

Important Safety Information

Be sure to read all safety information before using this product.

WARNING: To reduce the risk of fire or shock hazard, do not expose camcorder or AC adapter/charger to rain or moisture.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



This symbol indicates "dangerous voltage" inside the product that presents a risk of electric shock or personal injury.

ATTENTION

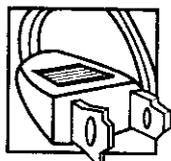
RISQUE DE CHOC
ELECTRIQUE NE PAS OUVRIR



This symbol indicates important instructions accompanying the product.

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

Cautions



CAUTION: To reduce the risk of electric shock, match the wide blade of plug to wide slot, and fully insert.

ATTENTION: Pour éviter les chocs électriques, introduire la lame la plus large de la fiche dans la borne correspondante de la prise et pousser jusqu'au fond.

To reduce risk of injury, charge only rechargeable batteries recommended by the manufacturer for this camcorder. Other types of batteries may burst causing damage and personal injury.

FCC Regulations state that unauthorized changes or modifications to this equipment may void the user's authority to operate it.

Product Registration

Please fill out the product registration card and return it immediately. Returning this card allows us to contact you if needed.

Keep your sales receipt for proof of purchase to obtain warranty parts and service and attach it here. Record the serial number and model numbers located on the bottom of the camcorder.

Model No: CC4393

Serial No: _____

Purchase Date: _____

Purchased From: _____

Assistance

© 2001 Sony Electronics Inc.

We want to make sure you enjoy your new camcorder. So, if you have any questions, please call:

Camcorder Exchange Warranty.800-283-6503

Customer Service800-336-1900

Accessories.800-338-0376

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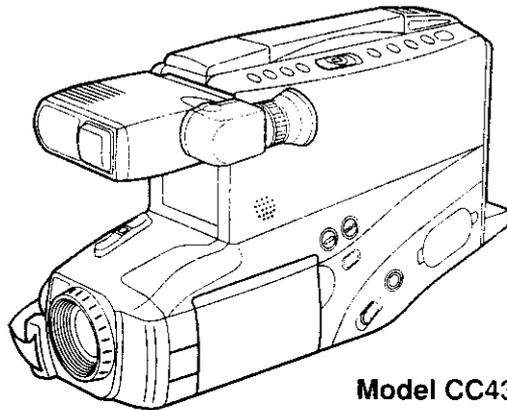
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First-Time Operation

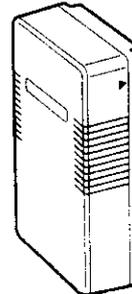
This section describes the necessary steps to set up and record with the camcorder for the first time. For more detailed operating and feature options, refer to the other sections of this manual.

1. Unpack the Camcorder and Accessories

- Save the packing materials and box in case you ever need to ship or store the camcorder.
- Items shown below are packed with the camcorder. If any parts are missing or appear damaged, contact the store where you purchased the unit immediately.

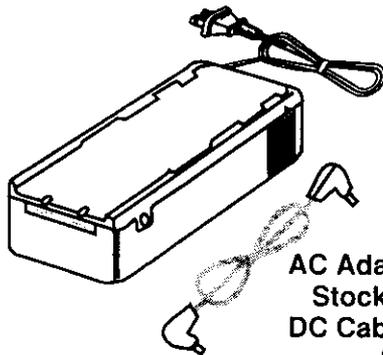


Model CC4393



Rechargeable 10-Volt Battery
Stock No. EP096FS

WARNING:
*Lead-acid
battery. Must be
disposed of
properly to avoid
environmental
problems*



AC Adapter/Charger:
Stock No. 241044
DC Cable: Stock No.
233328

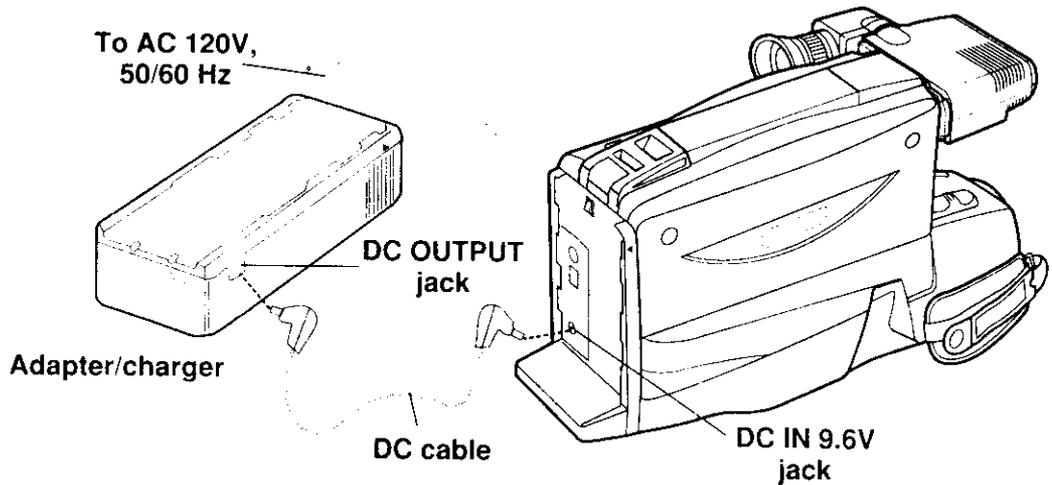


Shoulder Strap
Stock No. 227327
or Stock No. 241305

Caution: Do not use this adapter/charger for any purpose other than charging the EP096FS or EP096FL battery pack or supplying power to the camcorder.

First-Time Operation

2. Attach the Adapter/Charger



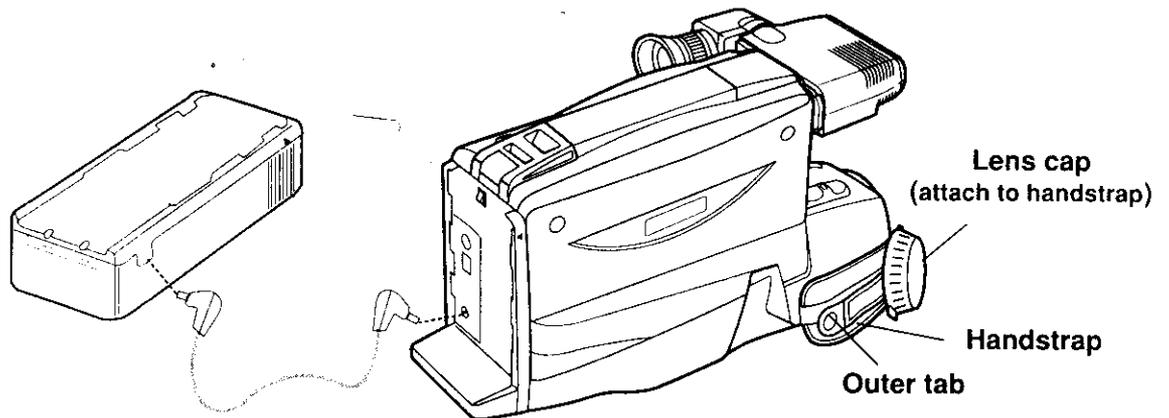
The lead-acid battery that came with the camcorder should be fully charged out of the box. When the battery is too weak to run the camera though, the adapter/charger can be used to power the camcorder:

1. Attach one end of the unit's DC cable to the *DC OUTPUT* jack on the side of the adapter/charger.

2. Attach the other end of the cable to the *DC IN 9.6V* jack on the camcorder.
3. Plug the adapter/charger's plug into a working power outlet.

Specific details about powering the camcorder are on page 15.

3. Adjust the Handstrap, Remove the Lens Cap, and Attach it to the Handstrap

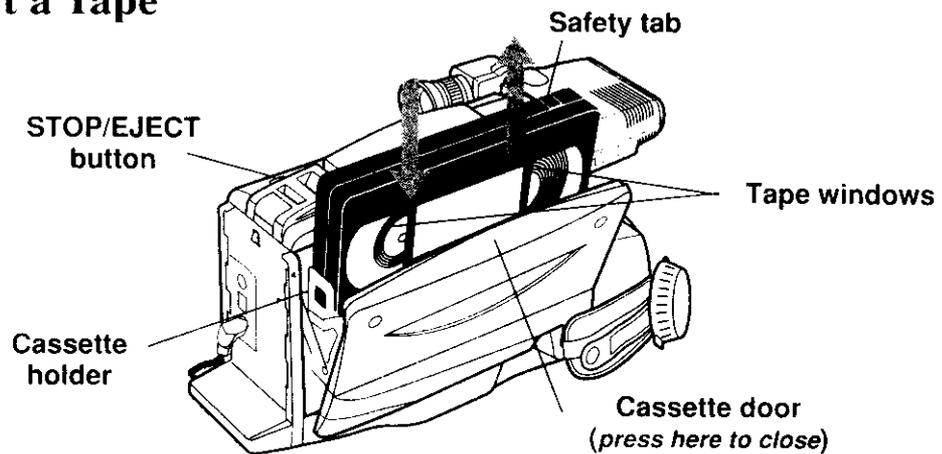


1. Open the handstrap by pulling the outer tab. Insert your hand and adjust the handstrap to fit.

2. Remove the lens cap and attach it to the handstrap *as shown*.
3. Refasten the handstrap.

First-Time Operation

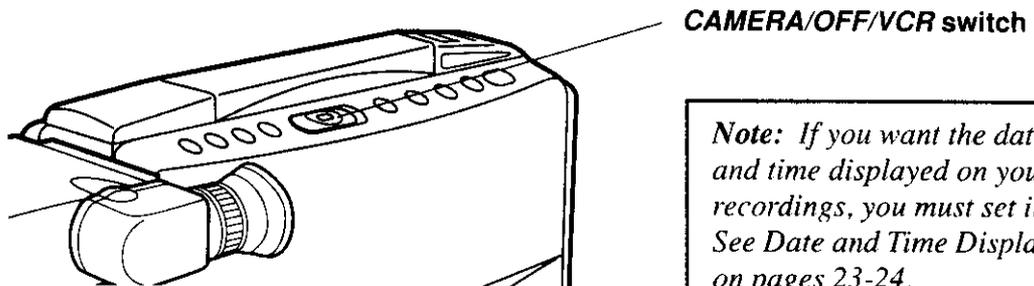
4. Insert a Tape



1. Press the *STOP/EJECT* button to open the cassette holder door.
2. Insert the cassette tape with the safety tab facing up and the tape windows facing out.
3. Press the cassette down gently until it locks into place, and close the cassette compartment door.

Specific details of tape insertion are on page 22.

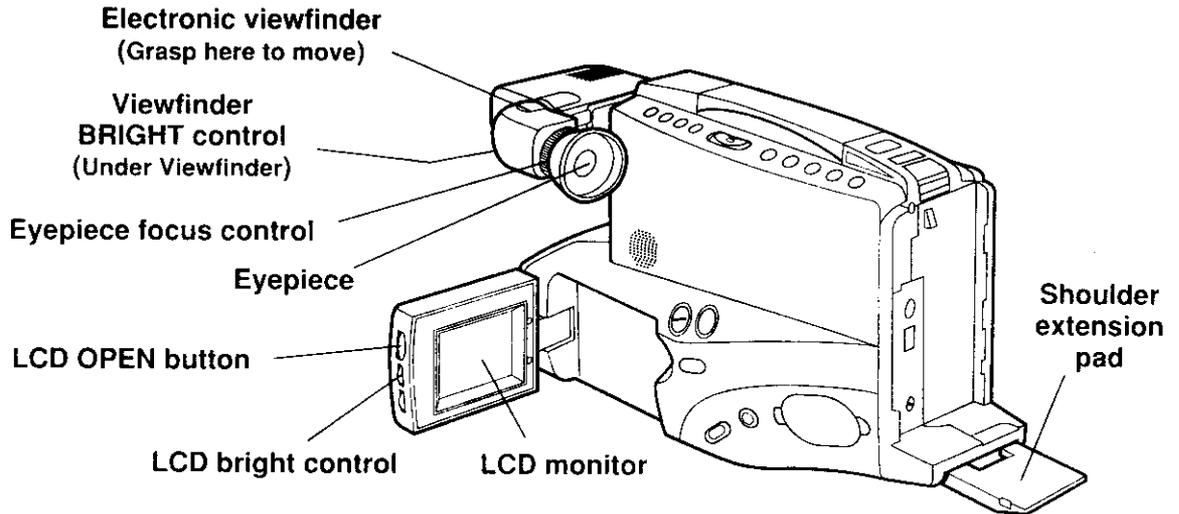
5. Turn on the Camcorder



- Press and hold the red button on the *CAMERA/OFF/VCR* switch. Slide the switch to *CAMERA*. The camcorder enters record-pause mode.
- The position of this switch tells the camcorder whether to record (*CAMERA*), turn the power off (*OFF*), or play back tapes (*VCR*).
- The camcorder automatically turns off if it remains in Record-Pause mode for more than five minutes. To turn back on, slide the power switch to *OFF* and then back to *CAMERA* or simply press the Record-Pause button.

(Continued on next page)

First-Time Operation



6. Use the LCD Monitor or Viewfinder to See What's Recording

What's being recorded can be seen with either the LCD monitor or the color viewfinder. When the LCD monitor is opened more than 45 degrees, the viewfinder automatically turns off. When the LCD monitor is closed, the viewfinder automatically turns on. When the LCD monitor is extended 90 degrees and rotated all the way around (screen side facing toward the scene being recorded), both the viewfinder and the LCD monitor reflect the shot.

Using the LCD Monitor

1. Unfold the shoulder extension pad.
2. Press the LCD's *OPEN* button to open the monitor. Once the monitor is open at least 45 degrees, the viewfinder automatically turns off.
3. Rotate the monitor only when it is open 90 degrees. When rotated 90 degrees or more, the image on screen becomes a mirror image and the viewfinder turns on.
4. To adjust the brightness of the image on the monitor, adjust the LCD bright control.
5. Fit the shoulder extension pad to your shoulder for convenient LCD monitor viewing.

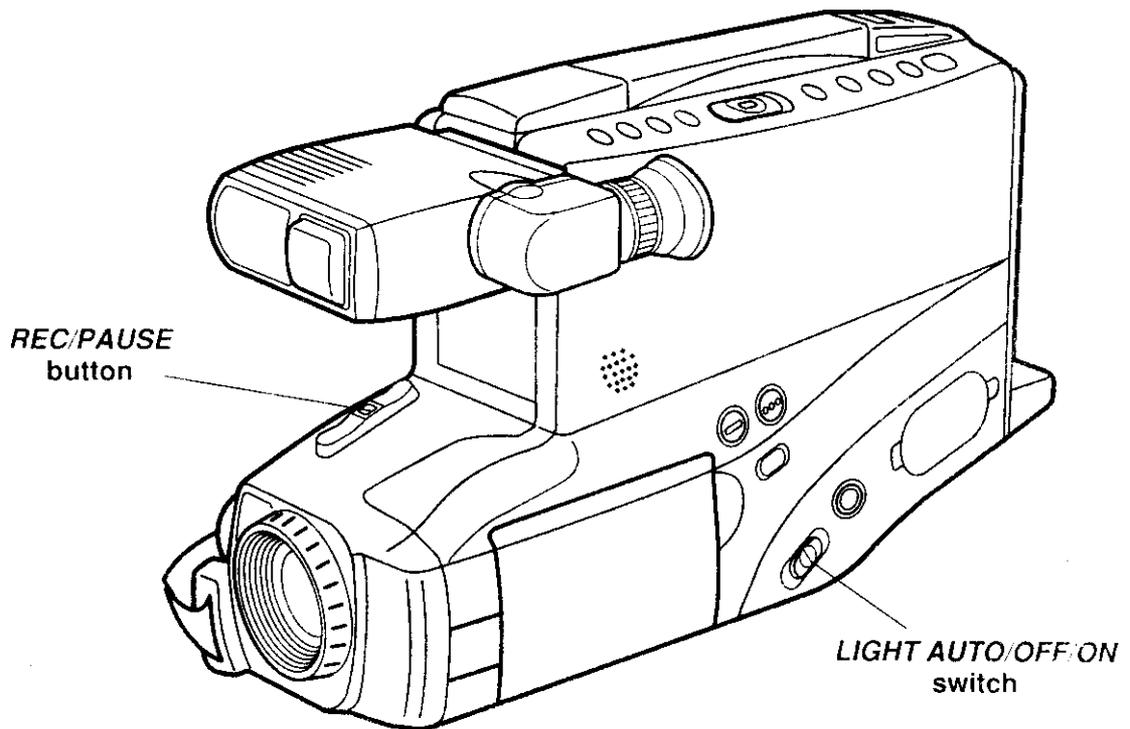
Using the Viewfinder

1. Make sure the monitor is closed and locked. If the monitor is open more than 45 degrees, the viewfinder automatically turns off.
2. Grasp the viewfinder and rotate it horizontally.
3. Pull the viewfinder out from the camcorder and rotate the eyepiece into a comfortable viewing position.

Caution: Pulling on the eye piece might cause damage to it or the camcorder.

4. Turn the eyepiece focus control to adjust the focus of the viewfinder for your vision.
5. Adjust the brightness of the image in the viewfinder by turning the *BRIGHT* control.

First-Time Operation



7. Slide the *LIGHT AUTO/OFF/ON* switch to *AUTO*

- The color enhancement light helps create brighter and sharper images.
- Set the *LIGHT AUTO/OFF/ON* switch to *AUTO* to activate the color enhancement light automatically when the camcorder is focused on a dark scene. "AUTO" also turns off on the LCD/viewfinder when the camera is aimed at a bright object.

For more details about the AUTO light, are on pages 12-13.

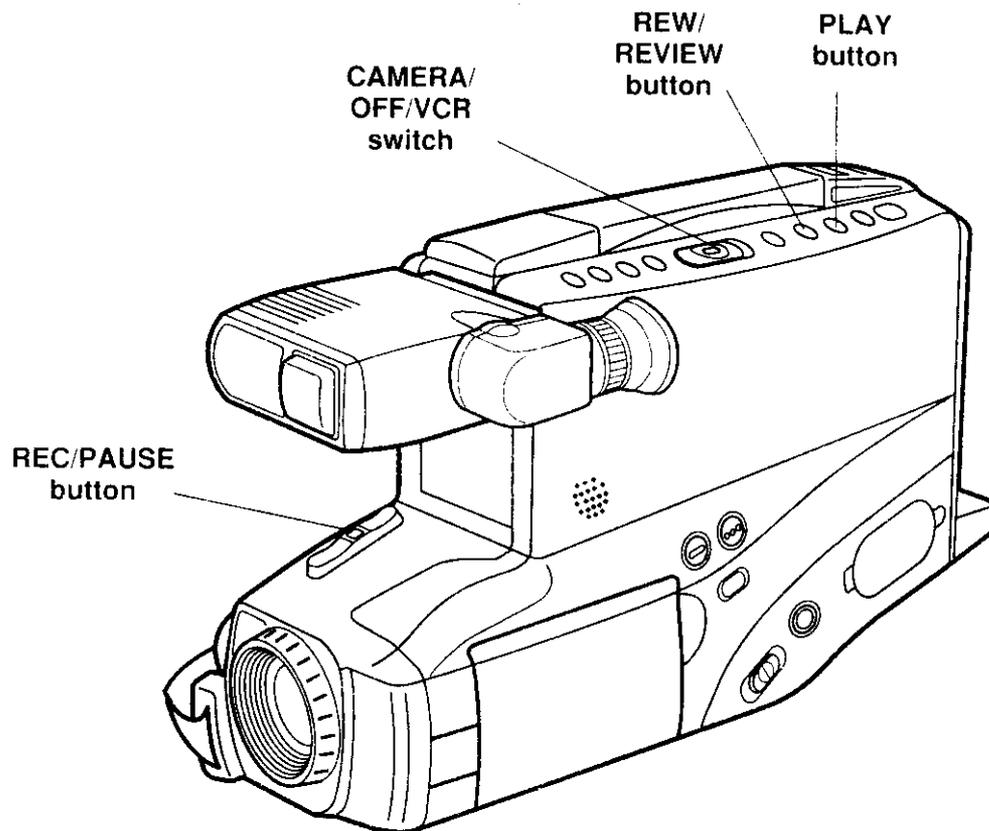
8. Start and Stop Recording

- Press and release the *REC/PAUSE* button to start recording. *REC* appears in the viewfinder or on the LCD monitor when the camcorder is recording.
- Press and release the *REC/PAUSE* button again to stop recording. The camcorder is now in the record-pause mode (**||** appears in the viewfinder or on the LCD monitor when the camcorder is in record-pause).

Caution: Make sure the LCD monitor is open 90 degrees before rotating it back into position for closing.

(Continued on next page)

First-Time Operation



9. Play Back What's Recorded

1. Press and hold the small button on the *CAMERA/OFF/VCR* switch while you slide it to *VCR*.
2. Press *REW/REVIEW* to rewind the tape.
3. Press *PLAY* to play back the tape.
4. Press *STOP/EJECT* when you are finished playing back the tape.

For specific details on the LCD monitor and viewfinder playback see the Playback chapter starting on page 53 in this manual.

10. Turn Off the Camcorder

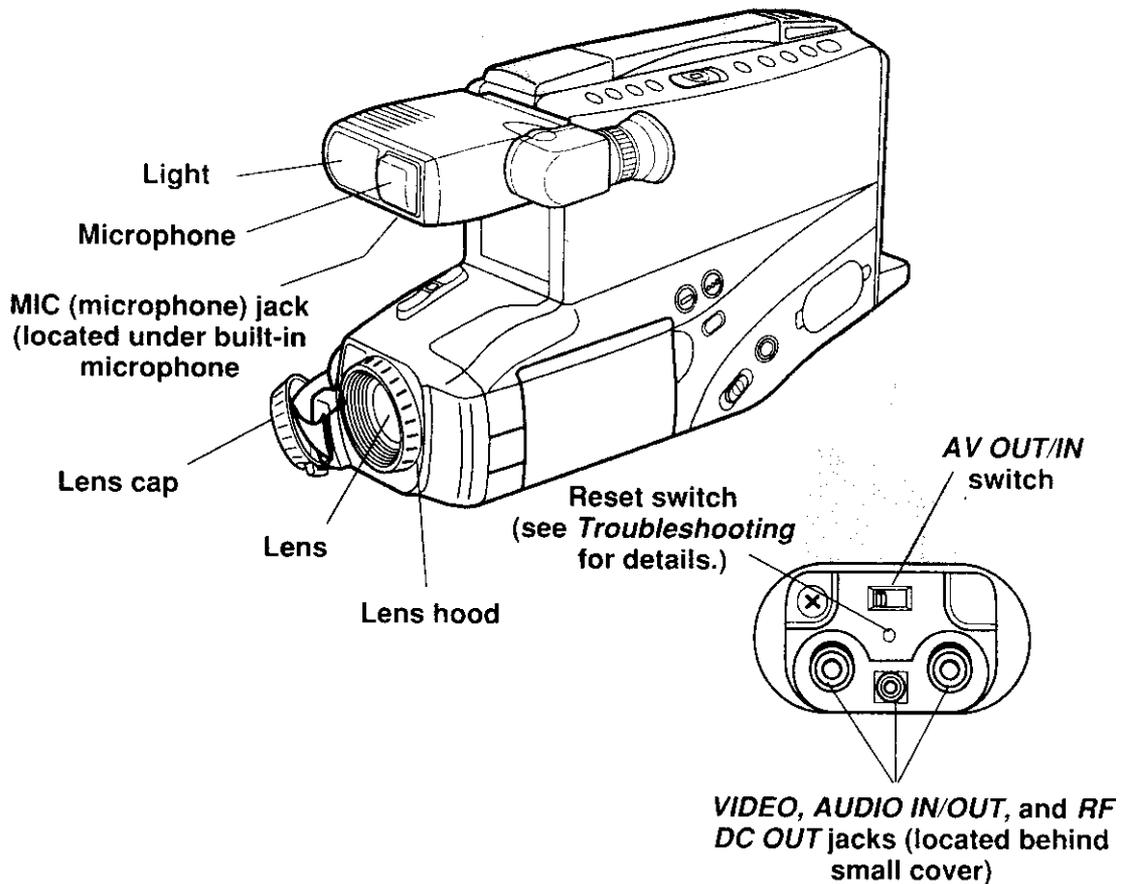
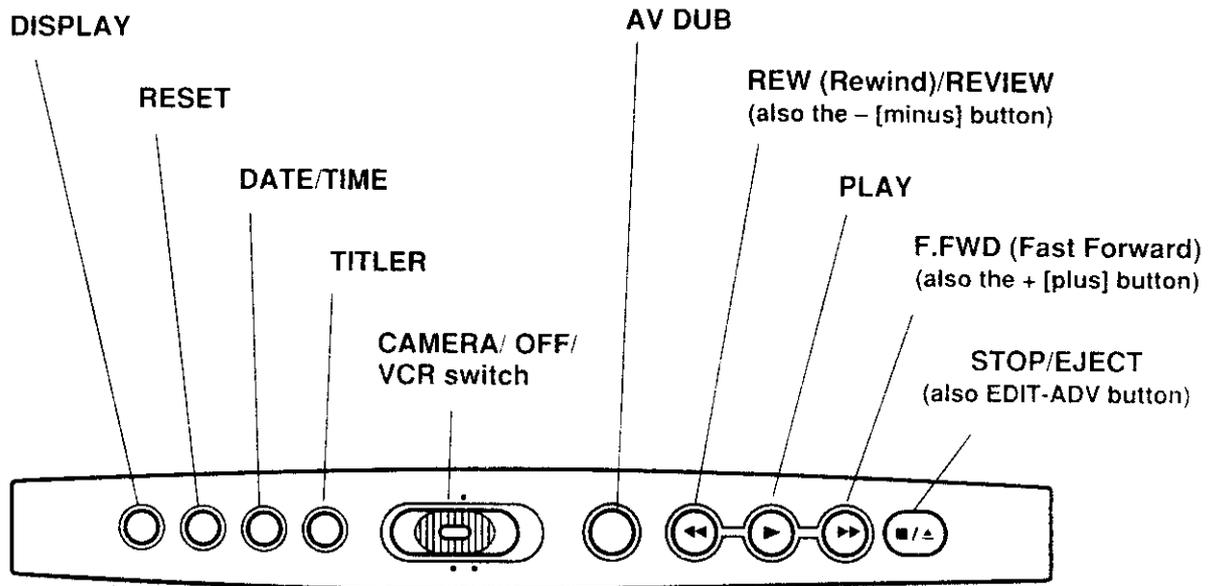
1. Set the *CAMERA/OFF/VCR* Switch to *OFF* to turn off power.

