SONY

Video Camera Recorder Hi8

CCD-TR700

Operation Manual

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

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-TR700   Serial No. _____

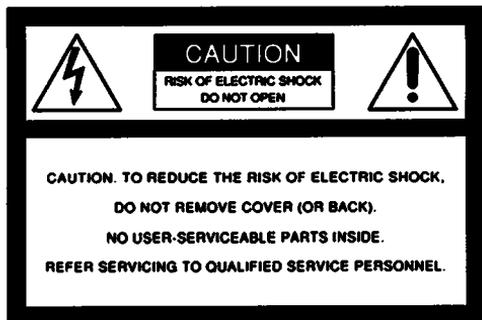Model No. AC-V35/V35A   Serial No. _____

video Hi8   Handycam

Welcome to Video Hi8

Congratulations on your purchase of this 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.

WARNING

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

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION. TO REDUCE THE RISK OF ELECTRIC SHOCK,

DO NOT REMOVE COVER (OR BACK).

NO USER-SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

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.

RECYCLING NICKEL-CADMIUM BATTERIES

**NICKEL-CADMIUM BATTERY.
MUST BE DISPOSED OF PROPERLY.**

Nickel-Cadmium batteries are recyclable. You can help preserve our environment by returning your unwanted batteries to your nearest Sony Service Center or Factory Service Center for collection, recycling or proper disposal.

Ni-Cd

Note: In some areas the disposal of nickel-cadmium batteries in household or business trash may be prohibited.

For the Sony Service Center nearest you call 1-800-222-SONY (United States only)
For the Factory Service Center nearest you call 416-499-SONY (Canada only)

Caution: Do not handle damaged or leaking nickel-cadmium batteries.

For the Customers in the U.S.A.

WARNING

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

| CAUTION |

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

For the Customers in CANADA

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

| CAUTION |

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

Table of Contents

As you read thorough this manual, buttons and settings on the camcorder are shown in capital letters. e.g. Set the POWER switch to CAMERA.

Precautions and Notes

Note on TV Color Systems

TV color systems are different depending on the countries. If you view the playback picture on a TV, you need a NTSC system based TV or a PAL-M system based TV with NTSC/PAL-M transcoder (as this is a NTSC system based camcorder). Please check the list on page 52 to see the TV color system of your country.

Precaution on Copyright

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

Precautions on Camcorder Care

- Do not let the camcorder get wet. Keep the camcorder from rain or sea water. It may cause a malfunction and sometimes the malfunction cannot be repaired. [a]
- 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 unit to malfunction and sometimes the malfunction cannot be repaired. [b]
- Never leave the camcorder under temperatures above 140 °F (60° C), such as in a car parked in the sun or under direct sunlight. [c]
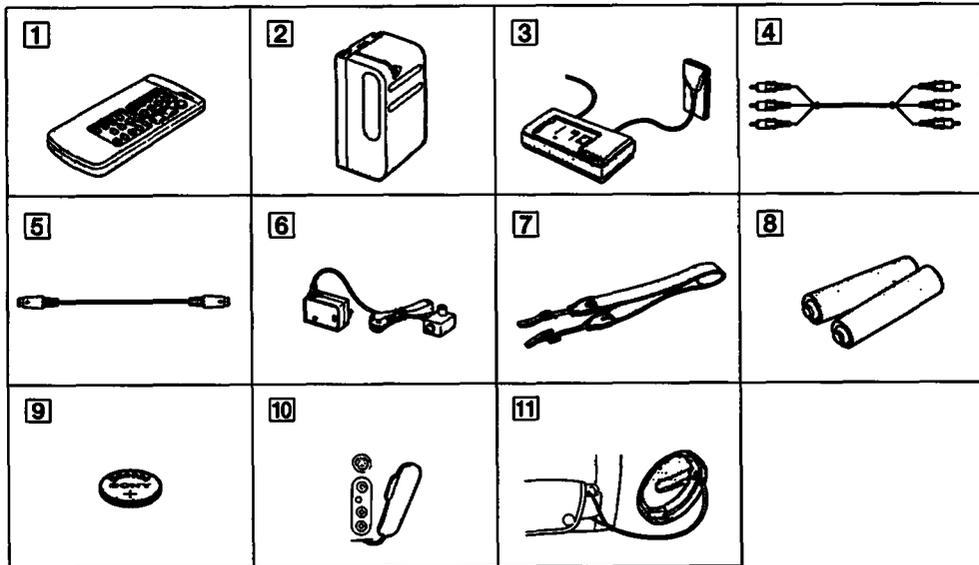
[a]   [b]   [c]

Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.

1. **Wireless Remote Commander** (1) (p60, 61)

2. **NP-66 Battery Pack** (1) (p.6)

3. **AC-V35/V35A AC power adaptor** (1) (p.6)

4. **A/V connecting cable** (1) (p.16)

5. **S video connecting cable** (1) (p.16)

6. **RFU adaptor RFU-90UC** (1) (p.16)

7. **Shoulder strap** (1) (p.59)

8. **Size AA (R6) battery for Remote Commander** (2) (p.61)

9. **CR2025 Lithium Battery** (1) (p.42, 43)
   Already installed in the camcorder

10. **Jack cover** (1)
    Attached to camcorder

11. **Lens cap** (1)

Charging and Installing the Battery Pack

Before using your camcorder, you first need to charge and install the supplied NP-66 battery pack. To charge the battery pack, use the supplied AC-V35/V35A AC power adaptor.

Charging the Battery Pack

Charge the battery pack on a flat place without vibration.
(1) Connect the power cord to a wall outlet.
(2) Align the right side of the battery with the line on the AC power adaptor, then slide the battery pack in the direction of the arrow. **(3)** Set the selector to CHARGE. Charging begins.
When charging is completed, the CHARGE lamp goes out. Set the selector to the center position and unplug the unit from the wall outlet. Then remove the battery and install it on the camcorder.
To stop charging, set the selector to the center position.
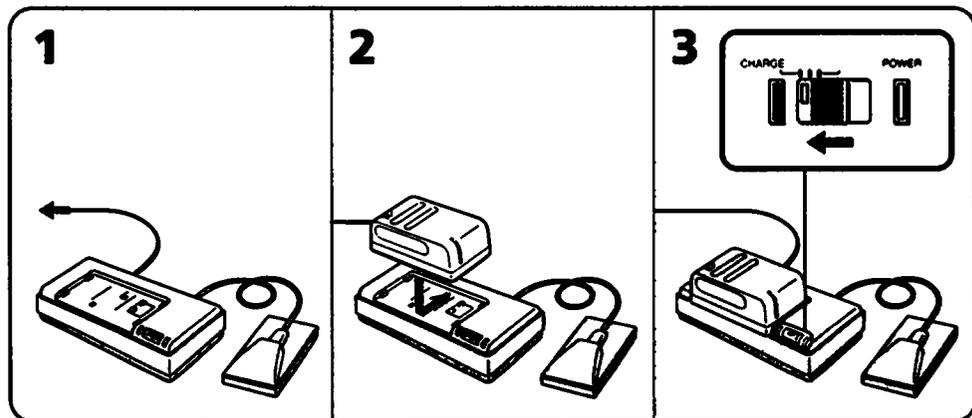
Charging time

Battery pack	NP-66 (Supplied)	NP-80 NP-80D	NP-77H	NP-66H	NP-60D	NP-55H
Charging Time*	80	155	140	100	75	70

* Approximate charging time to charge an empty battery pack using the AC-35V/V35A (Lower temperatures require a longer charging time).

Battery Life

Battery pack	NP-66 (Supplied)	NP-80 NP-80D	NP-77H	NP-66H	NP-60D	NP-55H
Typical Recording Time**	40	70	70	50	30	30
Continuous Recording Time***	70	125	125	90	60	55

** Approximate minutes when recording while you repeat recording start/stop on zooming and tunring the power on/off. The actual battery life may be shorter.
*** Approximate continuous recording time indoors.

Important!
Use the battery completely before recharging!

Before you recharge the battery, make sure the battery has been used up (discharged) completely. Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.

To use up the battery, remove the cassette and slide the POWER switch to CAMERA with the battery attached, and leave the camcorder until the ⊂⊃ indicator and the red lamp in the viewfinder flash rapidly.

Removing the Battery Pack

Slide the battery pack in the direction of the arrow (see drawing).

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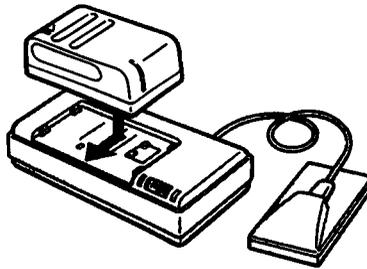
Notes on Charging the Battery Pack

• The POWER lamp will remain lit for a while even if the battery pack is removed and the power cord is unplugged after charging the battery pack. This is normal.

• If the POWER lamp does not light, set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to CHARGE again.

• You cannot operate the camcorder using the AC power adaptor while charging the battery pack.
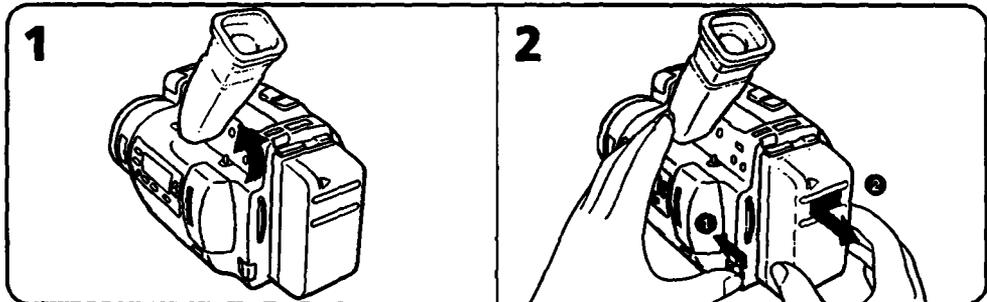
Installing the Battery Pack

(1) Lift up the viewfinder. (2) Align the right side of the battery pack with the white line on the camcorder, and slide the battery pack in the direction of the arrow.
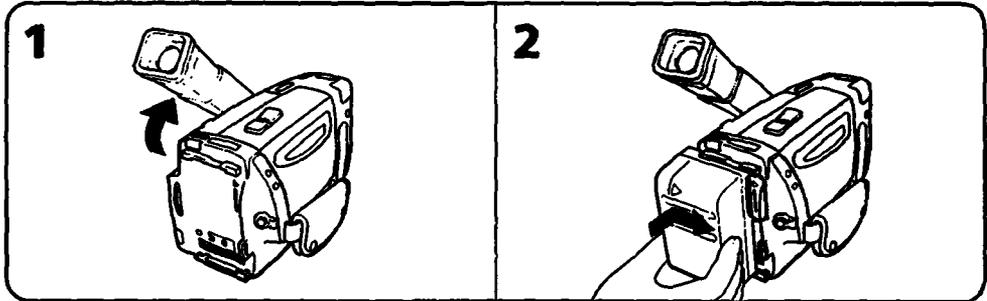
Removing the Battery Pack

(1) Lift up the viewfinder. (2) While pressing BATT, slide the battery pack to the left.

