-second steps, at less than 10 seconds in 1-second steps.
- Depending on the recording conditions, the actual remaining time may not be indicated accurately.
Charging the Battery Pack

The camcorder can be powered with a battery pack or directly using the compact power adapter. Charge the battery pack before use.

1. Turn off the camcorder.
2. Attach the battery pack to the camcorder.
   • Press the battery pack lightly and slide it down until it clicks.
3. Plug the compact power adapter into a power outlet.
4. Connect the compact power adapter to the camcorder’s DC IN terminal.
   • The CHARGE indicator starts flashing. The indicator will stay on when the charging is completed.
   • You can also use the compact power adapter without attaching a battery pack.
   • When the compact power adapter is connected, even if a battery is attached its power will not be consumed.

Once the Battery is Fully Charged

1. Disconnect the compact power adapter from the camcorder.
2. Unplug the compact power adapter from the power outlet.

To Remove the Battery Pack

Press [BATT.] to release the battery pack. Lift the battery pack and then pull it out.
IMPORTANT

- You may hear some noise from the compact power adapter during use. This is not a malfunction.
- We recommend charging the battery pack in temperatures between 10 °C and 30 °C (50 °F and 86 °F). Outside the temperature range of 0 °C to 40 °C (32 °F to 104 °F), the charging will not start.
- Do not connect to the camcorder’s DC IN terminal or to the compact power adapter any electrical equipment that is not expressly recommended for use with this camcorder.
- To prevent equipment breakdowns and excessive heating, do not connect the supplied compact power adapter to voltage converters for overseas travels or special power sources such as those on aircraft and ships, DC-AC inverters, etc.

NOTES

- The CHARGE indicator also serves as a rough estimate of the battery charge status. Continuously on: Battery fully charged. Flashes approx. twice per second: Battery over 50% charged. Flashes approx. once per second: Battery less than 50% charged.
- The charging time will vary depending on the surrounding temperature and the battery pack’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.
- U.S.A. and Canada only: The lithium ion/polymer battery that powers this product is recyclable. Please call 1-800-8-BATTERY for information on how to recycle this battery.

Charging, Recording and Playback Times

The times given in the table below are approximate and vary depending on the actual charging, recording or playback conditions.

<table>
<thead>
<tr>
<th>Battery Pack</th>
<th>BP-2L5</th>
<th>NB-2L</th>
<th>NB-2LH</th>
<th>BP-2L12</th>
<th>BP-2L14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging Time</td>
<td>145 min.</td>
<td>150 min.</td>
<td>160 min.</td>
<td>240 min.</td>
<td>285 min.</td>
</tr>
</tbody>
</table>

Maximum Recording Times

| Viewfinder | 95 min. | 105 min. | 125 min. | 225 min. | 275 min. |
| LCD [NORMAL] | 90 min. | 105 min. | 125 min. | 225 min. | 275 min. |
| LCD [BRIGHT] | 90 min. | 105 min. | 125 min. | 215 min. | 265 min. |

Typical Recording Times*

| Viewfinder | 50 min. | 55 min. | 70 min. | 120 min. | 150 min. |
| LCD [NORMAL] | 50 min. | 55 min. | 70 min. | 120 min. | 150 min. |
| LCD [BRIGHT] | 45 min. | 50 min. | 65 min. | 115 min. | 140 min. |

Playback Times

| 105 min. | 120 min. | 145 min. | 255 min. | 310 min. |

Maximum Recording Times

| Viewfinder | 105 min. | 120 min. | 145 min. | 250 min. | 305 min. |
| LCD [NORMAL] | 100 min. | 120 min. | 145 min. | 245 min. | 300 min. |
| LCD [BRIGHT] | 95 min. | 110 min. | 135 min. | 230 min. | 280 min. |

Typical Recording Times*

| Viewfinder | 60 min. | 65 min. | 80 min. | 135 min. | 165 min. |
| LCD [NORMAL] | 55 min. | 65 min. | 80 min. | 130 min. | 165 min. |
| LCD [BRIGHT] | 50 min. | 60 min. | 75 min. | 125 min. | 155 min. |

Playback Times

| 110 min. | 125 min. | 150 min. | 265 min. | 320 min. |

* Approximate times for recording with repeated operations such as start/stop, zooming, power on/off.
Installing the Backup Battery

The backup battery (lithium button battery CR1616) allows the camcorder to retain the date, time (26) and other camcorder settings while the power source is disconnected. Connect a power source to the camcorder when replacing the backup battery to retain the settings.

1 If a battery pack is attached, remove it first.
2 Open the backup battery cover.
3 Insert the backup battery with the + side facing out.
4 Close the cover.

NOTES

The backup battery has a life span of about a year. flashes in red to inform you that it needs to be replaced.

Inserting and Removing a Tape

Use only videocassettes marked with the logo.

1 Slide fully in the direction of the arrow and open the cassette compartment cover. The cassette compartment opens automatically.
2 Insert the cassette.
   • Insert the cassette with the window facing the grip belt.
   • To remove a cassette pull it straight out.
3 Press the mark on the cassette compartment until it clicks.
4 Wait for the cassette compartment to retract automatically and close the cassette compartment cover.
**IMPORTANT**

- Do not interfere with the cassette compartment while it is opening or closing automatically, or attempt to close the cover before the cassette compartment has fully retracted.
- Be careful not to get your fingers caught in the cassette compartment cover.

**NOTES**

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

---

**Inserting and Removing a Memory Card**

You can use commercially available SDHC memory cards, SD memory cards or MultiMedia cards (MMC) with this camcorder.

1. Turn off the camcorder.
2. Open the memory card slot cover.
3. Insert the memory card straight all the way into the memory card slot.
4. Close the cover.
   - Do not force the cover closed if the memory card is not correctly inserted.

**To remove the memory card**

First push the memory card once to release it, and then pull the card out.

---

**Preparing the Camcorder**

1. Turn on the camcorder.
2. Move the lens cover switch down to ( to open the lens cover.
3 Adjust the viewfinder.
Keep the LCD panel closed to use the viewfinder and adjust the dioptric adjustment lever as necessary.

4 Fasten the grip belt.
Adjust the grip belt so that you can reach the zoom lever with your index finger, and the start/stop button with your thumb.

The Wireless Controller

Inserting the Battery
(Lithium Button Battery CR2025)

1 Press the tab in the direction of the arrow and pull out the battery holder.
2 Place the lithium button battery with the + side facing up.
3 Insert the battery holder.

Using the Wireless Controller

Point the controller at the camcorder’s remote sensor when you press the buttons.

NOTES
- The wireless controller may not work properly when the remote sensor is situated under strong light sources or direct sunlight.
- If the wireless controller does not work, check that [WL.REMOTE] is not set to [OFF ●] (43). Otherwise, replace the battery.

Adjusting the LCD Screen

Rotating the LCD Panel
Open the LCD panel 90 degrees.
You can rotate the panel 90 degrees downward.

You can rotate the panel 180 degrees toward the lens (allowing the subject to monitor the LCD screen while you use the viewfinder). Rotating the panel 180 degrees is also useful if you wish to include yourself when recording with the self timer.
Using the Menus

Many of the camcorder’s functions can be adjusted from the menus that open after pressing the FUNC. button (FUNC.). For details about the available menu options and settings, refer to Menu Options Lists (37).

LCD Backlight

You can set the brightness of the LCD screen at normal or bright.

1 Press FUNC.
2 Select (▲▼) the icon and press (●) to open the setup menus.
3 Select (▲▼) [DISPLAY SETUP/] and press (●).
4 Select (▲▼) [BACKLIGHT] and press (●).
5 Select (▲▼) the desired option and press (●).
6 Press FUNC. to close the menu.

NOTES

- This setting does not affect the brightness of the recording or the viewfinder screen.
- Using the [BRIGHT] setting will shorten the effective usage time of the battery pack.

Selecting a FUNC. Menu Option

1 Press FUNC.
2 Select (▲▼) the icon of the function you want to change from the left side column.
3 Select (◀▶) the desired setting from the available options at the bottom bar.
   The selected option will be highlighted in light blue. Menu items not available will appear grayed out.
4 Press [FUNC.] to save the settings and close the menu.
   - You can press [FUNC.] to close the menu at any time.
   - With some settings you will need to press ( ) and make further selections. Follow the additional operation guides that will appear on the screen (such as the joystick icon , small arrows, etc.).

Selecting an Option from the Setup Menus

1 Press [FUNC.].
2 Select (▲▼) the icon and press ( ) to open the setup menus.
   You can also hold [FUNC.] pressed down for more than 2 seconds to open directly the setup menus screen.
3 Select (▲▼) the desired menu from the left side column and press ( ).
4 Select (▲▼) the setting you want to change and press ( ).
   - An orange frame will indicate the menu item currently selected. Menu items not available will appear grayed out.
   - To return to the menu selection screen, select (▼) [RETURN] and press ( ).
5 Select (▲▼) the desired option and press ( ) to save the setting.
6 Press [FUNC.].
   You can press [FUNC.] to close the menu at any time.
First Time Settings

Changing the Language
The language for on-screen and menu displays can be changed. The list of available languages depends on the region where you purchased the camcorder.

Language Set A
English, German, Spanish, French, Italian, Polish, Russian, Simplified Chinese and Japanese.
Language Set B

Changing the Time Zone

<table>
<thead>
<tr>
<th>DISPLAY SETUP/</th>
<th>LANGUAGE ENGLISH</th>
</tr>
</thead>
</table>

1 Press [FUNC.] .
2 Select (▲▼) the icon and press ( ◀ ) to open the setup menus.
3 Select (▲▼) [DATE/TIME SETUP] and press ( ◀ ) .
4 Select (▲▼) [T.ZONE/DST] and press ( ◀ ) .
The time zone setting appears. The default setting is New York or Singapore, depending on the region of purchase.
5 Select (▲▼) your time zone and press ( ◀ ) .
To adjust for daylight saving time, select the time zone with the mark next to the area.
6 Press [FUNC.] to close the menu.

Time Zones
Once you have set the time zone, date and time, you do not need to reset the clock every time you travel to another time zone. Select the time zone referring to the date and time displayed on the screen.
Setting the Date and Time

1 Press [FUNC.].
2 Select (▲▼) the ( ) icon and press ( ) to open the setup menus.
3 Select (▲▼) [DATE/TIME SETUP] and press ( ).
4 Select (▲▼) [DATE/TIME] and press ( ).
   Blinking arrows will be displayed around the first field of the date.
5 Change each field of the date and time with the joystick’s (▲▼) and move (▶) to the next field.
6 Press ( ) to start the clock.
7 Press [FUNC.] to close the menu.

NOTES

You can also change the date format ( 44).
1 Move the lens cover switch down to \( \text{ } \) to open the lens cover.

2 Holding the lock button pressed down, set the \( \text{POWER} \) switch to \( \text{CAMERA} \).

3 Move the \( \text{ } \) switch to \( \text{ } \) (tape).

4 Press \( \text{Start/Stop} \) to begin recording. Press \( \text{Start/Stop} \) again to pause the recording.

**To review the last scene recorded**

1 Set the mode switch to \( \text{P} \).

2 If the joystick guide does not appear on screen, press \( \text{ } \) to display it.

3 Push the joystick \( \text{ } \) momentarily towards \( \text{ } \) and release it.
   - The camcorder will play back a few seconds of the last recording made and return to record pause mode.
   - You can also hold the joystick pressed \( \text{ } \) towards \( \text{ } \) or \( \text{ } \) towards \( \text{ } \) to play back the tape (reverse or forward respectively) to locate the point where you want to start recording.

**When you have finished recording**

1 Close the lens cover and the LCD panel.

2 Turn off the camcorder.

3 Remove the tape.

4 Disconnect the power source and remove the battery pack.

---

**Before You Begin Recording**

Make a test recording first to check if the camcorder operates correctly. If necessary, clean the video heads (2).
NOTES

- About the recording time: By changing the recording mode you can change the video quality and as a result, also the available recording time (40).
- Previous recordings overwritten by a new recording cannot be recovered. Before you start recording, search for the end of the last recording (34).
- To protect the tape and video heads, the camcorder will enter the stop mode (■) if left in record pause (● ■) mode for 4 minutes 30 seconds. To resume recording press Start/Stop.
- When recording in very loud places (such as fireworks shows or concerts), sound may become distorted or it may not be recorded at the actual levels. This is not a malfunction.
- About the Power Save mode: To save power when the camcorder is powered by a battery pack, the camcorder will automatically shut off if left without any operations for 5 minutes (43). To restore the power, turn the camcorder off and then on again.
- About the LCD and viewfinder screen: The screens are produced using 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, blue or green dots. This has no effect on the recorded image and does not constitute a malfunction.
- When using a tripod: Do not leave the viewfinder exposed to direct sunlight as it may melt (due to concentration of the light by the lens). Do not use tripods with fastening screws longer than 5.5 mm (0.2 inch). Doing so may damage the camcorder.
- When recording movies, try to get a calm, stable picture.

Excessive camcorder movement while shooting and extensive use of fast zooms and panning can result in fidgety, jittery scenes. In extreme cases the playback of such scenes may result in visually induced motion sickness. If you experience such a reaction, immediately stop the playback and take a rest break as necessary.

Recording Still Images on the Memory Card

Before using a memory card for the first time, be sure to initialize it with this camcorder (62).

1. Move the lens cover switch down to (2) to open the lens cover.
2. Holding the lock button pressed down, set the POWER switch to CAMERA.
3. Move the ● ○/● ■ switch to (memory card).
4. Press PHOTO.
   - Once the focus is automatically adjusted, ● will turn green and one or more AF frames will appear.
   - The CARD access indicator will flash as the image is being recorded.
IMPORTANT

Avoid the following actions while the card access display (►) appears on screen and when the CARD access indicator is on or flashing. Failing to do so may result in permanent data loss.
- Do not open the memory card slot cover and do not remove the memory card.
- Do not disconnect the power source or turn off the camcorder.
- Do not change the position of the ○ / ◙ switch or the operating mode.

NOTES

If the subject is not suitable for autofocus, ○ turns yellow. Adjust the focus manually (104).

Recording Movie Clips on the Memory Card

You can record Motion JPEG movie clips on the memory card. The sound for the movies on the memory card will be monaural.

1 Move the lens cover switch down to ○ to open the lens cover.
2 Holding the lock button pressed down, set the POWER switch to CAMERA.
3 Move the ○ / ◙ switch to ◙ (memory card).

TO SELECT THE MOVIE CLIP SIZE

4 Press FUNC.
5 Select (▲▼) [MOVIE REC OFF] and select (◄►) the desired movie size.
   The number displayed on the right corner indicates the approximate recording time available on the memory card.