11. Close the LCD Monitor and Replace Lens Cap

Caution: Make sure the LCD monitor is open 90 degrees before rotating it back into position for closing.

First-Time Operation

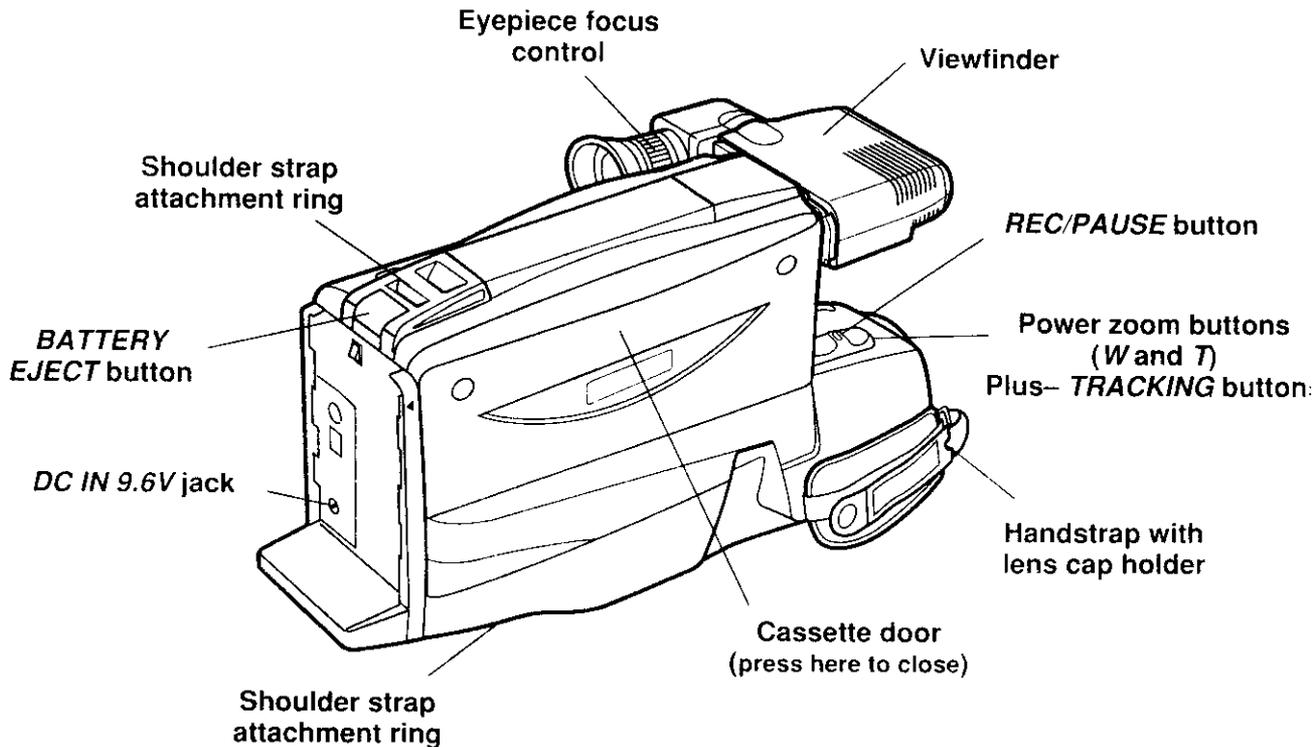
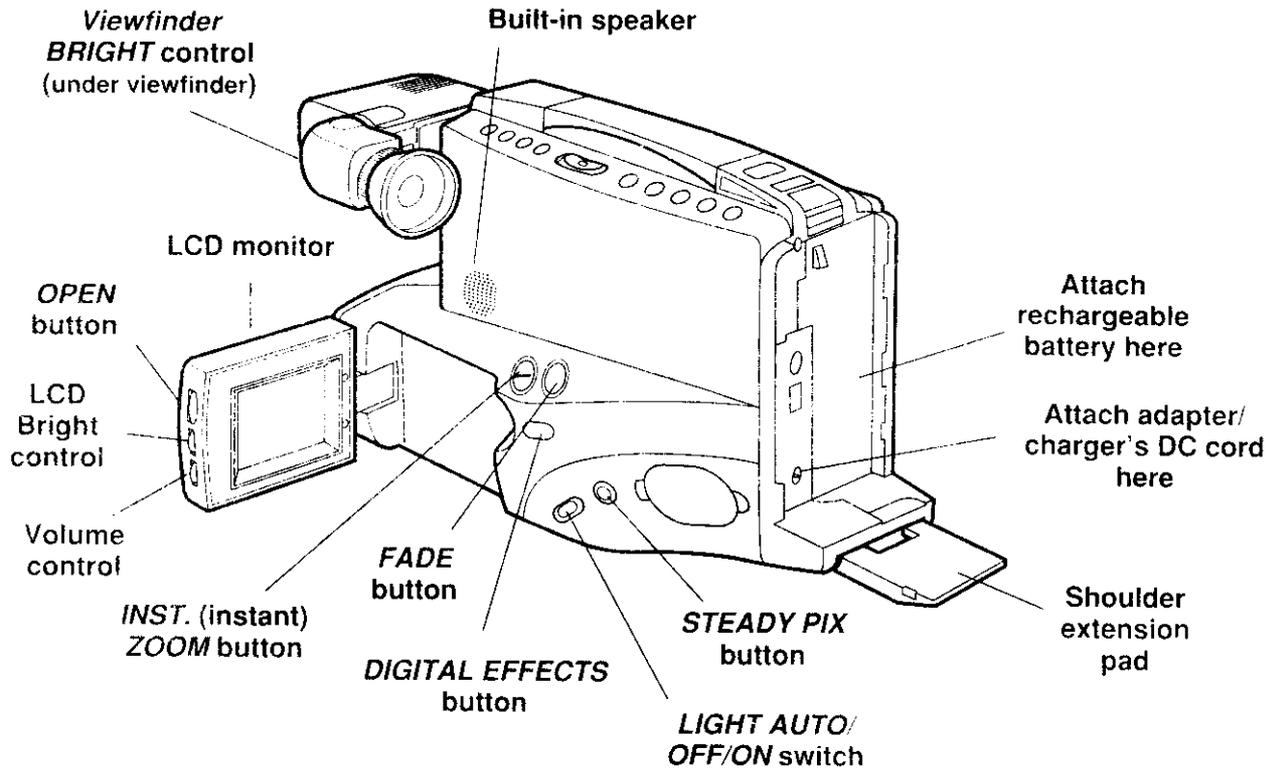
12. Review Operating Controls



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First-Time Operation

12. Review the Operating Controls (Continued)



Included Accessories

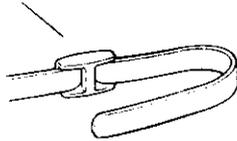
Shoulder Strap

The camcorder's shoulder strap is designed to let you carry the camcorder from your shoulder and – when you are ready to shoot – bring the camcorder to shooting position in one quick movement.

Attaching the Shoulder Strap

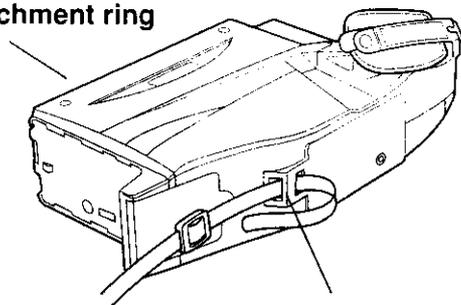
1. Unfasten one end of the shoulder strap from the buckle. Make sure you leave the buckle on the strap.

Buckle



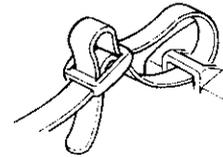
2. Thread one end of the shoulder strap through one of the shoulder strap rings as shown.

Shoulder strap attachment ring



Shoulder strap attachment ring

3. Thread the end of the strap back through the buckle making sure it is threaded over the outer strap. Make sure the strap is not twisted.



4. Repeat steps 1-3 to attach the other end of the strap.
5. Pull on the straps and make sure they are securely fastened before using the shoulder strap to support your camcorder.

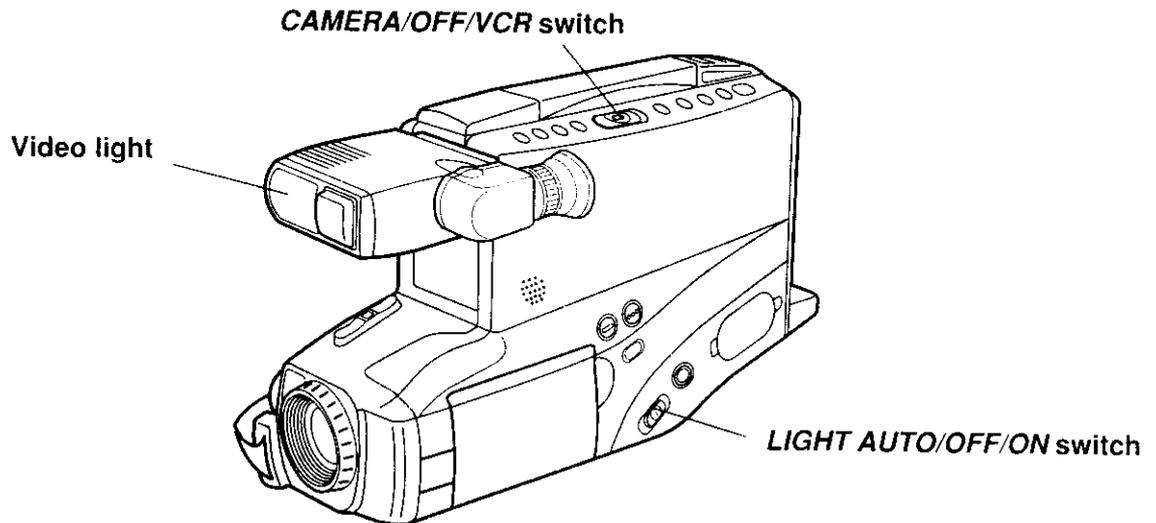
Cautions: When carrying the camcorder with the shoulder strap, rotate the viewfinder up to its original position. If the monitor is open, close and lock it. This helps prevent possible damage to the viewfinder or monitor from bumping against your body as you move.

Make sure the shoulder strap is firmly attached before using it to carry the camcorder.

Light

Built-in Color Enhancement Light

The built-in color enhancement light automatically adds light when needed.



Using the Light

1. Press and hold the small button on the *CAMERA/OFF/VCR* switch while you set it to *CAMERA*.
2. Set the *LIGHT AUTO/OFF/ON* switch.
 - To turn the light on, set the switch to *ON*.
 - If you want the light to come on automatically when the camcorder senses there is insufficient light, set the switch to *AUTO*.

Notes: For the light to operate in *AUTO*, you must have a tape in the camcorder.

If the lighting condition is unstable, the light may turn on and off. Set the light to *ON* or *OFF*.

- To turn the light off, set the switch to *OFF*. To save battery power, turn the light off when you are not recording.

Notes: When the light is turned on, the camcorder may turn off if the battery's power is low even though the battery level indicator is not flashing.

Avoid bumping or shaking the light when in use. The light's bulb is sensitive when hot and might burn out.

Cautions:

Do not operate the video light closer than one foot to people or other objects.

The video light and light cover become very hot. Do not touch them during operation or right after use. Serious injury may result.

To prevent overheating, do not block or cover the ventilation holes on the color enhancement light.

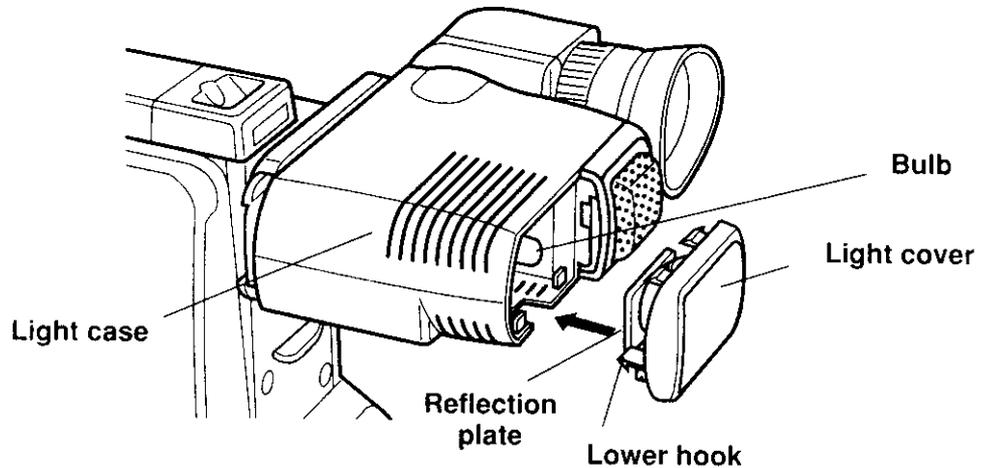
Do not place the camcorder in a carrying case right after using the light.

Never operate the video light close to flammable or explosive material.

Do not allow water to drop on the light when in operation.

Light

Replacing the Light Bulb



Removing and Replacing the Light Bulb

1. Press and hold the lower hook of the light cover while removing the light cover from the light case.
2. Replace the light bulb.

Note: See the installation instructions packed with the replacement bulb for detailed information.

3. To replace the light cover, pass the bulb through the hole of the reflection plate and attach the lower hook to the light case on the camcorder.
4. Press gently on the front of the light cover until it locks into place.

Note: Make sure the front cover of the light is properly attached.

Cautions:

Do not touch the light bulb with your fingers. If you accidentally touch the bulb, wipe it with a soft cloth. A dirty bulb may cause smoke and have a reduced service life.

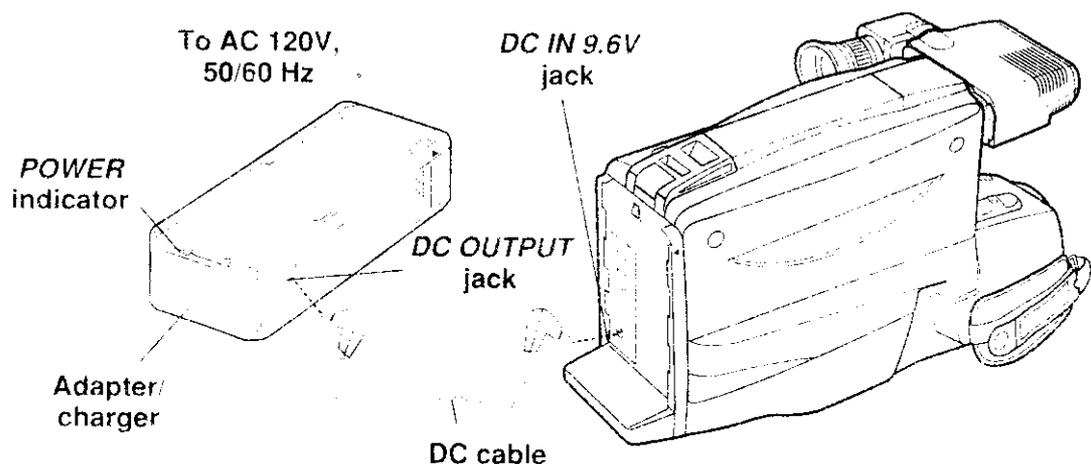
When replacing the bulb, only use bulb part number 221111 to reduce the risk of fire and other hazards.

Powering the Camcorder

Using the Adapter/Charger

The adapter/charger attaches to the camcorder and lets you power your camcorder directly from standard household power. The adapter/charger operates on 120 volts, 50/60 Hz, and can be used to power the camcorder or recharge the battery.

Caution: Do not attempt to use a "power converter" to use your AC adapter/charger on a power source other than 120 volts, 50/60 Hz, or the adapter/charger and camcorder may be damaged. If you wish to operate the AC adapter/charger on a power source other than 120 volts, 50/60 Hz, use only a transformer-type power converter. Do not use "solid-state" or "switching-type" power converters. They will damage your AC adapter/charger. An optional CPS014, shown on page 62, is designed for use on 100-240 volts, 50/60 Hz.



Caution: Do not use this adapter/charger for any other purpose other than charging the EP096FS or EP096FL battery pack or supplying power to the camcorder.

Attaching the Adapter/Charger

1. Attach one end of the adapter/charger's DC cable to the *DC OUTPUT* jack on the adapter/charger.
2. Attach the other end of the cable to the *DC IN 9.6V* jack on the camcorder.
3. Plug the adapter/charger's plug into an operating outlet. The *POWER* indicator on the adapter/charger lights when it is properly connected.

Notes: The adapter/charger cannot charge the battery and operate the camcorder at the same time. If you connect both, the adapter/charger powers the camcorder. Remove the

adapter/charger's cable from the *DC OUTPUT* jack to charge the battery.

When using the adapter/charger to power the camcorder, the battery level indicator might display . This indicator is used for battery operation and has no meaning when using the adapter/charger to power the camcorder.

Removing the adapter/charger

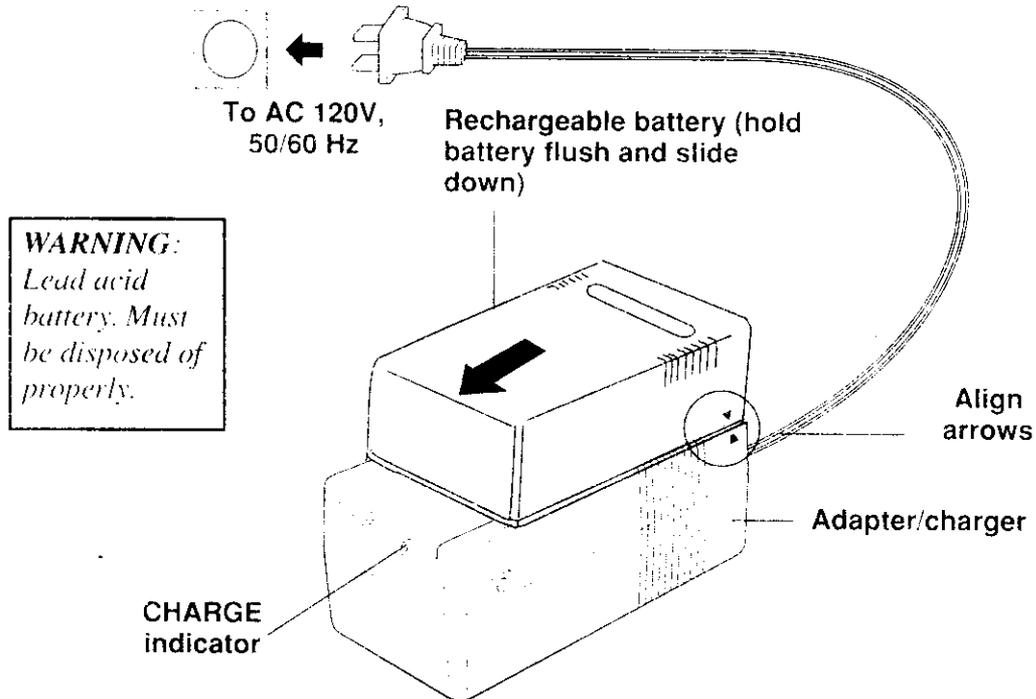
1. Unplug the adapter/charger from the wall outlet.
2. Remove the DC cable from the adapter/charger and camcorder.

Powering the Camcorder

Using the Battery

Charging the Battery

The battery should be charged right out of the box. If it is not charged or when the battery's power is depleted, a full charge take approximately two hours. The camcorder's operating time depends on how often you turn the power on and off and how much you use the monitor, zoom, and pause. To conserve battery power, turn the camcorder off during recording breaks.



Caution: When a battery is attached to the adapter/charger, do not turn them upside down. The battery might fall off and be damaged or cause injury.

If the DC cable is attached to the *DC OUTPUT* jack on the adapter/charger, remove it.

1. Align reference mark on battery with mark on adapter/charger.
2. Hold the battery flush against the adapter/charger and slide it in the direction of the arrow.
3. Plug adapter/charger into nearest AC outlet (120V, 50/60Hz).

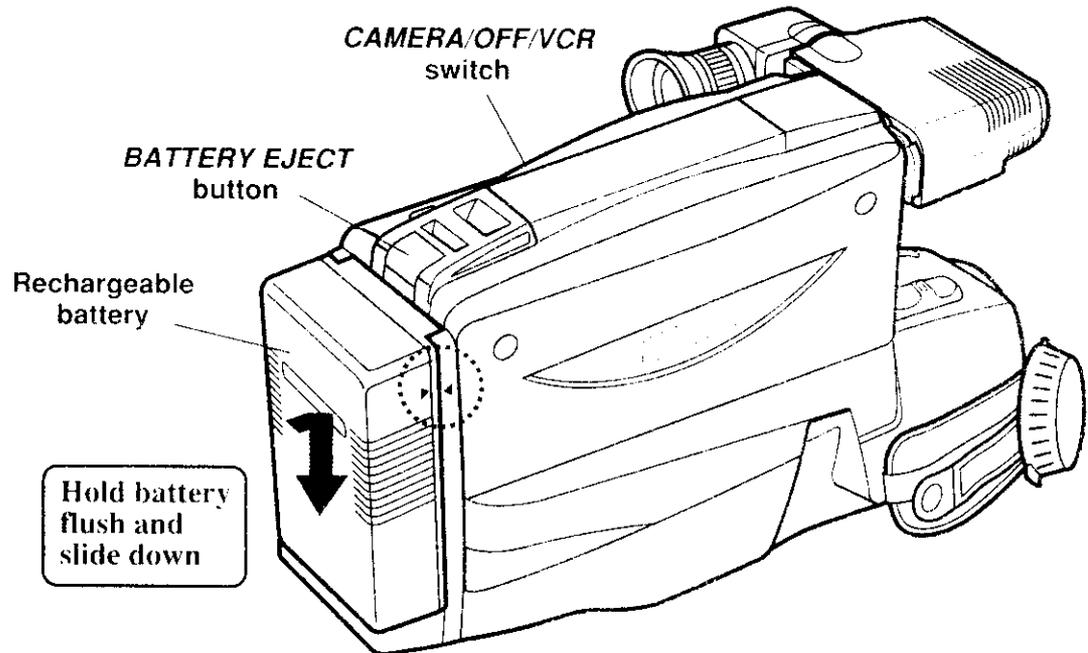
4. If the battery is properly connected, the adapter/charger's *CHARGE* indicator lights.