Inserting a Cassette

Make sure that the power source is installed.

When you want to record in the Hi8 system, use Hi8 video cassette **Hi⑧**.

(1) While pressing the small blue button on the EJECT knob, slide it in the direction of the arrow. The cassette holder automatically lifts up and opens. **(2)** Insert a tape with the window facing out. **(3)** Close the cassette holder by pressing the "PUSH" mark on the cassette holder.
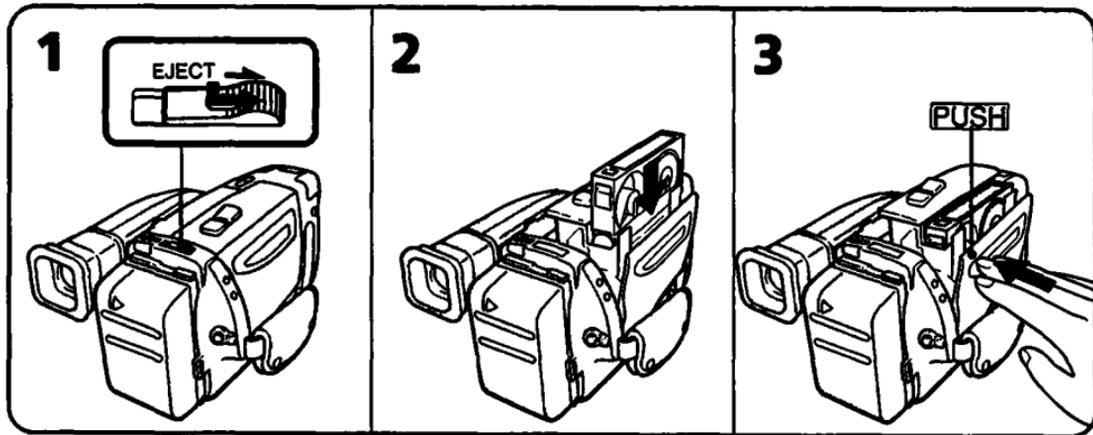
Caution

The cassette holder automatically goes down. Do not let it down by force so as to cause a malfunction.

To Eject the Cassette

While pressing the small blue button on the EJECT knob, slide it in the direction of the arrow.

Adjusting the Viewfinder Lens

Before you use the camcorder for the first time or after someone else has used it, focus the viewfinder lens. Make sure that the power source is installed to the camcorder.
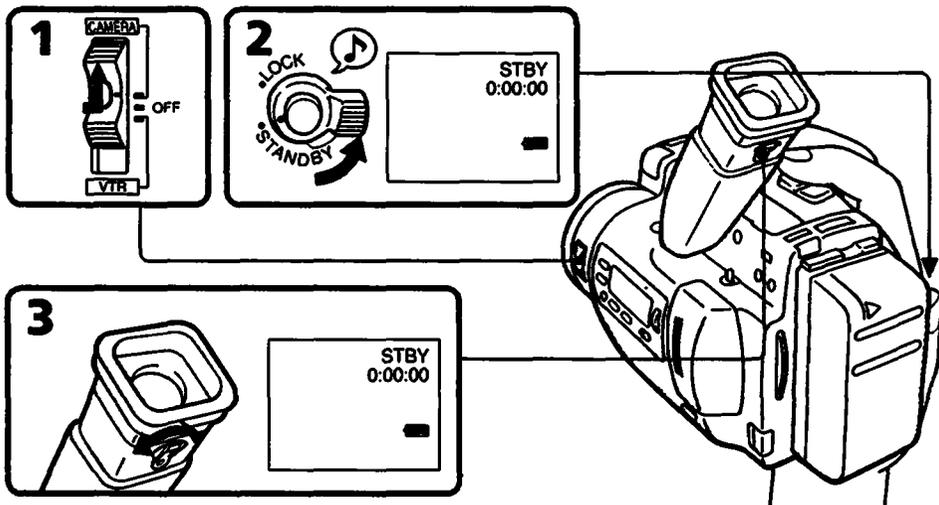**(1)** While pressing the small green button on the POWER switch, slide it to CAMERA. **(2)** Turn STANDBY up. **(3)** Move the viewfinder lens adjustment lever so that the indicators in the viewfinder come into sharp focus.

To adjust the picture quality

If you want to change hue, color and brightness of the picture displayed on the viewfinder screen, turn the screws on the viewfinder slowly using a screwdriver (not supplied). You do not need to adjust them in everyday operation.
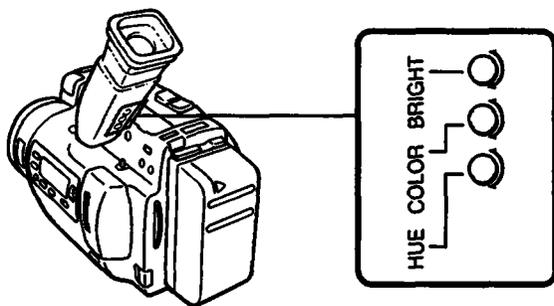
	Turn clockwise	Turn counterclockwise
BRIGHT	More brightness	Less brightness
COLOR	More color intensity	Less color intensity
HUE	Greenish skin tones	Reddish skin tones

Camera Recording ▶

Before you record one-time events, you may want to make a trial recording to make sure that the camcorder is working correctly. Make sure that the power source is installed and a cassette is inserted. (1) Remove the lens cap and clip it on the grip strap. (2) Make sure that the AUTO LOCK cover is closed for automatic adjustment. (3) While pressing the small green button on the POWER switch, slide it to CAMERA. (4) Turn STANDBY up. (5) Press START/STOP. The camcorder starts recording. The "REC" indicator appears and the red lamp lights up in the viewfinder.

To Stop Recording Momentarily

Press START/STOP again. The "STBY" indicator appears in the viewfinder (Standby mode).

To Finish Recording

Turn STANDBY down and slide the POWER switch to OFF. Close the lens cap and eject the tape.

Note on Standby mode

If you leave the camcorder in Standby mode for 5 minutes, the camcorder goes off automatically. This prevents wearing down the battery and wearing out the tape. To resume Standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on recording

When you record from the beginning of a tape, run the tape for about 15 seconds before starting the actual recording. This will ensure that you won't miss any start-up scenes when you play back the tape.

Note on the tape counter

The tape counter indicates the recording or playback time. Use it as a guide. There will be a time lag of several seconds from the actual time. To set the counter to zero, press COUNTER RESET under DATE (+) and TIME (NEXT).

Displaying the RC Time Code during playback

Press COUNTER/TIME CODE. The RC time code appears in the viewfinder and the display window. The frame numbers are not displayed in the display window. You can also display the RC time code during recording by pressing COUNTER/TIME CODE.

COUNTER/
TIME CODE

0:00:21:15

D:00:2 i

Notes on the RC time code displayed

Bars(—) appear in place of the RC time code when you play back:
• a blank portion of the tape.
• a tape in which the RC time code is illegible because of tape damage or noise.
• a tape recorded with a video camera recorder which does not have the RC time code function.
• the portion of a tape where the RC time code was erased together with the index signal.

Note on BEEP feature

As shown by ♪ in the illustrations, a beep sounds when you turn the power on or when you start recording and two beeps sound when you stop recording, confirming the operation. Note that the beep sound is not recorded on the tape. Several beeps also sound as a warning of any unusual condition of the camcorder.
If you do not want to hear the beep sound, set BEEP to OFF in the menu system (p.22).

When there is a strong wind

Set WIND to ON in the menu system (p.22). The noise from the wind will be reduced. The ⏚ indicator appears in the viewfinder.
After recording, set WIND to OFF. If you leave it ON, the sound may be recorded unnaturally.

Using the Zoom Feature

Zooming is a recording technique that lets you change the size of the subject in the scene. You can also use the zoom to focus manually or to decide on a shooting angle before you start recording.
For more professional-looking recordings, use the zoom sparingly.
T side : for telephoto (subject appears closer)
W side : for wide-angle (subject appears farther away)
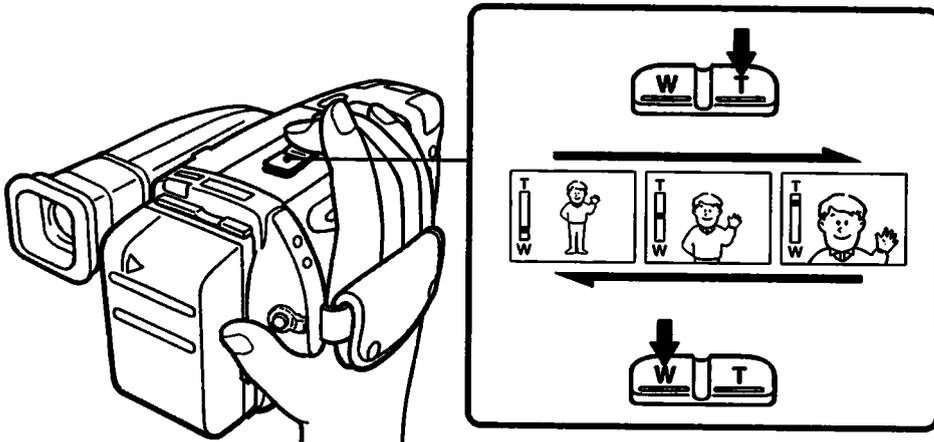
Making the Sound "zoom"
When you zoom in or zoom out, you can also set the sound to "zoom" along with the picture. To make the sound to "zoom", set ZOOM MIC to ON in the menu system (p.23). The ZOOM MIC indicator appears in the viewfinder.
When you "zoom" the sound, the sound is recorded in monaural.

Zooming speed
Press the power zoom button firmly for a high-speed zoom. Press it softly for a relatively slow zoom.

When you shoot a subject using a telephoto zoom
If you cannot get a sharp focus while in extreme telephoto zoom, press the W side of the power zoom button until the focus is sharp.
You can shoot a subject that is at least 80 cm (about 2.6 feet) away from the lens surface in the telephoto position, or 1 cm (about 1/2 inches) in the wide-angle position.

Manual focusing in macro
You can also shoot with manual focus while doing close-ups (p.27).

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Hints for Better Shooting

For hand-held shots, you'll get better results holding the camcorder according to the following suggestions:

- Hold the camcorder firmly and secure it with the grip strap so that you can easily manipulate the controls with your thumb. [a]
- Place your right elbow against your side.
- Place your left hand under the camcorder to support it.
- Place your eye firmly against the viewfinder eyecup.
- Use the viewfinder frame as a guide to determine the horizontal plane.
- You can also record in a low position to get an interesting recording angle. Turn the viewfinder up for recording from a low position (You can lift it up to 90 degrees.) Press REC START/STOP with your left thumb. [b]
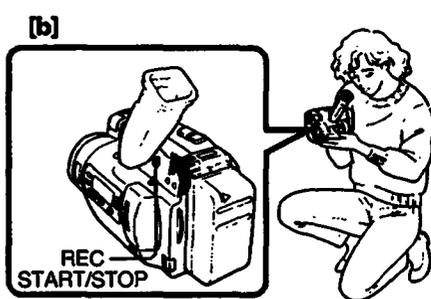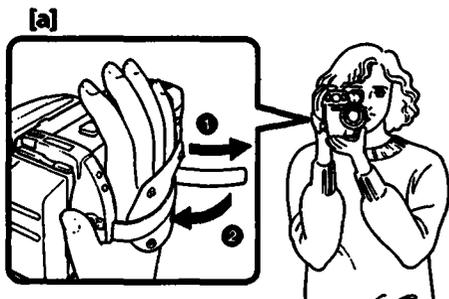
Place the camcorder on a flat surface or use a tripod

Try placing the camcorder on a table top or any other flat surface of suitable height. If you have a tripod for a still camera, you can also use it with the camcorder (p.59). Make sure the tripod screw is shorter than 6.5 mm (9/32 in).

