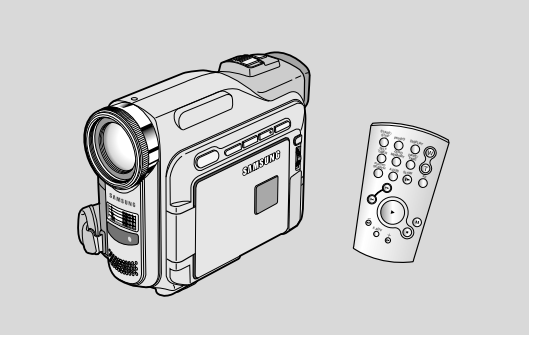
ENGLISH

Digital Video Camcorder

Mini DV Digital Video Cassette **SCD903**



AF Auto Focus
CCD Charge Coupled Device
LCD Liquid Crystal Display

Owner's Instruction Book

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

SAMSUNG ELECTRONICS

US PATENT 4415844

ENGLISH

Notices and Safety Instructions

Safety Instructions

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

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

To prevent electric shock, match wide blade of plug to wide slot and fully insert.

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

This symbol is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying this product.

1. READ INSTRUCTIONS:
All the safety and operating instructions should be read before the CAMCORDER is operated.

2. RETAIN INSTRUCTIONS:
The safety and operating instructions should be retained for future reference.

3. HEED WARNINGS:
All warnings on the CAMCORDER and in the operating instructions should be adhered to.

4. FOLLOW INSTRUCTIONS:
All operating and maintenance instructions should be followed.

5. CLEANING:
Unplug this CAMCORDER from the wall outlet before cleaning.
Do not use liquid or aerosol cleaners.
Use a dry cloth used for dusting cabinets.

6. ATTACHMENTS:
Do not use attachments not recommended by the CAMCORDER product manufacturer as they may be hazardous.

7. WATER AND MOISTURE:
Do not use this CAMCORDER near water;
for example, near a bathtub, wash bowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool or lake.

8. ACCESSORIES:
Do not place this CAMCORDER on an unstable cart, stand, tripod, bracket or table. The CAMCORDER may fall, causing serious injury to a child or adult, and serious damage to the unit.
Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the CAMCORDER. Any mounting of the unit should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer.

A. An appliance and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the appliance and cart combination to overturn.
PORTABLE CART WARNING
(Symbol provided by RETAC)

Notices and Safety Instructions

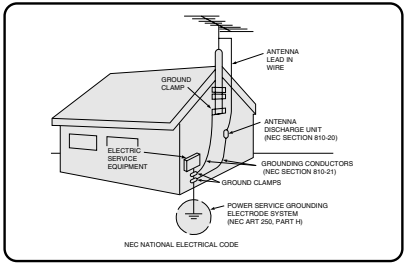
9. VENTILATION:
Slots and openings in the cabinet are provided for ventilation to ensure reliable operation of the CAMCORDER and to protect it from overheating. These openings must not be blocked or covered. Never place your CAMCORDER on a bed, sofa, rug, or other similar surface: on or near a radiator or heat register. This CAMCORDER should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

10. POWER SOURCES:
The CAMCORDER should be operated only from the type of power source indicated on the label.
If you are not sure of the type of power supply at your home, consult your appliance dealer or local power company.
A CAMCORDER is intended to be operated from battery power, or other sources, refer to the operating instructions.

11. GROUNDING OR POLARIZATION:
This CAMCORDER may be equipped with either a polarized 2-wire AC line plug (a plug having one blade wider than the other) or a 3-wire grounding type plug, a plug having a third (grounding) pin.
If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still fails to fit, contact your electrician to replace your outlet. Do not defeat the safety purpose of the polarized plug.

12. POWER-CORD PROTECTION:
Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords or plugs, convenient receptacles, and the point where they exit from the unit.

13. OUTDOOR ANTENNA GROUNDING:
If an outside antenna or cable system is connected to the CAMCORDER, be sure the antenna or cable system is grounded to provide some protection against voltage surges and built-up static charges, Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire and supporting structure, grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding to conductors, location of antenna-discharge unit, connection to grounding electrodes and requirements for the grounding electrode.
See figure below.



Notices and Safety Instructions

14. LIGHTNING:
For added protection of this CAMCORDER during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system.
This will prevent damage to the CAMCORDER due to lightning and power-line surges.

15. POWER LINES:
An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.

16. OVERLOADING:
Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

17. OBJECTS AND LIQUIDS:
Never push objects of any kind into this CAMCORDER through openings as they may touch dangerous voltage points or short out a part that could result in a fire or electric shock.
Never spill liquids of any kind onto the CAMCORDER. Should spillage occur, unplug unit and have it checked by a technician before use.

18. SERVICING:
Do not attempt to service this CAMCORDER yourself. Opening or removing covers may expose you to dangerous voltage or other hazards.
Refer all servicing to qualified service personnel.

19. DAMAGE REQUIRING SERVICE:
Unplug this CAMCORDER from the wall outlet and refer servicing to qualified service personnel under the following conditions:
a. When the power-supply cord or plug is damaged.
b. If any liquid has been spilled onto, or objects have fallen into the CAMCORDER.
c. If the CAMCORDER has been exposed to rain or water.
d. If the CAMCORDER does not operate normally by following the operating instructions, adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the CAMCORDER to its normal operation.
e. If the CAMCORDER has been dropped or the cabinet has been damaged.
f. When the CAMCORDER exhibits a distinct change in performance, this indicates a need for service.

20. REPLACEMENT PARTS:
When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer and having the same characteristics as the original part.
Unauthorized substitutions may result in fire, electric shock or other hazards.

21. SAFETY CHECK:
Upon completion of any service or repairs to this CAMCORDER, ask the service technician to perform safety checks to determine that the CAMCORDER is in safe operating order.

Notices and Safety Instructions

22. To prevent damage which may result in fire or shock hazard, do not expose this appliance to rain or moisture.

23. If this power supply is used at 240V ac, a suitable plug adapter should be used.

NOTE TO CATV SYSTEM INSTALLER:
This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.

USER INSTALLER CAUTION:
Your authority to operate this FCC certified equipment could be voided if you make changes or modifications not expressly approved by this party responsible for compliance to part 15 FCC rules.

NOTE:
"Hg LAMP(S) INSIDE THIS PRODUCT CONTAIN MERCURY AND MUST BE RECYCLED OR DISPOSED OF ACCORDING TO LOCAL, STATE OR FEDERAL LAWS"

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help and for additional suggestions.
  The user may find the following booklet prepared by the Federal Communications Commission helpful : "How to Identify and Resolve Radio-TV Interference Problems."
  This Booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

FCC Warning
The user is cautioned that changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC ID : A3L04OMEGA2
This device complies with Part 15 of 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.

ENGLISH

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Notes and Safety Instructions

Notes regarding the rotation of the LCD screen

Please rotate the LCD screen carefully as illustrated.
Over rotation may cause damage to the inside of the hinge that connects the LCD screen to the Camcorder.

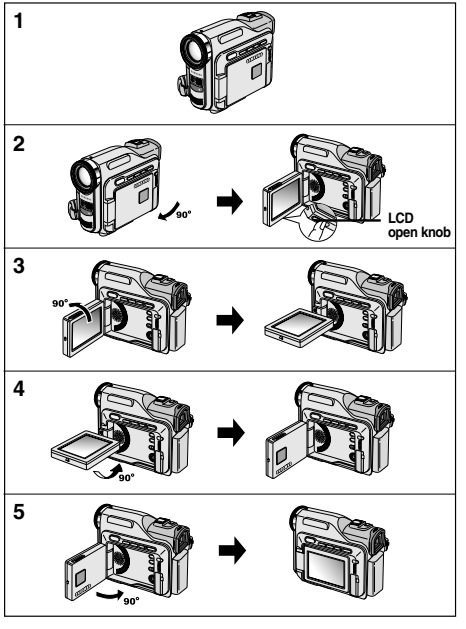
1. LCD screen closed.

2. Standard recording using the LCD screen.
   - A LCD Monitor is opened applying a finger to LCD open knob.

3. Recording when looking at the LCD screen from the top.

4. Recording when looking at the LCD screen from the front.

5. Recording with the LCD screen closed.



Notes and Safety Instructions

Notices regarding COPYRIGHT

Television programs, video tapes, DVD titles, films, and other program materials may be copyrighted.
Unauthorized copying of copyrighted material may be against the law.

Notes regarding moisture condensation

1. A sudden rise in atmospheric temperature may cause condensation to form inside the camcorder.

for example:
- When you move the camcorder from a cold location to a warm location (e.g. from outside to inside during winter.)
- When you move the camcorder from a cool location to a hot location (e.g. from inside to outside during the summer.)

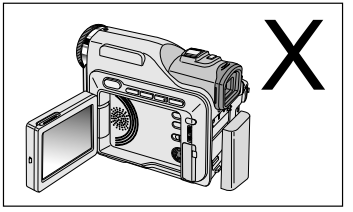
2. If the (DEW) protection feature is activated, leave the camcorder for at least two hours in a dry, warm room with the cassette compartment opened and the battery pack removed.

Notes regarding CAMCORDER

1. Do not leave the camcorder exposed to high temperature (above 60°C or 140°F).
   For example, in a parked car in the sun or exposed to direct sunlight.
2. Do not let the camcorder get wet.
   Keep the camcorder away from rain, sea water, and any other form of moisture. If the camcorder gets wet, it may get damaged.
   Faults caused by ingress of fluids may not be possible to repair.

Notes and Safety Instructions

Notes regarding the battery pack



- Make sure that the battery pack is fully charged before starting to record.
- To preserve battery power, keep your camcorder turned off when you are not operating it.
- If your camcorder is in CAMERA mode and it is left in STBY mode without being operated for more than 5 minutes with a tape installed, it will automatically turn itself off to protect against unnecessary battery discharge.
- Make sure that the battery pack is located correctly and firmly in place. Dropping the battery pack may damage it.
- A brand new battery pack is not charged. Before using the battery pack, you need to charge it completely.
- It is a good idea to use the viewfinder rather than the LCD when making long recordings, because the LCD uses up more battery power.

* When the battery reaches the end of its life, please contact your local dealer. The batteries have to be dealt with as chemical waste.