Note: Your battery will provide better service if you charge it before and after use and store it at room temperature.

5. Remove the charged battery by sliding it up and off the adapter/charger.
6. Attach the charged battery to the camcorder as shown on the next page.

Powering the Camcorder

Using the Battery (*Continued*)



Attaching a Charged Battery

If the DC cable is attached to the camcorder, remove it before attaching the battery.

1. Set the *CAMERA/OFF/VCR* switch to "OFF."
2. Align the reference arrow on the battery to the arrow on the back of the camcorder.
3. Hold the battery flush against the

camcorder while you slide it down in the direction of the arrow until it snaps into place.

Removing a battery

1. Set the *CAMERA/OFF/VCR* switch to *OFF*.
2. Press and hold the *BATTERY EJECT* button while removing the battery.

ATTENTION: THE RECHARGEABLE BATTERY CONTAINED IN THIS PRODUCT IS RECYCLABLE. AT THE END OF ITS USEFUL LIFE, UNDER VARIOUS STATE LAWS, IT MAY BE ILLEGAL TO DISPOSE OF THIS BATTERY IN THE MUNICIPAL WASTE STREAM. CHECK WITH YOUR LOCAL SOLID WASTE OFFICIALS FOR DETAILS IN YOUR AREA FOR RECYCLING OPTIONS OR PROPER DISPOSAL.



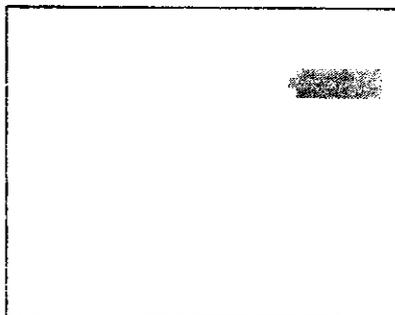
Pb

Powering the Camcorder

Using the Battery (*Continued*)

Battery level indicator

The battery level indicator appears in the viewfinder or LCD monitor and shows you the amount of power in the rechargeable battery.



battery level indicator display in viewfinder or LCD monitor

Note: If you can't see the battery level display, press **DISPLAY**.

- When  appears, the battery is fully charged
- As the power is used  and  appear.
- When the battery power is almost gone,  flashes in the viewfinder or on the LCD monitor. Recharge the battery or use the adapter/charger before continuing to use the camcorder. Set the **CAMERA/OFF/VCR** switch to **OFF** to turn off the camcorder before replacing the battery.

Notes: When you record using the rechargeable battery, the battery level indicator still flashes to warn you of low battery power even if you do not have the battery level indicator displayed.

The battery level indicator isn't recorded on the tape.

The battery level indicator has no meaning when you use the adapter/charger or optional car cord to power the camcorder.

Cautions: When a battery reaches empty during use, the camcorder turns off. The battery should still have enough reserve power to eject the cassette when you press **STOP/EJECT**.

*If the camcorder does not eject the cassette when you press **STOP/EJECT**, **do not force the cassette door open**. This will damage the camcorder.*

Before attempting to eject the cassette, power the camcorder with the adapter/charger or recharge the battery.

Powering the Camcorder

Using the Battery (*Continued*)

Battery care

- Your battery will provide better service and longer performance if you charge it before and after use, and store it at normal room temperature.
- The battery should be charged at a temperature of 32°F- 95°F (0°C- 35°C) to prevent damage
- Do not operate the battery at temperatures below 14°F (-10°C) or above 95°F (35°C). You might damage the battery if you use it at temperatures above 122°F (50°C)
- Operation time decreases at extremely low temperatures
- After repeated charges and use the operation time decreases. When the operation time becomes too short to be useful, it is time to replace the battery

Battery storage

- Store the battery at normal room temperature
- Lead acid batteries will completely discharge if not used. The battery should be recharged at least once every six months or it may lose its ability to hold a charge
- A battery stored for long periods might not supply power for the specified time. Additional recharging might help restore the battery's operation time

Battery safety precautions

- Batteries being recharged that have not been used for an extended period may continue to charge after the normal time. Do not charge a battery for more than 24 hours.
- If the *CHARGE* indicator on the adapter/charger starts flashing, remove the battery, and reattach it. If after several attempts, the indicator continues to flash, your battery cannot take a charge and must be replaced
- Throwing the battery into a fire or exposing the battery to excessive heat (over 149°F/65°C) could be hazardous
- Do not short the battery's terminals.
- Allow the battery to cool down before attaching it to the adapter/charger. The *CHARGE* indicator will not light and the battery will not charge if you attach a hot battery.
- Do not attempt to disassemble or modify the battery. There are no user-serviceable parts inside.
- Use the battery only with specified AC adapter/chargers and camcorders
- If leakage from a damaged battery contacts your skin or clothing, wash it off immediately with running water

Powering the Camcorder

Using the RCA Optional Car Cord Adapter

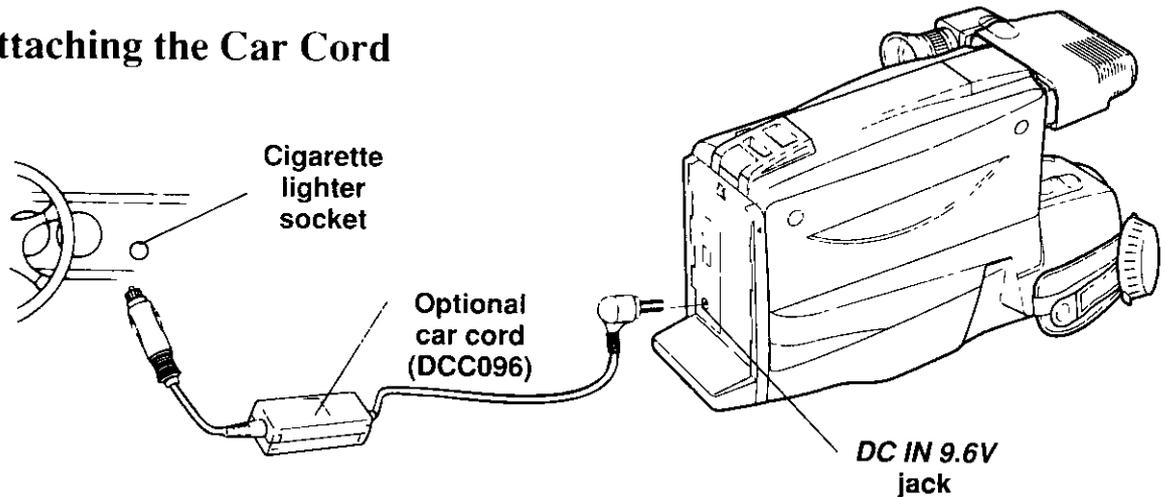
The optional DCC096 car cord shown on page 61 allows you to power your camcorder from the cigarette lighter socket of a car, truck, or RV. It converts 12-volts to a 9.6-volt output.

Note: Consult the installation and operating instructions enclosed with the DCC096 for complete operating instructions.

Caution: The DCC096 car cord is designed to be used only with vehicles having 12-volt negative ground electrical systems.

Warning: To avoid possible damage to the camcorder, use only the DCC096 car cord. It has positive tip polarity and is capable of converting 12 volts to 9.6 volts.

Attaching the Car Cord



1. Set the *CAMERA/OFF/VCR* switch to *OFF* to turn off the camcorder.
2. If the battery or DC cable is attached to the camcorder, remove it.
3. Insert the small plug on the car cord to the *DC IN 9.6V* jack located on the back of the camcorder.
4. Take the vehicle's cigarette lighter out of the socket.
5. Insert the car cord's cigarette lighter plug into the vehicle's cigarette lighter socket.
6. To turn on the camcorder, press and hold the small button on the *CAMERA/OFF/VCR* switch while you set it to *CAMERA*.

Notes: The vehicle does not have to be running for the camcorder to operate from the DC car cord.

The battery level indicator has no meaning when you use the car cord to power the camcorder.

Videocassettes

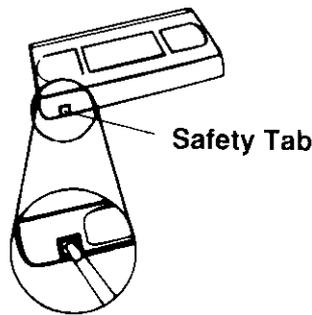
Tape Recording Basics

Make sure you select good quality tapes for your camcorder. Use of poor quality tapes or tapes that have been damaged or mishandled can contaminate the video heads, resulting in a snowy picture or no picture at all during playback. Because there is no control over the type of tape purchased or rented by consumers, **head cleaning is not covered under warranty.** It is considered normal maintenance.

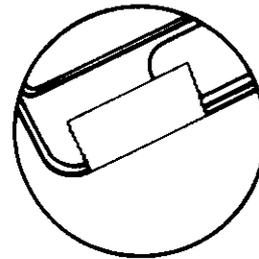
If a snowy picture or no-picture condition persists, consider the use of a dry chemical nonabrasive head-cleaning tape. Be sure to follow the directions with the head-cleaning kit carefully. Improper use of a head cleaner might damage your camcorder.

Erase Protection – Safety Tab

You can use your videocassettes over and over again. To erase a previous recording, just record over it.



To prevent accidental erasure, break off the tab.



To record on the tape again, cover the hole with vinyl tape.

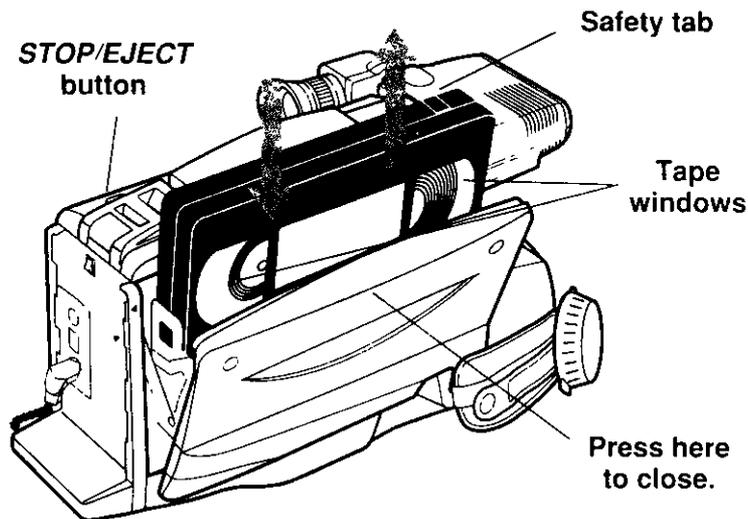
Recording and Playback Speed and Times

The camcorder records and plays back in VHS standard speed (SP). Listed below are the maximum recording times for popular VHS cassettes.

CASSETTE	RECORDING TIME
T-60	60 Min
T-120	2 Hrs
T-160	2 Hrs . 40 Min
T-180	3 Hrs

Videocassettes

Inserting and Removing Videocassettes



Caution Insert the cassette only one way with the tape wheel facing up and the tape windows facing out. The cassette should slide easily into the holder. Gently push the cassette down until it locks into place.

- 1 Attach a power source to the camcorder
- 2 Press the *STOP/EJECT* button. The cassette holder opens automatically
- 3 Insert the cassette with the tape wheel facing up and tape windows facing out. Gently push the cassette down until it locks into place
- 4 Gently close the cassette holder with your hand

Videocassette Care and Storage

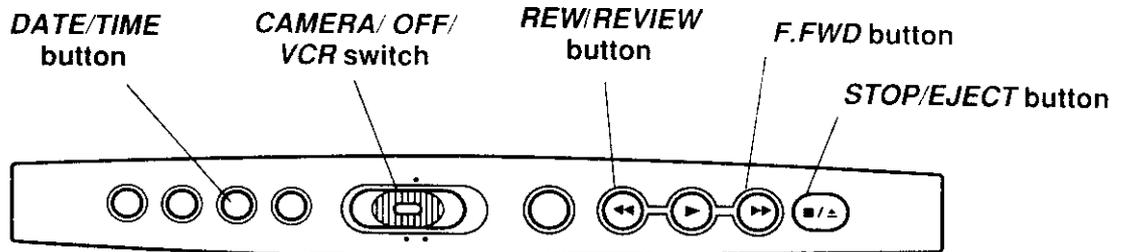
- When you are finished with a cassette, rewind it, remove it from the camcorder, and label it.
- Store cassettes vertically in their protective cases at normal room temperatures. Do not leave your camcorder or cassettes in a car or outdoors for an extended period. Excessive heat or cold might damage your cassettes.
- Keep the cassette away from strong magnetic fields such as electric motors and other devices.
- Keep dust from entering the cassette compartment. All dust is abrasive and will cause excessive wear on the tape and the camcorder's recording or playback heads.
- Do not use cassettes with damaged or spliced tape.
- Do not use a cassette if it has been damaged or exposed to moisture. The tape might jam and/or damage your camcorder.
- Break off the safety tab to prevent accidental erasure of your recording.

Date and Time Display

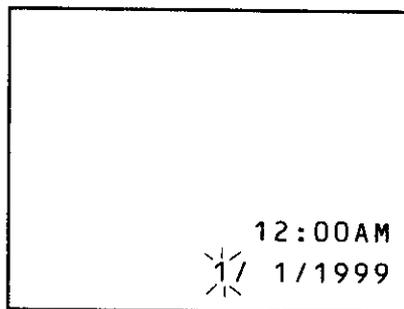
Setting the Time and Date

You must set the correct date and time before it can be displayed and recorded on your tapes. The built-in clock cell must be charged *as described on the next page*.

Note: If power is left on for more than ten minutes with no cassette in the camcorder and the date not set or the built-in clock battery not charged, the camcorder starts the demonstration mode. To stop the demonstration mode, disconnect and reconnect the power source or insert a cassette.



1. Attach the camcorder's battery or AC adapter.
2. Press and hold the small button on the *CAMERA/OFF/VCR* switch while you set it to *CAMERA*.
3. Press the *DATE/TIME* button to display the date and time on the LCD monitor or in the viewfinder.
A flashing cursor lets you know which part of the display you are setting. If the flashing cursor does not appear, press and hold *DATE/TIME* and then press *STOP/EJECT*.
4. Repeatedly press the *F.FWD* or *REW/REVIEW* until the correct month appears. Press and hold the button to advance the digits faster.
5. When the correct month is displayed, press *STOP/EJECT*. The cursor moves to the next part of the display.
6. Repeat steps 4 and 5 to set the correct month, day, year, hour, minute(s), and *AM/PM*.
7. After setting *AM* or *PM*, press the *DATE/TIME* button to remove the flashing cursor and start the internal clock.



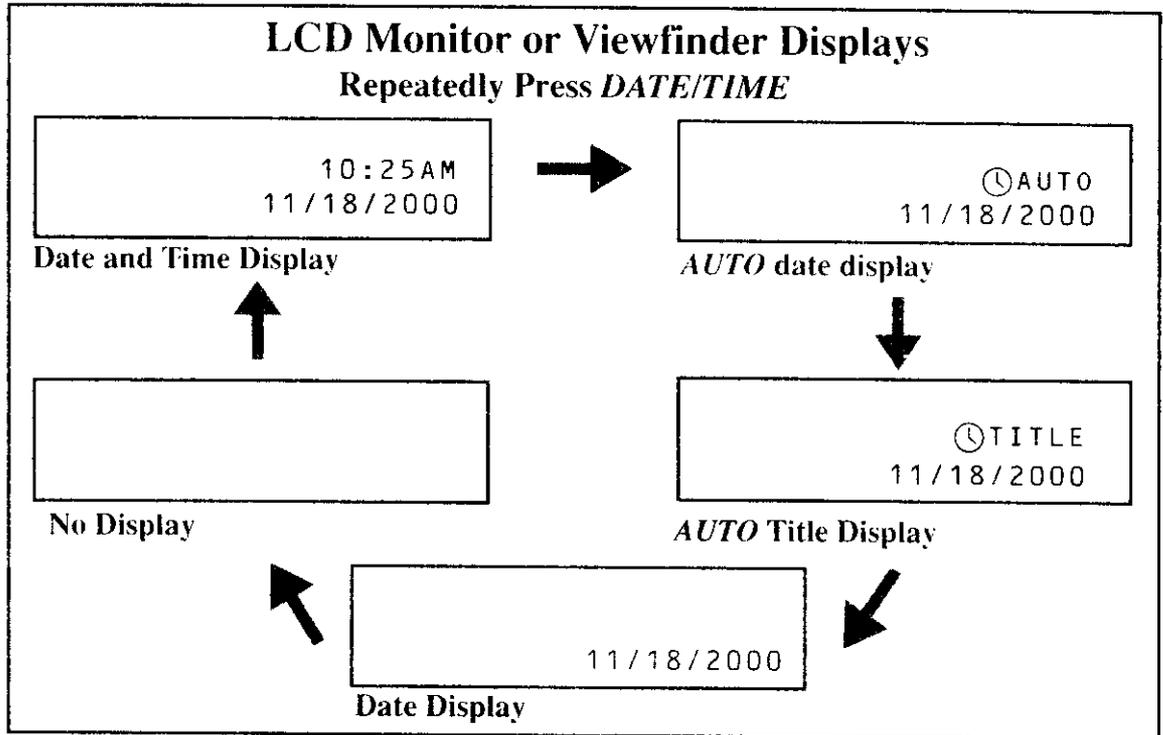
Correcting the Date or Time

To correct the date or time, press and hold the *DATE/TIME* button and then press *STOP/EJECT*. The display and the flashing cursor appear. Use *STOP/EJECT*, *F.FWD*, and *REW/REVIEW* to correct the time or date. Press *DATE/TIME* to remove the flashing cursor and start the clock.

Date and Time Display

Record the Time and Date, *AUTO* Date, Auto *TITLE*, or Date

The time and date, *AUTO* date, auto *TITLE*, date only, or no date can be recorded on your tape. Whenever one of these displays appear, it will be recorded.



To Select the Display to Record

1. Repeatedly press *DATE/TIME* to select the display you want to record.
 - **Date and Time Display:** The date and time will be displayed and recorded.
 - ⌚ **AUTO Date:** The date is automatically recorded for approximately 10 seconds at the beginning of the recording.
 - ⌚ **TITLE:** The date and title you have created are displayed and recorded for approximately 10 seconds at the beginning of the recording.
 - **Date Display:** The date is displayed and recorded.
 - **No Display:** No display is displayed or recorded.

Charging the Built-in Clock Battery

The camcorder has a built-in rechargeable battery that must be charged approximately every two months.

1. Attach the battery or AC adapter and set the *CAMERA/OFF/VCR* switch to *OFF*.

2. Leave the power supply attached at least 24 hours.

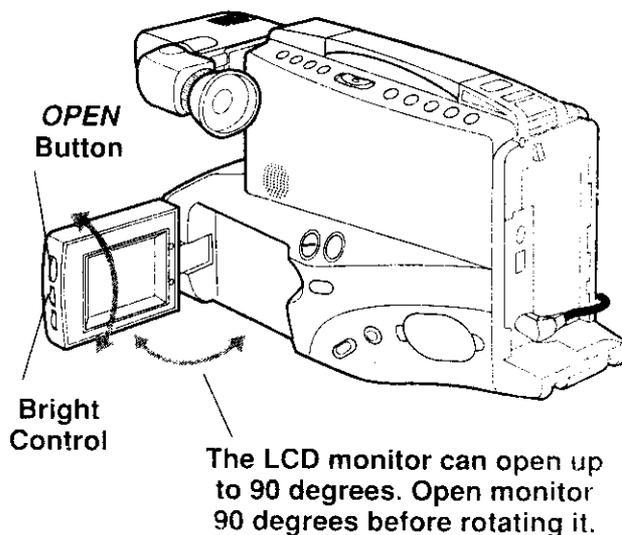
Caution: If the camcorder's internal battery is not charged every two months, it can over-discharge and shorten its life span. If you suspect that the battery is not working properly, contact an authorized RCA Service Center for service.

Seeing What's Recorded

Using the Viewfinder and LCD

What is being recorded can be viewed on the LCD monitor or through the camera's eyepiece, called the viewfinder. Note that when the LCD monitor is open more than 45 degrees, the viewfinder automatically turns off. Closing the LCD automatically turns the viewfinder display back on.

Using the LCD Monitor



Cautions: Do not force the LCD to open further than 90 degrees. This will damage the monitor and/or the camcorder.

Open the monitor 90 degrees before rotating it up, down or reversing its direction. Be sure the monitor is not rotated or tilted before closing the LCD.

Do not touch the monitor with your fingers. Use a soft cloth to clean it.

When carrying the camcorder with the shoulder strap, close and lock the LCD display. This will help prevent possible damage from bumping the monitor against your body while moving.

Adjusting the Monitor

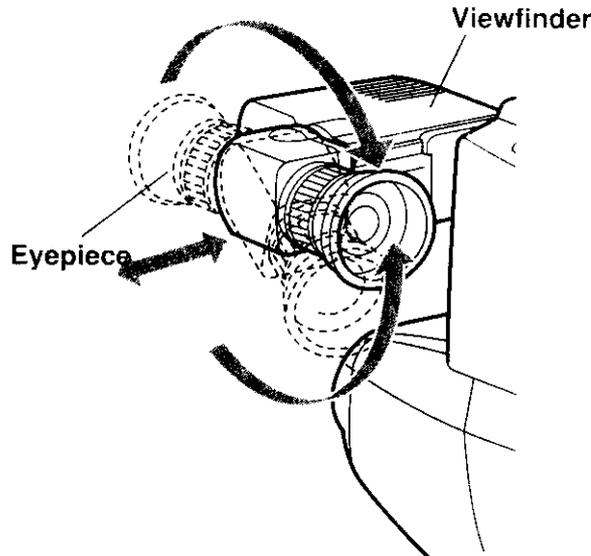
1. Press the *OPEN* button and swing the monitor out from the camera body. Make sure the LCD is open 90 degrees. The viewfinder will turn off.
2. Rotating the monitor
 - Tilt the monitor down to record from a high angle, such as over a crowd.
 - Tilt the monitor up to record from a low angle, such as when kneeling.
 - To enable both you and the person being recorded to see what's being recorded, rotate the LCD monitor completely around so the front of the monitor faces the person you're
3. To adjust the brightness of monitor's display, use the bright control on the side of the LCD. Adjusting the LCD's display does not affect the brightness of the recording being made.
4. When finished, carefully rotate the monitor back into position, closing and locking it into place.

Note: When recording on a bright, sunny day, the LCD monitor might be hard to see. Using the eyepiece will make the picture easier to see.

Seeing What's Recorded

Using the Viewfinder

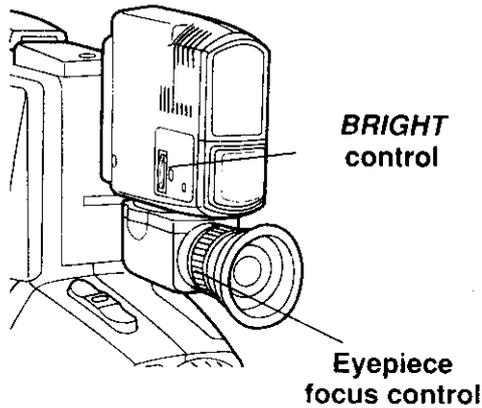
The camcorder's viewfinder (which contains the eyepiece) is a miniature monitor that displays the camcorder's recording image. When the LCD monitor is open from the camera body more than 45 degrees, the viewfinder automatically turns off. For convenient viewing, rotate the viewfinder horizontally, pull it out from the camcorder body and rotate the eyepiece back to face the camcorder's operator.



Cautions: Do not pull on the eyepiece. Do not force the eyepiece to rotate completely around. This could damage the viewfinder and/or the camcorder.

When carrying the camcorder with the shoulder strap, put the viewfinder back in its original position. This helps prevent possible damage to the viewfinder from bumping against your body as you move.

Viewfinder Controls



BRIGHT Control

The brightness of the viewfinder's image can be adjusted by rotating the **BRIGHT** control. This does not affect the picture being recorded by the camcorder.

