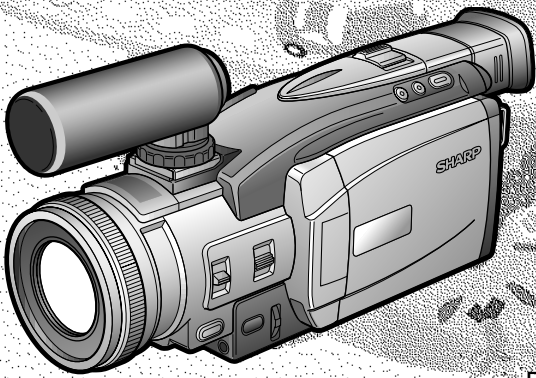


# SHARP®

LIQUID CRYSTAL DISPLAY CAMCORDER

MODEL  
**VL-AX1H**

■ OPERATION MANUAL ■



**SHARP**

**VIEWCAM·SLIM**

Mini **DV**

•The **Mini DV** logo is a trademark.

Please read this operation manual carefully before using the VIEWCAM.

If you require any advice or assistance regarding your Sharp product, please visit our web-site [www.sharp.co.uk/support](http://www.sharp.co.uk/support). Customers without Internet access may telephone 08705 274277 during office hours (or (01)676 0648 if telephoning from Ireland).

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Advanced Features

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This equipment complies with the requirements of Directives 89/336/EEC and 73/23/EEC as amended by 93/68/EEC.

Dieses Gerät entspricht den Anforderungen der EG-Richtlinien 89/336/EWG und 73/23/EWG mit Änderung 93/68/EWG.

Ce matériel répond aux exigences contenues dans les directives 89/336/CEE et 73/23/CEE modifiées par la directive 93/68/CEE.

Dit apparaat voldoet aan de eisen van de richtlijnen 89/336/EEG en 73/23/EEG, gewijzigd door 93/68/EEG.

Dette udstyr overholder kravene i direktiv nr. 89/336/EEC og 73/23/EEC med tillæg nr. 93/68/EEC.

Quest' apparecchio è conforme ai requisiti delle direttive 89/336/EEC e 73/23/EEC, come emendata dalla direttiva 93/68/EEC.

Η εγκατάσταση αυτή ανταποκρίνεται στις απαιτήσεις των οδηγιών της Ευρωπαϊκής Ένωσης 89/336/EOK και 73/23/EOK, όπως οι κανονισμοί αυτοί συμπληρώθηκαν από την οδηγία 93/68/EOK.

Este equipamento obedece às exigências das directivas 89/336/CEE e 73/23/CEE, na sua versão corrigida pela directiva 93/68/CEE.

Este aparato satisface las exigencias de las Directivas 89/336/CEE y 73/23/CEE, modificadas por medio de la 93/68/CEE.

Denna utrustning uppfyller kraven enligt riktlinjerna 89/336/EEC och 73/23/EEC så som kompletteras av 93/68/EEC.

Dette produktet oppfyller betingelsene i direktivene 89/336/EEC og 73/23/EEC i endringen 93/68/EEC.

Tämä laite täyttää direktiivien 89/336/EEC ja 73/23/EEC vaatimukset, joita on muutettu direktiivillä 93/68/EEC.

#### **WARNING**

#### **TO PREVENT SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

This equipment should be used with the recommended AC adapter/battery charger or battery pack.

#### **CAUTION**

To prevent electric shocks and fire hazards, do NOT use any other power source.

#### **Important:**

Recording and playback of any material may require consent. Please refer particularly to the provisions of the Copyright Act 1956, the Dramatic and Musical Performers Protection Act 1958, the Performers Protection Acts 1963 and 1972 and to any subsequent statutory enactments and orders.

#### **CAUTION**

To prevent shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to a qualified dealer or service centre.



#### **Power supply:**

#### **WARNING: THIS AC ADAPTER/BATTERY CHARGER IS NOT FOR USE WITH TOYS. THIS AC ADAPTER/BATTERY CHARGER IS FOR USE WITH SHARP VIEWCAM MODEL VL-AX1H ONLY.**

This unit can be operated by connecting it to either the AC adapter/battery charger or battery pack. The AC adapter/battery charger incorporates the AUTO VOLTAGE (AC 110–240 V, 50/60 Hz) function.



### SPECIAL NOTE FOR USERS IN THE U.K.

The mains lead of this product is fitted with a non-rewireable (moulded) plug incorporating a 3A fuse. Should the fuse need to be replaced, a BSI or ASTA approved BS 1362 fuse marked  or  and of the same rating as above, which is also indicated on the pin face of the plug, must be used.

Always refit the fuse cover after replacing the fuse. Never use the plug without the fuse cover fitted.

In the unlikely event of the socket outlet in your home not being compatible with the plug supplied, cut-off the mains plug and fit an appropriate type.

**DANGER:** The fuse from the cut-off plug should be removed and the cut-off plug destroyed immediately and disposed of in a safe manner.

Under no circumstances should the cut-off plug be inserted elsewhere into a 13A socket outlet, as a serious electric shock may occur.

To fit an appropriate plug to the mains lead, follow the instructions below:

**IMPORTANT:** The wires in the mains lead are coloured in accordance with the following code:

**Blue: Neutral**

**Brown: Live**

As the colours of the wires in the mains lead of this product may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The wire which is coloured blue must be connected to the plug terminal which is marked N or coloured black.
- The wire which is coloured brown must be connected to the plug terminal which is marked L or coloured red.

Ensure that neither the brown nor the blue wire is connected to the earth terminal in your three-pin plug.

Before replacing the plug cover make sure that:

- If the new fitted plug contains a fuse, its value is the same as that removed from the cut-off plug.
- The cord grip is clamped over the sheath of the mains lead and not simply over the lead wires.

IF YOU HAVE ANY DOUBT, CONSULT A QUALIFIED ELECTRICIAN.

#### NOTE:

The LCD panel of this camcorder is a very high technology product with more than 120,000 thin-film transistors\*, giving you fine picture detail. Occasionally, a pixel may appear on the screen as a fixed point of blue, green, red, or black. Please note that this does not affect the performance of your camcorder.

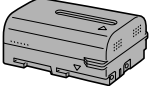
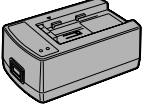
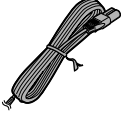
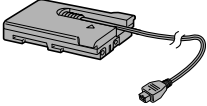

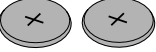
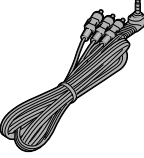
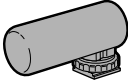

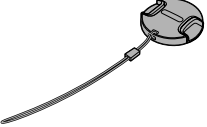

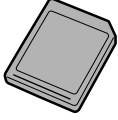
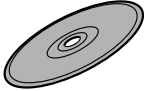
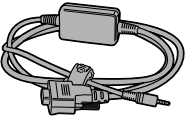
\*Specifications are subject to change without notice.

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- DPOF is a trademark of CANON INC., Eastman Kodak Company, Fuji Photo Film Co., Ltd. and Matsushita Electric Industrial Co., Ltd.
- All other brand or product names are registered trademarks or trademarks of their respective holders.

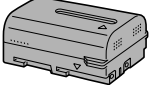
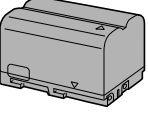
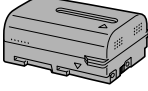
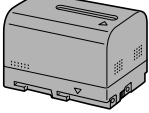
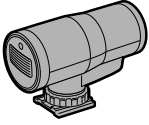


## Supplied Accessories

			
Battery pack BT-L221	AC adapter/ battery charger	Power cord	DC cable
			
Remote control	CR2025 type lithium battery x 2	Audio/video cable	Zoom microphone
			
Shoulder strap	Lens cap	Lens hood	8MB SD Memory Card
			
PixLab Video Capture Software (Lite Version)	PC connecting cable		



## Optional Accessories

 <p>Standard-life battery pack BT-L221</p>	 <p>Extended-life battery pack BT-L441</p>	 <p>Standard-life intelligent battery pack BT-LS222</p>	 <p>Extended-life intelligent battery pack BT-LS442A</p>
 <p>*IR &amp; Flash light VR-3VIF</p>			

**Note:**

- When using the \*IR & Flash light VR-3VIF with this camcorder, it can only be used as a flash.



## Precautions

- **When the camcorder is not in use, remember to remove the cassette tape, turn off the power, and disconnect the camcorder from the power source.**

- **Do not aim the lens at the sun.**  
Do not allow direct sunlight to strike the camcorder lens, the viewfinder eyepiece or the LCD monitor screen, whether or not recording is in progress, as it may damage the CCD sensor or LCD screen surface. Be particularly careful when recording outside.

- When shooting in dark places, avoid sudden brightly lit objects or light sources, such as the sun. Otherwise, the image may white out. Should this happen, point the lens in a different direction until the picture returns to normal.

- **Avoid magnetic sources.**

Using the camcorder near strong fluorescent lights, motors, televisions, or other magnetic sources may adversely affect recorded images.



- **Using the camcorder near a broadcasting station or other powerful transmission source may cause buzzing or picture deterioration.**

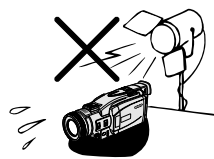
- **Avoid shocks and dropping.**

Do not drop or otherwise subject the camcorder to hard shocks or strong vibrations. Bumping or striking the unit during recording will generate noise in the recorded image.



- **Avoid placing the camcorder in close proximity to lighting equipment.**

The heat from incandescent lights may deform the camcorder, or cause it to malfunction.



- **Always respect prohibitions or restrictions on the use of electronic equipment on commercial flights or in other sensitive areas.**

- **Be aware of the temperature and humidity.**

You can use your camcorder at 0°C to +40°C, and at 30% to 80% relative humidity. Do not store the unit in an unventilated car in the summer, in direct sunlight, or near strong heat sources; this can result in severe damage to the unit casing and circuitry.



- **Avoid situations where water, sand, dust or other foreign matter could get on or inside the camcorder, and do not use or leave your camcorder in areas with excessive smoke, steam or moisture.**

Such environments can cause malfunctions or cause mildew to form on the lenses. Be sure to keep the unit in a well-ventilated location.



- **Some small, portable tripods may be difficult to attach and may not be sturdy enough to support your camcorder. Be sure to use only a strong, stable tripod.**



- **When using your camcorder in a cold environment, the LCD monitor screen often appears less bright immediately after the power is turned on. This is not a malfunction. To prevent the camcorder from becoming too cold, wrap it in a thick cloth (a blanket, etc.).**



## Dew Formation

### • What is “dew formation”?

When cold water is poured into a glass, dew drops form on the glass. This clinging of water drops is called dew formation.

### • When dew forms in your camcorder.

Dew will gradually form on the head drum of your camcorder and make the video tape stick to the head. This causes damage both to the head and the tape. When dew forms, recording and playback may not function properly.

Dew is likely to form in the following circumstances:

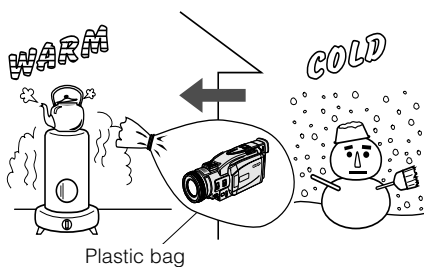
- When moving the camcorder from a cold place to a warm place.
- When placing the camcorder in a cold room which is then heated rapidly.
- When moving the camcorder outdoors from an air-conditioned room or car.
- When placing the camcorder in the direct path of air blowing from an air conditioner.
- When placing the camcorder in a humid room.



### • How to prevent trouble.

When using the camcorder in a place where dew is likely to form, allow the camcorder and the video tape to acclimatise to the surroundings for about one hour.

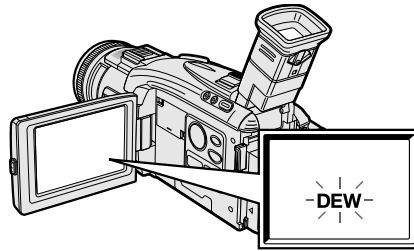
For example, when bringing the camcorder indoors after skiing, place it in a plastic bag.



- ① Be sure to tightly seal the plastic bag containing the camcorder.
- ② Remove the bag when the air temperature inside it reaches the temperature of the room.

### • “Dew” warning feature

If dew forms, the word “DEW” flashes on the screen, and the power will automatically turn off in approximately 10 seconds.



- ① If “DEW” flashes, remove the cassette, leave the cassette compartment open, and wait for a few hours to allow the camcorder to acclimatise to the surrounding temperature.
- ② To use the camcorder again, turn on the power after waiting for a few hours. Be sure that “DEW” has disappeared.
- ③ Do not insert a cassette while “DEW” is flashing; this may result in damage to the tape.
- ④ Since dew forms gradually, it may take 10 to 15 minutes before the dew warning feature engages.



## Precautions

### Dirty Video Heads

When the video heads have become clogged with dirt (dust and tape coating particles),

Striped noise



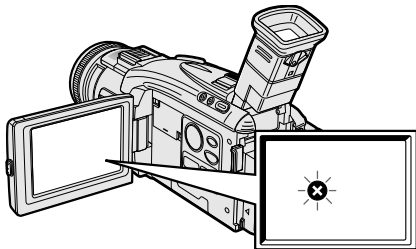
Mosaic noise




- mosaic-like noise appears on the playback picture. (see above illustration)
- playback pictures do not move.
- during playback, the whole screen becomes blue.

### Causes of video head clogging

- Environments with high-temperature and high-humidity
- A lot of dust in the air
- Damaged tape
- Worn tape
- Long-time use
- Dew formation



If the video heads become clogged, the  indicator appears on the screen. Contact your SHARP dealer for further advice or refer to page 101 "Before Requesting Service".

### Using a Cleaning Tape (Commercially Available)

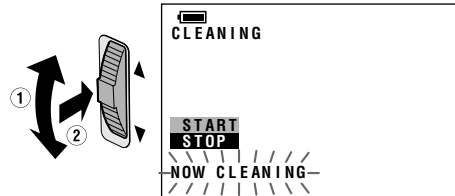
**Available mode:** TAPE-VCR

You can clean the video head with a commercially available cleaning tape.

#### Notes:

- **Excessive use of the cleaning tape may cause damage to the video heads. Please read the instructions accompanying the cleaning tape carefully before using it.**
- The fast forward and rewind functions cannot be used when the cleaning tape is in the camcorder.
- If the video heads again become clogged with dirt soon after cleaning, this might be caused by a damaged tape. In this case, stop using that cassette immediately.

- 1 Insert a cleaning tape into the camcorder.
- 2 Set the camcorder to TAPE-VCR mode.
  - The video head cleaning screen appears.
- 3 Turn the CONTROL dial to select "START", then push the dial to begin video head cleaning.
  - "NOW CLEANING" flashes during cleaning.



- After about 20 seconds, video head cleaning automatically finishes, and "EJECT THE CASSETTE." displays.

- 4 Remove the cleaning tape.

To cancel cleaning, press the CONTROL dial.





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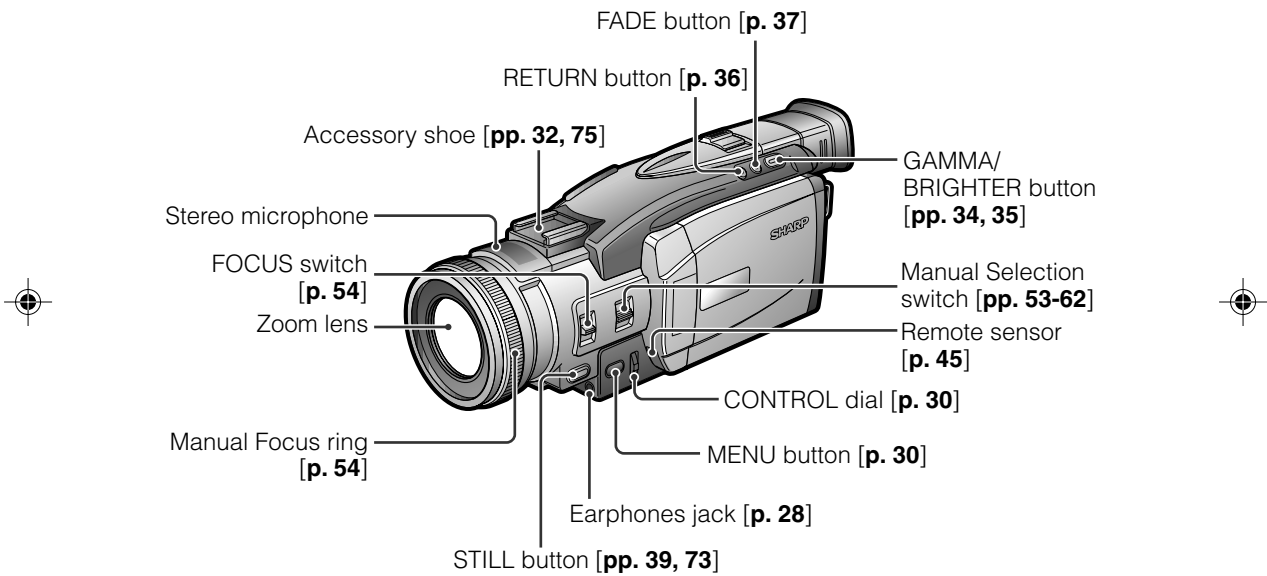


# Operation References

## Part Names

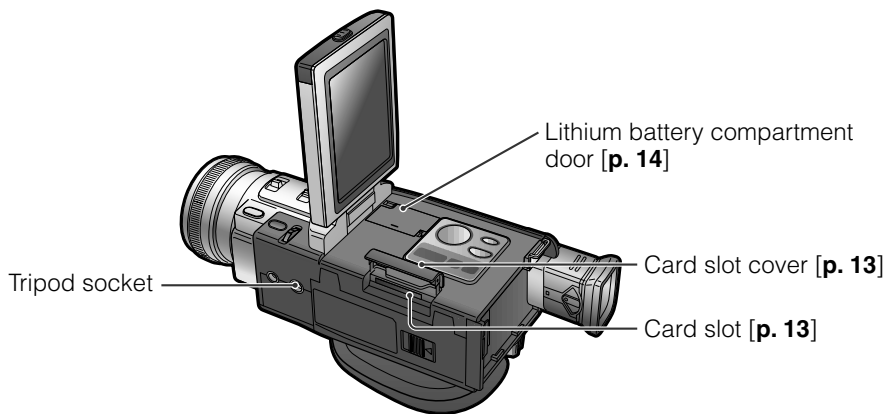
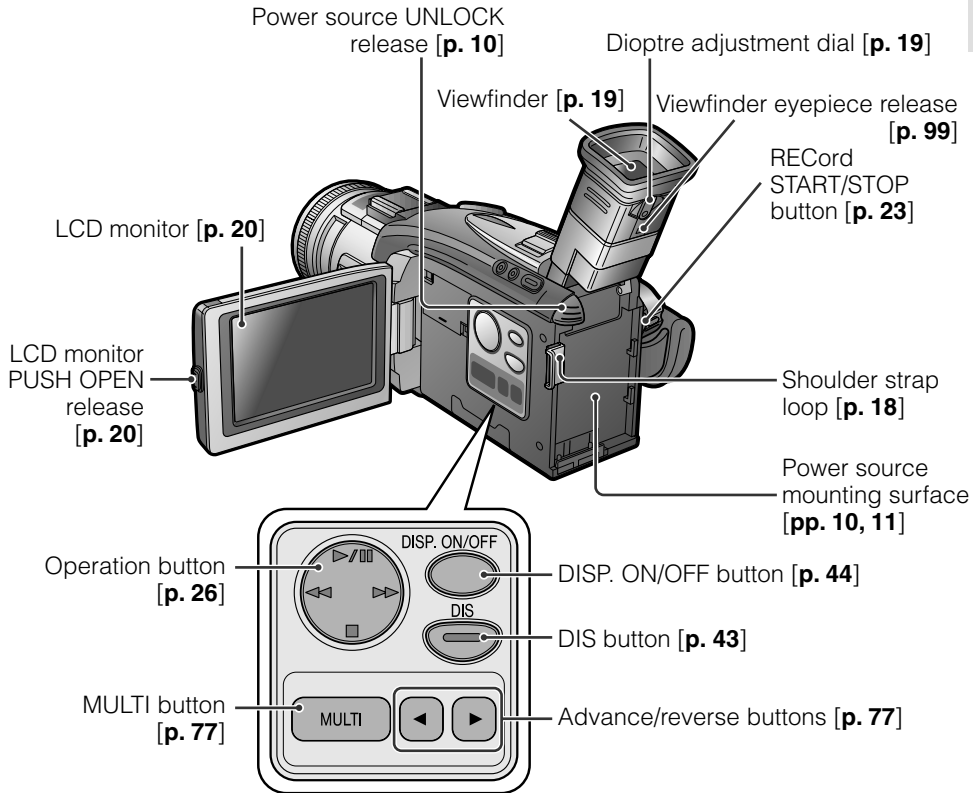
For details on the use of each part, refer to the page number indicated in brackets.

### Front view





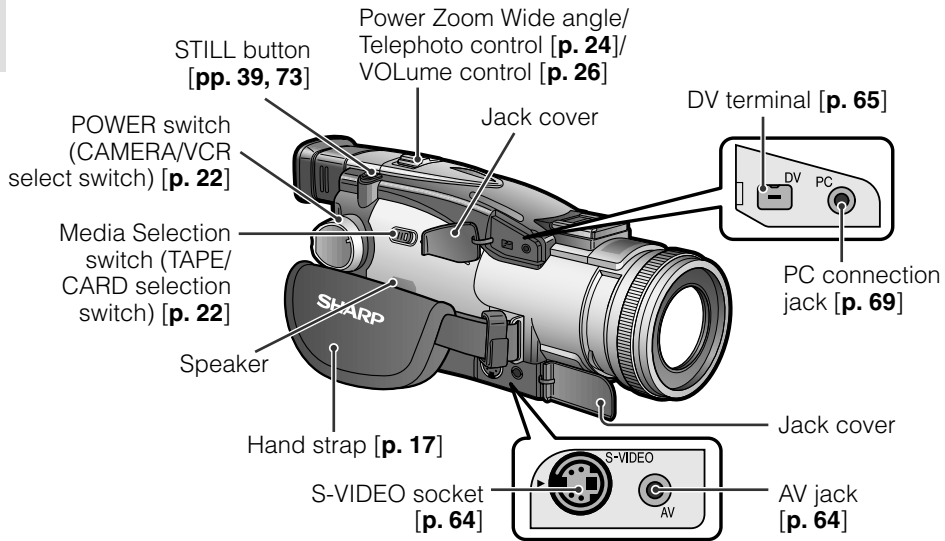
**Left view**



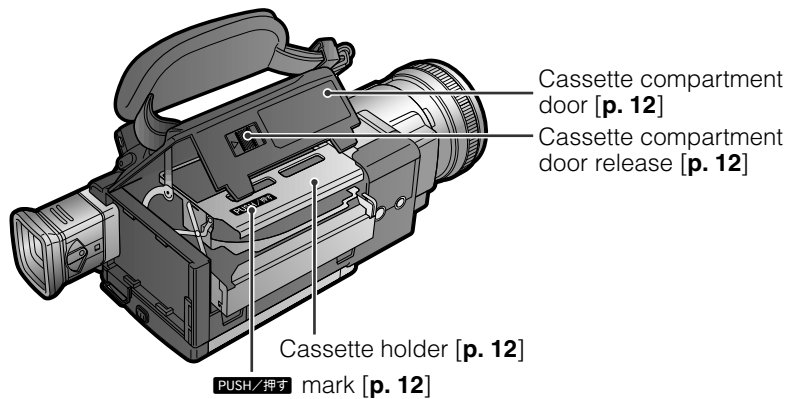
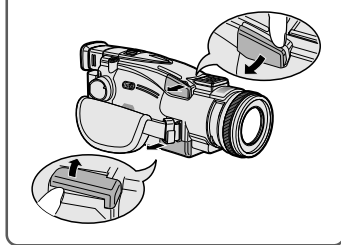


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#### Right view



#### To open the jack cover





## Quick Reference List

Below are some examples of camcorder's features.

- To record powerful close-up images.  
—See **page 31** (Setting the Digital Zoom)
- To record a backlit subject.  
—See **page 34** (Gamma Brightness Compensation) or **page 57** (Manual Exposure)
- To quickly return the tape to the end of the last recorded scene after playback.  
—See **page 36** (Quick Return)
- To record yourself in the scene while monitoring the shot.  
—See **page 40** (Self Recording)
- To record the subject with higher-quality audio.  
—See **page 43** (Selecting the 16-bit Audio Recording Mode)
- To enlarge any part of the picture during playback.  
—See **page 47** (Playback Zoom)
- To brighten the dark portion of the playback images without changing the bright portion.  
—See **page 49** (Gamma Playback)
- To focus on an off-centred subject.  
—See **page 54** (Manual Focus)
- To record still images on a card so that the images may be easily read into a computer.  
—See **page 73** (Card Recording)
- To turn off the confirmation sounds which are made when you operate the camcorder.  
—See **page 91** (Setting the Confirmation Sounds)

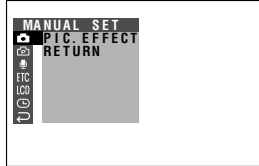
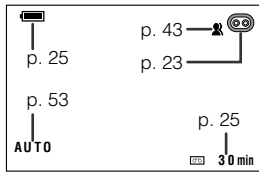


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For details on the use of each function, refer to the page number indicated.

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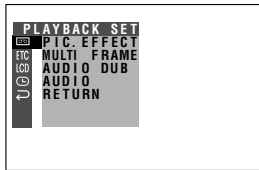
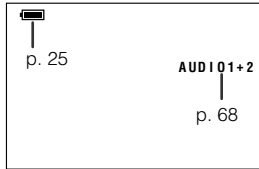
**LCD/VF SET**

- BACKLIGHT p. 88
- LCD BRIGHT p. 88
- LCD COLOUR p. 88
- VF BRIGHT p. 88
- RETURN p. 88

**CLOCK SET**

- DISPLAY p. 48
- AREA pp. 15, 89
- SUMR TIME p. 91
- SETTING p. 15
- 12H/24H p. 16
- RETURN p. 16

#### TAPE-VCR mode



**PLAYBACK SET**

- PIC. EFFECT p. 41
- MULTI FRAME pp. 50, 51
- AUDIO DUB p. 66
- AUDIO p. 68
- RETURN p. 68

**OTHERS**

- DEFAULT p. 92
- REMOTE p. 45
- SOUND p. 91
- TIME CODE p. 63
- TC OUT p. 63
- RETURN p. 63

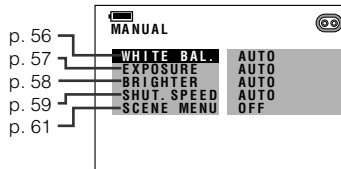
**LCD/VF SET**

- BACKLIGHT p. 88
- LCD BRIGHT p. 88
- LCD COLOUR p. 88
- VF BRIGHT p. 88
- RETURN p. 88

**CLOCK SET**

- DISPLAY p. 48
- RETURN p. 48

#### MANUAL screen (in TAPE-CAMERA, CARD-CAMERA modes)



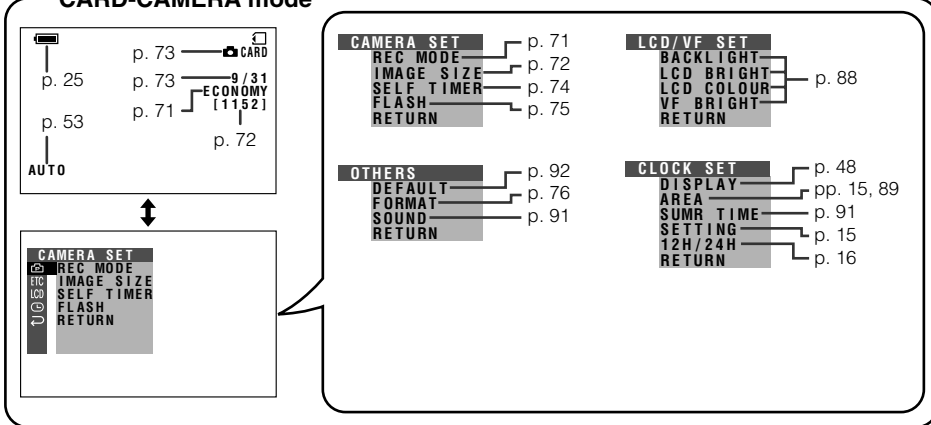
**Note:**

- See page 30 for procedures on how to display the desired screen.

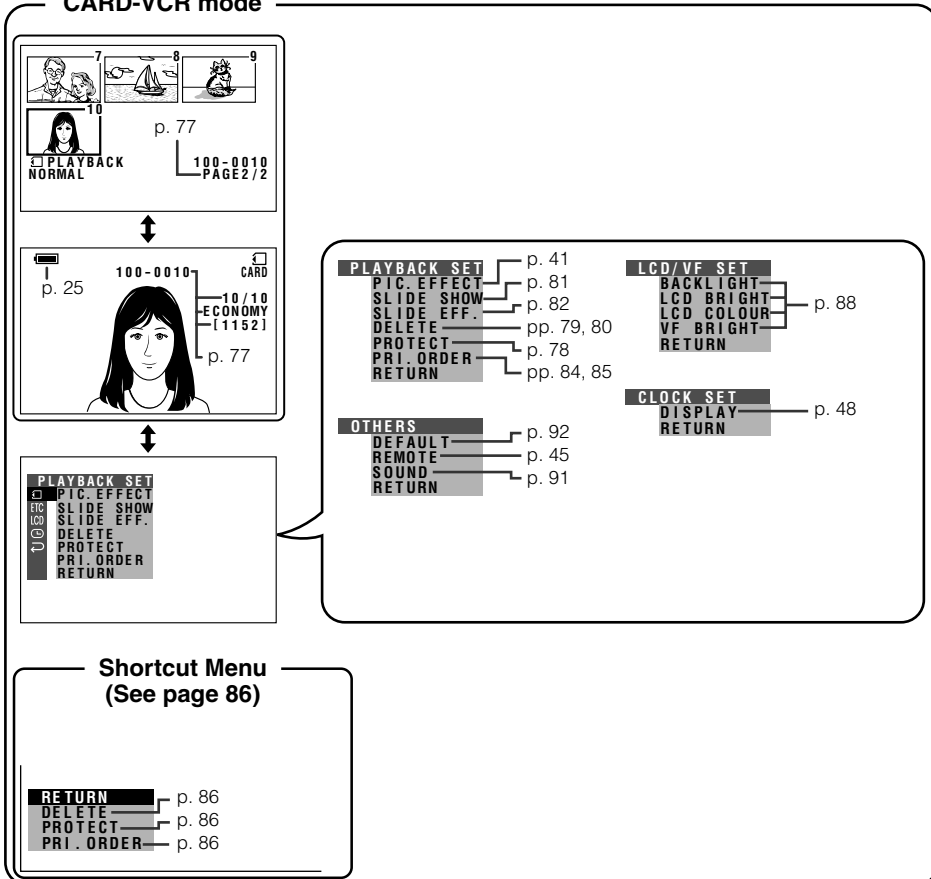




### CARD-CAMERA mode



### CARD-VCR mode

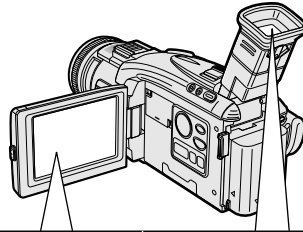




## Operation References

### Warning Indicators

If a warning indicator appears on the screen, follow the specified instructions.




