

Video Camera Recorder **8**

# CCD-FX410

## Operation Manual

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

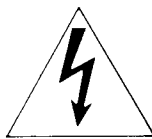
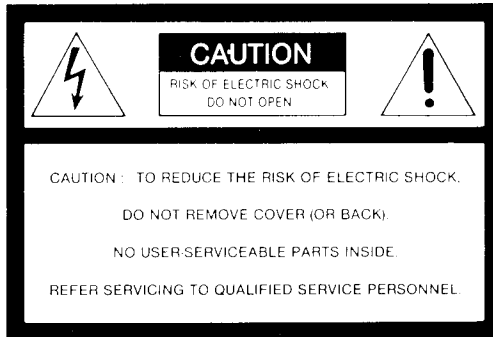
B



## Video 8 Handycam

## WARNING

**To prevent fire or shock hazard, do not expose the unit to rain or moisture.**



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



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

## Information for the customers in the U.S.A.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause 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 the receiving antenna
- Relocate the equipment with respect to the receiver
- Move the equipment away from the receiver
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

### Notice for the customers in Canada

This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

## Owner's Record

The model and serial numbers are located on the bottom. Record the serial number in the space provided on the right hand. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. CCD-FX410

Serial No. \_\_\_\_\_

# Table of Contents

	<b>Before You Begin</b>	
	About this manual .....	4
	Checking supplied accessories .....	5
	Before you start .....	5
	<b>Getting Started</b>	
Chapter 1	Charging and installing the battery pack .....	6
	Inserting a tape .....	9
	Preventing accidental erasure .....	9
	Adjusting the viewfinder lens .....	10
	Using the viewfinder as a sports finder .....	10
	Setting the BEEP switch .....	12
	Installing the lithium battery .....	13
Setting the date and time .....	14	
Storing a birth date in your camcorder .....	15	
	<b>Basic Camera Operation</b>	
Chapter 2	How to record .....	17
	How to play back a tape .....	20
	Using the remote commander .....	22
How to get the most out of your battery pack .....	24	
	<b>Advanced Camera Operation</b>	
Chapter 3	Connecting alternative power sources .....	27
	Using house current .....	27
	Using car battery .....	28
	Camera recording .....	29
	Recording the date or time .....	29
	Putting an AGE on your tape .....	30
	For low-position recording .....	31
	Checking the last portion of a scene you just recorded (EDITSEARCH) .....	32
	Hints for recording .....	32
	Re-recording on a previously recorded portion (EDITSEARCH) .....	33
	Inserting scene in the middle of a recorded tape .....	34
	Checking recording in the viewfinder (EDITSEARCH) .....	35
	Recording with an external microphone .....	36
	Connecting a wired remote control unit .....	36
	Making manual adjustments .....	37
	Focusing manually .....	37
	Compensating backlighting .....	39
	Using program AE .....	40
	Portrait mode .....	40
	Sports mode .....	41
High-speed shutter mode .....	42	
Using the special effects .....	43	
Zooming .....	43	
Close-up (macro) .....	44	
Fade-in and fade-out .....	45	
Playing back .....	47	
Recording .....	51	
Editing .....	53	
	<b>Additional Information</b>	
Chapter 4	Maintenance information .....	57
	Tips for better camera recording .....	61
	Identifying the parts .....	65
	Indicators inside the viewfinder .....	70
	Troubleshooting .....	71
	Specifications .....	73
	Index .....	74

# Welcome to Video 8

Thank you for purchasing a Sony Handycam® camcorder. With your Handycam you can capture life's precious moments with superior picture and sound quality. Your Handycam is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

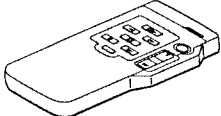
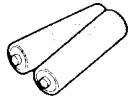
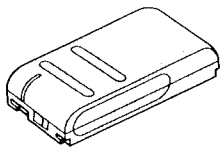
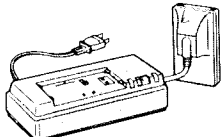

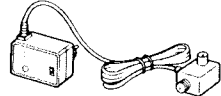
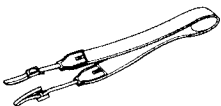


## About This Manual

This manual will show you how to operate the unit. To get the most out of the features of Handycam, we recommend you read this manual thoroughly. But if you want to shoot immediately, please read the chapters, **Getting Started** and **Basic Camera Operation**. Once you are familiar with basic operations, you may want to proceed to the chapter, **Advanced Camera Operation**.

- When you are reading through this manual, please remember that buttons and settings on the camcorder are in capital letters:  
e.g. Set POWER to CAMERA.
- Use "Identifying the Parts" as an index to looking for a function and operation according to the indication printed on the camcorder itself.

# Checking Supplied Accessories

Please check that the following accessories are supplied with your camcorder.

<ul style="list-style-type: none"><li>• Wireless Remote Commander (1)</li></ul> 	<ul style="list-style-type: none"><li>• Size AA (R6) battery for Remote Commander (2)</li></ul> 	<ul style="list-style-type: none"><li>• Battery pack NP-55H (1)</li></ul> 
<ul style="list-style-type: none"><li>• AC power adaptor AC-V60A (1)</li></ul> 	<ul style="list-style-type: none"><li>• Lithium battery CR2025 (1)</li></ul> 	<ul style="list-style-type: none"><li>• RFU adaptor RFU-90UC (1)</li></ul> 
<ul style="list-style-type: none"><li>• Shoulder strap (1)</li></ul> 	<ul style="list-style-type: none"><li>• Lens cap (1) (attached to the camcorder)</li></ul> 	<ul style="list-style-type: none"><li>• Jack cover (1) (attached to the camcorder)</li></ul> 

## Before You Start

Before you can start recording, you need to:

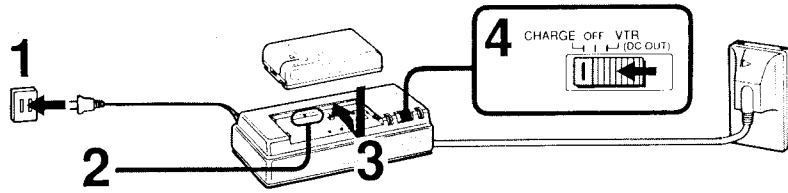
- 1 Charge and install the battery pack.
- 2 Insert a tape.
- 3 Adjust the viewfinder lens to your eyes.
- 4 Set the BEEP switch.
- 5 Install the lithium battery.
- 6 Set the date and time.

Let's go through these procedures step by step!

# Charging and Installing the Battery Pack

Before you can use this camcorder, you need to charge and install the battery pack.

## Charging the Battery Pack



- 1 Plug the AC power adaptor into a wall outlet.
- 2 Align the flat side of the battery pack with the line on the AC power adaptor.
- 3 Push down and slide the battery pack in the direction of the arrow.
- 4 Set the CHARGE/VTR switch to CHARGE.

Required charging time:

Type of battery pack	NP-55H (supplied)	NP-77H/ NP-77HD	NP-77	NP-66H	NP-55
Required charging time	70	140	120	100	60


(approx. minutes using AC-V60A)

When charging is finished, the charge indicator will go out.

### Important!

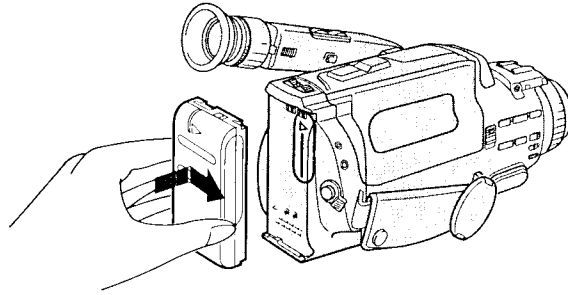
#### Use the battery completely before charging!

Before you recharge the battery, make sure the battery has been used (discharged) completely to avoid capacity down of the battery caused by excessive charging.

To use up the battery, remove the video cassette and simply slide POWER to CAMERA with the battery attached, and leave the camcorder until the  indicator appears blinking and a red lamp blinks in the viewfinder.

## Installing the Battery Pack

When you have finished charging the battery, install the battery pack as follows:



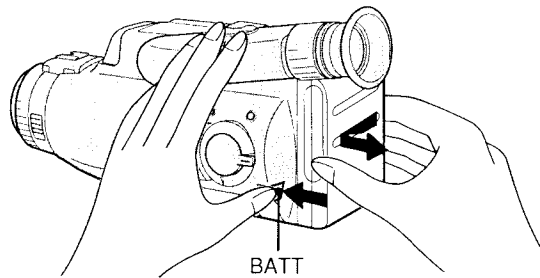
- 1 Align the flat side of the battery pack with the white line on the camcorder.
- 2 Make sure that the arrow on the battery pack is close to the top of the camcorder.
- 3 Push down and slide the battery pack in the direction of the arrow.

### Notes

- Make sure the battery is securely installed so that it does not fall. If the battery is not installed properly, the camcorder will not record accurately.
- You can use the AC power adaptor as a power source when recording indoors.

### To remove the battery pack

Slide BATT in the direction of the arrow, and at the same time, slide out the battery pack to the left.



## Charging and Installing the Battery Pack

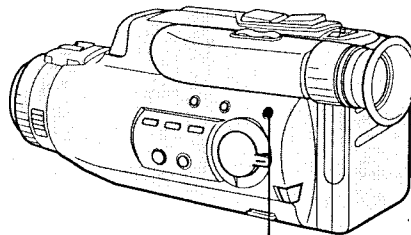
### Battery life and remaining capacity

A fully charged battery pack lasts for:

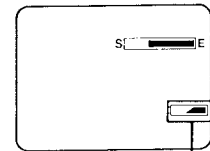
Type of battery pack	NP-55H (supplied)	NP-77H/ NP-77HD	NP-77	NP-66H	NP-55
Battery life	75	150	120	110	60

(approx. minutes, continuous recording when used indoors)


To check the remaining battery capacity, press TAPE/BATT CHECK.

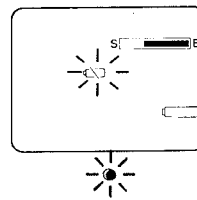


TAPE/BATT CHECK



Battery life indicator

The decreasing black bar indicates decreasing battery power. After the black bar disappears the  indicator will appear and blink and a red lamp will also blink in the viewfinder. When they blink rapidly, replace the battery pack.



#### Note

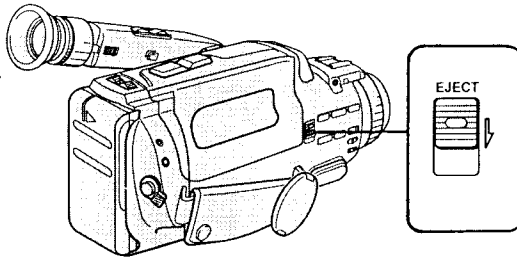
- Charge the battery pack when the black bar of the battery life indicator decreases quickly.
- The battery life indicator of the camcorder may indicate a different remaining capacity from that of the NP-77HD battery pack.

## Inserting a Tape

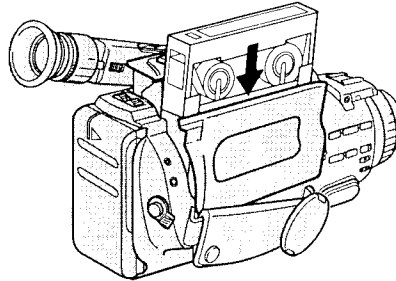
Make sure that the battery pack or other power source is attached.

- 1** Press the small blue button on EJECT and simultaneously push EJECT in the direction of the arrow.

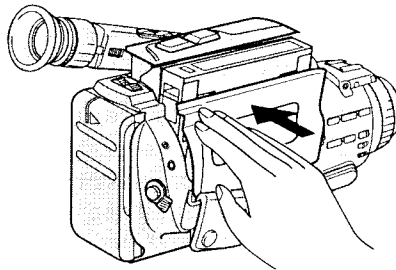
The cassette compartment automatically lifts up and opens toward you.



- 2** Insert a tape with the window facing outside.





- 3** Close the cassette holder by pressing the area marked "PUSH".

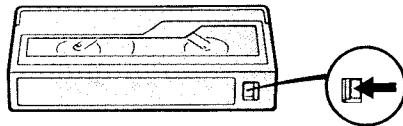


## Preventing Accidental Erasure

Slide the tab on the cassette to expose the red mark. This will prevent accidental recording.

To re-record on this tape, slide the tab opening the window.

If you try to record with the red mark exposed, the  and  indicators blink in the viewfinder and you will hear beep sound for about five seconds.

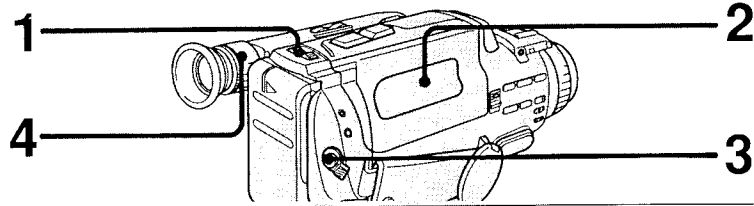


### Note on handling tapes

Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the type and thickness of tape, or if the red mark is exposed or covered, etc. Store tapes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.

## Adjusting the Viewfinder Lens

You may want to adjust the viewfinder lens to best fit your eyesight when you use this camcorder for the first time, or when you use it after someone else did. Make sure that a battery pack or other power source is attached to the camcorder.



- 1** Press the small green button on POWER and slide POWER to CAMERA.

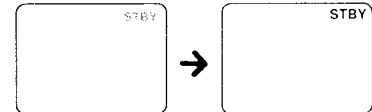


- 2** Insert a tape.  
(See page 9.)

- 3** Turn STANDBY up.



- 4** Turn the viewfinder adjustment ring around the viewfinder lens until the "STBY" indicator displayed in the viewfinder screen comes into sharp focus.



## Using the viewfinder as a sports finder

This camcorder is equipped with a Sports Finder. You can use the viewfinder as the sports finder by turning the viewfinder adjustment ring.

### What is a sports finder ?

Since this finder has a long focal length, you can monitor the picture while your eye is at a distance from the eyecup. The sports finder is convenient when moving around to shoot scenes.

### To set the viewfinder to the sports finder position

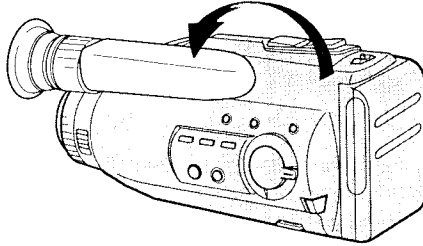
Turn the viewfinder adjustment ring clockwise completely.