6 Press FUNC. to close the menu.

TO RECORD THE MOVIE CLIP

7 Press Start/Stop to begin recording.
   • Press Start/Stop again to pause the recording.
     • SD/SDHC memory cards: You can record until "CARD FULL" appears (approx. 33 minutes with a 512 MB SD Memory Card). MultiMedia cards: The recording time is limited to 10 seconds at [160x120] or 30 seconds at [160x120].

IMPORTANT

Avoid the following actions while the card access display (►) appears on screen and when the CARD access indicator is on or flashing. Failing to do so may result in permanent data loss.
- Do not open the memory card slot cover and do not remove the memory card.
- Do not disconnect the power source or turn off the camcorder.
- Do not change the position of the ○ / ◙ switch or the operating mode.
- Do not insert/remove a tape while recording movie clips on the memory card.

NOTES

We recommend using a Canon SD Memory Card, or an SD Memory Card with a transfer rate of more than 2 MB/sec., after having initialized it with this camcorder. With memory cards not initialized with this camcorder, or after repeated times of recording/erasing the card, the writing speed may fall and the recording may stop.

Windows XP users: When you plan to connect the camcorder to a computer, keep the length of one movie clip shorter than approx. 12 minutes at [320x240] or 35 minutes at [160x120].
Zooming

POINTS TO CHECK

In addition to the 35x optical zoom, the digital zoom (up to 1000x) is also available.

35x Optical Zoom

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

You can also change the zoom speed. You can select one of three fixed zoom speeds or a variable speed that depends on how you operate the zoom lever: Press gently for a slow zoom; press harder for faster zooms.

NOTES

- You can also use the T and W buttons on the wireless controller. The zoom speed with the wireless controller will be the same as with the camcorder (when one of the fixed zoom speed levels is selected) or fixed at [SPEED 3] (when [VARIABLE] is selected).
- When set to [VARIABLE], the zoom speed will be faster in the record pause mode.
- Keep at least 1 m (3.3 ft.) to the subject. At wide-angle, you can focus on a subject as close as 1 cm (0.39 in.).

Quick Start Function

Using the Quick Start function, you'll never have to miss out on those great and fleeting opportunities to take a picture or record video. When you press QUICK START instead of turning off the camcorder, you can get it ready to start recording within approx. 1 second.

POINTS TO CHECK

You cannot enter the Quick-Start ready mode while recording.

1 Press QUICK START.
   - The QUICK START button lights up to signal that the camcorder is Quick-Start ready – “ready and waiting” to start recording.
   - Sometimes the QUICK START button will flash as the camcorder completes some preparations. The camcorder is Quick-Start ready when the button stops flashing and stays on.

2 When you wish to resume recording, press QUICK START again.
   Within approx. 1 second, the camcorder is ready in record pause mode.
NOTES

- When you wake up the camcorder from Quick Start mode, the following settings will be changed automatically.
  - Manual focus returns to automatic focus (AF).
  - Manual exposure adjustment returns to automatic exposure.
  - Zoom position returns to full wide angle W.
- In Quick-Start ready mode, the camcorder consumes only half the power used while recording. Using this mode you can save energy when using a battery pack.
- While the camcorder is in Quick-Start ready mode (QUICK START button lit up):
  - If you change the position of the \( / \) switch, the camcorder will shut off. To restore the power, turn the camcorder off and then on again.
  - The camcorder will shut off if left in the Quick-Start ready mode for 30 minutes, regardless of the [POWER SAVE] setting (43). To restore the power, turn the camcorder off and then on again.
  - If you open the cassette compartment cover, the camcorder will return to record pause mode.

Playback

Playing Back Movies

Play back the tape on the LCD display or close the LCD panel to use the viewfinder. You can also turn the LCD panel and close it with the screen facing out.

1 Holding the lock button pressed down, set the POWER switch to PLAY.
2 Move the \( / \) switch to \( \) (tape).
3 If the joystick guide does not appear on screen, press ( ) to display it.
4 Locate the point where you want to begin the playback.
   Push the joystick ( ) towards \( \) to rewind the tape or ( ) towards \( \) to fast forward.
5 Push the joystick (▲) towards ▶/|| to begin the playback.

**DURING PLAYBACK**

6 Push the joystick (▲) towards ▶/|| again to pause the playback.

7 Push the joystick (▼) towards ■ to stop the playback.

**TO ADJUST THE VOLUME**

1 Press [FUNC].

2 Select (▲▼) [ ]] SPEAKER VOLUME] and adjust (◄▶) the volume.
   • The sound from the built-in speaker will be muted when you close the LCD panel or while the STV-250N Stereo Video Cable is connected to the AV terminal.
   • If you turn off the volume completely, the icon will change to 

3 Press [FUNC] to close the menu.

**SPECIAL PLAYBACK MODES**

To operate the special playback modes use the buttons on the wireless controller. There is no sound during the special playback modes. To return to normal playback, push the joystick (▲) towards ▶/|| or press [PLAY] on the wireless controller.

- **Fast Playback:** Push the joystick (◄) towards ◄ or (►) towards ►. Hold the joystick pressed down to rewind/fast forward the tape while continuing the playback. You can also press and hold [REW] or [FF] on the wireless controller.
- **Reverse Playback:** During normal playback press ◄/||.
- **Frame Reverse/Advance:** During playback pause press ◄/||/+. Keep pressed for continuous frame-by-frame playback.
- **Slow Playback:** During normal or reverse playback press [SLOW+].
- **Double Speed Playback:** During normal or reverse playback press [×2].

**NOTES**

- You can display the date and time of the recording (55).
- During some special playback modes, you may notice some video problems (blocky video artifacts, banding, etc.) in the playback picture.
- To protect the tape and video heads, the camcorder will enter the stop mode (■) if left in playback pause (▶/||) mode for 4 minutes 30 seconds. To resume the playback push the joystick (▲) towards ▶/||.

---

**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.

1 While recording or during playback, press [ZERO SET MEMORY] on the wireless controller at the point you wish to return to later.
   • The time code changes to “0:00:00”.
   • Press [ZERO SET MEMORY] again to cancel the memory.

2 If you marked the zero memory while recording, set the camcorder to [PLAY] mode. If you marked the zero memory during playback, press [■].

3 Press ◄ to locate the zero mark.
   • If the tape counter shows a negative number, press ◄ instead.
   • ◄ appears and the camcorder rewinds/fast forwards the tape.
   • The tape stops at or near the zero mark, ■ disappears and the correct time code will be displayed again.
NOTES

If there are blank sections between recordings, the zero set memory may not work correctly.

Locating the End of the Last Scene

After playing back a tape, use this function to locate the end of the last scene recorded in order to continue recording from that point.

POINTS TO CHECK

Stop the playback before using this function.

1 Press \( \text{FUNC.} \).
2 Select \( \llbracket \downarrow \downarrow \rrbracket \) \( \rightarrow \) END SEARCH\) and press \( \cdot \).
3 Select \( \llbracket \downarrow \rrbracket \) \( \rightarrow \rightarrow \) [EXECUTE] and press \( \cdot \).
   • “END SEARCH” appears.
   • The camcorder rewinds/fast forwards the tape, plays back the last few seconds of the recording and stops the tape.
   • To cancel the search push the joystick \( \downarrow \) towards \( \cdot \).

NOTES

• End search cannot be used once you remove the cassette.
• If there are blank sections between recordings, the end search may not work correctly.
• You cannot use the end search to locate the end of a scene that was audio dubbed.

Locating Scenes by Recording Date

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

Press \( \leftarrow \) or \( \rightarrow \) on the wireless controller.
• Press more than once to search for further date changes (up to 10 times).
• To cancel the search press \( \cdot \).

NOTES

• Recordings shorter than 1 minute per date/time zone cannot be located with this function.
• Date search may not function if the data code is not correctly displayed.

Playing Back Still Images and Movie Clips from a Memory Card

1 Holding the lock button pressed down, set the \( \text{POWER} \) switch to \( \text{PLAY} \).
2 Move the \[ \text{MEMORY} / \text{CARD} \] switch to \[ \text{CARD} \] (memory card).

**To View Still Images**

3 If the joystick guide does not appear on screen, press \( \text{\textendash} \) to display it.

4 Push the joystick (\( \text{\textendash} \)) to move between the images.

**To Play Back Movie Clips**

5 Push the joystick (\( \text{\textendash} \)) towards \( \text{\textendash} \) to begin the playback.
   - Push the joystick (\( \text{\textendash} \)) towards \( \text{\textendash} \) again to pause/resume the playback.
   - Push the joystick (\( \text{\textendash} \)) and hold it pressed towards \( \text{\textendash} \) or \( \text{\textendash} \) to rewind/fast forward the movie clip. You can also press and hold \( \text{REW} \) or \( \text{FF} \) on the wireless controller.
   - Push the joystick (\( \text{\textendash} \)) towards \( \text{\textendash} \) to stop the playback.
   - When the movie playback ends or is stopped, the first frame of the movie appears as a still image.

**IMPORTANT**

- Avoid the following actions while the card access display \( \text{CARD} \) appears on screen, and when the CARD access indicator is on or flashing. Failing to do so may result in permanent data loss.
  - Do not open the memory card slot cover and do not remove the memory card.
  - Do not disconnect the power source or turn off the camcorder.

- Do not change the position of the \[ \text{MEMORY} / \text{CARD} \] switch or the operating mode.

  - The following may not be displayed correctly.
  - Images not recorded with this camcorder.
  - Images edited on or uploaded from a computer (except for the sample images for the Card Mix function (\( \text{\textendash} \) 58)).
  - Images whose file names have been changed.

**Image Jump**

You can jump ahead to a specific image without having to browse all images one by one. With movie clips, you can only start the image jump in stop mode (when the first frame appears as a still image).

Push the joystick (\( \text{\textendash} \)) and hold it pressed down. Release the joystick when the image number gets to the image you want to display.

**Slideshow**

1 Press \( \text{\textendash} \).

2 Select (\( \text{\textendash} \) [ \( \text{\textendash} \) SLIDESHOW] and press (\( \text{\textendash} \)).
   - The still images and movie clips on the memory card are played back in sequence.
   - Press (\( \text{\textendash} \)) to stop the slideshow.

**Index Screen**

1 Move the zoom lever toward \( \text{W} \).
   The index screen appears. Movies on the memory card are marked with a \( \text{\textendash} \).

2 Select (\( \text{\textendash} \), \( \text{\textendash} \)) an image.
   Move the cursor \( \text{\textendash} \) to the image you want to view.
3 Move the zoom lever toward T.
The index screen closes and the selected image is displayed.

---

**Magnifying the Playback Image**

During playback, movies and still images can be magnified up to 5 times. You can also select the area to be magnified.

1 **Move the zoom lever toward T.**
   - The image is magnified by 2 times and a frame appears indicating the position of the magnified area.
   - To further enlarge the image, move the zoom lever toward T. To reduce the magnification, move the zoom lever toward W.
   - • will appear for images that cannot be enlarged.

2 **Select (▲, ◀) the enlarged area of the picture with the joystick.**
To cancel the magnification, move the zoom lever toward W until the frame disappears.

---

**IMPORTANT**

- Movie clips on the memory card cannot be magnified.
- While the magnification position frame is displayed, it will replace the joystick guide. Cancel the magnification to return to normal playback of movies or still images.
Menu Options Lists

Menu items not available appear grayed out. For details about how to select an item, refer to Using the Menus (24).

**FUNC. Menu**

**Recording programs** (45)

Mode switch: 
- [P PROGRAM AE], [PORTRAIT], [SPORTS], [NIGHT], [SNOW], [BEACH], [SUNSET], [SPOTLIGHT], [FIREWORKS]

**White balance** (49)

Mode switch: 
- [AUTO], [DAYLIGHT], [TUNGSTEN], [SET]

**Image effect** (50)

Mode switch: 
- [IMAGE EFFECT OFF], [VIVID], [NEUTRAL], [SOFT SKIN DETAIL]

**Led Light** (56)

- [LIGHT OFF], [LIGHT ON]
Still image size/quality (52)

Size:

[ZR850] [L 1152x864],
[ZR830] [L 1024x768],
[S 640x480]

Quality:

[SUPER FINE], [FINE], [NORMAL]

Still image capturing (54)

[ S FINE/640x480],
[S FINE/640x480],
[S NORMAL/640x480]

SPEAKER VOLUME (32)

Adjust (↑↓) the volume with the joystick.

REC PAUSE (65)

Press ( ) to enter the record pause mode.

END SEARCH (34)

Press ( ) to search.

SLIDESHOW (35)

Press ( ) to start.

Still Image Protect (61)

[PROTECT OFF],
[PROTECT ON]

Protect a still image on the memory card.

This option will appear only when you press [FUNC.] within the time set for the [REVIEW] option (or immediately after recording the still image, if set to [OFF]).

PRINT ORDER (75)

[0] - [99] COPIES

Set a print order for a still image on the memory card.

Transfer Order (71)

[TRANS.ORDER OFF],
[TRANS.ORDER ON]

Set a transfer order for a still image on the memory card.
Setup menus

**CAMERA SETUP**

**SHUTTER**  (46)

Mode switch: P
Recording program: [PROGRAM AE], [AUTO], [1/60], [1/100], [1/250], [1/500], [1/1000], [1/2000]

Mode switch: P
Recording program: [PROGRAM AE], [AUTO], [1/60], [1/100], [1/250]

**A.SL SHUTTER**

[ON ON], [OFF OFF]
The camcorder automatically uses slow shutter speeds to obtain brighter recordings in places with insufficient lighting.

- The camcorder uses shutter speeds down to 1/30 (1/15 in mode).
- If a trailing afterimage appears, set the slow shutter to [OFF OFF].
- If (camcorder shake warning) appears, we recommend stabilizing the camcorder, for example, by mounting it on a tripod.

**D.ZOOM**

[OFF OFF], [105X], [1000X]
Determines the operation of the digital zoom.

- When activated, the camcorder will switch automatically to the digital zoom when you zoom in beyond the optical zoom range.
- With the digital zoom the image is digitally processed, so the image resolution will deteriorate the more you zoom in.
- The digital zoom indicator will appear in light blue from 35x up to 105x and dark blue from 105x up to 1000x.
- The digital zoom cannot be used with the [NIGHT] recording program.

**ZOOM SPEED**

[VAR VARIABLE], [SPEED 3], [SPEED 2], [SPEED 1]

- When set to [VAR VARIABLE] the zoom speed depends on how you operate the zoom lever: Press lightly for a slow zoom; press harder for faster zooms.
- The fastest zoom speed can be achieved with [VAR VARIABLE]. Among the fixed zoom speeds, [SPEED 3] is the fastest and [SPEED 1] the slowest.