Displayed for the first 3 seconds	Displayed after 3 seconds	Description of warning
<b>INSERT A CASSETTE.</b>		There is no video cassette in the camcorder. Insert a cassette (see <b>page 12</b> ).
<b>EJECT THE CASSETTE.</b>	<b>EJECT THE CASSETTE.</b>	The video cassette is defective and should be removed (see <b>page 12</b> ).
<b>CASSETTE NOT RECORDABLE.</b>	<b>PROTECT. TAB</b>	The erasure protect tab on the video cassette has been slid to the record-protect position, preventing recording (see <b>page 95</b> ).
<b>THE TAPE ENDS SOON.</b>	<b>TAPE END</b>	The tape is about to end. Prepare a new cassette (see <b>page 12</b> ).
<b>CHANGE THE CASSETTE.</b>	<b>TAPE END</b>	The tape has reached the end. Replace it with a new cassette (see <b>page 12</b> ).
<b>BATTERY IS TOO LOW.</b>		The battery is almost depleted. Replace it with a fully charged battery pack (see <b>page 10</b> ).
<b>DEW</b>	<b>DEW</b>	Dew has formed inside the camcorder. Wait a few hours for the dew to dry away (see <b>page iv</b> ). About 10 seconds after this warning appears, the camcorder automatically turns off.
		The video heads are clogged and should be cleaned (see <b>page v</b> ).
<b>LAMP</b>	<b>LAMP</b>	The fluorescent lamp behind the LCD monitor is close to the end of its service life. Call your local authorized Sharp dealer to have it replaced.
		When the setting of a MANUAL screen or the vertical rotation of the LCD monitor is between 135° and 180° in CAMERA mode, all warnings will be indicated by  in the centre of the viewfinder and the LCD screen. To check the type of warning, set the Manual Selection switch to "LOCK" or "AUTO" or rotate the monitor back to within 135°.



Displayed for 5 seconds	Description of warning
<b>NO MEMORY CARD</b>	The card is not inserted or is inserted improperly. Check that it is properly inserted (see <b>page 13</b> ).
<b>MEMORY CARD FULL</b>	The capacity of the card is full and cannot store any more images. Delete unnecessary images (see <b>page 79</b> ) or replace the card with a new one (see <b>page 13</b> ).
<b>NO DATA ON MEMORY CARD</b>	The card has no images recorded in the format the camcorder can recognize.
<b>MEMORY CARD ERROR</b>	The images in the card are corrupted or recorded in a format which is not compatible with this camcorder. Format the card to use it with this camcorder (see <b>page 76</b> ).
<b>FORMAT MEMORY CARD</b>	The card has not been formatted with this camcorder. Format the card (see <b>page 76</b> ).
<b>MEMORY CARD PROTECTED</b>	The card is write-protected (see <b>page 97</b> ).
<b>DATA PROTECTED</b>	You are trying to delete a protected image. Cancel the protection setting (see <b>page 78</b> ).
<b>MEMORY CARD READ ERROR</b>	The selected image cannot be read by this camcorder. Format the card to use it with this camcorder (see <b>page 76</b> ).
<b>CANNOT STORE DATA</b>	The card cannot record any data due to a problem with the card or data on the card. Replace the card (see <b>page 13</b> ).

**Note:**

-  indicates a flashing display.



# Preparation

## Charging the Battery Pack

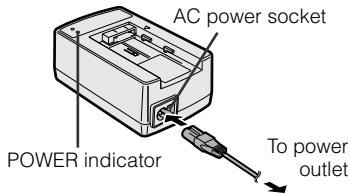
Preparation

Charge the battery pack with the supplied AC adapter/battery charger before use.

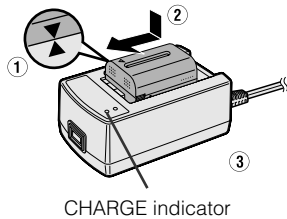
**Note:**

- Remove the DC cable from the AC adapter/battery charger when charging the battery pack.

- Connect the supplied power cord to the AC power socket on the AC adapter/battery charger, and insert the AC plug into a power outlet.
  - The POWER indicator lights up.

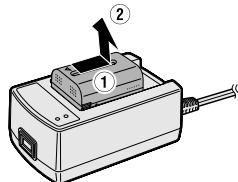


- Align the ▼ mark on the battery pack with the ▲ mark on the charger (1) and guide the battery into the groove. Pressing the battery (2), slide it in the direction of the arrow (3) until it locks into place.
  - The CHARGE indicator lights up.



- The CHARGE indicator turns off when the battery is fully charged.

- Slide the battery pack in the direction of the arrow (1), and remove it (2). Then remove the AC plug of the power cord from the power outlet.



9

## Charging time and maximum continuous recording and playback times in TAPE modes

Battery pack	Charging time	Max. continuous recording time		Max. continuous playback time on LCD
		LCD closed	LCD open	
BT-L221 BT-LS222	100	110	90	90
BT-L441	160	220	180	180
BT-LS442A	190	260	220	220

- The chart specifies the approximate times in minutes.

**Notes:**

- Charge the battery pack between 10°C and 30°C. The battery pack may not charge properly at temperatures too low or too high.
- The battery pack and charger become warm during charging. This is not a malfunction.
- Using the zoom (see page 24) and other functions or turning the power on and off frequently will increase power consumption. This may result in a decrease in the actual recording time compared to the maximum continuous recording time listed above.
- The charging time and recording time may vary depending on the ambient temperature and the condition of the battery pack.
- See pages 97 and 98 for more information on using the battery pack.

**Caution:**

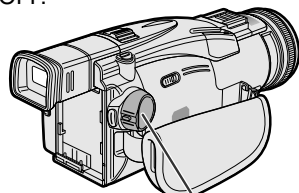
- Charge only SHARP model BT-L221, BT-L441, BT-LS222 or BT-LS442A battery packs. Other types of battery packs may burst, causing personal injury and damage.



## Attaching and Removing the Battery Pack

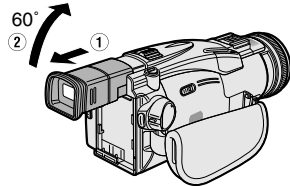
### Attaching

- 1 Make sure that the POWER switch is set to OFF.

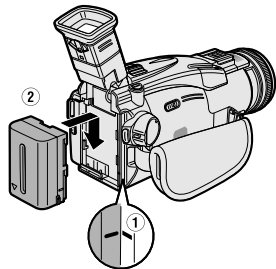


POWER switch

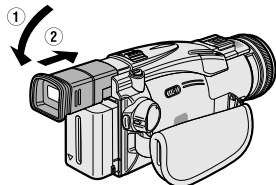
- 2 Pull out the viewfinder completely (1), then lift it up (2).



- 3 Align the — mark on the side of the battery pack with the — mark on the camcorder (1). Press the battery pack and slide it down completely until it locks into place (2).



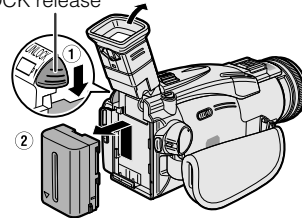
- 4 Lower the viewfinder (1), and push it in completely (2).



### Removing

- 1 Make sure that the POWER switch is set to OFF.
- 2 Press and hold the power source UNLOCK release in the direction of the arrow (1), then slide the battery pack up and take it out (2).

Power source UNLOCK release



Preparation

### Cautions:

- **BEFORE REMOVING THE BATTERY PACK, ALWAYS STOP RECORDING OR PLAYBACK AND TURN THE POWER OFF.** Removing the battery pack while shooting or during playback may damage the tape by causing it to wrap around the video head drum or destroy the card, rendering it unreadable and unwritable.
- Remove the battery pack from the camcorder if you will not use the camcorder for a long period of time.
- Make sure that the battery pack is firmly attached during operation. If it is not, the battery pack may come off or camcorder operation may fall because of the poor contact pressure.
- To prevent damage to the battery pack when removing, be sure to firmly hold the battery pack while pressing the release.
- Use only SHARP model BT-L221, BT-L441, BT-LS222 or BT-LS442A battery packs with this camcorder. Use of other batteries may create a risk of fire or explosion.





## Preparation

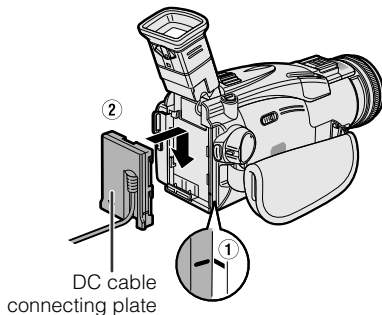
### Powering the Camcorder from an AC Outlet

You can also power the camcorder from a power outlet by using the supplied AC adapter/battery charger and DC cable.

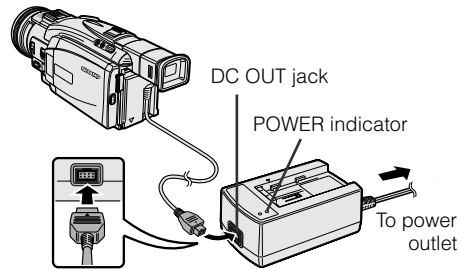
#### Caution:

- The supplied AC adapter/battery charger is specially designed for use with this camcorder, and should not be used as a power supply for other camcorders.

- Make sure that the POWER switch is set to OFF.
- Pull out the viewfinder completely, then lift it up.
- Align the  mark on the side of the DC cable connecting plate with the  mark on the camcorder (①). Press the connecting plate and slide it down completely until it locks into place (②).



- Lower the viewfinder, and push it in completely.
- Insert the DC cable plug into the DC OUT jack on the AC adapter. Connect the supplied power cord to the AC adapter, and insert the AC plug into a power outlet.
  - The POWER indicator on the AC adapter lights up, and the camcorder is supplied power.



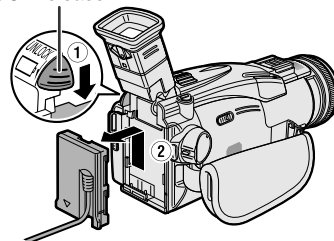
#### Note:

- When using the AC adapter/battery charger to power the camcorder, it cannot be used to charge the battery pack.

### Removing the DC cable from the camcorder

Perform steps 1 and 2 above. Press and hold the power source UNLOCK release in the direction of the arrow (①), then slide the connecting plate up and take it out (②).

Power source  
UNLOCK release



#### Cautions:

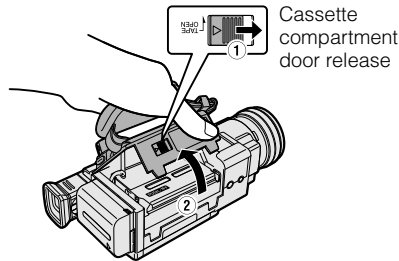
- BEFORE REMOVING THE DC CABLE, ALWAYS STOP RECORDING OR PLAYBACK AND TURN THE POWER OFF.** Removing the DC cable while shooting or during playback may damage the tape by causing it to wrap around the video head drum or destroy the card, rendering it unreadable and unwritable.
- Disconnect the camcorder from the AC adapter if you will not use the camcorder for a long period of time.
- The supplied DC cable is designed for use only with the supplied AC adapter/battery charger. Do not use it with the other equipment, as this may damage the cable or the equipment.



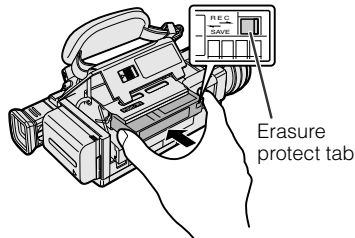
## Inserting and Removing a Cassette

### Inserting

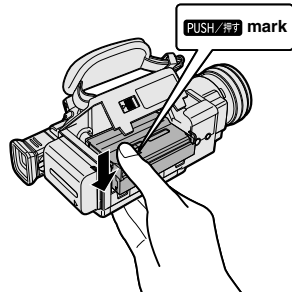
- 1 Attach the power source to the camcorder.
- 2 Hold the camcorder as shown below, slide the cassette compartment door release and open the cassette compartment door completely.
  - After confirmation sound, the cassette holder extends and opens automatically.



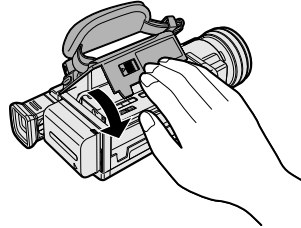
- 3 Insert a commercially available cassette fully with the window facing upwards, and with the erasure protect tab facing outwards.



- 4 Press the **PUSH/押す** mark gently until the cassette holder clicks into place.
  - After confirmation sound, the cassette holder retracts automatically.



- 5 Wait for the cassette holder to fully retract. Close the compartment door by pressing the centre until it clicks into place.



Preparation

### Removing

Perform steps 1 and 2 above, then take out the cassette.

#### Cautions:

- Do not try to close the cassette compartment door while the cassette holder is extending or retracting.
- Be careful not to get your fingers caught in the cassette holder.
- Do not apply force to the cassette holder except when pressing the **PUSH/押す** mark to close it.
- Do not tilt the camcorder or hold it upside down when you are inserting or removing a cassette. It may damage the tape.
- Remove the cassette if you will not use the camcorder for a long period of time.
- If you do not correctly close the cassette holder in step 4, the cassette protection mechanism of the camcorder might eject the cassette. If this happens, repeat the insertion procedure.
- Do not attempt to pick up the camcorder by the cassette compartment door.

#### Notes:

- If the battery power is too low, you may not be able to eject the cassette. Replace the battery pack with a fully charged one.
- See page 95 for more information on the video cassette tapes intended for use with this camcorder.



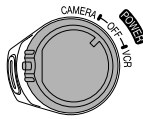
## Preparation

### Inserting and Removing a Card

You can use an SD Memory Card (supplied) or a MultiMediaCard (commercially available) for storing still images.

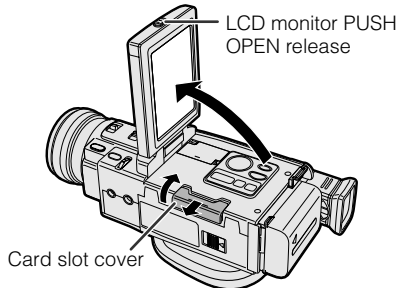
#### Inserting

- 1 Make sure that the POWER switch is set to OFF.

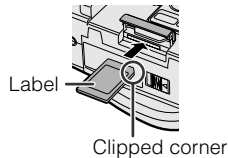


- 2 Press the LCD monitor PUSH OPEN release and open the LCD monitor.

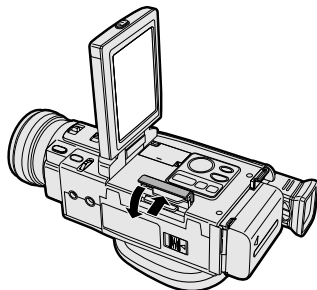
- 3 Slide the card slot cover and open it in the direction of the arrow.



- 4 Insert a card into the slot as shown below, and push it in as far as it will go.

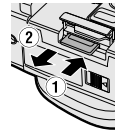


- 5 Close the card slot cover in the direction of the arrow.



#### Removing

Perform steps 1 to 3 above, push the card (①) and pull the card straight out (②) as shown below.



#### Notes:

- You cannot use a SmartMedia™ card or Memory Stick™ media with this camcorder. In this operation manual, "card" refers to the SD Memory Card or the MultiMediaCard.
- The supplied SD Memory Card is preformatted for immediate use.
- See pages 96 and 97 for more information on the cards intended for use with this camcorder.

#### Caution:

- Do not remove the card from the camcorder while recording data on the card (⏏ indicator flashes during recording). This may delete the recorded image or damage the card.



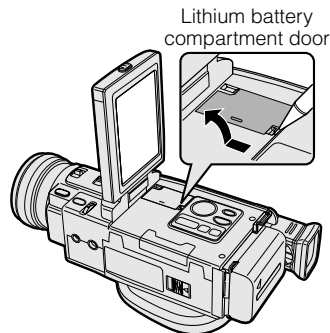


## Installing the Lithium Batteries

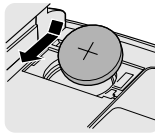
### Installing the Memory Battery

One of the supplied lithium batteries is used to store the memory of the date and time settings.

- 1 Press the LCD monitor PUSH OPEN release and open the LCD monitor.
- 2 Open the lithium battery compartment door using a pointed object such as the tip of a ballpoint pen.

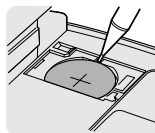


- 3 Insert the lithium battery into the compartment with the + side of the battery facing out.
- 4 Place the compartment door, and close it firmly until it clicks into place.
- 5 Close the LCD monitor until it clicks into place.



### Removing the lithium battery

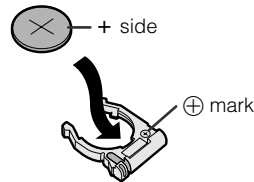
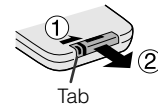
Perform steps 1 and 2 above, then lift up the battery using a pointed object, and take it out.



### Installing the Battery to Remote Control

Another supplied lithium battery is used to power the remote control unit.

- 1 Hold the remote control facing down, and pull out the battery holder while pressing the tab toward the centre.
- 2 Insert the lithium battery into the battery holder with the + side of the battery facing the ⊕ side of the holder.



- 3 Insert the battery holder back into position.

Preparation

### Notes on the Use of the Lithium battery

**CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type CR2025 recommended by the equipment manufacturer.

**WARNING:** KEEP THIS BATTERY AWAY FROM CHILDREN. IF SWALLOWED, CONSULT A PHYSICIAN IMMEDIATELY FOR EMERGENCY TREATMENT.

**CAUTION:** BATTERY MAY EXPLODE IF MIS-USED OR INSTALLED WITH POLARITY REVERSED. DO NOT RECHARGE, DISASSEMBLE OR DISPOSE OF IN FIRE.

- Do not short-circuit, recharge, disassemble, or heat the lithium battery.
- Should the lithium battery leak, wipe the battery compartment clean, and then insert a new battery.
- The lithium battery will last about one year under normal usage.

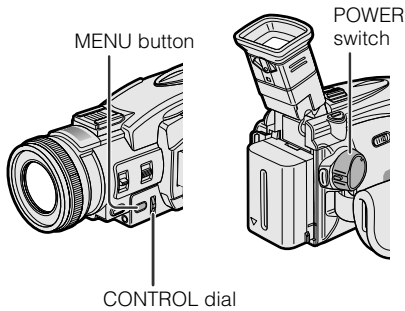


## Preparation

### Setting the Area, Date and Time

**Available modes:**  
TAPE-CAMERA, CARD-CAMERA

**Example:** Setting the date to June 2, 2003 (2. 6. 2003) and the time to 10:30 am (10:30) in London.



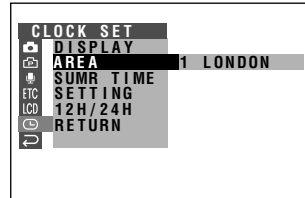
**Notes:**

- Before performing the steps below, make sure that the lithium battery has been installed (see page 14).
- If you are in an area that observes summer time, set the time to the standard time. You can then correct it for summer time by performing the steps on page 91.

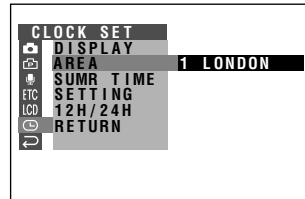
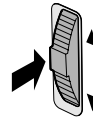
- 1 Press the LCD monitor PUSH OPEN release and open the LCD monitor.
- 2 Hold down the Lock button and set the POWER switch to CAMERA.



- 3 Press the MENU button to display the menu screen.



- 4 Then press the dial.



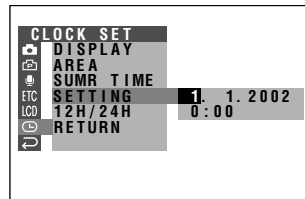
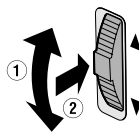
- 5 If "1 LONDON" is not displayed, turn the CONTROL dial until it appears, then press the dial.

**AREA 1 LONDON**

**Note:**

- See "Time Zone Chart" and "Area Table" on pages 89 and 90 for the area number and name of the representative city for your time zone.

- 6 Turn the CONTROL dial to select "SETTING", then press the dial.





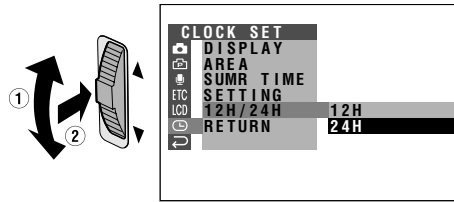
- 7 Turn the CONTROL dial to select "2" (day), then press the dial.  
**SETTING 2. 1. 2002**  
**0:00**
- 8 Turn the CONTROL dial to select "6" (month), then press the dial.  
**SETTING 2. 6. 2002**  
**0:00**
- 9 Turn the CONTROL dial to select "2003" (year), then press the dial.  
**SETTING 2. 6. 2003**  
**0:00**
- 10 Turn the CONTROL dial to select "10" (hour), then press the dial.  
**SETTING 2. 6. 2003**  
**10:00**
- 11 Turn the CONTROL dial to select "30" (minute), then press the dial.
  - The internal clock now starts operating.**SETTING 2. 6. 2003**  
**10:30**
- 12 Press the MENU button to turn off the menu screen.

**Note:**

- If the date and time have been set, the MANUAL SET screen (M) appears in step 3. Select "AREA" in the CLOCK SET screen (C) using the CONTROL dial.

**Changing to the 12-hour Time Mode**

- 1 After performing step 11 above, turn the CONTROL dial to select "12H/24H", then press the dial.



- 2 Turn the CONTROL dial to select "12H", then press the dial.  
**12H/24H 12H**
- 3 Press the MENU button to turn off the menu screen.

**Notes:**

- The date and time, once set, are internally recorded even when not displayed on the screen.
- The menu screen automatically turns off if no settings are made within five minutes.

Preparation



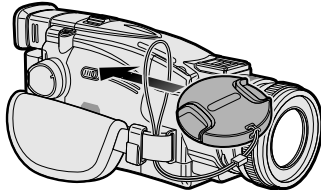


## Preparation

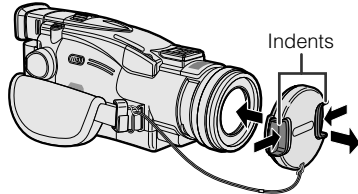
### Using the Lens Cap

Attach the strap of the lens cap to the hand strap as shown below.

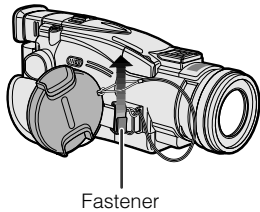
Preparation



When attaching or removing the lens cap, grasp the indents on both sides of the cap.



When recording, remove the lens cap and attach the lens cap cord to the fastener so that the cap will not get in the way.

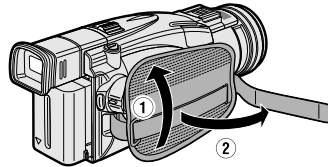


**Note:**

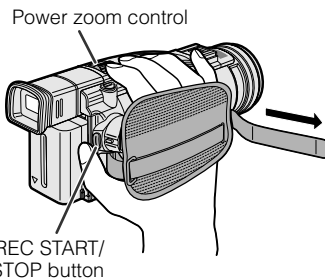
- Always attach the lens cap over the lens when not using the camcorder.

### Adjusting the Hand Strap

- 1 Open the hand strap flap (①) and the grip strap (②).



- 2 Loosen the grip strap, pass your right hand through the loop, and put your thumb on the REC START/STOP button and your forefinger on the Power Zoom control. Then, pull the grip strap tight until it fits snugly.



- 3 Seal the velcro fasteners of the grip strap and the hand strap flap.

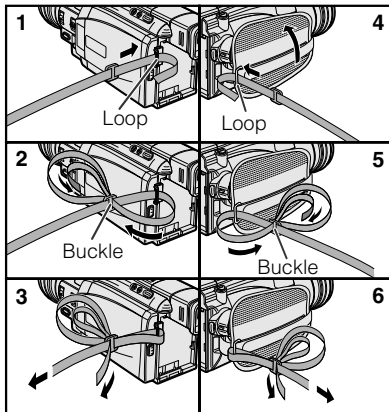
**Caution:**

- Do not swing the camcorder by the hand strap.



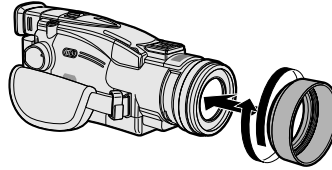
## Attaching the Shoulder Strap

- 1 Hold the end of the strap and thread it through the loop on the left side of the power source mounting surface.
- 2 Loosen the strap in the buckle, and feed the end of the strap through the buckle, as shown.
- 3 Draw the strap in the direction of the arrow to secure.
- 4-6 To attach the other end of the strap to the loop on the left side of the hand strap, open the hand strap flap, and perform the same procedure.



## Using the Lens Hood

When recording outdoors on a sunny day or in a location with bright lighting, attach the supplied lens hood to the camcorder. Turn the lens hood in the direction of the arrow to attach it.



To remove it, turn it in the opposite direction.

### Notes:

- The lens cap can still be attached on top of the lens hood.
- Filters and other accessories cannot be attached on top of the lens hood.

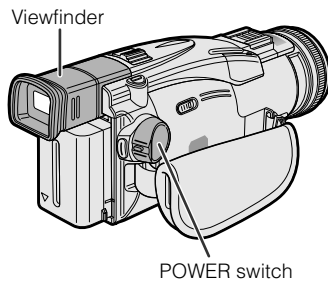
Preparation



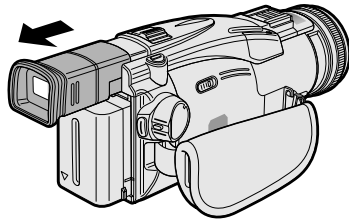
## Preparation

### Using the Viewfinder

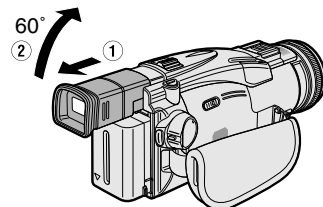
You can record the subject using the electronic LCD colour viewfinder. You can also watch video playback through the viewfinder.



- 1** Pull out the viewfinder completely.



- You can raise the viewfinder up to 60° to better aim the camcorder depending on your position.



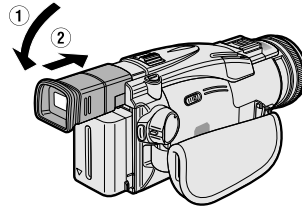
**Caution:** Do not try to raise the viewfinder until it is completely pulled out.

- 2** Hold down the Lock button and set the POWER switch to CAMERA or VCR.
- A picture displays in the viewfinder.



### Closing the viewfinder

Lower the viewfinder (1), and push it in completely (2).



#### Cautions:

- Do not use excessive force when moving the viewfinder.
- Do not pick up the camcorder by the viewfinder.

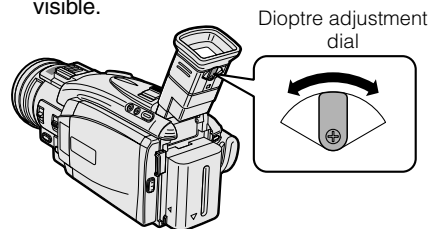
#### Notes:

- The viewfinder automatically turns off when the LCD monitor is opened. If the vertical rotation of the monitor is between 135° and 180° when in TAPE-CAMERA or CARD-CAMERA mode, however, the viewfinder is on and the subject is displayed both in the viewfinder and on the monitor (see page 40).
- You can adjust the settings on the MENU screen through the viewfinder by using the CONTROL dial. (See page 30 for the operation of the CONTROL dial.)
- Be sure to close the viewfinder after use.

### Adjusting the Dioptre

Adjust the dioptre according to your eyesight when the picture in the viewfinder is not clear.

- 1** Pull out the viewfinder completely, and then lift it up.
- 2** Hold down the Lock button and set the POWER switch to CAMERA.
- 3** While looking through the viewfinder, turn the Dioptre adjustment dial until the indicators in the viewfinder are clearly visible.



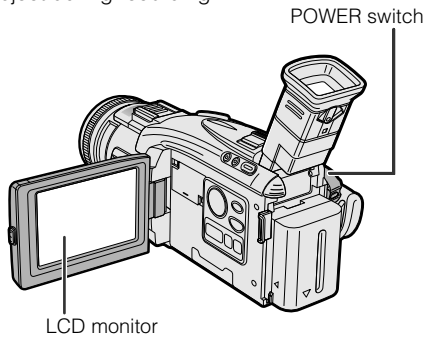
#### Note:

For cleaning the viewfinder, see page 99.