**To go from the sports finder position to the normal viewfinder position**

Turn the adjustment ring counterclockwise until the "STBY" indicator in the viewfinder comes into sharp focus when a tape is in your camcorder.

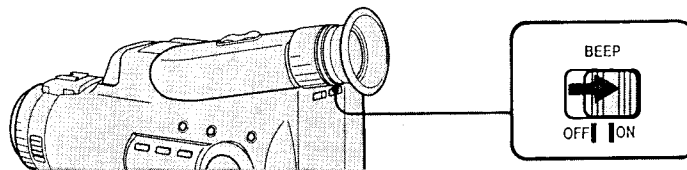
**When storing the camcorder**

Turn the viewfinder barrel to the front.



## Setting the BEEP Switch

This beep sound is to help you confirm when you start and stop recording. When BEEP is set to ON, it will beep once when you start recording and beep twice when you stop recording. It will also beep several times as a warning of any unusual conditions of the camcorder. If you want to deactivate the beep, set BEEP to OFF.



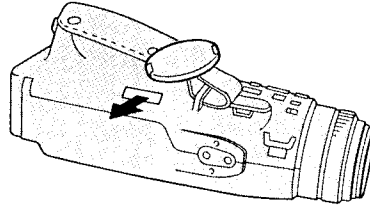
### Notes

- If the battery has been installed, remove it. Reattach the battery after setting the BEEP ON/OFF switch.
- Beep will not be recorded on the tape.
- For warning beep, see page 72.

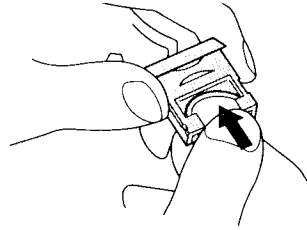
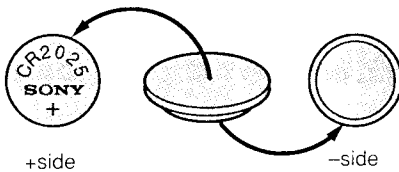
# Installing the Lithium Battery

To keep birth dates in the camcorder's memory as well as to activate the clock, lithium battery must be installed.

- 1** Remove the lithium battery holder located at the bottom of the camcorder.




- 2** Install the supplied CR2025 lithium battery with the + side facing down.



- 3** Put the lithium battery holder into the camcorder.

## Lithium battery life

The battery will last for approximately 1 year in normal operation. When the lithium battery becomes weak, the  indicator will blink in the viewfinder screen for about 5 seconds when you set POWER to CAMERA. In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025. Use of any other battery may present a risk of fire or explosion.**

When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, readjustments of the date, time and birth dates will be necessary.

## To change the lithium battery

Remove the lithium battery holder from the camcorder, and pull out the lithium battery and insert a new one.

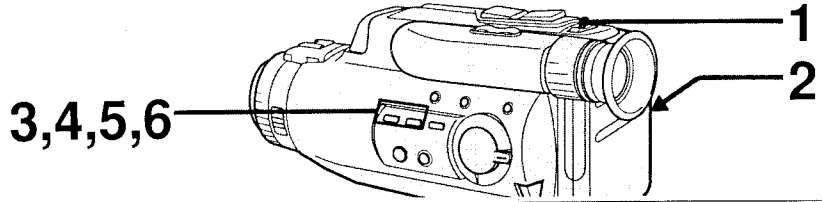
**Warning** Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

**Caution** Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

# Setting the Date and Time

Now, let's adjust the clock inside the camcorder to be able to superimpose date and time onto your video.

Make sure that power source and lithium battery are attached.



<p><b>1</b> Press the small green button on POWER and slide POWER to CAMERA.</p>	
<p><b>2</b> Turn STANDBY up.</p>	
<p><b>3</b> Press DATE (+) and TIME (NEXT) simultaneously for a few seconds until the date indicator appears in the viewfinder.</p> <p>DATE button now functions as + (to advance numbers) and TIME button functions as NEXT (to set).</p>	
<p><b>4</b> Adjust the flashing digits of the year, month, and hour using DATE (+), and press TIME (NEXT).</p>	
<p><b>Notes</b></p> <ul style="list-style-type: none"> <li>• When you keep DATE (+) pressed, the digits advance faster.</li> <li>• The year starts at 1992 and proceeds as follows: 1992 ----&gt; 1999 --&gt; 2000 ----&gt; 2020</li> </ul>	
<p><b>5</b> Adjust the flashing digits of minute using DATE (+).</p>	
<p><b>6</b> Press TIME (NEXT) to set the second to "00". The clock starts operating.</p>	

To correct date and time setting

Repeat steps 3 to 6.

# Storing a Birth Date in Your Camcorder

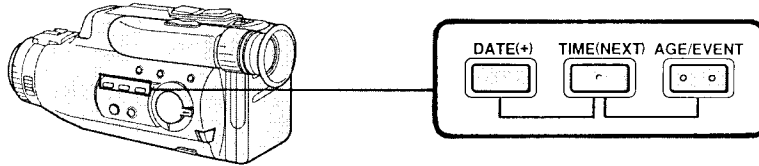
When you preset your child's birth date in the camcorder, you can put your child's age in years and months on your tape. You can also preset the date of an event. Once you enter the birth date of your child, the clock inside the camcorder will automatically update age of your child. You can superimpose the age anytime on your recording. You can preset up to three birth dates or events.

## Before you begin

Before you store a birth date in your camcorder, make sure that power source is connected, that the lithium battery is installed and that the date is correctly set.

## How to store birth date

To store a birth date in your camcorder, see the following example and procedure. Example: Store "Aug. 3, 1987" in memory 2.



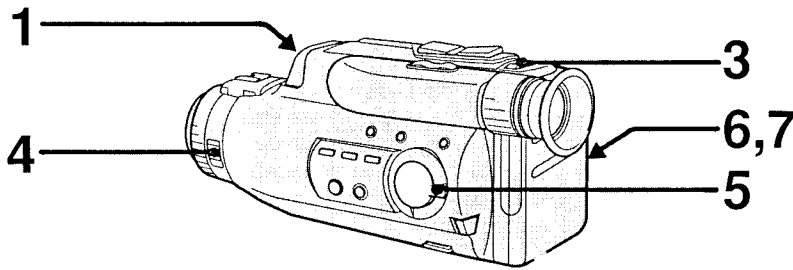
- |  |  |
|--|--|
| <p><b>1</b> Press the small green button on POWER and slide POWER to CAMERA.</p>   |  |
| <p><b>2</b> Turn STANDBY up.</p>   |  |
| <p><b>3</b> Press TIME (NEXT) and AGE/EVENT simultaneously for a few seconds until the "1 BIRTHDAY--- 1900" indicator appears in the viewfinder.</p>   |  |
| <p><b>4</b> Press DATE (+) to select 2.</p> <p>Each time you press DATE (+), the display in the viewfinder changes as follows:</p> <p>1 BIRTHDAY → 2 BIRTHDAY<br/>         ↑                      ↓<br/>         3 EVENT* ←</p> <p>* Although "EVENT" is displayed on 3, you can use it for age as well. 1 and 2 can also be used for event.</p> |  |
| <p><b>5</b> Press TIME (NEXT).</p> <p>The "1900" indicator blinks.</p>   |  |

(To be continued)

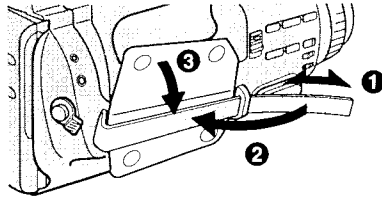


Before you record one-time events, make a trial recording to make sure that the camcorder is working perfectly.  
Keep the lens clean, or the focus cannot be adjusted properly.

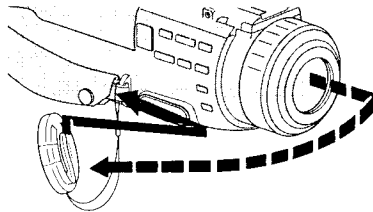
It is very easy to start recording scenes.



- 1** Hold the camcorder by putting your hand through the grip belt so that your thumb can easily press the red START/STOP button.



- 2** Remove the lens cap and attach it to the grip belt.

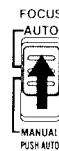


- 3** Press the small green button on POWER and slide POWER to CAMERA.

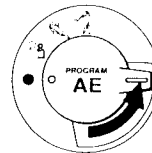
This puts the camcorder in the camera recording mode.



- 4** Set FOCUS to AUTO.



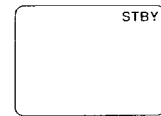
- 5** Set PROGRAM AE to the green position.



(To be continued)

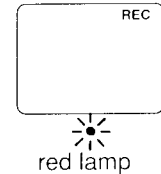
### 6 Turn STANDBY up.

"STBY" appears in the viewfinder. Now, you can see through the viewfinder.



### 7 Press START/STOP (red button) once.

The camera is recording when the word "REC" appears on the viewfinder screen and the red lamp lights in the viewfinder. You can also confirm the start of recording with beep sound when you have the BEEP switch turned on.



In the viewfinder you can see a black and white picture of what you are recording and information that indicates what the camcorder is now doing.

### Automatic recording

With PROGRAM AE set to the green position and FOCUS set to AUTO, all the camera functions are on automatic (i.e. auto iris, auto white balance, auto focus) and the shutter speed is set at normal (1/60 second.)

### To stop recording momentarily

Press START/STOP again. "STBY" appears in the viewfinder. It beeps twice when you have BEEP turned on.

### When you have finished recording

Turn STANDBY down and slide POWER to OFF.

### Ejecting the tape

Make sure that you have attached the battery pack or other power source to the camcorder.

- 1 Press the small blue button on EJECT, and at the same time push EJECT in the direction of the arrow.
- 2 Take out the tape.
- 3 Press the PUSH mark on the cassette holder to close it.

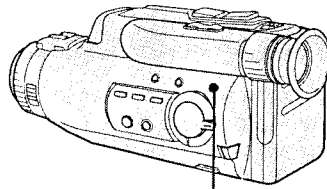
### Caution!

Please remember that you can only use 8-mm format video tapes with this camcorder, and that it is not possible to use PCM recording/playback available on some 8 mm recorders. The PCM sound recorded or after-recorded with other recorder cannot be played back with this camcorder.

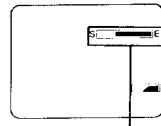
You will be able to record tapes in SP (standard play) mode only and play back tapes in both SP and LP (long play) modes.

## To check the time remaining of the tape

Press TAPE/BATT CHECK.

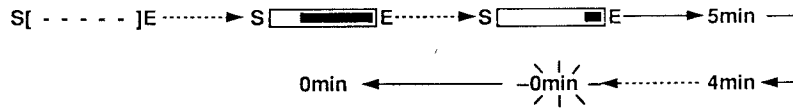



TAPE/BATT CHECK



Tape length indicator

After pressing TAPE/BATT CHECK, the time remaining may not be indicated for about 20 seconds. When the time remaining is less than about 5 minutes, the indicator indicates the minutes remaining.



When "5 min" lights, the  indicator appears in the viewfinder and blinks.

### Note on the tape length indicator

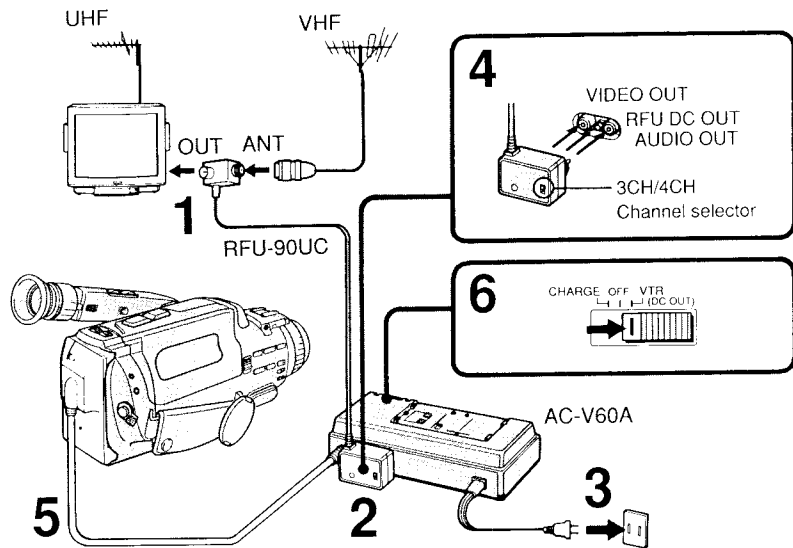
- The camcorder must be in the recording or playback mode when the TAPE/BATT CHECK is pressed to find out the time remaining. In the playback mode, however, the indicator does not indicate the minutes remaining.
- The tape length indicator does not change while using EDITSEARCH.

## How to Play Back a Tape

You can use this camcorder as a VCR by connecting it directly to your TV for playback. After you connect this camcorder to your TV, use the Remote Commander for convenient control of the camcorder.

### If Your TV Has Only an Antenna Input

There are several ways to connect the camcorder to your TV. If your TV has only an antenna input, use the supplied RFU adaptor and AC power adaptor. Make sure that the TV is turned off to prevent speaker damage before hooking up your camcorder. If your TV has video/audio inputs, see page 47.



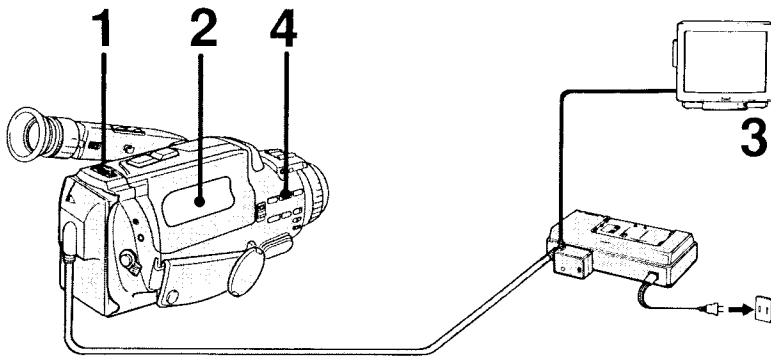
To add your camcorder connection to your TV which is already connected with regular TV (VHF) antenna, you need to:

- 1 Unplug the antenna cable from your TV first.  
Plug in the tail end of the RFU adaptor marked OUT to the antenna input of your TV. Re-wire the antenna cable you unplugged to the RFU adaptor jack marked ANT. This way, you can switch between TV broadcasting and your home video playback without re-wiring.
- 2 Connect the RFU adaptor to the AC power adaptor.
- 3 Connect the AC power adaptor to a wall outlet.
- 4 Set the channel selector on the RFU adaptor (and your TV channel) to 3 CH or 4 CH of the VHF channel, whichever is not active (vacant) in your area.
- 5 Attach the connecting plate of the AC power adaptor to the camcorder.
- 6 Make sure the CHARGE/VTR selector on the AC power adaptor is set to VTR position.