Notes regarding the Video Head Cleaning

- To ensure normal recording and a clear picture, clean the video heads regularly. If a square block-shape distorts playback, or only a blue screen is displayed, the video heads may be dirty. If this happens, clean the video heads with a dry type cleaning cassette.
- Do not use a wet-type cleaning cassette. It may damage the video heads.

Notes and Safety Instructions

Note regarding the LENS

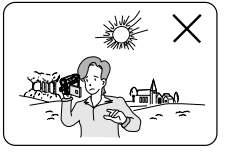
- Do not film with the camera lens pointing directly at the sun.
  Direct sunlight can damage the CCD(Charge Coupled Device).

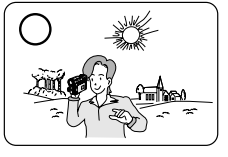
Notes regarding electronic viewfinder

1. Do not position the camcorder such that the viewfinder is pointing towards the sun. Direct sunlight can damage the inside of the viewfinder. Be careful when placing the camcorder under sunlight or near a window exposed to sunlight.
2. Do not pick up the camcorder using the viewfinder.
3. Excessive force when pulling the viewfinder out may damage it.

Notes regarding 'Record' or 'Playback' using the LCD

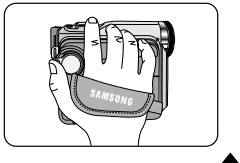
1. The LCD display has been manufactured using high precision tech-nology. However, there may be tiny dots (red, blue or green in color) that appear on the LCD display.
   These dots are normal and do not affect the recorded picture in any way.
2. When you use the LCD display under direct sunlight or outdoors, it maybe difficult to see the picture clearly.
   If this occurs, we recommend using the viewfinder.
3. Direct sunlight can damage the LCD monitor.





Notes regarding the hand strap

- To ensure a steady picture during filming, check that the hand strap is properly adjusted.
- Do not force your hand into the hand strap as you could damage it.



Notes and Safety Instructions

Precautions regarding the Lithium battery

1. The lithium battery maintains the clock function and user settings; even if the battery pack or AC adapter is removed.
2. The lithium battery for the camcorder lasts about 6 months under normal operation from time of installation.
3. When the lithium battery becomes weak or dead, the date/time indicator will display “---” when you set the DATE/TIME to ON.
   When this occurs, replace the lithium battery with a new one(type CR2025).
4. There is a danger of explosion if battery is incorrectly replaced.
   Replace only with the same or equivalent type.

Warning: Keep the LITHIUM BATTERY out of reach of children.
Should a battery be swallowed, consult a doctor immediately.

SERVICING

Do not attempt to service this CAMCORDER yourself.
Opening or removing covers may expose you to dangerous voltage or other hazards.
Refer all servicing to qualified service personnel.

REPLACEMENT PARTS

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer and having the same characteristics as the original part.
Unauthorized substitutions may result in fire, electric shock or other hazards.

Getting to Know Your Camcorder

Features

- **MULTI OSD LANGUAGE**
  You can select the desired OSD Language among English, French, Spanish, Portuguese, German and Italian.
- **Digital data transfer function with IEEE1394**
  By incorporating the IEEE 1394 (i.LINK™ : i.LINK is a serial data transfer protocol and inter connectivity system, used to transmit DV data) high speed data transport port, both moving and still images can be transferred to a PC, making it possible to produce or edit various images.
- **USB interface for digital image data transfer**
  You can transfer still images/movies to a PC using the USB interface without an add-on card.
- **PHOTO**
  The PHOTO function lets you capture an object as a still along with sound, while in Camera mode.
- **900x Digital zoom**
  Allows you to magnify an image up to 900 times its original size.
- **Color TFT LCD**
  A high-resolution color TFT LCD gives you clean, sharp images as well as the ability to review your recordings immediately.
- **Electronic Image Stabilizer (EIS)**
  The EIS compensates for any handshake, reducing unstable images particularly at high magnification.
- **Various digital effects**
  The DSE (Digital Special Effects) allows you to give your films a special look by adding various special effects.
- **Back Light Compensation (BLC)**
  The BLC function compensates for the bright background behind a subject you're recording.
- **Program AE**
  The Program AE enables you to alter the shutter speed and aperture to suit the type of scene/action to be filmed.
- **Digital Still Camera function**
  Using Memory Stick, you can easily record and playback standard still images.
- **MJPEG Recording**
  MJPEG recording makes it possible to record video onto a Memory Stick.
- **Mega-pixel CCD**
  Your camcorder incorporates a 1.0mega-pixel CCD. High-resolution still images can be recorded to a Memory Stick.
- **Built-in Flash**
  You can take natural-looking flash pictures with appropriate illumination using the built-in Flash.

Getting to Know Your Camcorder

Accessories Supplied with camcorder

Make sure that the following basic accessories are supplied with your digital video camera.

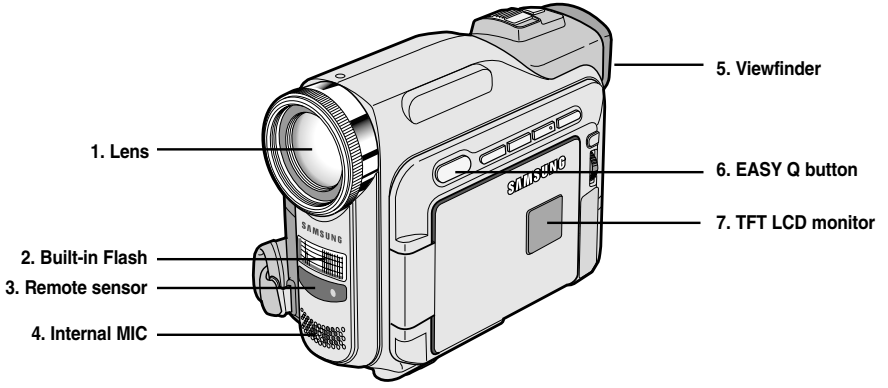
Basic Accessories

1. Lithium Ion Battery pack
2. AC Power Adapter (AA-E8 TYPE)
3. AC Cord
4. AUDIO/VIDEO Cable
5. Instruction Book
6. Lithium batteries for Remote Control and Clock. (TYPE: CR2025, 2 EA)
7. Remote Control
8. Shoulder strap
9. USB cable
10. Software CD
11. S-VIDEO Cable
12. USB Audio Cable
13. Lens cover

1. Lithium Ion Battery pack AD43-00128A	2. AC Power Adapter (AA-E8 TYPE) AD44-00090A	3. AC cord AD39-00076A
4. AUDIO/VIDEO Cable AD39-00001A	5. Instruction Book	6. Lithium batteries (CR2025, 2 EA) AD43-10130H
7. Remote Control AD59-00085A	8. Shoulder strap AD39-00073A	9. USB cable AD39-00073A
10. Software CD	11. S-VIDEO Cable AD39-42001Z	12. USB Audio Cable AD39-00101A
13. Lens Cover AD97-07942A		

Getting to Know Your Camcorder

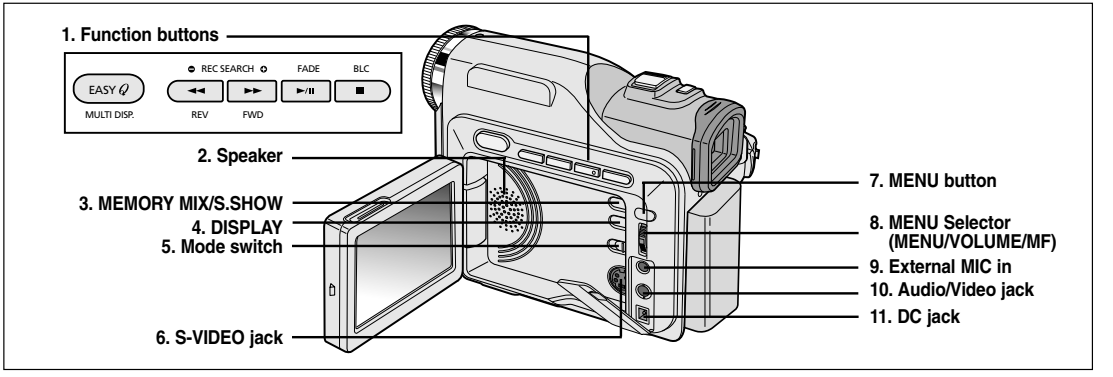
Front & Left View



1. Lens
2. Built-in Flash
3. Remote sensor
4. Internal MIC
5. Viewfinder (see page 33)
6. EASY Q button (see page 63)
7. TFT LCD monitor

Getting to Know Your Camcorder

Left Side View



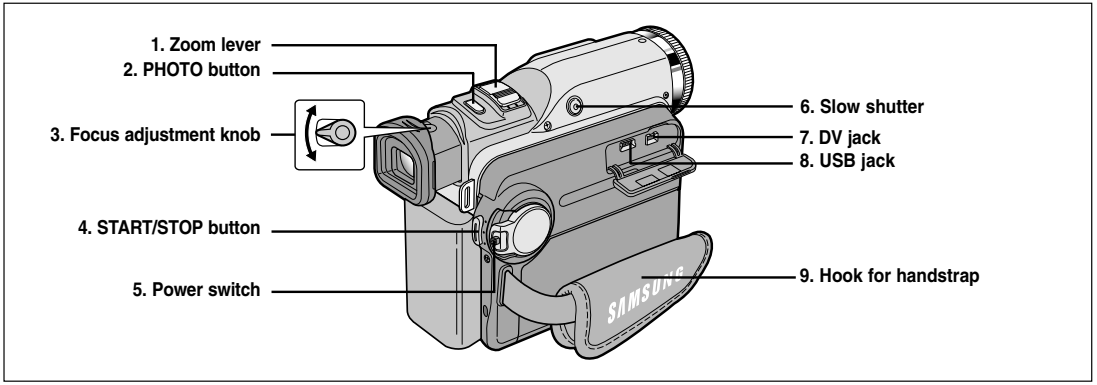
1. Function buttons

PLAYER	CAMERA	M.PLAY
-	EASY	MULTI DISP.
◀◀ : (REW)	REC SEARCH –	REV
▶▶ : (FF)	REC SEARCH +	FWD
▶/II: (PLAY/STILL)	FADE	MJPEG PLAY/STILL
■ : (STOP)	BLC	-