Focus Adjustment

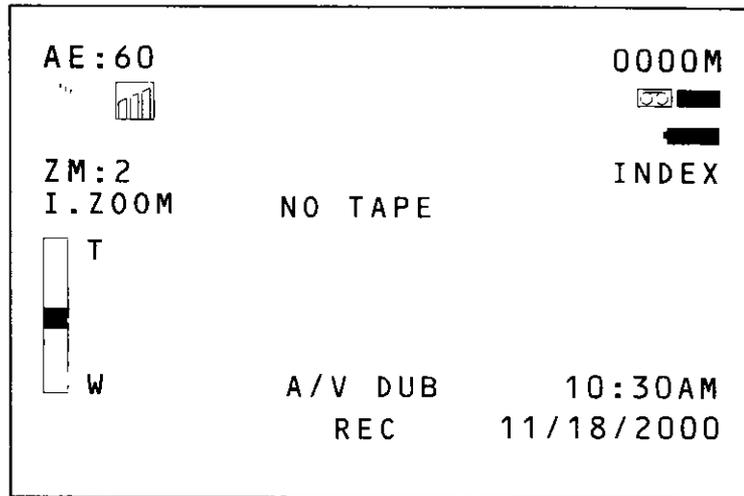
The eyepiece focus control allows adjustment of the focus of the viewfinder for your vision. If you wear eyeglasses, you probably can operate the camcorder without them.

It is easiest to set the correct focus by focusing on one of the viewfinder's on-screen displays. Look through the viewfinder and adjust the eyepiece focus control for your vision.

The eyepiece focus control does not affect the focus of the picture actually recorded by the camcorder.

On-Screen Displays

Identifying On-screen Elements



The camcorder's on-screen display delivers a variety of information about the camera's status and settings. To show this information, press the *DISPLAY* button on top of the camera.

The following is a list of on-screen icons used to display the camera's status and current settings.

Auto Exposure/Shutter Speed (*AE:60*)

Displays the current shutter speed used by the camcorder.

Battery Level Indicator (■■■■)

Displays the amount of energy left in the rechargeable battery. *For detailed information about the camera's battery, see page 16.*

Digital Effects (*ZM:2*)

Displays the selected indicator for the digital effect mode. To change the selected setting, press the *DIGITAL EFFECTS* button on top of the camera until the desired format is displayed.

- **16X9**— records in a wide format mode. Used for recordings to be displayed on a 16X9 TV.
- **VEGPOS**— reverses the captured image from positive to negative.
- **ZM:2**— activates extended zoom mode (wide angle) to 240 times when instant zoom is activated. *ZOOM* appears on-screen when an image is zoomed over 16 times.
- **MIRROR**— records mirror images on the left and right sides of the screen.
- **MOSAIC**— records a mosaic, or pixellated, image.
- *For detailed information about special effects, see pages 34-37.*

Steady Pix™ Indicator (■■■■)

The Steady Pix feature is designed to reduce the shakiness of recorded images. Often, when a camcorder is hand-held (rather than tripod mounted), there is noticeable movement of the camera. The Steady Pix feature reduces noticeable vibration in the recorded image.

(Continued on next page)

On-Screen Displays

To turn the Steady Pix feature on or off, press the *STEADY PIX* button on the side of the camera. The symbol, , appears on screen when the feature is activated. *For detailed information, see page 31.*

Fade Indicator ()

Activates one of four different types of fade effects from/to a blank screen.

-  indicates a slow, gradual fade.
-  indicates a fade from the center of the screen.
-  indicates a zooming fade.
- *B/W* indicates a black-and-white fade.

For more specific details, refer to pages 38-39.

Index Indicator (*INDEX*)

Displayed when the camcorder is placing an index mark on the tape. *For specific details, see page 32.*

Status Displays

The following indicators detail the status of the camcorder:

- *A. DUB*— appears during audio dubbing.
- *A/V DUB*— appears during dubbing of audio and video.
- *REC*— appears during recording.
- — appears while the camcorder is fast-forwarding through tape.
- — appears when the camcorder is rewinding through tape.
- — appears when a recording is paused.

Tape Counter with Memory Stop (0000M)

Displays the tape counter. The tape counter helps locate segments of tape. *For more specific details, refer to page 40.*

- Memory stop is turned on whenever the tape counter appears.

Tape Warnings (*TAPE*, *NO TAPE*, and *TAPE END*)

- *TAPL* flashes on screen when a recording is attempted with the safety tab removed from the camera's videocassette.
- *TAPE* flashes on screen when a damaged tape is inserted into the camera. Remove the tape and replace it with a new one.
- *NO TAPE* flashes when you try to record with no cassette inserted.
- *TAPE END* flashes when there is approximately five minutes of recording time left on the tape. This does not appear in the recording.
- *TAPE END* briefly appears when you reach the end of the cassette when you're recording. This does not appear in the recording.

Time and Date Display

To display the time and date, press the *DATE/TIME* button on top of the camera. *This will appear on the recording.*

Press the *DATE/TIME* button repeatedly to toggle through the recorded selections including *AUTO* date, auto *TITLE*, date only, no date, or time and date when the camcorder is in record-pause mode.

For more specific details, refer to pages 23-24.

On-Screen Displays

Tape-Remaining Indicator ()

Press the *DISPLAY* button on top of the camera to display the tape-remaining indicator. This display shows the approximate amount of tape left for recording or playback. *For more specific details refer to page 32.*

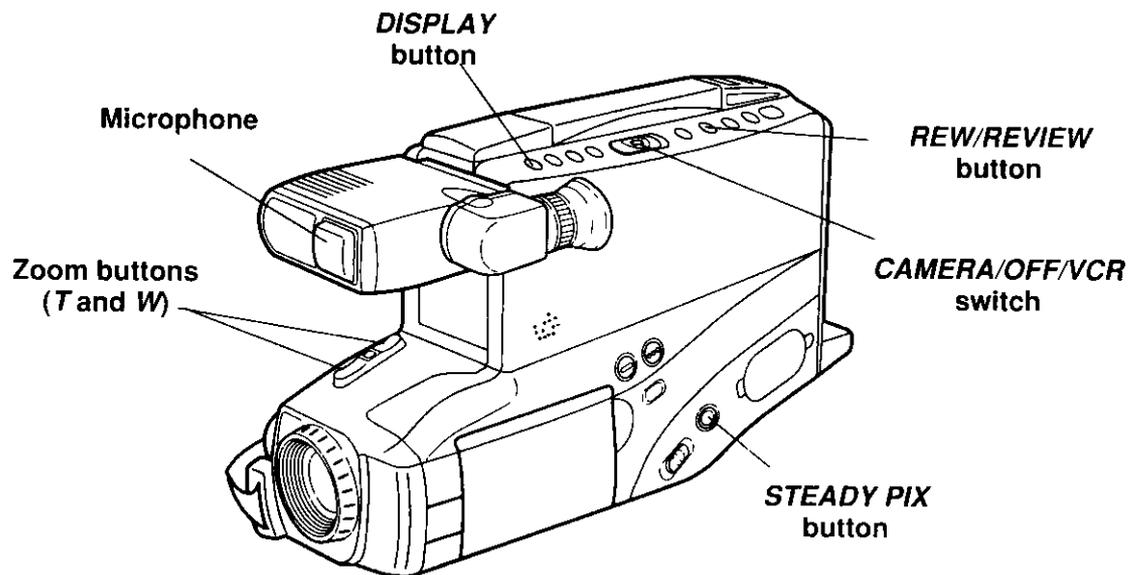
Zoom Indicators (*ZOOM* and *I.ZOOM*)(-)

- The zoom indicator (-) appears when you use the power zoom buttons (*T* and *W*).
- *ZOOM* appears when you zoom with the *T* button and magnifies the image more than 16 times.
- *I.ZOOM* appears when you press the *INST ZOOM* button to immediately enlarge the picture 1.5 times.
- *Details are on page 33.*

Camera Features

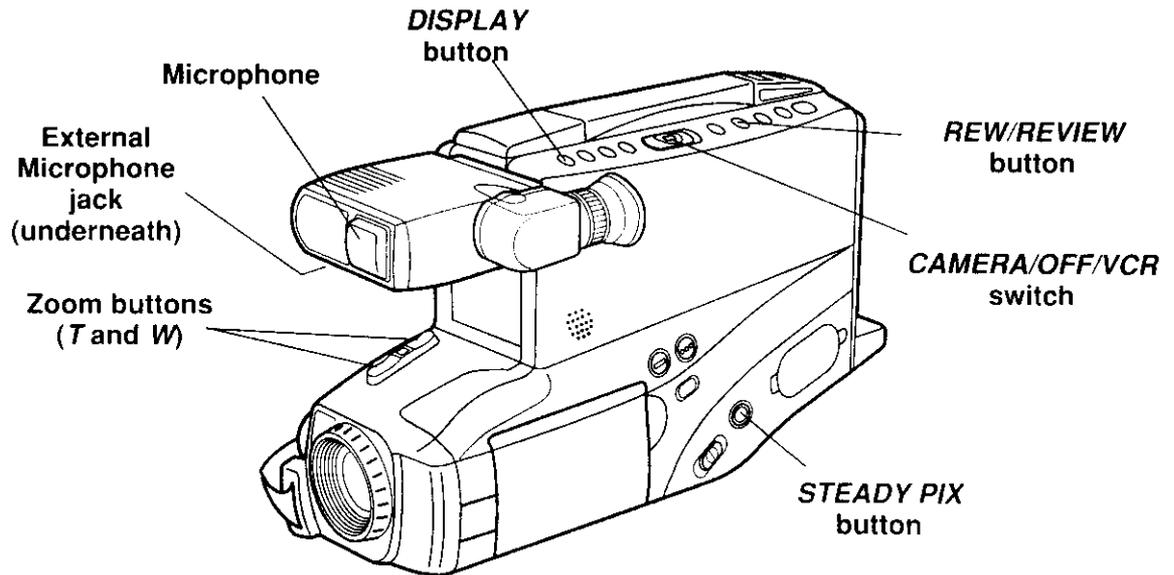
Your camcorder has a variety of features which can be changed with the touch of a button. Reviewing the camcorder's features for a few moments now will help you get the most out of your recordings.

In this section, you can not only learn to work with the standard, necessary functions of the camera (such as turning it on and advancing or reviewing the tape), but also some of the more special features that allow you to add your own flair to recordings.



(Continued on next page)

Camera Features



DISPLAY Button

Pressing the *DISPLAY* button toggles the camera's on-screen display on and off. The display shows on both the LCD monitor and the viewfinder's eyepiece. This screen display shows information about the battery level, the Steady Pix feature, shutter speed, tape counter with memory stop, remaining tape display, index, fade, zoom and digital effects indicators.

Microphone

The microphone picks up and records the sound during a taping. Being in the front of the camera, the microphone is more sensitive to sounds coming from whichever direction the lens is pointed. Using an external microphone will deactivate the built-in microphone.

Demonstration Mode

Your camcorder has a demonstration mode which highlights certain features of

the camera. This mode begins whenever the unit's power has been left on for more than ten minutes with no cassette inserted, without the date being set or the built-in clock battery charged.

To cancel demonstration mode, remove and reattach the battery or AC power adapter or insert a cassette.

Note: To prevent the demonstration mode from starting no matter how long the unit is powered on without tape, set the date and make sure the built-in clock battery is charged.

Quick Review Feature

To review the last few seconds of a recording, press and release the *REW/REVIEW* button on top of the camera when the camcorder is in record-pause mode. In order for this to work, the *CAMERA/OFF/VCR* switch must be set to *CAMERA*.

The camcorder will play back the last few seconds of the recording, and then stop the tape at its previous position, returning the camera to record-pause mode.

Camera Features

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AutoShot™ Feature

With this feature activated, the camcorder automatically adjusts focus, white balance, iris, shutter speed, and lighting according to the recording conditions.

Auto Focus

The camcorder focuses on the subject in the center of the camcorder's frame. Auto focus operates on the telephoto (*T*) side from approximately 3 feet to infinity. On the wide-angle (*W*) side, auto focus works from 3/8 of an inch from the lens surface (macro-focus) to infinity.

Note: The AE indicator for the shutter speed selected by the camcorder (1/60, 1/100, 1/120, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, or 1/4000) appears in the on-screen display when activated. This will not appear on the recorded image.

The following conditions may prevent auto focus from operating properly:

- Recording through a window.
- Recording a subject that has a close foreground and a far background.
- Recording two subjects at different distances that overlap.
- A subject not in center of the frame.
- Recording in low-light situations.
- Recording a scene with fast motions, like a tennis swing.

Macro Focus

The camcorder lens' macro-focus ability allows recording of objects as close as 3/8 of an inch. To use macro focus:

1. Press and hold zoom button *W* until the lens is completely zoomed out.
2. Position subject in the center of the frame and record.

Note: Zooming will automatically exit macro-focus. To change the size of the subject focused on in macro focus, move the camcorder lens closer or farther away from it.

For best results, increase lighting when recording with macro-focus.

Steady Pix™ feature

The Steady Pix feature corrects slight shaking of images during some recording modes including:

- Zooming in on a distant subject.
- Recording an approaching small subject.
- Recording while walking.
- Recording from a moving vehicle.

Using the Steady Pix Feature:

- Press the *STEADY PIX* button to activate. The steady pix indicator () appears on screen but not in the recording.
- Press the *STEADY PIX* button again to deactivate. The steady pix icon () disappears.

Notes: Turn the Steady Pix feature off when using a tripod. The feature may not operate properly when wide-angle or telephoto lens adapters are used.

There is a small change in the picture size when using the Steady Pix feature.

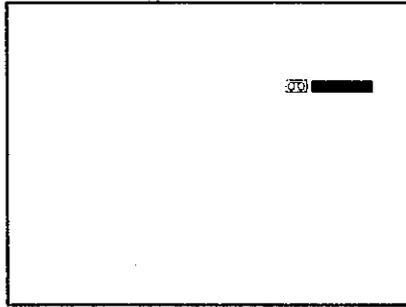
Accurate stabilization may not be possible if hand shake is excessive or when shooting the following:

- Subjects with vertical or horizontal stripes.
- Dark or dim subjects.
- Subjects with excessive backlighting.
- Scenes with movement in various directions.
- Scenes with low-contrast backgrounds.

Camera Features

Tape-Remaining Display

The tape-remaining display shows the approximate amount of tape left for recording or playback.

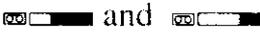


Tape-remaining display which shows in the LCD monitor or viewfinder

- Press the *DISPLAY* button on top of the camera to display the on-screen display. The tape-remaining indicator appears in the viewfinder or LCD.
- The camcorder takes approximately ten seconds to calculate the remaining tape when you first start playing or recording a tape.

“ _ _ _ _ _ ” appears while the camcorder calculates the amount of tape remaining.

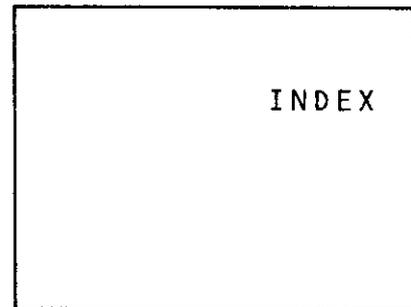
Once the remaining tape has been calculated, it is automatically updated and readily available as long as the same tape remains in the camcorder.

- When  appears, all or most of the tape remains.
-  and  appear as the tape is being used.
- When the tape has approximately five minutes left, “*TAPE END*” flashes in the viewfinder or on the LCD monitor.

Electronic Indexing

Each time you begin recording (after the unit has been turned off for at least four hours), the camcorder automatically records an index mark at the beginning of a new recording.

When an indexed tape is played back in a VCR that has a compatible indexing feature (called “VHS Index Search System”), these invisible marks can be located automatically. See your VCR’s *Owner’s Manual* for index playback



INDEX display which shows in the LCD monitor or viewfinder

instructions.

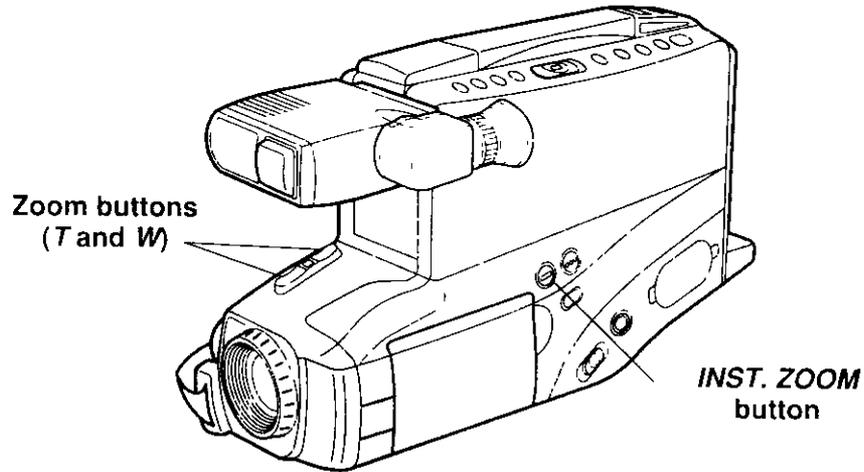
When the *DISPLAY* button is pressed and the on-screen menu appears, “*INDEX*” appears briefly to let you know the camcorder is recording an index mark.

Note: The camcorder does not record index marks every time you stop and start recording. An index mark is recorded only once – at the start of each recording session (or whenever the unit has been turned off for four hours).

Camera Features

Zooming

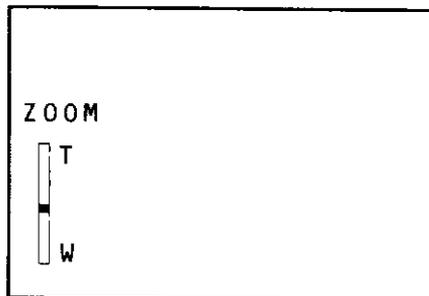
The zoom buttons (T and W) allow for close ups and wide-angle shots. While the zoom amount can be manually adjusted using the T and W buttons, instant zooming is also possible, immediately magnifying the picture 1.5 times.



Using the Zoom Buttons (T and W)

- To zoom in or out up to 72 times the normal magnification, press zoom button *T* or *W*.
 - To move the lens in the telephoto (close-up) direction, press *T*
 - To move the lens in the wide angle direction, press *W*.

The zoom level indicator appears in the on-screen displays when the *DISPLAY* button is pressed. "ZOOM" appears on screen when the image is magnified more than 16 times

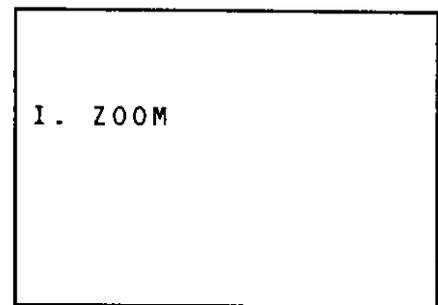


Zoom Level Indicator in LCD Monitor or Viewfinder

Using the Instant Zoom Button (INST. ZOOM)

- To instantly magnify the subject 1.5 times, press the *INST ZOOM* button on the side of the camcorder.

"*I. ZOOM*" appears in the on-screen displays during instant zooming



Instant zoom display shown in the on-screen displays when the *DISPLAY* button is pressed

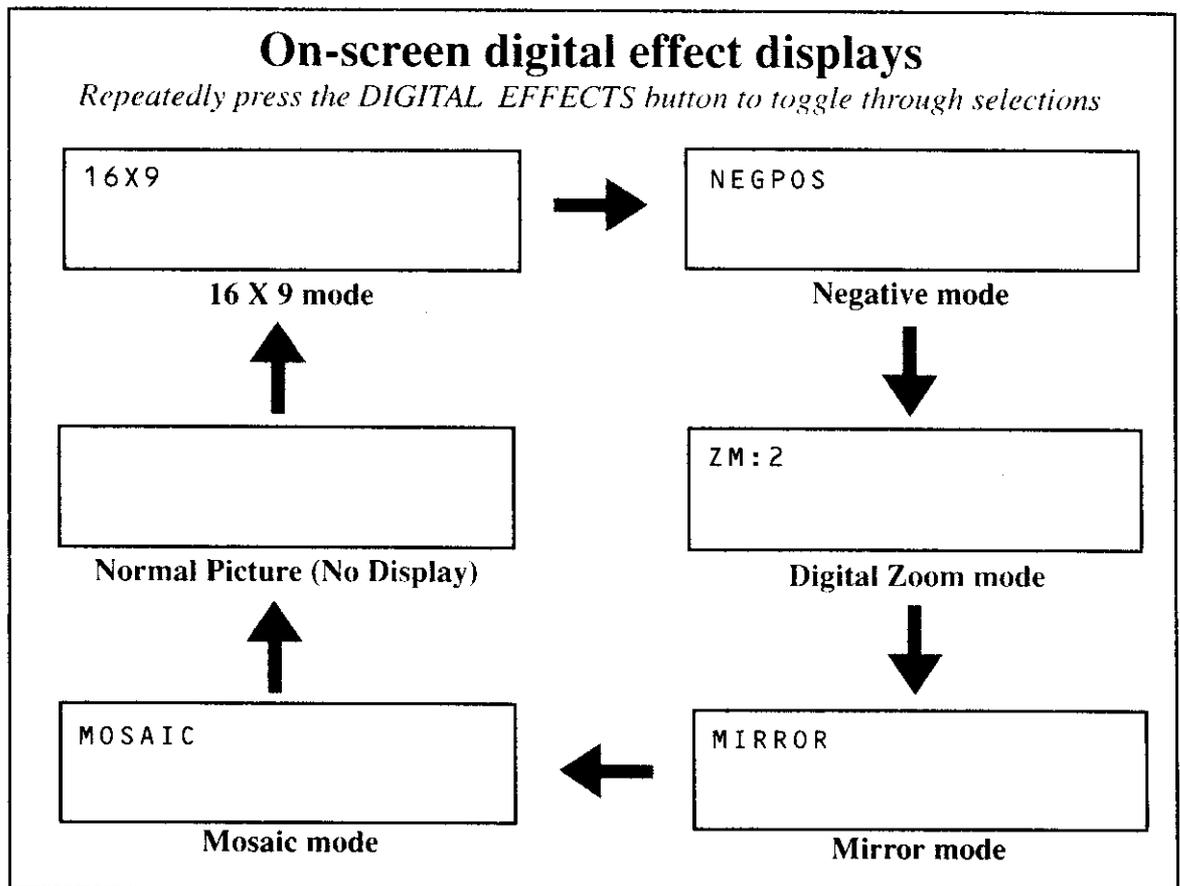
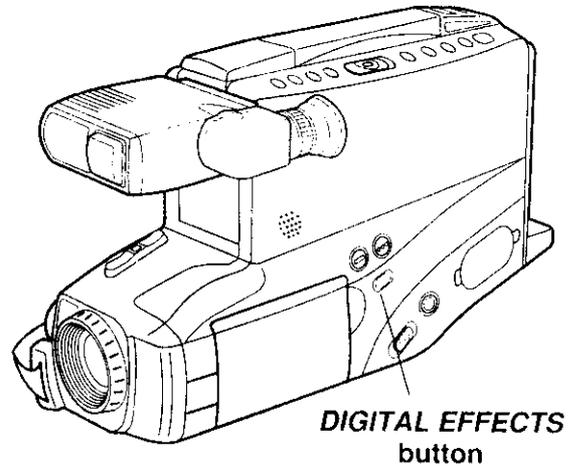
Digital Effects

Adding Effects

The camcorder has a digital processor that allows recording using one of five special digital effects. One can record using: 16X9 mode (wide format), negative image (reversing all colors), 240 times digital zoom (with instant zoom), mirror image (showing the image and its reversed opposite), or mosaic image (as though built with mosaic tiles). Each effect is described in detail in the following section.

Selecting a Digital Effect

1. Place the camcorder in record-pause mode. Make sure the on-screen displays appear in the viewfinder or on the LCD monitor. If not, press the *DISPLAY* button.
2. Repeatedly press the *DIGITAL EFFECTS* button until the indicator for the desired digital effect appears on screen. This icon will not be recorded.



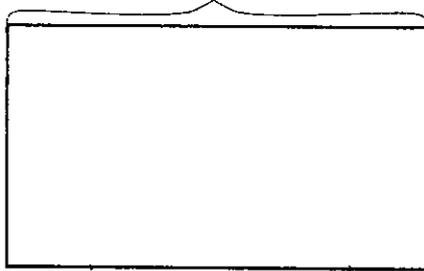
Digital Effects

Selecting a Digital Effect (Continued)

16X9 Mode

The camcorder has a wide format recording mode allowing the creation of recordings that are compatible with the 16X9 TV format. When 16X9 mode is activated, the camcorder records black bars at the top and bottom of the picture to produce the wide-screen effect. This is also known as *letterbox* recording.