You may want to keep the AC power adaptor and RFU adaptor connected to your TV once you have established the connection. This way, you can easily connect your camcorder to your TV just by attaching the connecting plate of the AC power adaptor to the camcorder. (Steps 5 and 6)

When you want to switch to regular TV program, set the CHARGE/VTR selector to OFF or turn off the power of the camcorder.

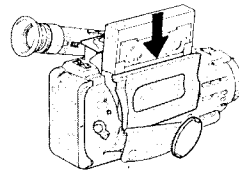
## How to Play Back a Tape



- 1** Press the small green button on POWER and slide POWER to VTR.

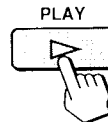


- 2** Insert a tape, if it is not in the camcorder.



- 3** Turn on the TV and select the channel that you adjusted the RFU adaptor (3 CH or 4 CH).  
If you are connecting with video/audio inputs, set TV's TV/VIDEO selector to VIDEO.

- 4** Press **▶** (PLAY).



To stop playback, press **□** (STOP).  
To rewind the tape, press **◀◀** (REW).  
To advance the tape rapidly, press **▶▶** (FF).

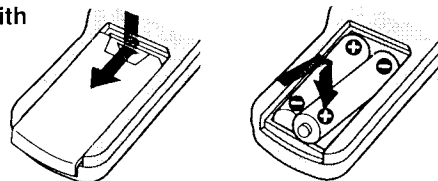
### When you have finished playback

- 1 Slide POWER to OFF.
- 2 Set CHARGE/VTR on the AC power adaptor to OFF.

# Using the Remote Commander

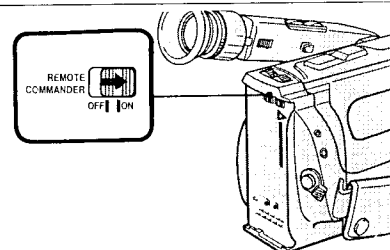
By using the Remote Commander, you can be in the picture with your friends and family, or conveniently control the playback of your tape from a distance.

- 1** Insert two size AA (R6) batteries with correct polarity.



- 2** Set  REMOTE COMMANDER ON/OFF on the battery mounting surface of the camcorder to ON.

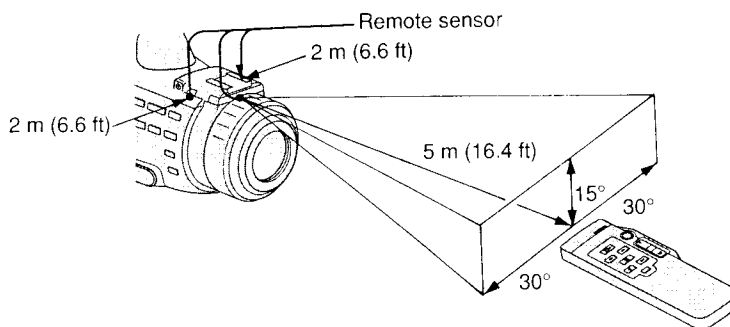
If the battery is attached, remove it. Reattach the battery after setting the REMOTE COMMANDER ON/OFF switch.



- 3** Set POWER on the camcorder as follows:

- When camerarecording, 1) press the small green button on POWER and slide POWER to CAMERA, 2) turn STANDBY up.
- When playing back, slide POWER to VTR.

- 4** Point the Commander to the remote sensor of the camcorder and press the appropriate button on the Commander.

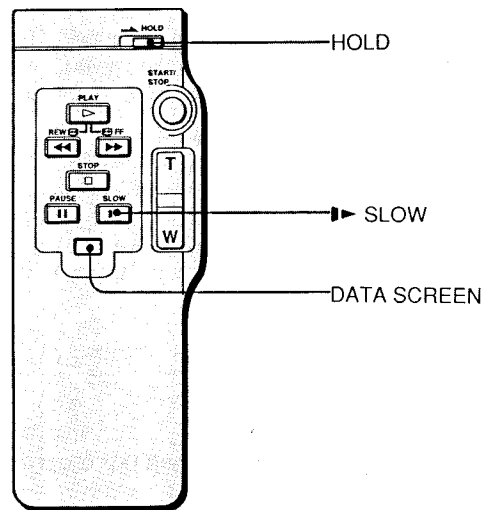


(Approximate maximum distance and angles for remote control)

## Note on the Remote Commander

- Keep the remote sensor away from the strong light source such as direct sunlight or illumination. Remote control with the Commander may not be effective.
- The command mode of the Commander is VTR2. Avoid to use the Sony VCRs with the same command mode at the same time.

## Getting familiar with some buttons



### HOLD switch

When you slide the switch in the direction of the arrow, all the buttons will become inoperable to prevent any misoperation when you accidentally press the buttons.

### ▶▶ SLOW and DATA SCREEN buttons

You can use the functions of these buttons only with the Commander.

## Battery life

In normal operation, batteries will last up to six months. If the camcorder does not operate properly, the batteries might be exhausted. Replace both batteries with new ones.

## To avoid damage from possible battery leakage

Remove the batteries when you will not use the Commander for a long time.

## When you connect the receiver of a remote control kit

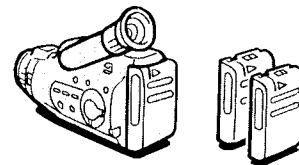
When you connect the receiver of a remote control kit (not supplied) to the REMOTE control connector, be sure to set  REMOTE COMMANDER ON/OFF on the battery mounting surface of the camcorder to OFF.

# How to Get the Most out of Your Battery Pack

## How to Prepare the Rechargeable Battery Pack

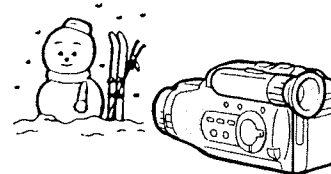
Have sufficient battery pack power to do 2 or 3 times as much recording than you have planned.

"Battery life" indicated in this manual is measured by the continuous recording time of the camcorder, placed at a room temperature using a full-charged battery.



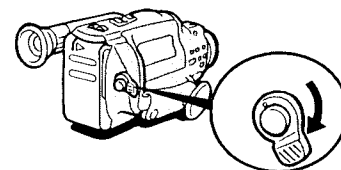
Battery life is shorter in a cold climate.

Battery efficiency is decreased and the battery will be used up more quickly.




Turn **STANDBY** of the camcorder down when not recording to save battery power.

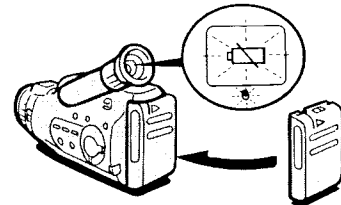
A smooth transition between scenes can be made even if recording is stopped and started again. While positioning the subject or selecting an angle, or looking through the viewfinder lens, the lens moves automatically inside the camcorder and the battery is used. The battery is also used when a tape is inserted or removed.



## When the Rechargeable Battery Pack Should Be Replaced

When the  indicator and red lamp in the viewfinder change from slow blinking to rapid blinking while you are recording.

Turn off the power switch of the camcorder and replace the battery pack. Leave the tape in the camcorder in order to obtain a smooth transition between scenes after the battery pack is replaced.





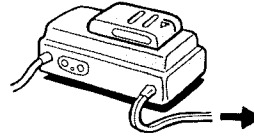
## Notes on Charging

### Before using the battery pack, charge it sufficiently.

A brand new battery pack is not charged.

### Make sure you use up the battery before recharging.

- If recording is completed before the  indicator appears in the viewfinder, it is recommended that you remove the tape, set POWER to CAMERA, turn STANDBY up, and leave the camcorder until the  indicator blinks rapidly.
- When you use the AC-S10 AC power adaptor, the DC-S10 car battery charger or BC-S10 portable battery charger, you can discharge the battery with their discharging function.
- Repeated charging without using up the battery may cause lowering of battery capacity. However, the original battery capacity can be recovered if you fully discharge (use up) and charge the battery again.



### Recharge the battery pack after long storage.

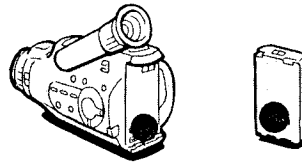
If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged.

Charge it again but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

## Keep the Terminals Clean

### If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.

When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition. Also, wipe the + and - terminals with a soft cloth or paper.



## How to Get the Most out of Your Battery Pack

### Notes on the Rechargeable Battery Pack

#### Why the battery pack heats up?

During charging or recording, the battery pack heats up. This means energy has been generated and chemical change has occurred inside the battery pack, and this is not dangerous.



#### How to care for the battery pack


- Remove the battery pack from the camcorder after using it, and keep it in a cool place. When the battery pack is in the camcorder, a small amount of current flows to the camcorder even if POWER is turned off. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended you charge the battery right before using.

#### How to use the switch on the battery pack

This switch is provided so that you can remember the charging condition. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up.



#### How many times can the battery pack be recharged?

It can be fully charged and discharged about 500 times under normal temperatures. If the  indicator blinks rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

#### Recommended temperatures during charging

Lower temperatures require a longer charging time. Charging under temperatures ranging from 10°C to 30°C (5°F to 85°F) is recommended.

#### Be sure to observe the following.

- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. Carry the battery pack attaching to the terminal cover.**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

## Connecting Alternative Power Sources

You can choose any of the following power sources for your camcorder: battery pack (see page 7), house current, and 12/24 V car battery.

The appropriate power source for you to choose depends on the place where you want to use your camcorder.

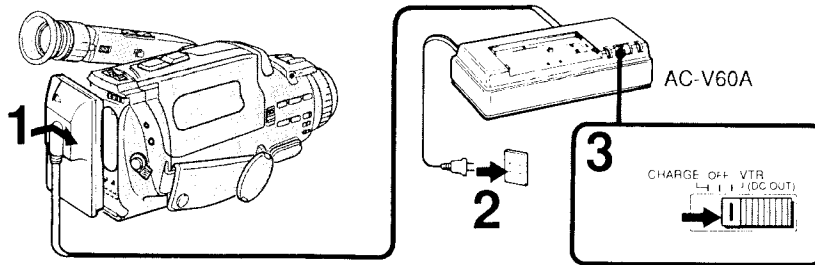
Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-55H (supplied), NP-77H/77HD, NP-77, NP-66H or NP-55
Indoors	House current	AC power adaptor AC-V60A (supplied), AC-V30 or AC-S10
In the car	12 V or 24 V car battery	DC pack DCP-77

### Note on power sources

Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. In this case, supply the power again immediately.

## Using House Current

The supplied AC-V60A AC power adaptor is required.



- 1** Align the flat side of the connecting plate with the white line on the camcorder, and push down and slide it in the direction of the arrow.
- 2** Connect the AC power adaptor to a wall outlet.
- 3** Set the CHARGE/VTR selector of the AC power adaptor to VTR.

See the instruction manual of the AC power adaptor for details.

### To remove the connecting plate

Remove it in the same way as you do with the battery pack. See page 7.

### Option

AC-S10 AC power adaptor:

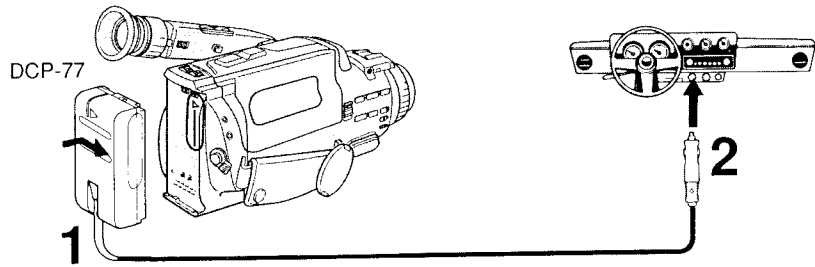
You can charge a battery, as well as discharge it to get the optimum condition of the battery.

How to Get the Most out of Your Battery Pack/  
Connecting Alternative Power Sources

## Connecting Alternative Power Sources

### Using Car Battery

The DCP-77 DC pack (not supplied) is required.



- 1** Align the flat side of the DC pack with the white line on the camcorder, and push down and slide it in the direction of the arrow.
- 2** Connect the cord of the DC pack to the cigarette lighter socket of a car (12 V or 24 V).

#### To remove the DC pack

Remove it the same way as you do with the battery pack. See page 7.

#### Options

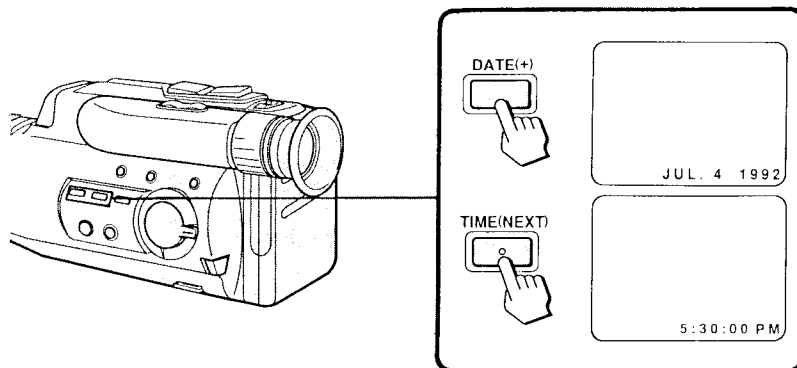
- BC-77, BC-S10 portable battery charger:  
You can charge a battery pack on 100 – 240 V AC. BC-S10 has discharging function, so you can charge a battery pack whether it is used up or not.
- DC-S10 car battery charger with discharging function:  
You can charge a battery pack through the cigarette lighter socket.

# Camera Recording

In the previous chapter “Basic Camera Operation”, you learned the basic recording operations. This section shows you how to record the date or time, record an age, re-record a picture and more.

## Recording the Date or Time

Date or time can be superimposed on your recording.



During camera recording or when in standby mode, press DATE for date indication or TIME for time indication.

The date or time displayed in the viewfinder is recorded with the picture.

### To stop recording date or time

Press DATE or TIME again.

The picture recording continues.



### About memory back-up

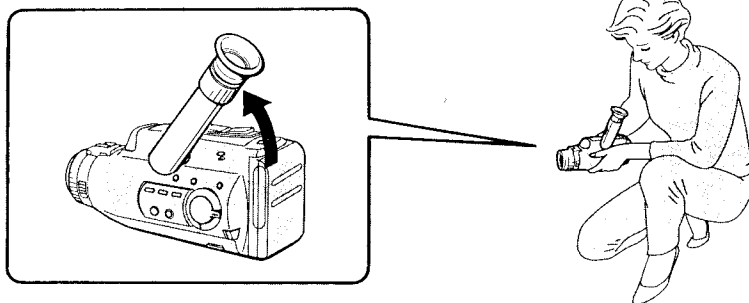
The camcorder uses the lithium battery on the bottom to keep the birth date in memory. The lithium battery life is approximately 1 year.