2. Speaker
3. MEMORY MIX/S.SHOW
4. DISPLAY
5. Mode switch (MEMORY STICK/TAPE)
6. S-VIDEO jack
7. MENU button
8. MENU Selector (MENU/VOLUME/MF)
9. External MIC in
10. Audio/Video jack
11. DC jack

Getting to Know Your Camcorder

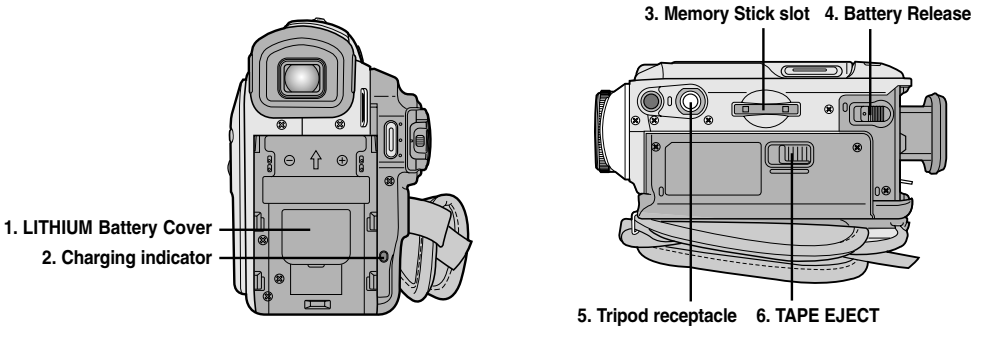
Right & Top View



1. Zoom lever
2. PHOTO button (see page 69)
3. Focus adjustment knob
4. START/STOP button
5. Power switch (CAMERA or PLAYER)
6. Slow shutter
7. DV jack
8. USB jack
9. Hook for handstrap

Getting to Know Your Camcorder

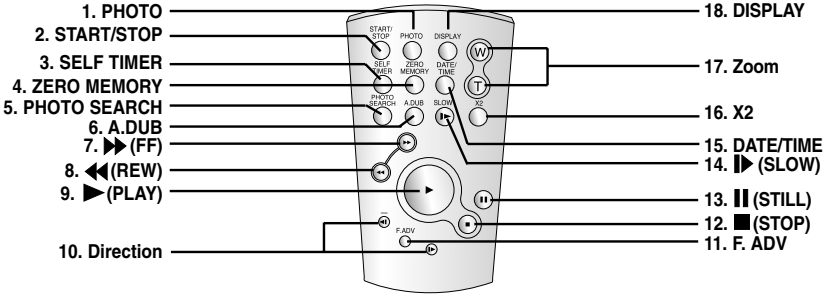
Rear & Bottom View



1. LITHIUM Battery Cover
2. Charging indicator
3. Memory Stick slot
4. Battery Release
5. Tripod receptacle
6. TAPE EJECT

Getting to Know Your Camcorder

Remote control



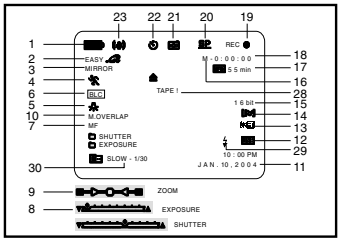
1. PHOTO
2. START/STOP
3. SELF TIMER (see page 20)
4. ZERO MEMORY (see page 75)
5. PHOTO Search (see page 69)
6. A.DUB (see page 67)
7. ▶▶ (FF)
8. ◀◀ (REW)
9. ▶ (PLAY)
10. Direction (◀▌▌ , ▌▌▶) (see page 73)
11. F. ADV (see page 74)
12. ■ (STOP)
13. ▌▌ (STILL)
14. ▌▶ (SLOW) (see page 73)
15. DATE/TIME
16. X2 (see page 74)
17. Zoom
18. Display

Getting to Know Your Camcorder

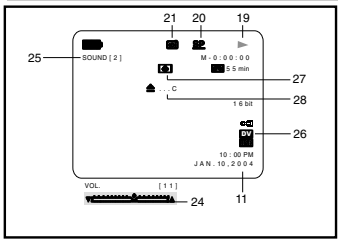
OSD (On Screen Display in CAMERA and PLAYER modes)

1. Battery level (see page 26)
2. Easy mode (see pages 63)
3. DSE (Digital Special Effects) mode (see page 49)
4. Program AE (see page 43)
5. White Balance mode (see page 45)
6. BLC (Back Light Compensation) (see page 65)
7. Manual focus (see page 64)
8. Shutter speed and EXPOSURE (see page 61)
9. Zoom position (see page 46)
10. Memory Mix (see page 51)
11. DATE/TIME (see page 57)
12. USB (see page 78)
13. WL. REMOTE (see page 39)
14. WIND CUT (see page 56)
15. Audio recording mode (see page 55)
16. Zero memory indicator (see page 75)
17. Remaining Tape (measured in minutes)
18. Tape Counter
19. Operating mode
20. Record speed mode
21. PHOTO mode
22. Self recording and waiting timer (see page 20)
23. EIS (see page 48)
24. Volume control (see page 35)
25. Audio playback channel (see page 68)
26. DV IN(DV data transfer mode) (see page 77)
27. DEW (see page 7)
28. Message Line
29. FLASH mode (see page 53)
30. SLOW SHUTTER (see page 62)

OSD in CAMERA mode



OSD in PLAYER mode



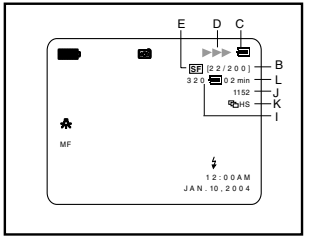
Getting to Know Your Camcorder

OSD (On Screen Display in M.REC/M.PLAY modes)

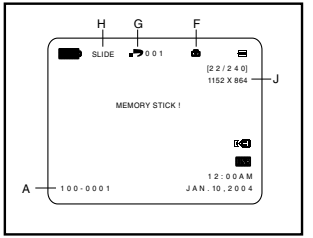
A. Folder number-file number (see page 83)
B. Image counter
- Current still image/Total number of recordable still images.

C. CARD (MEMORY STICK) indicator
D. Image recording and loading indicator
E. Photo Quality (see page 84)
F. ERASE PROTECTION indicator (see page 98)
G. Print Mark (see page 97)
H. SLIDE SHOW (see page 96)
I. MJPEG SCREEN SIZE (see page 86)
J. Image Size (see page 85)
K. Continuous Shot (see page 87)
L. Remaining Memory (MJPEG)

OSD in M.REC mode



OSD in M.PLAY mode



Turning the OSD on/off (On Screen Display)

● Turning OSD on/off

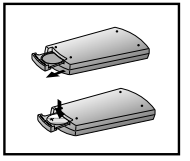
Press the DISPLAY button on the left side panel.
- Each press of the button toggles the OSD function on and off.
- When you turn the OSD off,
  In CAMERA mode: The STBY, REC, EASY.Q modes are always displayed on the OSD, even when the OSD is turned OFF. A key input will be displayed for 3 seconds then turn off.
  In PLAYER mode: When you press any function button, the function is displayed on the OSD for 3 seconds before it turns off.

● Turning the DATE/TIME on/off
- The DATE/TIME is not affected when the OSD function is switched ON or OFF.
- To turn the DATE/TIME on or off, access the menu and change the DATE/TIME mode. (see page 57)
- You may also use the Quick Menu to turn the DATE/TIME ON or OFF. (see page 59) (only in CAMERA/M.REC mode)

Preparation

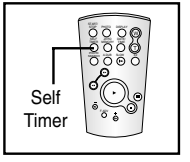
How to use the Remote Control

Battery Installation for the Remote Control



- ✤ You need to insert or replace the lithium battery when :
  - You purchase the camcorder.
  - The remote control doesn't work.
- ✤ Ensure that you insert the lithium cell correctly, following the + and - markings.
- ✤ Be careful not to reverse the polarity of the battery.

Self Record using the Remote Control



When you use the Self Timer function on the remote control, the recording begins automatically in 10 seconds.

1. Set the camcorder to CAMERA mode.

2. Press the SELF TIMER button until the appropriate indicator is displayed in the viewfinder.

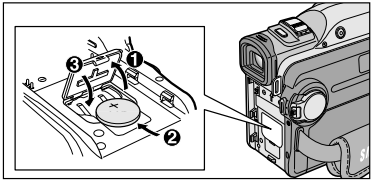
3. Press the START/STOP button to start the timer.
   - Self Timer starts counting down from 10 with a beep sound.
   - In the last one second of the countdown, the beep sound gets faster, then recording starts automatically.
   - If you want to cancel the Self Timer function before recording, press the SELF TIMER button.

4. Press START/STOP again when you wish to stop recording.

Preparation

Lithium Battery Installation

- ✤ The lithium battery maintains the clock function and preset contents of the memory; even if the battery pack or AC power adapter is removed.
- ✤ The lithium battery for the camcorder lasts about 6 months under normal operation from the time of installation.
- ✤ When the lithium battery becomes weak or dead, the date/time indicator will display "---" when you set the DATE/TIME to ON.
  When this occurs, replace the lithium battery with type CR2025.



1. Open the lithium battery cover from the camcorder.
2. Position the Lithium cell in the holder, with the positive (⊕) terminal face outward.
3. Close the lithium battery cover.

Note — The lithium battery must be inserted in the correct direction.

Warning: Keep the LITHIUM BATTERY out of the reach of the children.
Should any battery be swallowed, consult a doctor immediately.

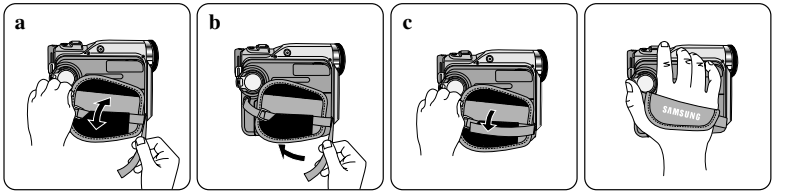
Preparation

Adjusting the Hand Strap

It is very important to ensure that the Hand strap has been correctly adjusted before you begin your recording.
The hand strap enables you to :
- Hold the camcorder in a stable, comfortable position.
- Press the Zoom and START/STOP button without having to change the position of your hand.