New 16x9 TV Screen

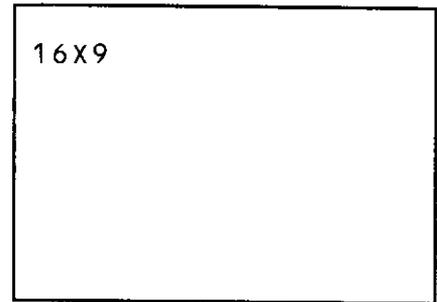


Standard Shape TV Screen

Caution: Do not use this mode unless you have a compatible 16 X 9 TV. When played on a regular (4 X 3) TV, black bars appear on top and bottom of the picture.

Recording in 16X9 Mode

1. Place the camcorder in record-pause mode. Make sure the on-screen displays appear in the viewfinder or on the LCD monitor. If not, press the *DISPLAY* button.
2. Repeatedly press the *DIGITAL EFFECTS* button until *16X9* appears.
3. Press *REC/PAUSE* to start recording.
4. To turn off *16X9* recording, press *REC/PAUSE* to pause recording, and repeatedly press *DIGITAL EFFECTS* until no digital effects display appears.



16X9 display as shown in the LCD Monitor or Viewfinder



16X9 Mode



Normal Mode

Digital Effects

Selecting a Digital Effect (*Continued*)

Negative Mode

To use the camcorder's negative mode reversing all colors:

- 1 Put the camera in record-pause mode. Make sure the on-screen displays appear. If not, press the *DISPLAY* button on top of the camera.
- 2 Repeatedly press *DIGITAL EFFECTS* until *NEGPOS* appears.
- 3 Press *REC/PAUSE* to start recording.
- 4 To turn off negative recording, press *REC/PAUSE* to pause recording, and repeatedly press *DIGITAL EFFECTS* until no digital effects display appears.



Normal Mode



Negative Mode

Digital Zooming

The camcorder has digital zooming allowing magnification up to 240 times (with instant zoom). Normal zooming is up to 72 times.

- 1 Place the camcorder in record-pause mode. Make sure the on-screen displays appear. If not, press the *DISPLAY* button.
- 2 Repeatedly press the *DIGITAL EFFECTS* button until *ZM 2* appears. Use the zoom buttons to zoom in and out on the image. *ZOOM* appears on-screen when magnification is greater than 16 times but does not record. Use the instant zoom feature while *ZM 2* appears to magnify up to 240 times.
3. Press *REC/PAUSE* to start recording.
4. To turn off digital zooming, press *REC/PAUSE* to pause recording, and repeatedly press *DIGITAL EFFECTS* until no digital effects display appears.

Note: As the zoom level increases during digital zooming, the picture will gradually become less sharp. Use the high zoom levels mainly for special effects.



Normal mode



Digital zoom mode

Digital Effects

Selecting a Digital Effect (Continued)

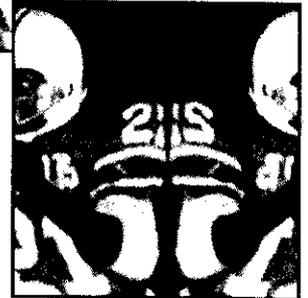
Mirror Mode

The camcorder has a mirror mode that lets you display a symmetric image on the left and right, obtained by placing a mirror at the center of the screen.

1. Place the camcorder in record-pause. Make sure the displays appear in the viewfinder or on the LCD monitor. If they do not, press *DISPLAY*.
2. Repeatedly press *DIGITAL EFFECTS* until *MIRROR* appears.
3. Press *REC/PAUSE* to start recording.
4. To turn off mirror recording, press *REC/PAUSE* to pause recording, and repeatedly press *DIGITAL EFFECTS* until no digital effects display appears.



Normal Mode

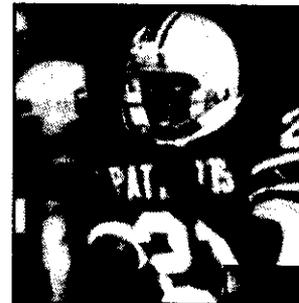


Mirror Mode

Mosaic Mode

The mosaic feature lets you add a mosaic effect to your recording.

1. Make sure the displays appear in the viewfinder or on the LCD monitor. If they do not, press *DISPLAY*.
2. Repeatedly press *DIGITAL EFFECTS* until *MOSAIC* appears.
3. Press *REC/PAUSE* to start recording.
4. To turn off mosaic recording, press *REC/PAUSE* to pause recording, and repeatedly press *DIGITAL EFFECTS* until no digital effects display appears.



Normal Mode



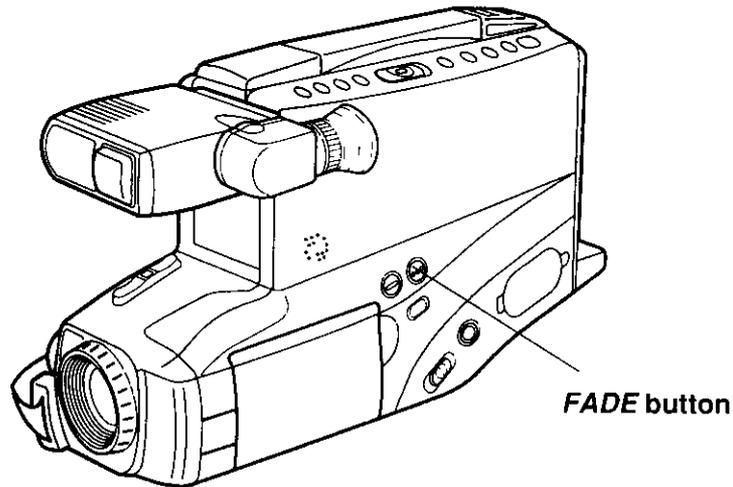
Mosaic Mode

Note: Mosaic recording cannot be used with digital zooming, instant zooming, steady pix, or the zoom fade features.

Digital Effects

Fading in and out of Scenes

A professional touch can be added to recordings by fading in and out of scenes. Both the picture and sound gradually appear or disappear with these various effects. The speed of the fade is controlled by the camcorder.



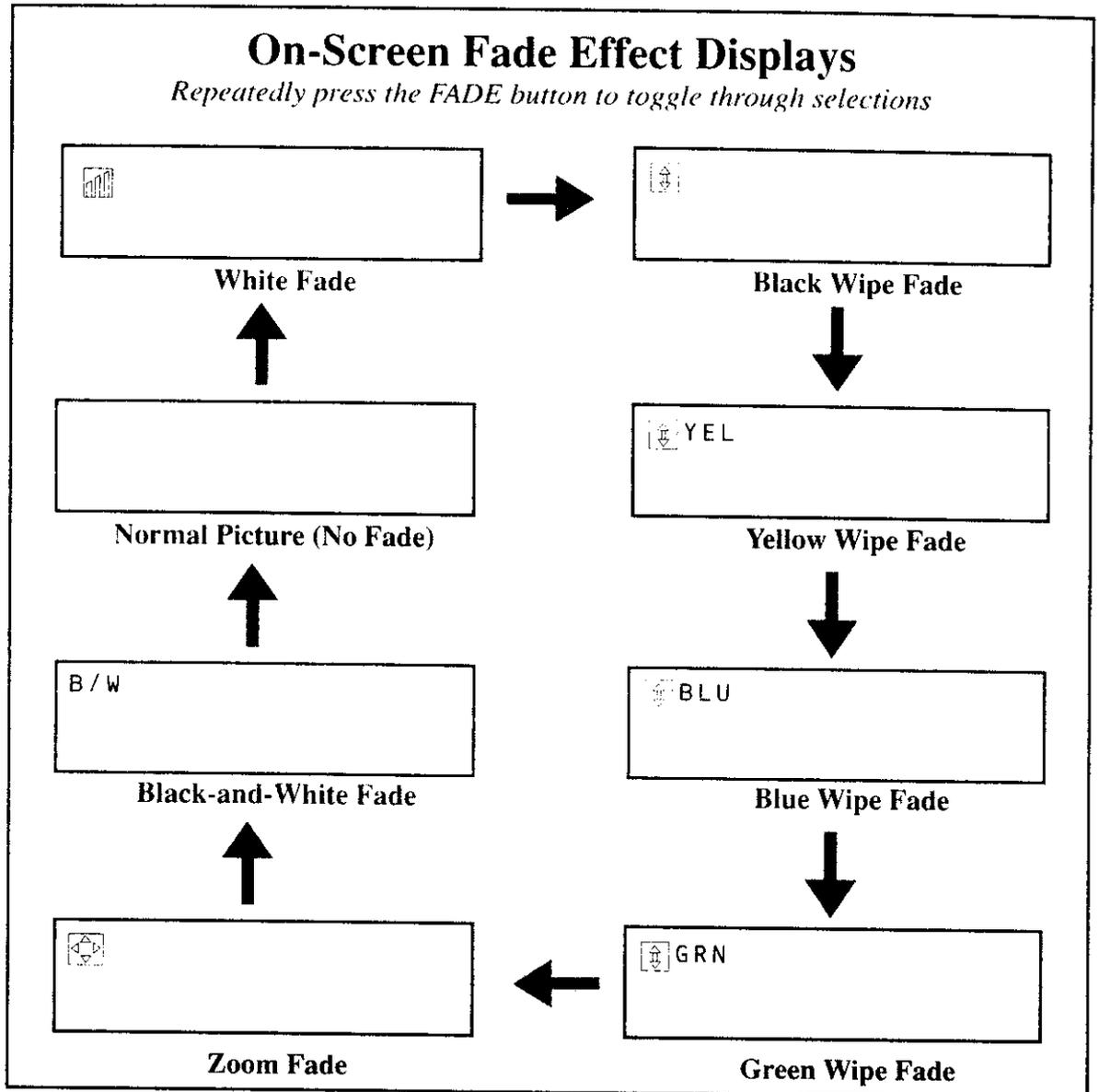
Selecting Fade Types

Fade effects include white fade, black, yellow, blue, and green wipe fade, zoom fade, or black-and-white fade.

- 1 Press *REC/PAUSE* to pause recording. Make sure the displays appear on screen. If not, press the *DISPLAY* button.
- 2 Repeatedly press the *FADE* button. The indicator for the fade selected will appear on screen.
 - Select  (white) to fade in and out to/from a white screen.
 - Select  (black wipe) to fade in and out to/from a black screen.
 - Select  *YEL*,  *BLU*,  *GRN* (yellow, blue, or green wipe) to fade to/from a yellow, blue, or green screen.

- Select  (zoom) to fade in and out while zooming.
- Select *B/W* (black-and-white) to fade in and out to/from a black-and-white picture.
- Select no fade indicator if you do not want to fade in or out.

Notes: Zoom fade does not operate with MIRROR and MOSAIC special effects modes. Pressing the DIGITAL EFFECTS button turns off the fade mode. Set the digital effect you want, and then set the fade.



Fading In

1. Press *REC/PAUSE* to pause recording.
2. Repeatedly press *FADE* to select the fade you want to use.
Note: The last fade used appears the first time you press *FADE*.
3. Press *REC/PAUSE* to start recording. The picture and sound gradually appears in place of the blank screen.

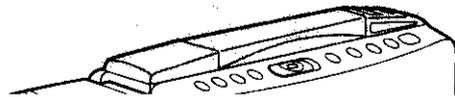
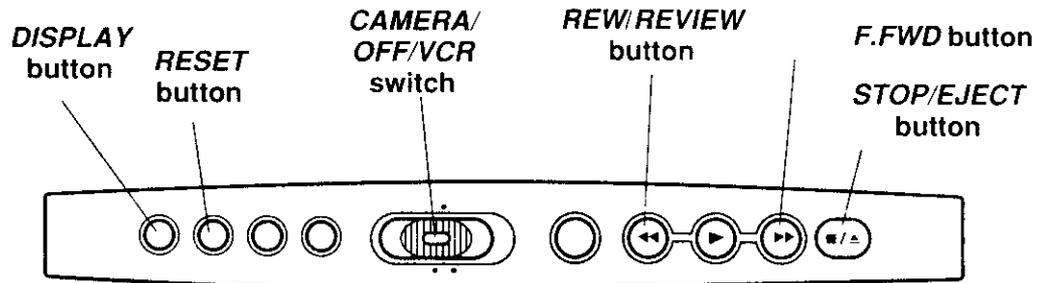
Fading Out

1. During recording, repeatedly press *FADE* to select a fade.
Note: The last fade used appears the first time you press *FADE*.
2. Press *REC/PAUSE* to stop recording. The picture and sound gradually disappears.

Tape Counter

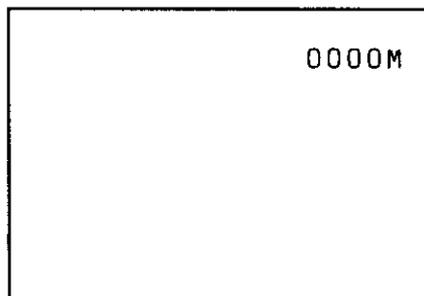
Locating Tape Segments

The tape counter acts as a handy reference to help you locate tape segments. The memory-stop feature helps locate a certain point on the tape. When the tape counter appears, the tape stops automatically during rewind or fast forward when the tape counter reaches 0000M.



Using Memory-Stop

1. Press *REC/PAUSE* to pause recording. Make sure the displays appear on screen. If not, press the *DISPLAY* button.
2. Locate the space on the tape to be returned to, and press *RESET* to reset the counter to 0000M.



Tape counter with memory stop

3. Continue to record or play the tape. To return to the marked space, press the *REC/PAUSE* button to stop

recording or the *STOP/EJECT* button to stop playback.

4. Press and hold the small, red button on the *CAMERA/OFF/VCR* switch and slide the switch to *VCR*.
5. Press the *REW/REVIEW* button. The tape rewinds to the counter reading of 0000M, the space marked.

Notes: Press the *DISPLAY* button to show or hide the tape counter. This number will appear on the recording. Memory stop is turned on whenever the tape counter appears.

The camcorder automatically stops when the counter reaches 0000M. To continue rewinding or fast forwarding, press the proper button again.

The tape counter automatically resets to 0000M whenever a cassette is inserted.

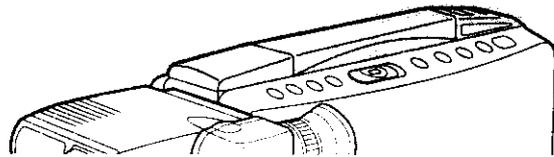
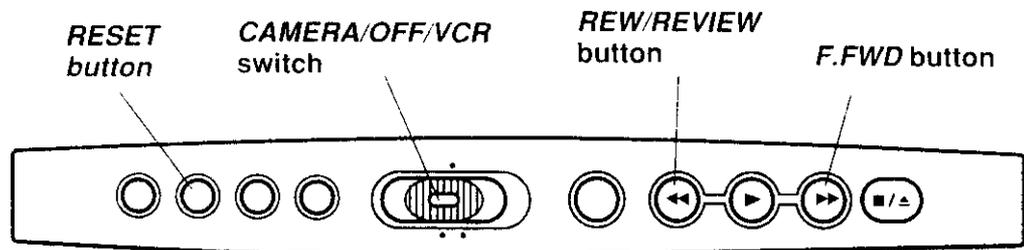
Editing Videocassettes

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Editing Features

The camcorder incorporates a complete package of advanced editing features to make it easy and fun to edit home videos giving them a professional touch. The major editing features described in this section include:

- Camera Edit
- Flying Erase Head
- Audio Dub
- A/V (Audio/Video) Dub
- Titler



Camera Edit Feature

The camera edit feature allows positioning the tape at a specific area while in record-pause mode. To enter RECORD mode, press and hold the small button on the *CAMERA/OFF/VCR* switch and slide it to *CAMERA*. Begin recording. When editing is desired, press the PAUSE button. To position the tape for editing:

- Press and hold *REW/REVIEW* to visually search the recorded tape in reverse.
- Press and hold *F.FWD* to visually search forward on the recorded tape.
- Press and hold *PLAY* to view the recorded tape at normal speed.

When the button used to search is released, the camcorder returns to record-pause mode, halted at that point on the videocassette.

Flying Erase Head

A separate head for erasing is mounted on a spinning (hence the term “flying”) headwheel within the camera. This flying head allows the creation of clean edits without the “glitches” or “rainbow noise” that might occur at the beginning or the end of recordings.

Editing Videocassettes

Audio Dubbing

The audio dub feature lets you record new audio (sound) on previously recorded video tape without erasing the original video (picture). The previous audio track is erased and replaced with the new dubbed audio.

The audio dub feature increases editing flexibility. Video segments can be assembled first and then voice-overs or music can be added later.

How to add new audio:

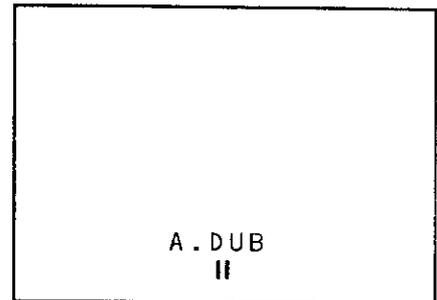
- Speaking into the camcorder's built-in or external (not supplied) microphone.
- Connecting an external sound system to the white AUDIO jack of the camcorder. To connect the camcorder to an external audio source, see the diagram on the next page.

Dubbing Audio Onto a Recording

1. Enter playback mode by pressing and holding the small button on the *CAMERA/OFF/VCR* switch, sliding it to the *VCR* position.
2. If recording from an external audio source, set the *AV OUT/IN* switch on the camcorder to the *IN* position.

Remember: Set the *AV OUT/IN* switch to *OUT* for normal recording.

3. Insert the tape to be dubbed and using the buttons *PLAY*, *F.FWD*, and/or *REW/REVIEW*, locate a point on the tape a few seconds before the point where dubbing will start.
4. Press the *PLAY* button to advance the tape at normal speed. At the exact point where dubbing is to begin, press the *REC/PAUSE* button to pause the recording.
5. Press and hold the *AV DUB* button, and then press the *PLAY* button. If both buttons are released at the same



time, "A. DUB ||" appears on screen. The camcorder is now ready to begin audio dubbing.

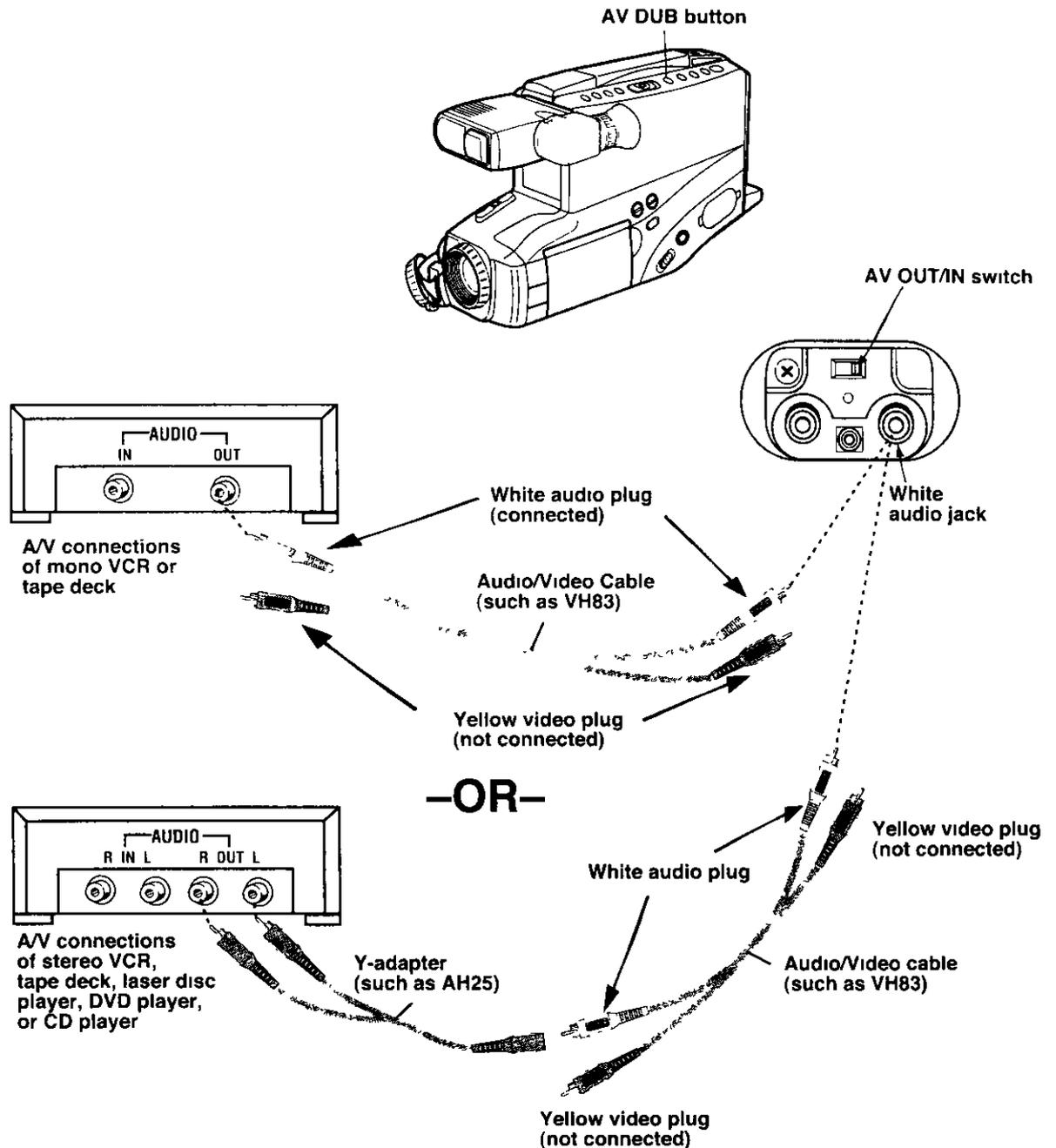
6. To begin dubbing, start the audio source and press the *REC/PAUSE* button. The || icon disappears when dubbing starts.

Note: Dubbing can be stopped at a certain point on the tape. To do so, find the end point for the dub on the recording and set the tape counter to 0000M by pressing the *RESET* button on top of the camera. Then rewind the tape to the start point for dubbing. The camcorder stops dubbing automatically when it reaches 0000M.

7. Press the *STOP/EJECT* button when audio dubbing is finished.

Editing Videocassettes

Connecting the Camcorder to an External Audio Source



Note: You need an optional Audio/Video cable, such as VH83 to connect to an external audio source. If the audio source has separate left and right outputs, attach the AV cable to the audio plug labeled MONO. If one is not labeled MONO, you might need a Y-adaptor to record audio from both the right and left channels (see the References section in this manual to order optional accessories)

Editing Videocassettes

Dubbing Both Audio and Video

The audio and video dub feature allows the recording of both new audio (sound) and video (picture) on a previously recorded tape. The audio and video dub is achieved with either

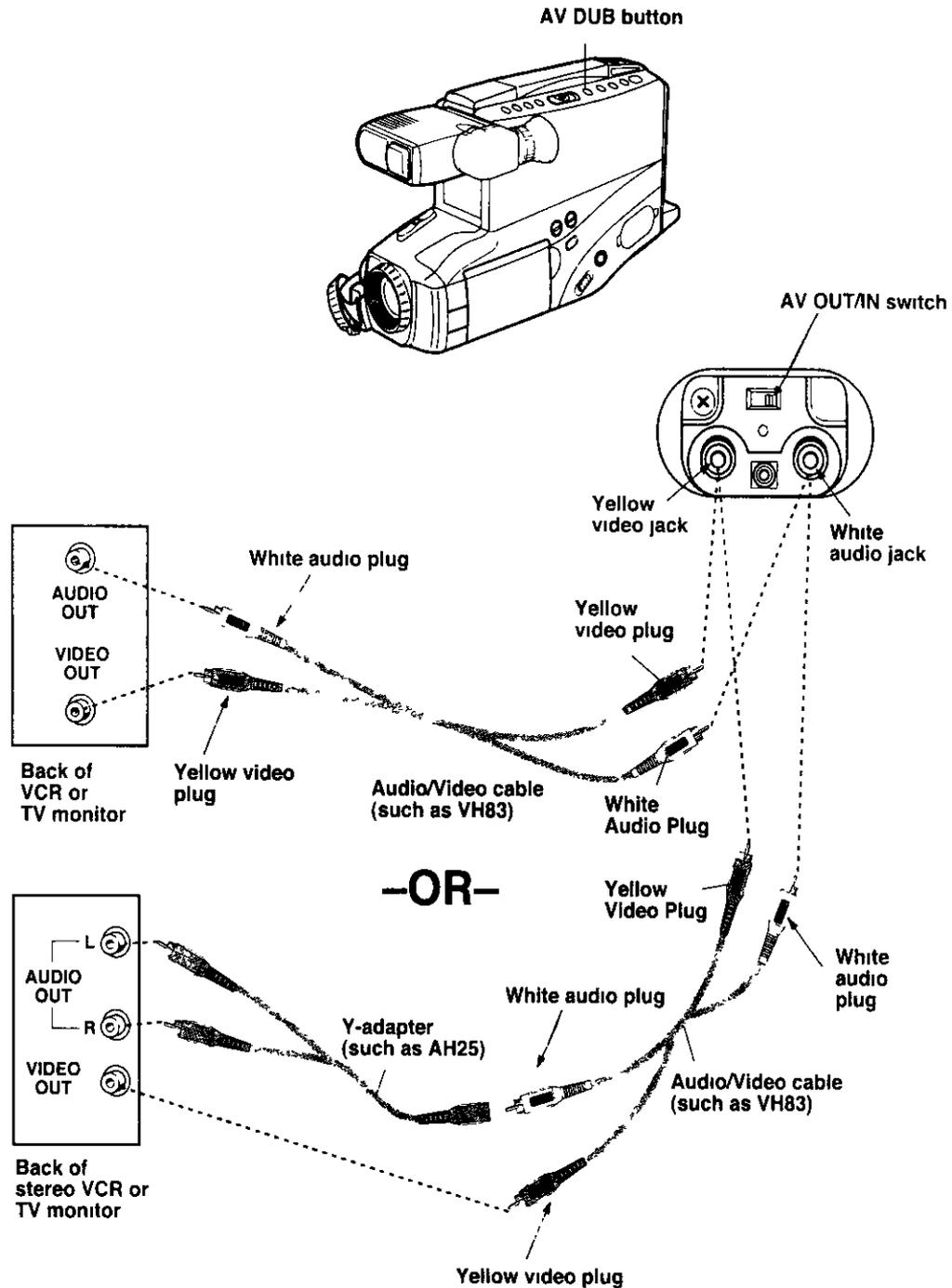
- The camcorder's built-in microphone or an external microphone (not included), and camera.
- or -
- An external sound and video system connected to the camcorder's white *AUDIO* and yellow *VIDEO* jacks. To connect the camcorder to external audio and video sources, see the diagram on the next page.