### When you connect the camcorder to a TV during recording

If you do not use the data-screen function by the Remote Commander, the age indicator will appear on the TV screen when the [1], [2], or [3] indicator goes out in the viewfinder and recording starts.

## For Low-position Recording

You can also record from low position to get an interesting recording angle.



Set the viewfinder to the sports finder position (page 10) and turn it for the low position recording. (It can be turned 180 degrees.)

## Camera Recording

### Checking the Last Portion of a Scene You Just Recorded (EDITSEARCH)

You can check the last portion of a scene you just recorded without changing the setting of the POWER switch using EDITSEARCH.

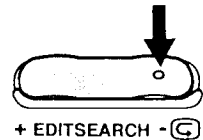
- 1** Put the camcorder in the standby mode by pressing the START/STOP button.



START / STOP

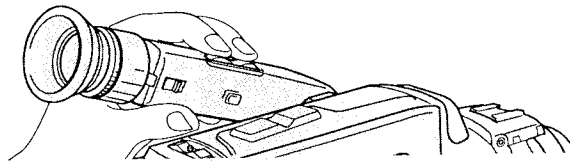
- 2** Press the - EDITSEARCH momentarily.

The last few seconds of the recorded portion will be played back in the viewfinder. After a few seconds of playback, the camcorder goes back to the standby mode, ready for the next recording.




#### Note on using EDITSEARCH

When you raise the viewfinder and use EDITSEARCH, hold the viewfinder with your thumb to prevent movement.



### Hints for Recording

#### If the tape reaches near the end during recording

The  indicator and the red lamp in the viewfinder and the camera recording/battery lamp on the camcorder blink slowly. When the tape reaches its end, blinking becomes rapid and beeps sound for about five seconds (if BEEP is set to ON.)

#### Notes on recording

- To record from the beginning of the tape, run the beginning of the tape for about 15 seconds before recording. This will avoid missing the starting point when the tape is played back.
- When moving from indoors to outdoors, or vice versa, turn STANDBY up and point the camcorder at a white object for about 10 seconds so that the white balance is properly adjusted.

#### Note on standby mode

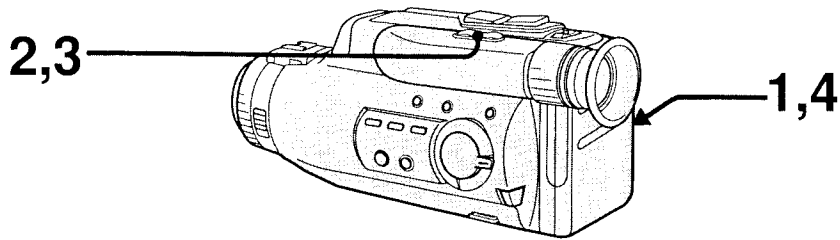
If you leave the camcorder in the standby mode for 5 minutes or more, the camcorder will be automatically turned off. To resume the standby mode, turn STANDBY down and turn it up again. To start recording, press START/STOP directly.

#### Note on light sources

If you are shooting a subject in bright conditions just after shooting in a dark place, the picture may not appear in the viewfinder. In this case, point the camcorder to the other direction.

## Re-recording on a Previously Recorded Portion (EDITSEARCH)

You can reshoot a scene over the last recorded portion using EDITSEARCH. The previously recorded portion will be erased.

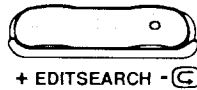


### 1 Turn STANDBY up.



### 2 Look in the viewfinder and find the point from where you want to begin recording by:

Keep pressing the + side of EDITSEARCH continuously to advance the picture at a normal playback speed, or the - side to reverse the picture.



### 3 At the desired point, release EDITSEARCH.

### 4 Press START/STOP.

Recording begins from the point you released EDITSEARCH. A smooth transition between scenes can be made after the pre-recorded portion even if STANDBY is turned down and turned up, or even if the power is turned off and on again, provided that the tape is not removed.



#### To pause recording

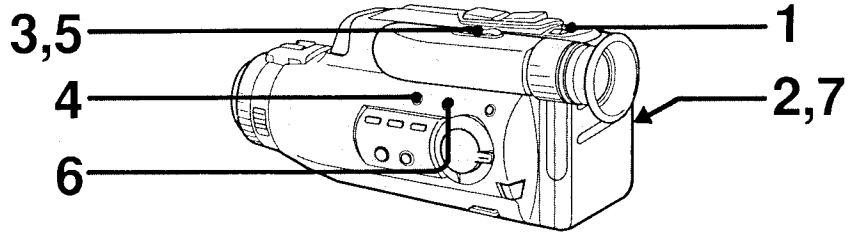
Press START/STOP again.

#### To stop recording

Turn STANDBY down.

## Inserting Scene in the Middle of a Recorded Tape

You can insert a scene in the middle of a recorded tape by setting the starting point and ending point. A previously recorded portion will be erased.



<p><b>1</b> Press the small green button and slide POWER to CAMERA.</p>	
<p><b>2</b> Turn STANDBY up.</p>	
<p><b>3</b> While looking in the viewfinder, keep pressing the + or – side of EDITSEARCH and release the button where you want to end the insertion. The camcorder enters the standby mode again.</p>	
<p><b>4</b> Press COUNTER RESET. The counter is reset to zero.</p>	
<p><b>5</b> While looking in the viewfinder, keep pressing the – side of EDITSEARCH and release the button at the point where you want to start the insertion.</p>	
<p><b>6</b> Press ZERO MEM. The insert ending point is stored in memory.</p>	

## 7 Press START/STOP.

Insert recording begins. The insert recording stops automatically at the counter zero point.



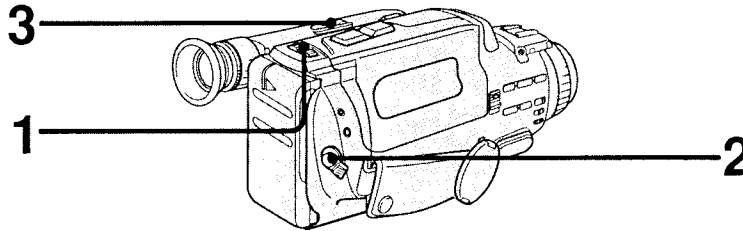
### To cancel the ZERO MEM

Press ZERO MEM.

**Note** The picture may be distorted at the ending point when played back.

## Checking Recording in the Viewfinder (EDITSEARCH)

You can check the recorded picture in the viewfinder using EDITSEARCH. Sound cannot be monitored.



- 1** Press the small green button, and slide POWER to CAMERA.



- 2** Turn STANDBY up.



- 3** Keep pressing the + or - side of EDITSEARCH to view the playback picture:  
+ side for the playback picture  
- side for the playback picture in reverse.



### To stop playback

Release EDITSEARCH.

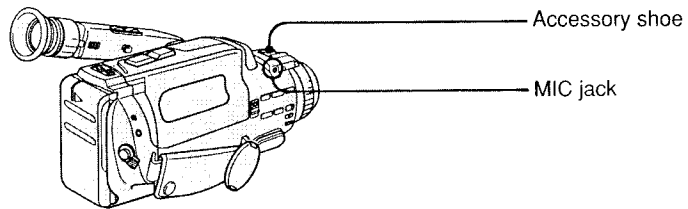
### To monitor the sound while viewing the playback picture in the viewfinder

- 1 Connect an earphone to the Ⓜ (earphone) jack.
- 2 Press the small green button and slide POWER to VTR.
- 3 Press ◀ to rewind the tape and press □ where you want to stop.
- 4 Press ▶ to start playback.


## Camera Recording

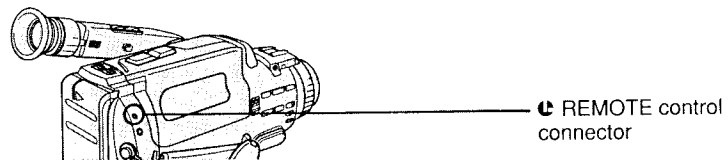
### Recording with an External Microphone

You can connect an external microphone (not supplied) to the MIC jack. This jack also accepts a “plug-in-power” microphone. Attach the microphone to the accessory shoe of the camcorder.





### Connecting a Wired Remote Control Unit

When you connect a wired remote control unit or editing controller (not supplied) to the  REMOTE control connector, you can operate your camcorder from a distance.



#### About (LANC)

 stands for Local Application Control Bus System. The  connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

# Making Manual Adjustments

The camcorder's automatic functions offer you worry-free operation under most shooting conditions. But in some circumstances, manual adjustment is better for effective recording. You can manually adjust focus and back light compensation with this camcorder. Some shooting situations may call for using some items manually, while others call for using them automatically. As long as you do not remove the battery, even if you set POWER to OFF, the previous manual settings are retained.

## Focusing Manually

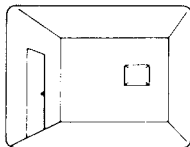
### When to use manual focus

In the following cases you would obtain better results by adjusting the focus manually.

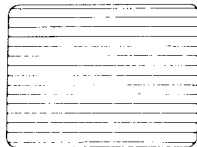
Too much brightness behind the subject



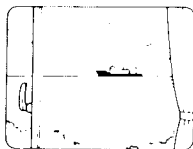
Subjects with little contrast-wall, sky, etc.



Horizontal stripes



Subject through frosted glass



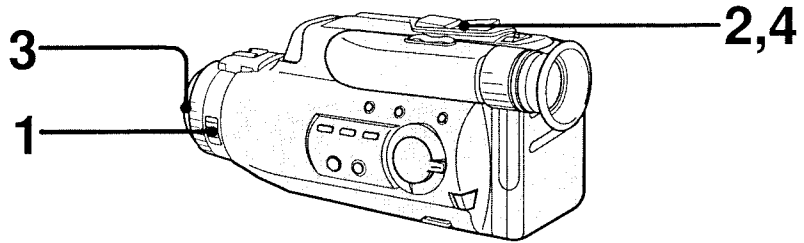
- Insufficient light
- One subject is close; the other is in the center, but at a distance
- Subjects beyond nets, etc., or another subject passes in front of the camcorder
- Bright subject or subject reflecting light
- High contrast behind the subject (the background may be focused)
- When shooting a stationary subject using tripod
- When you want to save battery power
- Autofocusing does not function momentarily when:
  - The setting of the shutter speed is changed.
  - Exposure is adjusted manually.
  - Lighting conditions change quickly.
  - Zooming is done from wide-range to telephoto.

This camcorder keeps in focus by referring to the picture contrast, which is weak in the above situations.

## Making Manual Adjustments

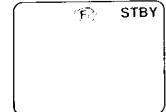
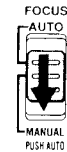
### How to focus manually

When adjusting focus manually, the best way is to first adjust at telephoto position before recording, then set the desired zoom angle. Let's go through step by step.



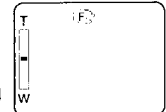
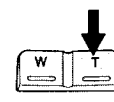
#### 1 Set FOCUS to MANUAL.

The  indicator appears in the viewfinder.



#### 2 Keep pressing the T side (telephoto) of the power zoom button until the zooming stops.

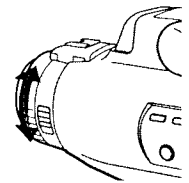
The power zoom indicator appears in the viewfinder.



#### 3 Turn the focus ring to achieve sharp focus.

##### Note

The focus ring does not have a stop position.



#### 4 Set the desired shot length using the power zoom button.



### Shooting with autofocus momentarily

While shooting with manual focusing, push FOCUS down to PUSH AUTO.

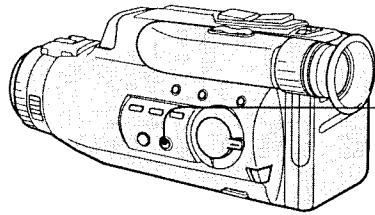
The autofocus functions **while you are pressing the button**. When you release the button, manual focusing will be resumed. Use this button when you change the focus from one subject to another. The focusing performs naturally. The previous settings except for focusing are retained.

### Shooting in relatively dark places


When shooting in relatively dark places such as indoors, the depth of field in proper focus is very shallow. For best results, shoot at wide angles after focusing in telephoto.

## Compensating Backlighting

In this camcorder, the exposure is automatically controlled. However, when shooting a subject that is backlit, that is, if the light source is coming in from the back of the subject, use the BACK LIGHT button to get natural exposure.



### Press BACK LIGHT.

The  indicator appears. If it does not appear, press the button again.

BACK LIGHT




Subject is too dark because of backlight.



With backlight compensation






### After shooting

Be sure to release this adjustment condition by pressing BACK LIGHT again. (The  indicator goes out.) Otherwise, picture will be too bright under normal lighting condition.

# Using Program AE

When you use the PROGRAM AE (Auto Exposure) function, you can give a "portrait" effect (shallow depth of field) or capture high-speed action with "sports" mode or "high-speed shutter" mode.

## What is PROGRAM AE (Auto Exposure)?

Program AE automatically selects just the right combination of shutter and aperture settings and gives you creative control of depth of field (distance range of object that will be in sharp focus). There are four preprogrammed modes: Normal (the green position), Portrait , Sports , and High-speed shutter . (See pages 40 to 42.)

## Portrait Mode



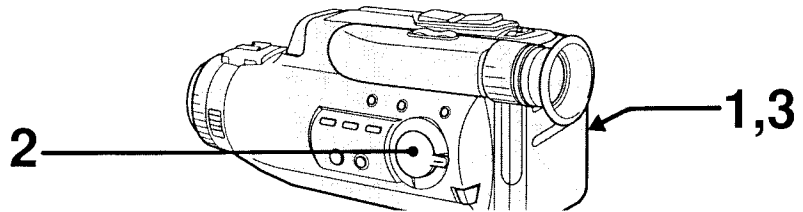
In the portrait mode, the object is in focus and the background is out of focus. Therefore, you can use this mode to highlight the subject. The aperture is controlled to open by automatically selecting the shutter speed (between 1/60 to 1/1850 that matches the shooting situation) to maintain the appropriate exposure. The portrait mode is most effective to be used outdoors.