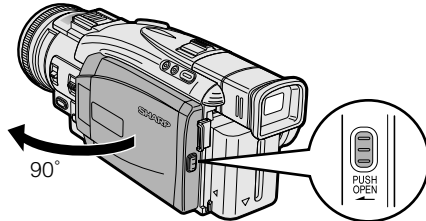


## Using the LCD Monitor

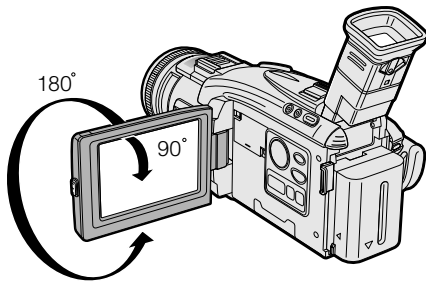
You can use the LCD monitor to play back recordings that you have made or to watch the subject during recording.



- 1 Press the LCD monitor PUSH OPEN release, and open the LCD monitor to a 90° angle to the camcorder body.

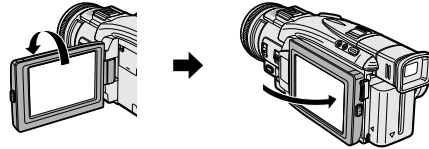


- 2 Adjust the LCD monitor to an angle that allows easy viewing of the on-screen picture.
  - The LCD monitor rotates 270° vertically.



**Caution:** Do not try to rotate the LCD monitor vertically until the monitor is completely opened.

- You can also fold the LCD monitor into the camcorder with the screen facing out for watching playback on the monitor.



- 3 Hold down the Lock button and set the POWER switch to CAMERA or VCR.
  - A picture displays on the LCD monitor.



Preparation

### Notes:

- Battery consumption is larger when the LCD monitor is open. Use the viewfinder instead of the LCD monitor when you want to save battery power.
- Use the viewfinder if the LCD screen becomes difficult to see under bright daylight.

## Closing the LCD monitor

Return the LCD monitor to the vertical 90° position with the screen facing in, and fold it into the camcorder until it clicks into place.

### Cautions:

- Do not use excessive force when moving the LCD monitor.
- When closing the LCD monitor, do not tilt it; otherwise the monitor may not close properly and may become damaged.
- Do not pick up the camcorder by the LCD monitor.
- Do not place the camcorder with the LCD monitor screen facing down.

### Note:

- Close the LCD monitor completely with the screen facing in when not in use.



## Preparation

### Tips on Recording Positions

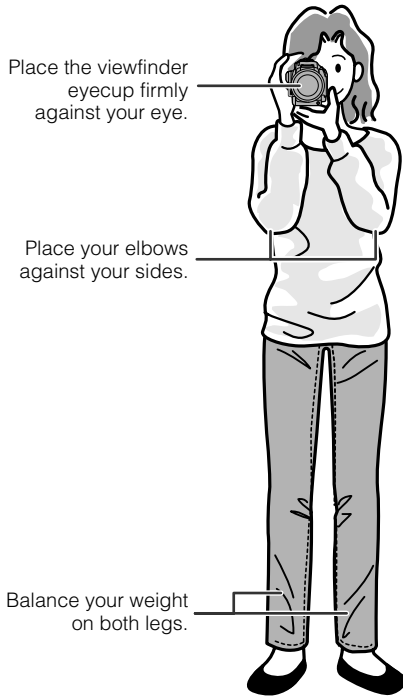
To create images that are easy to watch during playback, try to record with a stable posture and steady hand to prevent a shaky image.

Preparation

#### Holding the camcorder

Put your right hand through the hand strap, and place your left hand under the camcorder for support.

#### Basic posture



#### Shooting from a high angle

Turn the LCD monitor so that the screen faces downward.



#### Shooting from a low angle

##### Using the viewfinder

Raise the viewfinder to view the subject.



##### Using the LCD monitor



Turn the LCD monitor so that the screen faces upward.

#### Note:

- Take care not to touch the microphone with your fingers during recording. It will cause noise on the audio track.



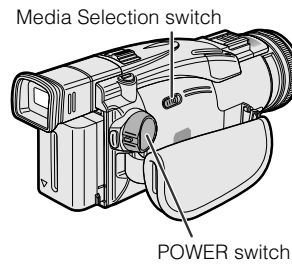


# Basic Operations

## Camera Recording

### Selecting the Camcorder Mode

This camcorder includes functions for use as both a video camera for recording and playing back images on a tape and as a digital still camera for recording and playing back still images on a card. One of the following camcorder modes needs to be set before starting any operation.

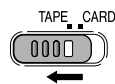


### Camcorder modes

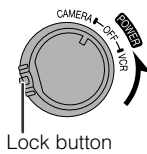
#### TAPE-CAMERA mode

For recording motion and still images on a tape.

- 1 Set the Media Selection switch to TAPE.



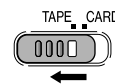
- 2 Hold down the Lock button and set the POWER switch to CAMERA.



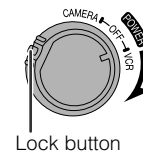
#### TAPE-VCR mode

For playing back or editing motion and still images recorded on a tape.

- 1 Set the Media Selection switch to TAPE.



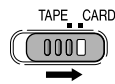
- 2 Hold down the Lock button and set the POWER switch to VCR.



#### CARD-CAMERA mode

For recording still images on a card.

- 1 Set the Media Selection switch to CARD.



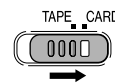
- 2 Hold down the Lock button and set the POWER switch to CAMERA.



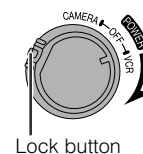
#### CARD-VCR mode

For playing back still images recorded on a card.

- 1 Set the Media Selection switch to CARD.



- 2 Hold down the Lock button and set the POWER switch to VCR.



#### Note:

- To turn the power off, set the POWER switch to OFF without pressing the Lock button.

#### Caution:

- Do not change the camcorder mode by operating the Media Selection switch during recording or playback, as this may cause damage to the tape or card.



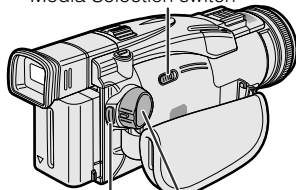
## Basic Operations Camera Recording

### Easy Camera Recording on Tape in Full Auto Mode


**Available mode:**  
TAPE-CAMERA

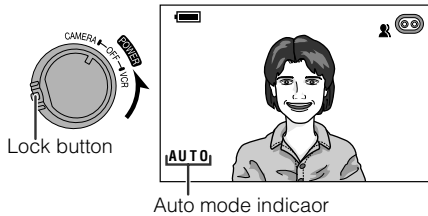
- Before you start recording, perform the operations described on pages 9 through 21 to prepare your camcorder for recording.

Media Selection switch



REC START/STOP button POWER switch

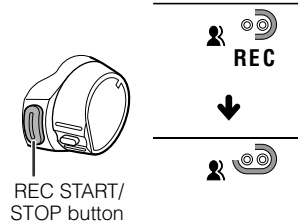
- 1 Remove the lens cap.
- 2 Set the Media Selection switch to TAPE. 
- 3 Hold down the Lock button and set the POWER switch to CAMERA.
  - The picture from the lens now displays.
  - The camcorder is now ready to record (Recording Standby mode).



**Note:**

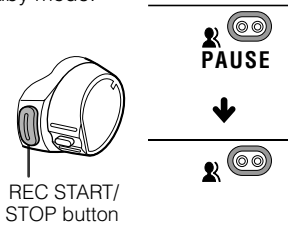
- If "AUTO" is not displayed at this time, set the camcorder to Full Auto mode (see page 53).

- 4 Press the REC START/STOP button to begin recording.



### To pause recording

Press the REC START/STOP button again. Recording pauses, and the camcorder enters Recording Standby mode.



### To turn the power off

Set the POWER switch to OFF without pressing the Lock button.

**Notes:**

- Battery power is consumed in Recording Standby mode. Turn off the power if you will not be recording again soon.
- If the camcorder remains in Recording Standby mode for more than 5 minutes in TAPE-CAMERA mode, the power will automatically turn off to save battery power and to protect the tape from being damaged. To resume recording, set the POWER switch to OFF and then back to CAMERA. (The camcorder will make a confirmation sound when it is left in Recording Standby mode for about 4 minutes.)

### Maximum continuous recording and actual recording times in TAPE-CAMERA mode

Battery pack	Max. continuous recording time		Actual recording time	
	LCD closed	LCD open	LCD closed	LCD open
BT-L221 BT-LS222	110	90	55	45
BT-L441	220	180	110	90
BT-LS442A	260	220	135	115

• The chart specifies the approximate times in minutes.

**Note:**

• Using the zoom (see page 24) and other functions or turning the power on and off frequently will increase power consumption. This may result in a decrease in the actual recording time compared to the maximum continuous recording time listed above.



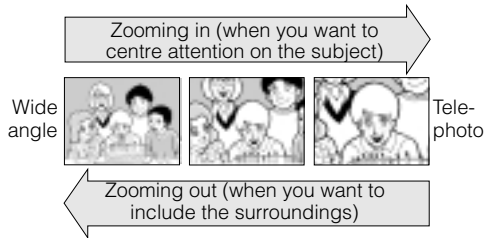
## Zooming

### Available modes:

TAPE-CAMERA, CARD-CAMERA

Zooming allows you to move visually closer to or farther from a subject without physically changing your position.

When using the optical zoom, you can enlarge the subject up to 23× in TAPE-CAMERA mode, and up to 22× in CARD-CAMERA mode.

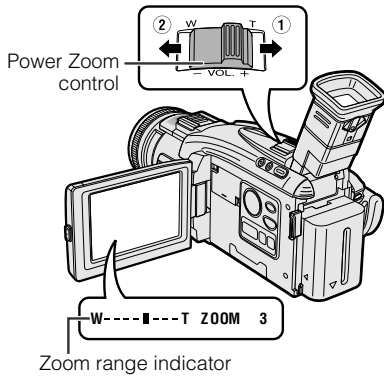


### Zooming in

Push the Power Zoom control to the T (tele-photo) side to get a close-up view (①).

### Zooming out

Push the Power Zoom control to the W (wide angle) side to get a wide field of view (②).



- The zoom range indicator shows you the current zoom setting.
- The zoom speed depends on how far you push the Power Zoom control.

### Notes:

- The camcorder is unable to focus when zooming in on subjects within 1.5 m. The camcorder will automatically zoom out until it is able to focus on the subject.
- See page 31 for how to use the digital zoom.

## Auto Focus

### Available modes:

TAPE-CAMERA, CARD-CAMERA

The camcorder is preset to Auto Focus mode, which is designed to focus on most types of subjects. In Auto Focus mode, the camcorder automatically focuses on the subject in the centre of the scene. Always keep the subject in the centre of the scene.

### Notes:

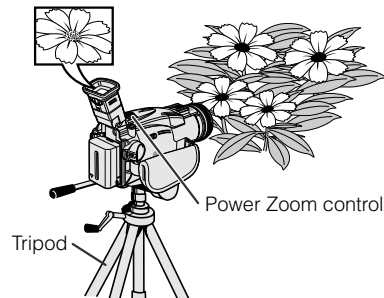
- If no subject is in the centre of the scene, the focus area will expand and the subject nearest the centre will be focused on.
- If no subject is displayed, the camcorder will automatically zoom out until a subject comes into the frame.
- Auto Focus may not work in the situations described on page 54. In these situations, use the manual focus function.

## Macro Shots

### Available modes:

TAPE-CAMERA, CARD-CAMERA

This camcorder lets you shoot close-up images of small objects such as flowers and insects, or make title frames for your videos. When you want to record a magnified image of a subject which is within approximately 1.5 m of the camcorder, do not zoom in on it. Instead, zoom out all the way by pushing the Power Zoom control to the W side, and then move the camcorder closer to the subject until you obtain the desired angle of view. The camcorder will automatically focus on the subject when the lens is set for the widest angle.



### Notes:

- When you are recording a macro shot, be sure that the subject receives sufficient illumination.
- It is recommended that you use a tripod for recording macro shots, to prevent image shaking.

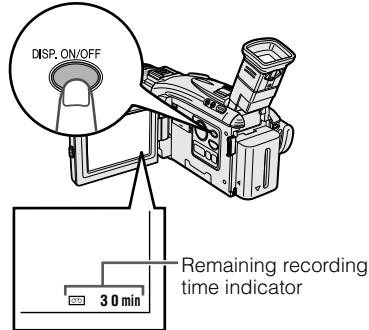


## Basic Operations Camera Recording

### Remaining Recording Time Display

**Available mode:**  
TAPE-CAMERA

When the camcorder is recording in TAPE-CAMERA mode, an on-screen indicator displays the approximate remaining tape time in minutes. You can turn on and off the indicator by pressing the DISP. ON/OFF button.



**Notes:**

- The remaining recording time indicator appears 10 seconds after pressing the REC START/STOP button to begin recording.
- The remaining recording time indicator only shows the approximate time left. Also, it varies slightly depending on the length of tape used. (This function is based on the DVM60 tape standard.)

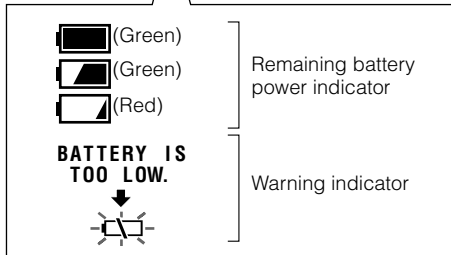
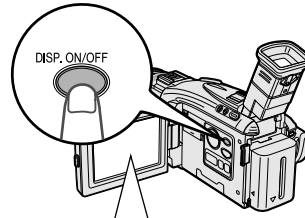
When the remaining recording time reaches 1 minute, a warning indicator will appear. Prepare a new cassette.

Warning indicator	Approx. remaining time
<p>THE TAPE ENDS SOON.</p> <p>↓</p> <p>TAPE END</p>	Less than 1 min.
<p>CHANGE THE CASSETTE.</p> <p>↓</p> <p>TAPE END</p>	The tape has reached the end.

### Remaining Battery Power Display

**Available modes:**  
All modes

When using the camcorder with the battery pack as the power source, you can turn on and off the remaining battery power indicator by pressing the DISP. ON/OFF button. If the battery power becomes very low, a warning indicator will appear. Replace the battery pack.



**Notes:**

- Use the remaining battery power indicator only as an approximate indication.
- The remaining battery power indicator may change to either a higher or lower level if you set the POWER switch to OFF and then back to CAMERA or VCR.
- In cold environments, the red remaining battery power indicator may appear sooner. The battery pack, however, can be used until the warning indicator appears.
- Use of the zoom functions when the warning indicator is displayed may cause the camcorder to suddenly lose power.
- This camcorder supports an intelligent battery function. Use of the optional BT-LS222 or BT-LS442A intelligent battery pack allows the number of minutes of continuous operating time that remains to be displayed on the screen based on the remaining battery power.

89 min



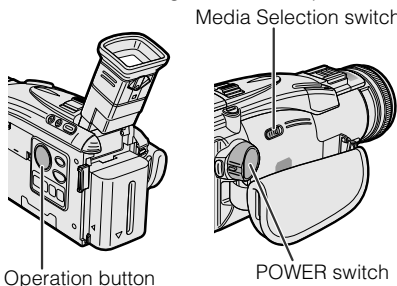
# Basic Operations

## Playback

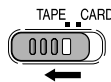
### Tape Playback

**Available mode:**  
TAPE-VCR

The LCD monitor screen functions as a handy playback monitor. Nothing needs to be connected, allowing instant on-screen playback with the sound through the built-in speaker.



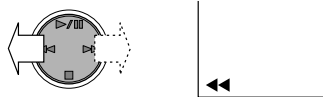
**1** Open the LCD monitor and adjust the angle, and then set the Media Selection switch to TAPE.



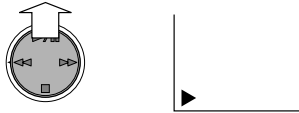
**2** Hold down the Lock button and set the POWER switch to VCR.



**3** Press ◀◀ (or ▶▶) on the Operation button to rewind (or fast forward) the tape to the desired point.



**4** Press ▶▶/|| to begin playback.

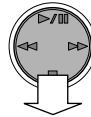


**Note:**

- If you press the REC START/STOP button in TAPE-VCR mode, the [RECORD] mark appears and the camcorder enters Recording Standby mode. If you do not intend to record, press [STOP] to turn the [RECORD] mark off, then press ▶▶/|| to begin playback. This will ensure your previous recording is not erased.

### To stop playback

Press [STOP].



### To turn the power off

Set the POWER switch to OFF without pressing the Lock button.

**Note:**

- The tape is automatically rewound when playback reaches the end of the tape.

### Watching the Playback in the Viewfinder

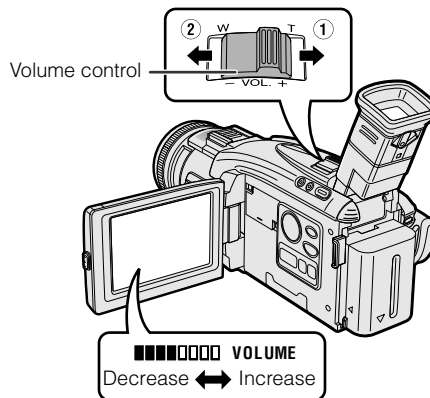
You can also watch the playback in the viewfinder by closing the LCD monitor with the screen facing in. You cannot monitor the sound through the speaker when watching the playback in the viewfinder.

### Volume Control

**Available mode:**  
TAPE-VCR

When the camcorder is in TAPE-VCR mode, push the Volume control to the + or - side to increase (1) or decrease (2) the volume.

The volume level indicator will appear on the LCD screen during adjustment only. Once the Volume control is released, the volume level indicator will disappear shortly.





## Basic Operations Playback

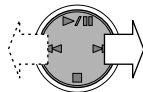
### Video Search

**Available mode:**  
TAPE-VCR

The video search function makes it easy to search for a desired scene on the tape.

#### Searching for a Scene Near the Current Tape Position

- 1 During playback in TAPE-VCR mode, press ►► (or ◀◀) on the Operation button.
  - The playback picture fast forwards (or reverses).



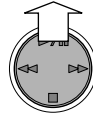
- 2 When you find the scene, press ►/|| to return to normal playback.

### Still

**Available mode:**  
TAPE-VCR

The still function allows you to pause playback in TAPE-VCR mode.

During playback in TAPE-VCR mode, press ►/|| on the Operation button.



To return to normal playback, press ►/|| again.

**Notes:**

- The sound is off in Still mode.
- To protect the tape, the camcorder automatically returns to normal playback if it is left in Still mode for more than 5 minutes.

#### Searching for a Scene Far from the Current Tape Position

**Available mode:**  
TAPE-VCR

- 1 During fast forward (or rewind) in TAPE-VCR mode, press and hold ►► (or ◀◀) on the Operation button.
  - The fast forward (or rewind) picture displays.
- 2 If the scene is still rather far from the current tape position, release the Operation button to normal fast forward (or rewind).
- 3 Repeat steps 1 and 2 above until you find the scene.
- 4 Press ►/|| to begin normal playback.

**Notes:**

- The sound is off during search.
- You may experience picture noise during search. This is not a malfunction.

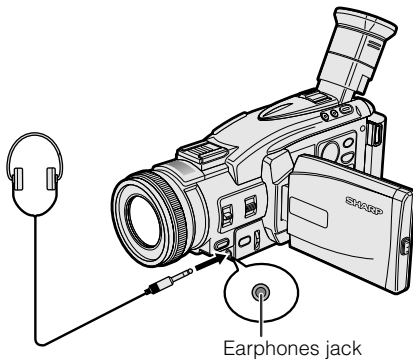


## Using Earphones (Commercially available)

**Available modes:**  
TAPE-VCR, TAPE-CAMERA

You can monitor the sound via stereo earphones (commercially available) during playback or recording.

Connect the plug of stereo earphones to the earphones jack on the camcorder as shown below.



**Notes:**

- Before connecting stereo earphones, turn the camcorder volume down to the lowest setting.
- The built-in speaker automatically turns off when stereo earphones are connected to the earphones jack.

## Watching Playback on a TV

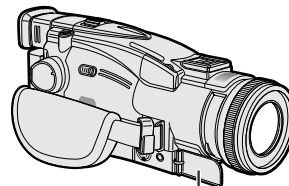
**Available modes:**  
TAPE-VCR, CARD-VCR

You can connect the camcorder to a TV to allow a larger audience to enjoy playback.

- 1 Open the jack cover on the camcorder (see page 3).

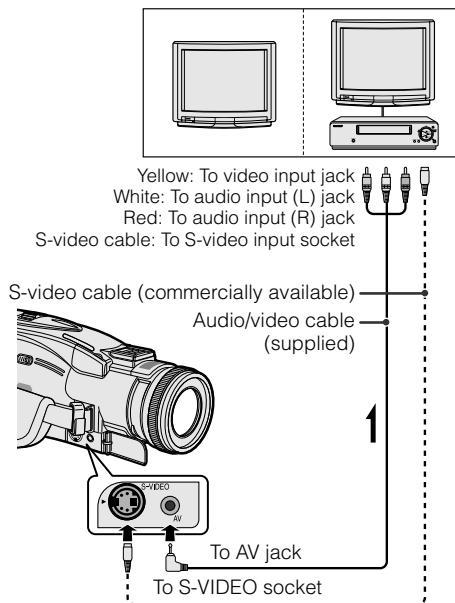
**Caution:**

- Check that the camcorder, TV, VCR and other equipment to be used are turned off before making any connections. Picture noise or malfunction may occur if any of the above is left on while making a connection.



Jack cover

- 2 Connect the camcorder to your TV (or VCR) with the supplied audio/video cable as shown.



←: The arrow shows the signal flow.



## Basic Operations Playback

- 3 Turn on the TV and set it to the "AV" or "VIDEO" channel. (See the operation manual of your TV.)
  - When connecting to a TV via a VCR, turn on the VCR and set it to the "AV" or "LINE" input channel. Operate the TV as you normally do to view the signal from the VCR. (See the operation manuals of your TV and VCR.)
- 4 Set the POWER switch on the camcorder to VCR, and begin playback (see page 26).

### Notes:

- If your TV or VCR has a 21-pin Euro-SCART connector, use the RCA/21-pin Euro-SCART conversion connector (QSOCZ0033TAZZ) available from our main parts distributor detailed on page 101.



- If your TV or VCR has only one audio input jack, use the white plug for the audio connection on the TV or VCR.
- If your TV or VCR has an S-video input socket, you can connect it to the S-VIDEO socket on the camcorder with a commercially available S-video cable.
- When the camcorder is connected to a TV for playback, the picture on the TV screen may flicker if the volume on the camcorder is set to maximum. Should this occur, turn the volume down (see page 26).
- Close the jack cover after use.

### About the S-video socket

S-video sockets are used to separately pass the chroma (colour) and luminance (brightness) components of video signals. They serve to improve the picture quality in both recording and playback.



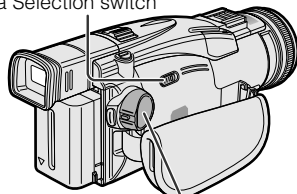
# Useful Features

## Using the Menu Screens

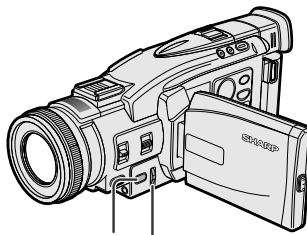
Use the menu screens to adjust the various camcorder settings.

**Example:** Changing the DGTL ZOOM menu setting in TAPE-CAMERA mode.

Media Selection switch



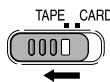
POWER switch



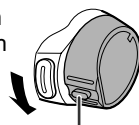
MENU button

CONTROL dial

- 1 Open the LCD monitor and adjust the angle, and then set the Media Selection switch to TAPE.



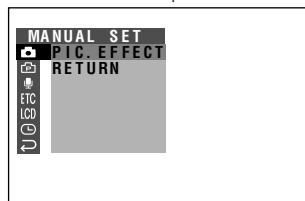
- 2 Hold down the Lock button and set the POWER switch to CAMERA.



Lock button

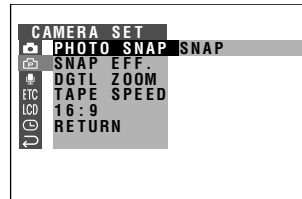
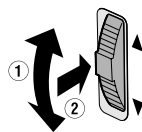
- 3 Press the MENU button until the menu screen appears.

Example



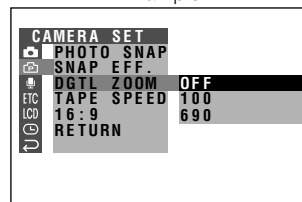
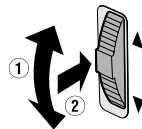
- 4 Turn the CONTROL dial to select the desired menu screen (CAMERA SET), then press the dial.

Example



- 5 Turn the CONTROL dial to select the desired menu item (DGTL ZOOM), then press the dial.

Example



- 6 Turn the CONTROL dial to select the desired menu setting, then press the dial.

**DGTL ZOOM 100**

- To adjust another menu item, turn the CONTROL dial to select "RETURN" and press the dial, then perform steps 4 to 6.

## To turn off the menu screen

Press the MENU button.

### Notes:

- Certain menu items are common to all camcorder modes. If the SOUND menu item, for example, is set to "OFF" in TAPE-CAMERA mode, it will be automatically set to "OFF" in other modes.
- The menu screen automatically turns off if no settings are made within five minutes.
- Items that are not selectable are greyed out.
- If you turn the CONTROL dial to select "D" and press the dial, the menu screen turns off, too.



# Useful Features

## Camera Recording


### Setting the Digital Zoom

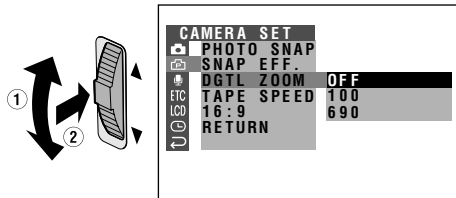
**Available mode:**  
TAPE-CAMERA

You can select three different zoom ranges: 1–23× (optical zoom), 23–100× (digital zoom) or 23–690× (digital zoom). The digital zoom allows you to record powerful close-up pictures with the same operation as normal zooming.

**Notes:**

- The digital zoom is in addition to the optical zoom giving a combined maximum zoom range of 1–690×.
- **As the image is enlarged digitally, the picture quality decreases when higher digital zoom settings are used.**

- 1 Open the LCD monitor and adjust the angle.
- 2 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select , then press the dial.
- 4 Turn the CONTROL dial to select “DGTL ZOOM”, then press the dial.

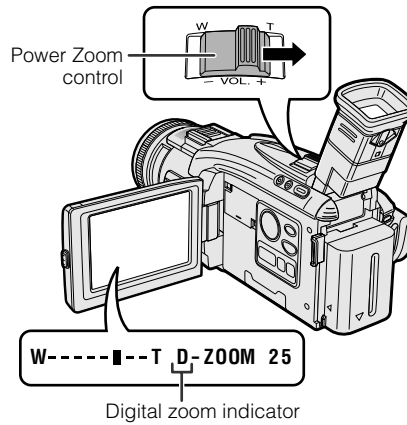


- 5 Turn the CONTROL dial to select “100” or “690”, then press the dial.



- 6 Press the MENU button to turn off the menu screen.

The “D” digital zoom indicator is displayed during digital zooming.



### To use optical zoom only

Select “OFF” in step 5 above.



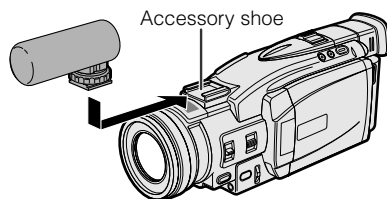
## Using the Zoom Microphone

**Available mode:**  
TAPE-CAMERA

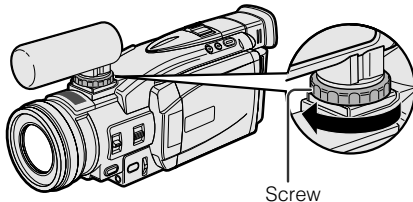
With the zoom microphone, you can record audio according to the magnification of the zoom lens for producing the optimum sound. You can also set the zoom microphone to record only sounds at a distance.

### Mounting

- 1 Align the zoom microphone with the accessory shoe on the camcorder, and slide it in the direction of the arrow until it locks into place.



- 2 Turn the screw in the direction of the arrow to secure the microphone.



### Removing

Turn the screw in the opposite direction than when mounting, then pull off the zoom microphone.

#### Cautions:

- Do not pick up the camcorder by the zoom microphone, as this may damage the equipment.
- The accessory shoe on the camcorder is designed only for use with the specified equipment (supplied zoom microphone or optional IR & Flash light).


## Selecting Zoom Microphone Mode

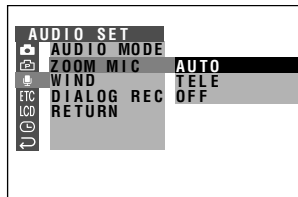
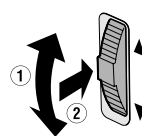
Select a Zoom Microphone mode when the zoom microphone is mounted.

**AUTO:** The camcorder automatically selects the optimum sound according to the magnification of the zoom lens. When the zoom lens is at a wide-angle setting, the built-in microphone is used to record sounds. As the zoom magnification increases, the sounds from the zoom microphone and built-in microphone are mixed according to the zoom setting.

**TELE:** The zoom microphone is fixed to record sounds at a distance. (The built-in microphone is turned off.)

**OFF:** The zoom microphone is turned off. (The built-in microphone is on.)

- 1 Mount the zoom microphone to the camcorder.
- 2 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select , then press the dial.
- 4 Turn the CONTROL dial to select "ZOOM MIC", then press the dial.



- 5 Turn the CONTROL dial to select the desired zoom microphone mode, then press the dial.
  - The selected zoom microphone mode is displayed on the menu screen.

**ZOOM MIC** **AUTO**

- 6 Press the MENU button to turn off the menu screen.