Cautions on the viewfinder

- Do not pick up the camcorder by the viewfinder. [a]
- Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder heats up and may be deformed. [b]
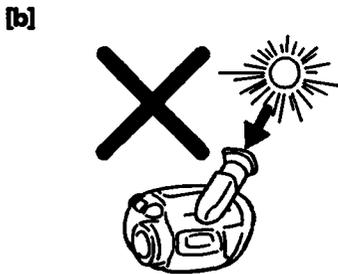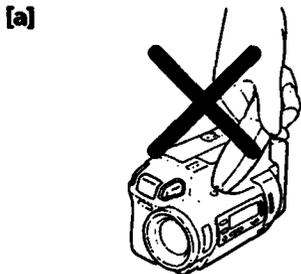
Checking the Recorded Picture in the Viewfinder

Using EDITSEARCH, you can review the last recorded scene or check the recorded picture in the viewfinder.

(1) While pressing the small green button on the POWER switch, slide it to CAMERA. **(2)** Turn STANDBY up. **(3)** Press EDITSEARCH. Press the - (⊕) side momentarily, the last few seconds of the recorded portion plays back **(Rec. Review)**.

Keep pressing EDITSEARCH to play back the last recorded portion **(Edit Search)**.

+ side: to view the forward playback picture
– side: to view the reverse playback picture
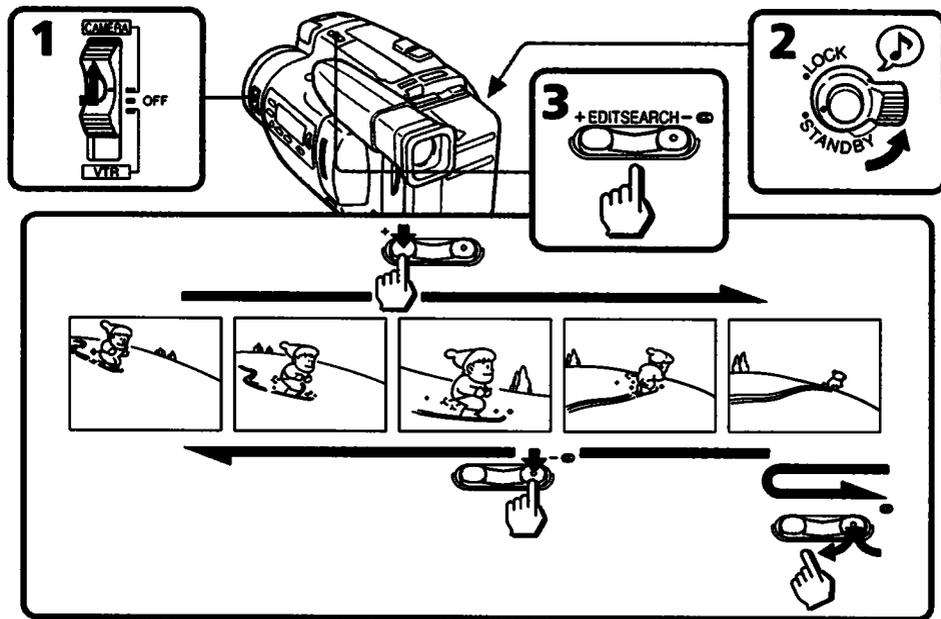
To Stop Playback
Release EDITSEARCH.

To Begin Re-recording
Press START/STOP. Re-recording begins from the point you released EDITSEARCH. Provided you do not eject the tape, the transition between the last scene you recorded and the next scene you record will be smooth.

Monitoring the Sound While Viewing the Playback Picture in the Viewfinder
Connect headphones (not supplied) to the headphone jack ⌒. While pressing the small green button on the POWER switch, slide it to VTR, and play back the tape (p.17).

Connections for Playback

You can use this camcorder as a VCR by connecting to your TV for playback. There are two ways to connect your camcorder.
- Connecting to a TV with Video/Audio input jacks or a VCR
- Connecting to a TV without Video/Audio input jacks

Connecting to a TV with Video/Audio Input Jacks or a VCR

Connect the camcorder to your TV by using the supplied connecting cable. Set the TV/VCR selector to VCR on the TV. When connecting the camcorder to VCR, set the input selector on the VCR to LINE. If you are going to connect the camcorder using the S video cable [a], you do not need to connect the yellow (video) plug of the A/V connecting cable [b].

: Signal flow
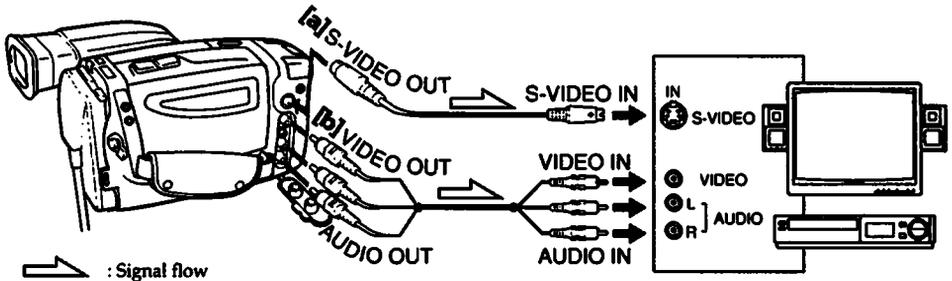
If your TV or VCR is a monaural type, connect only the white plug for audio on both the camcorder and the TV or the VCR. With this connection, the sound is monaural.

Connecting to a TV without Audio/Video Input Jacks

Connect the camcorder to the TV by using the supplied RFU adaptor. Set the channel selector on the RFU adaptor to 3CH or 4CH whichever is not used in your area. Turn on the TV and select the 0 position. Tune the TV so that you can get picture and sound from the camcorder.

: Signal flow

Releasing the Steady Shot Function

When you shoot, the '🖐' indicator appears in the viewfinder and the «🖐» appears in the display window. They indicate that the Steady Shot function is working and the camcorder compensates for camera-shake.

You can release the Steady Shot function. Do not use the Steady Shot function such as when shooting stationary object with a tripod.

Set STEADY SHOT to OFF.

To Activate the Steady Shot Function Again
Set STEADY SHOT to ON.

Notes on the Steady Shot Function
• The Steady Shot function will not correct excessive camera-shake.
• When you switch the STEADY SHOT, the exposure may vary.

Various Playback Modes

To locate a scene (Picture search)
Keep pressing ◄◄ or ►► during playback. To resume normal playback, release the button.

To monitor the high-speed picture during fastforward or rewind (Skip scan)
Keep pressing ◄◄ while rewinding or ►► while advancing the tape. To resume normal playback, press ▷.

To view the picture at double speed
For double speed playback in the reverse direction, press </◄II, then press x2 on the Remote Commander during normal playback. For double speed playback in the forward direction, press >/ II►, then press x2 during normal playback. To resume normal playback, press ▷.

To view a still picture (playback pause)
Press II during playback. To resume playback, press II or ▷.

To view the picture at 1/5 speed
(slow playback)
For reverse slow playback, press </◄II, then press I► during normal playback. For forward slow playback, press >/II►, then press I► during normal playback. To resume normal playback, press ▷.

To view the picture frame-by-frame
Press </◄II or >/II► in still mode. If you keep pressing the button, you can view the picture at 1/25 speed.
To resume normal playback, press ▷.

To view the picture in a sequence of stop-motion images
Press EDITSEARCH in playback pause mode. If you keep pressing EDITSEARCH, you can view the picture playback in the forward (+) or reverse (–) direction.

To change the playback direction
Press </◄II for reverse direction or >/II► for forward direction during playback. To resume normal playback, press ▷.

Notes on playback
• When still picture mode lasts for 5 minutes or more, the camcorder automatically enters stop mode.
• The sound is muted in the various playback modes. It can be heard in the double speed forward playback, but is a little noisy.
• Horizontal noise appears at the center of the screen when you play back a tape in reverse if the RC time code or the Data Code is displayed on the screen. This is normal.

To display the viewfinder screen indicators on the TV
Press DISPLAY.
To erase the indicators, press DISPLAY again.

To Select the Monitor Sound
Normally set HiFi SOUND to STEREO in the menu system. When you playback a dual soundtrack tape, set it to 1 or 2 in the menu system.

Displaying the Date or Time When You Recorded -Data Code Function

Even if you did not record the date or time when you were recording, you can display the date or time when you recorded (Data Code) on the TV during playback or editing. The Data Code is also displayed in the viewfinder and the display window.

To Display the Date When You Recorded
Press DATE (+) on the camcorder, or press DATA CODE on the Remote Commander.
To make the date disappear, press DATE (+) again or DATA CODE twice.

To Display the Time When You Recorded
Press TIME (NEXT) on the camcorder, or press DATA CODE on the Remote Commander twice.
To make the time disappear, press it again.
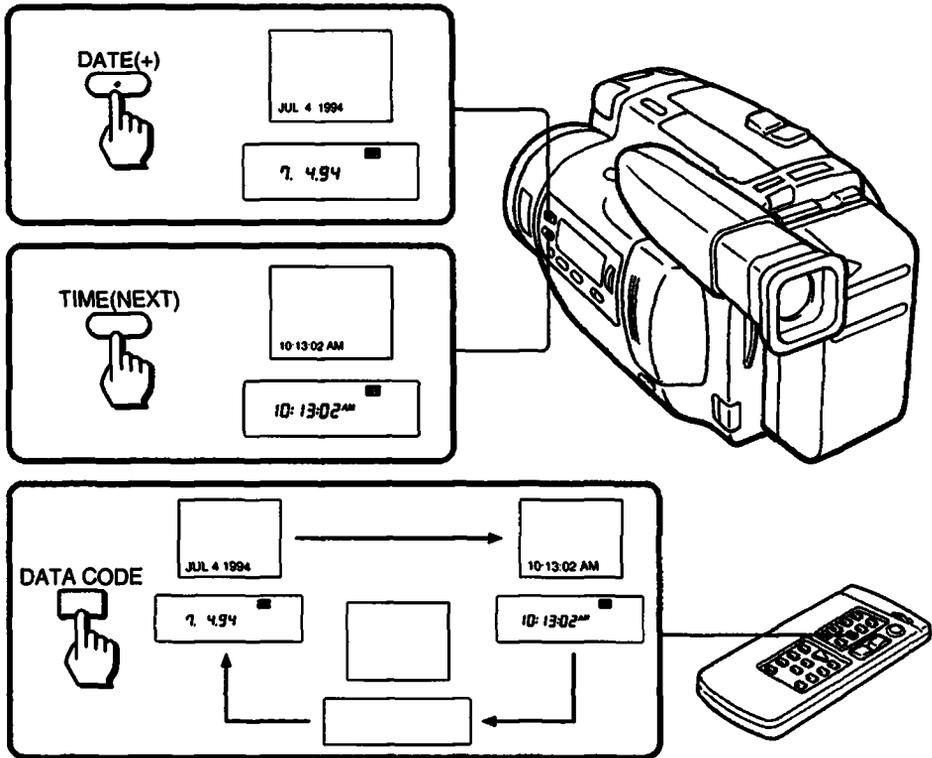
When bars (--:--:--:) appear
• A blank portion of the tape is being played back.
• The tape was recorded by a camcorder without the Data Code function.
• The tape was recorded by a camcorder without having date and time set.
• The tape is unreadable due to tape damage or noise.
• The tape was recorded in LP mode.