**FOCUS PRI.**  (54)

Mode switch: P
[ON: AiAF], [ON: CENTER], [OFF OFF]

**REVIEW**

[OFF OFF], [2sec], [4sec], [6sec], [8sec], [10sec]
Selects the time to display a still image after it has been recorded.
You can erase (60) or protect (61) the image if you press [FUNC.] while you are reviewing the image (or immediately after recording it, if set to [OFF OFF]).

### IMG STAB

Mode switch: [P]
[ON ON], [OFF OFF]
The image stabilizer compensates for camcorder shake even at full telephoto.

- The image stabilizer is designed to compensate for a normal degree of camcorder shake.
- The image stabilizer may not be effective when recording in dark places using the [ NIGHT] recording program.
- The image stabilizer cannot be turned off when the mode switch is set to EASY.
- We recommend setting the image stabilizer to [OFF OFF] when using a tripod.

### WIDESCREEN

[ON ON], [OFF OFF]
The camcorder uses the full width of the CCD providing high-resolution 16:9 recording.

- Since the displays on the camcorder have an aspect ratio of 16:9, recordings with a 4:3 aspect ratio will appear in the center of the screen with black sidebars.
- A still image cannot be simultaneously recorded on the memory card while recording movies in widescreen (16:9) mode.

**Playing back a widescreen recording:** TV sets compatible with the Video ID-1 system will automatically switch to wide (16:9) mode. Otherwise, change the aspect ratio of the TV manually. To play back on a TV with normal aspect ratio (4:3) change the [TV TYPE] setting accordingly (40).

### VCR SETUP

#### REC MODE

[SP STD PLAY], [LP LONG PLAY]
- Recording in LP mode extends the available recording time on the tape 1.5 times.
- Depending on the condition of the tape (long usage, imperfections, etc.) you may notice some video problems (blocky video artifacts, banding, etc.) in the playback picture when playing back recordings made in LP mode. We recommend using the SP mode for important recordings.
- Audio cannot be dubbed on tapes recorded in LP mode.
- If you make recordings in both SP and LP modes on the same tape, during playback you may notice some video problems in the picture at the point where the recording mode changes.
- When playing back in this camcorder tapes recorded in LP mode with other devices or vice versa, you may notice some problems in the playback picture or the sound may stop briefly.

#### TV TYPE

[NTSC NORMAL TV], [PAL WIDE TV]
In order to display the picture in full and in the correct aspect ratio, select the setting.
according to the type of television to which you will connect the camcorder. [NORMAL TV]: TV sets with 4:3 aspect ratio. [WIDE TV]: TV sets with 16:9 aspect ratio.

**AUDIO SETUP**

**OUTPUT CH**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[L/R], [L/L], [R/R]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AUDIO DUB.**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[AV AUDIO IN], [MIC MIC.IN]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WIND SCREEN**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

* **ZZ850**: only when dubbing audio with the built-in microphone.

Mode switch: [P]

[AUTO], [OFF OFF OFF]

The camcorder automatically reduces the background sound of wind when recording outdoors.

• The wind screen cannot be turned off when the mode switch is set to [EASY].

**12bit AUDIO**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[ST-1 STEREO1], [ST-2 STEREO2], [1:1 MIX/FIXED], [+ MIX/VAR.]

**MIX BALANCE**

<table>
<thead>
<tr>
<th>[CAMERA]</th>
<th>[CAMERA]</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[ST-1 ST-2]

When [12bit AUDIO] is set to [MIX/VAR.], adjust (►) the sound balance with the joystick.

• The camcorder will retain the audio balance adjustment, however if you turn off the camcorder, [12bit AUDIO] will be reset to [ST-1 STEREO1].

**AUDIO MODE**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[CAMERA]</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[16bit], [12bit]

**CARD OPERATIONS**

**PRINT ORD.ALL ERASE**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[CAMERA]</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[NO], [YES]

**TRANS.ORD.ALL ERASE**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[CAMERA]</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[NO], [YES]

**ERASE ALL IMAGES**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[CAMERA]</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[NO], [YES]

**INITIALIZE**

<table>
<thead>
<tr>
<th>CAMERA</th>
<th>[CAMERA]</th>
<th>[PLAY]</th>
<th>[PLAY]</th>
</tr>
</thead>
</table>

[NO], [YES]
* The following options are available only when you press [FUNC.] in the index screen.

**PROTECT**

Press ( ) to protect the image.

**PRINT ORDER**

Press ( ) to set the print order.

**TRANSFER ORDER**

Press ( ) to set the transfer order.

**DISPLAY SETUP**

**BRIGHTNESS**

Adjust ( ) the brightness of the LCD display with the joystick.

* Changing the brightness of the LCD display does not affect that of the viewfinder or the recordings.

**BACKLIGHT**

**MARKERS**

You can display a grid or a horizontal line at the center of the screen. The markers are available in white or gray. Use the markers as a reference to make sure your subject is framed correctly (vertically and/or horizontally).

* Using the markers will not affect the recordings on the tape or memory card.

**DISPLAYS**

You can hide the on-screen displays to show only the playback picture on the full screen.

* Tape operation displays appear for 2 seconds.
Warning messages, the data code (if activated), and displays on the index screen will appear regardless of the setting.

All on-screen displays will appear while the playback image is magnified or a digital effect is activated.

**6SEC.DATE**

[ON ON], [OFF OFF]

When you start playing back a tape or when the date of the recording changes, the date and time will be displayed for 6 seconds.

**DATA CODE**

([ ] 55)

[OFF OFF], [DATE], [TIME], [DATE & TIME]

**LANGUAGE**

([ ] 26)

The list of available languages depends on the region where you purchased the camcorder.

Language Set A:
[DEUTSCH], [ENGLISH], [ESPAÑOL], [FRANÇAIS], [ITALIANO], [POLSKI], [РУССКИЙ], [简体中文], [日本語]

Language Set B:
[ENGLISH], [简体中文], [繁體中文], [한국어]

**DEMO MODE**

[ON ON], [OFF OFF]

The demonstration mode displays the camcorder’s main features. It starts automatically when the camcorder is powered with the power adapter if you leave it turned on without loading a recording media for more than 5 minutes.

To cancel the demo mode once it started, press any button, turn off the camcorder or insert a videocassette.

**SYSTEM SETUP**

**WL.REMOTE**

[ON ON], [OFF OFF]

Allows the camcorder to be operated with the wireless controller.

**BEEP**

[HIGH VOLUME], [LOW VOLUME], [OFF OFF]

A beep will accompany some operations like turning on the camcorder, the self-timer countdown, etc. It also serves as a warning beep under unusual conditions.

**POWER SAVE**

[ON ON], [OFF OFF]

In order to save power when the camcorder is powered by a battery pack, it will automatically shut off if left without any operation for five minutes. Approximately 30 seconds before the camcorder shuts off, the message “AUTO POWER OFF” will appear.
FILE NOS.

[_Reset], [Continuous]
Select the image numbering method to be used when you insert a new memory card.
Images are automatically assigned consecutive image 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.
● We recommend using the [Continuous] setting.

DATE/TIME SETUP

[TimeZone/DST] (26)
[Date/Time] (27)

DATE FORMAT

[Y.M.D (2007.1.1 AM 12:00)],
[M.D,Y (JAN. 1, 2007 12:00 AM)],
[D.M.Y (1.JAN.2007 12:00 AM)]
Changes the date format for on-screen displays and for date printing.

FIRMWARE

You can verify the current version of the camcorder’s firmware. This menu option is usually grayed out.
Using the Recording Programs

**Easy Recording**
The camcorder adjusts the focus, exposure and other settings automatically, allowing you to just point and shoot.

- **P PROGRAM AE**
The camcorder sets the aperture and shutter speed.
- **NIGHT**
Use this mode to record in low-light conditions.
- **SUNSET**
Use this mode to record sunsets in vibrant colors.
- **PORTRAIT**
The camcorder uses a large aperture, achieving a focus on the subject while blurring other distracting details.
- **SNOW**
Use this mode to record in bright ski resorts. It prevents the subject from being underexposed.
- **SPOTLIGHT**
Use this mode to record spotlit scenes.
- **SPORTS**
Use this mode to record sports scenes such as tennis or golf.
- **BEACH**
Use this mode to record on a sunny beach. It prevents the subject from being underexposed.
- **FIREWORKS**
Use this mode to record fireworks.
**P: Changing the Shutter Speed and Special Scene Programs**

Use the automatic exposure (AE) program to set the shutter speed or select one of the special scene recording programs.

**POINTS TO CHECK**

**Mode switch:**

- **TO SET THE SHUTTER SPEED IN THE [PROGRAM AE] RECORDING PROGRAM**

**Shutter speed guidelines**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMERA:</td>
<td>1/60</td>
</tr>
<tr>
<td>CAMRA:</td>
<td>1/60</td>
</tr>
</tbody>
</table>

For general recordings.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMERA:</td>
<td>1/100</td>
</tr>
<tr>
<td>CAMRA:</td>
<td>1/100</td>
</tr>
</tbody>
</table>

For recording indoor sports scenes.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMERA:</td>
<td>1/250, 1/500, 1/1000</td>
</tr>
<tr>
<td>CAMRA:</td>
<td>1/250</td>
</tr>
</tbody>
</table>

For recording from within a car or train, or for recording moving subjects such as roller coasters.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Shutter Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMERA:</td>
<td>1/2000</td>
</tr>
</tbody>
</table>

For recording outdoor sports such as golf or tennis on sunny days.

Note that on screen only the denominator is displayed – “P 250” indicates a shutter speed of 1/250, etc.

**NOTES**

- Do not change the position of the mode switch while recording as the brightness of the image may change abruptly.
- **[PROGRAM AE]**
  - When setting the shutter speed, the number displayed will flash if the value selected is not appropriate for the recording conditions. In such case, select a different value.
  - If you use a slow shutter speed in dark places, you can obtain a brighter image, but the image quality may be lower, and the autofocus may not work well.
  - The image may flicker when recording with high shutter speeds.
  - **Recording movies under fluorescent lights:** If the screen starts to flicker, select [PROGRAM AE] and set the shutter speed to 1/100.
  - The shutter speed resets to [AUTO] when you set the mode switch to [EASY] or change the recording program.
- **[PORTRAIT]/[SPORTS]/[BEACH]/[SNOW]**
  - The picture may not appear smooth during playback.
### Adjusting the Picture: Exposure, Focus and Color

#### Manual Exposure Adjustment

At times, backlit subjects may appear too dark (underexposed) or subjects under very strong lights may appear too bright or glaring (overexposed). To correct this, you can manually adjust the exposure.

#### POINTS TO CHECK

1. If the joystick guide does not appear on screen, press ( ) to display it.
2. Push the joystick ( ) towards [EXP].
   - [EXP] on the joystick guide changes to light blue and the exposure adjustment indicator and the neutral value “±0” appear on the screen.
   - If you operate the zoom during exposure lock, the brightness of the image may change.
3. Adjust ( ) the brightness of the image as required.
   - The adjustment range and the length of the exposure adjustment indicator will vary depending on the initial brightness of the picture.
   - Pushing the joystick ( ) towards [EXP] again will return the camcorder to automatic exposure.
4. Push the joystick ( ) towards [BACK] to save the exposure setting.

---

- **[PORTRAIT]**
  - The blur effect of the background increases the more you zoom in (T).
- **[NIGHT]**
  - 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.
- **[SNOW]/[BEACH]**
  - The subject may become overexposed on cloudy days or in shaded places. Check the image on the screen.
- **[FIREWORKS]**
  - To avoid camcorder shake, we recommend using a tripod. Make sure to use a tripod especially in [CAMERA], as the shutter speed slows down.
Manual Focus Adjustment

Autofocus may not work well on the following subjects. In such case, focus manually.

Reflective surfaces

Subjects with low contrast or without vertical lines

Fast moving subjects

Through wet windows

Night scenes

POINTS TO CHECK

Mode switch: 

1 Adjust the zoom.
2 If the joystick guide does not appear on screen, press ( ) to display it.
3 Push the joystick ( ) towards [FOCUS] to activate the manual focus.

[FOCUS] on the joystick guide will be displayed in light blue and “MF” appears on the screen.
4 Adjust ( ) the focus as necessary.

- Push the joystick ( ) towards ▲ for a farther focal distance or push it ( ) towards ▼ for a closer focal distance.
- Pushing the joystick ( ) towards [FOCUS] again will return the camcorder to autofocus.

5 Push the joystick (▲) towards [BACK] to save the focus adjustment.

NOTES

The camcorder will automatically return to autofocus when you set the mode switch to EASY.

Infinity Focus

Use this function when you wish to focus on faraway subjects such as mountains or fireworks.

1 Adjust the zoom.
2 Keep the joystick pushed ( ) towards [FOCUS] for more than 2 seconds.

•  appears.
• Pushing the joystick ( ) towards [FOCUS] again will return the camcorder to autofocus.
• Operating the zoom or the joystick ( ) will return the camcorder to manual focus adjustment.
3 Push the joystick (▲) towards [BACK] to save the focus adjustment.
White Balance

The white balance function helps you accurately reproduce colors under different lighting conditions so that white objects will always look truly white in your recordings.

**POINTS TO CHECK**

**Mode switch:** [P]

**Options**

<table>
<thead>
<tr>
<th>Desired option*</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] AUTO]*</td>
</tr>
<tr>
<td>[ ] DAYLIGHT</td>
</tr>
<tr>
<td>[ ] TUNGSTEN</td>
</tr>
<tr>
<td>[ ] SET</td>
</tr>
</tbody>
</table>

*When you select [ , SET], do not press [FUNC.] and continue instead with the procedure below.

**TO SET THE CUSTOM WHITE BALANCE**

1. Point the camcorder at a white object, zoom in until it fills the whole screen and press ( ).
   When the adjustment is completed, stops flashing and stays on. The camcorder retains the custom setting even if you turn off the camcorder.
2. Press [FUNC.] to save the setting and close the menu.

**NOTES**

- When you select the custom white balance [ , SET]:
  - Make the white balance adjustment in a place with sufficient light.
  - Set [D.ZOOM] to [ OFF] (39).
  - Readjust the white balance if the lighting conditions change.
  - Very rarely and depending on the light source, may keep on flashing instead of staying on. Even in that case, the white balance would be properly adjusted and the results should be better than with [ AUTO].
- 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 and certain types of fluorescent lights
Image Effects
You can use the image effects to change the color saturation and contrast to obtain different results.

POINTS TO CHECK

Mode switch: P

Options

- [IMAGE EFFECT OFF]*
  Records with no image enhancing effects.

- [VIVID]
  Emphasizes the contrast and color saturation.

- [NEUTRAL]
  Tones down the contrast and color saturation.

- [SOFT SKIN DETAIL]
  Softens the details in the skin tone area for a more complimentary appearance.

Audio Recording and Playback

Audio Recording Mode
You can change the quality of the audio recording.

POINTS TO CHECK

Options

- [16bit] 16bit
  Records audio at the highest quality.