## Useful features

### Camera Recording

#### Windbreak

**Available mode:**  
TAPE-CAMERA


The windbreak function allows you to reduce annoying noise from strong winds when recording.

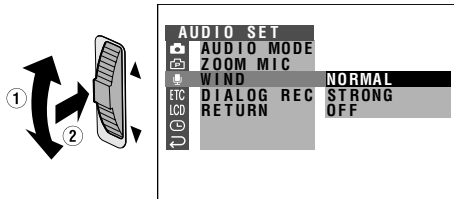
**NORMAL:** When a certain amount of wind starts to blow during recording, the wind noise is reduced automatically.

**STRONG:** Wind noise is largely eliminated. Select this setting when the wind is strong and the noise is irritating.

**OFF:** The windbreak function is turned off. Select this setting when you want to record sounds without the changes in wind intensity changing their tonal quality.

#### Useful Features

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "WIND", then press the dial.



- 4 Turn the CONTROL dial to select the desired wind mode, then press the dial.

**WIND** **STRONG**

- 5 Press the MENU button to turn off the menu screen.

#### To cancel Windbreak

Select "OFF" in step 4 above.


#### Note:

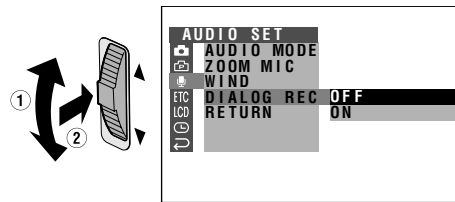
- Keep the windbreak function off during normal recording. If left on "NORMAL" or "STRONG", the recorded audio may sound somewhat muffled when played back.

#### Dialog Recording

**Available mode:**  
TAPE-CAMERA

When you want to record from a distance at a lecture, workshop, or other such occasion, the speaker's voice may blend in with ambient sounds. You can use the Dialog Recording function to pick up the speaker's voice more distinctly.

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "DIALOG REC", then press the dial.



- 4 Turn the CONTROL dial to select "ON", then press the dial.

**DIALOG REC ON**

- 5 Press MENU button to turn off the menu screen.

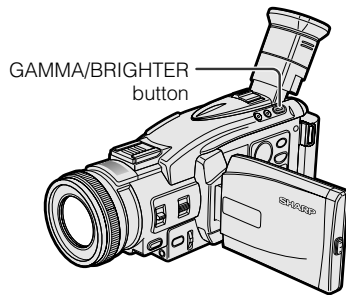
#### To cancel Dialog Recording

Select "OFF" in step 4 above.



## Gamma Brightness Compensation

**Available modes:**  
TAPE-CAMERA, CARD-CAMERA



When the subject is backlit, the image will appear dark if it is recorded normally. The gamma brightness compensation function improves the picture by increasing the brightness of the subject while leaving the brighter portion of the image unaffected.


In TAPE-CAMERA or CARD-CAMERA mode, press the GAMMA/BRIGHTER button once.

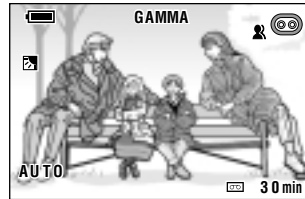
- "GAMMA" appears, indicating that Gamma Brightness Compensation is now working.




### To obtain a brighter picture

Press the GAMMA/BRIGHTER button again.

- The  indicator appears.



### Note:

- When the  indicator is displayed, the background will become slightly brighter.

### To cancel Gamma Brightness Compensation

Press the GAMMA/BRIGHTER button until "GAMMA" disappears.

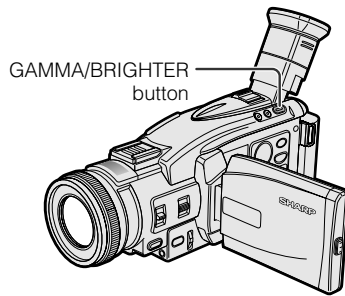


## Useful features Camera Recording

### Gain-up

#### Available modes:

TAPE-CAMERA, CARD-CAMERA



#### Useful Features

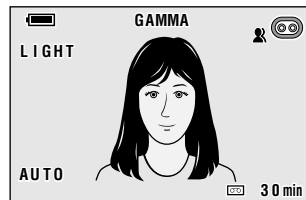
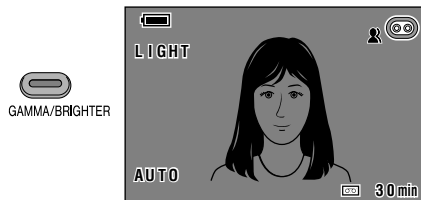
When you are recording in a dark or poorly illuminated location, "LIGHT" is displayed on the screen. Use the gain-up function to record a brighter picture.

#### Note:

- At locations where lighting is adequate, "LIGHT" will not appear. The gain-up function cannot be used in this case.

In TAPE-CAMERA or CARD-CAMERA mode, press the GAMMA/BRIGHTER button once.

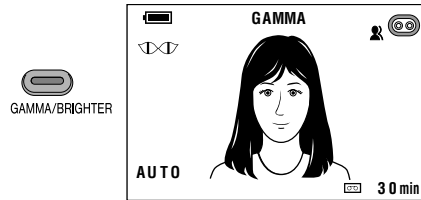
- "GAMMA" appears, indicating that the gain-up function is now working.



### To obtain a brighter picture

Press the GAMMA/BRIGHTER button again.



- The  indicator appears.



### To cancel the gain-up function

Press the GAMMA/BRIGHTER button until "GAMMA" disappears.

#### Notes:

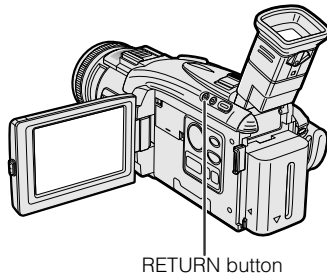
- You may experience some picture noise in Gain-up mode, which increases when the  displays.
- When the  indicator displays, you may get a shadow image behind a subject that is moving around a lot.
- Fine brightness adjustments are possible when using manual exposure (see page 57).
- Gain-up will cancel if you aim the camcorder in a bright location.



## Quick Return

**Available mode:**  
TAPE-CAMERA

If while playing back your tape you want to quickly return to the last recorded scene and start recording again, use the quick return function.



RETURN button

- 1 Set the camcorder to TAPE-CAMERA mode.
- 2 Press the RETURN button.
  - "SEARCH" flashes, and the tape begins fast forwarding or rewinding to the end of the last recorded scene.



- When the tape reaches the end of the last recorded scene, "FINISHED" is displayed, and the camcorder enters Recording Standby mode.

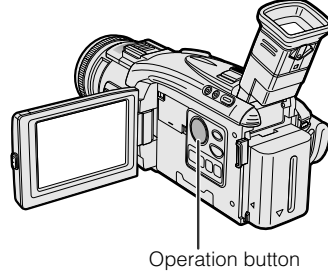
**Notes:**

- To cancel the quick return function while "SEARCH" is flashing, press the RETURN button again.
- Quick return will not work if you remove the cassette and reload it after recording or if nothing has been recorded since loading.

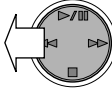

## Edit Search

**Available mode:**  
TAPE-CAMERA

The edit search function lets you search, without switching from TAPE-CAMERA mode to TAPE-VCR mode, for the point on the tape where you wish to start recording next.



Operation button

- 1 Set the camcorder to TAPE-CAMERA mode.
- 2 In Recording Standby mode, press and hold down ◀◀ (reverse edit search) or ▶▶ (forward edit search) on the Operation button.
 

- 3 When you find the point where you want to begin recording, release the button.

**Notes:**

- The sound is off during search.
- Forward edit search is performed at the same speed as normal playback, and reverse edit search at 6.5 times the normal playback.
- You may experience picture noise during reverse edit search.

Useful Features

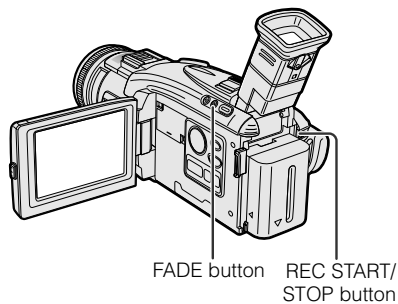


## Useful features Camera Recording

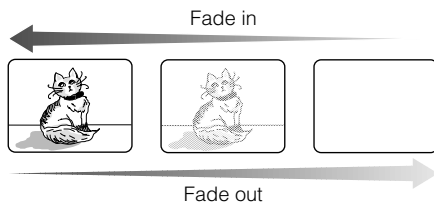
### Fade In and Fade Out

**Available mode:**  
TAPE-CAMERA

The fade function allows you to gradually bring the image and sound in or out at the beginning or end of a scene for creating scene transitions. This is especially effective in creating a dramatic change in scenery.



Useful Features



### Using

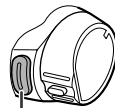
- In TAPE-CAMERA mode, press the FADE button.
  - "FADE" displays.



- Press the REC START/STOP button to begin recording.
  - The picture turns white, and the image and sound fade in.



- Press the REC START/STOP button at the point where you wish to stop recording.
  - The image and sound fade out as the picture gradually turns white. The camcorder then returns to Recording Standby mode.



### To cancel Fade mode

Press the FADE button again in Recording Standby mode.

### To use Fade Out only

- During camera recording in TAPE-CAMERA mode, press the FADE button to display "FADE".
- Press the REC START/STOP button at the point where you wish to stop recording.

### Notes:

- Fade mode automatically cancels after Fade Out.
- When using the Fade function during Wide screen mode recording, the top and bottom portions do not fade.





## Still Recording


### Still Recording Mode

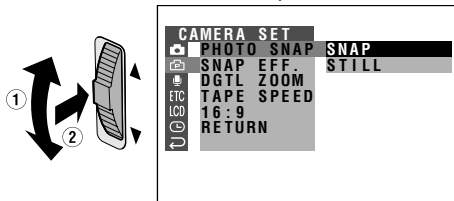
**Available mode:**  
TAPE-CAMERA

You can record still images of subjects with normal sound on a tape by selecting one of two still recording modes.

- SNAP:** A still picture is recorded for 6 seconds.
- STILL:** A continuous still image is recorded.

#### Selecting

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "PHOTO SNAP", then press the dial.



- 4 Turn the CONTROL dial to select the desired still recording mode, then press the dial.

**PHOTO SNAP STILL**

- 5 Press the MENU button to turn off the menu screen.

### Still Recording Effects

**Available mode:**  
TAPE-CAMERA

You can select one of these still recording effects to record the still images with an effect.


**PHOTO SHOT:** A still picture is recorded with the sound and visual effects of a camera shutter closing.

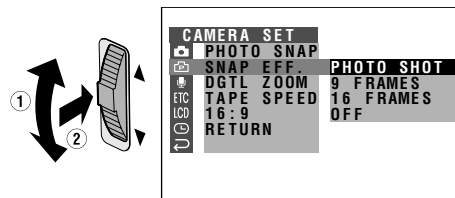
**9 FRAMES:** A still picture is recorded at intervals of 1/8 of a second using a 9-frame picture.

**16 FRAMES:** A still picture is recorded at intervals of 1/8 of a second using a 16-frame picture.

**OFF:** A still image recorded without any effect.

#### Selecting

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "SNAP EFF.", then press the dial.



- 4 Turn the CONTROL dial to select the desired still recording effect, then press the dial.

**SNAP EFF. 9 FRAMES**

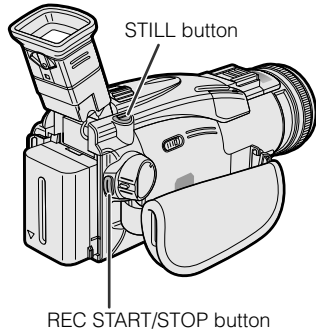
- 5 Press the MENU button to turn off the menu screen.

Useful Features



## Useful Features Camera Recording

### Using Still Recording



- 1** Set the camcorder to TAPE-CAMERA mode.
- 2** Select the still recording mode and effect.
- 3** In Recording Standby mode, press the STILL button fully.
  - A still image of the subject displays.
- 4** Press the REC START/STOP button.
  - The still image of the subject will be recorded.
  - In SNAP mode, the camcorder returns to Recording Standby mode after recording a still image for 6 seconds.



### To pause recording

Press the REC START/STOP button.

### To cancel the still image

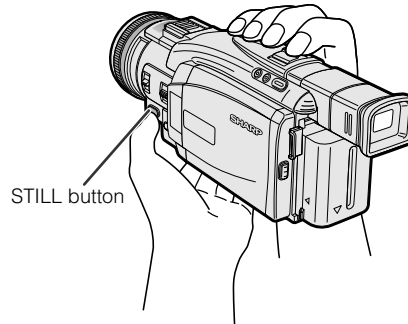
**In SNAP mode**, press the STILL button fully while the camcorder is in Recording Standby mode.

**In STILL mode**, press the STILL button fully.

#### Notes:

- Still Recording can also be used during recording by pressing the STILL button fully.
- The picture quality in Still Recording function will be slightly lower than normal pictures.
- You can use PHOTO SHOT without the sound effect of a camera shutter closing by setting the SOUND menu item to "OFF" (see page 91).

When it is difficult to record a still image clearly (e.g. using the high power zoom), hold the camcorder as shown below and use the STILL button beside the lens to prevent a shaky image.





## Self Recording

### Available modes:

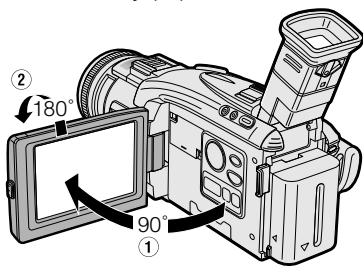
TAPE-CAMERA, CARD-CAMERA

Open the LCD monitor and rotate it 180° vertically so that the screen faces the other way and the subject can monitor the shot while you are recording with the viewfinder.

If the camcorder is steadied, you can record yourself in the scene by watching yourself on the LCD monitor. The supplied remote control is useful for such occasions.



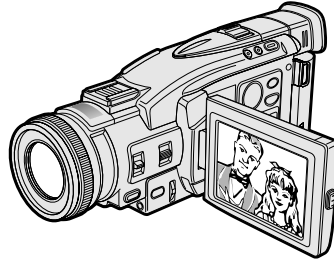
- 1 Pull out the viewfinder completely. Open the LCD monitor to a 90° angle to the camcorder body (1), and then rotate it 180° vertically (2).



- 2 Set the Media Selection switch to TAPE or CARD.

- 3 Set the POWER switch to CAMERA.

- The subject is displayed in the viewfinder, and a mirror image of the subject is displayed on the LCD monitor.



- 4 Begin recording.

### Caution:

- Do not invert the image by rotating the LCD monitor during recording.

### More Information on Self Recording

- Use the remote control to begin/stop recording.
- The screen image automatically inverts when the monitor rotation is between 135° and 180°. When the monitor section is turned back to the normal position, the image returns to normal.
- You can play back images while the monitor is in the self recording position. Set the camcorder to TAPE-VCR mode. The Operation button still retains its function as during normal playback, for example, ►/III on the Operation button works as the Play button.
- If the ◀▶ indicator flashes when the monitor is in the inverted position, this indicates a warning. To check the type of warning, rotate the monitor back to within 135°. (See pages 7 and 8 for descriptions of the warning indicators.)



## Useful Features Camera Recording

### Digital Picture Effects

**Available mode:**  
TAPE-CAMERA

These digital picture effects let you record the subject with a more dramatic effect.

**B/W:** To record in black-and-white.

**SEPIA:** To record in sepia colour similar to that of an old photograph.

**SOLARI:** To record with enhanced contrast, creating a unique artistic image.

**NEGA:** To record a picture whose blacks and whites of the image are reversed and colours of the image are inverted.

**BLUE:** To record with a blue filtering effect.

- 4 Turn the CONTROL dial to select the desired digital picture effect, then press the dial.

### PIC. EFFECT B/W


- 5 Press the MENU button to turn off the menu screen.

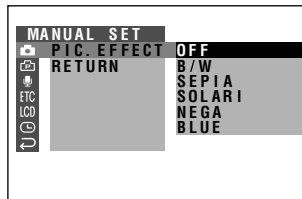
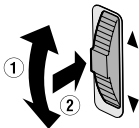
### To cancel the digital picture effect

Select "OFF" in step 4 above.

#### Notes:

- Digital picture effects cannot be used when a still image is displayed.
- Digital picture effects can be used in TAPE-VCR and CARD-VCR mode.

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "PIC. EFFECT", then press the dial.




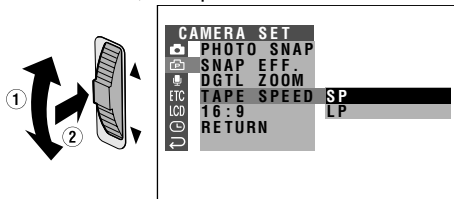


## Recording in LP (Long Play Recording) Mode

**Available mode:**  
TAPE-CAMERA

This camcorder allows you to record in LP (Long Play Recording) mode for approximately 50% more recording time with the same picture quality as that in SP (Standard Play Recording) mode.

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "TAPE SPEED", then press the dial.



- 4 Turn the CONTROL dial to select "LP", then press the dial.

### TAPE SPEED LP

- 5 Press the MENU button to turn off the menu screen.
  - The long play recording mode indicator appears.



Long play recording mode indicator

### To return to SP mode

Select "SP" in step 4 above.

## Notes on the use of LP mode

- To record in LP mode, be sure to use a Mini DV cassette labelled for use with LP mode.
- Frozen images, mosaic-pattern picture noise, audio interruptions or audio loss may occur in the following cases:
  - When using a tape which is not designated for use with LP mode.
  - When a tape recorded in LP mode under high temperature conditions is played back.
  - When a tape recorded in LP mode with the camcorder is played back on a Mini DV player or camcorder from another manufacturer.
  - When a tape recorded in LP mode is played back on a Mini DV player or camcorder without an LP function.
- Audio dubbing is not possible with LP mode recording.

Useful Features




## Useful Features Camera Recording

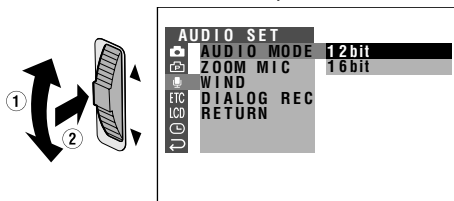
### Selecting the 16-bit Audio Recording Mode

**Available mode:**  
TAPE-CAMERA

This camcorder allows you to select between 12-bit and 16-bit audio recording modes. The camcorder normally records audio in the 12-bit audio recording mode. For higher-quality audio recording, select the 16-bit audio recording mode.

- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "AUDIO MODE", then press the dial.

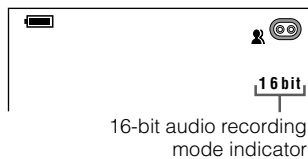
Useful Features



- 4 Turn the CONTROL dial to select "16bit", then press the dial.

**AUDIO MODE 16 bit**

- 5 Press the MENU button to turn off the menu screen.
  - The 16-bit audio recording mode indicator appears.



#### To return to 12-bit audio recording mode

Select "12bit" in step 4 above.

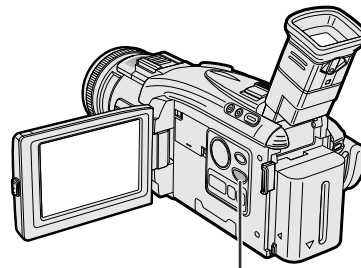
**Note:**

- When using Audio Dubbing with 16-bit audio recordings, both the dubbed and original sounds will be recorded in mono (see page 66).


### Digital Image Stabilization (DIS)

**Available mode:**  
TAPE-CAMERA


The digital image stabilization (DIS) function allows you to stabilize the image by electronically compensating for relatively minor image shaking that is often annoying in close-up shots.



DIS button

Press the DIS button. The  indicator appears, and the camcorder enters DIS mode.



To return to normal recording mode, press the DIS button again. The  indicator will disappear.

**Notes:**

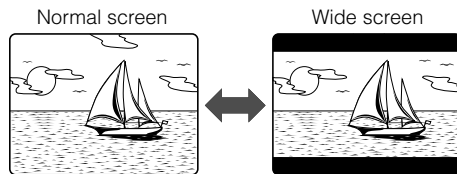
- The DIS function cannot compensate for excessive image shaking.
- When image shaking does not occur (e.g. when using the camcorder on a tripod), turn off the DIS function. The picture will appear more natural when the DIS function is off.
- In CARD-CAMERA mode, the DIS function cannot be used.




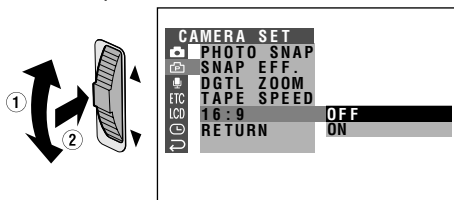
## Wide Screen (16:9)

**Available mode:**  
TAPE-CAMERA

The wide screen function lets you record scenes with the wide-screen feel of a movie shown in a theatre. The top and bottom of the picture are masked with black bands to produce an effective screen aspect ratio of 16:9.



- 1 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "16:9", then press the dial.



- 4 Turn the CONTROL dial to select "ON", then press the dial.

**16:9 ON**

- 5 Press the MENU button to turn off the menu screen.
  - The picture is displayed with the top and bottom portions masked.

### To return to normal screen

Select "OFF" in step 4 above.

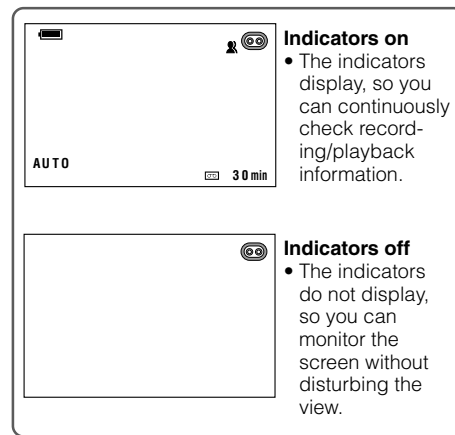
#### Note:

- When still recording with "9 FRAMES" or "16 FRAMES" effect, each frame will display in normal (not wide) screen.

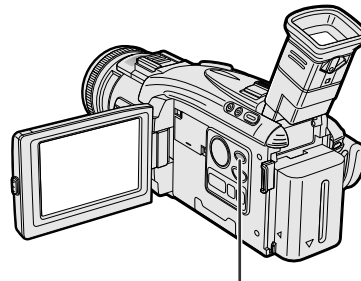
## Turning on/off the On-screen Indicators

**Available modes:**  
All modes

You can turn the on-screen indicators on and off as you like.



Press the DISP. ON/OFF button. The On-screen indicators will be displayed.



DISP. ON/OFF button

To turn off the On-screen indicators, press the DISP. ON/OFF button again.

#### Note:

- When you press the GAMMA/BRIGHTER button, FADE button or RETURN button after turning off the On-screen indicators, they will be displayed automatically.



# Useful Features

## Playback

### Using the Remote Control

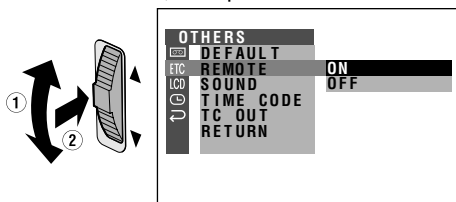
Use the supplied remote control to operate the camcorder from a distance, such as when you want to record yourself in a scene, or when the camcorder is connected to a TV for use as a VCR.

### Turning on the Remote Control Mode

**Available modes:**  
TAPE-VCR, CARD-VCR

- 1 In TAPE-VCR or CARD-VCR mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select [ETC], then press the dial.
- 3 Turn the CONTROL dial to select "REMOTE", then press the dial.

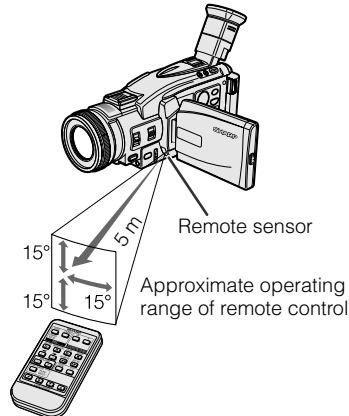
Useful Features



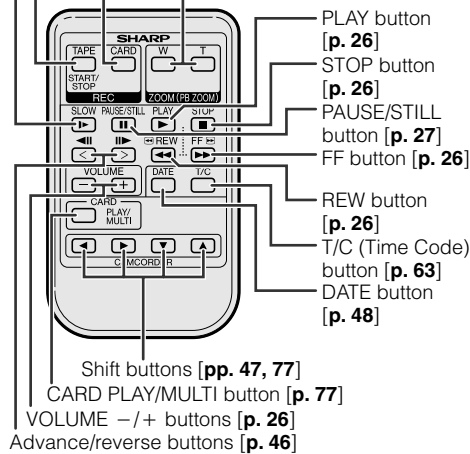
- 4 Turn the CONTROL dial to select "ON", then press the dial.
- REMOTE ON**
- 5 Press the MENU button to turn off the menu screen.

### Operating

Aim the remote control at the remote sensor of the camcorder, and press the control buttons to operate.



- SLOW button [p. 46]
- TAPE REC START/STOP button [p. 23]
- CARD REC button [p. 73]
- ZOOM buttons (W/T) [pp. 24, 47]



#### Notes:

- Be careful not to expose the remote sensor to direct sunlight or strong interior lighting, as this may prevent the remote control from operating properly.
- Be sure that there are no obstacles between the remote control and the remote sensor.

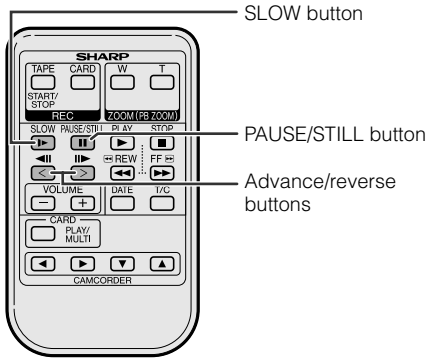




## Tape Playback Functions with the Remote Control

**Available mode:**  
TAPE-VCR

You can use the following playback functions with the supplied remote control. (See page 45 for use of the remote control.)



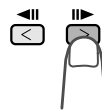
## Frame Advance

The frame advance function allows you to play back still images frame by frame.

**1** During playback in TAPE-VCR mode, press the PAUSE/STILL button (II) to pause playback.



**2** Press the II> (or <II) button.  
• Each time you press the button, the picture advances one frame forward (or backward).



To return to normal playback, press the PLAY button (▶).

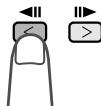
### Notes:

- The sound is off during reverse, slow, and frame advance playback.
- If you use the slow or frame advance function with the tape recorded in LP mode, the picture may advance several frames at a time.
- You can take clearer still images by recording with a fast shutter speed (see page 59).

## Reverse Playback

The reverse playback function allows you to play back video in reverse.

During playback in TAPE-VCR mode, press the <II button.



To return to normal playback, press the PLAY button (▶).

## Slow

The slow function allows you to play back images in slow motion.

During playback in TAPE-VCR mode, press the SLOW button (▶).

To view slow playback in reverse, press the <II button.



To return to normal playback, press the PLAY button (▶).

### Note:

- To protect the tape, the camcorder automatically returns to normal playback if it is left in Slow mode for more than 10 minutes.



## Useful Features Playback

### Playback Zoom

**Available modes:**  
TAPE-VCR, CARD-VCR

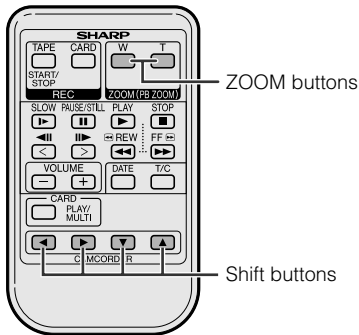
The playback zoom function allows you to magnify the playback picture up to 10 times its original size and shift the magnified picture by using the remote control. (See page 45 for use of the remote control.)

### To cancel Playback Zoom

Press the ZOOM W button, which zooms out to the widest angle.

#### Notes:

- Use of Playback Zoom may cause a reduction in picture quality for still images.
- Images in Playback Zoom mode cannot be transferred via DV or PC connecting cable to a personal computer.



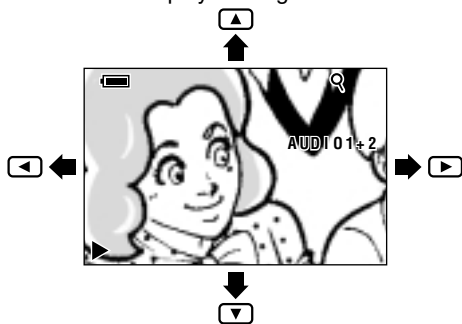
Useful Features

- The example screens shown are for TAPE-VCR mode.

- 1 During playback in TAPE-VCR or CARD-VCR mode, press the ZOOM T button to zoom in.



- 2 Press the Shift ◀, ▶, ▲, or ▼ button to shift the displayed image.



47




## Displaying the Date and Time of Recording

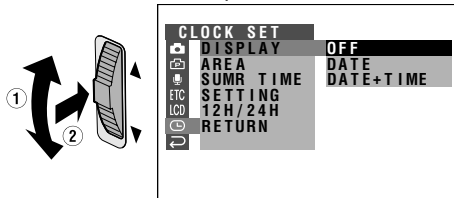
### Available mode:

All modes

Follow the procedure below to display the date, or both the date and time, of recording on the screen. You can display the date and time during both recording and playback by pressing the DISP. ON/OFF button.

- The example screens shown are for TAPE-CAMERA mode.

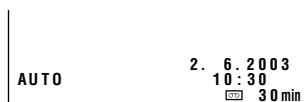
- 1 Hold down the Lock button and set the POWER switch to CAMERA or VCR.
- 2 Press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select , then press the dial.
- 4 Turn the CONTROL dial to select "DISPLAY", then press the dial.



- 5 Turn the CONTROL dial to select "DATE" or "DATE + TIME", then press the dial.

**DISPLAY** **DATE+TIME**

- 6 Press the MENU button to turn off the menu screen.
  - The date (or the date and time) appears.