Note
The Data Code may be erased if you mark an index signal or record the sound on the PCM track on VCR.

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Using Alternate Power Sources

You can choose any of the following power sources for your camcorder: battery pack (p.6), house current, alkaline batteries, and 12/24 V car battery. Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Indoors	House current	AC power adaptor AC-V35/V35A (supplied), AC-S10
Outdoors	Battery pack	Battery pack NP-66 (supplied), NP-80, NP-80D, NP-77H, NP-66H, NP-60D, NP-55H
In the car	12 V or 24 V car battery	DC pack DCP-77

Using House Current

To use the supplied AC-V35/V35A AC power adaptor:
(1) Connect the AC power adaptor to a wall outlet. (2) Lift up the viewfinder. Align the right side of the connecting plate with the white line on the camcorder, then slide the connecting plate in the direction of the arrow. (3) Set the selector of the AC power adaptor to the VTR (DC OUT) position.
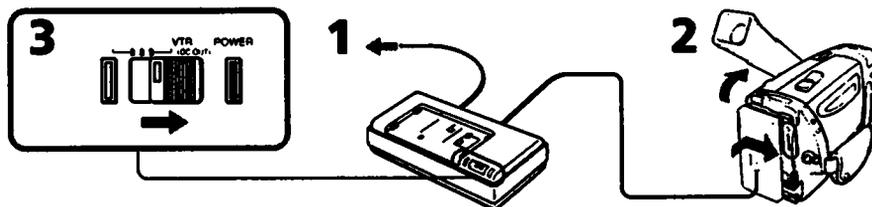
Warning

Mains cord must only be changed at qualified service shop.

Precautions

The set is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the set itself has been turned off.

Note on the POWER lamp

The POWER lamp will remain lit for a while even if the unit is unplugged after use. This is normal.

To remove the adaptor

The adaptor is removed in the same way as the battery pack (P.8).

Options for Charging the Battery Pack

AC-S10 AC power adaptor, BC-S10 battery charger:
You can charge a battery pack whether it is used up or not with this adaptor because it has a discharging function.
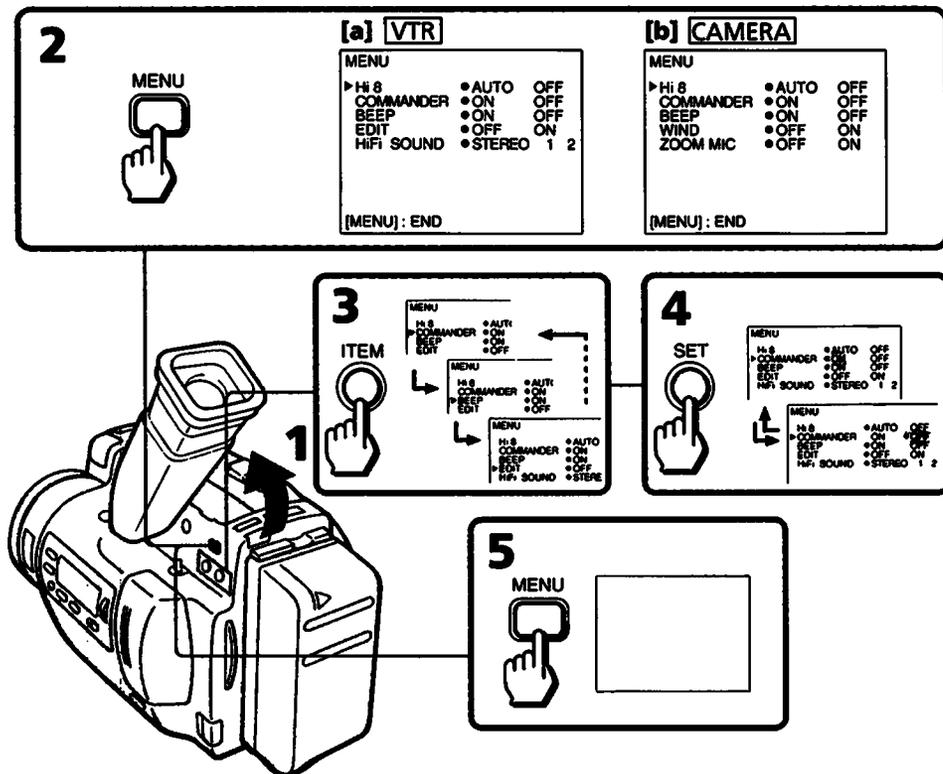
Using a Car Battery

Use the DCP-77 DC pack (not supplied). Connect the cord of the DC pack to the cigarette lighter socket of the car (12 V or 24 V). Connect the DC pack to the battery mounting surface of the camcorder.

To remove the DC pack
The DC pack is removed in the same way as the battery pack (p.8).

Changing the Mode Settings

You can change the mode settings in the menu system to further enjoy the features and functions.
(1) Lift up the viewfinder. **(2)** Press MENU to display the menu in the viewfinder. **(3)** Press ITEM to move the cursor ▶ and select the desired item. **(4)** Press SET to move the cursor ● (or ○) and set the desired mode. If you want to change the other modes, repeat steps 3 and 4. **(5)** Press MENU to erase the menu display.

[a] VTR

```
MENU
▶Hi 8           ●AUTO   OFF
 COMMANDER  ●ON     OFF
 BEEP         ●ON     OFF
 EDIT         ●OFF    ON
 HiFi SOUND   ●STEREO 1  2


[MENU] : END
```

[b] CAMERA

```
MENU
▶Hi 8           ●AUTO   OFF
 COMMANDER  ●ON     OFF
 BEEP         ●ON     OFF
 WIND         ●OFF    ON
 ZOOM MIC     ●OFF    ON


[MENU] : END
```

About the previous mode settings
When you detach the battery, the mode settings are saved for 5 minutes (displayed with cursor ●).
However, these settings are canceled if the lithium battery is exhausted.

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Selecting the Mode Setting of Each Item

Hi8 <AUTO/OFF>

• Normally select AUTO to have the camcorder automatically set the recording mode (Hi8 or standard 8mm) depending upon cassette type being used.

• Select OFF to record a Hi8 tape in standard 8 mm format. See page 45 for details about cassette types.

COMMANDER <ON/OFF>

• Select ON when using the supplied Remote Commander for the camcorder.

• Select OFF when not using the Remote Commander for the camcorder.

BEEP <ON/OFF>

• Select ON to hear a beep sound when starting or stopping recording, confirming the operation.

• Select OFF when you do not want to hear the beep sound.

Options displayed in VTR mode only

EDIT <OFF/ON>

• Select OFF when using the camcorder just for playing back, not for editing.

• Select ON to minimize the picture deteriorations when playing back to edit.

HiFi SOUND <STEREO/ 1 / 2 >

• Normally select STEREO.

• Select 1 or 2 to play back a dual soundtrack tape.

Options displayed in CAMERA mode only

WIND <ON/OFF>

• Select ON to reduce wind noise when recording.

• Select OFF otherwise.

ZOOM MIC <ON/OFF>

• Select ON when recording making the sound "zoom" along with the picture.

• Select OFF when recording the usual Hi-Fi stereo sound regardless of zooming.

Recording the Date or Time

In CAMERA mode, press DATE (+) or TIME (NEXT). You can record the date or time displayed in the viewfinder with the picture. You cannot record the date and time at the same time. Except for the date or time indicator, no indicator in the viewfinder is recorded.
The clock is set to the East Coast Standard Time at the factory.

DATE(+)

JUL 4 1994

TIME(NEXT)

5:30:00 PM
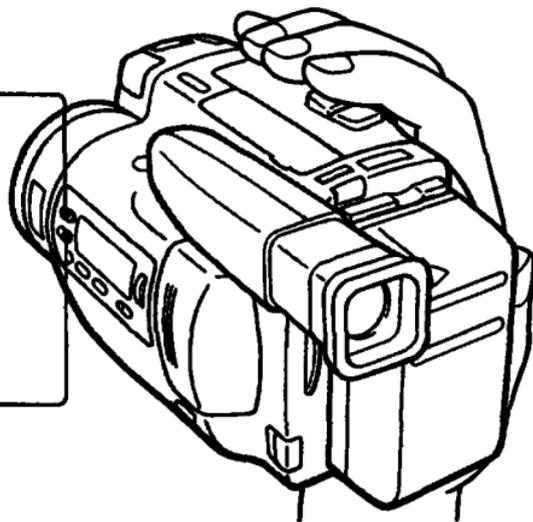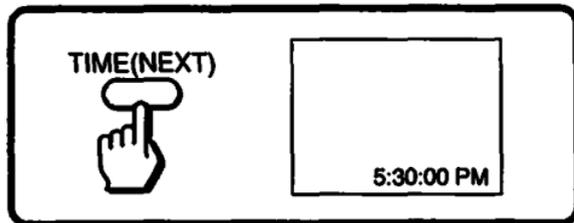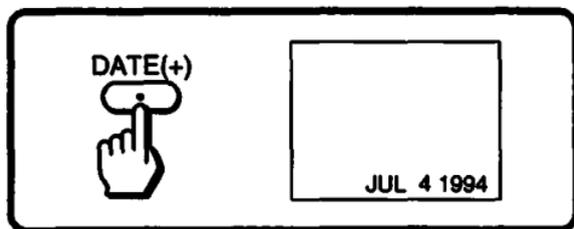
To Stop Recording with the Date or Time
Press DATE (+) or TIME (NEXT) again. Recording continues.

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 (FADER) or mosaic (M.FADER). The sound will also gradually increase. When fading out, the picture will gradually fade to black or mosaic. The sound will also decrease.

When Fading in [a]

(1) During the camcorder is in Standby mode, press FADER. The fade indicator starts flashing. (2) Press START/STOP to start recording. The fade indicator stops flashing.