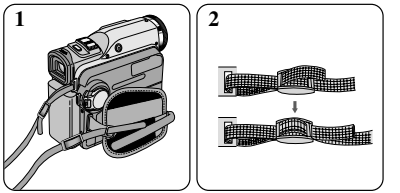
Hand strap

a. Pull and Open the Hand Strap cover to release the Hand Strap.
b. Adjust its length and stick it back onto the Hand Strap cover.
c. Close the Hand Strap cover again.

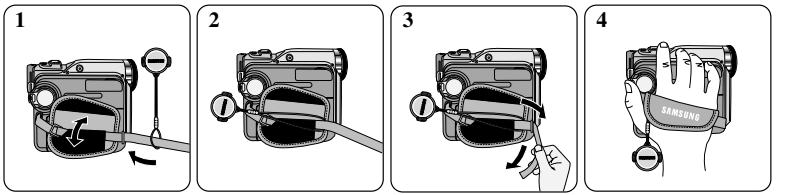


Shoulder Strap

The Shoulder Strap enables you to carry your camcorder around in complete safety.
1. Insert the end of strap into the Shoulder Strap hook on the camcorder.
   Insert the other end of strap into ring inside hand strap.
2. Thread each end into the buckle, adjust the length of the strap and then pull it tight in the buckle.



Attaching the Lens Cover



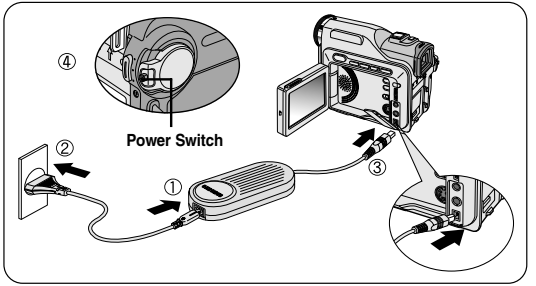
Preparation

Connecting a Power Source

There are two types of power source that can be connected to your camcorder.
- The AC Power Adapter and AC cord : used for indoor recording.
- The Battery Pack : used for outdoor recording.

To use the AC Power adapter and DC Cable

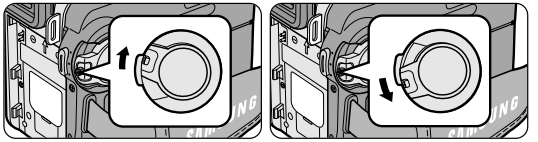
1. Connect the AC Power adapter to the AC cord.
2. Connect the AC cord to a wall socket.



Notes

- You must use the AA-E8 type AC Power adapter.
- The plug and wall socket type may differ according to your resident country.

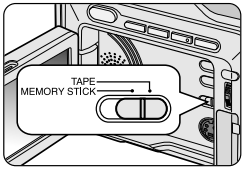
3. Connect the DC cable to the DC jack socket of the camcorder.
4. Set the camcorder to the desired mode by holding down the tab on the power switch and turning it to the CAMERA or PLAYER mode.



< CAMERA mode > < PLAYER mode >

To select the CAMCORDER mode

- ✤ If you want to use this unit as a camcorder, set the mode switch to TAPE position.
- ✤ If you want to use this unit as a DSC (Digital Still Camera), set the mode switch to MEMORY STICK position.



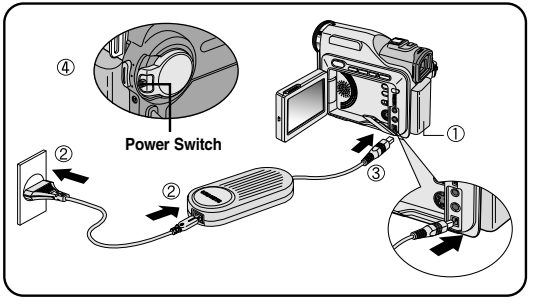
Preparation

Using the Lithium Ion Battery Pack

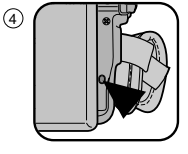
✤ The amount of continuous recording time available depends on
- The type and capacity of the battery pack you are using.
- How often the Zoom function is used.
  It is recommended that you have several batteries available.

Charging the Lithium Ion Battery Pack

1. Attach the battery pack to the camcorder.
2. Connect the AC Power adapter to an AC cord and connect the AC cord to a wall socket.
3. Connect the DC cable to the DC jack socket on the camcorder.
4. Turn the power switch to off, and the charging indicator will start to flash, showing that the battery is charging.



Blinking time	Charging rate
Once per second	Less than 50%
Twice per second	50% ~ 75%
Three times per second	75% ~ 90%
Blinking stops and stays on	90 ~ 100%
On for a second and off for a second	Error - Reset the battery pack and the DC cable



5. When the battery is fully charged, disconnect the battery pack and the AC Power adapter from the camcorder.
   - Even with the power switched off, the battery pack will still discharge if it is left connected to the camcorder.

Notes

- The battery pack may be charged a little at the time of purchase.
- To prevent reduction in the life and capacity of the battery pack, always remove it from the camcorder after it is fully charged.

Preparation

Using the Lithium Ion Battery Pack

Table of continuous recording time based on model and battery type.

- ✤ If you close the LCD screen, it switches off and the viewfinder switches on automatically.
- ✤ The continuous recording times given in the table above are approximations.
  Actual recording time depends on usage.

Time / Battery	Charging time	Continuous recording time	
		LCD ON	VIEWFINDER ON
SB-LS110	Approx. 1hr 40min	Approx. 1hr 20min	Approx. 2hr
SB-LS220	Approx. 3hr 30min	Approx. 3hr	Approx. 4hr 10min

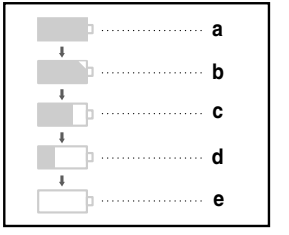
Notes

- The battery pack should be recharged in an environment of between 32°F (0°C) and 104°F (40°C).
- The battery pack should never be charged in a room temperature that is below 32°F (0°C).
- The life and capacity of the battery pack will be reduced if it is used in temperatures below 32°F (0°C) or left in temperatures above 104°F (40°C) for a long period, even when it is fully recharged.
- Do not put the battery pack near any heat source (fire or flames, for example).
- Do not disassemble, process, pressure, or heat the Battery Pack.
- Do not allow the + and - terminals of the battery pack to be short-circuited. It may cause leakage, heat generation, induce fire and overheating.
- When using SB-L220 Battery, use of Viewfinder is inconvenient.
  The use of LCD Monitor is preferable.

Preparation

Battery level display

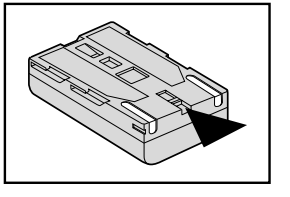
- **The battery level display indicates the amount of power remaining in the battery pack.**



a. Fully charged
b. 20~40% used
c. 40~80% used
d. 80~95% used
e. Completely used (flickers)
(The camcorder will turn off soon, change the battery as soon as possible)

✤ Please refer to the table on page 25 for approximate continuous recording time.
✤ The recording time is affected by environmental temperature and conditions.
The recording time becomes very short in a cold environment.
The continuous recording time in the operating instructions are measured using a fully charged battery pack at 77°F(25°C).
As the environmental temperature and conditions may differ when you actually use the camcorder, the remaining battery time may not be the same as the approximate continuous recording time given in these instructions.
✤ The gray bar shown here to indicate battery level, is actually white in the viewfinder. For example, on the viewfinder, "a" (full) will be displayed as a full white bar, and "e" (empty) will be displayed as a battery outline with the background image behind it.

Tips for Battery Identification



A charge mark is provided on the battery pack to help you remember whether it has been charged or not.
Two colors are provided (red and grey)-you may choose which one indicates charged and which indicates discharged.

Note

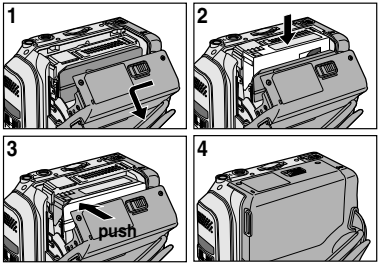
■ The charge mark setting does not affect the battery's charge status.

Preparation

Inserting and Ejecting a Cassette

✤ When inserting a tape or closing a cassette holder, do not apply excessive force. This may cause a malfunction.
✤ Do not use any tape other than Mini DV cassettes.

1. Connect a power source and slide the TAPE EJECT switch and open the cassette door.
   - The cassette holding mechanism rises automatically.
2. Insert a tape into the cassette holder with the tape window facing outward and the protection tab toward the top.
3. Press the area labelled PUSH on the cassette holding mechanism until it clicks into place.
   - The cassette is loaded automatically.
4. Close the cassette door.
   - Close the door completely until you can hear a “click”.



Note

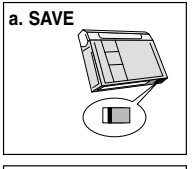
When you have recorded something that you wish to keep, you can protect it so that it will not be accidentally erased.

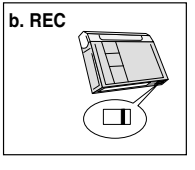
a. Protecting a tape :
Push the safety tab on the cassette so that the hole is uncovered.

b. Removing the tape protection :
If you no longer wish to keep the recording on the cassette, push the write-protect tab back so that it covers the hole.

- **How to store a tape**

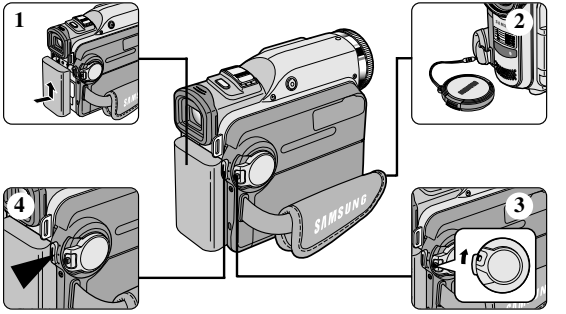
a. Avoid places with magnets or magnetic interference.
b. Avoid humidity and dust prone places.
c. Keep the tape in an upright position and avoid storing it in direct sunlight.
d. Avoid dropping or knocking your tapes.