### Notes:

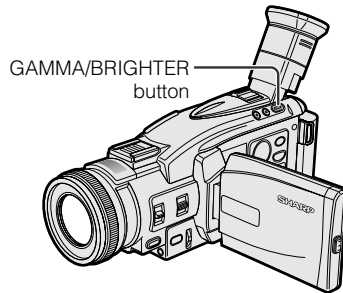
- Before recording, make sure that the date and time have been correctly set. If they have not been set, the display will be left blank when playing back the recording. (The display will also be left blank for unrecorded or damaged portions of the tape.)
- In TAPE-VCR or CARD-VCR mode, the current date and time are displayed when the tape or card is not being played back.
- You can also press the DATE button on the remote control to display the date (or date and time).



## Useful Features Playback

### Gamma Playback

**Available mode:**  
TAPE-VCR



### To cancel Gamma Playback

Press the GAMMA/BRIGHTER button until "GAMMA1" and "GAMMA2" disappear.

**Note:**

- **Gamma Playback has no effect during still playback.**

The gamma playback function improves the playback picture in TAPE-VCR mode by increasing the brightness of the subject while leaving the brighter portions of the image unaffected.

**Useful Features**

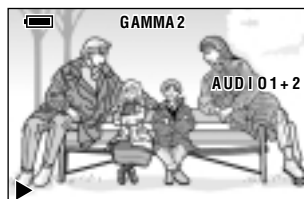
During playback in TAPE-VCR mode, press the GAMMA/BRIGHTER button once.

- "GAMMA1" appears, and the picture becomes brighter.



To obtain a brighter picture, press the GAMMA/BRIGHTER button again.

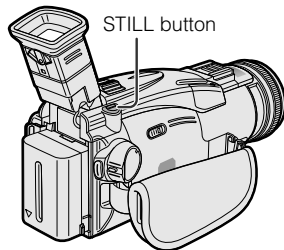
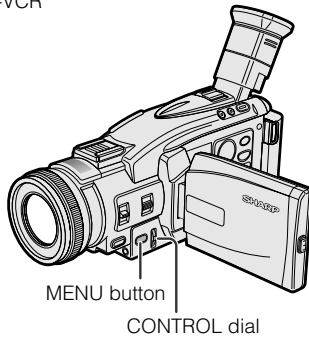
- "GAMMA2" appears.





## Multiple Strobe Playback

Available mode:  
TAPE-VCR



- 5 Turn the CONTROL dial to select "9 FRAMES" (9-frame picture) or "16 FRAMES" (16-frame picture), then press the dial.

### MULTI FRAME 16 FRAMES

- 6 Press the MENU button to turn off the menu screen, then begin playback.
- 7 Press the STILL button fully at the point where you want to begin the multiple strobe playback.
  - A multi-frame picture of the image is displayed.



### To cancel Multiple Strobe Playback


Press the STILL button fully again.

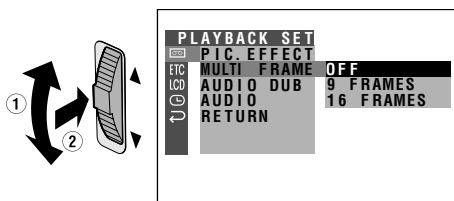
#### Notes:

- Multiple Strobe Playback cannot be used during video search, still, slow or reverse playback.
- When a card is loaded, the multi-frame picture is recorded on the card (see page 51).

Useful Features

The multiple strobe playback function can be used to capture the action of a fast-moving subject at intervals of 1/8 of a second using a 9- or 16-frame picture. This is useful when you want to check your form in sports such as tennis or golf.

- 1 Remove the card from the camcorder.
- 2 In TAPE-VCR mode, press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select , then press the dial.
- 4 Turn the CONTROL dial to select "MULTI FRAME", then press the dial.





## Useful Features Playback

### Copying an Image from Tape to Card

**Available mode:**  
TAPE-VCR

You can capture your favourite image frame from a video tape recording and save it on card.

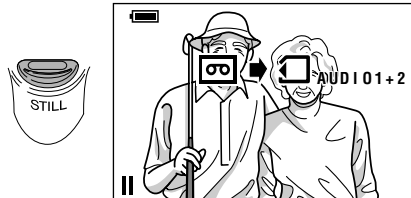
- 1 Insert the recorded Mini DV cassette and a card in the camcorder.
- 2 Set the camcorder to TAPE-VCR mode, then begin tape playback.
- 3 Select the frame number of the image (see page 50).

#### MULTI FRAME OFF

**OFF:** 1-frame picture  
**9 FRAMES:** 9-frame picture  
**16 FRAMES:** 16-frame picture


Useful Features

- 4 Hold the STILL button half-way down at the point where the desired image appears.
  - A still picture of the image displays.



**Note:**

- To cancel the still picture, release the STILL button.

- 5 Press the STILL button fully to copy the image to the card.
  - The  indicator flashes red while the image is copied.



**Note:**

- The size of the image copied with this function is fixed at 640 x 480 pixels.



## Picture Effect Playback

### Available modes:

TAPE-VCR, CARD-VCR

These picture effects let you play back images with a more dramatic effect.

**B/W:** The picture is displayed in black-and-white.



**SEPIA:** The picture is displayed in sepia colour similar to that of an old photograph.

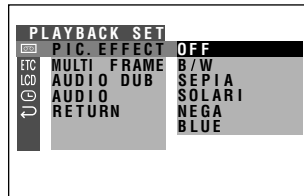
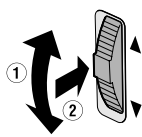
**SOLARI:** The contrast of the subject is enhanced, creating a unique artistic image.

**NEGA:** The blacks and whites of the image are reversed and colours of the image are inverted.

**BLUE:** The picture plays back with a blue filtering effect.

- The example screens shown are for TAPE-VCR mode.

- 1 During playback in TAPE-VCR (or CARD-VCR) mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select  (or ) , then press the dial.
- 3 Turn the CONTROL dial to select "PIC. EFFECT", then press the dial.



- 4 Turn the CONTROL dial to select the desired picture effect, then press the dial.

**PIC. EFFECT B/W**

- 5 Press the MENU button to turn off the menu screen.

### To cancel Picture Effect Playback

Select "OFF" in step 4 above.

### Notes:

- Images in Picture Effect Playback mode cannot be transferred via DV or PC connecting cable to a personal computer.
- **You cannot use Picture Effect Playback with Multiple Strobe Playback, Slide Show Playback or Still playback.**

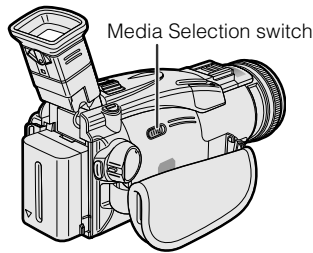
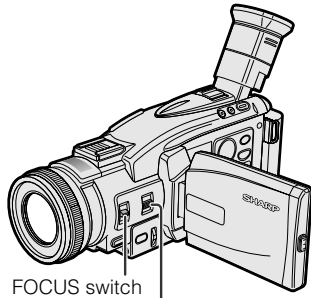


# Advanced Features

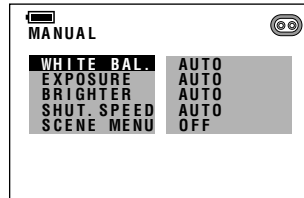
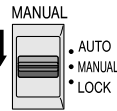
## Camera Recording

### Setting the Camcorder to Full Auto Mode

**Available modes:**  
TAPE-CAMERA, CARD-CAMERA

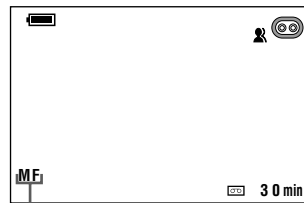
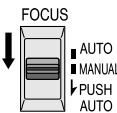


When the Manual Selection switch is set to MANUAL, MANUAL screen appears.



- In this mode, you can adjust white balance, exposure, gain, shutter speed and scene menu manually. (See page 56 to 62.)

When the FOCUS switch is set to MANUAL, "MF" appears.

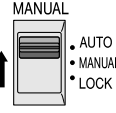



Manual focus indicator

- Using this mode, you can focus on the subject in various situation. (See page 54.)

**Advanced Features**

To easily record good-quality images, perform camera shooting in Full Auto mode. If "AUTO" is not displayed on the screen, the camcorder is in Manual mode. Perform the procedure below to cancel all the manual settings and set the camcorder to Full Auto mode.

- Set the camcorder to TAPE-CAMERA or CARD-CAMERA mode.
- In Recording Standby mode, if the Manual Selection switch is set to LOCK or MANUAL, set the switch to AUTO.
 
- If the FOCUS switch is set to MANUAL, set the switch to AUTO.
 



Auto mode indicator







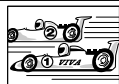

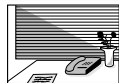








## Manual Focus

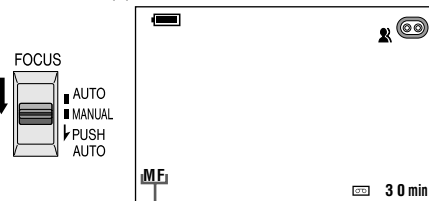
### Available modes:

TAPE-CAMERA, CARD-CAMERA

Auto Focus may not be able to focus on the subject in the situations shown below. In such situations, set the camcorder to Manual Focus mode and focus manually.

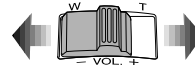
 Subject is too dark.	 Lack of contrast, e.g. snow scene.
 Fast-moving subject.	 Background is too bright.
 Subject has horizontal stripes.	 Subject is being shot through a dirty or wet window.
 Light reflects off the subject.	 Two subjects at different distances overlap in the same scene.
 Subject has fine, repeated patterns.	 Subjects at different distances appear in the centre of the scene at the same time.
 Fast-speed shutter being used under fluorescent lighting.	

- 1 Set the camcorder to TAPE-CAMERA or CARD-CAMERA mode.
- 2 In Recording Standby mode, set the FOCUS switch to MANUAL.
  - "MF" appears.

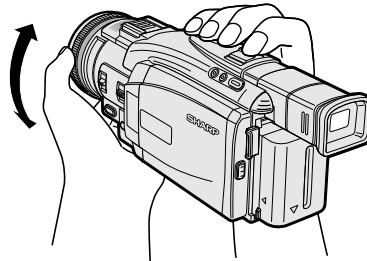


Manual focus indicator

- 3 Adjust the Power Zoom control to frame the subject as you desire.



- 4 Rotate the Manual Focus ring to focus on the subject.
  - When the ▲ indicator is displayed, the focus will be at infinity. You cannot focus any closer when the ● indicator is displayed.



### Notes:

- The camcorder may not be able to focus correctly if the subject is closer than approximately 1.5 m. Set the zoom control to wide angle, and try refocusing again.
- If the lens is dirty or fogged, the camcorder may not be able to focus correctly.

Advanced Features



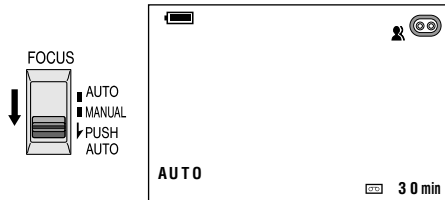
## Advanced Features Camera Recording

### To temporarily use Auto Focus

You can use this feature to shift away from a subject you have focused on manually to another subject, and it will automatically stay in focus to give you a smooth image.

Push and hold the FOCUS switch to PUSH AUTO.

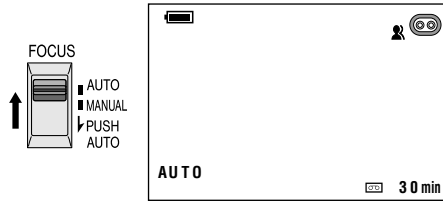
- Auto Focus works while the switch is held to PUSH AUTO.



Release the FOCUS switch to return to Manual Focus mode.

### To cancel Manual Focus mode

Set the FOCUS switch to AUTO.





## Adjusting White Balance

### Available modes:

TAPE-CAMERA, CARD-CAMERA

The colour of the subject on the screen looks different depending on lighting conditions. Select a White Balance setting that matches the lighting conditions.

**AUTO:** Colouring adjusted automatically for the current lighting condition

**LOCK:** Fix the setting to the standard balance (White Balance Lock)

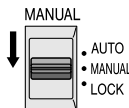
**INDOOR:** For recording indoors with halogen lamps or incandescent lighting

**OUTDOOR:** For recording outdoors on a sunny day

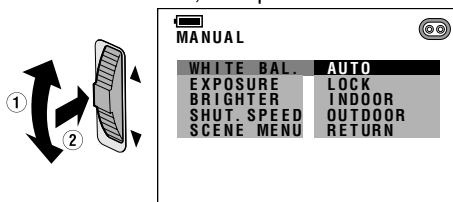
**RETURN:** For maintaining the previous setting

## Selecting

- 1 In TAPE-CAMERA or CARD-CAMERA mode, set the Manual Selection switch to MANUAL to display the MANUAL screen.



- 2 Turn the CONTROL dial to select "WHITE BAL.", then press the dial.



- 3 Turn the CONTROL dial to select a white balance setting, then press the dial.

### WHITE BAL. OUTDOOR

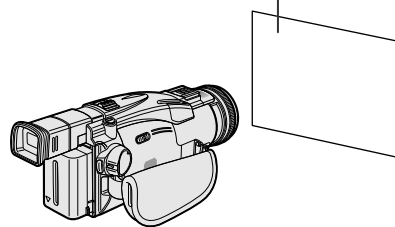
- When selecting "LOCK", perform the steps "Locking the White Balance".

- 4 Set the Manual Selection switch to LOCK to lock the selected White Balance setting.
  - The camera recording screen appears.

## Locking the White Balance

- 1 Select "LOCK" in step 3 above.
- 2 Aim the lens at a white object.

White paper or white cloth



- Adjust the distance of the object so that the entire screen is white.

- 3 Press the CONTROL dial to set the white balance lock.
  - "LOCK" flashes during the locking procedure.

### Note:

- If you move the camcorder while "LOCK" is flashing, "LOCK" may not stop flashing. If this occurs, press the CONTROL dial to cancel the procedure, and then repeat step 3.

- 4 Set the Manual Selection switch to LOCK.
  - The camera recording screen appears.

## To cancel White Balance setting

After performing step 1 and 2 in "Selecting", turn the CONTROL dial to select "AUTO", then press the dial.

## To return to Full Auto mode

Set the camcorder to Full Auto mode (see page 53).

### Note:

- White Balance setting will cancel if a scene setting is selected thereafter.



## Advanced Features Camera Recording

### Manual Exposure

#### Available modes:

TAPE-CAMERA, CARD-CAMERA

The camcorder is preset to Auto Exposure mode, which automatically selects the optimal aperture. However, when there is too much contrast in brightness between the subject and background, you may not be able to record a clear image. In this case, use the manual exposure function to correct the exposure level.

#### Background is too bright and subject too dark (backlit subject).

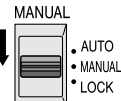
- Increase the exposure level to allow more light through the lens.

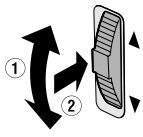


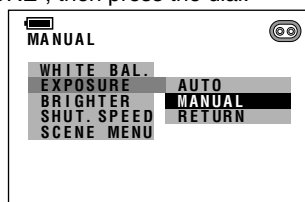
#### Subject is too bright against background.

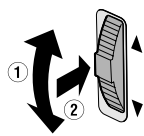
- Decrease the exposure level to allow less light through the lens.

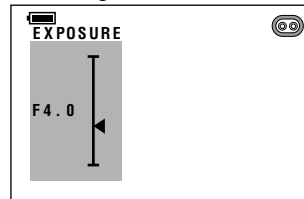


- In TAPE-CAMERA or CARD-CAMERA mode, set the Manual Selection switch to MANUAL to display the MANUAL screen.
 

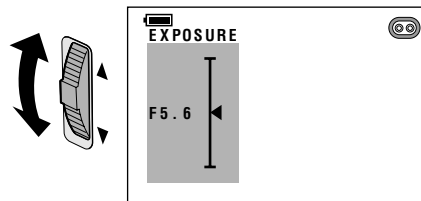
- Turn the CONTROL dial to select "EXPOSURE", then press the dial.
 



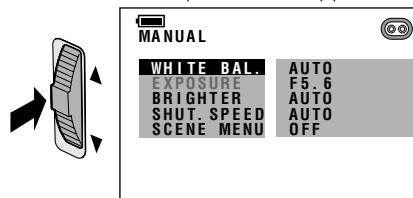
- Turn the CONTROL dial to select "MANUAL", then press the dial to display the exposure setting screen.
 



- Turn the CONTROL dial to select the desired exposure level.
  - The number shown is the selected F-number. You can select 15 steps from F1.8 (most light) to F19 (least light).



- Press the CONTROL dial.
  - The selected exposure level appears.



- Set the Manual Selection switch to LOCK to lock the selected F-number.
  - The camera recording screen appears.

#### To return to Auto Exposure mode

After performing step 1 and 2 above, turn the CONTROL dial to select "AUTO", then press the dial.

#### To return to Full Auto mode

Set the camcorder to Full Auto mode (see page 53).

#### Note:

- Manual Exposure mode will cancel if a scene setting is selected thereafter.



## Manual Gain

### Available modes:

TAPE-CAMERA, CARD-CAMERA

When recording in a dark or poorly illuminated location with Auto Gain mode, the light sensitivity of the camcorder (gain) will be automatically adjusted and the recorded image may be brighter than the subject actually is. If you want to faithfully record a dark scene in this case, use the manual gain function. You can also adjust the gain to record a backlit subject brighter.

### Example of use

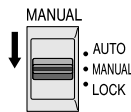
#### Faithfully recording a dark scene.

- Select a smaller gain value (to decrease the light sensitivity).

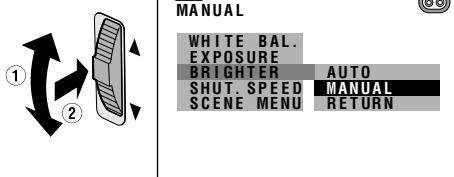
#### Background is too bright and subject is too dark (backlit subject)

- Select a larger gain value (to increase the light sensitivity).

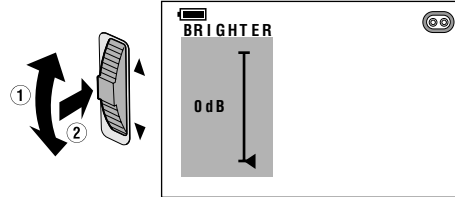
- In TAPE-CAMERA or CARD-CAMERA mode, set the Manual Selection switch to MANUAL to display the MANUAL screen.



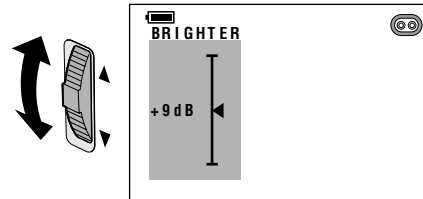
- Turn the CONTROL dial to select "BRIGHTER", then press the dial.



- Turn the CONTROL dial to select "MANUAL", then press the dial to display the BRIGHTER adjustment screen.



- Turn the CONTROL dial to select the desired gain value.
  - The number shown is the selected gain value.
  - The adjustment range is 7 steps from 0dB (lowest sensitivity) to +18dB (highest sensitivity).



**Note:** If you select a large gain value, the image may appear grainy.

- Set the Manual Selection switch to LOCK to lock the selected gain value.
  - The camera recording screen appears.

### To return to Auto Gain

After performing 1 and 2 above, turn the CONTROL dial to select "AUTO", then press the dial.

### To return to Full Auto mode

Set the camcorder to Full Auto mode (see page 53).

### Notes:

- In order to check the manual setting state after performing step 5, reset the Manual Selection switch to MANUAL.
- **The camcorder will return to Auto Gain mode if a scene setting is selected and then cancelled thereafter.**





## Advanced Features Camera Recording

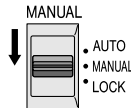
### Setting the Shutter Speed

#### Available modes:

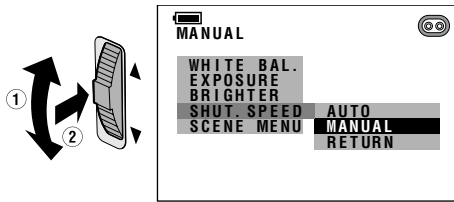
TAPE-CAMERA, CARD-CAMERA

The shutter speed is preset to auto mode, which automatically selects the optimal shutter speed for the ambient light. However, depending on the subject or situation, you may want to set the shutter speed manually to create a high-quality picture.

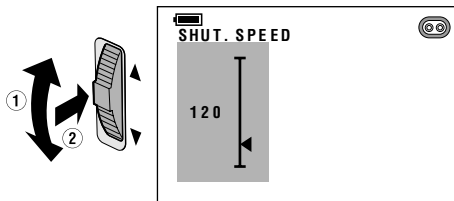
- 1 In TAPE-CAMERA or CARD-CAMERA mode, set the Manual Selection switch to MANUAL to display the MANUAL screen.



- 2 Turn the CONTROL dial to select "SHUT. SPEED", then press the dial.

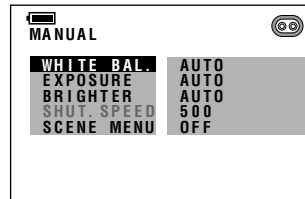
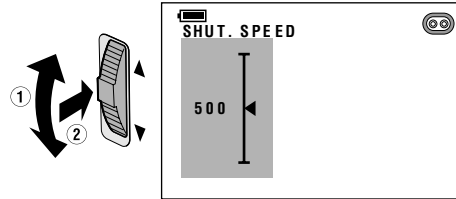


- 3 Turn the CONTROL dial to select "MANUAL", then press the dial to display the shutter speed setting screen.



- 4 Turn the CONTROL dial to select the desired shutter speed, then press the dial.

- In TAPE-CAMERA mode, you can select 17 speeds from 1/25 sec. ("25") (slowest shutter speed) to 1/10,000 sec. ("10000") (fastest shutter speed).
- In CARD-CAMERA mode, you can select 9 speeds from 1/25 sec. ("25") to 1/500 sec. ("500").



- The selected shutter speed appears.

- 5 Set the Manual Selection switch to LOCK to lock the selected shutter speed.

- The camera recording screen appears.

#### To return to Auto Shutter Speed mode

After performing step 1 and 2 above, turn the CONTROL dial to select "AUTO", then press the dial.

#### To return to Full Auto mode

Set the camcorder to Full Auto mode (see page 53).



## Recommended Shutter Speeds

The faster the shutter speed, the darker the picture becomes. Select the most appropriate shutter speed for the ambient light.

Situation	Recommended shutter speed
<ul style="list-style-type: none"> <li>Recording sports action in bright daylight.</li> <li>Recording in bright daylight at a ski resort.</li> </ul>	1/10,000 sec.   1/1,000 sec.
<ul style="list-style-type: none"> <li>Recording outdoor sports on a partially cloudy day.</li> <li>Recording an outside scene through a car window (when you want to minimize blur caused by the camera shaking).</li> </ul>	1/1,000 sec.   1/250 sec.
<ul style="list-style-type: none"> <li>When you want to reduce the light by half. Use as a substitute for an ND2 filter.</li> </ul>	1/120 sec.
<ul style="list-style-type: none"> <li>Recording in a poorly-illuminated location.</li> <li>When you want to create artistic trailing images of fast-moving subjects.</li> </ul>	1/25 sec.

### Notes:

- Recording with a shutter speed faster than 1/50 sec. tends to darken the picture. Record in bright locations when you use a fast shutter speed.
- Using a fast shutter speed under fluorescent lighting will cause flickering in the picture and possibly periodic colour shifts.
- When selecting 1/25 sec. shutter speed, you may get a shadow image behind a subject that is moving around a lot.
- The manual shutter speed setting will cancel if a scene setting is selected or gain-up function is used thereafter.**

## Tips on Using the Manual Shutter Speed

- Fast shutter speeds can be used with the still recording functions (see pages 38, 39 and 73) to record higher quality still images of fast-moving subjects.
- If the on-screen picture flickers when recording under fluorescent lighting, you may be able to compensate by setting the shutter speed to 1/120 sec.



## Advanced Features Camera Recording

### Scene Menu (Program AE)

#### Available modes:

TAPE-CAMERA, CARD-CAMERA

You can set the camcorder to the shooting mode that will create the best results for a specific situation. Just select one of the scene settings shown below.

**SHUT.SPEED:** You can manually adjust the shutter speed. The camcorder will automatically choose the optimal exposure level (F-number) according to the selected shutter speed.

**EXPOSURE:** You can manually adjust the exposure level (F-number). The camcorder will automatically choose the optimal shutter speed according to the selected exposure level.

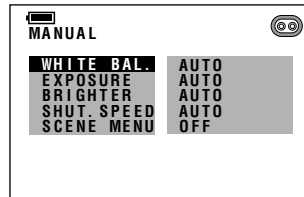
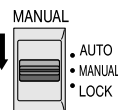
**SPORT:** You can record a fast-moving subject with little blurriness. (The shutter speed is set to 1/500 sec.) This is effective for recording tennis swings, track and field events, and so on.

**SUNLIGHT:** You can record without darkening the subject even if the background is particularly bright. This is effective for recording at ski area or when swimming in the ocean.

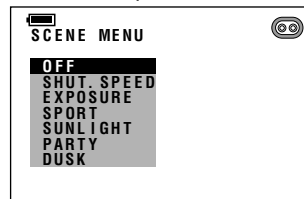
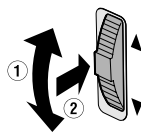
**PARTY:** You can record a picture with the brightness adjusted for a subject with a large contrast to minimize white flaring. This is effective for recording subjects illuminated by a spotlight.

**DUSK:** You can accurately record the red of the setting sun and the surrounding twilight.

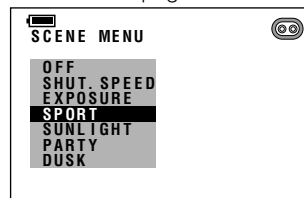
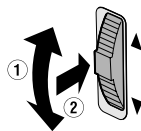
- 1 In TAPE-CAMERA or CARD-CAMERA mode, set the Manual Selection switch to MANUAL to display the MANUAL screen.



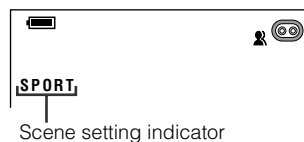
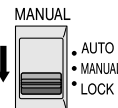
- 2 Turn the CONTROL dial to select "SCENE MENU", then press the dial.



- 3 Turn the CONTROL dial to select the desired scene setting, then press the dial.
  - The selected scene setting displays in yellow.
  - If you select the SHUT.SPEED or EXPOSURE scene setting, follow the procedure on the next page.



- 4 Set the Manual Selection switch to LOCK to lock the selected scene setting.
  - The selected scene setting indicator appears.

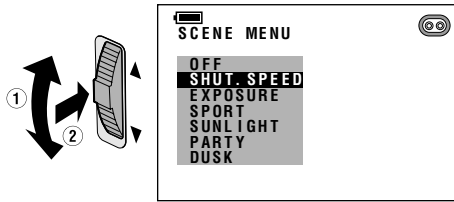




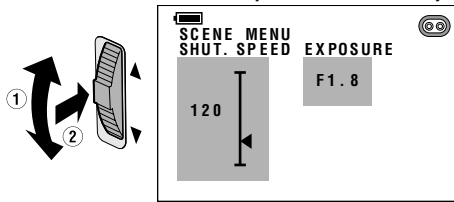


## Adjusting the SHUT.SPEED scene setting

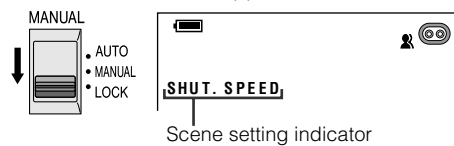
- 1 After performing step 2 on the previous page, turn the CONTROL dial to select "SHUT. SPEED", then press the dial.



- 2 Turn the CONTROL dial to select the desired shutter speed, then press the dial.
  - In TAPE-CAMERA mode, you can select 17 speeds from 1/25 sec. ("25") to 1/10,000 sec. ("10000").
  - In CARD-CAMERA mode, you can select 9 speeds from 1/25 sec. ("25") to 1/500 sec. ("500").
  - The F-number is adjusted automatically.

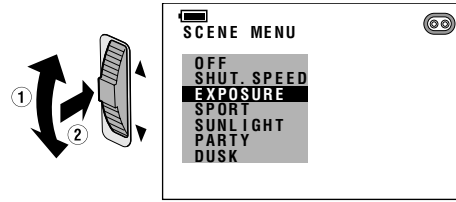


- 3 Set the Manual Selection switch to LOCK to lock the selected scene setting.
  - "SHUT.SPEED" appears.

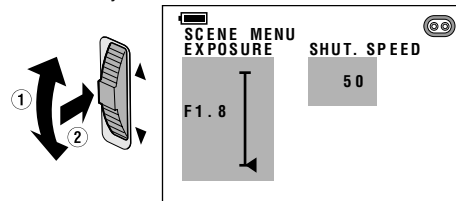


## Adjusting the EXPOSURE scene setting

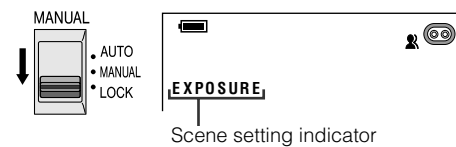
- 1 After performing step 2 on the previous page, turn the CONTROL dial to select "EXPOSURE", then press the dial.



- 2 Turn the CONTROL dial to select the desired F-number, then press the dial.
  - You can select 15 steps from F1.8 to F19.
  - The shutter speed is adjusted automatically.



- 3 Set the Manual Selection switch to LOCK to lock the selected scene setting.
  - "EXPOSURE" appears.



## To cancel the scene setting

Select "OFF" in step 3 on the previous page.

### Note:

- Scene settings cannot be used with Gain-up function.