When Fading out [b]

(1) During recording, press FADER. The fade indicator starts flashing. (2) Press START/STOP to stop recording. The fade indicator stops flashing.
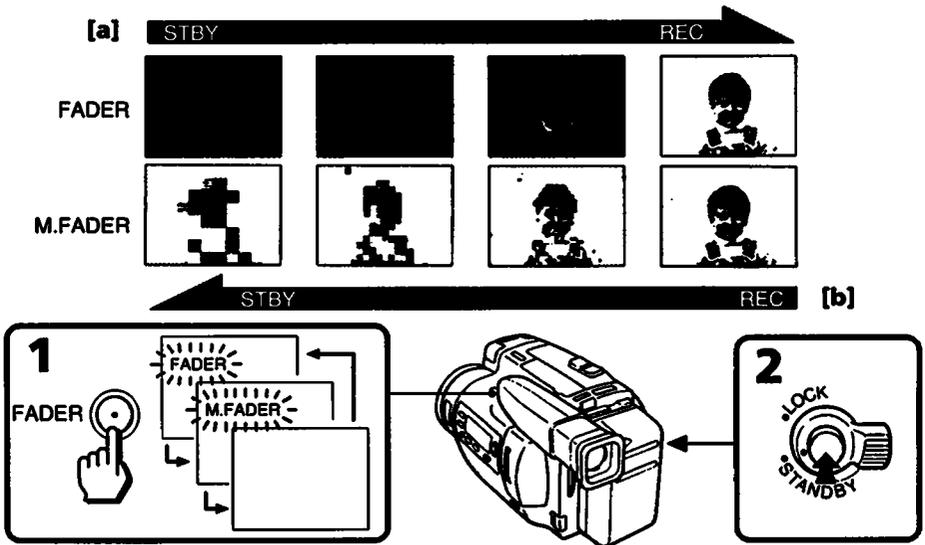
To Cancel the Fade-in/out Function

Before pressing START/STOP, press FADER once or twice until you have neither the FADER nor M.FADER indicator in the viewfinder.

When the date/time indicator is displayed.
The date/time does not fade in nor fade out.

Releasing the Steady Shot Function

When you shoot, the 🖑 indicator appears in the viewfinder and the «🖑» appears in the display window. They indicate that the Steady Shot function is working and the camcorder compensates for camera-shake.

You can release the Steady Shot function. Do not use the Steady Shot function such as when shooting stationary object with a tripod.

Set STEADY SHOT to OFF.

To Activate the Steady Shot Function Again
Set STEADY SHOT to ON.

Notes on the Steady Shot Function
• The Steady Shot function will not correct excessive camera-shake.
• When you switch the STEADY SHOT, the exposure may vary.

Selecting Automatic or Manual Adjustment Modes

The camcorder's automatic functions offer you worry-free operation under most shooting conditions. But in some circumstances, manual adjustment is better for creative recording.

Automatic Mode

Close the AUTO LOCK cover. In AUTO LOCK mode, the camcorder adjusts the focus, exposure and white balance automatically.
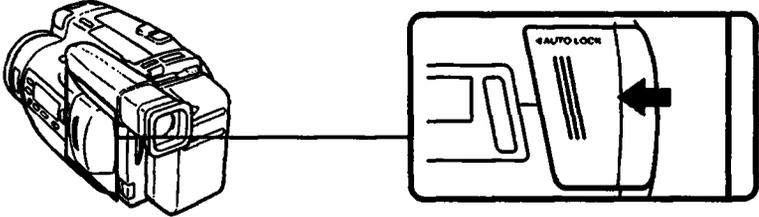
Manual Adjustment Mode

Open the AUTO LOCK cover until it clicks. In manual mode, you can adjust the focus, exposure, and white balance manually and select from four PROGRAM AE modes to fit the shooting situation. Even if in manual mode, the settings which were not in manual adjustment mode remain the same as when in automatic adjustment mode.
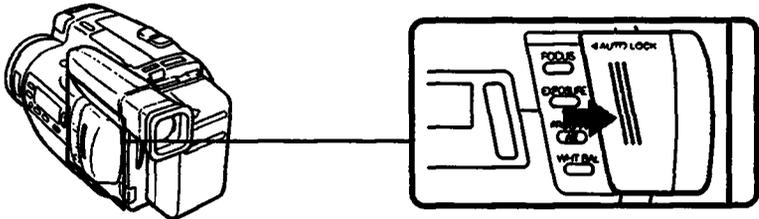
About the previous settings
Manual settings are saved in the following case:
• When you set the POWER switch to OFF.
• When you resume automatic mode after you make manual adjustments and then select manual mode again.
However, manual settings are canceled if more than 5 minutes pass after you have detached the battery.

Focusing Manually

When to Use Manual Focus

Use manual focus under the following conditions:

[a]   [b]   [c]   [d]
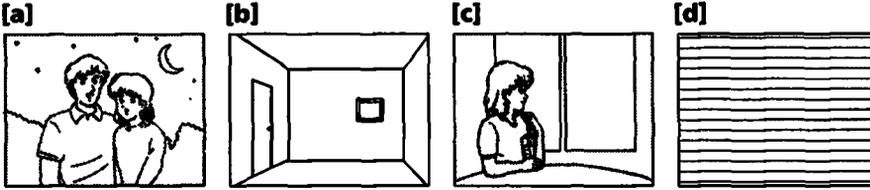
- Insufficient light [a]
- Subjects with little contrast-walls, sky, etc. [b]
- Too much brightness behind the subject [c]
- Horizontal stripes [d]
- Subjects through frosted glass
- Subjects beyond nets, etc.
- Bright subject or subject reflecting light
- Shooting a stationary subject when using a tripod

Focusing Manually

When focusing manually, first focus in telephoto before recording, and then reset the shot length.
(1) Open the AUTO LOCK cover until it clicks. (2) Press FOCUS. The focus indicator appears in the viewfinder and display window. (3) Keep the power zoom button to the T side until the zooming stops. (4) Turn the focus ring to adjust the focus. (5) Set the desired shot length.
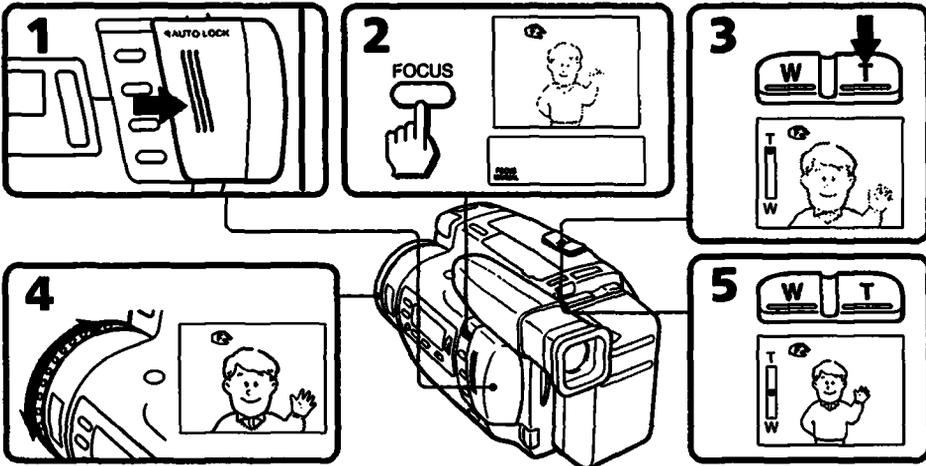
To Reactivate Auto focusing
Press FOCUS again, or close the AUTO LOCK cover. The focus indicator in the viewfinder and display window disappears.

Shooting in relatively dark places
Shoot at wide angles after focusing in telephoto.

Note on the focus ring
The focus ring does not have a stop position.

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Adjusting the Exposure

When to Adjust the Exposure

Adjust the exposure manually under the following cases.

[a]
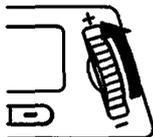
[b]

[a] Turn the exposure dial to + when:
• The background is too bright (back lighting)
• Insufficient light: most of the picture is dark

[b] Turn the exposure dial to – when:
• Bright subject and dark background
• To record the darkness faithfully

Adjusting the Exposure

(1) Open the AUTO LOCK cover until it clicks. (2) Press EXPOSURE. The exposure indicator appears in the viewfinder and display window. The exposure is locked at the actual brightness. (3) Turn the exposure dial to adjust exposure. The exposure is locked at the adjusted brightness.
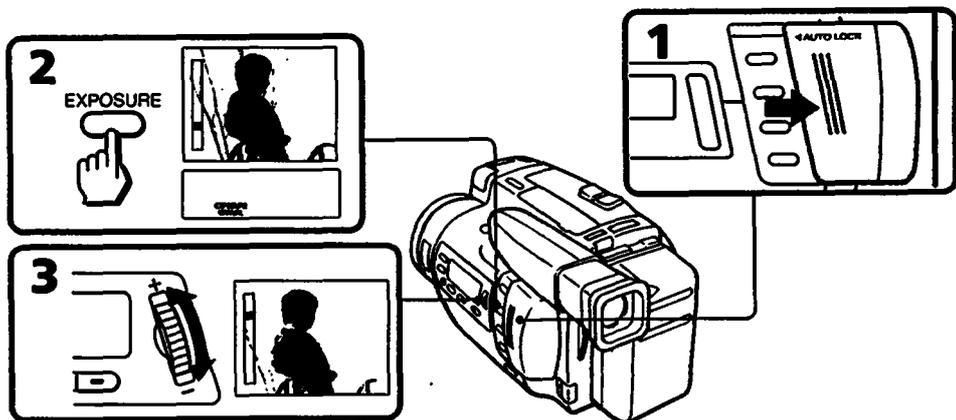
To Return to Automatic Exposure Mode
Press EXPOSURE again, or close the AUTO LOCK cover.

Shooting with the sun behind you
If the light source is behind your subject, or in the following situations, the subject will be recorded too dark.
• The subject is indoors and there is a window behind the subject.
• Bright light sources are included in the scene.
• When shooting a person wearing white or shiny clothes in front of a white background, the face will be recorded too dark.

Shooting in the dark
We recommend you to use the video light (not supplied). To get the best colour, you must maintain a sufficient light level.

Using the PROGRAM AE Function

You can select from four PROGRAM AE (Auto Exposure) modes to suit your shooting situation. When you use PROGRAM AE, you can get a portrait effect (the subject is in focus and the background is out of focus), capture high-speed action, or record night views.

Selecting the Best Mode

Select one of four modes, referring to the following.