You may want to use the portrait mode when shooting the following subjects:

- a still subject such as person or flower
- zooming in a subject in the telephoto mode
- subjects behind such obstacles as net



## How to set to portrait mode

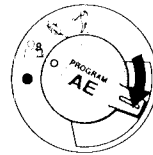


**1** Turn STANDBY up.



START / STOP

**2** Set PROGRAM AE to .  
 appears in the viewfinder.



**3** Press START/STOP.  
Recording with the portrait mode starts.



START / STOP

## To resume the automatic mode

Set PROGRAM AE to the green position.

**Note** When recording under fluorescent, sodium, or mercury lamp, the brightness of the recorded picture may vary, or the color of the recorded picture may become unnatural.

## Sports Mode



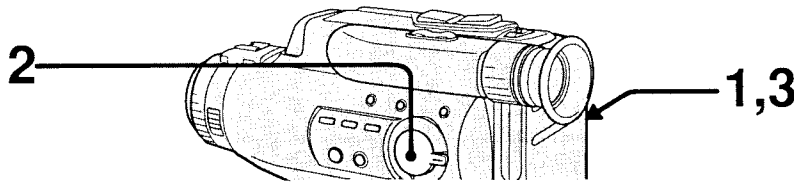
In the sports mode, you can record subjects moving at high speed clearly, providing a high-quality picture minimum blur in the slow and still playback modes. The fastest shutter speed that matches the shooting situation (between 1/60 and 1/500) is selected to maintain the appropriate exposure. The sports mode provides more effective recording than you can achieve by using the high-speed shutter mode.



You may want to use the sports mode when shooting the following subjects:

- outdoor sports scene such as football, tennis or golf
- recording a landscape in a moving car

### How to set to sports mode



<b>1</b> Turn <b>STANDBY</b> up.	
<b>2</b> Set <b>PROGRAM AE</b> to . appears in the viewfinder.	
<b>3</b> Press <b>START/STOP</b> . Recording with the sports mode starts.	

Using Program AE

### To resume the automatic mode

Set PROGRAM AE to the green position.

### Hint for effective camera work

When shooting sports event from a distance, such as a football game, we tend to zoom from the wide to the telephoto position to catch the one-time events. Even under these circumstances, by using the sports mode, you can get a sharp picture when played back later in the slow or still mode.

### Notes

- The sports mode is effective under sufficient lighting, such as under sunlight.  
When used under extremely dark conditions, the shutter speed may not be shifted to high speeds.
- When recording under fluorescent, sodium, or mercury lamp, the brightness of the recorded picture may vary, or the color of the recorded picture may become unnatural.

## High-speed Shutter Mode



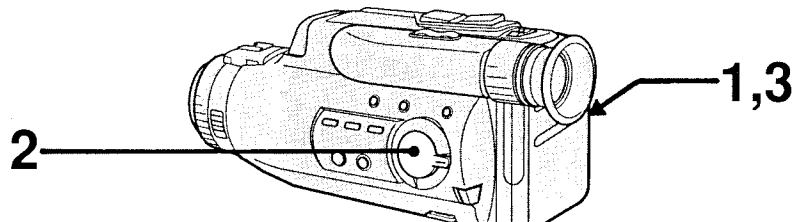
In the high-speed shutter mode. The shutter speed is set to 1/4000. Subjects moving at high speed can be recorded and the picture can be observed more clearly with less picture shaking in the still or slow modes compared to slower shutter speeds. Remember that you need enough lighting to use the high-speed shutter mode since the aperture is fixed.



You may want to use the high-speed shutter mode when:

- Shooting a golf swing or a tennis match with the tennis ball captured clearly.
- You wish to play back certain scenes with high speed movements in a clear, sharp picture.

### How to set to high-speed shutter mode



<b>1</b> Turn <b>STANDBY</b> up.	
<b>2</b> Set <b>PROGRAM AE</b> to . appears in the viewfinder.	
<b>3</b> Press <b>START/STOP</b> . Recording with the high speed shutter mode starts.	

### To resume the normal shutter speed

Set PROGRAM AE to the green position

#### Notes

- In the high-speed shutter mode, record under sunlight or use a video light.
- When you record a TV screen in the high-speed shutter mode, the brightness of the recorded picture may vary.
- When you shoot a very bright subject in the high-speed shutter mode, a light vertical, belt-like line ("smear") may appear on the screen.
- When you record in the high-speed shutter mode under a light discharged tube, such as a fluorescent lamp, sodium lamp or mercury lamp, the brightness of the recorded picture may vary.

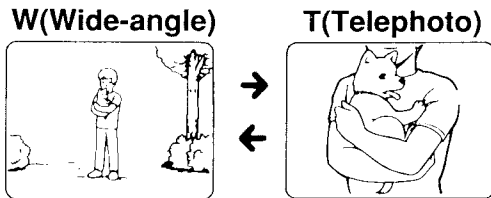
# Using the Special Effects

You can get a professional-looking home video using these special effects; zoom, close-up, fade-in and fade-out.

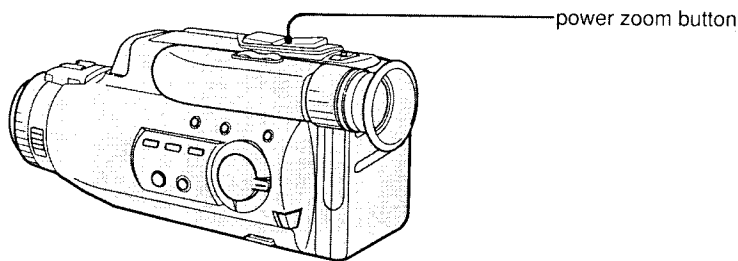
## Zooming

You can change the size of the subject in the scene. Use zooming to focus manually or to decide the shooting angle. Also use "zoom-in (Telephoto)" for dramatic close-ups. Use "zoom-out (Wide-angle)" for panoramic long shots.

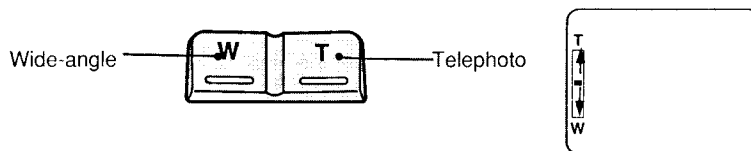
Most common mistake, however, is using zoom-in or zoom-out too often during recording. For natural recording, you may want to set the zoom first and then start recording.



To zoom



Press the T side of power zoom button for telephoto (subject appears closer) and the W side for wide-angle (subject appears farther away).



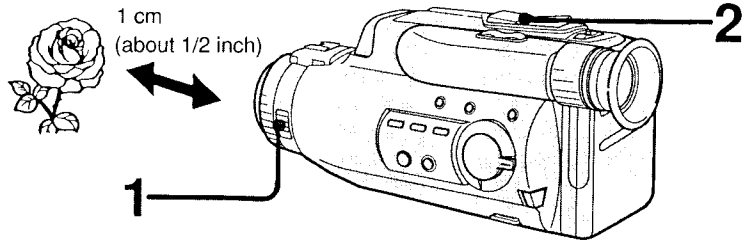
The camcorder's power zoom button offers a variable speed zooming; pressing it firmly for high speed zooming and softly for normal speed zooming.

Variable speed zoom cannot be operated with the power zoom button on the Commander.

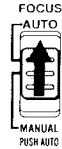
Using Program AE/  
Using the Special Effects

## Close-up (Macro)

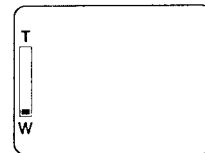
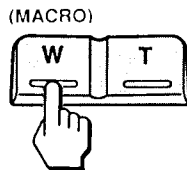
You can shoot subjects that are at least 1 cm (about 1/2 inch) away from the lens surface.



**1** Set FOCUS to AUTO.



**2** Press the W side of the power zoom button until the indicator inside the viewfinder stops at the W end.



### Manual adjustment

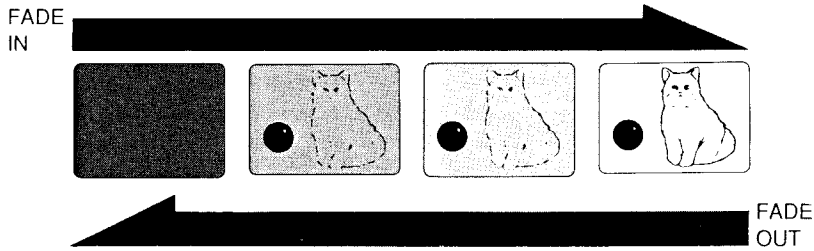
You can shoot with manual focus in doing close up. For details, see page 38.

### Note

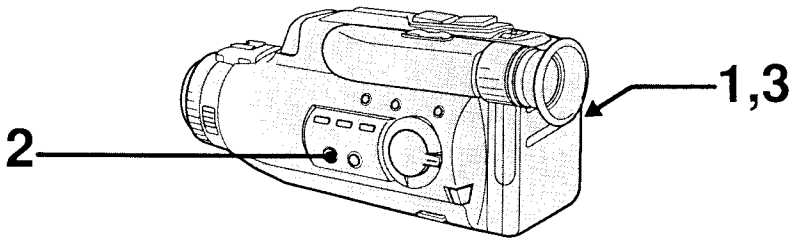
When doing close up, the depth of field (distance range of the subject that will be in sharp focus) is very shallow. So pay attention to focusing. To keep the subject in focus, use a tripod.

## Fade-in and Fade-out

You can fade-in or fade-out to give your recording a professional appearance. When fading-in, the picture will gradually appear from black. The sound will also be gradually increased. When fading-out, the picture will gradually fade to black. The sound will be decreased.



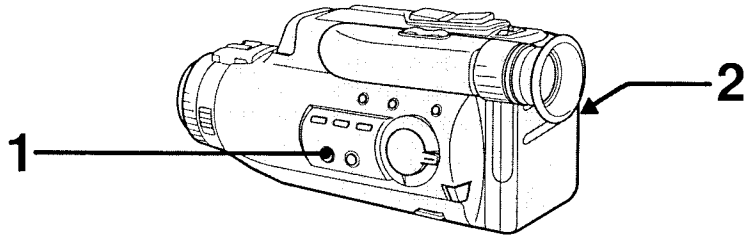
To fade-in



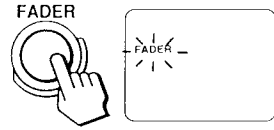
<b>1</b> Turn <b>STANDBY</b> up.	
<b>2</b> Press <b>FADER</b> . The "FADER" indicator appears in the viewfinder and blinks.	
<b>3</b> Press <b>START/STOP</b> . Fade-in is performed and recording will start.	

Using the Special Effects

### To fade-out



- 1** While recording, press FADER.  
The "FADER" indicator appears in the viewfinder and blinks.



- 2** Press START/STOP to stop recording.  
Fade-out is performed and then recording stops.



### To cancel the fade-in/out function

Before pressing START/STOP, press FADER again.

### If you want to use the fade-in/out function repeatedly

Start from step 1 each time.

### When the date/time (page 29), or age (page 30) is displayed

The date/time, or age does not fade-in or fade-out.

# Playing Back

In the earlier section (page 20), we've explained the basic connection to your TV. Here, we will talk about several other ways of connection to TV depending on the type of TV you have.

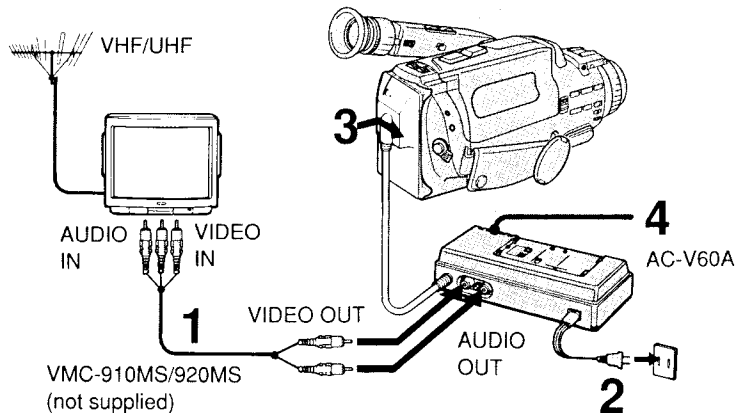
You can easily make a proper connection of camcorder and TV by using the supplied AC-V60A AC power adaptor.

If you connect a TV not equipped with video/audio inputs, see page 20.

## Connecting a TV with Video/Audio Inputs

### How to connect a TV with video/audio inputs

Use the supplied AC-V60A AC power adaptor and A/V connecting cable to connect to the TV. Make sure that the TV is turned off to prevent damage to the speaker.



- 1 Connect Video and Audio using the A/V cable between TV and AC power adaptor. If your TV is a monaural type, use the VMC-710M/720M A/V connecting cable (not supplied).
- 2 Connect the AC power adaptor to a wall outlet.
- 3 Attach the connecting plate of the AC power adaptor to the camcorder.
- 4 Set the CHARGE/VTR selector on the AC power adaptor to VTR (DC OUT).

#### Note

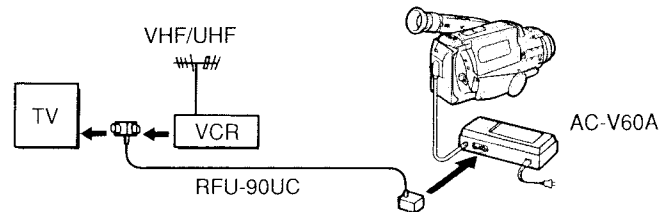
Perform only steps 3 and 4 when playing back a tape. You can keep the AC power adaptor and the TV connected when playing back a tape.

Using the Special Effects/  
Playing Back

Connecting to a TV via a VCR

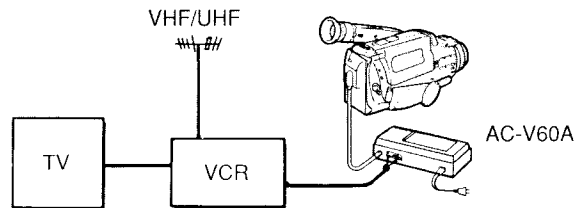
If your TV has no VIDEO/AUDIO input jacks

Disconnect the antenna connection between the TV and the VCR, and connect the RFU adaptor to the VHF/UHF input of the TV and VHF/UHF output of the VCR.



If your TV has VIDEO/AUDIO input jacks

Connect Video and Audio from the AC power adaptor to the VCR instead of to the TV. Set the input selector of the VCR to LINE, if available.