Advanced Features

# Advanced Features

## Playback

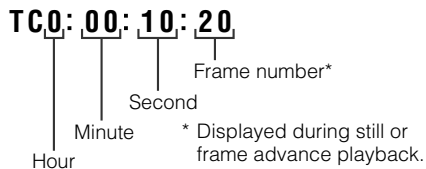
### Using the Time Code

**Available modes:**

TAPE-VCR, TAPE-CAMERA

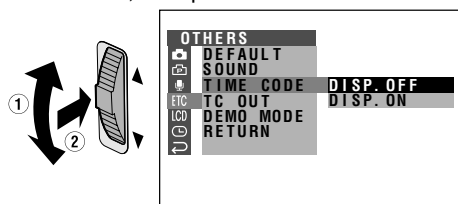
The time code shows the hour, minute and second of recording, and the frame number (1 frame = approx. 1/25 sec.). This is automatically recorded along with the subject when you are recording on the tape. You can display the time code on the screen as an accurate counter in both TAPE-VCR and TAPE-CAMERA modes.

**Display format**



The example screens shown are for TAPE-VCR mode.

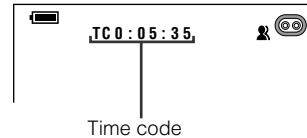
- 1 During playback or camera recording in TAPE modes, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select ETC, then press the dial.
- 3 Turn the CONTROL dial to select "TIME CODE", then press the dial.



- 4 Turn the CONTROL dial to select "DISP. ON", then press the dial.

**TIME CODE DISP. ON**

- 5 Press the MENU button to turn off the menu screen.
  - The time code appears.



**To turn off the time code**

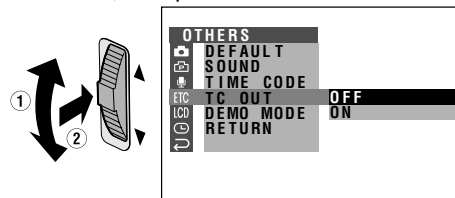
Select "DISP. OFF" in step 4 above.

**Notes:**

- When the tape reaches an unrecorded section, the time code returns to zero (TC0:00:00). Once recorded, the time code cannot be changed.
- You can also press the T/C (Time Code) button on the remote control to display the time code.

**Displaying the time code on a TV during playback**

- 1 In TAPE-VCR mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select ETC, then press the dial.
- 3 Turn the CONTROL dial to select "TC OUT", then press the dial.



- 4 Turn the CONTROL dial to select "ON", then press the dial.

**TC OUT ON**

- 5 Press the MENU button to turn off the menu screen.

Advanced Features

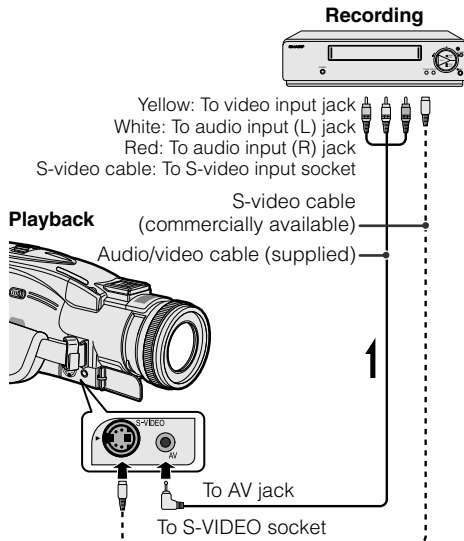


## Editing

**Available mode:**  
TAPE-VCR

Video editing lets you refine your videos by removing unwanted sequences from your tape, or transposing one sequence with another. This camcorder lets you monitor the source program on the built-in LCD monitor without having to connect it to an external TV or video monitor.

Connect the camcorder to a VCR with the supplied audio/video cable, as shown.



←: The arrow shows the signal flow.

### Notes:

- See page 3 for how to open the jack cover.
- If your VCR has only one audio input jack, use the white plug for the audio connection on the VCR.
- If your VCR has an S-video input socket, you can connect it to the S-VIDEO socket on the camcorder with a commercially available S-video cable.

## Cutting Unwanted Sequences

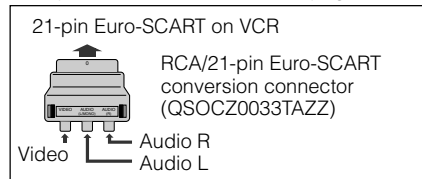
- 1 Playback the tape to be edited on the camcorder, and locate the beginning and end of the sequence you wish to cut. Write down the time code reading at the beginning and end of that sequence (see page 63). Then rewind the tape to before the beginning of the portion that you wish to keep.
- 2 Load a video cassette into the recording VCR.
- 3 Press ► / ⏸ on the camcorder to begin playback, then press the Record button on the VCR to begin recording.
- 4 Press the Pause/Still button on the VCR to pause recording when the source tape reaches the beginning of the sequence to be cut.
- 5 Press the Pause/Still (or Record) button on the VCR to resume recording when the source tape reaches the end of the sequence to be cut.

### To stop editing

Press ■ on the camcorder and press the Stop button on the VCR.

### Notes:

- If your VCR has a 21-pin Euro-SCART connector, use the RCA/21-pin Euro-SCART conversion connector (QSOCZ0033TAZZ) available from our main parts distributor detailed on page 101.



- Some of the transitions between edited sequences may be slightly off.
- There may be picture noise during video search or still playback. This does not imply a defect in the camcorder.
- The time code display will be recorded along with the edited sequences if the TC OUT item is set to "ON". Set to "OFF" before editing (see page 63).



## Advanced Features Playback

### Editing with the DV Terminal (IEEE1394)

**Available mode:**  
TAPE-VCR

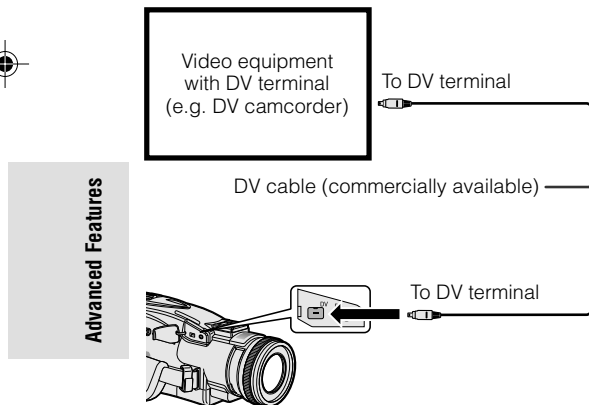
This camcorder enables you to perform digital video editing. Connect the camcorder to video equipment with a DV terminal using a commercially available DV cable. A DV cable is able to transfer all dubbing signals including video and audio.

### To Record to Video Equipment

See "Cutting Unwanted Sequences" on page 64, using the video equipment as the recording source.

**Note:**

- Make sure that the video equipment to which you are recording can input dubbing signals via the DV terminal.



Advanced Features

### To Record from Video Equipment

- 1 Set the camcorder to TAPE-VCR mode, and insert a Mini DV cassette.
- 2 Begin playback on the video equipment connected to the camcorder.
  - Check the camcorder screen to see if the picture is properly received.
- 3 Press the REC START/STOP button on the camcorder.
  - The camcorder enters Recording Standby mode.
- 4 Press ►/|| on the Operation button to begin recording.

### To stop recording

Press ■ on the Operation button.

### Cutting Unwanted Sequences

- 1 Press ►/|| to pause recording when the source tape reaches the beginning of the sequence to be cut.
- 2 Press ►/|| to resume recording when the source tape reaches the end of the sequence to be cut.

**Notes:**

- Make sure that the video equipment from which you are recording can output dubbing signals via the DV terminal.
- If the video equipment is not set to playback mode or the DV cable is not properly connected, "NO SIGNAL" is displayed on the camcorder screen.
- If no picture or sound is input to the camcorder even if the DV cable is properly connected and you are playing back the source media from the video equipment, set the POWER switch on the camcorder to OFF and then back to VCR, or disconnect the DV cable and connect it again.
- If a digital video recording with a copyright protection signal is used as the playback source, "COPYRIGHT PROTECTED." appears on the camcorder monitor and the recording function is disabled (see page 95).



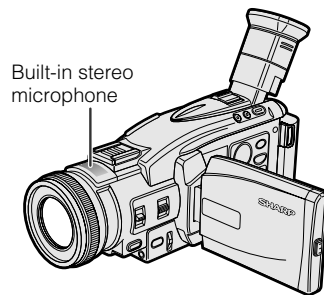
## Audio Dubbing Feature

**Available mode:**  
TAPE-VCR

You can add narration to recordings made with this camcorder, while preserving the original audio and video recordings.

### Microphone for Audio Dubbing

You can use the built-in stereo microphone to record narration.



**Notes:**

- Audio dubbing does not function through the DV terminal.
- You cannot use the zoom microphone to record narration.
- You cannot use audio dubbing with recordings made in LP mode.

## Audio Recording

### In normal recording mode

**12-bit audio recording**

The audio is recorded in stereo on Audio 1.

**Audio 1:** Stereo (left and right) sound

**Audio 2:** No audio

**16-bit audio recording**

The audio is recorded in stereo with the left and right sound on two separate channels.

**Audio 1:** Left sound

**Audio 2:** Right sound

### In Audio Dubbing mode

**12-bit audio recording**

The dubbed audio is recorded on Audio 2.

**Audio 1:** Original stereo (left and right) sound

**Audio 2:** Dubbed stereo (left and right) sound

**16-bit audio recording**

The dubbed audio is recorded on Audio 2 over the original right sound. Both dubbed and original sounds are mono.

**Audio 1:** Original left sound

**Audio 2:** Dubbed sound


**Note:**

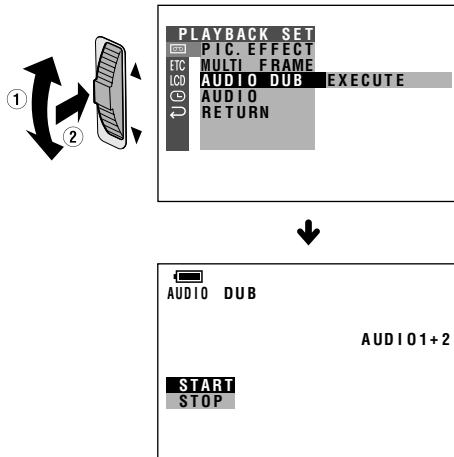
- You can select 12 or 16-bit audio recording mode by performing the procedure on page 43.



## Advanced Features Playback

### Audio Dubbing

- 1 Play back the recorded Mini DV cassette and locate the tape position where you wish to start audio dubbing.
- 2 Press ►/|| to pause playback.
- 3 Press the MENU button until the menu screen appears.
- 4 Turn the CONTROL dial to select , then press the dial.
- 5 Turn the CONTROL dial to select "AUDIO DUB", then press the dial.
  - The audio dubbing screen appears.



Advanced Features

- 6 Press the CONTROL dial to begin audio dubbing. Record your narration.

### To pause audio dubbing

Press the CONTROL dial. To resume audio dubbing, press the CONTROL dial again.

### To cancel audio dubbing

Press the MENU button. The audio dubbing screen disappears.

### If you wish to change the dubbed audio or dub additional scenes

- 1 Press the MENU button to turn off the audio dubbing screen.
- 2 Repeat steps 1 to 6 above.

#### Notes:

- It is recommended that you use Audio Dubbing only with recordings made with this camcorder. Use of recordings made with other digital video equipment may result in poor audio quality.
- Audio dubbing will automatically pause if the original audio changes from 12-bit mode to 16-bit mode or vice versa. Press the CONTROL dial to resume operation.
- Audio dubbing will automatically stop if a portion recorded in LP mode or an unrecorded portion of the tape is encountered.
- You can playback the dubbed audio and the original audio together or separately (see "Selecting the Audio Playback Mode" on next page).



## Selecting the Audio Playback Mode

**Available mode:**  
TAPE-VCR

You can select any of the following audio playback modes.

### Audio 1+2

- 12-bit recording in stereo (Audio 1 and Audio 2 channels)
- 16-bit recording in stereo (left and right channels)


### Audio 1

- 12-bit recording in stereo (Audio 1 channel only)
- 16-bit recording in mono (left channel only)

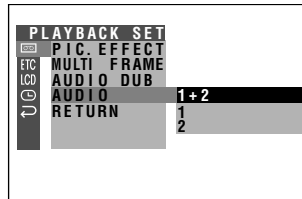
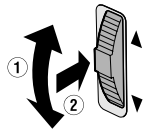
### Audio 2

- 12-bit recording in stereo (Audio 2 channel only)
- 16-bit recording in mono (right channel only)

- 1 Play back a Mini DV cassette with dubbed audio.
- 2 Press the MENU button until the menu screen appears.

- 3 Turn the CONTROL dial to select , then press the dial.

- 4 Turn the CONTROL dial to select "AUDIO", then press the dial.



- 5 Turn the CONTROL dial to select the desired audio playback mode, then press the dial.

**AUDIO 1+2**

- 6 Press the MENU button to turn off the menu screen.
  - The selected audio playback mode indicator appears.

Audio playback mode indicator



#### Note:

- The audio playback mode indicator, "AUDIO", displays in different colours depending on the recording mode (12- or 16-bit) used for the recording being played back. A white display indicates 12-bit recording mode, while a green indicates 16-bit.

Advanced Features





## Advanced Features Playback

### Configuring Software for PC Connection

This camcorder can transfer still playback images in TAPE-VCR mode or still images in TAPE-CAMERA and CARD modes to a personal computer by using the supplied Video Capture Software.

#### System Requirements

- IBM PC/AT or compatible with Intel® Pentium® 133 MHz or faster processor
- Microsoft Windows® 95B, Windows® 95C, Windows® 98, Windows® 98 Second Edition, Windows® 2000 Professional\*, or Windows® Me operating system
- 32 MB or more of RAM
- 9 MB minimum of available hard-disk space
- SVGA (800 × 600 pixels) colour display monitor with 16-bit colour or higher
- CD-ROM drive (for installation)
- RS-232C serial port
- Mouse or other pointing device

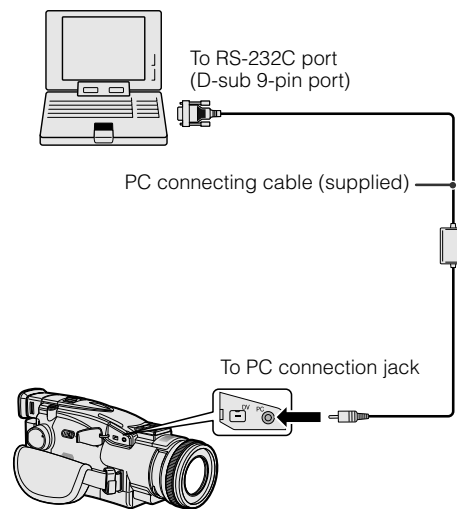
\* In the Windows® 2000 Professional environment, only the system administrator has installation access rights.

#### Installing the Software

- 1 Turn on the PC and start up Windows.
- 2 Insert the CD-ROM of the Video Capture Software into the CD-ROM drive.
- 3 Double click on the "My Computer" icon.
- 4 Double click on the CD-ROM drive icon.
- 5 Double click on the "Setup.exe" file.
- 6 Follow the instructions as they appear on the PC monitor until the installation is complete.
- 7 Restart the PC.

### Connecting the camcorder to a Personal Computer

- 1 Turn off the camcorder and PC.
- 2 Connect the camcorder as shown below.
  - Before connecting the camcorder to the PC, make sure that the PC power is off to insure that images are transferred properly.



- 3 Turn on the PC, then turn on the camcorder in the desired camcorder mode.

#### Notes:

- It is recommended to use the AC adapter/battery charger as a power source for extended periods of use.
- Images with the following functions cannot be transferred to a personal computer.
  - TAPE-VCR/CARD-VCR mode: Picture Effect Playback
  - TAPE-CAMERA/CARD-CAMERA mode: Digital Picture Effects
- Using a commercially available PC card adapter, it is possible to directly transfer still images on a card to a PC (see page 87).
- To edit still images transferred with the Video Capture Software, use a commercially available image editing software.





## Using the Software

For tips on how to use the Video Capture Software, refer to the operation manual located on the CD-ROM in PDF format. Follow the steps below to open the PDF file containing the manual.

### Note:

- For the latest product information, be sure to read the "Readme" text file located in the "Readme" folder of the Video Capture Software CD-ROM. Select the "Readme" text file you prefer. The letters between "Readme" and ".txt" define the language; for example, "en" in "Readmeen.txt" stands for English, etc.

## Installing Adobe Acrobat Reader

Adobe Acrobat Reader 4.0 or later is required for viewing the PDF manual of the Video Capture Software. If the Adobe Acrobat Reader is not installed on your PC, perform steps below to install one.

- 1 Insert the CD-ROM of the Video Capture Software into the CD-ROM drive.
- 2 Double click on the "My Computer" icon.
- 3 Double click on the CD-ROM drive icon.
- 4 Double click on the "Acroread" folder.
- 5 Double click on the desired language version.

Language	File name
Chinese, Simplified	ar40chs.exe
Chinese, Traditional	ar405cht.exe
Dutch	ar405dut.exe
English	ar405eng.exe
French	ar405fre.exe
German	ar405deu.exe
Italian	ar405ita.exe
Korean	ar405kor.exe
Portuguese	ar405por.exe
Spanish, Castilian	ar405esl.exe
Swedish	ar405swe.exe

- 6 Follow the instructions as they appear on the PC monitor until the installation is complete.
- 7 Restart the PC.

## Opening the PDF Manual

- 1 Insert the CD-ROM of the Video Capture Software into the CD-ROM drive.
- 2 Double click on the "My Computer" icon.
- 3 Double click on the CD-ROM drive icon.
- 4 Double click on the "Manual" folder.
- 5 Double click on the PDF file of the desired language version.
  - Adobe Acrobat Reader launches and the selected PDF manual opens.

### Note:

- If the PDF file does not open, Adobe Acrobat Reader may not be properly installed. Refer to steps in "Installing Adobe Acrobat Reader" to check the installation procedure.

## Printing the PDF Manual

Print out the PDF manual so that you can consult it whenever necessary.

- 1 Open the PDF manual.
- 2 Select "Print" in the "File" menu.

### Note:

- The menu expressions such as "Print" and "File" may vary according to the language version of Adobe Acrobat Reader installed on the PC.
- 3 Select your print settings, then click "OK".



# Digital Still Camera Features

## Camera Recording

### Selecting the Picture Quality and Image Size

**Available mode:**  
CARD-CAMERA

The picture quality of still images recorded on the card depends on the picture quality and image size setting. Select the appropriate setting to match your recording objectives.

#### Approximate number of recordable images with the supplied card

Picture quality setting	Approx. number of images	
	1152 × 864	640 × 480
NORMAL	21	89
ECONOMY	40	161
FINE	10	53

**Note:**

- The number of recordable images differs depending on the combination of picture quality and image size settings used and the images shot.


#### Selecting the Picture Quality

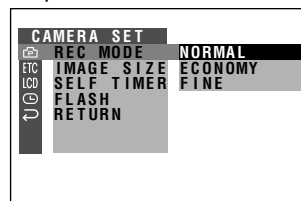
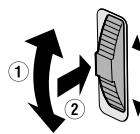
The camcorder compresses each image with the picture quality setting to save memory on a card.

**NORMAL:** Records images with standard picture quality.

**ECONOMY:** Allows you to take more shots than in NORMAL mode but with a lower quality.

**FINE:** Records images with higher quality than in NORMAL mode but with a lower number of recordable images.

- In CARD-CAMERA mode, press the MENU button until the menu screen appears.
- Turn the CONTROL dial to select , then press the dial.
- Turn the CONTROL dial to select "REC MODE", then press the dial.



- Turn the CONTROL dial to select the desired setting, then press the dial.

**REC MODE** **ECONOMY**

- Press the MENU button to turn off the menu screen.
  - The selected picture quality indicator appears.



Picture quality indicator

**Note:**

- The picture quality indicator is also displayed in CARD-VCR mode. The picture quality indicator displayed during playback is based on the amount of data for that recorded image. Since the amount of data differs depending on factors such as image detail, sometimes the picture quality indicator displayed during playback may not match the picture quality setting used during recording.




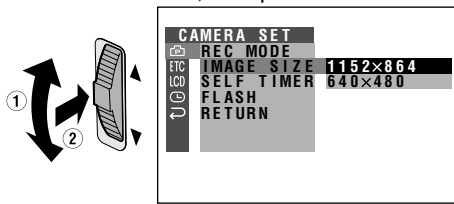
## Selecting the image size

Still images recorded on a card are made up of pixels. You can select the number of pixels in still images. Larger numbers of pixels provide greater image detail, but also use more card memory.

**1152 × 864 (1152):** Images are recorded in 1152 × 864 pixels.

**640 × 480 (640):** Images are recorded in 640 × 480 pixels.

- 1 In CARD-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "IMAGE SIZE", then press the dial.



- 4 Turn the CONTROL dial to select "1152 × 864" or "640 × 480", then press the dial.

**IMAGE SIZE 1152×864**

- 5 Press the MENU button to turn off the menu screen.
  - The selected image size indicator appears.



Image size indicator

Digital Still Camera  
Features

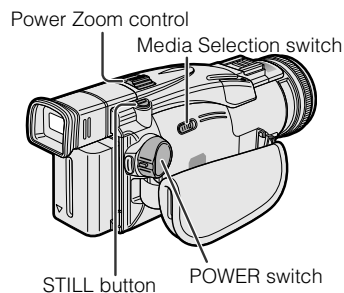



## Digital Still Camera Features Camera Recording

### Card Recording

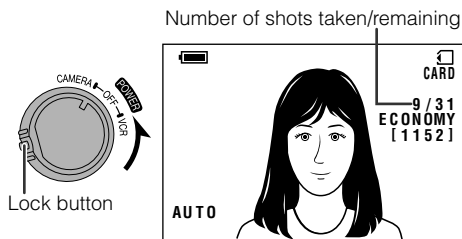
**Available mode:**  
CARD-CAMERA

You can take a still picture in the same way as you do with a standard camera and record that image on the card.

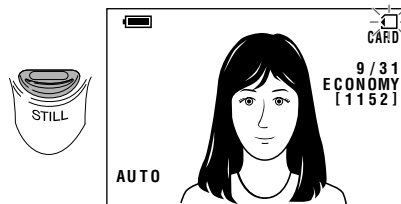
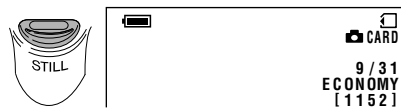


- 1 Insert a card into the camcorder (see page 13).
- 2 Remove the lens cap. Pull out the viewfinder completely or open the LCD monitor.
- 3 Set the Media Selection switch to **CARD**.
 
- 4 Hold down the Lock button and set the **POWER** switch to **CAMERA**.
  - The picture from the lens now displays.

Digital Still Camera  
Features



- 5 Adjust the Power Zoom control to frame the subject as you desire.
  - The zoom range is 1–22× in this mode.
- 6 Press the **STILL** button half-way down to **focus on the subject**.
  - The camcorder automatically focuses on the subject. When it is set, you will hear a sound and see a camera icon, then the camcorder locks the focus.
- 7 Press the **STILL** button fully to begin recording.



- The camera icon flashes red while data is being recorded on the card, and returns to white when recording completes.
- To record another image, release the **STILL** button and make sure the picture is not frozen in the monitor, then perform steps 6 and 7.

#### Notes:

- Recording under insufficient lighting may result in blurred images. It is recommended that you use a tripod to record insufficiently illuminated subjects.
- Recording under the light of a fluorescent, mercury, or sodium lamp may cause flickering in the image and, depending on the timing of the shot, may result in changes to colour hue in the image.
- Set the **SOUND** menu item to "OFF" to turn off the focus locking sound.

#### Caution:


- Do not turn the power off while the camera icon is flashing in step 7.

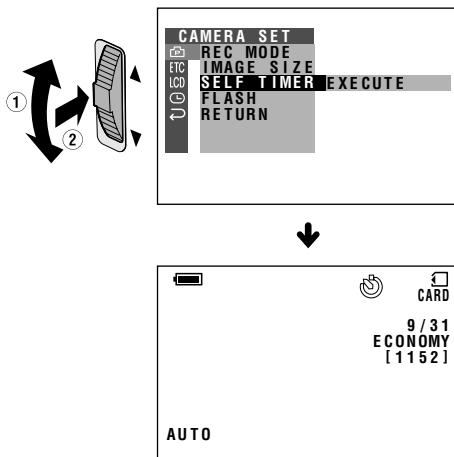


## Recording with the Self-Timer

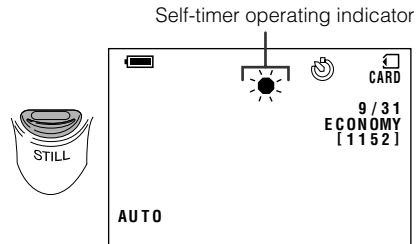
**Available mode:**  
CARD-CAMERA

The self-timer function allows you to record images after a time-lag of 10 seconds. This is convenient when you want to record an image of you and your friends together.

- 1 In CARD-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "SELF TIMER", then press the dial.



- 4 Press the STILL button fully to set the timer.
  - The self-timer operating indicator flashes while the timer counts down.



- The shutter automatically releases after 10 seconds, and a still image of the subject is recorded.

### Notes:

- When recording with the self-timer, stabilize the camcorder in the horizontal plane by attaching it to a tripod, etc.
- To cancel the self-timer, press the STILL button fully again in step 4 above.
- Self-timer mode cancels after recording one image. Repeat steps 1 to 4 to record another image with the self-timer.

### Caution:

- Do not turn the power off or remove the card once the self-timer operating indicator begins flashing.



## Digital Still Camera Features Camera Recording

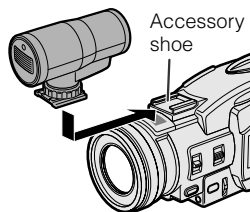
### Using the Flash Light (Optional Accessory)

**Available mode:**  
CARD-CAMERA

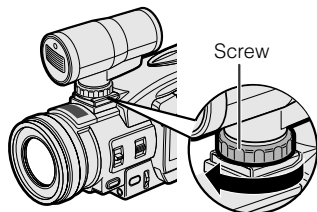
Using the flash function of the optional IR & Flash Light VR-3VIF enables you to record good-quality still images even in dark locations.

#### Mounting

- 1 Align the IR & Flash Light with the accessory shoe on the camcorder, and slide it in the direction of the arrow until it locks into place.



- 2 Turn the screw in the direction of the arrow to secure the IR & Flash Light.



#### Removing

Turn the screw in the opposite direction than when mounting, then pull off the IR & Flash Light.

#### Caution:

- Do not pick up the camcorder by the IR & Flash Light, as this may damage the equipment.


#### Notes:

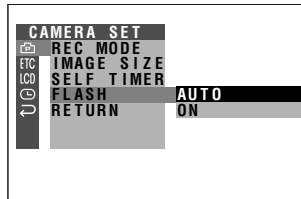
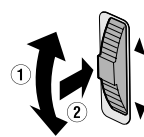
- Using the optional IR & Flash Light VR-3VIF will shorten the continuous camera recording time with the battery pack.
- For details, see the operation manual of the optional IR & Flash Light.
- The IR light cannot be used, even if the VR-3VIF is mounted on the camcorder.

### Selecting Flash Mode

**AUTO:** Flash automatically fires in dark locations (when "LIGHT" is displayed on the screen) each time you press the STILL button.


**ON:** Flash fires every time you press the STILL button.

- 1 Mount the IR & Flash Light to the camcorder and then set the POWER switch on the IR & Flash Light to FLASH.
- 2 In CARD-CAMERA mode, press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select , then press the dial.
- 4 Turn the CONTROL dial to select "FLASH", then press the dial.



- 5 Turn the CONTROL dial to select "AUTO" or "ON", then press the dial.

**FLASH ON**

- 6 Press MENU button until the menu screen turns off.
  - The  indicator appears.




Flash indicator

#### Caution:

- You should never use the flash with the camcorder close to another person.

#### Notes:

- The  indicator flashes while the flash is being charged.
- If you press the STILL button while the  indicator is flashing, flash does not fire but a still image of the subject is recorded.





## Formatting a Card

**Available mode:**  
CARD-CAMERA

Before using a commercially available card with this camcorder, you must first have it formatted. Also, if any of the following warning indicators displays, you will need to format your card.

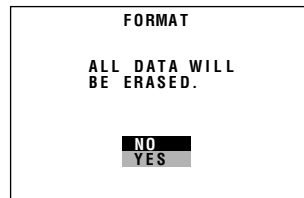
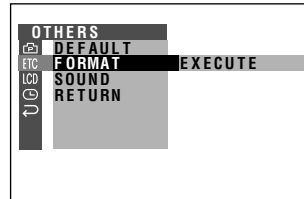
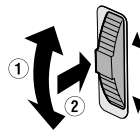
- "FORMAT MEMORY CARD"
- "MEMORY CARD ERROR"
- "MEMORY CARD READ ERROR"
- "CANNOT STORE DATA"

### Cautions:

- **Formatting a card erases all stored images, including delete-protected images.** Be sure to backup important data on your computer or other media before formatting the card (see pages 69, 70 and 87).
- Do not remove the power source during formatting, as this may cause damage to the camcorder or card. It is recommended that you use the AC outlet for the power supply.

- 1 Insert a card to be formatted into the camcorder.
- 2 In CARD-CAMERA mode, press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select ETC, then press the dial.

- 4 Turn the CONTROL dial to select "FORMAT", then press the dial.
  - To cancel formatting, turn the CONTROL dial to select "NO", then press the dial.



- 5 Turn the CONTROL dial to select "YES", then press the dial to begin formatting.
  - The menu screen displays when formatting finishes.
- 6 Press the MENU button to turn off the menu screen.

### Notes:

- The supplied card is preformatted for immediate use.
- Use this camcorder to format a card. The camcorder may not recognize the images on a card formatted by a computer or other equipment.