👤 Portrait mode
• A still subject such as a person or a flower
• Zooming in on a subject in the telephoto mode
• A subject behind an obstacle such as a net

🏌 Sports mode
• Outdoor sports scene such as football, tennis, golf or skiing
• A landscape in a moving car

🏃 High-speed shutter mode
• A golf swing or a tennis match in fine weather with the ball captured clearly
• Playing back certain scenes with high-speed movements in a clear, sharp picture

🌙 Twilight mode
Recording night views, neon signs or fireworks

Using the PROGRAM AE Function

(1) Open the AUTO LOCK cover. (2) Press PROGRAM AE. The indicator of the selected PROGRAM AE mode appears in the viewfinder and the display window.
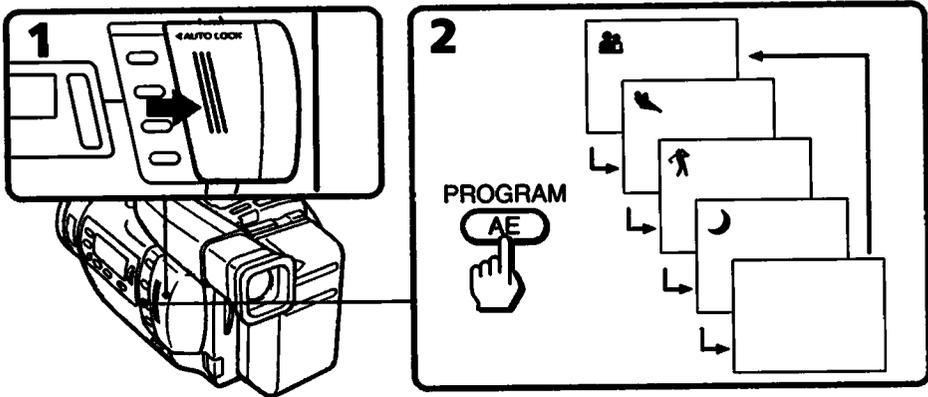
PROGRAM
AE

Note on shutter speed
The shutter speed in each PROGRAM AE mode is as follows:
Portrait mode-between 1/60 to 1/2000
Sports mode-between 1/60 to 1/500
High-speed shutter mode-1/4000
Twilight mode-1/60
Normal mode-1/60

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Adjusting the White Balance

White balance is the adjustment to make white subjects look white and to obtain a more natural color balance.

Selecting the Appropriate Mode

Select the appropriate white balance mode under the following conditions:

[a]   [b]   [c]   [d]

☼ Indoor mode
• Lighting condition changes quickly. [a]
• Too bright place such as photography studios
• Under sodium lamps or mercury lamps

HOLD Hold mode
Monochromatic subject or background [b]

☀ Outdoor mode
• Under a colour matching fluorescent lamp
• Recording a sunset/sunrise, just after sunset, just before sunrise [c], neon signs, or fireworks [d]

Setting White Balance Mode

(1) Open the AUTO LOCK cover until it clicks. (2) Press WHT BAL repeatedly so that the desired mode indicator appears in the viewfinder and display window.
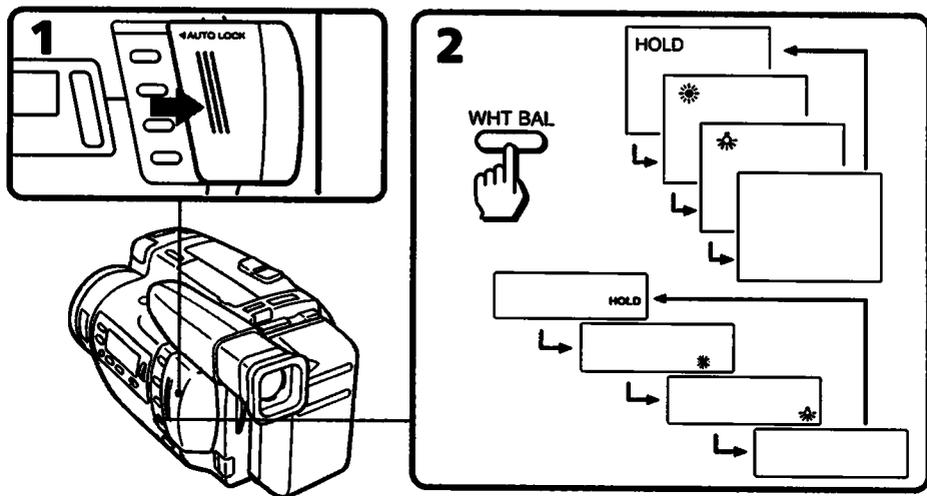
Locking the White Balance Setting (HOLD mode)

When you set the white balance to HOLD mode, the last automatic white balance setting will be locked and maintained even if lighting conditions change.

(1) Close AUTO LOCK cover. (2) Point the camcorder at a white and flat object such as a white wall or paper for about 15 seconds. (3) Open AUTO LOCK cover. (4) Press WHT BAL repeatedly so that the HOLD indicator appears in the viewfinder and display window.

Note on the HOLD mode setting

When you detach the battery or change white balance mode, the setting you made for HOLD mode is canceled.

To Return to Automatic White Balance Mode

Press WHT BAL repeatedly until the white balance indicator disappears, or close AUTO LOCK cover.

Inserting a 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.
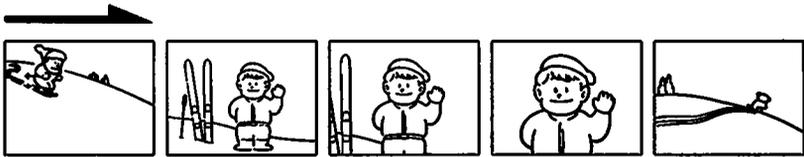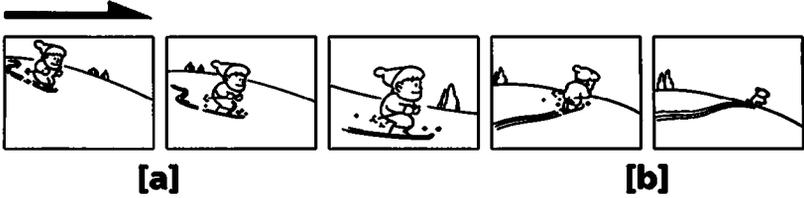
[a]   [b]

↓

Use the tape counter. When the RC time cord appears in the display window, press COUNTER/TIME CODE to display the tape counter.

(1) While looking in the viewfinder in Standby mode, keep pressing the + or − side of EDITSEARCH and release the button where you want to end the insertion **[b]**. **(2)** Press COUNTER RESET to set the counter to zero. **(3)** While looking in the viewfinder, keep pressing the - side of EDITSEARCH and release the button where you want to start the insertion **[a]**. **(4)** Press ZERO MEM to stop recording of insert at the counter's zero point. **(5)** Press START/STOP. Insert recording begins. The insert recording stops automatically at the counter zero point.
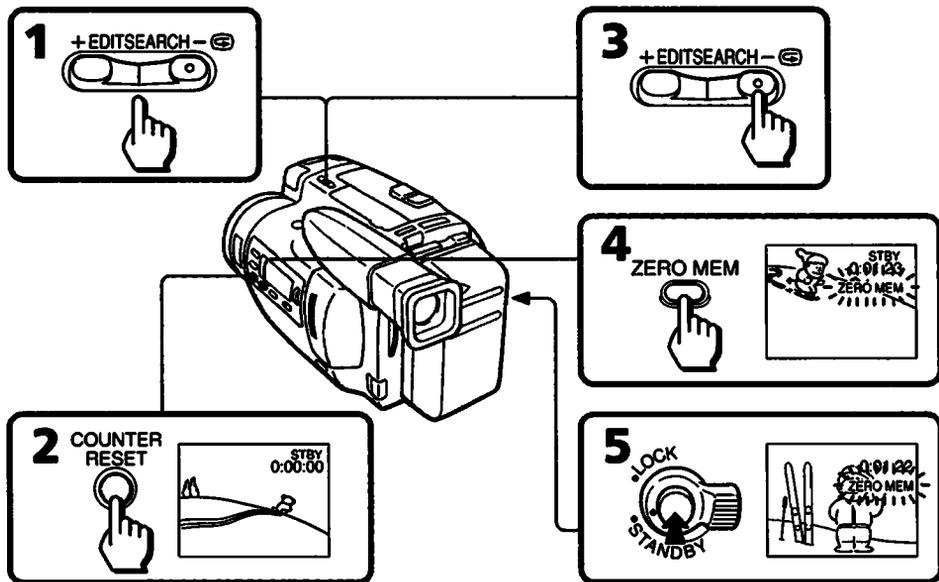
Canceling the ZERO MEM
Press ZERO MEM again. The ZERO MEM indicator disappears.

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

Returning to a Pre-registered Position

You can easily go back to the desired point on a tape after playback.
Use the tape counter. When the RC time cord appears in the display window, press COUNTER/TIME CODE to display the tape counter.
(1) During playback, press COUNTER RESET at the point you later want to locate. The counter shows "0:00:00" in the viewfinder and the display window. **(2)** Press □ when you want to stop playback.
(3) Press ZERO MEM to stop rewinding at the counter's zero point. The "ZERO MEM" indicator flashes in the viewfinder and the display window. **(4)** Press ◄◄. The tape stops automatically when the counter reaches approximately zero.
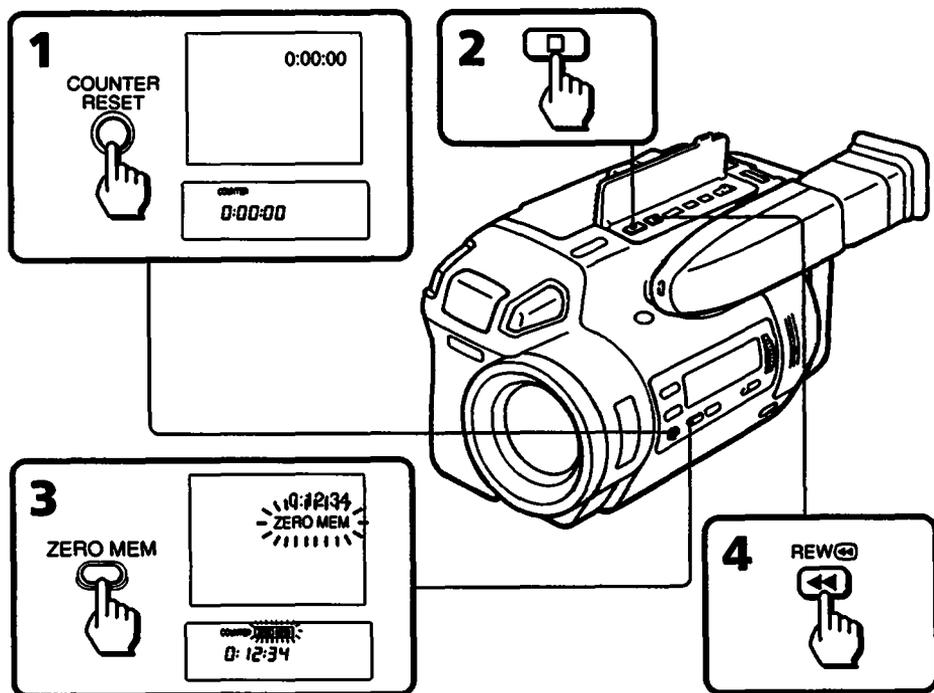
Notes on the tape counter
• Something must be recorded on the tape in order for the tape counter to function. Tape counter does not work on a blank tape.
• There may be a discrepancy of several seconds from the actual time.

Notes on ZERO MEM
• When you press ZERO MEM, the counter's zero point is memorized.
• This function is canceled automatically once the tape is rewound or sent forward to the point you pre-registered.
• Be sure to press ZERO MEM when the tape is stopping. It does not function during recording or playing back.

Using this Function in Reverse
You can return to a desired position after rewinding with this function. Press COUNTER RESET at the point you want to return to later. Press ◄◄. Press □ when you want to stop rewinding. Press ZERO MEM. Press ►►. The tape automatically stops near the zero point you first set.