## Playing Back a Tape in Various Speeds

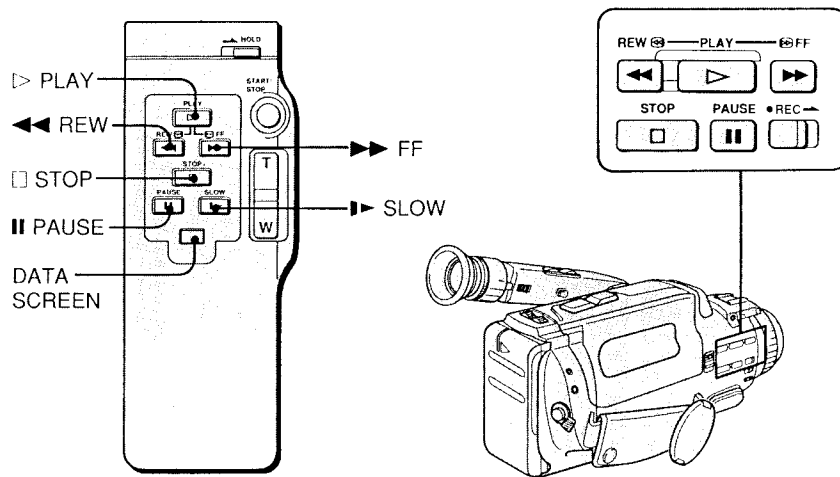
The supplied wireless Remote Commander is useful to control the camcorder from a distance. When using it, be sure to set the **REMOTE COMMANDER ON/OFF** switch to ON.

### To make the same indications in the viewfinder on the TV (only on the Commander)

Press DATA SCREEN.

To turn the indications off, press it again.

This DATA SCREEN on TV will tell you which playback mode you are using.



### To view the still picture (playback pause)

Press || during playback.

|| appears in the viewfinder.

To resume normal playback, press ▷ or ||.

#### Note

When the still picture mode lasts for 5 minutes or more, the camcorder automatically enters the stop mode.

### To view the picture at 1/5 speed (slow playback) (only on the Commander)

Press ▶ during playback.

▶ appears in the viewfinder.

#### Note

To resume normal playback, press ▷.

When slow playback lasts for 1 minute or more, the playback at the normal speed starts automatically.

## Playing Back

### To locate the desired scene (picture search)

Keep pressing ◀◀ or ▶▶ during playback or in the still picture mode. ⏮ or ⏭ appears in the viewfinder.

To resume normal playback, release the button.

### To locate the desired scene quickly (skip scan)

Press ◀◀ during rewinding or ▶▶ during advancing the tape rapidly. ⏮ or ⏭ appears in the viewfinder.

To resume normal playback, press ▷.

### About the playback picture

During the various playback modes, streaks appear on the screen.

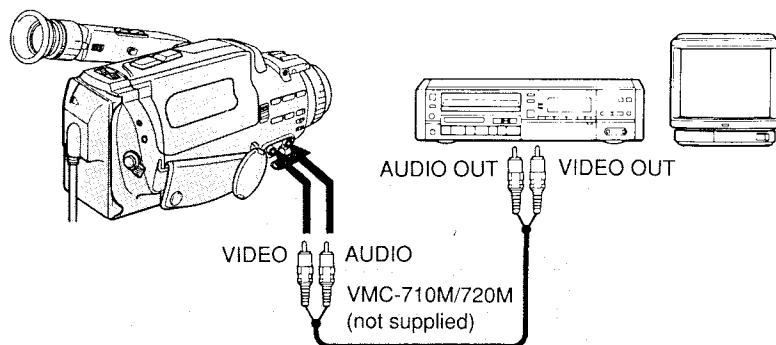
# Recording

## Recording from a VCR or TV

You can record a tape from another VCR or a TV program from the TV both equipped with video/audio outputs.

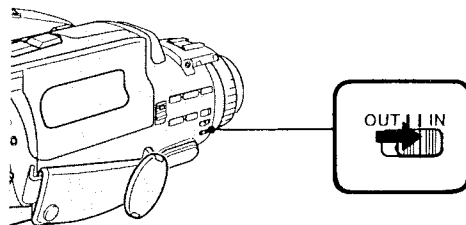
### How to connect

Disconnect the RFU adaptor from the AC power adaptor if it is connected.  
Make connection using the appropriate A/V cable (such as Sony VMC-710M/720M for monaural equipment or VMC-910MS/920MS for stereo equipment).



### How to record

- 1 Set the IN/OUT selector on the camcorder to IN.



- 2 Turn on the VCR or TV.
- 3 Play back the tape or select the TV channel to be recorded.
- 4 Set POWER of the camcorder to VTR.
- 5 Insert a tape and slide ● REC.  
Recording starts. You can monitor the picture being recorded in the viewfinder.

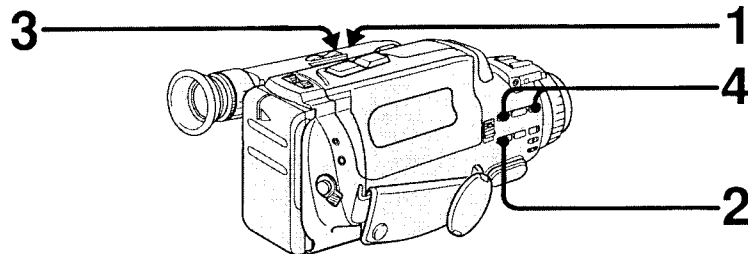
Playing Back/  
Recording

## Using the Tape Counter

During recording or playback, the digits on the counter indicate the actual recording or playback time.

### To count the whole tape

Press COUNTER RESET at the beginning of the tape so that the counter shows "0:00:00". Write down the counter reading at a particular point so that you can easily find that point later by referring to the tape counter.



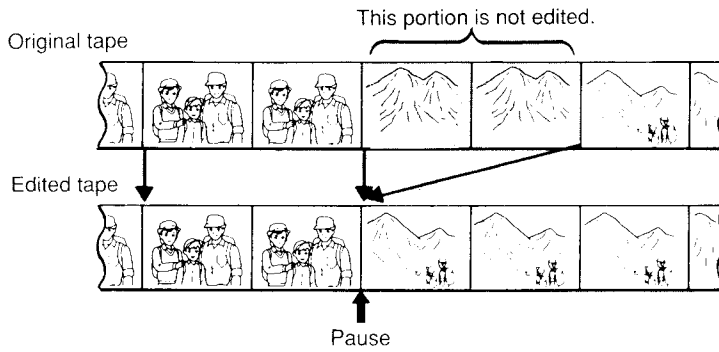
<p><b>1</b> During playback, press COUNTER RESET at the point you later want to locate. The counter shows "0:00:00".</p>	<p>COUNTER RESET</p>
<p><b>2</b> Press  when the playback has finished, as usual.</p>	<p>STOP</p>
<p><b>3</b> Press ZERO MEM. The "ZERO MEM" indicator blinks in the viewfinder. <b>Be sure to press ZERO MEM after you stop the tape.</b> It does not function during recording or playback.</p>	<p>ZERO MEM</p>
<p><b>4</b> Press  or .</p> <p>The tape rewinds or advances and stops automatically when the counter reaches approximately zero.</p>	<p>REW   FF</p>

### Notes on the tape counter and the ZERO MEM button

- Something must be recorded on the tape in order for the tape counter to function. Tape counter will not work on blank tape.
- The counter reading and the point of the tape may not correspond exactly. Use the counter as a guide.  
There will be a time lag of several seconds especially when you repeat fast-forward running/rewinding and play back the tape recorded in LP and SP modes mixed.
- The ZERO MEM mode is cancelled automatically once the tape is rewound or sent forward to the point where you pre-registered.

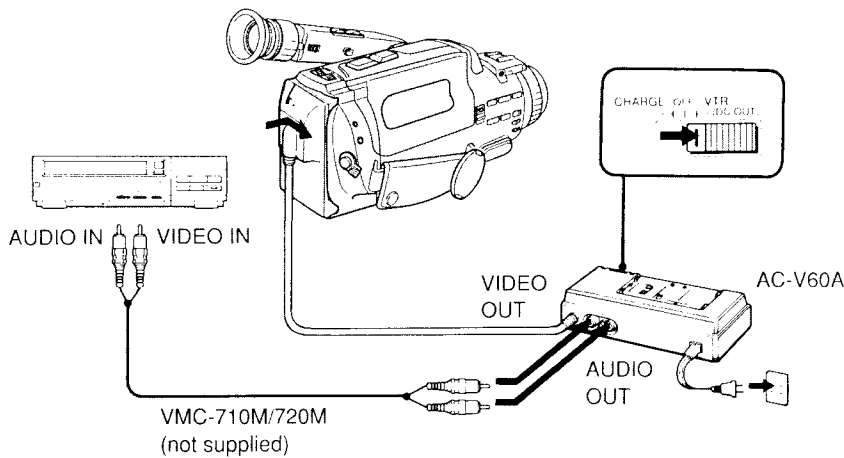
## Editing Tapes with a VCR

You can edit a tape with an additional **8** 8mm, **B** Betamax or **VHS** VHS format VCR.



### How to connect

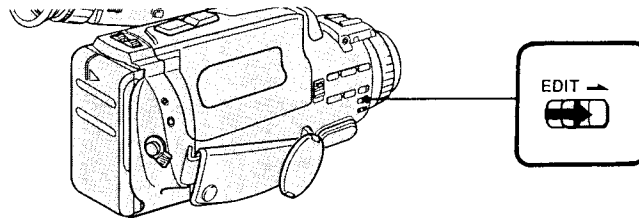
Make connections using the appropriate A/V cable (such as Sony VMC-710M/720M for monaural VCR or VMC-910MS/920MS for stereo VCR) and set the CHARGE/VTR selector on the AC power adaptor to VTR. Set the input selector of the VCR to LINE, if available.



### How to edit

**1** Insert a tape to be recorded into recording VCR.

**2** Slide EDIT on the camcorder to the direction of the arrow.



**3** Set POWER of the camcorder to VTR, then insert the recorded tape.

**4** Play back a tape on the camcorder until you locate the point where you want to start editing, then set the camcorder to the playback pause mode.

**5** On the recording VCR, locate the recording starting point and set the VCR to the recording pause mode.

**6** Press **II** PAUSE of the camcorder and VCR simultaneously to start editing.

#### To edit more scenes

Repeat steps 4 to 6.

#### To stop editing momentarily

Press **II** on the recording VCR.

#### To stop editing

Press **□** on both VCRs.

#### If you use the DATA SCREEN function

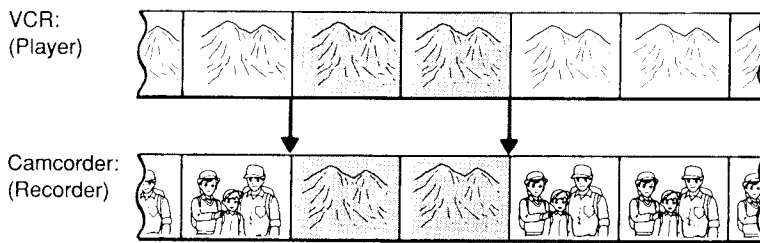
The indicators displayed on the TV screen will also be recorded.

#### Use of the EDIT switch

When you set EDIT to the direction of the arrow (EDIT ON), you can keep picture and sound deteriorations resulting from editing to the minimum. Avoid using the edited tape for multiple generations of editing. After editing, be sure to set this switch in the opposite direction of the arrow (EDIT OFF).

## Replacing Recordings on a Tape (Insert Editing)

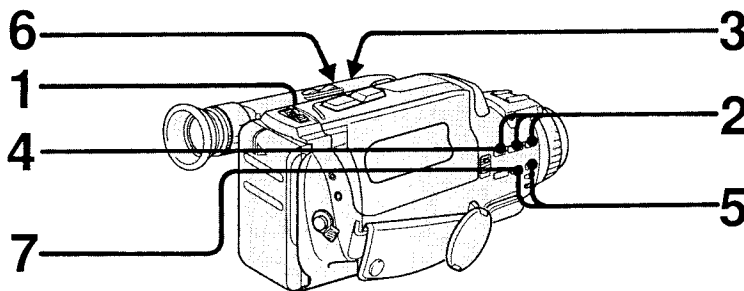
You can insert a new scene from a VCR on your originally recorded tape by setting the starting point and ending point.



### How to connect

Connections are the same as in "Recording from a VCR or TV (page 51)." Before you begin replacing recordings, **set the VCR to the playback pause mode at the beginning of the scene to be recorded.** Set the CHARGE/VTR selector on the AC power adaptor to VTR.

### How to replace recordings



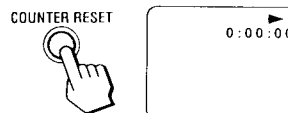
- 1** Press the small green button on **POWER** and slide **POWER** to **VTR**.  
The counter appears in the viewfinder.

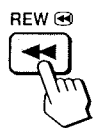



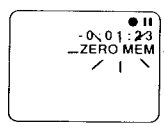
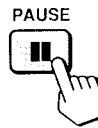


- 2** Locate the end point where the insert should end by pressing **◀◀** or **▶▶** during playback.



- 3** At the end point, press **COUNTER RESET**.  
The counter is reset to "0:00:00".



<p><b>4</b> Locate the start point where the insert should begin by pressing ◀◀.</p>	
<p><b>5</b> At the start point, set the camcorder into recording pause mode.</p>	 
<p><b>6</b> Press ZERO MEM. The end point of the insert is stored in memory.</p>	 
<p><b>7</b> Press II of both units to start insert editing. You can monitor the picture being inserted in the viewfinder screen.</p>	

The insert recording will stop automatically near the zero point on the counter.

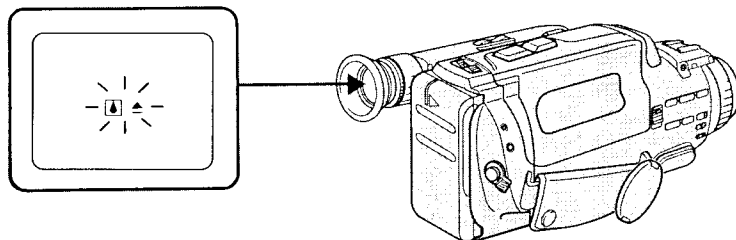
**To change the end point**

Press ZERO MEM so that the ZERO MEM indicator disappears, and operate again from step 2.



## Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface of the tape or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

### If moisture condenses inside the unit



Moisture is present inside the camcorder when:

- The  indicator in the viewfinder blinks.  
When the tape is inserted, the  indicator also blinks.
- Several beeps sound continuously for five seconds when the BEEP switch is set to ON and the tape is inserted.




In such cases, no function except for tape ejection will work.

**Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least 1 hour.**

The camcorder can be used again if the  indicator does not appear when the power is turned on again.


### If moisture condenses on the surface of the tape

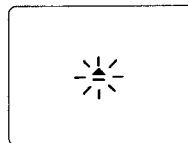
Moisture is present on the surface of the tape when:

- The  indicator blinks inside the viewfinder when the tape is inserted and a tape transport button (, , etc.) is pressed.
- Several beeps sound continuously for about five seconds when the BEEP switch is set to ON.