- [12bit]*
  Records audio on 2 channels (Stereo 1) leaving 2 channels free (Stereo 2) for audio dubbing or for adding a sound track later.

ABOUT THE WIND SCREEN
The camcorder automatically reduces the background sound of wind, but you can turn the wind screen off when you want the microphone to be as sensitive as possible (41).
Audio Playback Modes

Selecting the Audio Channel
You can select the audio channel to play back when playing back a tape with audio recorded on two channels (either stereo sound or bilingual audio signals).

Points to Check

Options

Selecting the Audio Track on a Tape with Dubbed Audio
You can select the audio track to play back when playing back a tape that has a dubbed audio track (Stereo 2) in addition to the original recorded audio (Stereo 1).
Recording Options using the Memory Card

Selecting the Size and Quality of Still Images

Still images are recorded on the memory card using the JPEG (Joint Photographic Experts Group) compression. As a general rule select a larger image size for higher quality.

Options

Approximate number of still images that can be recorded on different sizes of memory cards with the following quality settings:

- : [SUPER FINE], : [FINE],  : [NORMAL].

On a 32 MB memory card

<table>
<thead>
<tr>
<th>Image Size</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L 1152x864</td>
<td>40</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td>L 1024x768</td>
<td>50</td>
<td>75</td>
<td>150</td>
</tr>
<tr>
<td>S 640x480</td>
<td>140</td>
<td>200</td>
<td>365</td>
</tr>
</tbody>
</table>

On a 128 MB memory card

<table>
<thead>
<tr>
<th>Image Size</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L 1152x864</td>
<td>185</td>
<td>280</td>
<td>545</td>
</tr>
<tr>
<td>L 1024x768</td>
<td>220</td>
<td>330</td>
<td>635</td>
</tr>
<tr>
<td>S 640x480</td>
<td>585</td>
<td>850</td>
<td>1,530</td>
</tr>
</tbody>
</table>

On a 512 MB memory card

<table>
<thead>
<tr>
<th>Image Size</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L 1152x864</td>
<td>735</td>
<td>1,115</td>
<td>2,155</td>
</tr>
<tr>
<td>L 1024x768</td>
<td>885</td>
<td>1,310</td>
<td>2,515</td>
</tr>
<tr>
<td>S 640x480</td>
<td>2,320</td>
<td>3,355</td>
<td>6,040</td>
</tr>
</tbody>
</table>

* Default value with the ZR850

<table>
<thead>
<tr>
<th>Icon of the currently selected Image Quality/Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired image size*</td>
</tr>
<tr>
<td>PressFUNC.</td>
</tr>
<tr>
<td>Desired image quality*</td>
</tr>
</tbody>
</table>

* The number displayed on the right corner indicates the approximate number of images that can be recorded with the current quality/size setting.

NOTES

- Depending on the number of images on the memory card (Windows: more than 1,800 images; Macintosh: more than 1,000 images), you may not be able to download images to a computer. Try using a card reader.
- Connection to a PictBridge compatible printer will not work when the memory card contains more than 1,800 images. For best performance, we recommend to keep the number of images on the memory card under 100.
Selecting the Size of Movie Clips on the Memory Card

Movies are recorded on the memory card using the Motion-JPEG compression. The sound for these movie clips is monaural.

**Options**

Approximate recording time available on different sizes of memory cards.

- **[320](320x240)**
  - File Size per Second: Approx. 250 KB.

<table>
<thead>
<tr>
<th>Memory Card</th>
<th>Recording Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 MB</td>
<td>2 min.</td>
</tr>
<tr>
<td>128 MB</td>
<td>8 min.</td>
</tr>
<tr>
<td>512 MB</td>
<td>33 min.</td>
</tr>
</tbody>
</table>

- **[160](160x120)**
  - File Size per Second: Approx. 120 KB.

<table>
<thead>
<tr>
<th>Memory Card</th>
<th>Recording Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 MB</td>
<td>4 min.</td>
</tr>
<tr>
<td>128 MB</td>
<td>18 min.</td>
</tr>
<tr>
<td>512 MB</td>
<td>70 min.</td>
</tr>
</tbody>
</table>

Capturing a Still Image while Recording Movies

While you are recording a movie on the tape you can simultaneously capture the same picture as a still image on the memory card without interrupting your recording to change modes. The size of the still image will be 640x480 and cannot be changed but the quality of the still image can be selected.

**POINTS TO CHECK**

* In **mode, the default is [320](320x240).*

TO CAPTURE THE STILL IMAGE

While you are recording a movie, press [PHOTO]. The still image is recorded on the memory card while the screen continues to show the video recording.
NOTES

- The still image cannot be recorded on the memory card while recording in widescreen (16:9) mode or while a digital effect is activated.
- To record still images we recommend using the CAMERA mode, which offers the best quality for still images.

Capturing a Still Image or Movie Clip from the Playback Picture

While you are playing back a tape you can capture the picture as a still image or as a movie clip on the memory card. The size of the still image will be [640x480] and cannot be changed.

Select the quality of the still image with the procedure below. Refer to Selecting the Size of Movie Clips on the Memory Card (10 3) to select the size of the movie clip.

TO CAPTURE A STILL IMAGE
During playback or in playback pause mode, press PHOTO.

TO CAPTURE A MOVIE CLIP
During Playback or in playback pause mode, press [Start/Stop].

Press [Start/Stop] again to stop the recording.

NOTES

The data code of the captured still image/movie clip will reflect the date and time when it was recorded on the memory card.

Automatic Focus Priority

When the focus priority is activated, the camcorder records a still image only after the focus has been adjusted automatically. When the mode switch is set to P, you can also select the AF (autofocus) frame.

Options

* Default value

FUNC. (10 24)

[ON: AiAF]*
(Mode switch: P*, EASY)

Depending on the shooting conditions, one or more AF frames out of the nine frames available are automatically selected and the focus is fixed on them.

[ON: CENTER]
(Mode switch: P*)

A single focusing frame appears in the center of the screen and the focus is automatically fixed on the center AF frame. This is convenient for making sure the focus is exactly where you want it.

[OFF]
(Mode switch: P)

Select this option if you wish to record a still image as soon as you press PHOTO. The focus priority cannot be turned off when the mode switch is set to EASY.

* Except for the FIREWORKS recording program.
NOTES

In the [FIREWORKS] recording program the focus priority is automatically set to [OFF].

Other Functions

Data Code

The camcorder keeps a data code containing the date and time of recording. You can select the data to be displayed.

Options

<table>
<thead>
<tr>
<th>Desired option</th>
</tr>
</thead>
<tbody>
<tr>
<td>[OFF]†</td>
</tr>
<tr>
<td>No data code display.</td>
</tr>
<tr>
<td>[DATE], [TIME]</td>
</tr>
<tr>
<td>Displays the date or time when the scene or still image was recorded.</td>
</tr>
<tr>
<td>[DATE &amp; TIME]</td>
</tr>
<tr>
<td>Displays both the date and time of the recording.</td>
</tr>
</tbody>
</table>

Advanced Functions

FUNC. (24)

FUNC. ⇒ MENU

CAMERA SETUP

FOCUS PRI.

FUNC. ⇒ Desired option

FUNC. (24)

FUNC. ⇒ MENU

DISPLAY SETUP/

DATA CODE

FUNC. ⇒ Desired option
**LED Light**

You can turn on the LED light (assist lamp) at any time, regardless of the recording program.

- Press \( \text{FUNC.} \) \( \text{LIGHT OFF} \) to turn the LED light off.

**Self Timer**

**POINTS TO CHECK**

- Set the camcorder in record pause mode.

**Digital Effects**

**[ FADE-T] Faders**

Begin or end scenes with a fade to or from black. You can preview the effect on the display.

- Press \( \text{FADER} \) \( \text{FADE-T} \).
- Select [FADE-T] to [WIPE] to cancel the self timer.

**NOTES**

Once the countdown has begun, you can also press \( \text{Start/Stop} \) (when recording movies) or press \( \text{PHOTO} \) fully (when recording still images) to cancel the self timer. The self timer will also be canceled if you turn off the camcorder.

- Press \( \text{PHOTO} \) to record the still image.
- The camcorder will record the still image after a 10-second countdown*. The countdown appears on the screen.

* 2 seconds when using the wireless controller.
**Other Functions**

### Advanced Functions

#### [\[ EFFECT\] Effects

Add flavor to your recordings. Sound will be recorded normally. You can preview the effect on the display.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[BLK&amp;WHT]</td>
<td>(black and white)</td>
</tr>
<tr>
<td>[SEPIA]</td>
<td></td>
</tr>
<tr>
<td>[ART]</td>
<td></td>
</tr>
<tr>
<td>[MOSAIC]</td>
<td></td>
</tr>
<tr>
<td>[BALL]</td>
<td></td>
</tr>
<tr>
<td>[CUBE]</td>
<td></td>
</tr>
<tr>
<td>[WAVE]</td>
<td>(color mask)</td>
</tr>
<tr>
<td>[COLOR M.]</td>
<td></td>
</tr>
</tbody>
</table>

#### [\[ CARD MIX\] Card Mix (\[ 58\)]

Combines a still image from the memory card with your recording.

#### Selecting a Fader / Effect

**POINTS TO CHECK**

- **Mode switch:** [P]
- **Default value**

**START**

- **D.EFFECT OFF**

**FUNC.**

- **FUNC.**

**Applying**

1. **Press** [D.EFFECTS] to activate the fader/effect.
   - The icon of the selected effect turns green.
   - Press [D.EFFECTS] again to deactivate the fader/effect.

**To Fade In**

- **Press** [D.EFFECTS] ...
  - **CAMERA** (\[ 25\]): ...in record pause mode, then press **Start/Stop** to start recording with a fade in.
  - **PLAY** (\[ 25\]): ...in playback pause mode, then push the joystick (\[ \]) towards \[ \] to fade in and start the playback.
To Fade Out

Press [D.EFFECTS] ...
- **CAMERA** (CAMERA): ...while recording, then press [Start/Stop] to fade out and pause the recording.
- **PLAY** (PLAY): ...during playback, then push the joystick (▲) towards ▶/❚❚ to fade out and pause the playback.

To Activate an Effect

Press [D.EFFECTS] ...
- **CAMERA** (CAMERA): ...while recording or in record pause mode.
- **PLAY** (PLAY): ...during playback.
- **CAMERA** (CAMERA): ...and then press [PHOTO] to record the still image in black and white.

NOTES

- When you are not using the digital effect, select [D.EFFECT OFF].
- The camcorder retains the setting last used even if you turn off the digital effects or change the recording program.
- The digital effects are not available when [TV TYPE] is set to [NORMAL TV] and the stereo video cable is connected to the AV terminal.

Combining Images (Card Mix)

You can choose one of the sample images (including picture frames and backgrounds) from the collection on the supplied DIGITAL VIDEO SOLUTION DISK and combine it with your live video recording to add a note of playfulness to your movies.

The card mix combines illustrations or titles with your recordings. The live video recording will appear instead of the light area of the card mix image.

Mix level adjustment: Light area of the still image.

POINTS TO CHECK

Upload to the memory card a sample image from the supplied DIGITAL VIDEO SOLUTION DISK software CD-ROM. Refer to Adding Still Images from your Computer to the Memory Card in the electronic instruction manual (PDF file) included on the same CD-ROM.

Mode switch: [P] *Default value*

**FUNC.** (24)

Setting

Icon of the currently selected Digital Effect

CARD MIX

To set the card mix

1. Select (▲▼) [IMAGE SELECT] and then select (◀▶) the still image you want to combine.
2. If you want to adjust the mix level, select (▲▼) [MIX LEVEL] and set (◀▶) the level preferred.
3. Press (◉) to save the settings and press [FUNC.] to close the menu. appears.
Applying

Press \texttt{D.EFFECTS}.  
- The \texttt{M} changes to green and the combined image appears.  
- Still images cannot be recorded on the memory card while the Card Mix function is activated.
Still Image Options

Erasing Still Images

**IMPORTANT**
Be careful when erasing images. Erased images cannot be recovered.

**NOTES**
- Protected images cannot be erased.
- Movie clips on the memory card can only be erased when the first scene is displayed as a still image (not during playback).

**Erasing a Single Image**

1 If the joystick guide does not appear on screen, press ( ) to display it.
2 Select ( ) the image you want to erase.
3 Push the joystick ( ) towards ( ) to erase the image.
4 Select ( ) [ERASE] and press ( ).

**Erasing a Single Image Just After Recording**

You can erase the last recorded still image while reviewing it within the time set for the [REVIEW] option (or immediately after recording it, if [REVIEW] is set to [OFF OFF]).

**Erasing All Images**

While reviewing the image immediately after recording:

- Press ( ) to enter the FUNC. menu.
- Select ( ) [IMAGE ERASE] and press ( )
- Select ( ) [ERASE] and press ( )

- Press ( ) to enter the FUNC. menu.
- Select ( ) [CARD OPERATIONS] and press ( )
- Select ( ) [ERASE ALL IMAGES] and press ( )
- Select ( ) [YES] and press ( )
Protecting Still Images

You can protect still images from accidental erasure.

**IMPORTANT**

Initializing the memory card (p. 62) will permanently erase all recorded still images, even the protected ones.

**NOTES**

Movie clips on the memory card can only be protected when the first scene is displayed as a still image (not during playback).

**Protecting a Single Image**

You can protect the last recorded still image while reviewing it within the time set for the [REVIEW] option (or immediately after recording it, if [REVIEW] is set to [OFF OFF]).

**Protecting a Single Image Just After Recording**

You can protect the last recorded still image while reviewing it within the time set for the [REVIEW] option (or immediately after recording it, if [REVIEW] is set to [OFF OFF]).

* To cancel the image protection, select [PROTECT OFF] instead.

---

**Protecting a Single Image**

* To cancel the image protection, select [PROTECT OFF] instead.

---

**Protecting a Single Image**

* To cancel the image protection, select [PROTECT OFF] instead.

---

**Protecting a Single Image**

* To cancel the image protection, select [PROTECT OFF] instead.
Protecting Still Images from the Index Screen

Move the zoom lever toward W to enter the still image index screen.

**FUNCTION.**

1. Press the MENU button.
2. Select CARD OPERATIONS and press the button.
3. Select INITIALIZE and press the button.
4. Select YES and press the button.

*Appears on protected images. Press ( ) again to cancel the protection.
**After closing the menu the camcorder returns to the index screen.

Initializing the Memory Card

Initialize new memory cards when you use them for the first time. You may also have to initialize a card if you get the “CARD ERROR” message or you may choose to do so to erase all data recorded on it.

**IMPORTANT**
- Initializing the memory card will erase all still images and movie clips, even the protected ones. The original image files cannot be recovered.
- Initialize all memory cards before using them with this camcorder.