You can locate the beginning of a desired programs easily by marking an index signal during recording or playback and searching for it later.

Marking and Erasing an Index Signal

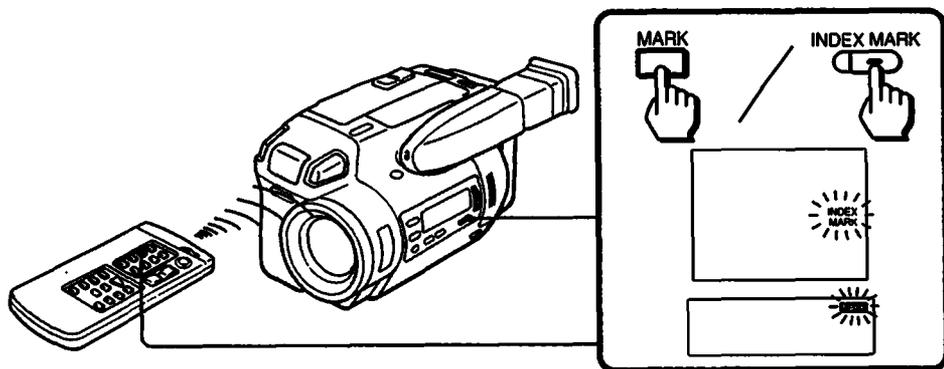You can mark an index signal during recording or playback. You can also mark it with the Remote Commander.

Marking an Index Signal at the Beginning of Recording or Playback

Press INDEX MARK on the camcorder or the Remote Commander in recording standby or playback pause mode. The INDEX MARK indicator appears in the viewfinder with the MARK indicator flashing and the MARK indicator flashes in the display window. When recording or playback starts, the MARK indicator stops flashing. This shows that the index signal is being marked. The INDEX MARK indicator will then disappear.

Marking an Index Signal during Recording or Playback

Press INDEX MARK on the camcorder or the Commander at the point you want to locate later.

Notes
• Make sure you mark index signals at more than two-minute intervals. Otherwise, you may not be able to search for them correctly.
• If you stop recording while the index signal is being marked (the INDEX MARK indicator lights in the viewfinder), the search may not be completed correctly.
• If you mark an index signal on the tape with the data code recorded, the data code will be erased at the point on which the index signal is marked. When playing back this tape, the camcorder keeps displaying the data code immediately before the erased one. If the data code does not exist for more than 30 seconds, the data code displays bars (—).
• If you mark the index signal during playback, the sound cannot be heard and a black band appears at the bottom of the picture. This will not affect the recorded sound or picture.
• If you record in VTR mode, the index signal is marked at the beginning of recording automatically. However, if you start recording in playback pause mode, it is not marked.

Note on the unusable tape for an index signal
You cannot mark an index signal on a tape with the red mark on the cassette exposed (p.45) or the tape recorded with VCR in LP mode.

Erasing an Index Signal

(1) Locate the index signal to be erased the index scan or index search function. (p.38) **(2)** Press INDEX ERASE on the Remote Commander within 2 to 10 seconds while the desired program plays back. After the index signal is erased, the camcorder returns to index scan or index search mode, whichever was used in step 1.
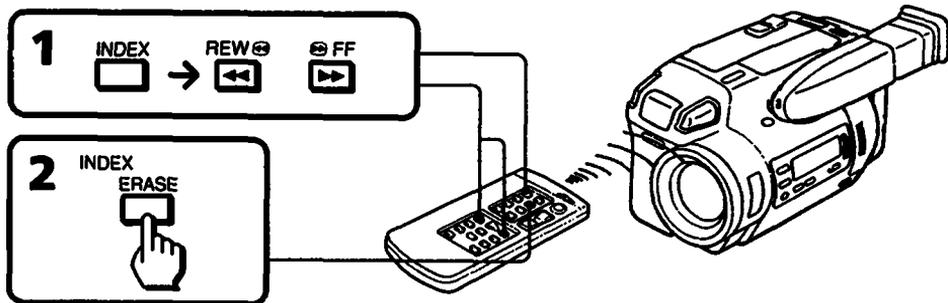
Notes on erasing
- Press ERASE more than 2 seconds after the playback of the desired program begins.
- You cannot erase the index signal on a tape on which the red mark on the cassette is exposed.
- While the index signal is being erased, the sound cannot be heard and a black band appears at the bottom of the picture. This will not affect the recorded sound or picture.
- The camcorder can detect index signals marked with VCR, but cannot erase them. VCR with a index function can detect index signals marked with this camcorder but cannot erase them.
- An index signal may be erased when making PCM after recording in the portion where the index signel is marked.

Note on RC time code and data code
When an index signal is erased, the RC time code and data code on the same portion of the tape is also erased. Bars (----) appear in place of the RC time code when the portion is played back. To use that tape for editing using an editing controller, rewrite the RC time code (p.39).

Scanning the Beginning of Each Marking Position – Index Scan

You can scan the begining of each marking position in succession. Use the Remote Commander. To view the index number on a TV, press DISPLAY.

(1) Press INDEX on the Remote Commander during normal playback or playback pause mode.

(2) Press ◄◄ or ►►. The tape rewinds or advances rapidly and plays back for approximately 10 seconds from the point on which the index signal was marked. If you want to continue playback, press ▷. When you do not press any button, the tape is automatically scanned to the next program.
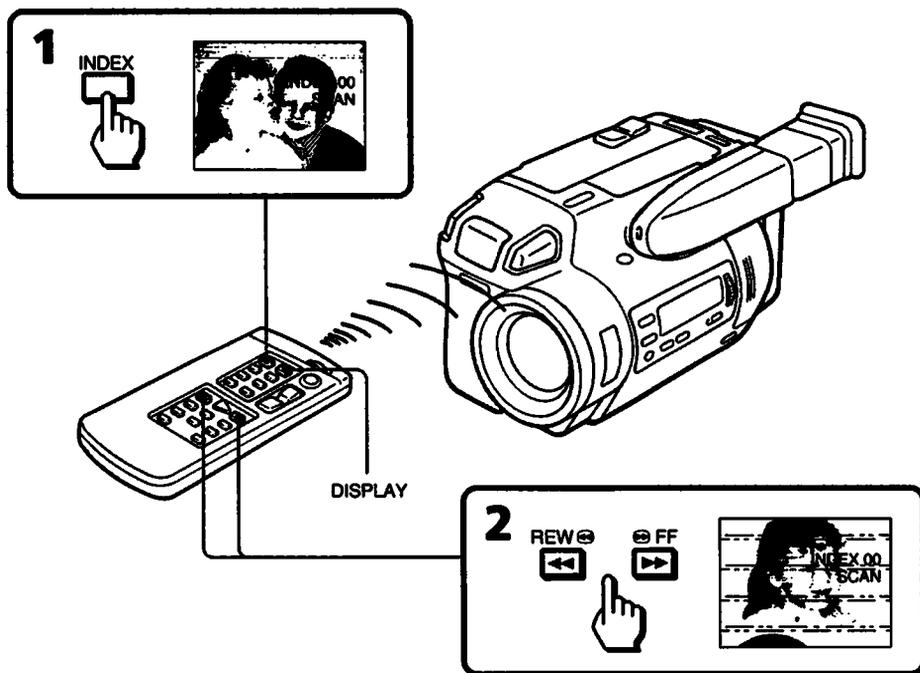
Scanning the Beginning of Each Program in Sequence

(1) Press INDEX on the Remote Commander during stop mode. **(2)** Press ◄◄ or ►►. The tape rewinds or advances rapidly and plays back for approximately 10 seconds from the point on which an index signal was marked. **(3)** Press ▷ when the desired program starts playback.

To cancel index scan mode
Press ▷. Normal playback resumes.

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Locating the Desired Marking Position - Index Search

You can locate the desired marking position. Use the Remote Commander.
(1) Press INDEX on the Remote Commander during stop or playback mode. **(2)** Press INDEX repeatedly until the index number of the desired programme is displayed in the viewfinder. **(3)** Press ◄◄ or ►►. Playback starts from the beginning of the desired program.
[a] the position that is playingback now
[b] index number
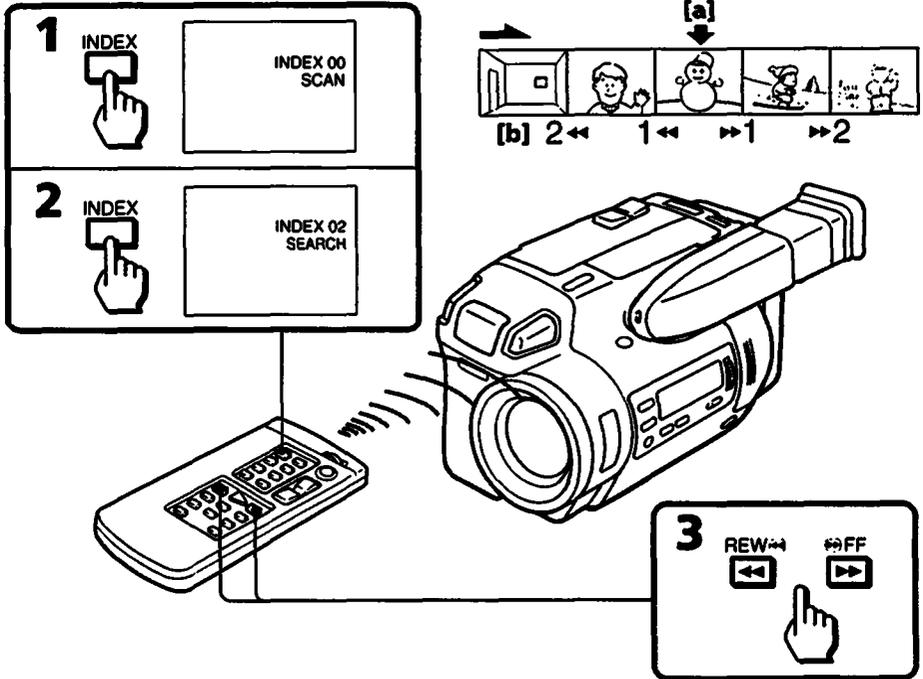
To Stop index search mode
Press ►. Normal playback resumes.