Basic Recording

Making your First Recording



1. Connect a Power source to the camcorder. (see page 23)
   (A battery pack or a AC power adapter)
   - Insert a cassette. (see page 27)

2. Remove the LENS COVER.

3. Set the power switch to the CAMERA position.
   - Open the LCD monitor.
   - Set the mode switch to the TAPE position.
     Make sure that STBY is displayed.
   - If the protection tab of the cassette is open, STOP and PROTECTION! will be displayed.
   - Make sure the image you want to record appears in the LCD monitor or viewfinder.
   - Make sure the battery level indicates that there is enough remaining power for your expected recording time.

4. To start recording, press the START/STOP button.
   - REC is displayed in the LCD.
     To stop recording, press the START/STOP button again.
   - STBY is displayed in the LCD.

Basic Recording

Selecting the OSD LANGUAGE

✤ Select the appropriate OSD Language among English, French, Spanish, Portuguese, German and Italian.
✤ The Language Function works in CAMERA, PLAYER, M.REC, M.PLAY modes.

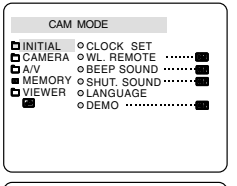
1. Press the MENU button.
   ■ The menu list will appear.

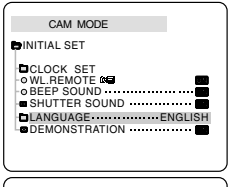
2. Move the MENU SELECTOR to highlight INITIAL and push the MENU SELECTOR.

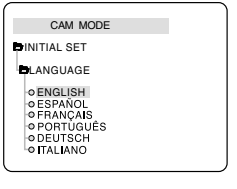
3. Select LANGUAGE from the sub-menu and push the MENU SELECTOR.

4. Using the MENU SELECTOR, select the LANGUAGE and push the MENU SELECTOR.
   ■ Push the MENU SELECTOR to confirm the OSD LANGUAGE.

5. To exit, press the MENU button.
   ■ The OSD changes to the selected language.







Note

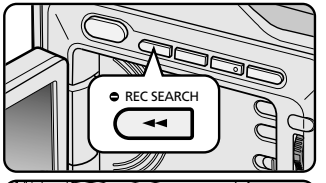
■ "LANGUAGE" is always indicated in ENGLISH.

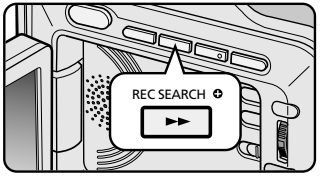
Basic Recording

When a cassette is loaded and the camcorder is left in the STBY mode for more than 5 minutes without being used, it will switch off automatically.
To use it again, push the START/STOP button or set the Power switch to OFF and then back to CAMERA.
This Auto Power off feature is designed to save battery power.

Record Search (REC SEARCH)

- ✤ You can view a recording using the REC SEARCH +, – function in STBY mode. REC SEARCH – enables you to play the recording backwards and REC SEARCH + enables you to play it forwards, for as long as you keep each button pressed down.
- ✤ If you press the REC SEARCH – button in STBY mode, your camcorder will play in reverse for 3 seconds and return to the original position automatically.





Note

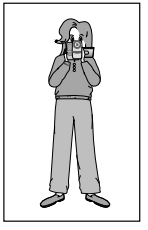
Mosaic shaped picture distortion may appear on the screen while in Record Search mode.

Basic Recording

Hints for Stable Image Recording

- While recording, it is very important to hold the camcorder correctly.
- Fix the LENS cover firmly by clipping it to the hand strap. (see page 22)

Recording with the LCD monitor



1. Hold the camcorder firmly using the hand strap.
2. Place your right elbow against your side.
3. Place your left hand under or beside the LCD to support and adjust it.
   Do not touch the built-in microphone.
4. Choose a comfortable, stable position for the shots that you are taking.
   You can lean against a wall or on a table for greater stability.
   Do not forget to breathe gently.
5. Use the LCD frame as a guide to determine the horizontal plane.
6. Whenever possible, use a tripod.

Recording with the Viewfinder

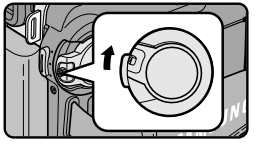
1. Hold the camcorder firmly using the hand strap.
2. Place your right elbow against your side.
3. Place your left hand under the camcorder to support it.
   Be sure not to touch the built-in microphone.
4. Choose a comfortable, stable position for the shots that you are taking.
   You can lean against a wall or on a table for greater stability.
   Do not forget to breathe gently.
5. To view an object through the viewfinder, pull it out until you hear the ‘click’ sound.
   Excessive force may cause damage to the viewfinder.
6. Place your eye firmly against the viewfinder eyecup.
7. Use the viewfinder frame as a guide to determine the horizontal plane.
8. Whenever possible, use a tripod.

Basic Recording

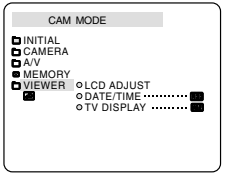
Adjusting the LCD

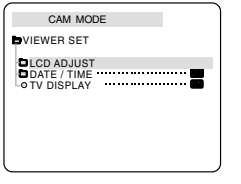
✤ Your camcorder is equipped with a 2.5 inch color Liquid Crystal Display(LCD) screen, which enables you to view what you are recording or playing back directly.

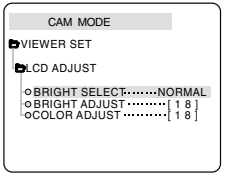
✤ Depending on the conditions under which you are using the camcorder (indoors or outdoors for example), you can adjust ;
- BRIGHT SELECT
- BRIGHT ADJUST
- COLOR ADJUST



1. Set the POWER switch to CAMERA position.
   - In the PLAYER mode, you may only setup the LCD while the tape is playing.
2. Open the LCD screen, and the LCD switches on.
3. Press the MENU button.
4. Move the MENU SELECTOR so that VIEWER is highlighted and then push the MENU SELECTOR.
5. Move the MENU SELECTOR so that LCD ADJUST is highlighted.
6. Push the MENU SELECTOR to enter the sub-menu.
7. Move the MENU SELECTOR so that it highlights the menu item you want to adjust (BRIGHT SELECT, BRIGHT ADJUST, COLOR ADJUST).







Basic Recording

8. Push the MENU SELECTOR again.
   - You may select NORMAL, SUPER in the BRIGHT SELECT feature and push the MENU SELECTOR to save the setting.
   - Use the MENU SELECTOR to adjust the value of BRIGHT ADJUST and COLOR ADJUST.
   - You can set values for BRIGHT ADJUST between 00 ~ 35 and COLOR ADJUST between 00 ~ 35.

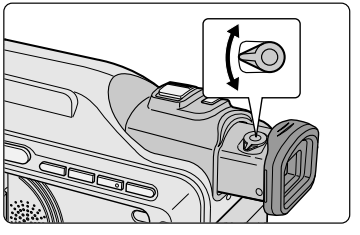
9. Press the MENU button to finish the setting.

Using the VIEWFINDER

✤ In the PLAYER mode, the VIEWFINDER will work when the LCD is closed.
✤ In the CAMERA mode, the VIEWFINDER will work when the LCD is closed or rotated counterclockwise 180°.

Adjusting the Focus

Use the focus adjustment knob of the VIEWFINDER to focus the picture.
(refer to figure)

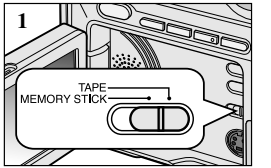


Basic Recording

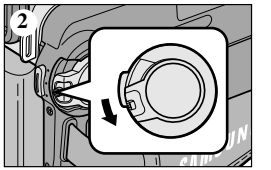
Playing back a tape you have recorded on the LCD

✤ You can monitor the playback picture on the LCD monitor.
✤ Make sure that the battery pack is in place.

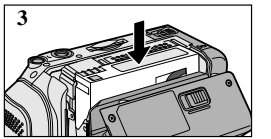
1. Set the mode switch to TAPE.



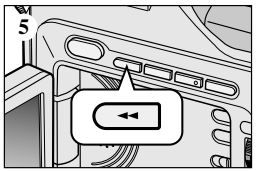
2. Hold down the power switch tab and turn it to the PLAYER position.
   - A confirmation sound beeps.



3. Insert the tape you wish to view. (see page 27)
4. Open the LCD screen.
   Adjust the angle of the LCD screen and set the brightness or color if necessary.
5. Press the ◀◀ (REW) button to rewind the tape to the starting point.
   - To stop rewinding, press the ■(STOP) button.
   - The camcorder stops automatically after rewinding is complete.



6. Press the ▶/II (PLAY/STILL) button to start playback.
   - You can view the picture you recorded on the LCD.
   - To stop the PLAY operation, press the ■(STOP) button.



Notes

- You can also view the picture on a TV screen, after connecting the camcorder to a TV or VCR. (see page 71)
- Various functions are available in PLAYER mode. (see page 73)

Basic Recording

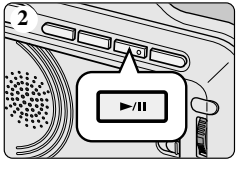
Adjusting the LCD during PLAY

- ✤ You can adjust the LCD during playback.
- ✤ The adjustment method is the same procedure as used in CAMERA mode. (see page 32)

Controlling Sound from the Speaker

The Speaker works in PLAYER mode only.

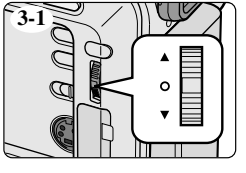
- ■ When you use the LCD screen for playback, you can hear recorded sound from the built-in Speaker.
  - Follow the instructions below to decrease or mute speaker volume in the PLAYER mode.



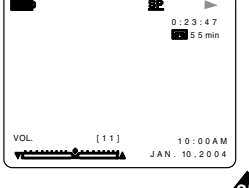
1. Set the power switch to PLAYER mode.

2. Press ▶/II (PLAY/STILL) to play the tape.

3. When you hear sounds once the tape is in play, use the MENU SELECTOR to adjust the volume.
   - ■ A volume level display will appear on the LCD.
     Levels may be adjusted from anywhere between 00 to 19.
   - ■ If you close the LCD while playing, you will not hear sound from the speaker.