**FUNCTION.**

1. Press the MENU button.
2. Select CARD OPERATIONS and press the button.
3. Select INITIALIZE and press the button.
4. Select YES and press the button.

*Appears on protected images. Press ( ) again to cancel the protection.
**After closing the menu the camcorder returns to the index screen.
Connecting to a TV or VCR

Connection Diagrams
Turn off all the devices when making the connections and refer also to the instruction manual of the connected device.

<table>
<thead>
<tr>
<th>Terminal on the Camcorder</th>
<th>Connecting Cable</th>
<th>Terminal on the Connected Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Output connection (Signal Flow →) to a TV or VCR with AV Terminals. Input connection (Audio only, Signal flow ←) from an analog source for audio dubbing.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Image of AV and DV terminals]</td>
<td>STV-250N Stereo Video Cable (Supplied)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yellow, White, Red</td>
</tr>
</tbody>
</table>

2. Output connection (Signal Flow →) to an HDTV with a DV (IEEE1394) terminal. Input connection (Signal Flow ←) from a TV or other digital video source with a DV (IEEE1394) output.

[Diagram of DV cable with 4-pin and 6-pin connections]

* Be careful to correctly insert the 6-pin plug into the DV terminal. Inserting it in the wrong direction can result in damage to the camcorder.
Connecting to a TV or VCR

Playback on a TV Screen
The quality of the playback picture will vary depending on the connected TV and the type of connection used.

Before making the connections, select the [TV TYPE] setting according to the TV set to which you will connect the camcorder (40).

Connecting
Connect the camcorder to the TV following one of the connection diagrams shown in the previous section Connection Diagrams (63).

Playback

1 Turn on the camcorder and the connected TV or VCR.
   On a TV: Set the input selector to VIDEO. On a VCR: Set the input selector to LINE (IN).
2 Start the playback of the movies (32) or still images (34).

NOTES
● Turn off all the devices before starting the connections.
● We recommend powering the camcorder using the compact power adapter.

Recording to a VCR or Digital Video Recorder
You can copy your recordings by connecting the camcorder to a VCR or a digital video device. When recording to a digital video recorder using the DV terminal, you can copy recordings with virtually no generation loss in video and sound quality.

Connect the camcorder to the external device following one of the connection diagrams shown in the previous section Connection Diagrams (63).

Connecting
Connect the camcorder to a VCR or other analog device using connection type 1, or to a DVD recorder or other digital recording device using connection type 2, as shown in the previous section Connection Diagrams (63).

Recording

1 This camcorder: Load the recorded cassette.
2 Connected device: Load a blank cassette or disc and set the device to record pause mode.
3 This camcorder: Locate the scene you wish to copy and pause the playback shortly before the scene.
4 This camcorder: Resume the movie playback.
   When using an analog connection you can include in the copy also the date/time of the original recording (55).
5 Connected device: Begin recording when the scene you wish to copy appears. Stop recording when copying is complete.
6 This camcorder: Stop playback.

NOTES
● We recommend powering the camcorder using the compact power adapter.
● When recording to a VCR using an analog connection –connection type 1 (63)–, the quality of the edited tape will be lower than the original.
Connecting to a TV or VCR

When recording to a digital video recorder using the DV terminal –connection type 2 (63)–:
- If the picture does not appear, disconnect the DV cable and restore the connection after a short while or turn the camcorder off and then on again.
- Proper operation cannot be guaranteed for all digital devices equipped with a DV terminal. If the operation does not work, use the AV terminal.

Digital Video Dubbing

You can input video from other digital video devices and record the input video on the tape in the camcorder.

Connecting

Connect the camcorder to the video input source using the digital connection –connection type 2 (63)– shown in the previous section Connection Diagrams.

Dubbing

1 Load a blank cassette in this camcorder.
2 Connected device: Load the recorded cassette or disc.
3 Press FUNC., select (▲▼) [REC PAUSE] and press (▲▼).
4 Select (◄►) [EXECUTE] and press (▲▼).
5 Connected device: Start the playback.
   In record pause mode and while recording you can check the picture on the camcorder’s screen.

6 When the scene you wish to record appears, push the joystick (▲) towards ●/■ to begin recording. Recording starts.
7 While recording, push the joystick (▲) towards ●/■ to pause the recording.
   In record pause, push the joystick (▲) towards ●/■ again to resume recording.
8 Push the joystick (▼) towards ■ to stop recording.
9 Connected device: Stop the playback.

IMPORTANT
- Blank sections may be recorded as anomalous picture.
- If the picture does not appear, disconnect the DV cable and restore the connection after a short while or turn the camcorder off and then on again.
- Do not connect any devices to the camcorder’s USB terminal while an external device is connected to the DV terminal.
- You can only record video signals in DV standard (standard definition, SP or LP mode) from devices carrying the DV logo. Note that signals from identically shaped DV (IEEE1394) terminals may be in different video standards.

NOTES

We recommend powering the camcorder using the compact power adapter.

Copyright Signal

Certain software tapes are copyright protected. If you attempt to play back such tape, “COPYRIGHT PROTECTED PLAYBACK IS RESTRICTED” appears and you will not be able to view the contents of
the tape. If you attempt to record from such tape via the HDV/DV terminal, “COPYRIGHT PROTECTED DUBBING RESTRICTED” appears and you will not be able to record the contents of the tape.

---

**Audio Dubbing**

You can add sound to a recording using the built-in microphone.

**Connecting an External Audio Device**

Connect the external audio device (CD player, etc.) to the camcorder using connection type 1 (63). Connect only the audio plugs (red and white) of the STV-250N Stereo Video Cable and leave the yellow video plug unconnected. Refer also to the instruction manual of the connected device.

**To Select the Audio Source**

Options

<table>
<thead>
<tr>
<th></th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>[AV AUDIO IN]*</td>
<td>Dub audio from an external analog device.</td>
</tr>
<tr>
<td>[M I C. M I C. IN]</td>
<td>Dub audio using the built-in microphone.</td>
</tr>
</tbody>
</table>

1 Locate the scene you wish to start audio dubbing. Before locating the starting point, you can also set the zero set memory (33) at the point where you want the audio dubbing to end. The camcorder will automatically stop audio dubbing at that point.

2 Press [PAUSE II].

3 Press [AUDIO DUB]. “AUDIO DUB.” and \(\text{II}\) appear.
4 Press [PAUSE] to begin dubbing.
   - Audio device: Begin playback.
   - Microphone: Speak into the microphone.

5 Press [STOP] to stop dubbing.
   - Audio device: Stop playback.

**IMPORTANT**

- Audio dubbing will stop if the tape has a blank section or a section recorded in LP mode or [16bit] audio.
- You cannot use the DV terminal for audio dubbing.
- The quality of the dubbed sound will not be as good when dubbing audio to a tape that was not recorded with this camcorder or after having dubbed audio over the same scene more than 3 times.

**NOTES**

- While dubbing audio using the built-in microphone: You can connect the camcorder to a TV to check the picture on the TV screen and check the sound through headphones connected to the TV.
- While dubbing audio using an external audio device: You can check the picture on the camcorder's LCD screen and the sound through the built-in speaker or the audio device.

**TO SELECT THE AUDIO TRACK FOR PLAYBACK**

You can select the audio track that will be played when playing back a tape that was audio dubbed (51).
## Connecting to a Computer

### PC Connection Diagrams

**DV Terminal**
Check the type and orientation of the terminal and make sure you connect the DV cable properly.

**USB Terminal**
Open the terminal cover to access.

---

<table>
<thead>
<tr>
<th>Terminal on the Camcorder</th>
<th>Connecting Cable</th>
<th>Terminal on the Connected Device</th>
</tr>
</thead>
</table>
| **1** Output connection (Signal Flow ➔) to a computer with a DV (IEEE1394) terminal or a DV capture board. | ![DV Cable](image)  
(DV Cable (Commercially available)) | ![4-pin](image)  
| ![6-pin*](image)  |

* Be careful to correctly insert the 6-pin plug into the DV terminal. Inserting it in the wrong direction can result in damage to the camcorder.

| **2** Output connection (Signal Flow ➔) to a PC or PictBridge compatible printer with an USB port. | ![USB Cable](image)  
(USB Cable (Supplied)) | ![USB](image)  |
Transferring Video Recordings
You can transfer recordings to a computer using the DV terminal.

Equipment and System Requirements
- A computer equipped with an IEEE1394 (DV) terminal or an IEEE1394 (DV) capturing board.
- A DV cable (commercially available).
- Video Editing Software.
- The appropriate driver
  A driver is preinstalled on Windows operating systems later than Windows 98 Second Edition and Mac operating systems later than Mac OS 9, and will be installed automatically.

Connecting

1 Start the computer.
2 Set the camcorder to [Play] mode.
3 Connect the camcorder to the computer using the digital connection –connection type [ ] (68)– shown in the previous section PC Connection Diagrams.
4 Start the video editing software.
   Refer to the instruction manual of the editing software.

IMPORTANT
- The video transfer may not work correctly depending on the software and the specifications/settings of your computer.
- If the computer freezes while the camcorder is connected to it, disconnect the DV cable and turn off the camcorder and the computer. After a short while, turn them on again, set the camcorder to [Play] mode and restore the connection.
- Before connecting the camcorder to the computer using a DV cable, make sure that the camcorder and computer are not connected with a USB cable, and that no other IEEE1394 device is connected to the computer.
- Depending on the video editing software, you may need to set the POWER switch on the camcorder to a mode other than PLAY. Refer to the instruction manual of the editing software.

NOTES
- We recommend powering the camcorder using the compact power adapter.
- Refer also to the instruction manual of the computer.
- The programs ZoomBrowser EX and Image Browser included with the supplied CD-ROM can only be used to transfer still images recorded on the memory card. Video recordings on the tape cannot be transferred to the computer using the software included with the supplied CD-ROM.

Transferring Still Images or Movie Clips – Direct Transfer
You can transfer still images and movie clips recorded on the memory card to a computer using the supplied USB cable and the Digital Video Software included in the software CD-ROM.

Preparations
The first time you connect the camcorder to the computer, you need to install the software and set the auto-launch setting. From the second time on, you will only need to connect the camcorder to the computer to transfer images.

1 Install the supplied Digital Video Software.
2 Set the camcorder to [Play] mode.
3 Connect the camcorder to the computer using the USB connection—connection type [2] (68)—shown in the previous section PC Connection Diagrams.


4 Set the auto-launch setting.
   • See Starting CameraWindow (Windows) or Auto-downloading (Macintosh) in the Digital Video Software instruction manual (electronic version on PDF file).
   • The direct transfer menu appears on the camcorder screen.

**IMPORTANT**

- When the CARD access indicator is on or flashing do not perform the following actions. Doing so may result in permanent data loss.
  - Do not open the memory card slot cover and do not remove the memory card.
  - Do not disconnect the USB cable.
  - Do not turn off the camcorder or the computer.
  - Do not change the position of the / switch or the operating mode.

- Operation may not work correctly depending on the software and the specifications/settings of your computer.

- The image files on your memory card are valuable, original data files. If you wish to use the image files on your computer, make copies of them first, and use the copied file, retaining the original.

**NOTES**

- We recommend powering the camcorder using the compact power adapter.
- Refer also to the computer’s instruction manual.
- Users of Windows XP and Mac OS X: Your camcorder is equipped with the standard Picture Transfer Protocol (PTP) allowing you to download still images (JPEG only) simply by connecting the camcorder to a computer using the USB cable without installing the software from the supplied software CD-ROM.

**Transferring Images**

- **[ALL IMAGES...]**
  Transfers all images to the computer.

- **[NEW IMAGES...]**
  Transfers only those images that have not yet been transferred to the computer.

- **[TRANSFER ORDERS...]**
  Transfers images with transfer orders (71) to the computer.

- **[SELECT & TRANSFER...]**
  Allows you to select the still image you want to transfer to the computer.

- **[WALLPAPER...]**
  Allows you to select the still image you want to transfer and set it as your computer’s desktop background.
1 Select (▼) a transfer option and press (■).

**IF YOU SELECT [ALL IMAGES], [NEW IMAGES] OR [TRANSFER ORDERS]**

2 In the confirmation screen, select (►) [OK] and press (■).
   - The images are transferred and displayed on the computer.
   - The camcorder returns to the transfer menu once the transfer is complete.
   - To cancel the transfer, select (◄) [CANCEL] and press (■), or press FUNC..

**IF YOU SELECT [SELECT & TRANSFER] OR [WALLPAPER]**

2 Select (◄►) the image you wish to transfer and press (■).
   - [SELECT & TRANSFER]: The selected image is transferred and displayed on the computer. To continue transferring, select another image.
   - [WALLPAPER]: The selected image is transferred to the computer and displayed as the desktop’s background.
   - Press FUNC. to return to the transfer menu.

**NOTES**

When the camcorder is connected to the computer and the image selection screen is displayed, press FUNC. to return to the transfer menu.

**Transfer Orders**

You can mark the still images you want to transfer to the computer as a transfer order. You can set transfer orders for up to 998 still images.

**Selecting Still Images to Transfer (Transfer Order)**

Do not connect the USB cable to the camcorder while setting the transfer orders.

[Diagram of camera and computer connected via USB cable]  (10)

**FUNC.**  (24)

**FUNC.** \(\Rightarrow\) TRANSORDER OFF

**FUNC.** \(\Rightarrow\) TRANSORDER ON*

* To cancel a transfer order, select [TRANS. ORDER OFF] instead.

**Setting Transfer Orders from the Index Screen**

[Diagram of camera and computer connected via USB cable]  (10)

Move the zoom lever toward W to enter the still image index screen.

**FUNC.**  (24)
Connecting to a Printer

Printing Still Images – Direct Print

The camcorder can be connected to any PictBridge compatible printer. You can mark the still images you want to print and set the desired number of copies as a print order (75).

**CANON PRINTERS:** SELPHY CP and SELPHY DS printers and PIXMA printers marked with the PictBridge logo.

Connecting the Camcorder to the Printer

1. Insert the memory card containing the still images you want to print.
2. Turn on the printer.
3. Connect the camcorder to the printer using the USB connection –connection type (68)– shown in the previous section PC Connection Diagrams.

If continues to flash (for more than 1 minute) or if does not appear, the camcorder is not correctly connected to the printer. In such case, disconnect the USB cable and turn off the camcorder and the printer. After a short while, turn them on again, set the camcorder to mode and restore the connection.

**NOTES**

- will appear for images that cannot be printed.
- We recommend powering the camcorder using the compact power adapter.
- Refer also to the printer’s instruction manual.
## Selecting the Print Settings

You can select the number of copies and other settings for printing. The setting options vary depending on your printer model.