Dubbing Audio and Video Onto a Recording

1. Enter playback mode by pressing and holding the small button on the *CAMERA OFF VCR* switch, sliding it to the *VCR* position.
2. If recording from external sources connected to the camcorder's white *AUDIO* and yellow *VIDEO* jack, set the *AV OUT-IN* switch to *IN*.
Remember: Set the *AV OUT-IN* switch to *OUT* for normal recording.
3. Insert the tape to be dubbed and using the buttons *PLAY FFWD*, and/or *REW REVIEW*, locate a point on the tape a few seconds before the point where dubbing will start.
4. Press the *PLAY* button to advance the tape at normal speed. At the exact point where dubbing is to begin, press the *REC/PAUSE* button to pause the recording.
5. Press and hold the *AV DUB* button, and then press the *PLAY* button. If both buttons are released at the same time, "*AV DUB II*" appears on screen. The camcorder is now ready to begin audio dubbing.
6. To enter audio and video dub mode, again press and hold the *AV* button, while pressing the *PLAY* button. "*AV DUB II*" appears in the on-screen display. The camera is now ready to start audio and video dubbing.
7. Start the audio source and press the *REC/PAUSE* button. The *II* icon disappears when dubbing starts.
Note: Dubbing can be stopped at a certain point on the tape. To do so, find the end point for the dub on the recording and set the tape counter to 0000M by pressing the *RESET* button on top of the camera. Then rewind the tape to the start point for dubbing. The camcorder stops dubbing automatically when it reaches 0000M.
8. Press the *STOP/EJECT* button when audio dubbing is finished.

Editing Videocassettes

Connecting the Camcorder to External Audio and Video Sources



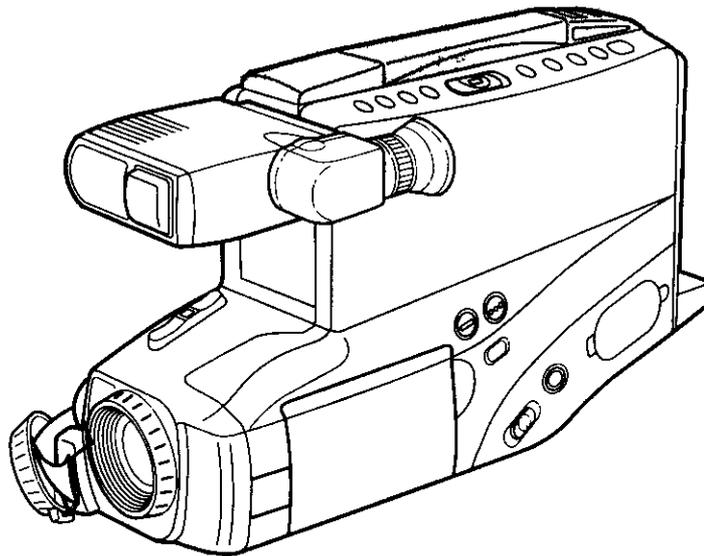
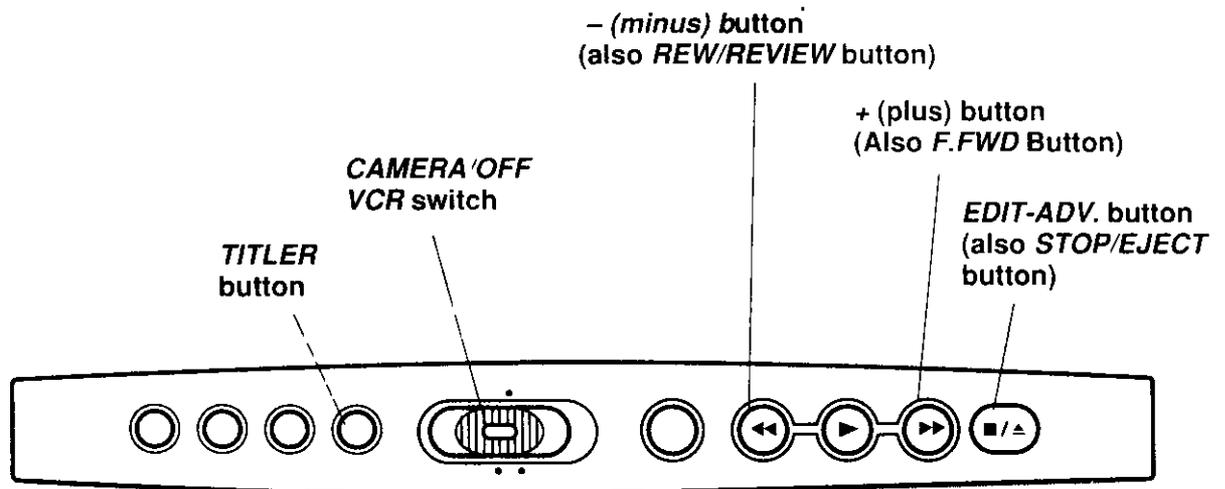
Note: You need an optional Audio/Video cable, such as VH83 to connect to an external audio source. If the audio source has separate left and right outputs, attach the AV cable to the audio plug labeled MONO. If one is not labeled MONO, you might need a Y-adaptor to record audio from both the right and left channels (see the References section in this manual to order optional accessories).

Editing Videocassettes

Camcorder Titler

The camcorder's built-in titler can store added personalized text into memory. The created title can be displayed and recorded at any time.

The built-in character register contains more than 45 different characters. Your title can contain up to 32 characters on two lines.



Editing Videocassettes

Creating Personalized Titles

1. Attach a power source to the camcorder. Press and hold the small button on the *CAMERA/OFF/VCR* switch and slide it to *CAMERA*.
2. Press the *TITLER* button to display the titler register on screen. A flashing cursor will be visible.
3. Press the *EDIT-ADV* button to move the cursor to the desired character.
4. Make the first selection for a customized title by pressing the + (plus) or – (minus) button until the desired character appears on screen.

See the chart of characters below for available selections.

5. After selecting the first character, press the *EDIT-ADV* button to move the flashing cursor to the next desired character to appear.
6. Repeat steps 4 and 5 until you have completed the customized title.
7. When finished, press the *TITLER* button to store the customized expression and remove the chart of characters from on screen.

Remember: *Be sure to remove the titler graphics from the on-screen display as this before continuing to record.*

Correcting Errors

1. Press the *TITLER* button to display the chart of characters on screen.
2. Press the *EDIT-ADV* button to move the flashing cursor over the character to be corrected.
3. Press the + (plus) or – (minus) button until the correct character appears.
4. When finished, press the *TITLER* button to store the corrected expression and remove the chart of characters from on screen.

Note: *If you want to delete a character, press the + (plus) or – (minus) buttons until the blank space appears.*

Titler's Chart of Characters													
A	B	C	D	E	F	G	H	I	J	K	L	M	
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
0	1	2	3	4	5	6	7	8	9	?	'	./	,
-	;	:	<	>	!	(BLANK)							

Editing Videocassettes

Recording onto a Tape in the Camcorder

1. Attach a power source to the camcorder. Press and hold the small button on the *CAMERA/OFF/VCR* switch and slide it to the *CAMERA* position.
2. Navigate to the desired location on the tape to record a title.

Note: If you record a title on a prerecorded tape, the audio and video is erased where the title is inserted. A three-to-four second pause of blank tape appears before the pre-existing audio and video return.

To eliminate the pauses of blank tape, use the audio and video dub feature to add titles to prerecorded tapes (See pages 42-43 for more information).

3. Press *TITLER* to display the titler graphics in the viewfinder or on the LCD monitor.
4. Press *REC/PAUSE* to start recording the title.
5. After you have recorded the title for the desired length of time, press the *TITLER* button to remove it. The camera will now record normally. To stop recording, press the *REC/PAUSE* button.

Remember: Remove the titler graphics for normal recording.

Note: You can also use the automatic title recording feature to automatically record the title and date for 10 seconds when you begin recording. Press the *DATE/TIME* button to display  *TITLE* icon before starting to record.

Recording Titles While Copying a Tape From the Camcorder to Another VCR

1. Attach a power source to the camcorder.
2. Place the tape to copy in the camcorder, then press and hold the small button on the *CAMERA/OFF/VCR* switch while sliding it to the *VCR* position.
3. Place a blank tape in the VCR and place the VCR in record-pause mode.
4. Begin copying the tape from the camcorder to the VCR. For specific details, see pages 54-55.
5. Find the point on the tape to insert a title and press the *TITLER* button.
6. After recording the title for a desired amount of time, press the *TITLER* button to stop recording it.
7. Stop the camcorder and VCR when finished copying the tape.

Important Note: Remove the titler graphics for normal recording by pressing the *TITLER* button.

Tips

Recording Tips

- Make sure indoor scenes are well lit. Adequate lighting improves picture quality and color reproduction.
- Do not move the camcorder rapidly from side-to-side while recording. A steady gradual “pan” avoids blurring and “jitter.”
- Use the viewfinder or LCD monitor to ensure the camcorder is level while recording so that scenes don’t appear “tilted.”
- Do not bump or tap the camcorder’s microphone as a sound test while recording to ensure the camera’s view doesn’t become tilted.
- Including close-ups of individuals when taping family outings or group functions is a good way to ensure memorable moments.
- Fading in and out of scenes makes videos appear more professional.
- Learn to use the special digital effects available with the camcorder to add variety to personal recordings.
- Be aware of video and audio backgrounds. Background details barely noticed during recording may show up as visual “clutter” on tape. Background noises (especially TV sets, radios, household appliances, traffic sounds, etc.) can detract from the desired sound to be captured.
- Avoid long “still” shots of landmarks and scenic attractions. Recordings are more interesting if they include people and details. “Local color” will give travel videos lasting appeal. Consider recording a familiar or landmark scene from an unfamiliar vantage point.

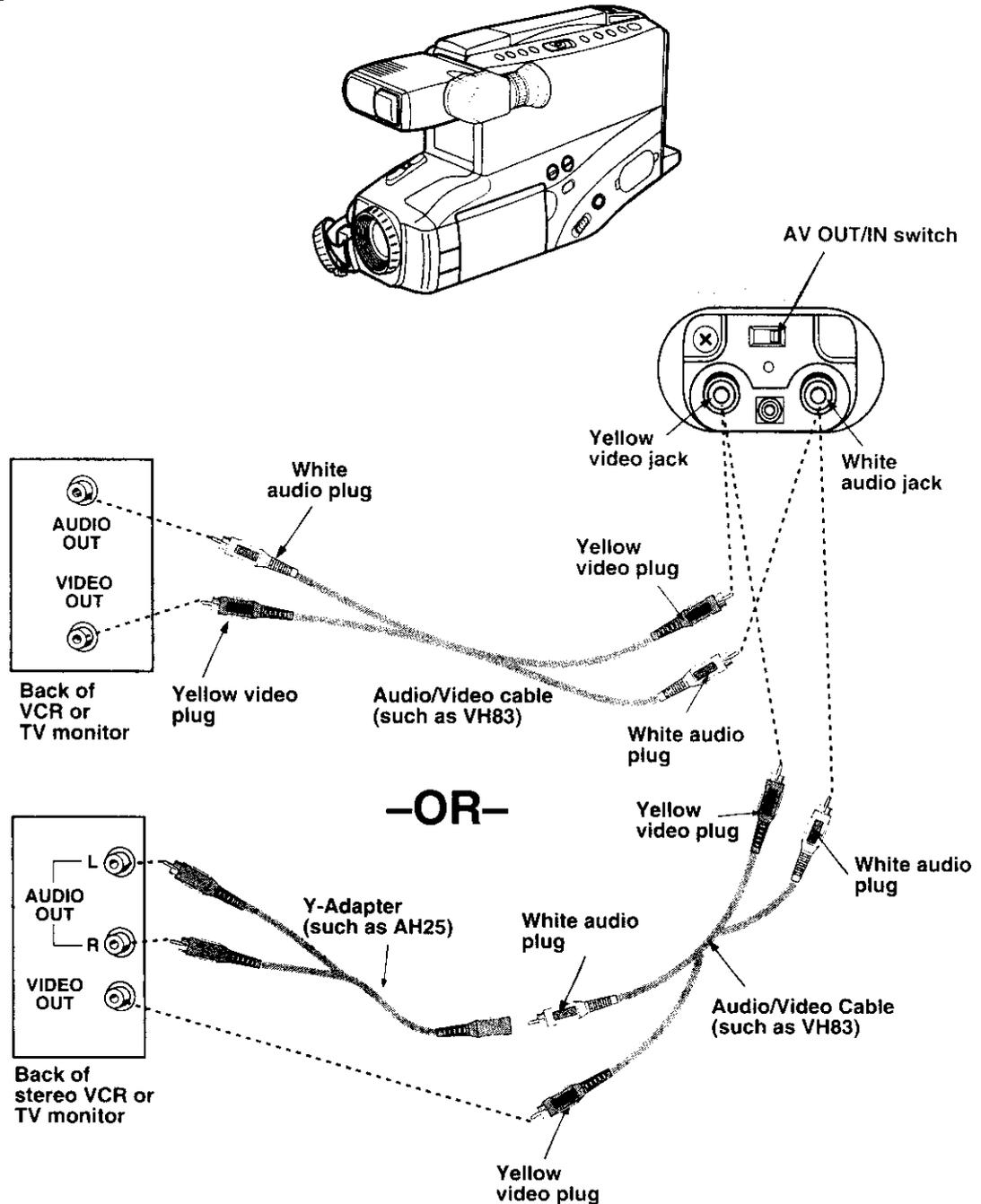
Travel Tips

- Write down the camcorder’s serial number and keep it separate from the camcorder when traveling. If it is lost or stolen, you will be able to identify it.
- Use extra care when using the camcorder or accessories at a beach or pool. Spray, sand, and dust should be avoided as they can cause serious damage to parts. If the lens has been exposed to the elements, clean it only with proper lens cleaning supplies.
- Make sure to have all necessary adapters before taking the camcorder to other countries. Consult with an authorized dealer for advice on needs.
- Carry the camcorder in a carrying case when traveling. An ordinary suitcase or carry bag does not offer proper protection. Treat the camcorder as carry-on luggage and protect it from rough handling. *See the Accessories Order Form in the References section of this manual for a custom case.*

Copying Tapes

Recording From a VCR or TV Monitor

To record from a VCR or TV monitor to a tape in the camcorder using audio and video output jacks, an optional A/V cable, such as VH83 is needed. For detailed information, see the "Optional Accessories" section in the manual's *References* section. To connect the camcorder to an external VCR or TV source, see the diagram below.



Copying Tapes

Copying Tapes to the Camcorder

Installation

1. Attach the white plug on one end of the optional audio/video cable to the *AUDIO OUT* jack of the VCR or TV monitor.

Note: An optional audio/video cable, such as *VH83* is needed for this operation. If the audio source has separate left and right outputs, attach the audio plug to the jack labeled *MONO*. If no jack is labeled *MONO*, a *Y*-adapter may be needed, as shown on page 63 to record audio from both the right and left channels (see, "Accessories," in the References section of this manual for information about ordering optional cables).

2. Attach the yellow plug on the same end to the *VIDEO OUT* jack on the VCR or TV monitor.
3. Attach the yellow plug on the other end of the cable to the yellow *VIDEO* jack and the white plug to the white *AUDIO* jack on the camcorder's side panel.
4. Set the *AV OUT/IN* switch on the camcorder to *IN*.

Recording

1A. Camcorder connected directly to TV monitor: turn on TV and tune TV to channel you want to record.

1B. Camcorder connected to VCR that is connected to TV: turn on VCR and select the channel to record (or place cassette to be copied in VCR).

Note: If you want to see what is being recorded, turn on the TV and tune it to the channel that you normally use to see the signal from the VCR.

2. Set the *AV OUT/IN* switch on the camcorder to the *IN* position.
3. Attach a power source to the camcorder. Press and hold the small button on the *CAMERA/OFF/VCR* switch while sliding it to *CAMERA*.

4. Insert a cassette with the safety tab intact into the camcorder.
5. Press the *REC/PAUSE* button to start the camcorder's record mode.
If copying a tape, start playing the VCR.
6. Press the camcorder's *REC/PAUSE* button to stop recording when finished.

Remember: Set the *AV OUT/IN* switch on the camcorder to *OUT* for normal recording on the camcorder.

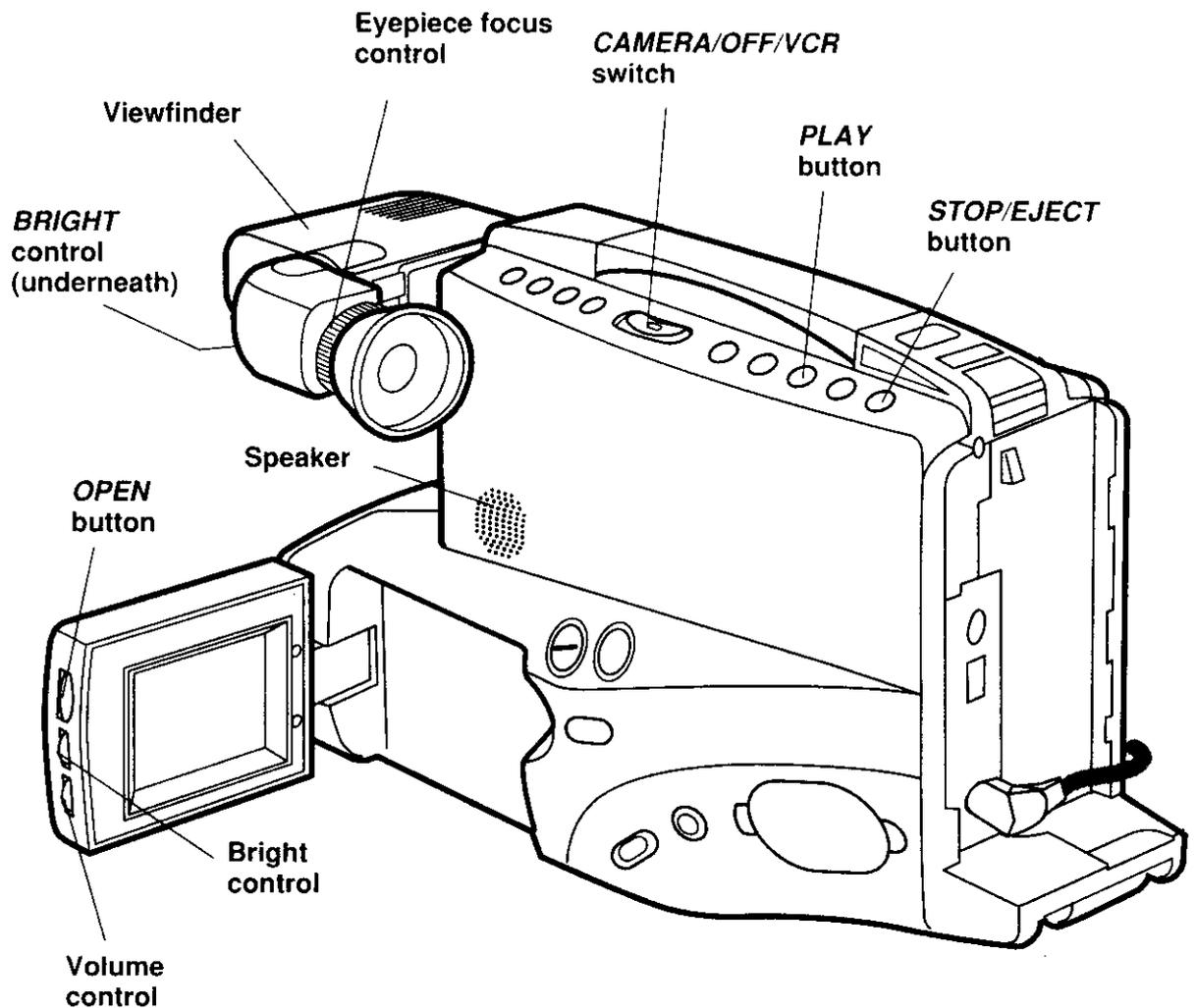
Caution: The unauthorized recording of television programs and other materials may infringe the rights of others.

Playback

Using the LCD Monitor or Viewfinder

Recordings can be watched in color using the LCD monitor or viewfinder. When the LCD monitor is open more than 45 degrees, the viewfinder automatically turns off. Close the LCD monitor and the viewfinder automatically turns on.

Rotate the monitor completely around and place it against the camcorder for convenient playback. During playback, recorded sound can be heard through the camcorder's built-in speaker when using the LCD monitor.



Playback

Playing Back Tapes

1. Attach a power supply.
Attach the adapter/charger, charged battery, or optional car cord.
2. Insert a tape.
 - Press the *STOP/EJECT* button to open the cassette compartment.
 - Insert the cassette with its safety tab facing up and the tape windows facing out.
 - The camcorder can only play back tapes recorded in the SP speed.
 - Press the cassette down gently until it locks into place, then close the cassette compartment door.
3. Press and hold the small button on the *CAMERA/OFF/VCR* switch while setting it to the *VCR* position.
4. Use the LCD monitor or viewfinder to view what you are playing back.

Using the LCD Monitor

- Press the *OPEN* button to open the LCD monitor. Make sure the monitor is open at least 45 degrees. Note that the viewfinder automatically turns off.
- When opened 90 degrees, the LCD monitor can be rotated around and placed back against the camcorder.
- Fit the shoulder extension pad for convenient viewing using the LCD monitor.
- Adjust the brightness of the monitor playback by turning the bright control on the side of the LCD.
- Speaker volume can be adjusted by turning the volume control.

Note: The LCD monitor may become warm to the touch when left open for an extended period of time. This is normal.

Using the Viewfinder

- Make sure the monitor is closed and locked. If the monitor is open more than 45 degrees, the viewfinder automatically turns off.
- Grasp the viewfinder and rotate it horizontally.
- Pull the viewfinder out from the camcorder and rotate the eyepiece to a comfortable viewing position.

Caution: Pulling on the eyepiece might cause damage to the eyepiece or camcorder. Pull only from the viewfinder.