In such cases, no function except for tape ejection will work.

**Eject the tape and let the camcorder and the tape sit for at least 1 hour.**

The tape can be used again if the  indicator does not appear when the tape is inserted and a tape transport button is pressed.



### If moisture condenses on the lens

No caution indicators will appear, but the picture becomes dim.

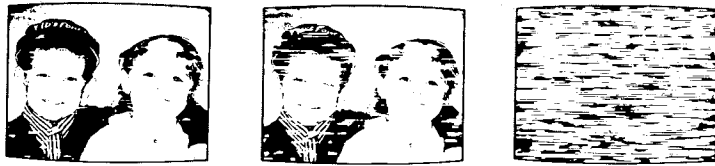
**Turn off the power and leave the camcorder unused for at least 1 hour.**

### How to prevent moisture condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.

- 1 Be sure to tightly seal the plastic bag containing the camcorder.
- 2 Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about one hour).

### Video Head Cleaning



Slight contamination → Critical contamination

#### To ensure clear picture, clean the video heads periodically

When playback pictures become noisy or hardly visible, the video heads may be contaminated.

In such a case,

- 1 Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied), referring to its instructions.
- 2 After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.
- 3 If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times.)

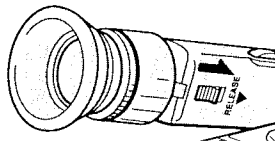
**Caution** Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

**Note** If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

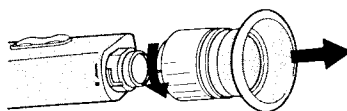
## Viewfinder Cleaning

To clean the viewfinder

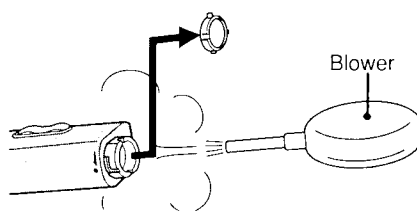
- 1** Pull the switch on the viewfinder barrel down.



- 2** Turn the eyecup in the direction of the arrow and detach the eyecup.

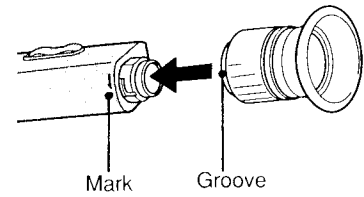


- 3** Clean the surface of the screen with a commercially available blower.

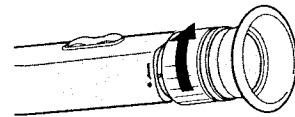


### To reattach the eyecup

- 1** Align the groove on the eyecup with the ● mark on the barrel.



- 2** Turn the eyecup in the reverse direction of the arrow.



# Tips for Better Camera Recording

## How to Achieve Better Camera Recording

### Take a good posture for shooting

For hand-held shots, it is important to hold the camcorder properly.

- Hold the camcorder firmly and secure it with the grip belt so that you can easily manipulate the camcorder with your thumb.
- Place your right elbow firmly against your side.
- Place your left hand under the camcorder to support it. When adjusting the focus manually, make sure the camcorder does not move.
- Stand opposite to the subject and let your feet take a comfortable stance.
- Place your eye firmly against the viewfinder eyecup.

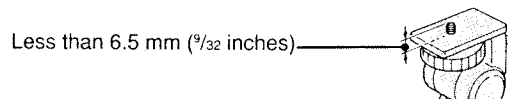


### Use a tripod

If you have a tripod for a still camera, you can also use it with the camcorder. If a tripod is not available, try placing the camcorder on a tabletop or any other flat surface of suitable height.

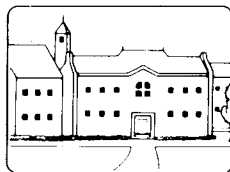
#### Caution

When attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5 mm. Otherwise the screw may damage the inner part of the camera.



### Keep the horizontal plane level

You can easily determine the horizontal plane by using the viewfinder frame as a reference.



## Tips for Better Camera Recording

### Plan ahead

If you are going to edit the tape after recording, shoot the scene a little longer to make the editing easier.

### Lighting

Shoot with the sun behind you.

When the light source is behind the subject, or in the following situations, the subject will be recorded too dark and the background too light.

- The subject is indoors and there is a window behind the subject.
- Bright sources such as fluorescent or incandescent lamps are included in the scene.
- You are shooting a person wearing white or shiny clothes in front of a white background. In this case, the face will be recorded too dark.

### Use video light in the dark

To get the best colors, you must maintain a sufficient light level.

Photography lamps or halogen lamps are recommended. For best results, use of Sony video lights are recommended since their weight and low heat output levels allow safe and direct connection to the camcorder.

Do not point the light at the camcorder. The high heat from the light may warp the casing of the camcorder.

For detailed instructions on proper use of the light, read its instruction manual.

### Brightness levels

Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording technique.

Situation	Brightness	Condition	
Snow-covered mountains Snow fields Sandy beach, clear day in summer	Unit: lux	ND filter recommended	
Clear day, mid day (100,000 lux) Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)	100,000	Normal recording	
Overcast day, one hour after sunrise (2,000) Office lit by fluorescent lamps, near window (1,000)	10,000		
Clear day, one hour before sunset (1,000) Department store counter (500 – 700) Station wicket (650) Office lit by fluorescent lamps (400 – 500)	1,000		
Room lit by two 30 W fluorescent lamps (300) Subway station platform (300)	500 300		
Arcade at night (150 – 200)	100		
Theater lobby (15 – 35) Candlelight (10 – 15)	10		Video light recommended

## Using Your Camcorder Abroad

Each country has its own electricity system and TV color system. Before using your camcorder abroad, check the following points.

### Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60 Hz.

### Difference In Color System

This camcorder is an NTSC system based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV or a PAL-M system based TV with NTSC/PAL-M transcoder. Check the following alphabetical list.

#### NTSC system countries

Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, The Philippines, U.S.A., Venezuela, etc.

#### PAL system countries

Australia, Austria, Belgium, China, Denmark, Finland, Germany (former West Germany), Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

#### PAL M system country

Brazil

#### PAL N system countries

Argentina, Paraguay, Uruguay

#### SECAM system countries

Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

## Precautions

### On operation

- Operate the camcorder on 6.0 V (battery pack) or 7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder or the microphone.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- **Do not let sand get into the camcorder.**  
When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the camcorder to malfunction and sometimes the malfunction cannot be repaired.
- **Do not let the camcorder get wet.**  
Keep the camcorder from rain or sea water. It may cause malfunction and sometimes the malfunction cannot be repaired.

## Tips for Better Camera Recording

### On care

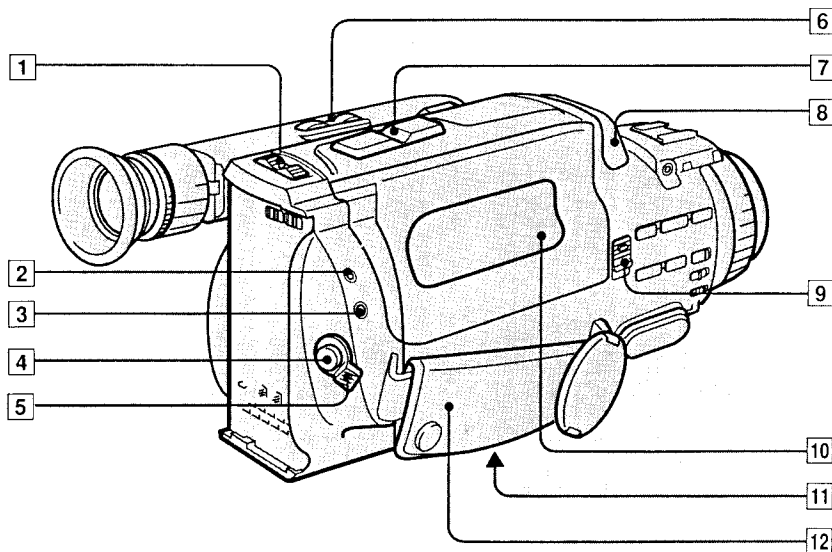
- When the unit will not be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera section and player section and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth. Clean the camcorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

### Note on copyright

Television programs, films, video tapes and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

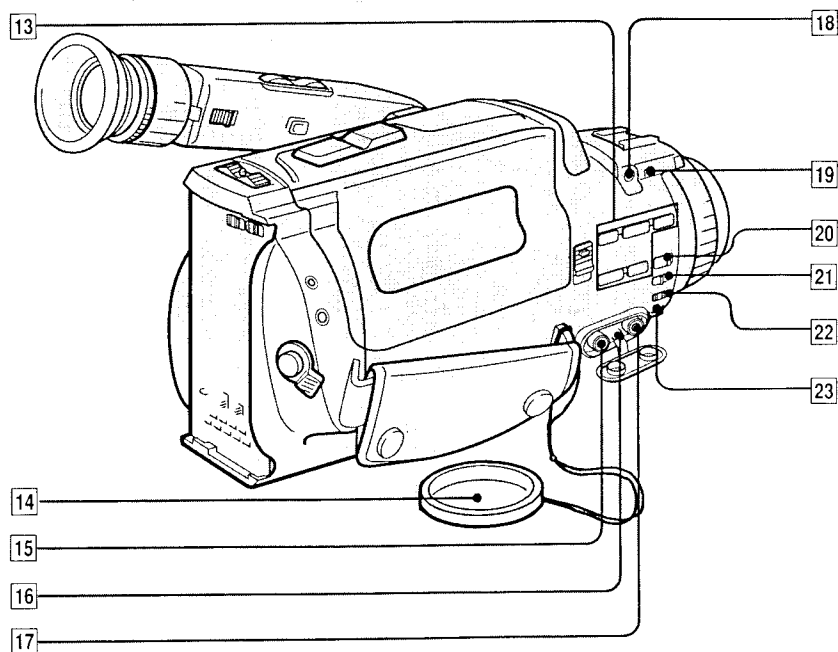
# Identifying the Parts

For details on the use of each part, refer to the pages indicated in the circle.



- 1** **POWER** switch  
CAMERA: for camera recording  
VTR: for playing back or editing tapes  
OFF: power off
- 2** **REMOTE** control connector (stereo mini-minijack) 36
- 3** **earphone** jack (minijack)
- 4** **START/STOP** button
- 5** **STANDBY** switch
- 6** **EDITSEARCH** (and recording review) button 32 33 34 35
- 7** **Power zoom (MACRO)** button 43 44
- 8** **Built-in microphone**
- 9** **EJECT** (cassette eject) knob 9
- 10** **Cassette holder**
- 11** **Lithium battery holder**
- 12** **Grip belt** 17

## Identifying the Parts



**13** **Tape transport buttons** 49

- ▷ PLAY (playback)
- ▶▶ FF (fast-forward)
- ◀◀ REW (rewind)
- STOP (stop)
- || PAUSE (pause)

**14** **Lens cap**

**15** **VIDEO input/output jack (phono jack)** 51

**16** **RFU DC OUT (RFU adaptor DC output) jack (special minijack)**

**17** **AUDIO input/output jack (phono jack)** 51

**18** **MIC jack (PLUG IN POWER) (mono mini-jack)**

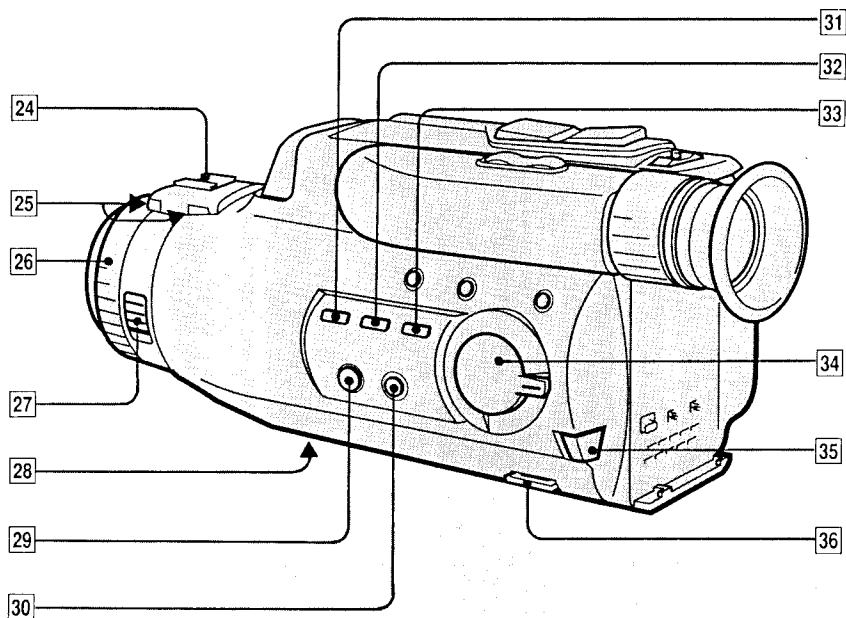
**19** **Remote control sensor** 22

**20** **● REC (recording) switch** 53

**21** **EDIT switch** 54

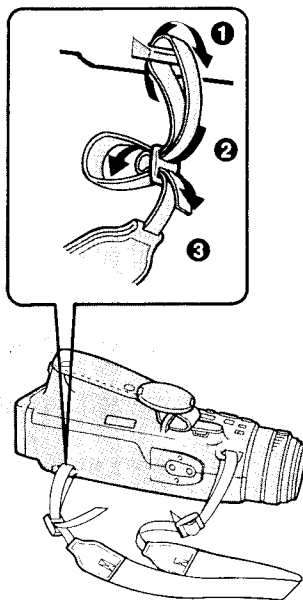
**22** **IN/OUT (video and audio input/output) selector** 51