### Options

<table>
<thead>
<tr>
<th>Paper settings</th>
<th>Current paper settings (paper size, paper type and page layout)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of copies</td>
<td>Select 1-99 copies.</td>
</tr>
<tr>
<td>Print effect</td>
<td></td>
</tr>
<tr>
<td>Date printing</td>
<td></td>
</tr>
</tbody>
</table>

#### [PAPER]

- **[PAPER SIZE]**
  Available paper sizes vary depending on the printer model.

- **[PAPER TYPE]**
  Select [PHOTO], [FAST PHOTO] or [DEFAULT].

- **[PAGE LAYOUT]**
  Select [DEFAULT] or one of the following available page layouts.
  - [BORDERED]: Prints the whole image area almost exactly as the recorded still image.
  - [BORDERLESS]: Enlarges the center portion of the still image to fit the width/height ratio of the selected paper size. The top, bottom and sides of the still image may be slightly trimmed out.
  - [2-UP], [4-UP], [8-UP], [9-UP], [16-UP]: Prints multiple small copies of the same still image on one sheet of paper.

- **[Date print]**
  Select [ON], [OFF] or [DEFAULT].

#### [Print Effect]

The print effect can be used with printers compatible with the Image Optimize function to achieve higher quality prints. Select [ON], [OFF] or [DEFAULT].

- **Canon PIXMA/SELPHY DS printers**: You can also select [VIVID], [NR] and [VIVID+NR].

- **Number of Copies**
  Select 1-99 copies.

### NOTES

- Print setting options and [DEFAULT] settings vary depending on the printer model. For details, refer to the printer’s instruction manual.
- **Canon PIXMA/SELPHY DS Printers**: When the paper size is set to [10 x 14.8 cm] you can print multiple small copies on a single print by selecting 2-, 4-, 9- or [16-UP]. You can also use this setting to print on the specially designed photo stickers sheets.
  - When the paper size is set to [A4] you can print 4 copies on the same sheet by selecting [4-UP].

- **Canon PIXMA/SELPHY CP Printers**: When the paper size is set to [CREDITCARD] you can print multiple small copies on a single print by selecting 2-, 4-, or [8-UP]. You can also use [8-UP] to print on the specially designed photo stickers sheets.
  - When the paper size is set to [10 x 14.8 cm] or [9 x 13 cm] you can print 2 or 4 copies on the same sheet by selecting [2-UP] or [4-UP].
  - When you are using the specially designed wide-sized photo paper you can set the paper size to [DEFAULT] and print 2 or 4 copies on the same sheet by selecting [2-UP] or [4-UP].
Printing after Changing the Print Settings

1 Press P.SET.
   • The print setting menu appears.
   • Depending on the printer, the message “BUSY.” may appear before the camcorder displays the print setting menu.

2 In the print settings menu, select (△, ▼) the setting you want to change and press (●).

3 Select (△) the desired setting option and press (●).

4 Select (△) [PRINT] and press (●).
   • Printing starts. The print setting menu disappears when the printing is completed.
   • To continue printing, select another still image.

TO CANCEL THE PRINTING
Press (●) while printing. A confirmation dialog appears. Select [OK] and press (●). With Canon’s PictBridge compatible printers, the printing will stop immediately (even if not completed) and the paper will be fed through.

PRINTING ERRORS
If an error occurs during the printing process, an error message appears ( 81).
- Canon’s PictBridge compatible printers:
  Resolve the error. When printing does not resume automatically, select [CONTINUE] and press (●). If [CONTINUE] cannot be selected, select [STOP], press (●) and retry printing.

Refer also to the printer’s instruction manual for details.
- If the error still persists and printing does not restart, disconnect the USB cable and turn off the camcorder and the printer. After a short while, turn them on again, set the camcorder to mode and restore the connection.

WHEN YOU HAVE FINISHED PRINTING
Disconnect the cable from the camcorder and printer and turn off the camcorder.

IMPORTANT
• The following still images may not be correctly printed with a PictBridge compatible printer.
  - Images created or changed on a computer and transferred to the memory card.
  - Images recorded with the camcorder but edited on a computer.
  - Images whose file names were changed.
  - Images not recorded with this camcorder.
• Observe the following precautions during printing:
  - Do not turn off the camcorder or the printer.
  - Do not change the position of the / switch.
  - Do not disconnect the USB cable.
  - Do not remove the memory card.
• If the message “BUSY.” does not disappear, disconnect the USB cable and restore the connection after a short while.
Print Orders

You can mark the still images you want to print and set the desired number of copies as a print order. These print order settings are compatible with the Digital Print Order Format (DPOF) standards and can be used for printing on DPOF compatible printers (72). You can set print orders for up to 998 still images.

Selecting Still Images for Printing (Print Order)

Do not connect the USB cable to the camcorder while setting the print orders.

* To cancel the print order, set the number of copies to 0.

Setting Print Orders from the Index Screen

Move the zoom lever toward W to enter the still image index screen.

* and the number of copies appear on images marked with a print order. To cancel the print order set ( ) the number of copies to 0.

**After closing the menu the camcorder returns to the index screen.

Erasing All Print Orders

* and the number of copies appear on images marked with a print order. To cancel the print order set ( ) the number of copies to 0.

**After closing the menu the camcorder returns to the index screen.
Connecting to a Printer

Printing

1 Connect the camcorder to the printer using the USB connection – connection type [ ] shown in the previous section PC Connection Diagrams.
2 Press [FUNC.], select [▲▼] [MENU] and press [ ].
3 Select [▲▼] [ ] [PRINT] and press [ ].
   • The print setting menu appears.
   • The error message “SET ▲ PRINT ORDER” appears if you connect a printer with direct print function and select [PRINT] without having set any print orders.
4 Make sure that [PRINT] is selected and press [ ].
   Printing starts. The print setting menu disappears when the printing is completed.

NOTES

- Depending on the connected printer, you can change some print settings before step 4 ( 1 73).
- Cancel Printing/Printing Errors ( 1 74).
- Restarting Printing: Open the print menu as explained in steps 2-3 above. Select [RESUME] in the print setting menu and press [ ]. The remaining images will be printed. Printing cannot be restarted when the print order settings have been changed or if you deleted a still image with print order settings.
### 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

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Camcorder will not turn on.</td>
<td>Battery pack is exhausted. Replace or charge the battery pack.</td>
</tr>
<tr>
<td>• The camcorder switches off by itself.</td>
<td>Attach the battery pack correctly.</td>
</tr>
<tr>
<td>• The cassette compartment cover will not open.</td>
<td>Use the compact power adapter.</td>
</tr>
<tr>
<td>• The cassette compartment stopped half way while inserting/removing a tape.</td>
<td></td>
</tr>
<tr>
<td>• The LCD/viewfinder switches on and off.</td>
<td></td>
</tr>
<tr>
<td>Battery pack will not charge.</td>
<td>Charge the battery pack in temperatures between 0 °C and 40 °C (32 °F and 104 °F).</td>
</tr>
<tr>
<td></td>
<td>Battery packs become hot with use and may not charge. When the battery pack is outside the charging temperature range, the CHG (charge) indicator will flash irregularly. The charging will start once the battery pack temperature is below 40 °C (104 °F).</td>
</tr>
<tr>
<td></td>
<td>The battery pack is damaged. Use a different battery pack.</td>
</tr>
<tr>
<td></td>
<td>If you connect a faulty power adapter or battery pack, the CHARGE indicator flashes approx. twice per second and the charging stops.</td>
</tr>
<tr>
<td></td>
<td>Check that the compact power adapter is correctly connected to the camcorder.</td>
</tr>
</tbody>
</table>

#### Recording/Playback

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buttons will not work.</td>
<td>Turn on the camcorder.</td>
</tr>
<tr>
<td></td>
<td>Load a cassette.</td>
</tr>
<tr>
<td>Abnormal characters appear on the screen. The camcorder does not operate properly.</td>
<td>Disconnect the power source and reconnect it after a short time. If the problem still persists, disconnect all power sources (including the battery pack and the backup battery). This will reset all the camcorder’s settings.</td>
</tr>
<tr>
<td>“” flashes on the screen.</td>
<td>Load a cassette.</td>
</tr>
<tr>
<td>“” flashes on the screen.</td>
<td>Battery pack is exhausted. Replace or charge the battery pack.</td>
</tr>
<tr>
<td>“A” flashes on the screen.</td>
<td>Condensation is detected. See reference page.</td>
</tr>
<tr>
<td>“REMOVE THE CASSETTE” appears on the screen.</td>
<td>Remove the cassette and reinsert it.</td>
</tr>
<tr>
<td>The wireless controller will not work.</td>
<td>Set [WL.REMOTE] to [ON].</td>
</tr>
<tr>
<td></td>
<td>The battery of the wireless controller is exhausted. Replace the battery.</td>
</tr>
</tbody>
</table>
## Problem Solution

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video noise appears on screen.</td>
<td>When using the camcorder in a room where a plasma TV is located, keep a distance between the camcorder and the plasma TV.</td>
</tr>
<tr>
<td>Video noise appears on the TV screen.</td>
<td>When using the camcorder in a room where a TV is located, keep a distance between the compact power adapter and the power or antenna cables of the TV.</td>
</tr>
<tr>
<td>The tape stops during record pause or playback pause.</td>
<td>To protect the tape and video heads, the camcorder will enter the stop mode (■) if left in playback pause (▶■) or record pause (●■) mode for 4 minutes 30 seconds. To resume the operation press [Start/Stop] (when recording) or push the joystick (▲) towards ▶/■ (during playback).</td>
</tr>
<tr>
<td>Image will not appear on the screen.</td>
<td>Set the camcorder to [CAMERA (CAMERA).</td>
</tr>
<tr>
<td>“SET THE TIME ZONE, DATE AND TIME” appears on the screen.</td>
<td>Set the time zone, date and time.</td>
</tr>
<tr>
<td>Pressing the start/stop button will not start recording.</td>
<td>Set the camcorder to [CAMERA (CAMERA).</td>
</tr>
<tr>
<td>Camcorder will not focus.</td>
<td>Autofocus does not work on that subject. Focus manually.</td>
</tr>
<tr>
<td>Sound is distorted.</td>
<td>When recording near loud sounds (such as fireworks or concerts), sound may become distorted.</td>
</tr>
<tr>
<td>Viewfinder picture is blurred.</td>
<td>Adjust the viewfinder with the dioptic adjustment lever.</td>
</tr>
</tbody>
</table>

### Recording

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image will not appear on the screen.</td>
<td>Set the camcorder to [CAMERA (CAMERA).</td>
</tr>
<tr>
<td>“SET THE TIME ZONE, DATE AND TIME” appears on the screen.</td>
<td>Set the time zone, date and time.</td>
</tr>
<tr>
<td>Pressing the start/stop button will not start recording.</td>
<td>Set the camcorder to [CAMERA (CAMERA).</td>
</tr>
<tr>
<td>Camcorder will not focus.</td>
<td>Autofocus does not work on that subject. Focus manually.</td>
</tr>
<tr>
<td>Sound is distorted.</td>
<td>When recording near loud sounds (such as fireworks or concerts), sound may become distorted.</td>
</tr>
<tr>
<td>Viewfinder picture is blurred.</td>
<td>Adjust the viewfinder with the dioptic adjustment lever.</td>
</tr>
</tbody>
</table>

### Playback

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>During playback there is video noise.</td>
<td>Video heads are dirty. Clean the video heads.</td>
</tr>
<tr>
<td>Pressing the playback button does not start playback.</td>
<td>Load a cassette.</td>
</tr>
<tr>
<td></td>
<td>Set the camcorder to [PLAY (PLAY).</td>
</tr>
<tr>
<td></td>
<td>Tape reached the end (“[ END” appears on the screen). Rewind the tape or replace the cassette.</td>
</tr>
</tbody>
</table>
## Problem Solution

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sound from the built-in speaker.</td>
<td>Open the LCD panel.</td>
</tr>
<tr>
<td></td>
<td>Speaker volume is turned off. Adjust the volume with the [SPEAKER VOLUME] setting.</td>
</tr>
<tr>
<td>Image will not appear on the TV screen.</td>
<td>Check again that the camcorder is properly connected to the TV.</td>
</tr>
<tr>
<td>Tape is running, but image will not appear on the TV screen.</td>
<td>TV/VIDEO selector on the TV is not set to VIDEO. Set the selector to VIDEO.</td>
</tr>
<tr>
<td></td>
<td>Video heads are dirty. Clean the video heads.</td>
</tr>
<tr>
<td></td>
<td>You attempted to play back or dub copyright a protected tape. Stop playback/dubbing.</td>
</tr>
<tr>
<td>Memory card cannot be inserted.</td>
<td>Memory card was not facing the correct direction. Turn the memory card over and reinsert it.</td>
</tr>
<tr>
<td>Cannot record on the memory card.</td>
<td>Memory card is full. Erase still images to free some space or replace the memory card.</td>
</tr>
<tr>
<td></td>
<td>Memory card was not initialized. Initialize the memory card.</td>
</tr>
<tr>
<td></td>
<td>The folder and file numbers have reached their maximum value. Set [FILE NOS.] to [RESET] and insert a new memory card.</td>
</tr>
<tr>
<td>Memory card cannot be played back.</td>
<td>Set the camcorder to [PLAY].</td>
</tr>
<tr>
<td>Image cannot be erased.</td>
<td>Image is protected. Cancel the protection.</td>
</tr>
<tr>
<td></td>
<td>The write-protect switch on an SD or SDHC memory card is set to prevent accidental erasure. Change the position of the write-protect switch.</td>
</tr>
<tr>
<td>“[ ]” flashes in red.</td>
<td>Card error occurred. Turn off the camcorder. Remove and reinsert the memory card. Initialize the memory card if flashing persists.</td>
</tr>
</tbody>
</table>

## Printing

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The printer is not operating even though the camcorder and printer are correctly connected.</td>
<td>Disconnect the USB cable and turn off the camcorder and the printer. After a short while, turn them on again, set the camcorder to [PLAY] mode and restore the connection.</td>
</tr>
</tbody>
</table>