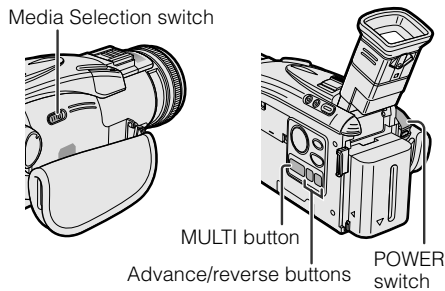
# Digital Still Camera Features

## Playback

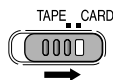
### Card Playback

**Available mode:**  
CARD-VCR

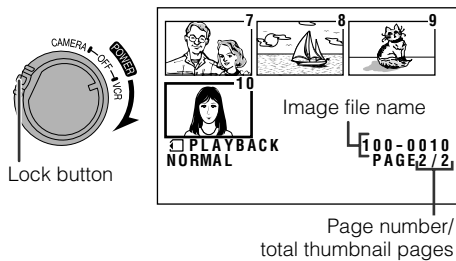
You can play back and view still images recorded on a card on the LCD monitor.



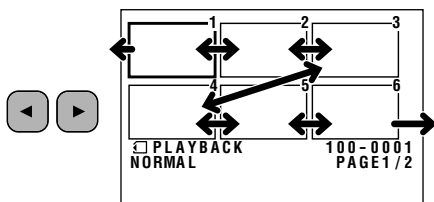
- 1 Set the Media Selection switch to CARD.



- 2 Hold down the Lock button and set the POWER switch to VCR.
  - The images recorded on the card display in a thumbnail format.



- 3 Press ◀ or ▶ to move the selection frame to the desired image.
  - Each time you press ◀ or ▶, the selection frame moves as shown below.



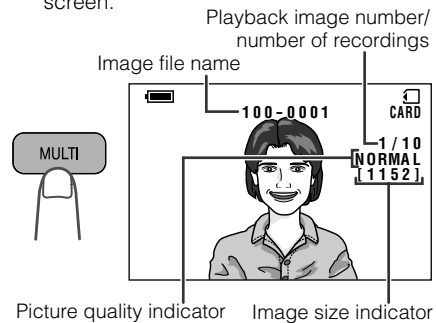
- You can also turn the CONTROL dial to move the selection frame.

**Note:**

- Holding down ◀ or ▶ increases the speed of motion of the selection frame.

- 4 Press the MULTI button.

- The selected image is displayed in full-screen.



### Available Operations during Full-screen Display

- You can display the full-screen picture of the previous or next image by pressing ◀ or ▶.
- When holding down ◀ or ▶, you can search through the images on the card. The search can be very fast, so it is recommended to turn on the indicators to display the image filename.
- To return to a thumbnail of the images, press the MULTI button again.

**Notes:**

- Depending on the amount of data for the recorded image, the picture quality indicator displayed during playback may not match the picture quality setting used during recording.
- The images bigger than 1280 × 960 pixels, e.g. images recorded on other equipment, display as thumbnails, not full screen.
- Do not play back any card storing a defective image (with noise and distortion) created on other equipment. If you mistakenly play back data on such a card, set the POWER switch to OFF, remove, and never use it with this camcorder.




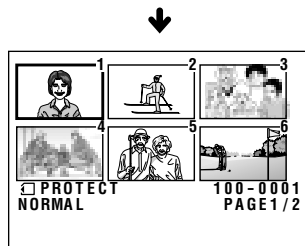
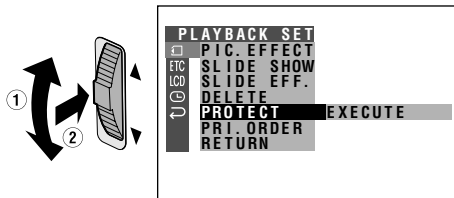




## Delete Protection

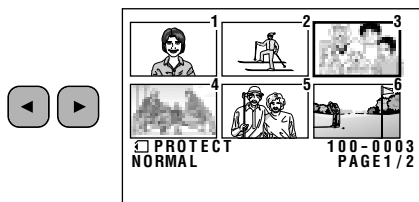
**Available mode:**  
CARD-VCR

You can prevent your important images recorded on the card from accidental erasure.

- 1 In CARD-VCR mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "PROTECT", then press the dial.




- 4 Press  or  to select the image for delete protection.

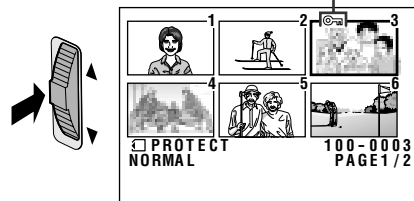


- You can also turn the CONTROL dial to select the image for delete protection.

- 5 Press the CONTROL dial to set delete protection.

- The  indicator appears.

Delete protection indicator

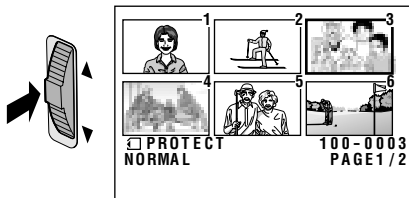


- If you want to protect another image, repeat steps 4 and 5.

- 6 Press the MENU button to return to PLAYBACK screen.

### To cancel the protection setting

- 1 Select the image for delete protection cancellation in step 4 above.
- 2 Press the dial to cancel the protection.



- 3 Press the MENU button to return to PLAYBACK screen.

#### Note:

- Formatting a card erases all stored images, including delete-protected images.

### Setting by the Shortcut Menu

You can easily set the Delete Protection setting using the shortcut menu. See page 86 for details.



## Digital Still Camera Features Playback

### Deleting Stored Images


**Available mode:**  
CARD-VCR

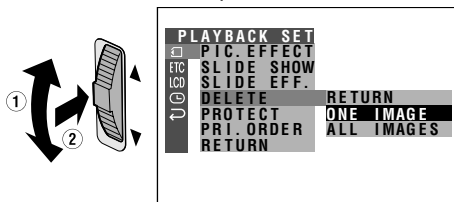
#### Deleting One Stored Image

You can delete unwanted images to free up card memory for new one.

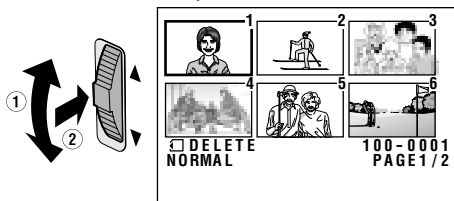
**Note:**



- Deleted images cannot be restored. Check whether or not you want the images before performing the procedure below.

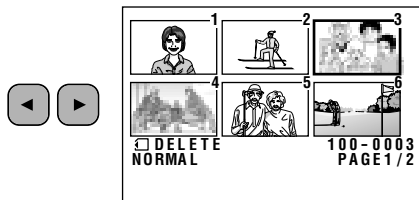
- In CARD-VCR mode, press the MENU button until the menu screen appears.
- Turn the CONTROL dial to select , then press the dial.
- Turn the CONTROL dial to select "DELETE", then press the dial.



- Turn the CONTROL dial to select "ONE IMAGE", then press the dial.



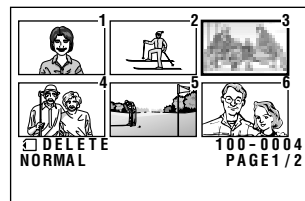
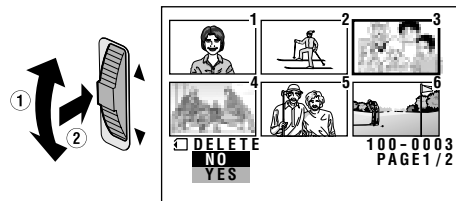
- Press  or  to select the image to be deleted.



- You can also turn the CONTROL dial to select the image to be deleted.

- Press the CONTROL dial to set the image.
  - To cancel deletion, turn the CONTROL dial to select "NO", then press the dial.

- Turn the CONTROL dial to select "YES", then press the dial to delete the image.



- If you want to delete another image, repeat steps 5 to 7.

- Press the MENU button to return to PLAYBACK screen.

**Note:**

- The protected images cannot be deleted. Cancel the protection setting to delete the image (see page 78).

**Caution:**

- Do not turn the power off while deleting an image.

### Setting by the Shortcut Menu

You can easily delete one stored image using the shortcut menu. See page 86 for details.




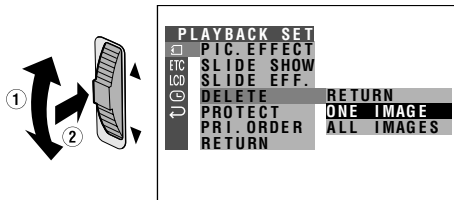
## Deleting All Stored Images

You can delete all stored images on a card in one operation.

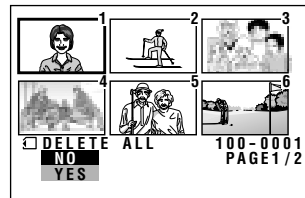
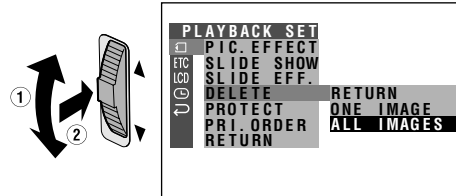
### Notes:

- Deleted images cannot be restored. Check whether or not you want the images before performing the procedure below.
- If you want to keep some images on the card, first delete-protect them (see page 78), and then perform the procedure below.

- In CARD-VCR mode, press the MENU button until the menu screen appears.
- Turn the CONTROL dial to select , then press the dial.
- Turn the CONTROL dial to select "DELETE", then press the dial.



- Turn the CONTROL dial to select "ALL IMAGES", then press the dial.



- Turn the CONTROL dial to select "YES", then press the dial to delete all the images.

- To cancel deletion, turn the CONTROL dial to select "NO", then press the dial.

### Notes:

- The protected images cannot be deleted. Cancel the protection setting to delete the image (see page 78).
- If a print order is assigned to delete-protected images and you perform the procedure above, the print order will cancel (the protection setting will not cancel).
- It may take several seconds to delete all images from the card.

### Caution:

- Do not turn the power off while deleting images.



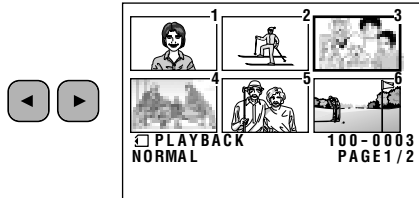
## Digital Still Camera Features Playback

### Slide Show Playback


**Available mode:**  
CARD-VCR

You can automatically play back consecutive still images recorded on a card at intervals of 5 seconds. This is useful when confirming the data recorded on a card.

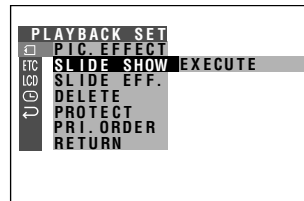
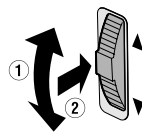
- 1 Set the camcorder to CARD-VCR mode.
- 2 Press ◀ or ▶ to select the image from which you want to begin slide show playback.



- You can also turn the CONTROL dial to select the image to begin slide show playback.

- 3 Press the MENU button until the menu screen appears.
- 4 Turn the CONTROL dial to select , then press the dial.

- 5 Turn the CONTROL dial to select "SLIDE SHOW", then press the dial.
  - Beginning from the image selected in step 2, the recorded images will display in full-screen one after another in order of recording.



- After playing back all the images on the card once, Slide Show Playback automatically stops.

- 6 Press the MENU button to turn off the menu screen, then press the MULTI button to return to PLAYBACK screen.

#### To stop Slide Show Playback

During slide show playback, press the MENU button twice, then press the MULTI button to return to PLAYBACK screen.

#### Note:

- Slide Show Playback cannot be used with picture effect playback.

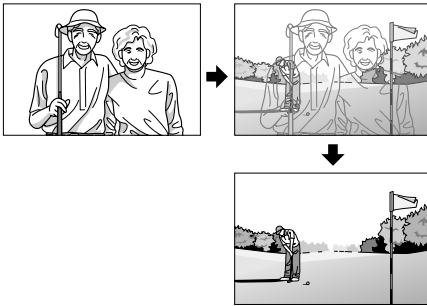


## Slide Show Effects

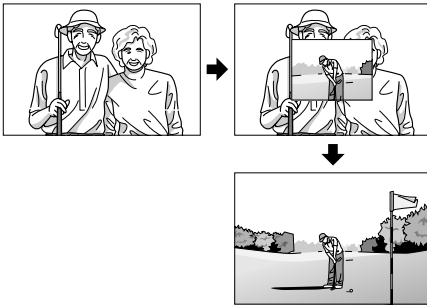
**Available mode:**  
CARD-VCR

Use slide show effects to create an interesting transition between still images during slide show playback.


**OVERLAP:** A still image fades out as the next still image fades in, replacing the previous image. The two scenes momentarily dissolve.

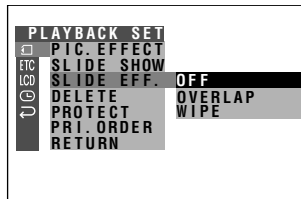
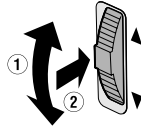


**WIPE:** A still image is replaced with the next still image first appearing in the middle of the screen and gradually expanding to fill the screen.



## Using

- 1 In CARD-VCR mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "SLIDE EFF.", then press the dial.



- 4 Turn the CONTROL dial to select "OVERLAP" or "WIPE", then press the dial.

**SLIDE EFF. WIPE**

- 5 Perform steps of Slide Show Playback on the previous page.
  - The still image is replaced with the next still image with the selected slide show effect.

### To cancel the slide show effect

Select "OFF" in step 4 above.

#### Note:

- Slide show effects cannot be used with playback zoom or picture effect playback.



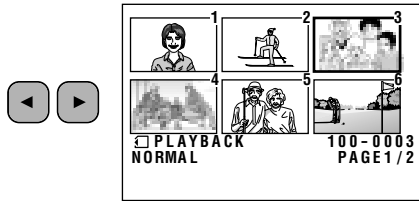
## Digital Still Camera Features Playback

### Copying an Image from Card to Tape

**Available mode:**  
CARD-VCR

Use the procedure below to select still images recorded on a card and insert them in a tape.

- 1 Insert the recorded card and a Mini DV cassette into the camcorder.
- 2 Set the camcorder to TAPE-VCR mode, then locate where you want to insert an image on the tape.
- 3 Set the camcorder to CARD-VCR mode.
- 4 Press ◀ or ▶ to select the desired image, then press the MULTI button.
  - The selected image is displayed in full-screen.



- You can also turn the CONTROL dial to select the desired image.

- 5 Press the REC START/STOP button.
  - The camcorder enters Recording Standby mode.



REC START/  
STOP button



- 6 Press ▶/|| to begin copying the image to the tape.
- 7 Press the ▶/|| again to stop copying.
- 8 Press the REC START/STOP button to cancel Recording Standby mode.



## Print Order

**Available mode:**  
CARD-VCR

The print order function allows you to add print information called DPOF to still images recorded on a card.


### About DPOF

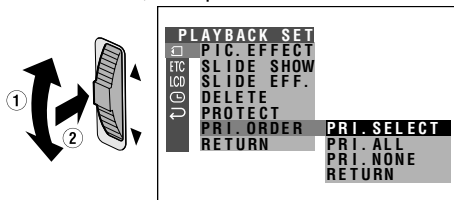
DPOF (Digital Printing Order Format) defines the print information for the specific images and number of each image on memory cards. In the near future you will be able to easily make prints on a DPOF-compatible printer or order copies at your local print shop.

**Note:**

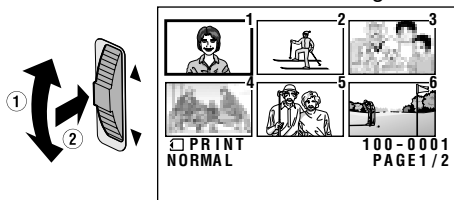
- You can print an image even if no print order has been assigned.



### Assigning Print Order to an Image

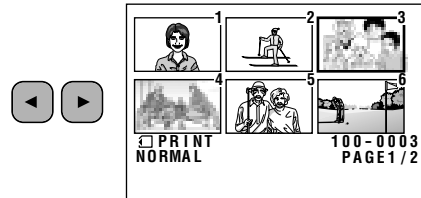
- In CARD-VCR mode, press the MENU button until the menu screen appears.
- Turn the CONTROL dial to select , then press the dial.
- Turn the CONTROL dial to select "PRI. ORDER", then press the dial.



- Turn the CONTROL dial to select "PRI. SELECT", then press the dial to display a thumbnail of the recorded images.



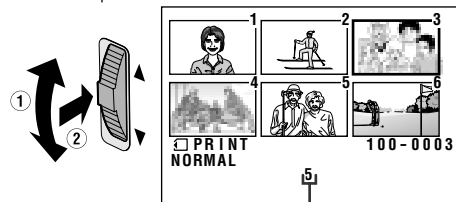
- Press  or  to select the image to which you want to assign a print order.



- You can also turn the CONTROL dial to select the image.

- Press the CONTROL dial, then turn the CONTROL dial to select the number of printouts.

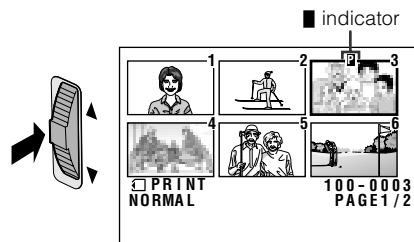
- 1 through 99 can be set for the number of printouts.



Number of printouts

- Press the CONTROL dial to set the print order.

- The  indicator appears.



- If you want to assign another print order, repeat steps 5 to 7.

- Press the MENU button to return to PLAYBACK screen.

### Setting by the Shortcut Menu

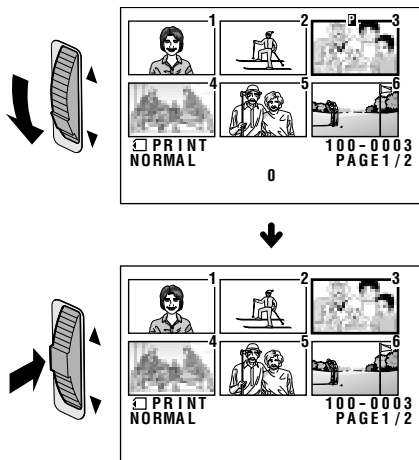
You can easily set the print order using the shortcut menu. See page 86 for details.



## Digital Still Camera Features Playback

### To cancel the print order for an image

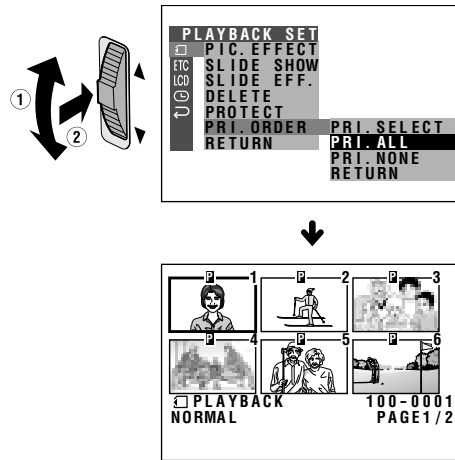
- 1 Select the image for cancelling out of print order in step 5 above, then press the CONTROL dial.
- 2 Turn the CONTROL dial to select "0", then press the dial.
  - The ■ indicator disappears.



- 3 Press the MENU button to return to PLAYBACK screen.

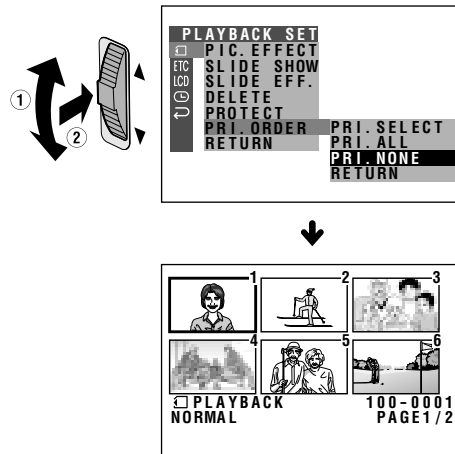
### Assigning Print Order to All Images

- 1 Perform steps 1 to 3 in "Assigning Print Order to an Image".
- 2 Turn the CONTROL dial to select "PRI. ALL", then press the dial.



### To cancel the print order for all images

- 1 Perform steps 1 to 3 in "Assigning Print Order to an Image".
- 2 Turn the CONTROL dial to select "PRI. NONE", then press the dial to cancel the print order for all images.
  - The ■ indicators are turned off.





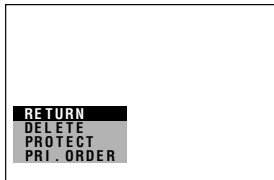


## Using the Shortcut Menu


### Available menu:

Delete Protection, Deleting Stored Images, Print Order

Using the Shortcut menu, you can set the same functions of Delete Protection, Deleting Stored Images and Print Order easily.

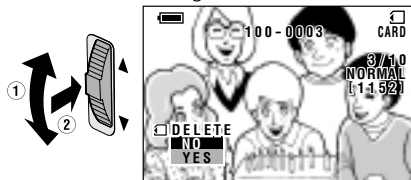


### Delete Protection

- 1 In CARD-VCR mode, display the image for delete protection in full-screen.
- 2 Press the CONTROL dial to display the Shortcut menu screen.
  - To cancel, select "RETURN" and press the CONTROL dial.
- 3 Turn the CONTROL dial to select "PROTECT", then press the dial.
  - The  indicator appears.

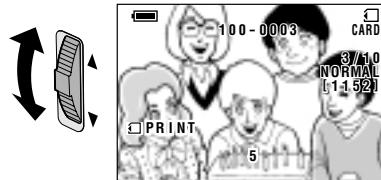
### Deleting one Stored Image

- 1 In CARD-VCR mode, display the image to be deleted in full-screen.
- 2 Press the CONTROL dial to display the Shortcut menu screen.
  - To cancel, select "RETURN" and press the CONTROL dial.
- 3 Turn the CONTROL dial to select "DELETE", then press the dial.
- 4 Turn the CONTROL dial to select "YES" then press the dial to delete the image.
  - The selected image is deleted.



### Assigning Print Order to an Image

- 1 In CARD-VCR mode, display the image to which you want to assign a print order.
- 2 Press the CONTROL dial to display the Shortcut menu screen.
  - To cancel, select "RETURN" and press the CONTROL dial.
- 3 Turn the CONTROL dial to select "PRI. ORDER", then press the dial.
- 4 Turn the CONTROL dial to select the number of printouts.



- 5 Press the CONTROL dial to set the print order.



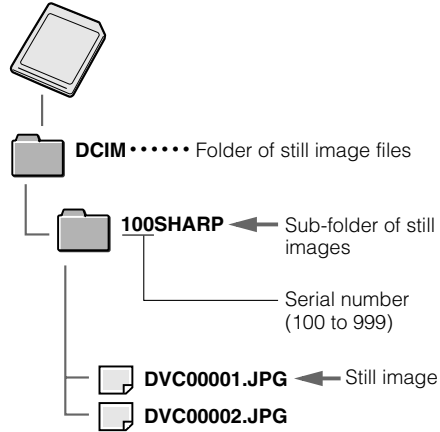
## Digital Still Camera Features Playback

### Transferring Data on Card to Computer

Using a commercially available PC card adapter for each card type, you can transfer still images directly from a card to a computer.

### Image Folders and File Names

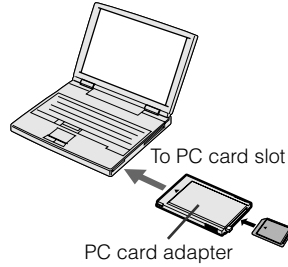
Still images recorded using the camcorder are stored on a card as shown below.



#### Note:

- It may not be possible to open the "100SHARP" folder depending on the Windows operating system being used. If this happens, start up Explorer and open the "100SHARP" folder by clicking on the folder located in the left pane of the window.

### Using a PC Card Adapter (Commercially Available)



#### Notes:

- For details, see the operation manuals of the computer and PC card adapter.
- If you copy any data incompatible with this camcorder to the card, the camcorder will not be able to recognize it.

# Appendix

## Picture/Backlight Adjustments

### Available modes:

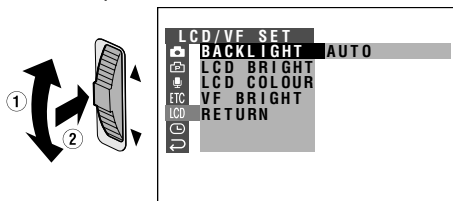
All modes

If the picture is difficult to see due to ambient light or other factors, adjust the monitor picture settings.

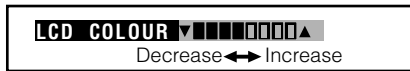
- The example screens shown are for TAPE-CAMERA mode.

### Adjusting the Picture

- 1 Press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select LCD, then press the dial.



- 3 Turn the CONTROL dial to select "LCD BRIGHT", "LCD COLOUR" or "VF BRIGHT", then press the dial.
- 4 Turn and hold the CONTROL dial to adjust the item to the desired setting.



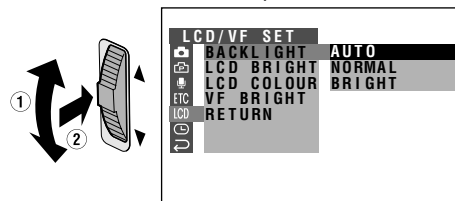
- 5 Press the CONTROL dial, then press the MENU button to turn off the menu screen.

### Notes:

- When adjusting the colour, the picture on the LCD monitor may differ from the picture actually recorded. Do not change the colour setting unless necessary. (This adjustment only affects the monitor picture, not the recorded image.)
- The viewfinder turns on if you select "VF BRIGHT".

## Adjusting the Backlight

- 1 Press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select LCD, then press the dial.
- 3 Turn the CONTROL dial to select "BACKLIGHT", then press the dial.



- 4 Turn the CONTROL dial to select "AUTO", "NORMAL" or "BRIGHT", then press the dial.

### BACKLIGHT BRIGHT

**AUTO:** The camcorder automatically switches between "NORMAL" and "BRIGHT" depending on the ambient light. This mode is only available in TAPE-CAMERA or CARD-CAMERA mode.

**NORMAL:** For use indoors or under moderate lighting conditions.

**BRIGHT:** For use outdoors under strong lighting conditions, such as bright daylight.

- 5 Press the MENU button to turn off the menu screen.



## Appendix

### World Clock


#### Available modes:

TAPE-CAMERA, CARD-CAMERA

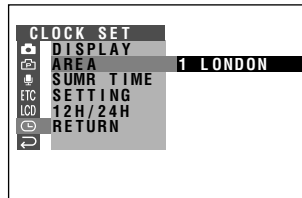
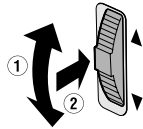
The world clock function allows you to easily adjust the clock to the local time when you use the camcorder while travelling anywhere around the world.

- Set the area, date and time for your local time zone if not already set (see page 15).

**Example:** Changing the clock from London time to Paris time.

- 1 In TAPE-CAMERA or CARD-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.

- 3 Turn the CONTROL dial to select "AREA", then press the dial.

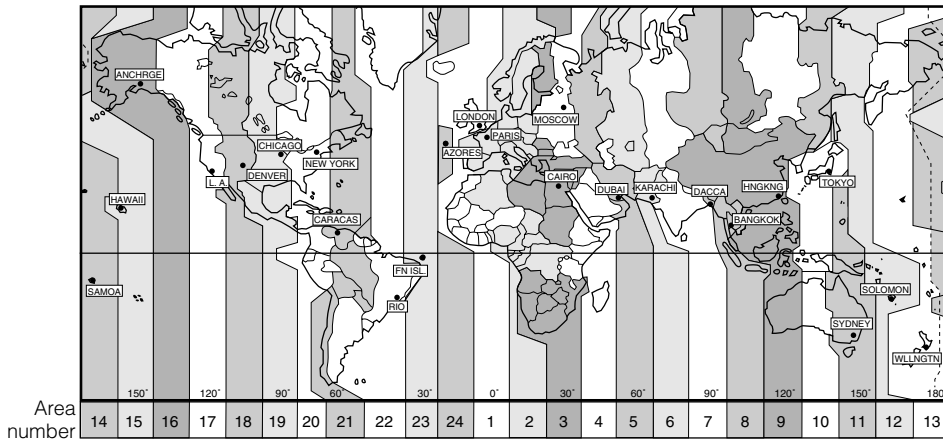


- 4 Turn the CONTROL dial to select "2 PARIS", then press the dial.
  - The camcorder is now set to Bangkok time.

**AREA 2 PARIS**

- 5 Press the MENU button to turn off the menu screen.

### Time Zone Chart





### Area Table

Area number	Area name	Countries or areas*
1	LONDON	England, Morocco, GMT (Greenwich mean time)
2	PARIS	Austria, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, Portugal, CST (Continental Standard Time), Tunisia
3	CAIRO	Egypt, Finland, Greece, Turkey
4	MOSCOW	Ethiopia, Iraq, Kenya, Mauritius, Saudi Arabia, Seychelles, Russia (Moscow)
5	DUBAI	United Arab Emirates
6	KARACHI	Maldives, Pakistan
7	DACCA	Bangladesh, India, Myanmar
8	BANGKOK	Cambodia, Indonesia (Jakarta), Thailand, Vietnam
9	HNGKNG	Australia (Perth), China, Hong Kong, Indonesia (Borneo, Bali), Malaysia, Philippines, Singapore, Taiwan
10	TOKYO	Japan, Korea
11	SYDNEY	Australia (Sydney)
12	SOLOMON	New Caledonia
13	WLLNGTN	Fiji, New Zealand
14	SAMOA	Western Samoa
15	HAWAII	U.S.A. (Hawaii), Tahiti, HST (Hawaii Standard Time)
16	ANCHRGE	U.S.A. (Alaska), AST (Alaska Standard Time)
17	L.A.	U.S.A. (Los Angeles, San Francisco), PST (Pacific Standard Time)
18	DENVER	U.S.A. (Denver), MST (Mountain Standard Time)
19	CHICAGO	Mexico (Mexico City), U.S.A. (Chicago), CST (Central Standard Time)
20	NEW YORK	Canada (Montreal), Jamaica, Peru, U.S.A. (New York, Washington D.C.), EST (Eastern Standard Time)
21	CARACAS	Chile, Dominican Republic, Venezuela
22	RIO	Argentina, Brazil, Uruguay
23	FN ISL.	Fernando de Noronha
24	AZORES	Azores Islands

\*These are commonly used names. Official names may vary.