<3-2>



Note

- ■ When the cable is connected to the Audio/Video jack, you cannot hear sound from the speaker and cannot adjust the volume.

Advanced Recording

Use of various Functions

● Setting menu items

MENU	SUB MENU	Available mode			
		CAMERA	PLAYER	M.REC	M.PLAY
INITIAL	CLOCK SET	✔	✔	✔	✔
	WL.REMOTE	✔	✔	✔	✔
	BEEP SOUND	✔	✔	✔	✔
	SHUTTER SOUND		✔	✔	
	LANGUAGE	✔	✔	✔	✔
	DEMONSTRATION	✔			
CAMERA	PROGRAM AE	✔			
	WHT. BALANCE	✔		✔	
	D. ZOOM	✔			
	EIS	✔			
	DSE SELECT	✔			
	MEMORY MIX	✔			
	FLASH SELECT	✔		✔	
A/V	REC MODE	✔	✔		
	PHOTO SEARCH		✔		
	PHOTO COPY		✔		
	AUDIO MODE	✔	✔		
	AUDIO SELECT		✔		
	WIND CUT	✔	✔		
MEMORY	PHOTO QUALITY		✔	✔	
	IMAGE SIZE		✔	✔	
	MJPEG SIZE		✔	✔	
	CONTINUOUS SHOT			✔	
	PRINT MARK				✔
	PROTECT				✔
	FILE NO.		✔	✔	✔
	DELETE				✔
	FORMAT				✔
VIEWER	LCD ADJUST	✔	✔	✔	✔
	DATE/TIME	✔	✔	✔	✔
	TV DISPLAY	✔	✔	✔	✔

● Set the camcorder to CAMERA or PLAYER mode and M.REC or M.PLAY mode

1. Press the MENU button. The MENU OSD is displayed.
   The cursor (HIGHLIGHT) indicates the feature you are currently adjusting.
2. Use the MENU SELECTOR and push the MENU SELECTOR on the right side panel to select and activate the item.
3. You can exit the menu mode by pressing the MENU button.

Advanced Recording

● Availability of functions in each mode

Operating Mode \ Requested Mode	Digital functions				Digital special effects
	EIS	D.ZOOM	PHOTO (TAPE)	SLOW SHUTTER	
EIS		O	O	△	O
D.ZOOM	O		O	* △	O
PHOTO	×	×		×	×
SLOW SHUTTER	×	×	O		×
Digital Special Effects	O	O	O	×	

O : The requested function will work in this operating mode.
× : You can not change the requested mode.
△ : The operating function will be released and the requested one will work.
* : The operating function will be released and the requested one will work.
(the data during the operating mode will be backed up)

Notes

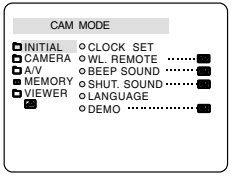
- When a menu item on the LCD is marked with an ☒ , that item cannot be activated.
- When you select an item that cannot be changed, an error message will be displayed.

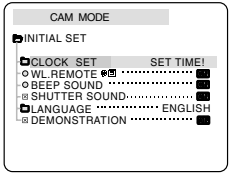
Advanced Recording

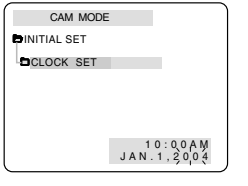
● CLOCK SET

✤ CLOCK setup works in CAMERA, PLAYER, M.REC and M.PLAY modes.
✤ The DATE/TIME is automatically recorded onto a tape.
Before recording, please set the DATE/TIME.

1. Press the MENU button.
   ■ The menu list will appear.
2. Move the MENU SELECTOR to highlight INITIAL and push the MENU SELECTOR.
3. Use the MENU SELECTOR to select CLOCK SET from the submenu.
4. Push the MENU SELECTOR to enter SETTING mode.
   ■ A blinking item indicates the item to be changed. The year will blink first.
5. Using the MENU SELECTOR, change the year setting.
6. Push the MENU SELECTOR.
   ■ The month will blink.
7. Using the MENU SELECTOR, change the month setting.
8. Push the MENU SELECTOR.
   ■ The day will blink.
9. You can set the day, hour and minute following the same procedure for setting the year and month.
10. Push the MENU SELECTOR after setting the minutes.
    ■ The word COMPLETE! will appear, and a few seconds later, the menu screen will automatically return to the sub menu.
11. To exit, push the MENU button.







Advanced Recording

● WL. REMOTE

✤ The WL.REMOTE function works in CAMERA, PLAYER, M.REC, M.PLAY modes.
✤ The WL.REMOTE option allows you to enable or disable the remote control for use with the camcorder.

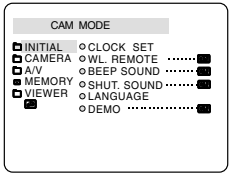
1. Press the MENU button.
   ■ The menu list will appear.

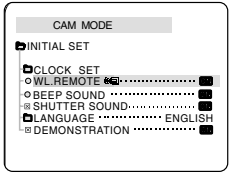
2. Move the MENU SELECTOR to highlight INITIAL and push the MENU SELECTOR.

3. Use the MENU SELECTOR to select WL.REMOTE from the submenu.

4. Push the MENU SELECTOR to enable or disable the remote control.
   The setting switches between ON/OFF each time you push the MENU SELECTOR.

5. To exit, press the MENU button.
   ■ If you set the remote to OFF in the menu and try to use it, the remote icon will blink for 3 seconds and disappear on the LCD.





Advanced Recording

● BEEP SOUND

✤ The BEEP SOUND function works in CAMERA, PLAYER, M.REC, M.PLAY modes.
✤ Use the MENU to setup the BEEP SOUND function.
Select whether or not you want to hear a beep sound whenever you change a setup value.

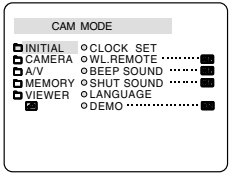
1. Press the MENU button.
   ■ The menu list will appear.

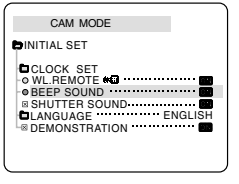
2. Move the MENU SELECTOR to highlight INITIAL and push the MENU SELECTOR.

3. Use the MENU SELECTOR to select BEEP SOUND from the submenu.

4. Push the MENU SELECTOR to enable or disable the BEEP SOUND.
   The setting switches between ON/OFF each time you push the MENU SELECTOR.
   ■ You will hear a Beep Sound when you select the ON setup.
   ■ When you press the START/STOP button to start recording, the BEEP SOUND is automatically set to OFF so you can't hear it any longer.

5. To exit, press the MENU button.



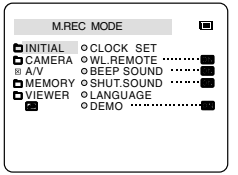


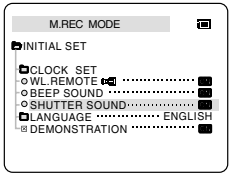
Advanced Recording

● SHUTTER SOUND

✤ You can hear SHUTTER SOUND only when the PHOTO function is working.
✤ Determines whether or not you wish to hear a SHUTTER SOUND when using the DSC feature.

1. Set the mode switch to MEMORY STICK.
2. Set the power switch to CAMERA mode.
3. Press the MENU button.
   ■ The menu list will appear.
4. Move the MENU SELECTOR to highlight INITIAL and push the MENU SELECTOR.
5. Use the MENU SELECTOR to select SHUTTER SOUND from the submenu.
6. Push MENU SELECTOR to switch between ON and OFF.
7. To exit, press the MENU button.





Advanced Recording

● DEMONSTRATION

- ✤ Demonstration automatically shows you the major functions that are included with your camcorder so that you may use them more easily.
- ✤ The DEMONSTRATION function may only be used in the CAMERA mode without a tape inserted in the camcorder.
- ✤ The demonstration operates repeatedly until the DEMONSTRATION mode switched OFF.

1. Set the camcorder to CAMERA mode.
   (The mode switch must be in the TAPE position.)

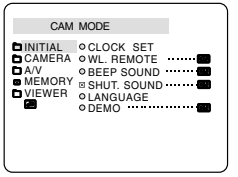
2. Press the MENU button.
   - The menu list will appear.

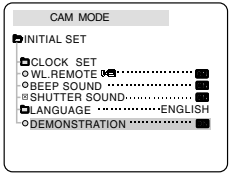
3. Move the MENU SELECTOR to highlight INITIAL and push the MENU SELECTOR.

4. Select DEMONSTRATION from the submenu and push the MENU SELECTOR.

5. To activate the DEMONSTRATION, set DEMONSTRATION ON.
   - Press the MENU button to quit the menu.
   - The demonstration will begin.

6. To end the DEMONSTRATION, set the DEMONSTRATION to OFF.





Notes

- The DEMONSTRATION function only works without a TAPE installed.
- The DEMONSTRATION mode is automatically activated when the camcorder is left idle for more than 10 minutes after switching to the CAMERA mode (no tape is inserted in the camcorder).
- If you press other buttons (FADE, BLC, PHOTO, EASY) during the DEMONSTRATION mode, the DEMONSTRATION stops temporarily and resumes 10 minutes later if you do not operate any other functions.

Advanced Recording

● PROGRAM AE

✤ The PROGRAM AE function works in CAMERA mode only.
✤ The PROGRAM AE mode allows you to adjust shutter speeds and apertures to suit different recording conditions.
✤ They give you creative control over the depth of field.

■ AUTO mode

- Automatically balances the exposure between the subject and the background.
- To be used in normal conditions.
- The shutter speed automatically varies from 1/60 to 1/250 per second, depending on the scene.

■ SPORTS mode ( )

- For recording people or objects moving quickly.

■ PORTRAIT mode ( )

- For focusing on the background of the subject, when the background is out of focus.
- The PORTRAIT mode is most effective when used outdoors.
- The shutter speed automatically varies from 1/60 to 1/1000 per second.

■ SPOTLIGHT mode ( )

- For recording correctly when there is only light on the subject and not the rest of the picture.

■ SAND/SNOW mode ( )

- For recording when people or objects are darker than the background because of reflected light from sand or snow.

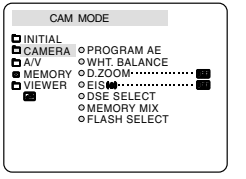
■ High S. SPEED (High Shutter Speed) mode ( )

- For recording fast-moving subjects such as players in golf or tennis games.