**23** **Hook for shoulder strap**



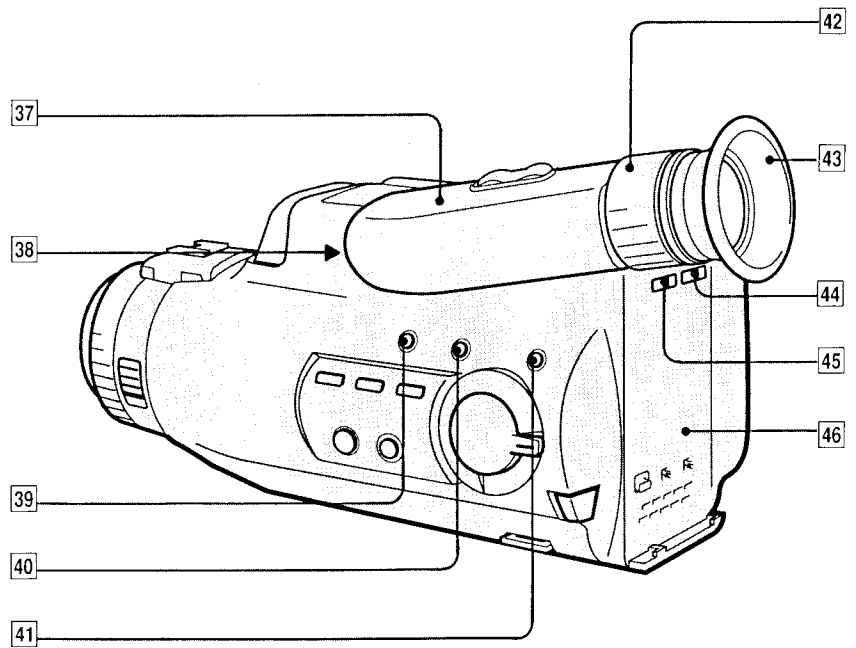
- 24 Accessory shoe
- 25 Remote control sensor 22
- 26 Focus ring
- 27 FOCUS (AUTO/MANUAL/PUSH AUTO) switch 17 38
- 28 Tripod receptacle (bottom)
- 29 FADER button 45 46
- 30 BACK LIGHT button 39
- 31 DATE (+) button 14 15 29
- 32 TIME (NEXT) button 14 15 29
- 33 AGE/EVENT button 15 30
- 34 PROGRAM AE selector 17 40 41 42
- 35 BATT (battery eject) knob 7
- 36 Hook for shoulder strap

Attaching the shoulder strap



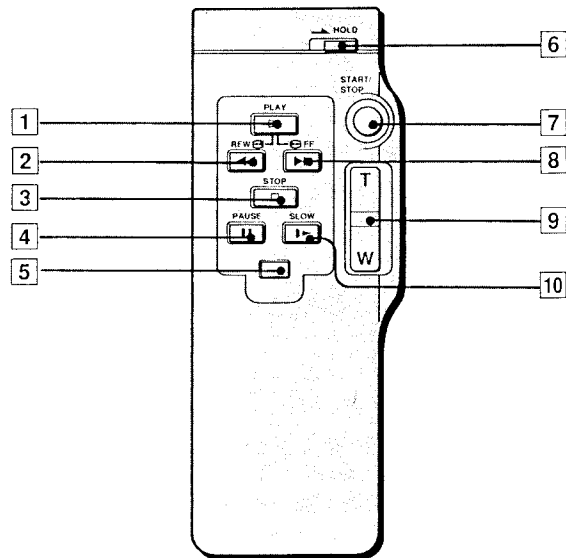
Identifying the Parts

## Identifying the Parts



- 37** Viewfinder
- 38** Camera recording/battery lamp **72**
- 39** COUNTER RESET button **34 52 55**
- 40** ZERO MEM button **34 52 55**
- 41** TAPE/BATT CHECK button **8 19**
- 42** Viewfinder adjustment ring **10**
- 43** Eyecup
- 44** BEEP ON/OFF switch **12**
- 45** **R** REMOTE COMMANDER ON/OFF switch **22**
- 46** Battery mounting surface

## Wireless Remote Commander



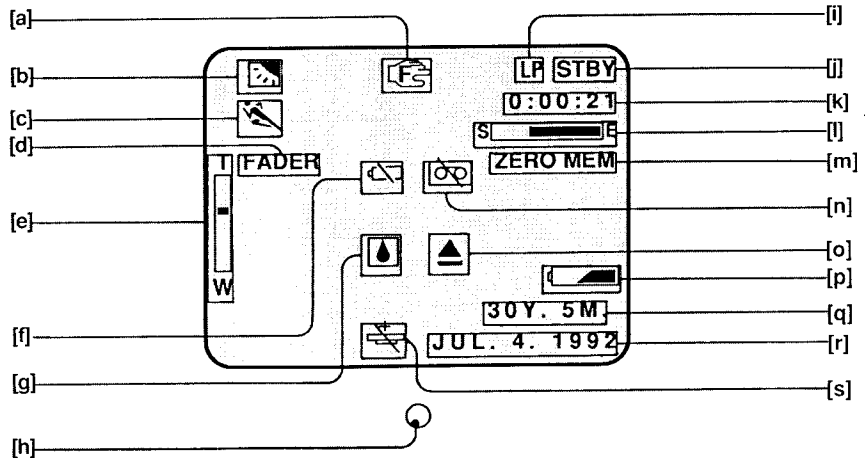
- 1 ▷ PLAY (play back) button 49
- 2 ◀◀ REW (rewind) button 50
- 3 ■■ STOP button
- 4 ■■ PAUSE button 49
- 5 DATA SCREEN button\* 49
- 6 HOLD switch\* 23
- 7 START/STOP button
- 8 FF ▶▶ (fast forward) button 50
- 9 Power zoom button
- 10 ▶▶ SLOW (slow playback) button\* 49

### Note

The \* indicates the functions which are operable only with the commander.

# Indicators inside the Viewfinder

## Inside the Viewfinder



- [a] Manual focusing (☞)
- [b] BACK LIGHT is pressed. (☒)
- [c] PROGRAM AE setting (☞, ☞, ☞)
- [d] FADER is pressed.
- [e] Power zoom indicator
- [f] "Exchange battery." (☞)
- [g] Moisture has condensed. (☒)
- [h] Lights up during recording.  
When blinking: "Exchange battery or tape."
- [i] Playback mode (LP)
- [j] Tape transport mode
- [k] Tape counter
- [l] Remaining time of tape
- [m] ZERO MEM is pressed.
- [n] "Exchange tape or no tape inside." (☞)
- [o] "Trouble has occurred" (☒) "Clean video heads." (☒)
- [p] Remaining capacity of a battery
- [q] Age
- [r] Date or Time
- [s] "Replace lithium battery" (☞)

# Troubleshooting

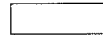
If any difficulty should arise during operation, go through the following table. Should the difficulty persist, unplug the unit and contact your Sony dealer or local authorized Sony service facility.

Symptom	Cause	Corrective actions
The power does not turn on.	The battery is not attached.	Attach the battery.
	The battery is used up.	Use a charged battery.
	The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.
The power turns off.	While being operated in the CAMERA mode, the camcorder has been in the pause mode for more than 5 minutes.	Turn down the STANDBY switch, and turn it up again.
	The battery is used up.	Use a charged battery.
The battery pack is quickly discharged.	The ambient temperature is too low.	—
	The battery pack has not been charged fully.	Charge the battery pack again.
The START/STOP button does not operate.	The tape is affixed to the drum.	Remove the tape with the cassette eject button.
	The tape is at its end.	Rewind the tape or use a new one.
	The POWER switch is set to VTR.	Set it to CAMERA.
	The tab on the tape is out (red).	Use a new tape or slide the tab.
The tape cannot be removed from the compartment.	The battery is used up.	Use a charged battery or the AC power adaptor.
No function except for tape ejection works.	Moisture condensation has occurred. (See page 57.)	Remove the tape and leave the camcorder for at least an hour.
The tape does not move when a tape transport button is pressed.	The POWER switch is set to CAMERA or OFF.	Set it to VTR.
	The tape is at its end.	Rewind the tape or use a new one.
The autofocusing function does not work.	FOCUS was not set to AUTO when recording.	Set FOCUS to AUTO.
	Shooting conditions are not suitable for autofocusing operation. (See page 37).	Set FOCUS to MANUAL to adjust the focus manually.
The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.
A vertical band appears when a subject such as lights or a candle flame is shot against a dark background.	The contrast between the subject and background is too high; the camera is not malfunctioning.	—
The playback picture is not clear.	EDIT is set in the direction of the arrow.	Set EDIT in the opposite direction of the arrow.
	The channel or input for the camcorder is not selected on the TV.	Select correctly.
The picture is noisy.	The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH (See page 58.) cleaning cassette.
When the TV is connected to the camcorder using the VIDEO/AUDIO jacks, the picture on the TV is not clear or moves vertically.	The IN/OUT selector is set to OUT.	Set it to IN.

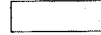
Indicators inside the Viewfinder/  
Trouble shooting

## Troubleshooting

If an indication blinks in the viewfinder screen or a caution lamp on the main unit blinks, check the following table.



slow blinking



fast blinking

	Symptom		Cause	Corrective actions
Camera operation VTR operation		Battery lamp	The battery is weak.	Prepare a charged one.
Camera operation VTR operation		Battery lamp	The battery is used up.	Use a charged battery.
Camera operation		Beeps	The tape is at its end.	Use a new tape.
		Beeps	The tape is near its end.	Prepare a new one.
		Beeps	No tape is inserted.	Insert a tape.
Camera operation VTR operation		Beeps	The tab on the tape is out (red).	Slide the tab.
		Beeps	Moisture condensation has occurred.	Remove the tape and leave the camcorder for at least an hour.
		Beeps	The gap of the head is clogged.	Clean the head using the Sony V8-25CLH video head cleaning tape.
Camera operation VTR operation		Beeps	Other troubles may occur.	Consult your nearest Sony dealer.
Camera operation VTR operation			The lithium battery is not installed. The lithium battery is exhausted. The lithium battery is weak.	Install a lithium battery with the battery pack or other power source attached. Otherwise, you must readjust the date, time and birth dates.
	blinks for 5 seconds in the viewfinder after setting the POWER switch to CAMERA.			

# Specifications

## System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassette
Tape speed	SP mode: Approx. 1.43 cm (19/32 inch)/sec. LP mode: Approx. 0.72 cm (5/16 inch)/sec. (playback only)
Recording time	SP mode: 2 hours (P6-120)
Playback time	SP mode: 2 hours (P6-120) LP mode: 4 hours (P6-120)
Fast forward/rewind time	Approx. 6 min. 30 sec. (P6-120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (black and white)
Lens	Combined 10 x power zoom lens f=6.1 to 61 mm (1/4 to 2 1/2 inches) Approx. 44 to 440 mm (1 3/4 to 17 3/8 inches) converted into the focal length of a 35-mm still camera. F 1.6 with macro Filter diameter: 37 mm (1 1/2 inches) TTL autofocus system inner focus wide macro system
Color temperature	AUTO
Minimum illumination	2 lx
Illumination range	2 lx to 100,000 lx (0.2 to 9294 footcandles)
Recommended illumination	More than 100 lx (9 footcandles)
Aperture correction	Automatic With backlight adjustment

## Input and output connector

Video input/output	Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative
Audio input/output	Phono jack Input: -7.5 dBs, input impedance more than 47 kilohms Output: -7.5 dBs, (at output impedance 47 kilohms) impedance less than 1 kilohms

RFU DC OUT	Special minijack, 5V DC
Earphone jack	Minijack, 8-ohm impedance
Remote $\bullet$ jack	Stereo mini-minijack
MIC jack	Minijack, -66 dBs, low impedance with 2.5 to 3 V DC output, impedance 6.8 kilohms
Microphone power output jack	Special minijack, 5 V DC

## General

Power requirements	On battery mounting surface 6.0 V (battery pack) 7.5 V (AC power adaptor)
Power consumption	5.5 W (camera recording) including the viewfinder
Installation	Vertically, horizontally
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-20°C to +60°C (-4°F to +140°F)
Dimensions	Approx. 118 x 108 x 265 mm (w/h/d) (4 3/4 x 4 3/8 x 10 1/2 in.)
Weight	Approx. 820 g (1 lb 13 oz) excluding the battery pack, lithium battery, and cassette Approx. 1060 g (2 lb 5 oz) including the battery pack NP-55H, lithium battery CR2025, and cassette P6-120
Microphone	Electret condenser microphone, uni-directional, monaural type

## Wireless Remote Commander

Remote control system	Infrared control
Command mode	VTR 2
Power requirements	3 V DC, 2 size AA (R6) batteries
Dimensions	Approx. 48 x 19 x 130 mm (w/h/d) (1 9/16 x 3/4 x 5 1/8 inches)
Weight	Approx. 50 g (1.8 oz) (excluding batteries)

Design and specifications are subject to change without notice.

# Index

## A

AC Adaptor .....	6, 27
Accessory Shoe .....	36
Adjusting Viewfinder .....	10
Age Button .....	15, 30
Audio Output .....	47
Audio/Video Cable .....	47
Auto Focus .....	17

## B

Back Light .....	39
Battery .....	6
Battery lamp .....	72
Battery Pack .....	6
Beep .....	12

## C

Camera Mode .....	17
Camera Recording Lamp .....	18
Car battery operation .....	28
Charging Battery .....	6
Cleaning Video Head .....	58
Clock Set .....	14
Close-up .....	44
Connection .....	20, 47
Counter Reset .....	34, 52

## D,E

Data Screen .....	49
Date/Time .....	29
Dew Indication .....	57
Earphone Jack .....	35
Edit Switch .....	54
Editing .....	53
Editsearch .....	32
Eject .....	18
Exposure .....	40
External Microphone Jack .....	36
Eyecup .....	59

## F,G,H

Fade in/Fade out .....	45
Fast-Forward .....	21
High Speed Shutter .....	42
Hold Switch .....	23

## I,J,K,L

Indoor .....	27
Insert .....	34, 55
LANC .....	36
Lens Cap .....	17
Lithium Battery .....	13

## M,N,O,P

Manual Focus .....	37
Pause Button .....	49
Play .....	21
Playback on TV .....	20, 47
Portrait Mode .....	40
Power Sources .....	27
Power Zoom .....	43
Program AE .....	40
Push Auto .....	38

## R

Rec Review .....	32
Record/Pause .....	18
Remote Commander .....	22
Remote Control Jack .....	36
Rewind .....	21
RFU Adaptor .....	20

## S

Shoulder Strap .....	67
Skip-scan .....	50
Slow .....	49
Specifications .....	73
Sports finder .....	10
Sports Mode .....	41
Standby .....	18
Still Picture .....	49
Stop .....	21
Supplied Accessories .....	5

## T,U,V

Tape/Batt Check .....	8, 19
Tape Counter .....	52
Tripod Mounting .....	61
Troubles .....	71
VTR Mode .....	21
VHF Antenna .....	20
Video Cassette Tapes .....	9
Viewfinder Indicator .....	70

## W,X,Y,Z

Warning .....	72
Wireless Remote Commander .....	22
Zero Mem .....	34, 56
Zoom .....	43

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If you have any question about this product, you may call:

or write to:

**Sony Customer Information Center**

East Coast : 201-930-7669 (SONY) NJ  
Central : 708-250-7669 (SONY) IL  
West Coast : 714-821-7669 (SONY) CA

Sony Customer Information Center  
Sony Drive, Mail Drop #T1-11,  
Park Ridge, NJ 07656

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