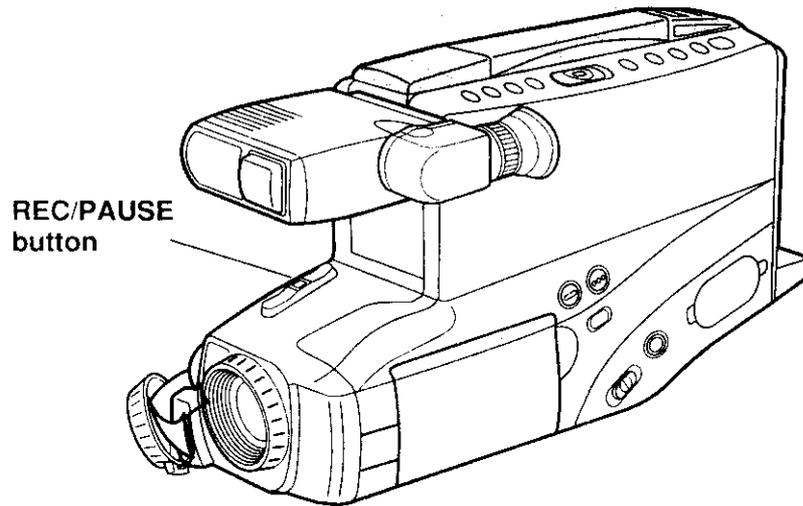
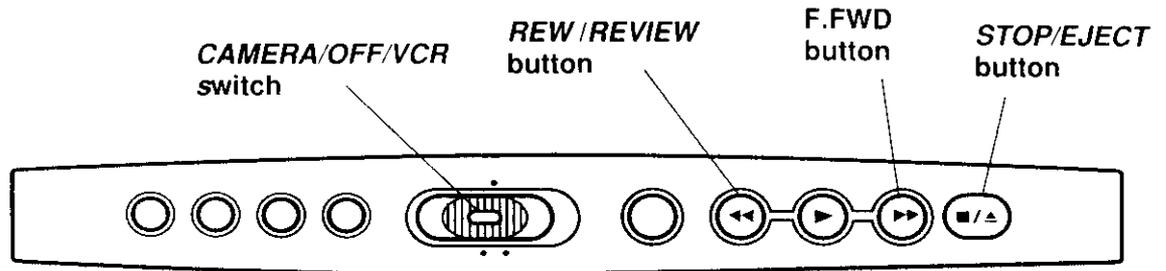
- Turn the eyepiece focus control to adjust the sharpness of the viewfinder for individual vision needs.
- Turn the *BRIGHT* control underneath the viewfinder to adjust the brightness of the eyepiece.

Note: You cannot hear the sound from the camcorder's speaker when using the viewfinder for playback.

5. Press the *PLAY* button to begin tape playback.
 - If necessary, adjust tracking.
 - During playback, use the playback features as described in this section.
6. Press the *STOP/EJECT* button when finished.

Playback

Playback Features



Tape Positioning

Press the small, red button on the *CAMERA/OFF/VCR* switch while setting it to the *VCR* position.

- Press and quickly release the *REW/REVIEW* button or the *F.FWD* button to rewind or fast-forward the tape to the desired position.
- Press the *STOP/EJECT* button once to stop the tape.

Visually Searching

- During playback, press and hold the *F.FWD* button or *REW/REVIEW* button to search the tape visually in forward or reverse.

- Release the button to return to normal playback mode.

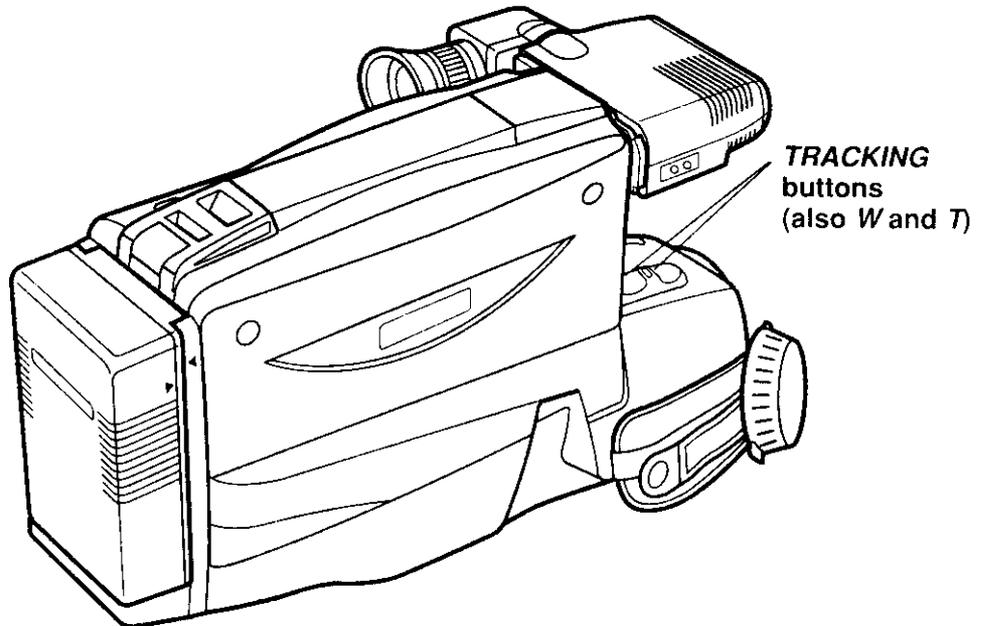
Stop-Action Pause

- During playback, press the *REC/PAUSE* button to “stop the action” and view one frame of the tape.
- Press the *REC/PAUSE* button again to return to normal playback.

Caution: *Pause is designed only for momentary interruptions and should not be used for an extended period of time. If the camcorder remains in pause mode for more than five minutes, it automatically enters stop mode and turns off to prevent excessive tape wear.*

Playback

Playback Features (*Continued*)



Tracking

During playback, streaks might appear in the recorded image. Press either *TRACKING* button (*W* or *T*) to move the streaks up or down and out of the picture.

- During stop-action playback, pressing one tracking button might reduce picture “jitter” (picture bouncing up and down). Some “jitter” is normal. Remove the tape to reset the tracking to its preset center.

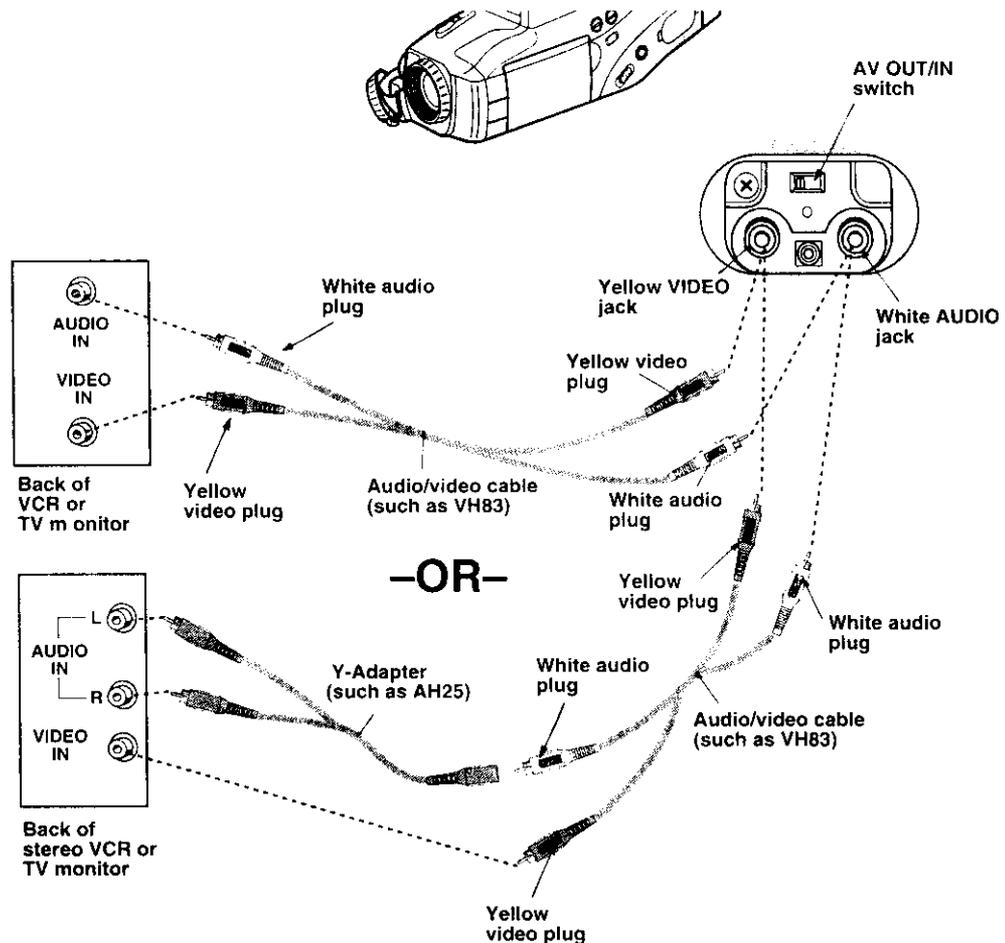
Note: The tracking buttons only affect tape playback. They have no effect during the recording mode.

Playback

Playback on a TV or VCR Using A/V Input Jacks

To connect your camcorder to a TV monitor or VCR with Audio/Video IN jacks, an optional A/V cable such as VH83 is needed. See, "Optional Accessories" in the *References* section of this manual to order necessary cables.

If your TV is already connected to a VCR, attach the camcorder to the VCR and watch



what the camcorder is recording or playing on the TV.

Installation

1. Attach the white plug on one end of the audio/video cable to the *AUDIO IN* jack on the TV or VCR.

Notes: If the A/V cable does not have white and yellow ends, be sure to attach the same color to the A/V jacks of the camera and TV/VCR.

If the TV/VCR has stereo AUDIO IN jacks,

attach the plug to the jack labeled MONO. If no jack is not labeled MONO, you might need a Y-adapter, such as AH25 to hear both channels. For more information about Y- cables, see, "Optional Accessories" in the *References* section of this manual.

2. Attach the yellow plug to the *VIDEO IN* jack on the TV or VCR.
3. Attach the white plug on the other end

Continued on Next Page

Playback

of the A/V cable to the *AUDIO* jack (located under the small cover on the side of the camcorder).

4. Attach the yellow plug to the yellow *VIDEO* jack on the camcorder.
5. Set the *AV OUT/IN* switch to *OUT*.

Playback Operation and How to Copy Tapes on the VCR

1. A. **Camcorder connected directly to a TV:** turn on the TV and tune it to the video input channel.
B. **Camcorder connected to a VCR that is already connected to TV:** turn on VCR and place it in the "line input" or "camera mode" (if the VCR does not have these modes, consult the *VCR Owner's Manual* for information about viewing recordings from an external source). Operate the TV as normal to see the signal coming from the VCR.
2. Press and hold the small, red button on the *CAMERA/OFF/VCR* switch while setting it to the *VCR* position.

Note: The camcorder can only play back tapes recorded in the SP speed.

3. Press *PLAY*.
 - During playback, use the playback features mentioned previously in this section.
 - Turn the volume control on the monitor down all the way to prevent picture distortion.
4. To copy what the camcorder is

playing, place a blank cassette in the VCR and press the VCR's *RECORD* button.

Note: Make sure the memory-stop feature is turned off (press DISPLAY) or the camcorder will enter play-pause when the counter reaches 0000M.

5. Press *STOP/EJECT* when you are finished.

Viewing What the Camcorder is Seeing (or Recording)

1. A. **Camcorder connected directly to a TV:** turn on the TV, and tune it to the video input channel.
B. **Camcorder connected to a VCR that is already connected to TV:** turn on VCR and place it in the "line input" or "camera mode" (if the VCR does not have these modes, consult the *VCR Owner's Manual* for information about viewing recordings from an external source). Operate the TV as normal to see the signal coming from the VCR.
2. Press and hold the small, red button on the *CAMERA/OFF/VCR* switch while setting it to the *VCR* position.

Note: Turn the TV's volume down to prevent a high-pitched squeal caused from feedback.

3. Press the *REC/PAUSE* button to begin recording. Watch what the camcorder is seeing (or recording) on the TV screen.

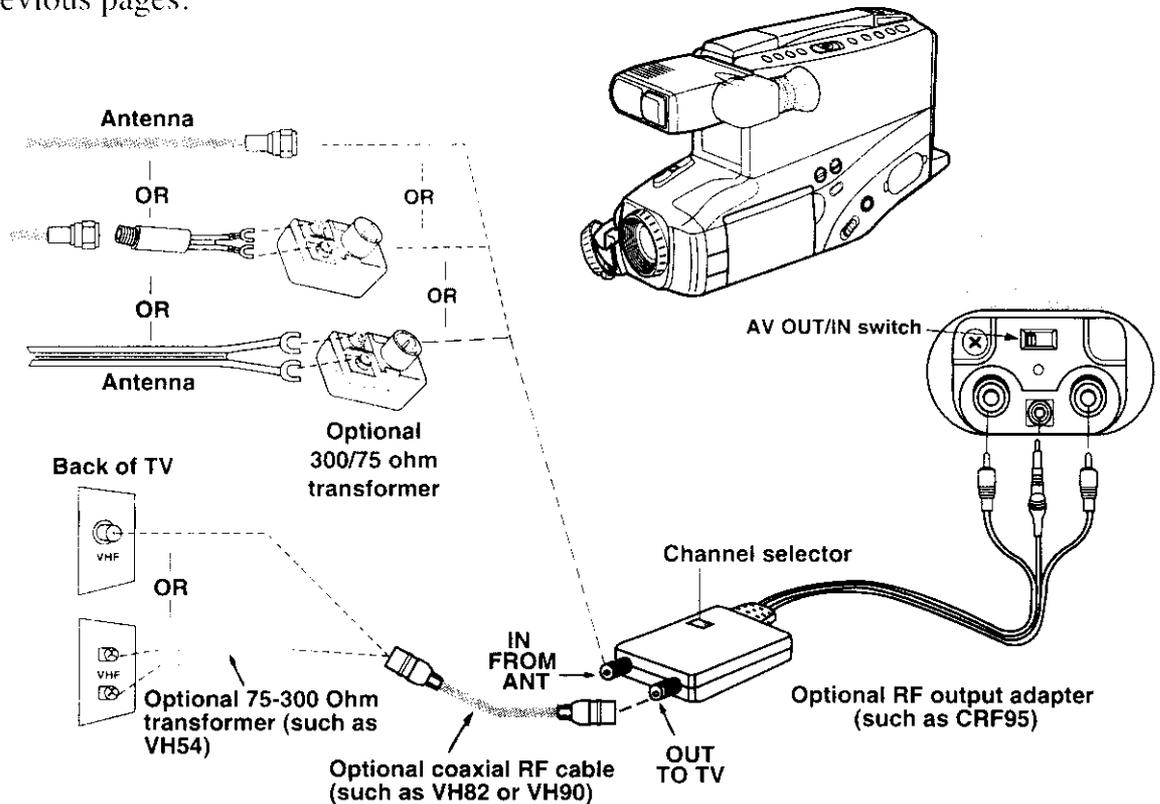
Caution: The unauthorized recording of copyrighted material may infringe the rights of others.

Playback

Playback on a TV Without A/V inputs

To connect your camcorder to a TV without A/V inputs, an optional CRF95 RF output adapter and an optional coaxial RF cable, such as VH82 or VH90, are necessary. For more information about output adapters and coaxial cables, see, "Optional Accessories," in the *References* section of this manual.

If the TV has AUDIO and VIDEO IN jacks (or is connected to a VCR), refer to the previous pages.



Installation

1. Disconnect the VHF antenna from your TV. Connect the antenna to the *IN FROM ANT* connector on the RF output adapter if you are going to leave the adapter connected to the TV.

Note: If your VHF antenna is the flat twin-lead type attached by two screws, you need an optional 300/75 ohm transformer.

2. Attach one end of the optional coaxial RF cable to the *OUT TO TV* connector on the adapter, and attach the other end to the VHF input on your TV as shown.

Note: If your TV has 300 ohm screw terminals, you need a 75/300 ohm transformer, such as VH54 (see page 63 for diagram).

3. Attach the RF output adapter's yellow plug to the *VIDEO* jack, the small plug to the *RF DC OUT* jack, and the white plug to the *AUDIO* jack located under the small cover on the side of the camcorder.
4. Set the *AV OUT/IN* switch to *OUT*.

Continued on Next Page

Playback

Playback Operation

1. Set the *CH3/CH4* switch on the RF output adapter to channel *CH3* or *CH4*.
2. Turn on the TV, and tune it to the same channel you selected with the RF output adapter's *CH3/CH4* switch.
3. Press and hold the small button on the *CAMERA/OFF/VCR* switch while you set it to *VCR*.
4. Press *PLAY* on the camcorder.
 - Turn the volume control on the monitor down all the way to prevent picture distortion.
 - During playback, use the playback features (*see pages 54-55 for full description*).
5. Press *STOP/EJECT* on the camcorder when you are finished.

Viewing What's Recording

1. Turn on the TV and tune it to channel 3 or 4. Turn the TV's volume down to prevent a high-pitched squeal caused by feedback.
2. Set the *CH3/CH4* switch on the RF output adapter to the same channel you selected on the TV.
3. Press and hold the small button on the *CAMERA/OFF/VCR* switch while you set it to *CAMERA*.
4. Press the *REC/PAUSE* button to begin recording. You can watch what the camcorder is seeing (or recording) on the TV screen.

Normal TV viewing

For normal TV viewing, leave the RF output adapter hooked up to the TV. Disconnect the adapter's plug from the camcorder or turn the camcorder's power off.

Note to Cable TV Installer

This reminder is provided to call your attention to Article 820-40 of the National Electrical Code (Section 54 of Canadian Electrical Code, Part I), that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as practical.

Optional Accessories

This section offers a look at some great ideas for sparking creativity and adding to the fun of owning and using VHS camcorder. The following pages have a selection of accessories which help make more memorable moments look and sound even better.

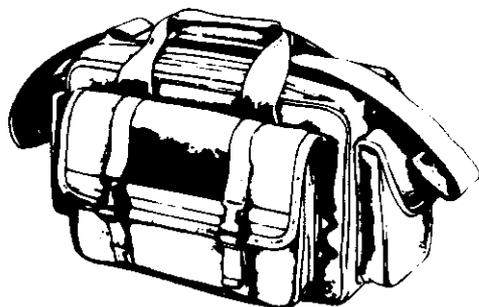
These accessories are designed to make the process of recording and watching your videos more enjoyable.

To order accessories, contact your local RCA reseller or use the Optional Accessories Order Form at the end of this section.

All accessories are available through toll-free ordering or traditional mail.

Soft carrying case

AC202

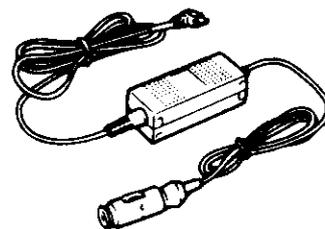


This case provides protection and utility for full size camcorders and most accessories. It is constructed of rugged nylon fabric for years of reliable service.

Three outside pockets provide ample accessory storage with mesh-covered lens filter compartment and built-in holders for memo pads, pens, and other accessories. The hand grip and adjustable shoulder strap allow for convenient, comfortable transportation of the camcorder.

DC car cord adapter

DCC096



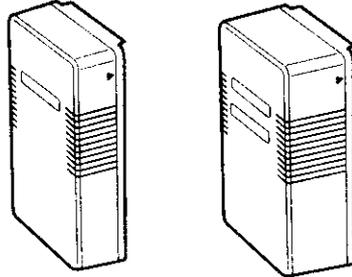
Warning: do not use any other car cord with this camcorder.

This car cord adapter enables you to operate your camcorder from your car, truck, or RV by plugging the unit directly into the vehicle's cigarette lighter socket. The DCC096 is designed specifically to convert power from a 12-volt battery to a 9.6-volt output.

Optional Accessories

Rechargeable batteries

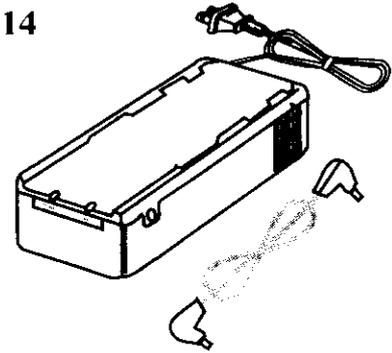
EP096FS and EP096FL



These rechargeable lead-acid batteries are designed specifically for long life. The EP096FS is a 1-hour battery. The EP096FL powers your camcorder twice as long as the EP096FS (depending on how much you turn the camcorder on and off and use zoom and pause). Both can be recharged with the AC adapter/charger that came with your camcorder.

AC battery charger

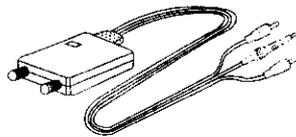
CPS014



The CPS014 battery charger plugs directly into an AC outlet and charges the EP096FS and EP096FL camcorder batteries. Because the CPS014 operates on 100-240 Volts, 50/60 Hz, it can be used virtually anywhere in the world. A plug adapter might be required in some countries.

RF output adapter

CRF95



This RF output adapter is used with a coaxial RF cable, such as VH82 or VH90, to connect your camcorder to a standard TV (one without audio/video inputs) for playback. If your antenna cable is the flat twin-lead type attached by two screws, you need a 300-to-75 ohm transformer. If your TV has 300 ohm antenna screw terminals, you need an optional 75-to-300 Ohm transformer such as VH54.

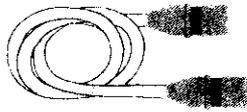
Notice: All specifications and descriptions of accessories are subject to change without notice.

Optional Accessories

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Coaxial RF cables

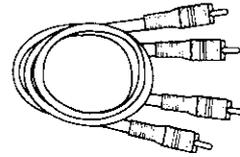
VH82 (6-ft)
VH90 (12-ft)



These RF cables are used with the RF output adapter to connect the camcorder to a standard TV (one without A/V input jacks) for playback. If the TV has 300 ohm antenna screw terminals, an optional 75-to-300 ohm transformer, such as VH54, is necessary. If the antenna cable is the flat twin-lead type attached by two screws, an optional 300-to-75 ohm transformer is needed.

Audio/Video cable

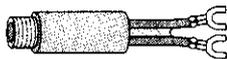
VH83



This six foot audio/video cable can be used to connect the camcorder to a TV monitor or VCR for tape playback or copying tapes.

Cable transformer

VH54



This 75-to-300 ohm transformer is used to connect a standard 75-ohm antenna cable (such as VH82- or VH90-to-300 ohm screw terminals on a TV).

Y-adapter

AH25



This Y-adapter allows connection of the camcorder's mono audio cable to a stereo TV or VCR.

All specifications and descriptions of accessories are subject to change without notice.

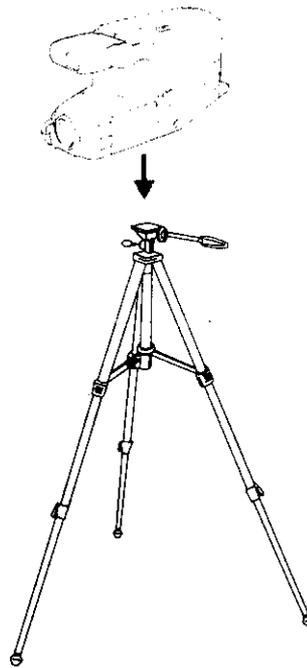
Optional Accessories

Tripod

AC093

Mounting the camcorder on a tripod, such as AC093, keeps the camcorder steady and produces excellent video results.

This tripod's fluid-effect head provides smooth camera pan and tilt. The quick-release mount makes it easy to attach or remove the camcorder. The grooved, tubular 3-section leg design folds down to 24" when not in use. Rubber feet allow for sure footing and built-in retractable leg spikes eliminate the need for removing the feet.



Cautions: Before using a tripod, make sure it is stable enough to hold the camcorder without falling over. Do not transport the camcorder attached to the tripod.

When attaching your camcorder to a tripod, be careful not to force the tripod screw into the camcorder's tripod mounting hole.

The tripod screw should not protrude into the camcorder more than approximately three-eighths ($3/8$) inch. Forcing the screw could damage the mounting hole on the bottom of the camcorder.