## Editing

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot record with this camcorder video input from an external video device connected using a DV cable.</td>
<td>Wrong signal standard. Refer also to the instruction manual of the connected device.</td>
</tr>
</tbody>
</table>
## List of Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Explanation/Solution</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET THE TIME ZONE, DATE AND TIME</td>
<td>You have not set the time zone, date and time. This message appears each time you turn on until you set the time zone, date and time.</td>
<td>26</td>
</tr>
<tr>
<td>CHANGE THE BATTERY PACK</td>
<td>Battery pack is exhausted. Replace or charge the battery pack.</td>
<td>19</td>
</tr>
<tr>
<td>THE TAPE IS SET FOR ERASURE PREVENTION</td>
<td>Cassette is protected. Replace the cassette or change the position of the protect switch.</td>
<td>84</td>
</tr>
<tr>
<td>REMOVE THE CASSETTE</td>
<td>Camcorder stopped operating to protect the tape. Remove the cassette and reinsert it.</td>
<td>21</td>
</tr>
<tr>
<td>CHECK THE INPUT</td>
<td>The DV cable is not correctly connected to the DV terminal, or the connected digital device is turned off.</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>The video input signal is in a different television system (PAL or SECAM).</td>
<td>–</td>
</tr>
<tr>
<td>CONDENSATION HAS BEEN DETECTED</td>
<td>Condensation has been detected in the camcorder.</td>
<td>86</td>
</tr>
<tr>
<td>CONDENSATION HAS BEEN DETECTED</td>
<td>Condensation has been detected in the camcorder. Remove the cassette.</td>
<td>86</td>
</tr>
<tr>
<td>REMOVE THE CASSETTE</td>
<td>Tape reached the end. Rewind the tape or replace the cassette.</td>
<td>–</td>
</tr>
<tr>
<td>CHECK THE CASSETTE [REC MODE]</td>
<td>You attempted to dub audio on a tape recorded in a recording mode other than SP.</td>
<td>66</td>
</tr>
<tr>
<td>CHECK THE CASSETTE [AUDIO MODE]</td>
<td>You attempted to dub audio on a tape recorded with an audio mode other than [16bit].</td>
<td>66</td>
</tr>
<tr>
<td>CHECK THE CASSETTE [BLANK]</td>
<td>You attempted to dub audio on a tape with a blank section.</td>
<td>66</td>
</tr>
<tr>
<td>CHECK THE CASSETTE [INCORRECT TAPE SPECIFICATION]</td>
<td>You attempted to dub audio on a tape recorded in HD standard.</td>
<td>–</td>
</tr>
<tr>
<td>INCORRECT TAPE SPECIFICATION</td>
<td>You attempted to play back a tape recorded in a different television system (PAL or SECAM) or in a recording standard not supported by this camcorder.</td>
<td>–</td>
</tr>
<tr>
<td>INPUT SIGNAL NOT SUPPORTED</td>
<td>The digital device connected with the DV cable is incompatible with the camcorder.</td>
<td>–</td>
</tr>
<tr>
<td>HEADS DIRTY, USE CLEANING CASSETTE</td>
<td>Video heads are dirty. Clean the video heads.</td>
<td>2</td>
</tr>
<tr>
<td>COPYRIGHT PROTECTED PLAYBACK IS RESTRICTED</td>
<td>You attempted to play back a copyright protected tape.</td>
<td>65</td>
</tr>
<tr>
<td>COPYRIGHT PROTECTED DUBBING RESTRICTED</td>
<td>You attempted to dub a copyright protected tape. May also appear when an anomalous signal is received during analog line-in recording.</td>
<td>65</td>
</tr>
<tr>
<td>NO CARD</td>
<td>Memory card not is inserted into the camcorder.</td>
<td>22</td>
</tr>
<tr>
<td>NO IMAGES</td>
<td>No images are recorded on the memory card.</td>
<td>–</td>
</tr>
</tbody>
</table>
### Message | Explanation/Solution
---|---
**CARD ERROR** | A memory card error occurred. The camcorder cannot record or display the image. The error may be temporary. If the message disappears after 4 seconds and “□” flashes red, turn the camcorder off, remove the card and reinsert the card. If “□” changes to green, you can continue recording/playback.
**CARD FULL** | Memory card is full. Erase some images to free some space or replace the memory card.
**THE CARD IS SET FOR ERASURE PREVENTION** | The write-protect switch on an SD or SDHC memory card is set to prevent accidental erasure. Change the position of the write-protect switch.
**NAMING ERROR** | The folder and file numbers have reached their maximum value. Set the [FILE NOS.] option to [RESET] and erase all the images on the memory card or initialize it.
**UNIDENTIFIABLE IMAGE** | The image file is corrupted or it was saved using a compression method other than that compatible with this camcorder (JPEG).
**Transfer Order Error** | You attempted to set more than 998 transfer orders.
**Print Order Error** | You attempted to set more than 998 still images in the print order.
**CANNOT TRANSFER!** | You attempted to transfer a still image that cannot be displayed with this camcorder.
**THIS IMAGE CANNOT BERecorded** | Some analog images cannot be recorded on the memory card depending on the signal.
**TOO MANY STILL IMAGES DISCONNECT USB CABLE** | Disconnect the USB cable and decrease the number of still images on the memory card to less than 1800. If a dialog appeared on the computer screen, close it and then restore the connection.

---

### Direct Print Related Messages

**NOTES**

About Canon PIXMA/SELPHY DS Printers: If the printer’s error indicator flashes or an error message appears on the printer’s operation panel, refer to the printer’s instruction manual.

<table>
<thead>
<tr>
<th>Message</th>
<th>Explanation/Solution</th>
</tr>
</thead>
</table>
**PAPER ERROR** | There is a problem with the paper. The paper is not correctly loaded or the paper size is wrong. Alternatively, if the paper output tray is closed, open it to print. |
**NO PAPER** | Paper is not correctly inserted or there is no paper. |
**PAPER JAM** | The paper jammed during printing. Select [STOP] to cancel printing. After removing the paper, set some paper again and retry printing. |
**INK ERROR** | There is a problem with the ink. |
**NO INK** | The ink cartridge is not inserted or is out of ink. |
<table>
<thead>
<tr>
<th>Message</th>
<th>Explanation/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW INK LEVEL</td>
<td>The ink cartridge needs to be replaced soon. Select [CONTINUE] to restart printing.</td>
</tr>
<tr>
<td>INK ABSORBER FULL</td>
<td>Select [CONTINUE] to resume printing. Contact a Canon Service Center (refer to the list included with the printer) to replace the ink absorber.</td>
</tr>
<tr>
<td>• FILE ERROR</td>
<td>You attempted to print an image that was recorded with another camcorder, with a different compression, or was edited on a computer.</td>
</tr>
<tr>
<td>• CANNOT PRINT!</td>
<td></td>
</tr>
<tr>
<td>SET PRINT ORDER</td>
<td>No still image on the memory card has been marked with a print order.</td>
</tr>
<tr>
<td>PRINTER ERROR</td>
<td>Cancel printing. Turn the printer off and then on again. Check the printer status. If the error still persists, refer to the printer’s instruction manual and contact the appropriate customer support center or service center.</td>
</tr>
<tr>
<td>PRINT ERROR</td>
<td>Cancel printing, disconnect the USB cable and turn off the printer. After a while, turn the printer back on and reconnect the USB cable. Check the printer status.</td>
</tr>
<tr>
<td>HARDWARE ERROR</td>
<td>Cancel printing. Turn off the printer and turn it back on. Check the printer status. If the printer is equipped with a battery, it might be exhausted. In such case, turn off the printer, replace the battery and turn it back on.</td>
</tr>
<tr>
<td>COMMUNICATION ERROR</td>
<td>The printer is experiencing a data transfer error. Cancel printing. Disconnect the USB cable and turn off the camcorder and the printer. After a short while, turn them on again, set the camcorder to [PLAY] mode and restore the connection. If you attempted to print from a memory card that contains a large number of images, reduce the number of images.</td>
</tr>
<tr>
<td>PRINTER IN USE</td>
<td>The printer is in use. Check the printer status.</td>
</tr>
<tr>
<td>PAPER LEVER ERROR</td>
<td>Paper lever error occurred. Adjust the paper selection lever to the proper position.</td>
</tr>
<tr>
<td>PRINTER COVER OPEN</td>
<td>Close the printer cover securely.</td>
</tr>
<tr>
<td>NO PRINTHEAD</td>
<td>No print head is installed in the printer or the print head is defective.</td>
</tr>
</tbody>
</table>
Handling Precautions

Camcorder

- Do not carry the camcorder by the LCD panel. Be careful when closing the LCD panel.
- Do not leave the camcorder in places subject to high temperatures (like the inside of a car under direct sunlight), or high humidity.
- Do not use the camcorder near strong electric or magnetic fields such as above TVs, near plasma TVs or mobile phones.
- Do not point the lens or viewfinder at strong light sources. Do not leave the camcorder pointed at a bright subject.
- Do not use or store the camcorder in dusty or sandy places. The camcorder is not waterproof – avoid also water, mud or salt. If any of the above should get into the camcorder it may damage the camcorder and/or the lens.
- 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.

Battery Pack

**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 °C (140 °F). Do not leave it near a heater or inside a car in hot weather.
- Do not try to disassemble or modify it.
- Do not drop or knock it.
- Do not get it wet.

- Charged battery packs continue to discharge naturally. Therefore, charge them on the day of use, or the day before, to ensure a full charge.
- Attach the terminal cover whenever a battery pack is not in use. Contact with metallic objects may cause a short circuit and damage the battery pack.
- Dirty terminals may cause a poor contact between the battery pack and the camcorder. Wipe the terminals with a soft cloth.
- Since storing a charged battery pack for a long time (about 1 year) can shorten its lifecycle or affect performance, we recommend to discharge the battery pack fully and to store it in a dry place at temperatures no higher than 30 °C (86 °F). 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 °C to 40 °C (32 °F to 104 °F), the optimal range is from 10 °C to 30 °C (50 °F to 86 °F). At cold temperatures, performance will temporarily decline. Warm it in your pocket before use.
Do’s and Don’ts

- 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.

**Back side of the battery pack**

- Terminal cover attached
  - Charged
  - Uncharged

**Cassette**

- Rewind tapes after use. A slack or damaged tape may cause video problems and/or audio distortions during playback.
- Return cassettes to the 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 removing and reinserting the cassette. 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 SAVE or ERASE OFF.

**Memory Card**

- We recommend saving backups of memory card images on your computer. Image data may be corrupted or lost due to memory card defects or exposure to static electricity. Canon Inc. makes no warranties for corrupted or lost data.
- Do not turn off the camcorder, disconnect the power source or remove the memory card while the CARD access indicator is flashing.
- Do not use memory cards in places subject to strong magnetic fields.
- Do not leave memory cards in places subject to high humidity and high temperature.
- Do not disassemble, bend, drop, or subject memory cards to shocks and do not expose them to water.
- Do not touch or expose the terminals to dust or dirt.
- Check the direction before inserting the memory card. Forcing a memory card into
the slot if it is not correctly oriented may damage the memory card or the camcorder.

- Do not attach any labels or stickers on 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.
- Keep the battery out of the reach of children. If swallowed, seek medical assistance immediately. The battery case may break and the battery fluids may cause internal damage.
- Do not disassemble, heat or immerse the battery in water to avoid the risk of explosion.
- For California, USA only: Included lithium battery contains Perchlorate Material – special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate for details.

### Lithium Button Battery

**WARNING!**

- The battery used in this device may present a fire or chemical burn hazard if mishandled. Do not recharge, disassemble, heat above 100 °C (212 °F) or incinerate the battery.

Backup battery CR1616:
- Replace the battery with a CR1616 made by Panasonic, Hitachi Maxell, Sony, Toshiba, Varta or Renata. Use of other batteries may present a risk of fire or explosion.

Lithium battery for the wireless controller CR2025:
- Replace the battery with a CR2025 made by Panasonic, Hitachi Maxell, Sony, Sanyo, or with Duracell2025. Use of other batteries may present a risk of fire or explosion.
- Dispose of the used battery according to applicable recycling regulations.

- Do not pick up the battery using tweezers or other metal tools as this will cause a short circuit.
- Wipe the battery with a clean dry cloth to ensure proper contact.
**Maintenance/Others**

**Cleaning the Camcorder**

**Camcorder Body**
- Use a soft, dry cloth to clean the camcorder body. Never use chemically treated cloth or volatile solvents such as paint thinner.

**Lens and Viewfinder**
- If the lens surface is dirty, the autofocus may not work properly.
- Remove any dust or dirt particles using a non-aerosol type blower brush.
- Use a clean, soft lens-cleaning cloth to gently wipe the lens or viewfinder. Never use tissue paper.

**LCD Screen**
- Clean the LCD screen using a clean, soft lens-cleaning cloth.
- Condensation may form on the surface of the screen when the temperature changes suddenly. Wipe it with a soft dry cloth.

**Storage**
- If you do not intend to use the camcorder for a long time, store it in a place free of dust, in low humidity, and at temperatures not higher than 30 °C (86 °F).

---

**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
Do's and Don'ts

To avoid condensation
● Do not expose the camcorder to sudden or extreme changes in temperature.
● Remove 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 automatically shuts off, the warning message “CONDENSATION HAS BEEN DETECTED” appears for approx. 4 seconds and starts flashing.
● If a cassette is loaded, the warning message “REMOVE THE CASSETTE” appears and starts flashing. Remove the cassette immediately and leave the cassette compartment open. Leaving the cassette in the camcorder may damage the tape.
● A cassette cannot be loaded when condensation is detected.

Resuming use
● The precise time required for water droplets to evaporate will vary depending on the location and weather conditions. 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 the Canon Service Center for information on plug adapters for overseas use.

Playback on a TV screen
You can only play back your recordings on TVs compatible with the NTSC system. The NTSC system is used in the following countries/areas:
American Samoa, Antigua, Aruba, Bahamas, Barbados, Bermuda, Bolivia, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guam, Guatemala, Greenland, Haiti, Honduras, Jamaica, Japan, Korea, Mexico, Micronesia, Myanmar, Nicaragua, Panama, Peru, Philippines, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Surinam, Taiwan, Trinidad and Tobago, USA, Venezuela, Virgin Islands.
The BP-2L5 is not available as a separate optional accessory.
Optional Accessories

Call or visit your local retailer/dealer for genuine Canon video accessories. You can also obtain genuine accessories for your Canon camcorder by calling: 1-800-828-4040, Canon U.S.A. Information Center.

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
When you need extra battery packs, select one of the following models: NB-2L, NB-2LH, BP-2L12, BP-2L14.

<table>
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<tr>
<th>Battery Pack</th>
<th>Charging Time*</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP-2L5</td>
<td>70 min</td>
</tr>
<tr>
<td>NB-2L</td>
<td>80 min</td>
</tr>
<tr>
<td>NB-2LH</td>
<td>90 min</td>
</tr>
<tr>
<td>BP-2L12</td>
<td>150 min</td>
</tr>
<tr>
<td>BP-2L14</td>
<td>170 min</td>
</tr>
</tbody>
</table>

* Charging time varies according to the charging condition.

CB-2LW Battery Charger
Use the battery charger for charging the battery packs. It plugs directly into a power outlet without a cable.

CBC-NB2 Car Battery Charger
Use the car battery charger to charge battery packs on the move. The car battery cable plugs into your car’s cigarette lighter and runs off a 12-24 V DC negative ground battery.
**Shoulder Strap**
You can attach a shoulder strap for more security and portability. Pass the ends through the strap mount and adjust the length of the strap.