Advanced Recording

Setting the PROGRAM AE

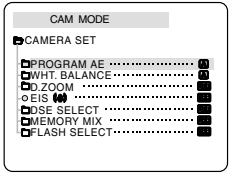
1. Press the MENU button.
   - The menu list will appear.

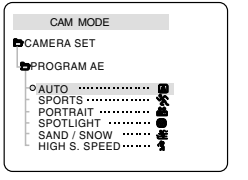


2. Move the MENU SELECTOR to highlight CAMERA and push the MENU SELECTOR.

3. Select PROGRAM AE from the submenu.

4. Push the MENU SELECTOR to enter the sub-menu.





5. Using the MENU SELECTOR, select the PROGRAM AE mode.
   - Push the MENU SELECTOR to confirm the PROGRAM AE mode.

6. To exit, press the MENU button.

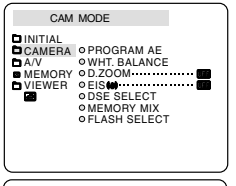
Notes

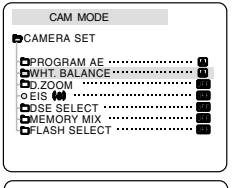
- The PROGRAM AE function will not operate in EASY mode.
- When recording with a PROGRAM AE mode, the Flash function does not work.

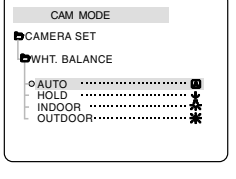
Advanced Recording

● WHT. BALANCE (WHITE BALANCE)

✤ The WHITE BALANCE function works in CAMERA or M.REC mode only.
✤ The WHITE BALANCE is a recording function that preserves the unique image color of the object in any recording condition.
✤ You may select the appropriate WHITE BALANCE mode to obtain good quality image color.
- AUTO (A) : This mode is generally used to control the WHITE BALANCE automatically.
- HOLD ( ) :This fixes the current WHITE BALANCE value.
- INDOOR ( ) : This controls the WHITE BALANCE according to the indoor ambience.
  - Under halogen or studio/video lighting
  - Subject is of one dominant color
  - Close ups
- OUTDOOR ( ) : This controls the WHITE BALANCE according to the outdoor ambient light.
  - In daylight, especially for close ups and where the subject is of one dominant color.







1. Set the camcorder to CAMERA mode.
2. Press the MENU button.
   - The menu list will appear.
3. Move the MENU SELECTOR to highlight CAMERA and push the MENU SELECTOR.
4. Select WHT.BALANCE from the submenu.
5. Push the MENU SELECTOR to enter the sub-menu.
6. Using the MENU SELECTOR, select the WHITE BALANCE mode.
   - Push the MENU SELECTOR to confirm the WHITE BALANCE mode.
7. To exit, press the MENU button.

Notes

- The WHT.BALANCE function will not operate in EASY mode.
- Turn the digital zoom off (if necessary) to set a more accurate white balance.
- Reset the white balance if lighting conditions change.
- During normal outdoor recording, setting to AUTO may provide better results.

Advanced Recording

Zooming In and Out with DIGITAL ZOOM

✤ Digital Zoom works in CAMERA mode only.

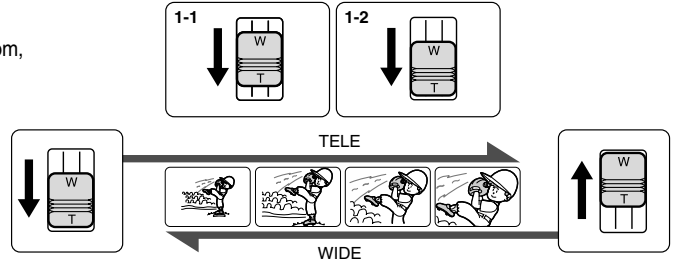
Zooming In and Out

✤ Zooming is a recording technique that lets you change the size of the subject in a scene.
For more professional looking recordings, do not use the zoom function too often.
✤ You can zoom using variable zoom speeds.
✤ Use these features for different shots. Please note that over-use of the zoom feature can lead to unprofessional looking results and a reduction of battery usage time.

1. Move the zoom lever slightly for a gradual zoom, move it further for a high-speed zoom.
Your zooming is monitored on the OSD.

2. T(Telephoto) side:
Subject appears closer.

3. W(Wide angle) side:
Subject appears farther away.



Note

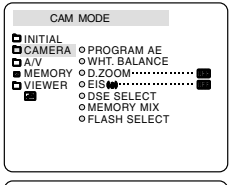
You can record a subject that is a minimum of 1 m (about 3.2 feet) away from the lens surface in the TELE position, or about 10 mm (about 0.5 inch) away in the WIDE position.

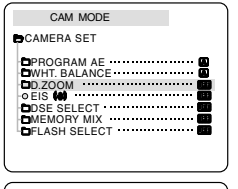
Advanced Recording

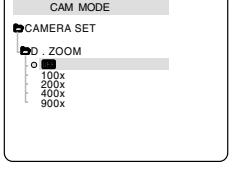
Digital Zoom

- ✤ Zooming more than 12x is achieved digitally.
- ✤ The picture quality may deteriorate depending on how much you zoom in on the subject.
- ✤ We recommend that you use the EIS feature with DIGITAL ZOOM for picture stability. (see page 48)

1. Set the camcorder to CAMERA mode.
2. Press the MENU button.
   - ■ The menu list will appear.
3. Move the MENU SELECTOR to CAMERA and push the MENU SELECTOR.
4. Select D.ZOOM from the submenu.
5. Push the MENU SELECTOR to setup the 100x, 200x, 400x, 900x digital zoom function or to turn the feature OFF.
6. To exit, press the MENU button.







Advanced Recording

● EIS (Electronic Image Stabilizer)

✤ The EIS function works in CAMERA mode only.
✤ EIS (Electronic Image Stabilizer) is a function that compensates for any shaking or hand movement while holding the camcorder (within reasonable limits).
✤ It provides more stable pictures when:
- Recording with the zoom
- Recording a small object close-up
- Recording and walking at the same time
- Recording through the window of a vehicle

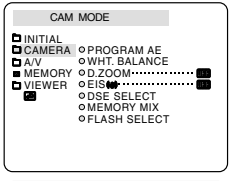
1. Set the camcorder to CAMERA mode.

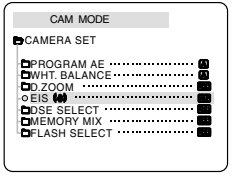
2. Press the MENU button.
   - The menu list will appear.

3. Move the MENU SELECTOR highlight to CAMERA and push the MENU SELECTOR.
   - The sub menu list will appear.

4. Move the MENU SELECTOR to activate the EIS function, push the MENU SELECTOR.
   - The EIS menu is changed to ON.
   - If you do not want to use the EIS function, set the EIS menu to OFF.

5. To exit, press the MENU button.





Notes

- It is recommended that you deactivate the shake compensation function when using a tripod.
- If you use the EIS function, the picture quality may deteriorate.
- While setting the EIS to ON, the WIDE, STROBE (DSE function) mode do not work.

Advanced Recording

● DSE(Digital Special Effects) SELECT

- ✤ The DSE function works in CAMERA mode only.
- ✤ The digital effects enable you to give a creative look to your recording by adding various special effects.
- ✤ Select the appropriate digital effect for the type of picture that you wish to record and the effect you wish to create.
- ✤ There are 8 DSE modes.

a. ART mode
This mode gives the images a coarse effect.

b. MOSAIC mode
This mode gives the images a mosaic effect.

c. SEPIA mode
This mode gives the images a reddish-brown pigment.

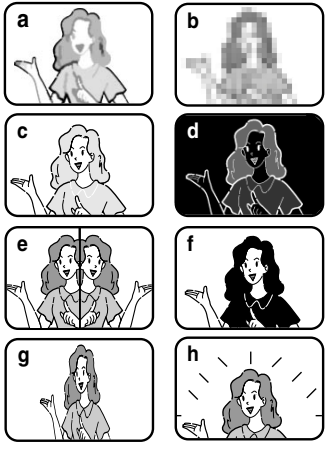
d. NEGA mode
This mode reverses the colors of the images, creating a negative image.

e. MIRROR mode
This mode cuts the picture in half, using a mirror effect.

f. BLK & WHT mode
This mode changes the images to black and white.

g. WIDE [16:9] mode
Produce images in the WIDE [16:9] format for Playback on wide screen TVs.

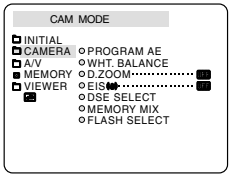
h. STROBE mode
This effect converts on-screen action to a series of still images, giving an effect similar to slow-motion.

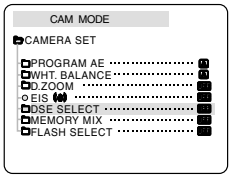


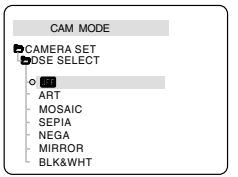
Advanced Recording

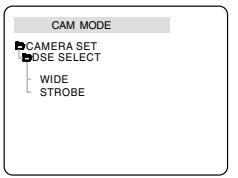
Selecting an effect

1. Set the camcorder to CAMERA mode.
2. Press the MENU button.
   - The menu list will appear.
3. Move the MENU SELECTOR to highlight CAMERA and push the MENU SELECTOR.
4. Select DSE SELECT from the submenu.
5. Push the MENU SELECTOR to enter the sub-menu.
6. Using MENU SELECTOR, select the DSE mode.
   - Push the MENU SELECTOR to confirm the DSE mode.
7. To exit, press the MENU button.









Notes

- The DSE function will not operate in EASY mode.
- While setting the WIDE or STROBE to ON, the EIS function does not work.

Advanced Recording

● MEMORY MIX

- ✤ The MEMORY MIX function works in CAMERA mode only.
- ✤ You can superimpose a still image you have recorded on the Memory Stick on top of the moving image you are recording.
- ✤ You can record the superimposed images on a tape.
- ✤ Select from 4 types of Memory Mix effects:

■ M. CHROMA (Memory chroma key)

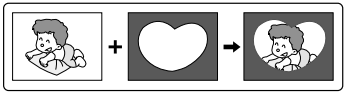
- You can swap a blue area of a still image such as a picture frame with a moving image.