Optional Accessories

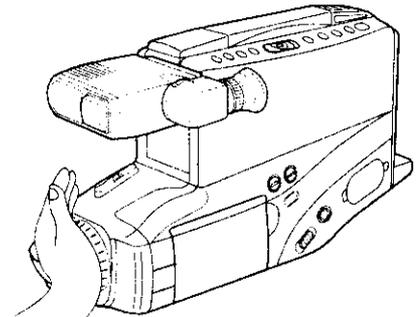
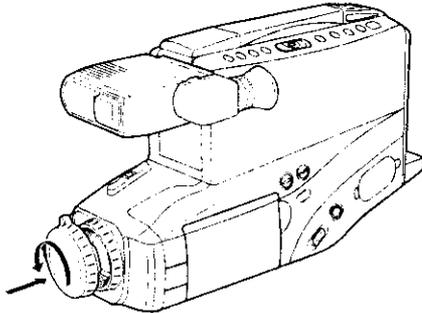
© 2005 Sony Electronics Inc.

Removing the lens hood

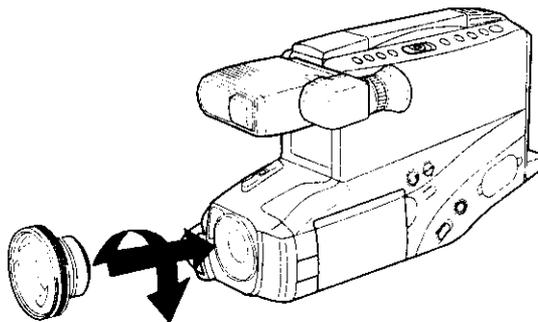
Remove the lens hood so you can attach optional accessories, such as wide-angle lens, lens extenders, or lens filter kits.

Attaching an accessory Lens

1. Attach the lens cap over the lens hood.
2. To remove the lens cap and hood, turn them counterclockwise with the palm of your hand.



3. Turn the accessory lens clockwise into the camcorder's lens. Make sure the lens is tightened firmly, but do not over tighten.



Caution: Do not grasp the end of the lens hood.

All specifications and descriptions of accessories are subject to change without notice.

Optional Accessories

Part Number: 100-240V

Order Form for Camcorder Model CC4393				
Description	Part No.	Price	Qty.	Total
Deluxe Tripod	AC093	\$ 59.95		
Soft Camcorder Case	AC202	\$ 49.95		
Y-Adapter	AH25	\$ 2.95		
AC Adapter/Charger (100-240V)	CPS014	\$219.95		
RF Output Adapter	CRF95	\$ 59.95		
Car Cord Adapter	DCC096A	\$ 44.95		
Rechargeable Battery (Extended)	EP096FL	\$ 59.95		
Rechargeable Battery (Standard)	EP096FS	\$ 69.95		
75-300 Cable Transformer	VH54	\$ 2.95		
Coaxial RF-Cable	VH82	\$ 5.45		
Audio/Video Cable	VH83	\$ 5.95		
Coaxial RF-Cable	VH90	\$ 7.95		
Replacement Bulb (4 watt) for Built-in Light	224257	\$ 20.15		
Shoulder Strap	241305	\$ 7.20		
AC Adapter/Charger (Supplied) and DC Cable	241044 233328	\$ 109.90 \$ 16.60		
Total Merchandise				\$ _____
Sales Tax				\$ _____
<p>We are required by law to collect the appropriate sales tax for each individual state, county, and locality to which the merchandise is being sent.</p>				
Shipping and Handling				\$ 5.00
Total Amount Enclosed				\$ _____
<p>Use VISA, MasterCard, or Discover. Money order or check must be in U.S. currency only. No COD or cash. Prices are subject to change without notice.</p>				

Detach Here



Please complete other side also

Optional Accessories

Charge your order on your VISA, MasterCard,
or Discover Card by filling in below

USE YOUR CREDIT CARD

IMPORTANT: Copy complete account number from your VISA card

Expiration date:



IMPORTANT: Copy complete account number from your MasterCard

Copy Number above your name on MasterCard Expiration date:



IMPORTANT: Copy complete account number from your Discover Card

Expiration date:



AUTHORIZED SIGNATURE

Prices are subject to change without notice.

Print or type your name and
address clearly.

A complete and correct order will
save you days of waiting.

Name: _____
Street: _____
_____ Apt: _____
City: _____
State: _____ Zip: _____
Daytime Phone No.: _____

Please make sure that both sides of this form have been filled out completely.

- Allow 4 weeks for delivery.
- All accessories are subject to availability.

Detach Here 

Optional Accessories

To order accessories, contact an authorized RCA reseller.

If a dealer is not nearby, you can also follow the directions below to order by telephone or direct-by-mail.

Orders in the United States and Canada

To place your order by phone, have your Visa, MasterCard, or Discover card ready and call the toll-free number listed below between 8 AM and 10 PM (EST) Monday through Friday or between 9 a.m. and 5 p.m. (EST) Saturday.

Use this number only to place an order for accessory items listed on this order form.

1-800-338-0376

To place your order by mail, detach and mail the completed order form with credit card information, money order, or check in U.S. currency (made payable to Thomson Consumer Electronics, Inc.) to the following address:

Video Accessories
PO Box 8419
Ronks, PA 17573

References

In this section, specific information about the camcorder can be found. This includes care and maintenance, specifications, troubleshooting, warranty information, and an index for the manual are sources found here.

References

Troubleshooting

If you're having trouble with your camcorder, you probably can correct the problem yourself. Before you take your camcorder to an Authorized RCA Camcorder Service Center or call a service person, use the chart below. Find the problem and try the adjustment(s) that is listed to the right.

If service should be necessary, read your warranty to find out what is covered and how to get service.

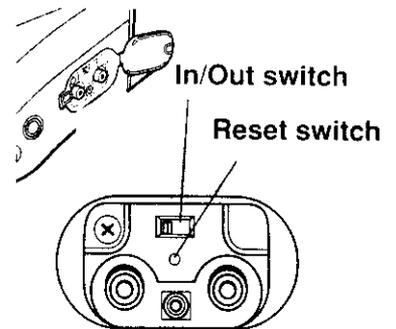
Trouble	Checks and Adjustments
No power	<ul style="list-style-type: none">• Set the <i>CAMERA/OFF/VCR</i> switch to <i>CAMERA</i> or <i>VCR</i> to turn on the camcorder.• If using battery, it may need to be recharged.• If using AC adapter/charger, make sure it is plugged into a working outlet.
Won't record or play back	<ul style="list-style-type: none">• If using AC adapter/charger, make sure it is plugged into a working outlet.• Make sure <i>CAMERA/OFF/VCR</i> switch is set to correct position for desired operation.• There might not be a cassette in the camcorder.• Try ejecting and reinserting the cassette.• The cassette tape might be broken, try another cassette.• You might have reached the end of the cassette, try rewinding it.• Moisture condensation might cause the tape to stick to the headwheel and damage the headwheel or tape. Give the camcorder 2 or 3 hours to reach a stable temperature before reinserting a cassette.
Won't play back	<ul style="list-style-type: none">• <i>CAMERA/OFF/VCR</i> switch must be set to <i>VCR</i>.
Won't record	<ul style="list-style-type: none">• Safety tab on cassette is removed. Use another tape.
No picture	<ul style="list-style-type: none">• <i>CAMERA/OFF/VCR</i> switch must be set to <i>CAMERA</i>.• Remove lens cap.
Camcorder turns off	<ul style="list-style-type: none">• Set the <i>CAMERA/OFF/VCR</i> switch to <i>OFF</i> and then to <i>CAMERA</i> or <i>VCR</i> to turn back on. If camcorder is left in record-pause or play-pause for several minutes, it turns off to prevent tape wear.

References

Trouble	Checks and Adjustments
Sound is too low or distorted	<ul style="list-style-type: none"> • Subject was too far from camcorder.
Tape stops during rewind or fast forward or will not operate during rewind or fast forward	<ul style="list-style-type: none"> • Whenever the tape counter appears, the camcorder will stop rewinding (or fast forwarding) when counter reads <i>0000M</i>. Press <i>REW/REVIEW</i> or <i>FFWD</i> again to continue rewinding or fast forwarding, or press <i>DISPLAY</i> to remove the tape counter. • Make sure titler graphics do not appear in viewfinder or on LCD monitor. Press <i>TITLER</i> button to remove.
Camcorder remains in play-pause mode	<ul style="list-style-type: none"> • Press <i>REC/PAUSE</i> to return to normal playback.
Poor auto-focus operation	<ul style="list-style-type: none"> • Lens is smudged and image appears unfocused. • Eyepiece focus control is misadjusted.
Viewfinder displays are out of focus or hard to see	<ul style="list-style-type: none"> • Eyepiece focus control is misadjusted. • Adjust <i>BRIGHT</i> control on the bottom of the viewfinder.
Picture quality is poor during playback	<ul style="list-style-type: none"> • Tape was recorded on a different camcorder or VCR. If the picture contains black-and-white streaks, press one of the tracking buttons to correct it. • Camcorder only has one speed (SP). If the tape was recorded at a different speed, it cannot be played back on this camcorder.
Picture recorded with a special fade or digital effect (such as negative, 16X9, mosaic, or mirror)	<ul style="list-style-type: none"> • A fade or fade wipe mode has been selected. Turn off the fade effect by pressing <i>FADE</i>. • A digital recording effect has been selected. Turn off the digital effects by pressing <i>DIGITAL EFFECTS</i>.
Camcorder starts demonstration mode	<ul style="list-style-type: none"> • Power on for ten minutes with no cassette inserted and date not set or built-in battery not charged. Insert cassette, or remove and reattach the power source.

References

Trouble	Checks and Adjustments
Date and/or time or title were recorded on tape	<ul style="list-style-type: none"> • Displays are recorded on tape whenever they appear in the viewfinder or on the LCD monitor. Remove them from the viewfinder or LCD monitor when recording. • When  <i>DATE</i> or  <i>TITLE</i> is selected, the display is automatically recorded when you begin recording or change the cassette. • Title is recorded whenever it appears in the viewfinder or LCD Monitor. Press the <i>TITLER</i> button to remove the title from the viewfinder or LCD monitor.
Date and/or time are incorrect	<ul style="list-style-type: none"> • Date or time may need to be set. • Clock lithium cell battery may need recharging.
Viewfinder turns off and on	<ul style="list-style-type: none"> • LCD monitor is open at least 45 degrees. The viewfinder automatically turns off. Monitor closed, viewfinder turns on. • During recording, viewfinder turns on when monitor rotated around to face the subject. • During playback, viewfinder turns off when monitor rotated around and placed against camcorder.
Camcorder does not turn on and/or function buttons will not operate	<ul style="list-style-type: none"> • Remove the power source. After one minute press the reset switch gently using a nonmetallic pointed item, such as a toothpick, until you feel a click. This resets the camcorder to the factory settings and erases the date, time, and custom settings. Wait for at least one minute after resetting the camcorder to attach a power supply.
No or low sound during monitor playback	<ul style="list-style-type: none"> • Adjust the volume control on the side of the monitor. • To hear sound during camcorder playback, use the monitor. There is no sound during viewfinder playback.



References

Trouble	Checks and Adjustments
Black bars on top and bottom of picture.	<ul style="list-style-type: none">• <i>16X9</i> feature selected.
Bright, crystal-shaped spots appear in viewfinder or on LCD monitor	<ul style="list-style-type: none">• Sunlight is directly entering the lens.
Colored bright spots appear in viewfinder or LCD monitor	<ul style="list-style-type: none">• Black spots or bright spots of light (red, green, or blue) may appear in viewfinder or on the LCD monitor. These spots are not recorded on the tape and are not due to a defect in the unit.
Back of LCD monitor is hot	<ul style="list-style-type: none">• The light that illuminates the LCD monitor gets hot. To cool it down, close the LCD monitor and turn off the camcorder.
Rechargeable battery runs down sooner than expected	<ul style="list-style-type: none">• Lead-acid batteries must be kept charged. Charge your battery before and after every use and at least every six months.• Battery run times are measured when the camcorder is recording continuously. To check your battery; charge it completely, aim the camcorder at a clock, and record the clock. When the camcorder stops recording, play the last part of the tape and check the time on the clock. A one-hour battery should give you about 60 minutes of recording time. In practical use, a fully charged battery might not record for 60 minutes because the battery uses power when you pause the recording and uses extra power when you zoom.

References

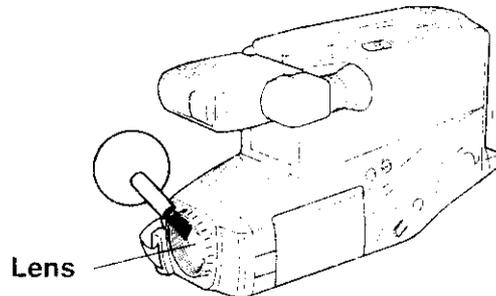
Cleaning the Camcorder

To clean the camcorder's exterior, remove any power source connected to the camcorder and gently wipe it with a clean soft cloth.

Caution: Use of strong cleaning products, such as those containing alcohol or benzine, might damage the camcorder.

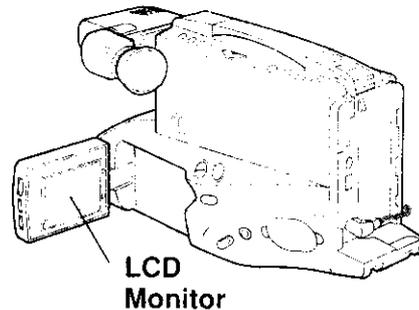
Cleaning the Lens

To clean the camcorder's lens, blow it with a blower brush, and then gently wipe the lens with cleaning tissue and commercially prepared cleaning solution designed for use on camera lens. Improper cleaning might scratch the lens.



Caution: Do not touch the lens with your fingers. The oil from your skin can damage the lens.

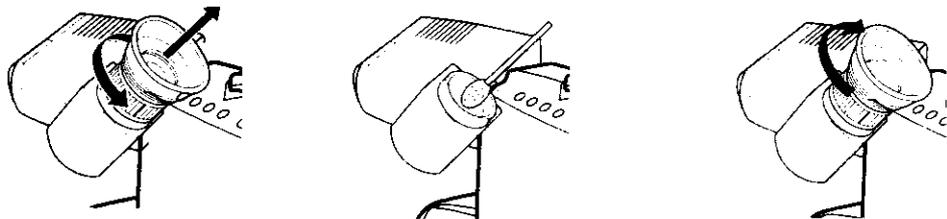
Cleaning the LCD Monitor



To clean the camcorder's LCD monitor, use a clean, soft cloth to carefully wipe the monitor. Improper cleaning may scratch the monitor.

Caution: Do not touch the monitor with your fingers. The oil from your skin might damage the monitor.

Cleaning the Viewfinder



1. Turn the eyepiece counterclockwise and pull it out.
2. Gently use a cotton swab or blower to remove the dust.

3. To reattach the eyepiece, align the reference marks and turn the eyepiece until it clicks into place.

References

Proper Care and Storage

- Keep dust and grit from entering the camcorder's cassette door. Dust and grit are abrasive and cause excessive wear to both the camcorder's recording/playback heads and cassettes.
- Always place the lens cap back on the camcorder when it is not in use.
- Before handling your camcorder, make sure your hands and face are free from any chemical products such as suntan lotion, as it might damage the finish.
- The camcorder might be damaged by improper storage or handling. Do not subject the camcorder to swinging, shaking, or dropping.
- Do not store the camcorder in temperatures below -22°F (-30°C) or above 149°F (65°C).
- When the camcorder is not in use, always remove the cassette and AC adapter/charger or battery.
- Retain the original carton for future storage or shipping purposes.

Things to Avoid

- Do not attempt to disassemble your camcorder. There are no user-serviceable parts inside.
- Avoid operating your camcorder immediately after moving it from a cold location to a warm location. Give the camcorder 2 to 3 hours to reach a stable temperature before inserting a cassette. When the camcorder is moved from cold to warm, condensation might cause the tape to stick to the headwheel and damage the headwheel or tape.
- Do not aim your camcorder at the sun or other bright objects.
- Do not leave your camcorder in direct sunlight for extended periods of time. The resulting heat buildup might permanently damage the camcorder's internal parts.
- Do not operate the camcorder in extremely humid environments.
- Do not operate the camcorder near the ocean as salt water or salt water spray might damage the internal parts of the camcorder.
- Do not operate the camcorder for extended periods in temperatures below 40°F (4°C) or above 95°F (35°C).
- Do not expose the camcorder or adapter/charger to rain or moisture. If any component becomes wet, turn off the power and take the unit to an Authorized RCA Camcorder Service Center.
- Do not use an adapter/charger or batteries other than the ones specified for the camcorder. Use of the wrong accessories might cause damage to the camcorder.
- When carrying the camcorder, do not hold it by the viewfinder or LCD monitor. This could cause a malfunction, damage the camcorder, or cause personal injury.

References

Specifications

General

Power requirement: 9.6VDC
Power consumption:
 LCD monitor on: 9 watts
 Viewfinder on: 7.5 watts
Weight: 4.7 lbs. (2.15kg)

Dimensions – Including Viewfinder:

4-3/4" (W) x 8-3/8" (H) x 13-1/8" (D)
121 (W) x 213 (H) x 334 (D) mm

Video Input

1.0 Vp-p, 75 ohm

Video Output

1.0 Vp-p, 75 ohm

Audio Input

-7.8 dBs (316m Vrms),
more than 47 K ohm

Audio Output

-78 dBs (316m Vrms),
less than 1 K ohm

Microphone Input

-68 dBs (316m Vrms),
more than 1 K ohm

Video Recorder Section

Format: VHS
Record/playback system:
Two video record/playback heads
 One flying erase head
Video signal: EIA standard
 NTSC color

Viewfinder

0.55" color electronic viewfinder

LCD Monitor

3" diagonally measured
LCD/TFT active matrix system

Camera Section

Scanning: 525 lines/60 fields/30 frames
Image Sensor: 1/4" CCD Imager
Lens: F1.4
16:1 (4-64 mm) power zoom lens
Diameter: 46 mm

Tripod Mount

One 1/4" x 10 threaded hole

AC Adapter/Charger

Power requirement: 120 V,
50/60 Hz.
Power consumption: 24 watts
Weight: .85 lbs. (390g)
Dimensions:
 6"(W) x 1.7"(H) x 2.7"(D)
 152 (W) x 43 (H) x 69 (D) mm

References

Limited Warranty

You can reach Thomson at the following number:

800-283-6503

(Toll free inside U.S.A.)

Our toll-free Camcorder number operates from 8 a.m. to 5 p.m., CST Monday – Friday for U.S. customers only

Thomson provides a toll-free telephone number to help you with any problems you may encounter with your camcorder. Many can be diagnosed over the phone, and if necessary, repair or replacement will be arranged. Please have your camcorder model/serial number and date of purchase ready when you call. If your unit is out of warranty, we will quote the cost of a repair or replacement unit to you.

Returning Equipment to Thomson for Repair or Exchange

If we are unable to resolve your problem over the phone, we will gladly service your unit or exchange it for a new or, at our option, refurbished camcorder. Refer to the limited warranty on the next page to learn about your specific rights and responsibilities.

Always consult Thomson and get a Return Authorization number before returning anything! Obtain a Return Authorization (RA) number from the telephone representative before returning your equipment to avoid delays, accounting errors, or even loss of your unit.

Important Information to Customers Who Ship Defective Equipment to Thomson Consumer Electronics

The Thomson representative who authorized the return of your equipment will give you an RA number over the phone. They will also provide you with instructions on where and how to return your Camcorder. Write the number in large, clear characters on the outside of the box. To avoid confusion and misunderstandings, shipments without an RA number clearly visible on the outside of the box will be returned to you at your expense.

Include a brief note describing the problem and any conversations about the problem you have had with Thomson personnel.

Include your name, address and model/serial number of your Camcorder. These numbers are located on the bottom of your unit.

If your Camcorder is within the warranty period, please provide a copy of the bill of sale to verify purchase date. Use the original box and packing material to protect the equipment from damage in shipment.

For your protection, insure all shipments for full replacement value and use a reliable shipper. Thomson assumes no responsibility for warranty shipments from the customer to the factory if not shipped in the manner prescribed by Thomson.

References

What your warranty covers:

- Any defect in materials or workmanship.

For how long after your purchase:

- 90 days for labor charges.
- One year for parts.

The warranty period for rental units begins with the first rental or 45 days from date of shipment to the rental firm, whichever comes first.

What we will do:

During the initial 90 days

- Exchange your camcorder with a new or refurbished unit, or repair your camcorder. The option will be ours. There will be no cost to you.

After the 90 days and within one year

- Exchange your camcorder with a new or refurbished unit, or repair your camcorder. The option will be ours. Parts will be provided at no charge, but you will be responsible for the cost of labor required for the repair.

How you get service:

- Call 1-800-283-6503 and have your unit's date of purchase and model/serial number ready. The model/serial number information is on the bottom of your camcorder.
- A representative will troubleshoot your problem over the phone. If the representative determines that you should receive a replacement unit, you will be provided with a Return Authorization (RA) number and the location of a nearby exchange point if one exists. No returns will be accepted without the RA number.

To receive a replacement Camcorder before you return yours:

Option I

1. Provide your Discover, MasterCard, or Visa account number and expiration date

to our phone representative. This is for security purposes. If we receive your unit, excluding all accessories, within 14 days from the date you were provided the RA number, only items not covered by warranty will be charged to your account. **IF YOUR UNIT IS NOT RECEIVED WITHIN 14 DAYS, THE SUGGESTED RETAIL VALUE OF THE CAMCORDER WILL BE CHARGED TO YOUR CREDIT CARD.** This amount, less \$10.00 handling, will be credited if the unit is subsequently received.

2. We will send you a replacement unit.
3. Ship the unit back to us, excluding all accessories, using the replacement unit's carton. Shipping instructions will be included in the carton along with your RA number which will allow you to easily ship the unit back to us. **Make sure you insure your shipment in case of damage or loss.** Include with the shipment:
 - Evidence of purchase date, such as a bill of sale to verify your unit's warranty eligibility.
 - A brief note describing your camcorder's problem.
 - Your name, address and phone number.

Return transportation, storage, handling, and insurance costs are your sole responsibility. We accept no liability in case of damage or loss.

Option II

1. We will send a replacement unit to the exchange point.
2. The exchange location will notify you of its arrival.
3. Take your unit, excluding all accessories, and your evidence of purchase date, such as a bill of sale, to the exchange location and you will be provided the new or refurbished unit.

References

4. If the repairs were covered by your warranty, you will not be billed.

To receive a replacement unit after we have received your unit:

1. **Write the RA number on the outside of the carton used to return the unit. Make sure you insure your shipment in case of damage or loss.**
2. Carefully pack the unit, excluding all accessories, using the original box and packing material if possible.
3. Include with the shipment:
 - Evidence of purchase date, such as a bill of sale, to verify your unit's warranty eligibility.
 - A brief note describing your camcorder's problem.
 - Your name, address and phone number.

Return transportation, storage, handling, and insurance costs are your sole responsibility. We accept no liability in case of damage or loss.

4. The representative will advise the address to mail a cashier's check or money order for payment if there are any out of warranty labor or parts charges and you elect not to use your credit card.
5. Upon receipt of your product, a new or refurbished unit will be shipped to you.

To have your Camcorder repaired by an Authorized RCA Camcorder Service Center:

- Check with your dealer or call 1-800-336-1900 for the Authorized RCA Camcorder Service Center nearest you.
- Take your unit to the Authorized RCA Camcorder Service Center of your choice.
- Show the Authorized RCA Camcorder Service Center representative evidence of purchase date, such as a bill of sale.

- Pick up your camcorder when repairs are complete.

What your warranty does not cover:

- Adjustment of customer controls.
- Damage from misuse or neglect.
- A unit that has been modified or incorporated into other products or is used for institutional or other commercial purposes.
- Batteries for remote control and clock.
- Cleaning of video/audio heads.
- Camcorders purchased or serviced outside the U.S.A.
- Return transportation, storage and handling costs of your unit, including insurance for loss or damage.
- Acts of God, such as but not limited to lightning damage.

Product Registration:

- Please complete and mail the Product Registration Card packed with your camcorder. It will make it easier to contact you should it ever be necessary. The return of the card is not required for warranty coverage.

How State Law relates to warranty:

- This warranty gives you specific legal rights and you also may have other rights that vary from state to state.

If you purchased your camcorder outside the United States:

- This warranty does not apply. Contact your dealer for warranty information.

References

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- + And – Buttons.
 - See Minus (-) Button.
 - See Also Plus (+) Button
- 16x9 Indicator 27, 35

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Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Alterations or modifications carried out without appropriate authorization may invalidate the user's FCC right to operate the equipment.

This Class B digital apparatus meets all requirements of the Canadian Interference — Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

 **THOMSON CONSUMER ELECTRONICS**
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