**WS-20 Wrist Strap**
Use this for extra additional protection for active shooting.

**SC-2000 Soft Carrying Case**
A handy camcorder bag with padded compartments and plenty of space for accessories.

This mark identifies genuine Canon video accessories. When you use Canon video equipment, we recommend Canon-brand accessories or products bearing the same mark.
### Product Codes

#### Provided Accessories
- CA-590 Compact Power Adapter: D85-1671-000
- WL-D85 Wireless Controller: D83-0712-000
- STV-250N Stereo Video Cable: 3067A002AA (D82-0590-201)
- IFC-300PCU USB Cable: 6906A001AA

#### Optional Accessories
- BP-2L12 Battery Pack: 7871A002AA
- BP-2L14 Battery Pack: 9582A002AA
- NB-2L Battery Pack: 7302A001AA
- CB-2LW Battery Charger: 0763B001AA
- CBC-NB2 Car Battery Charger: 7873A002AA
- WS-20 Wrist Strap: 3118A002AA (D81-0190-202)
- SC-2000 Soft Carrying Case: 9389A001AA
- DVM-CL DV Cleaning Cassette: 3134A002AA (D36-0032-201)
## Specifications

### ZR850/ZR830

#### System

**Video Recording System**
- 2 rotary heads, helical scanning DV system (consumer digital VCR SD system), digital component recording

**Audio Recording System**
- PCM digital sound: 16 bit (48 kHz/2 channels); 12 bit (32 kHz)

**Television System**
- EIA standard (525 lines, 60 fields) NTSC color signal

**Image Sensor**
- 1/6-inch CCD, approx. 1,070,000 pixels
  - **Effective pixels**
    - 16:9 Movies (Image stabilizer [ON]) approx. 550,000 pixels
    - 16:9 Movies (Image stabilizer [OFF]) approx. 710,000 pixels
    - 4:3 Movies approx. 690,000 pixels
    - Still images approx. 800,000 pixels
- 35 mm equivalent:
  - 16:9 Movies (Image stabilizer [ON]) 47.1–1,649
  - 16:9 Movies (Image stabilizer [OFF]) 41.7–1,460
  - 4:3 Movies 44.6–1,561
  - Still images 41.5–1,453

**Compatible Tapes**
- Videocassettes bearing the “IN” mark

**Tape Speed**
- SP: 18.81 mm/s (0.74 ips); LP: 12.56 mm/s (0.49 ips)

**Maximum Recording Time (60 min. tape)**
- SP: 60 minutes; LP: 90 minutes

**LCD Screen**
- 2.7 in., wide, TFT color, approx. 112,000 pixels

**Viewfinder**
- 0.35 in., wide, TFT color, approx. 114,000 pixels

**Microphone**
- Stereo electret condenser microphone

**Lens**
- f=2.6–91 mm, F/2.0–5.0, 35x power zoom
  - 35 mm equivalent:
    - 16:9 Movies (Image stabilizer [ON]) 47.1–1,649
    - 16:9 Movies (Image stabilizer [OFF]) 41.7–1,460
    - 4:3 Movies 44.6–1,561
    - Still images 41.5–1,453
  - 35 mm equivalent:
    - 16:9 Movies (Image stabilizer [ON]) 45.8–1,603
    - 16:9 Movies (Image stabilizer [OFF]) 41.0–1,435
    - 4:3 Movies 49.8–1,743
    - Still images 43.6–1,526

**Lens Configuration**
- 10 elements in 8 groups

**AF system**
- TTL autofocus, manual focus available

**Minimum Focusing Distance**
- 1 m (3.3 ft.); 1 cm (0.39 in.) on maximum wide angle

**White Balance**
- Auto white balance, preset white balance (DAYLIGHT, TUNGSTEN) or custom white balance

**Minimum Illumination**
- 2 lx ([NIGHT] recording program, Shutter speed at 1/8)
  - 8 lx (Easy recording mode, Auto slow shutter [ON], Shutter speed at 1/30)

**Recommended Illumination**
- More than 100 lx

**Image Stabilization**
- Electronic

### Memory Card

**Recording Media**
- SDHC (SD High Capacity) memory card, SD memory card, MultiMedia Card (MMC) *

**Size of Still Images**
- 1,152 x 864 (**ZR850** only), 1,024 x 768 (**ZR830** only), 640 x 480 pixels
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<tr>
<th>General Information</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Size of Movie Clips</strong></td>
<td>320 x 240, 160 x 120 pixels; 15 frames/sec.</td>
</tr>
<tr>
<td><strong>File Format</strong></td>
<td>Design rule for Camera File system (DCF), Exif 2.2 compliant, DPOF compliant</td>
</tr>
</tbody>
</table>

* This camcorder has been tested with SD memory cards up to 2 GB. Performance cannot be guaranteed for all memory cards.
** This camcorder supports Exif 2.2 (also called “Exif Print”). Exif Print is a standard for enhancing the communication between camcorders and printers. By connecting to an Exif Print-compliant printer, the camcorder’s image data at the time of shooting is used and optimized, yielding extremely high quality prints.

### Input/Output Terminals

**AV Terminal**

∅ 3.5 mm minijack, [Zoom]: Video output only, Audio input/output; [Zoom]: output only

<table>
<thead>
<tr>
<th>Size of Movie Clips</th>
<th>320 x 240, 160 x 120 pixels; 15 frames/sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>File Format</strong></td>
<td>Design rule for Camera File system (DCF), Exif 2.2 compliant, DPOF compliant</td>
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### Power/Others

<table>
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<th>Power supply (rated)</th>
<th>7.4 V DC (battery pack), 8.4 V DC (compact power adapter)</th>
</tr>
</thead>
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<tr>
<td><strong>Power consumption</strong> (AF on)</td>
<td>[Zoom] 2.3 W, [Zoom] 2.1 W</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 – 40 °C (32 – 104 °F)</td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>57 x 92 x 119 mm (2.2 x 3.6 x 4.7 in.) excluding the grip belt</td>
</tr>
<tr>
<td>Weight (camcorder body only)</td>
<td>380 g (13.4 oz.)</td>
</tr>
</tbody>
</table>

### CA-590 Compact Power Adapter

| Power input | 100 – 240 V AC, 50/60 Hz, 0.14 – 0.08 A |
| Rated output | 8.4 V DC, 0.6 A |
| Operating temperature | 0 – 40 °C (32 – 104 °F) |
| Dimensions | 46 x 26 x 70 mm (1.8 x 1.0 x 2.8 in.) |
| Weight | 95 g (3.4 oz.) |

### BP-2L5 Battery Pack

| Battery type | Rechargeable Lithium Ion Battery |
| Rated voltage | 7.4 V DC |
| Operating temperature | 0 – 40 °C (32 – 104 °F) |
| Battery capacity | 530 mAh |
| Dimensions | 33.3 x 16.2 x 45.2 mm (1.3 x 0.64 x 1.8 in.) |
| Weight | 40 g (1.4 oz.) |

Weight and dimensions are approximate. Errors and omissions excepted. Subject to change without notice.
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CANON CONSUMER DIGITAL VIDEO EQUIPMENT LIMITED WARRANTY FOR THE UNITED STATES

The warranty set forth below is given by Canon U.S.A., Inc. with respect to equipment purchased in the United States. The limited warranty is only effective upon presentation of your Bill of Sale or other proof of purchase. Canon consumer digital video equipment is warranted under normal, non-commercial, personal use, against defective materials or workmanship as follows:

Parts: Defective parts will be exchanged for new parts or comparable rebuilt parts for a period of ONE YEAR from the date of original purchase, except for a defective Video Head, which will be exchanged for a period of three months from the date of purchase.

Labor: For a period of ONE YEAR from the date of original purchase, labor will be provided free of charge by our factory service centers or designated service facilities located in the United States. When returning equipment under this warranty, you must pre-pay the shipping charges, and you must enclose the Bill of Sale or other proof of purchase with a complete explanation of the problem. During your ONE-YEAR warranty period, repairs will be made and the equipment return-shipped to you free of charge. If your warranty period is over, you will be given an estimate of the cost of repair and an opportunity to approve or disapprove of the repair expense before it is incurred. If you approve, repairs will be made and the equipment return-shipped to you. (shipping charges apply). If you disapprove, we will return-ship the equipment at no charge to you.

Non-Canon brand peripheral equipment and software which may be distributed with Canon DV camcorders are sold “AS IS” without warranty of any kind by CUSA, including any implied warranty regarding merchantability or fitness for a particular purpose. The sole warranty with respect to such non-Canon brand items is given by the manufacturer or producer thereof.

CUSA shall have no responsibility under this limited warranty for use of Canon DV Camcorders in conjunction with incompatible peripheral equipment and incompatible software.

In order to obtain warranty service, contact the authorized Canon retail dealer from whom you purchased the DV Camcorder or call the CANON INFORMATION CENTER AT 1-800-828-4040). You will be directed to the nearest service facility for your product.

This Limited Warranty covers all defects encountered in normal use of the equipment and does not apply in the following cases:

A) Loss or damage to the equipment due to abuse, mishandling, accident, improper maintenance, or failure to follow operating instructions;
B) If the equipment is defective as a result of leaking batteries, sand, dirt or water damage;
C) If defects or damages are caused by the use of unauthorized parts or by service other than our authorized agent;
D) If the equipment is used for commercial or industrial use.

This Limited Warranty does not cover accessories or consumables for the DV Camcorder, which are sold “AS IS”, without warranty of any kind by CUSA.

Please retain this warranty card and your Bill of Sale as a permanent record of your purchase. This card is most important in order to be sure you are contacted right away should there be a safety inspection, modification or product recall under applicable laws or regulations.

NO IMPLIED WARRANTY, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE APPLIES TO THIS EQUIPMENT AFTER THE APPLICABLE PERIOD OF EXPRESS WARRANTY OR GUARANTY, EXCEPT AS MENTIONED ABOVE, GIVEN BY ANY PERSON, FIRM OR CORPORATION WITH RESPECT TO THIS EQUIPMENT SHALL BIND THE UNDERSIGNED. (SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS. SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU). CUSA SHALL NOT BE LIABLE FOR LOSS OF REVENUES OR PROFITS. EXPENSE FOR SUBSTITUTE EQUIPMENT OR SERVICE, STORAGE CHARGES, LOSS OF DATA, OR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY THE USE, MISUSE OR INABILITY TO USE THE DV CAMCORDER, REGARDLESS OF THE LEGAL THEORY ON WHICH THE CLAIM IS BASED, AND EVEN IF CUSA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NOR SHALL RECOVERY OF ANY KIND AGAINST CUSA BE GREATER THAN THE PURCHASE PRICE OF THE DV CAMCORDER SOLD BY CUSA AND CAUSING THE ALLEGED DAMAGE. WITHOUT LIMITING THE FOREGOING, YOU ASSUME ALL RISK AND LIABILITY FOR LOSS, DAMAGE OR INJURY TO YOU AND YOUR PROPERTY AND TO OTHERS AND THEIR PROPERTY ARISING OUT OF USE, MISUSE OR INABILITY TO USE THE DV CAMCORDER NOT CAUSED DIRECTLY BY THE NEGLIGENCE OF CUSA. (SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU). THIS WARRANTY SHALL NOT EXTEND TO ANYONE OTHER THAN THE ORIGINAL PURCHASER OF THIS EQUIPMENT OR THE PERSON FOR WHOM IT WAS PURCHASED AS A GIFT.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. CANON U.S.A., INC.
CANON CONSUMER DIGITAL VIDEO EQUIPMENT LIMITED WARRANTY

The limited warranty set forth below is given by Canon Canada Inc. (“Canon Canada”) with respect to Canon digital video equipment purchased in Canada. This limited warranty is only effective upon presentation of a bill of sale or other proof of purchase for this Canon digital video equipment to a Canon Service Facility when repairs are required. Canon consumer video digital equipment is warranted under normal, non-commercial, personal use, against defective materials or workmanship as follows:

Parts: Defective parts will be exchanged for new parts or, at Canon Canada’s option, comparable rebuilt parts for a period of one year from the date of original purchase, except Video Heads which will be exchanged for a period of 3 months from the date of purchase.

Labour: For a period of one year from the date of original purchase, labour will be provided free of charge by our Canon Service Facilities in Canada.

This limited warranty covers all defects except where:

(a) The loss or damage to the product results from:
   i) accident, natural disaster, mishandling, abuse, neglect, unauthorized product modification or failure to follow instructions contained in the instruction manual;
   ii) the use of accessories, attachments, products, supplies, parts or devices with this Canon product that do not conform to Canon specifications or that cause abnormally frequent service problems;
   iii) repairs or services performed by any party other than a Canon Service Facility;
   iv) defective batteries or any exposure to water, sand or dirt;
   v) shipping (claim must be presented to the shipper);

(b) Any serial number on the video equipment is altered or removed.

(c) The digital video equipment is used for commercial, professional or industrial purposes.

This limited warranty does not cover the cabinet (exterior finish) of the digital video equipment, video cassette tapes, head cleanings, nor does it apply to digital video equipment purchased outside Canada.

TO OBTAIN WARRANTY SERVICE

Ship your Canon digital video equipment in its original carton, box or equivalent, properly packed, fully insured with shipping charges prepaid, together with a copy of your bill of sale or other proof of purchase and a description of the problem to any of the Canon Service Facilities in Canada.

LIMITATIONS

Except as otherwise required by applicable legislation, this warranty is in lieu of all other warranties, conditions, guarantees or representations, express or implied, statutory or otherwise, relative to this Canon product, including implied warranties or conditions of merchantability or fitness for a particular purpose.

Canon Canada assumes no liability for special, consequential or incidental damages or loss that may arise, whether on account of negligence or otherwise, from the use, misuse or inability to use this Canon product (including loss of profit, revenue, video tapes or enjoyment) or from failure to conform to any express or implied warranties, conditions, guarantees or representations. Any recovery under this limited warranty shall not exceed the purchase price of the product. Canon Canada does not assume or authorize any other person to assume for Canon Canada any other liability with respect to this Canon product.

This warranty does not extend to any person other than the original purchaser of this Canon product or the person for whom it was purchased as a gift and states your exclusive remedy.

NOTICE TO CONSUMER

If you plan to take important videos or if the product has not been used for some time, please check all functions with the instruction book before using it.
If you have any questions, call the Canon U.S.A. Information Center toll-free at 1-800-828-4040 (U.S.A. only).

If you have any questions, call the Canon Canada Information Center toll-free at 1-800-828-4040 (CANADA only).

Si vous avez des questions, veuillez téléphoner sans frais au Canada 1-800-828-4040 (CANADA seulement).

The information on this manual is verified as of January 1st, 2007.
Les informations contenues dans ce manuel ont été vérifiées le 1er janvier 2007.
La información de este manual fue verificada el 1 de enero de 2007.