■ M.LUMI (Memory luminance key)

- You can swap a brighter area of a still image such as a handwritten illustration or title with a moving image.
  Make your own title or illustration by drawing or writing on a white piece of paper. Adjust the mix level in the light area of the still image.

■ C. LUMI (Camera luminance key)

- Superimpose the currently recording image on top of a still image, which becomes its background.
  Shoot the subject against a brighter background.
  The brighter area of the moving image will be a swapped with a still image.



■ M.OVER LAP (Memory overlap)

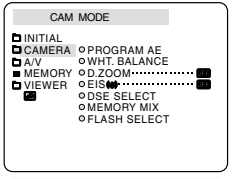
- You can make a moving image fade in on top of a still image recorded on the Memory Stick as the overlap function.

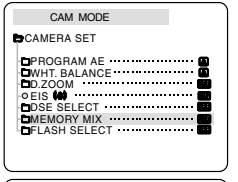
Advanced Recording

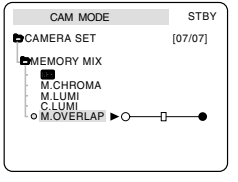
Recording Superimposed images on a tape

✤ Insert a tape for recording into your camcorder.
✤ Insert a Memory Stick is recorded still images into your camcorder.

1. Set the camcorder to CAMERA mode.
2. Press the MENU button.
   - The menu list will appear.
3. Move the MENU SELECTOR to highlight CAMERA and push the MENU SELECTOR.
4. Select MEMORY MIX from the submenu and push the MENU SELECTOR.
5. Move the MENU SELECTOR to select the desired MEMORY MIX mode and push the MENU SELECTOR.
   - Your currently recording image is combined with the last recorded image.
6. Press the ◀◀ (REV)/ ▶▶ (FWD) buttons to select the still image you want to superimpose.
7. Move the MENU SELECTOR to adjust the mix level.
   - Push the MENU SELECTOR to confirm the MEMORY MIX mode.
8. To exit, press the MENU button.
   - Your selected MEMORY MIX mode is flashed in the display.
9. Press the MEMORY MIX button.
   - The still image is superimposed on the moving image.
   - Each time you press the MEMORY MIX button, your selection is activated (display lights continuously) or de activated (display flashes).
10. Press the START/STOP button to start recording.
    - The superimposed images are recorded onto the tape.







Note

- If you turn the position of the power switch, select your still image for MEMORY MIX again.

Advanced Recording

Using the Built - in Flash

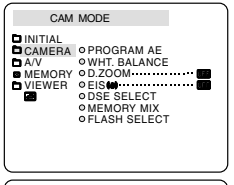
✤ You can take natural looking flash pictures with appropriate illumination using the built-in flash, whether they are night scenes, in doors or in other dark places.
- OFF : The flash does not fire.
- ⚡A (Auto): The flash comes on depending on the brightness of the subject.
- ⚡ (Flash on): The flash comes on regardless of the brightness of the subject.
- ⚡ (Red-eye reduction auto) : The flash pre-fires automatically before the main firing to reduce the red-eye phenomenon.

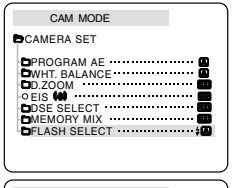
● FLASH SELECT

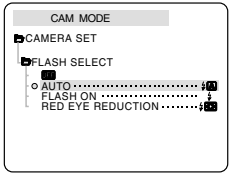
✤ The FLASH SELECT function works in CAMERA and M.REC mode.

1. Set the camcorder to CAMERA mode.
2. Press the MENU button.
   - The menu list will appear
3. Move the MENU SELECTOR to highlight CAMERA and push the MENU SELECTOR.
4. Select FLASH SELECT from the submenu and push the MENU SELECTOR.
5. Using the MENU SELECTOR, Select the FLASH SELECT mode.
   - Push the MENU SELECTOR to confirm the FLASH SELECT mode.
6. To exit, press the MENU button.

Warning!
- **Do not fire the flash with the flash bulb covered with your hand.**
- **Do not fire the flash close to people's eyes.**







Notes

- While using the following functions, you cannot use the FLASH function:
  - PROGRAM AE, SHUTTER SPEED, EXPOSURE, STROBE (DSE function), SLOW SHUTTER, CONTINUOUS SHOT, MEMORY MIX
  - When you are recording movies onto a tape.
- If the flash is forced to fire (Flash on) in a bright location, the effect of flash photography may sometimes not be obtained.
- When ⚡ (Red-eye reduction auto) is set, the flash fires twice-once to perform red-eye reduction and the second flash main firing for taking the photograph. It takes about 1.5 second between the flash firing for red-eye reduction and the main firing.

Advanced Recording

● REC MODE

✤ The REC MODE function works in both CAMERA and PLAYER modes.
✤ This camcorder records and plays back in SP (standard play) mode and in LP (long play) mode.
- SP (standard play): This mode permits 60 minutes of recording time with a DVM60 tape.
- LP (long play): This mode permits 90 minutes of recording time with a DVM60 tape.

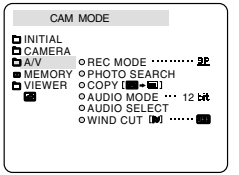
1. Set the camcorder to CAMERA or PLAYER mode.

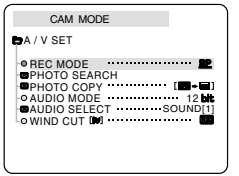
2. Press the MENU button.
   - The menu list will appear.

3. Move the MENU SELECTOR to highlight A/V and push the MENU SELECTOR.

4. Select REC MODE from the submenu and push the MENU SELECTOR.
   - The REC MODE toggles between SP and LP with each press.

5. To exit, press the MENU button.





Notes

- We recommend that you use this camcorder to play back any tape recorded on this camcorder. Playing back a tape recorded in other equipment may produce mosaic shaped distortion.
- When you record a tape in SP and LP modes, or LP mode only, the playback picture may be distorted or the time code may not be written properly between scenes.
- Record using SP mode for best picture and sound quality.

Advanced Recording

● AUDIO MODE

✤ The AUDIO MODE function works in CAMERA and PLAYER modes.
✤ This camcorder records sound in two ways. (12bit, 16bit)
- ■ 12bit : You can record two 12bit stereo sound tracks.
  The original stereo sound can be recorded onto the MAIN (SOUND1) track.
  Additional stereo sound can be dubbed onto the SUB (SOUND2) track.
- ■ 16bit : You can record one high quality stereo sound using the 16bit recording mode.
  Audio dubbing is not possible when using this mode.

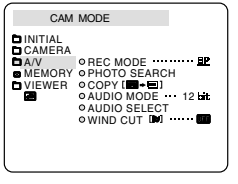
1. Set the camcorder to CAMERA mode.

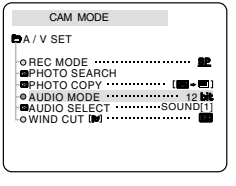
2. Press the MENU button.
   - ■ The menu list will appear.

3. Move the MENU SELECTOR to highlight A/V and push the MENU SELECTOR.

4. Select the AUDIO MODE from the menu and push the MENU SELECTOR.
   - ■ The AUDIO MODE toggles between 12bit-16bit with each push.

5. To exit, press the MENU button.





Advanced Recording

● WIND CUT

✤ The WIND CUT function works in CAMERA and PLAYER modes.
✤ The WIND CUT function minimizes wind noise or other noise while recording.
- When the wind cut is on, it is possible other low sounds will be eliminated along with the sound of the wind.

1. Set the camcorder to CAMERA mode.

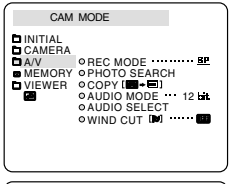
2. Press the MENU button.
   ■ The menu list will appear.

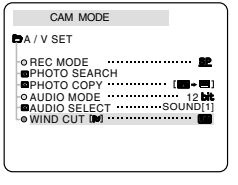
3. Move the MENU SELECTOR to highlight A/V and push the MENU SELECTOR.

4. Select WIND CUT from submenu.

5. This feature toggles ON/OFF each time you push the MENU SELECTOR.
   ■ [ ] is shown in the display when you turn the WIND CUT on.

6. To exit, press the MENU button.





Notes

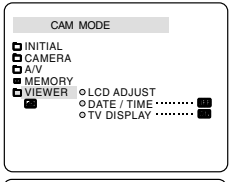
■ Make sure WIND CUT is set to off when you want the microphone to be as sensitive as possible.
■ Use the WIND CUT when recording in windy places such as the beach or near buildings.

Advanced Recording

● DATE/TIME

✤ The DATE/TIME function works in CAMERA, PLAYER, M.REC and M.PLAY modes.
✤ The date and time are automatically recorded on a special data area of the tape.

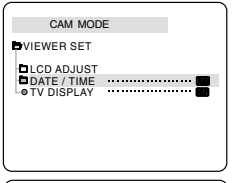
1. Press the MENU button.
   ■ The menu list will appear.



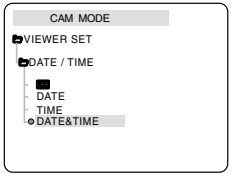
2. Move the MENU SELECTOR to highlight VIEWER and push the MENU SELECTOR.

3. Move the MENU SELECTOR to highlight DATE/TIME.

4. Push the MENU SELECTOR to select the sub-menu.



5. Using the MENU SELECTOR, select the DATE/TIME mode.
   ■ You can choose to display - the OFF, DATE, TIME, DATE/TIME
     - OFF
     - DATE only
     - TIME only
     - DATE & TIME
   ■ To return to the previous menu, highlight the DATE/TIME in the middle of the menu and push the MENU SELECTOR.



6. To exit, press the MENU button.

Notes

■ The DATE/TIME is not affected by the OSD ON/OFF (DISPLAY) button.
■ The DATE/TIME will read “- - -” in the following conditions.
  - During playback of a blank section of a tape.
  - If the tape was recorded before setting the DATE/TIME in the Camera’s memory.
  - When the lithium battery becomes weak or dead.
■ Before you can use the DATE/TIME function, you must set the Clock.
  See CLOCK SET on page 38.