## Appendix

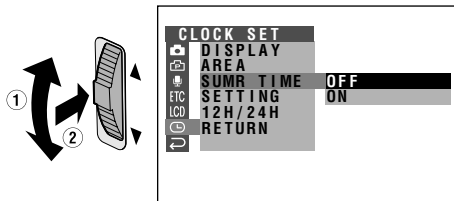
### Selecting Summer Time

#### Available modes:

TAPE-CAMERA, CARD-CAMERA


Perform the procedure below to advance the clock of the camcorder one hour to Summer time.

- 1 In TAPE-CAMERA or CARD-CAMERA mode, press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select , then press the dial.
- 3 Turn the CONTROL dial to select "SUMR TIME", then press the dial.



- 4 Turn the CONTROL dial to select "ON", then press the dial.
  - The time automatically changes to summer time.

**SUMR TIME ON**

- 5 Press the MENU button to turn off the menu screen.
  - The  indicator appears when the date/time is displayed.

#### To reset to standard time

Select "OFF" in step 4 above.

### Setting the Confirmation Sounds

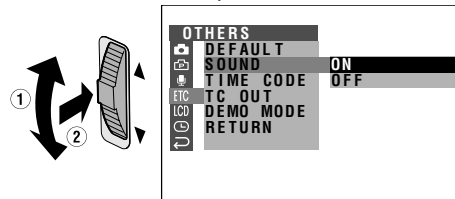
#### Available modes:

All modes

A confirmation sound is made when you turn on or off the POWER switch, press the REC START/STOP button, or perform other designated operations. Use the procedure below to change the type of sound or to turn off the confirmation sounds altogether.

**ON:** Chiming sound  
**OFF:** No confirmation sound

- 1 Press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select ETC, then press the dial.
- 3 Turn the CONTROL dial to select "SOUND", then press the dial.



- 4 Turn the CONTROL dial to select the desired sound setting, then press the dial.

**SOUND OFF**

- 5 Press the MENU button to turn off the menu screen.

#### Note:

- If you select "OFF", the sounds will turn off including:
  - Shutter closing sound in PHOTO SHOT mode and CARD-CAMERA mode
  - Focus confirmation sound in CARD-CAMERA mode



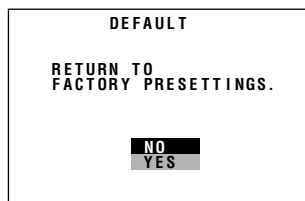
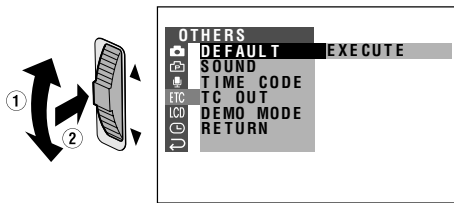
## Setting the Camcorder to Factory Presettings

### Available modes:

All modes

You can set the camcorder to the factory presettings in one operation.

- 1 Press the MENU button until the menu screen appears.
- 2 Turn the CONTROL dial to select ETC, then press the dial.
- 3 Turn the CONTROL dial to select "DEFAULT", then press the dial.



- 4 Turn the CONTROL dial to select "YES", then press the dial.
  - To cancel, turn the CONTROL dial to select "NO", then press the dial.
- 5 Press the MENU button to turn off the menu screen.

### Note:

- Even when you perform the steps above, the clock setting maintains the memory.



## Appendix

### Useful Information

#### Hints for Better Shooting

- Position the subject in the centre of the scene. When using auto focus, whatever is in the centre of the scene is kept in focus.



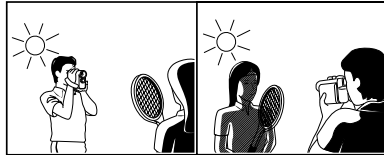
Position the subject in the centre.



Focus manually when you need to position the subject off centre (see pages 54 and 55).

- Avoid backlit subjects. For the best picture, shoot with the light source behind you.

When the background is brighter than the subject, the subject often becomes too dark. If you have to record in this lighting, use Gamma Brightness Compensation or correct the exposure level to improve the picture (see pages 34 and 57).



Light from behind

Backlighting

- Before zooming, think about how to best frame the shot. Frequent zooming produces unattractive pictures. It also runs down the battery more quickly.
- When image shaking is noticeable during zoomed-in telephoto shooting, use a tripod or push the Power Zoom control to the W side to zoom out.
- Horizontal panning (lateral movement) and tilting (vertical movement) should be done slowly to emphasize the wide expanse of a scene or the height of a building, and to make scenes easy to watch during playback.
- Use a wide-angle setting for fast-moving subjects.

#### Note:

- It may take longer to focus when zooming and panning are used frequently.

### Lighting

For clear, good-quality recording, 500 to 100,000 lux is needed. Recording is possible with less light, but the picture quality may suffer. Adequate lighting is also essential for correct white balance.

Brightness (Lux)	Situation (Lux)
100,000	Blue sky Clear day at noon (100,000)
10,000	Clear day at 10 am (65,000) Clear day at 3 pm (35,000) Cloudy day at noon (32,000) Cloudy day at 10 am (25,000)
1,000	Cloudy day, one hour after sunrise (2,000) Clear day, one hour before sunset (1,000) Fluorescent light near window (1,000)
100	Factory floor (700–800) Sales counter in department store (500–700) Bowling alley (500) Library (400–500) Office with fluorescent lighting (400–500) Fluorescent desk lamp (400) Flashlight at 1 m (250) Shop stairway (100)
10	During intermission at movie theatre (15–35) Cigarette lighter at 30 cm (15–20) Candles on birthday cake at 20 cm (10–15) Candlelight

Optimal lighting range

#### Note:

- The figures in the chart are approximations.

#### Tips on good lighting

In most outdoor, daytime scenes, natural lighting is adequate for home videos. Indoors, however, artificial lighting is usually required. Video lights with halogen lamps provide the most natural artificial light over a long operating life.






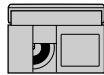
## DV Technology

Digital video (DV) is a revolutionary technology that enables recording and playback of high quality images with the use of special digital features previously unavailable with conventional analog formats.

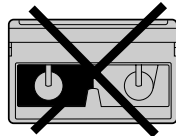
### DV and conventional video cassette tapes

There are two kinds of DV-format video cassette tapes: the Mini DV cassette and the larger DV cassette used for extended playback and recording. This camcorder only operates with Mini DV cassettes. DV cassettes cannot be used. Be sure to use Mini DV cassettes with the  mark.

Mini DV cassette



DV cassette

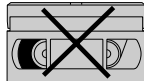


8 mm, VHS, and Beta cassettes cannot be used for playback or recording with this camcorder.

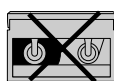
8 mm cassette



VHS cassette



Beta cassette



#### Note:

- This camcorder reproduces the highest picture quality when used with an ME tape. It is recommended you use an ME tape for high-quality recording and playback.

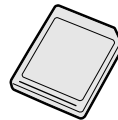
This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

## SD Memory Card and MultiMediaCard

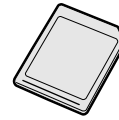
SD Memory card and MultiMediaCard are compact recording media just 32 mm long and 24 mm wide which support the needs of the digital network society where music, images, games and various other provider services are offered.

- You can use an SD Memory Card (supplied) and a MultiMediaCard (commercially available) for storing still images with this camcorder, not a SmartMedia™ card or Memory Stick™ media.

SD Memory Card



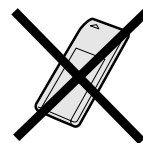
MultiMediaCard



SmartMedia™ card



Memory Stick™ media



- An SD Memory Card is superior to a MultiMediaCard in terms of copyright protection functions and high speed transfer.
- The SD Memory Card is compatible with MultiMediaCard, and data stored on MultiMediaCard can be used with the SD Memory Card.

#### Note:

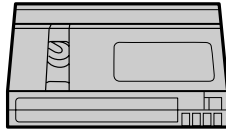
- This camcorder is verified to work with the following card types and capacities.
  - SD Memory Card: 128 MB or less
  - MultiMediaCard: 64 MB or less






## Appendix

### Mini DV Cassette

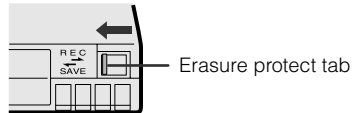


#### Precautions when using a Mini DV cassette

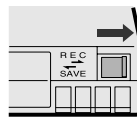
- Be sure to use only Mini DV cassettes with the  mark.
- This camcorder can record and play back using Mini DV cassettes with cassette memory, but it cannot record or play back this memory.
- To record in LP mode, use a Mini DV cassette labelled for use with LP mode.
- Do not insert anything into the holes on the bottom of the Mini DV cassette or block them in any way.
- Avoid placing the Mini DV cassette in an area conducive to dust or mold.
- Do not place the Mini DV cassette near magnetic sources such as electric clocks or magnetic devices as this may adversely affect recorded material.
- When a previously recorded Mini DV cassette is used again for recording, the previously recorded material will be automatically erased.
- The Mini DV cassette will not operate if inserted in the wrong direction.
- Do not repeatedly insert and eject the Mini DV cassette without running the tape as this may cause uneven tape winding and damage the tape.
- Do not place the Mini DV cassette in direct sunlight, near strong heat sources, or in areas with excessive steam.
- Store the Mini DV cassette in its case and stand it in an upright position.
- If the tape is not properly wound, rewind the tape.
- Do not drop the Mini DV cassette or subject it to excessive shocks.

#### To protect recordings against accidental erasure

Slide the protect tab on the rear of the Mini DV cassette to the "SAVE" position.

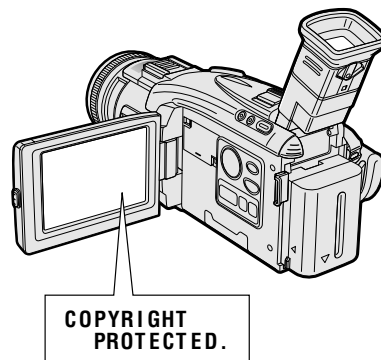


To record over a previously recorded tape, slide the protect tab to the "REC" position.



### Copyright Protection

The digital VCR has far superior recording and playback ability than the traditional analog VCR, and in order to protect digital video software copyrights, a system for managing copyrights has been established. Some digital video recording with pre-recorded copyright protection signals can still be played back on this camcorder. If you play a digital video recording that has a copyright protection signal on video equipment with a DV terminal and attempt to record a copy of that software on this camcorder, "COPYRIGHT PROTECTED." appears on the screen and the recording is disabled.





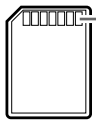
## MultiMediaCard

Improper handling of the MultiMediaCard may cause damage to the card or images on the card. Follow the instructions below for correct use.



### Label

- Do not peel off the label or paste any paper, tape, or other material over it.



### Contacts

- This is the part of the card that makes contact with other equipment. Do not touch with your fingers, scratch, smudge or damage in any way.

## Precautions on handling MultiMediaCards

- Be sure to insert the card in the correct direction. Do not try to force the card in.
- The card is a precision component. Do not disassemble or modify it in any way. Take care not to bend it, subject it to severe shock, drop it, or allow it to get wet.
- Do not put the card in your pocket or other unprotected location as it may break due to pressure applied when you sit.
- Do not expose the card to excessive heat or fire.

## Do not use or store the MultiMediaCard in the following kinds of environment:

- Locations subject to electrical noise or powerful magnetic fields. Data on the card may be destroyed (erased).
- Locations exposed to direct sunlight.
- Locations subject to high temperature or high humidity.
- Locations where dust gathers in large amounts or blows through the air.
- Corrosive environments.
- Sunlit or enclosed spaces and other such locations subject to high temperature.

## Watch out for static electricity

- Do not let dirt or other foreign matter accumulate on the card contacts, or touch them with your fingers, or rub or scrape them. Static electricity may damage (erase) data on the card. Clean the card by wiping it gently with a soft, dry cloth.
- Carry and store the card in its original plastic case to protect it from dirt, grime and static electricity. (The polyethylene case is anti-static.)

## Watch out for condensation

- Moisture (condensation) may form inside and outside the card if it is carried into an area subject to sudden, large changes in temperature. Watch out for condensation, because it can cause malfunctions.
- When moisture condenses on the card, leave it at the prevailing temperature until the water evaporates naturally.

## Your image data

- It is best to copy your valuable image data from the card onto some other medium (personal computer, floppy disk, MO disk, etc.) and make a backup. Malfunction, repair, and so on can cause the recorded images to disappear from the card.
- Make absolutely sure not to remove the card or turn the camcorder power off while the card is recording data, erasing data, or formatting (initializing). This can cause loss of data and damage the card.
- Initializing the card will erase the data on it. Make sure no important image data is recorded on the card before you initialize it.
- Please be aware that Sharp Corporation will not be liable for any damages resulting from loss of data caused by incorrect handling of the card by you or a third party, or caused by exposure to static electricity or electrical noise or by malfunction.



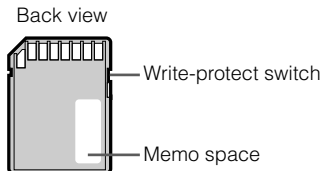
## Appendix

### SD Memory Card

#### Precautions on handling SD Memory Cards

- After removing the card from the camcorder, be sure to immediately store it in the card case.
- Do not disassemble or modify the card.
- Do not strike, bend, drop, or allow the card to become wet.
- Do not touch the metal terminals with your hands or metallic objects.
- Do not peel off the label from the card.
- Do not attach other labels or stickers to the card.
- Do not use or store the card in locations directly exposed to sunlight, heat vents, heating appliances, or other locations with extremely high temperatures such as inside a closed vehicle in the summer.
- Do not use or store the card in humid or dusty locations.
- Do not use or store the card in locations exposed to corrosive gases.

#### Protecting your data



- Set the write-protect switch to "LOCK". Set the switch to the unlocked side when you want to record or edit the card again.
- Use an oil-based felt-tipped pen to write in the memo space. Do not use a pencil or ballpoint pen as these may damage the card or destroy the data on the card.
- Do not remove the card or turn off the power of the camcorder and peripheral equipment while data is being read or written. Also do not remove the power source from the camcorder. These actions can cause data to be destroyed. (Please be aware that Sharp Corporation cannot be held liable for any data loss or other loss directly or indirectly caused by data loss.)
- Make backup copies of your data wherever possible.

### AC Adapter/Battery Charger

- The AC adapter/battery charger may interfere with reception if used near a radio.
- Prevent flammables, liquids, and metal objects from entering the adapter/charger.
- The adapter/charger is a sealed unit. Do not attempt to open or modify it.
- Do not damage, drop, or subject the adapter/charger to vibration.
- Do not leave the adapter/charger in direct sunlight.
- Avoid using the adapter/charger in humid or extremely hot places.

### Replacing the Fluorescent Lamp

This camcorder uses a fluorescent lamp to backlight the LCD monitor. If the monitor becomes dark or difficult to view, the fluorescent lamp may need to be replaced. Contact the nearest SHARP service centre or your dealer for further advice.

### Battery Pack

This camcorder uses a lithium-ion type battery pack.

#### Charging

- Charge the battery pack immediately (or a day) before use. The battery pack gradually self-discharges even if stored in a fully charged state.
- Charge the battery pack between 10°C and 30°C.
- Fully charge the battery pack. Use of an insufficiently charged battery pack will shorten actual time of use.
- Refresh (discharging before charging) is unnecessary.



## Use

- To conserve battery power, be sure to turn off the camcorder power when not in use.
- Battery consumption may vary depending on the condition of use. Recording with many starts and stops, frequent zooming, and recording in low temperatures will shorten actual recording times.
- Use of a weak battery pack may cause loss of power while operating the camcorder. Use a fully charged battery pack to protect both the battery pack and the unit.
- It is recommended that you have enough battery packs on hand to handle two or three times your estimated recording time. See page 23 for the approximate times of actual recording for the battery packs.

Battery power is consumed even when the camcorder power is turned off. If you are not going to use your camcorder immediately, remove the battery pack (see page 10).

### Note:

- Use only SHARP BT-L221, BT-L441, BT-LS222 or BT-LS442A battery packs. These are designed specifically for use with this camcorder.

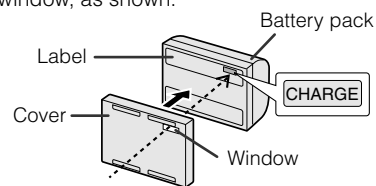
## Extending battery pack life

Even when the battery pack is not used, the capacity of the battery pack will naturally deteriorate over time. To limit the deterioration of the capacity, it is recommended to perform the following procedure at least once every six months:

- ① Charge the battery pack until the CHARGE indicator of the charger turns off.
- ② Attach the battery pack to the camcorder, and set the POWER switch to CAMERA without inserting a cassette. Allow the battery power to fully discharge by leaving it on the camcorder until the camcorder power automatically turns off.
- ③ Remove the battery pack and store it between 10°C and 20°C.

## Storage

- Store the battery pack in a fully discharged state.
- Store the battery pack in a dry, cool place.
- When storing a fully charged battery pack, put the cover on it so that the "CHARGE" mark printed on the label is seen through the window, as shown.



When storing a battery pack that is not fully charged, put the cover upside down so that only the battery pack casing can be seen through the window.

### Cautions:

- Improper handling of the battery pack may present a risk of fire or explosion. Pay close attention to the following:
  - Do not allow metallic objects to come in contact with the terminals. This can cause a short circuit.
  - Do not disassemble or repair the battery pack by yourself.
  - Do not use any battery charging equipment other than that designed for use with these battery packs.
  - Do not place the battery pack under direct sunlight or in excessively hot places (over 60°C) such as the dashboard of cars.
  - Do not expose the battery pack to moisture or water.
  - Do not drop the battery pack or subject it to strong force.
  - Keep the battery pack out of reach of children.
  - Dispose of used battery packs promptly. Do not dispose of them in fire.
- To protect the terminals, put the cover on the battery pack when it is not in use.

### Notes:

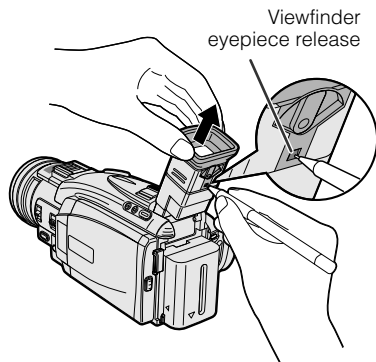
- The battery pack will become warm during charging and use. This is not a malfunction.
- The battery pack has a limited service life. If the period of use becomes noticeably shorter with a normal charge, the battery pack is at the end of its service life. Replace it with a new battery pack.
- If the terminals of the battery pack are dirty, wipe the terminals with a soft, dry cloth.



## Appendix

### Cleaning

- Many plastic parts are used in the camcorder casing. Do not use thinner, benzene or other strong chemical cleaners. These may cause discoloration and damage to the casing.
- Clean the casing with a soft, dry cloth. If the casing is particularly dirty, wipe the casing with a tightly wrung cloth dampened with a diluted, neutral detergent. Then wipe it again with a soft, dry cloth.
- Use a soft cloth to wipe finger marks and other smudges off the LCD screen.
- Use a soft cloth, or compressed air and lens paper designed for photographic lenses to clean the lens and the viewfinder eyepiece.
- To clean the viewfinder eyepiece, detach the eyepiece using the viewfinder eyepiece release as shown below.



### Using Your Camcorder Abroad

Television signal standards and electrical voltages and frequencies vary substantially from country to country. When you are abroad, check the sections below before using the AC adapter/battery charger or connecting the camcorder to a TV.

#### AC Adapter/Battery Charger (Supplied Accessory)

The supplied AC adapter/battery charger is compatible with 50 Hz and 60 Hz electrical systems in the range of 110 V to 240 V AC.

#### Television Signal Standards

In any country, you can always watch the video picture by using the LCD monitor screen or the viewfinder.

However, if you want to watch the picture on a TV screen, the TV must be PAL system compatible. PAL is used in the following areas: Germany, Great Britain, Sweden, Denmark, Austria, Belgium, Switzerland, Italy, Spain, Holland, Finland, Portugal, Norway, Hong Kong, Thailand, Australia, New Zealand, Singapore, Kuwait, China, etc.



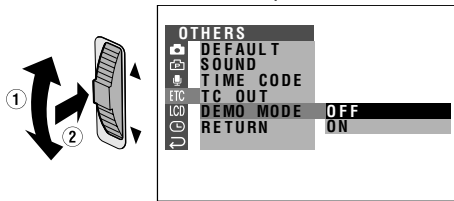
## Demonstration Mode

**Available mode:**  
TAPE-CAMERA

You can watch a brief demonstration of the special camcorder features in Demo mode. If the demonstration appears on the screen when you turn on the camcorder for the first time, cancel the Demo mode to use your camcorder.

### Watching the Demonstration

- 1 Remove the Mini DV cassette from the camcorder (see page 12).
- 2 In TAPE-CAMERA mode, press the MENU button until the menu screen appears.
- 3 Turn the CONTROL dial to select ETC, then press the dial.
- 4 Turn the CONTROL dial to select "DEMO MODE", then press the dial.



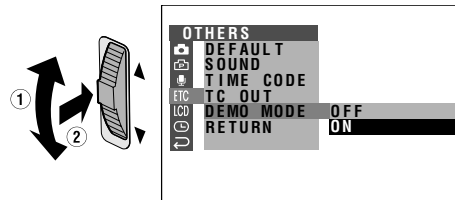
- 5 Turn the CONTROL dial to select "ON", then press the dial.

**DEMO MODE ON**

- 6 Set the POWER switch to OFF, then hold down the Lock button and set the POWER switch to CAMERA.
  - The demonstration begins.

## Cancelling Demo Mode

- 1 During the demonstration, press the MENU button to pause the demonstration.
- 2 Turn the CONTROL dial to select ETC, then press the dial.
- 3 Turn the CONTROL dial to select "DEMO MODE", then press the dial.



- 4 Turn the CONTROL dial to select "OFF", then press the dial.

**DEMO MODE OFF**

- 5 Press the MENU button to turn off the menu screen.

### Notes:

- The demonstration will pause if you press the MENU button. If you leave it for 60 seconds, or turn the power off temporarily and then set the POWER switch to CAMERA, the demonstration will begin again.
- In CARD-CAMERA mode, the Demonstration mode can not be used.



## Appendix

### Before Requesting Service

The following conditions do not always denote trouble. Therefore, perform the checks described below before calling for service. If the problem cannot be corrected by the use of this guide, remove the mains plugs from the wall socket, and contact the dealer or supplier from whom the unit was purchased in order to obtain service. Where this is not possible, please visit our web-site [www.sharp.co.uk/support](http://www.sharp.co.uk/support). Customers without Internet access may telephone 08705 274277 during office hours (or (01)676 0648 if telephoning from Ireland).

Certain replacement parts and accessories may be obtained from our main parts distributor, who can be contacted on the following numbers:

WILLOW VALE ELECTRONICS LTD.: 0121 766 5414

In the unlikely event of this equipment requiring repair during the guarantee period, you will need to provide proof of the date of purchase to the repairing company. Please keep your invoice or receipt, which is supplied at the time of purchase.

	Symptom	Possible cause	Suggested solution
Power	No power.	Power source is not properly connected.	Connect power source properly (pp. 10, 11).
		Battery pack is not charged.	Charge battery pack sufficiently (p. 9).
		Dew in camcorder.	Wait until dew dries (p. iv).
		Safety function is in effect.	Set POWER switch to OFF and remove battery pack. Wait for 2 seconds, then reinstall battery pack and turn on power (p. 10).
CAMERA mode	REC START/STOP button does not work.	Erase-protect tab on video cassette is open.	Close tab or use a new cassette (p. 95).
	Power suddenly turns off.	Camcorder left in Recording Standby mode for 5 minutes in TAPE-CAMERA mode.	Set POWER switch to OFF and then back to CAMERA.
	Auto focus does not work.	Manual Focus mode is engaged.	Set FOCUS switch to Auto (p. 53).
		Zoom used on close subject.	Zoom out from subject (p. 24).
		Subject has little contrast in brightness, or is full of horizontal or vertical stripes.	Focus manually (p. 54).
	Bright subject produces wide vertical lines.	Occurs when shooting subject with strong contrast to the background. Does not indicate a malfunction.	—
	Automatically zooms out without operating Zoom control.	Camcorder is unable to focus when zooming in on subject within 1.5 m, and automatically zooms out until it focuses on subject.	—
No subject in the field of view.		Direct lens to some subject, or set zoom to widest angle before shooting (p. 24).	
Display automatically changes in TAPE-CAMERA mode.	Camcorder is in Demo mode.	Set DEMO MODE menu item to "OFF" (p. 100).	
VCR mode	No image appears on connected TV screen.	Video input channel on TV or TV channel is not selected properly.	Select video input channel or TV channel properly (p. 28).
		Audio/video cable or S-video cable is not properly connected.	Connect audio/video cable or S-video cable properly (p. 28).





	Symptom	Possible cause	Suggested solution
VCR mode	Cannot rewind or fast forward tape.	Position at beginning or end of tape.	Rewind or fast forward tape to desired point (p. 26).
	Video noise in image.	Dirty video heads.	Call for service (p. 101) or use a commercially available cleaning tape (p. v).
		Old or worn tape.	Use a new cassette.
CARD mode	Cannot delete image on card.	Image is delete-protected.	Cancel the protection setting (p. 78).
	Cannot format card.	—	Contact your dealer for advise.
General	Cassette will not eject.	Power source is not properly connected.	Connect power source properly (pp. 10, 11).
		Battery pack is not charged.	Charge battery pack sufficiently (p. 9).
		Camcorder is recording.	Stop tape and try again (p. 23).
	No image on monitor.	Fluorescent lamp has burned out.	Call for service (p. 101).
	Viewfinder picture is hard to see.	Viewfinder dioptre is not properly adjusted.	Adjust dioptre (p. 19).
		Inappropriate picture adjustments.	Adjust picture (p. 88).
	Monitor picture is hard to see.	Inappropriate picture adjustments.	Adjust picture (p. 88).
	CHARGE indicator flashes in red when charging battery pack.	AC adapter or battery pack may have malfunctioned.	Call for service (p. 101).
	Cannot edit to connected VCR.	Audio/video cable or S-video cable is not properly connected.	Connect audio/video cable or S-video cable properly (p. 64).
	Remote control does not function.	REMOTE menu item is set to "OFF".	Set REMOTE menu item to "ON" (p. 45).
		Remote control battery has run down.	Replace remote control battery with new one (p. 14).
Remote control used beyond operating range.		Use remote control within operating range (p. 45).	
Intense daylight falling on camcorder remote sensor.		Protect remote sensor from exposure to intense daylight (p. 45).	
Obstacle between remote control and camcorder remote sensor.		Remove obstacle or use remote control from different angle (p. 45).	

**Notes:**

- This unit is equipped with a microprocessor. Its performance could be adversely affected by external electrical noise or interference. If this should happen, turn off the power and disconnect the unit from any power sources, including the lithium battery, etc. Then reconnect the power sources to resume operation.
- If the characters displayed in the viewfinder or on the LCD monitor appear to malfunction, disconnect the power source and remove the lithium battery, then reconnect the power source, insert the lithium battery, and turn the power on again. The characters should be normal. Set the date and time, then resume operation.





## Appendix

### Specifications

#### Camcorder

Signal System:	PAL standard
Recording System:	2 rotary heads, helical scanning system
Cassette:	Digital VCR Mini DV video cassette
Recording/Playback Time:	90 minutes (DVM60, LP mode)
Tape Speed:	SP mode: 18.831 mm/second LP mode: 12.568 mm/second
Pickup Device:	1/3.6" (6.4 mm, effective size: 5.0 mm) CCD image sensor (with approx. 1,330,000 pixels including optical black)
Lens:	23 × optical/690 × digital (in TAPE-CAMERA mode), 22 × optical (in CARD-CAMERA mode) power zoom lens (F1.8–3.5, f=3.8–87.4 mm in TAPE-CAMERA mode, f=4.0–87.4 mm in CARD-CAMERA mode), full-range auto focus
Lens Filter Diameter:	46 mm
Viewfinder:	Electric LCD colour viewfinder
Monitor:	3" (7.5 cm) full-colour LCD screen (TFT active matrix)
Microphone:	Electret stereo microphone
Colour Temperature Compensation:	Auto white balance with white balance lock, outdoor or indoor
Minimum Illumination:	3 lux* (with gain-up, F1.8)
Still Image Compression System:	JPEG base line conformance
Still Image Recording Format:	JPEG (Exif2.1)
Still Image Recording Medium:	SD Memory Card, MultiMediaCard
Power Requirement:	DC 7.4 V
Power Consumption:	4.3 W (during camera recording in TAPE-CAMERA mode using the viewfinder in Full Auto mode with the DIS function on) 5.1 W (during camera recording in TAPE-CAMERA mode using the LCD monitor in Full Auto mode with the DIS function on and backlight in normal mode)
Operating Temperature:	0°C to +40°C
Operating Humidity:	30% to 80%
Storage Temperature:	–20°C to +60°C
Dimensions (approx.):	77 mm (W) × 86 mm (H) × 212 mm (D)
Weight (approx.):	655 g (without battery pack, lithium battery, video cassette, lens cap, lens hood, shoulder strap and card)

#### AC Adapter/Battery Charger (UADP-0321TAZZ)

Power Requirement:	AC 110–240 V, 50/60 Hz
DC Output:	7.3 V
Power Consumption:	23 W
Dimensions (approx.):	69 mm (W) × 43 mm (H) × 113 mm (D)
Weight (approx.):	160 g

#### SD Memory Card (Supplied Accessory)

Memory Capacity:	8 MB
Power Requirement:	3 V
Operating Temperature:	0°C to +40°C
Storage Temperature:	–20°C to +65°C

Specifications are subject to change without notice.

\*Minimum illumination: Since there is no widely accepted testing procedure for determining minimum illumination capability, lux ratings are comparable only between models from the same manufacturer.

# **SHARP CORPORATION**

## **SHARP ELECTRONICS (U.K.) LTD.**

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