Writing the RC Time Code on a Recorded Tape

You can write the RC time code on a recorded tape. Use the Remote Commander.
(1) While pressing the small green button on the POWER switch, slide it to VTR. **(2)** Rewind the tape to the beginning and set the camcorder to playback pause mode. **(3)** Press TIME CODE WRITE on the Remote Commander. The TIME CODE WRITE indicator appears in the viewfinder with WRITE flashing.
(4) Press ▷ or ❚❚ to start playback. The WRITE indicator stops flashing and the RC time code writing starts from 0:00:00:00.
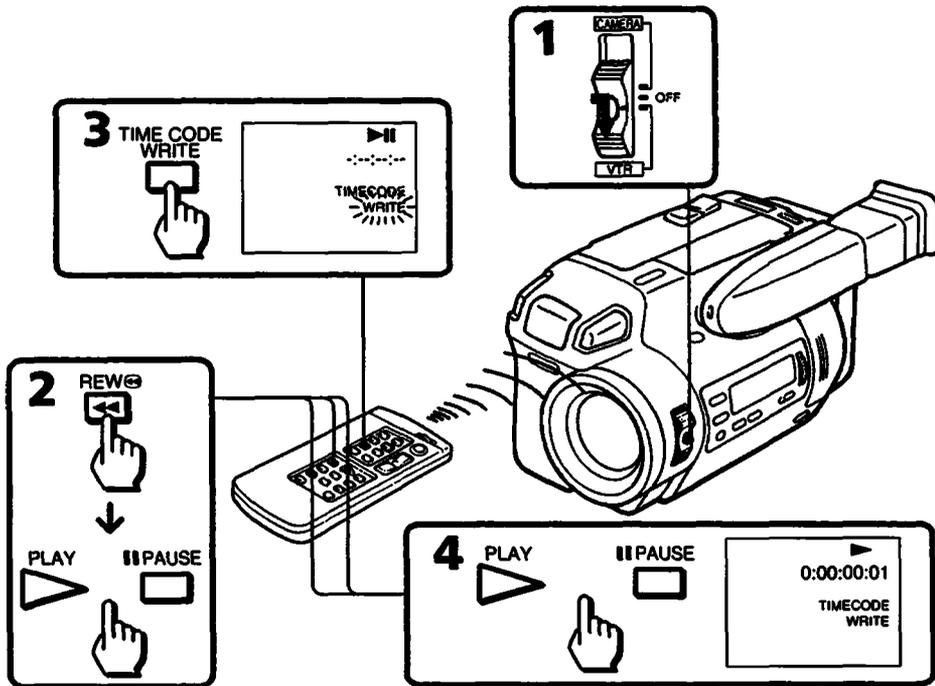
To Stop Writing the RC Time Code
Press ☐ (or any tape transport button).

To Write the RC Time Code from the End of the RC Time Code Recorded Portion
Rewind the tape to the portion on which the RC time code has been written and set the camcorder to playback pause mode. Then follow steps 3 and 4 above. The RC time code is written continuously.

Canceling RC time code writing
The RC time code writing stops when:
• you press TIME CODE WRITE again before starting playback
• you press INDEX before starting playback
• you change from playback mode to another mode

Notes on writing the RC time code
• When you are writing the RC time code from the middle of a tape without the time code written, writing starts several frames before the current picture.
• You can not write the RC time cord on the tape recorded in LP mode. Though you can write it on the tape recorded in mixed LP and SP modes, it may not be displayed correctly when the tape is played back.

Editing onto Another Tape

You can create your own video programme by editing with any other ⊞ 8 mm, **Hi⊞** Hi8, **VHS** VHS, **SVHS** S-VHS, **VHSC** VHSC, **SVHSC** S-VHSC, ⊞ Betamax or **EDBeta** ED Betamax VCR that has audio/video inputs.

Before Editing

Connect the camcorder to the VCR using the A/V connecting cable (supplied). (p.23).
Set the input selector on the VCR to LINE, if available. Note that the data code of that tape is erased.
(1) Set the POWER switch to VTR. **(2)** Set EDIT to ON in the menu system (p.31).

➡ : Signal flow
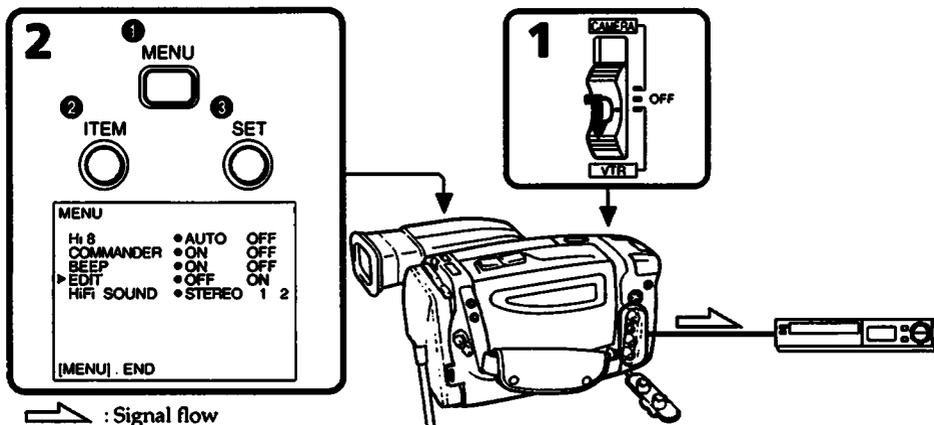
If your VCR is a monaural type, connect only the white plug for audio on both the camcorder and VCR.

Starting Editing

(1) Insert a blank tape (or a tape you want to record over) into the VCR. And insert your recorded tape into the camcorder. **(2)** Play back the recorded tape on the camcorder until you locate the point where you want to start editing, then set the camcorder in the playback pause mode. **(3)** On the VCR, locate the recording start point and set the VCR in the recording pause mode. **(4)** Press **II** on the camcorder and VCR simultaneously to start editing.

To Edit More Scenes
Repeat steps 2 to 4.

To Stop Editing Momentarily
Press **II** on the VCR.

To Stop Editing
Press ☐ on both the camcorder and the VCR.

Use of the EDITSEARCH button
You can play back the tape in normal/reverse direction by keep pressing EDITSEARCH during playback pause mode. You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Note on the EDIT mode
When you set EDIT to ON in the menu system, you can keep picture deterioration resulting fron editing to a minimum. However, when you edit or copy to anothre VCR, avoid using the edited tape for multiple generations of editing. After editing, be sure to set EDIT to OFF.

Note on the DISPLAY function
If you have displayed the viewfinder screen indicators on the TV, erase the indicators by pressing DISPLAY on the Remote Commander so that they will not be superimposed on the edited tape.

Recording from a TV or VCR

You can record a tape from another VCR or a TV program from a TV that has video/audio outputs. Connect the camcorder to the TV or VCR.
(1) Set the POWER switch to VTR. **(2)** Slide REC to the direction of the arrow at the point where you want to start recording. In recording and recording pause mode, S VIDEO and VIDEO/AUDIO jacks automatically work as output jacks.
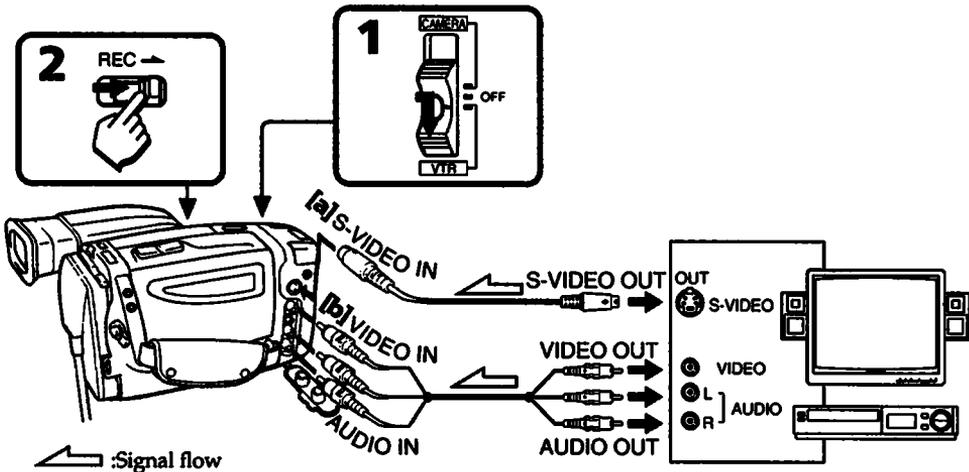
:Signal flow

If your TV or VCR is a monaural type, connect only the white plug for audio on both the camcorder and the TV or VCR.
If you are going to connect the camcorder using the S video cable **[a]**, you do not need to connect the yellow (video) plug of the A/V connecting cable **[b]**.

To Check the Picture from a TV or VCR before Recording
Press PAUSE after sliding REC. You can check the picture in the viewfinder.

To Stop Recording
Press □.

Replacing the Lithium Battery

Your camcorder is arleady installed a lithium battery. When the battery becomes weak or dead, replace with the new one.

Lithium Battery Life

The lithium battery for the camcorder lasts for about 1 year under normal operation. When the battery becomes weak or dead, the date or the time indicator and the ◌ indicator flash in the viewfinder for about 5 seconds and the date or the time indicator keeps flashing in the display window when you set the POWER switch to CAMERA.

In this case, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion.**
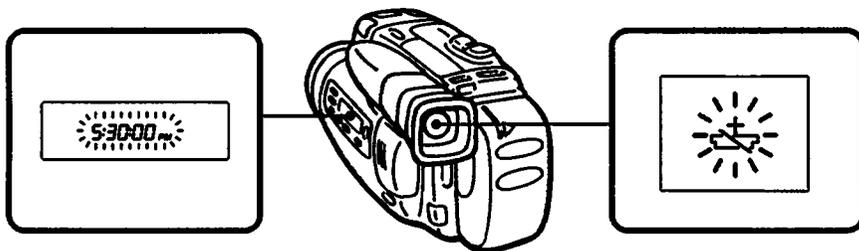
Note on Lithium Battery

The lithium battery has a positive (+) side and a negative (−) side as illustrated below. **Be sure to install the lithium battery with the positive side facing out.**
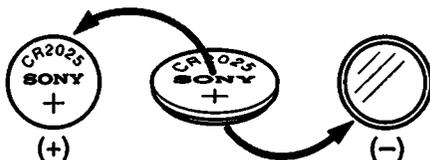
Warning
The battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

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

Replacing the Lithium Battery
To activate the clock, you must insert a lithium battery. When replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date and time.
(1) Open the lid of the lithium battery compartment on the bottom of the camcorder.
(2) Push the lithium battery down once and pull it out from the holder. **(3)** Install the lithium battery with the positive (+) side facing out. Close the lid.
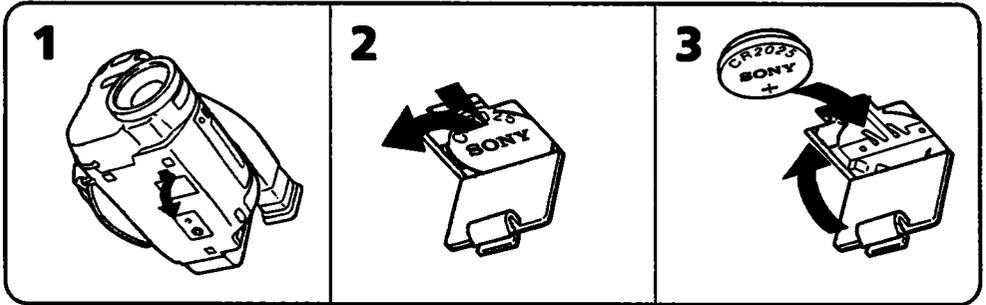
Resetting the Date and Time

Before setting the clock, make sure a power source and lithium battery are installed.
(1) Press DATE (+) and TIME (NEXT) simultaneously for about 3 seconds until date indicator flashes in the display window. **(2)** Adjust the digits of the year, month, day, hour and minutes by pressing DATE (+) and TIME (NEXT). Note that when you keep DATE (+) pressed, the digits advance faster.
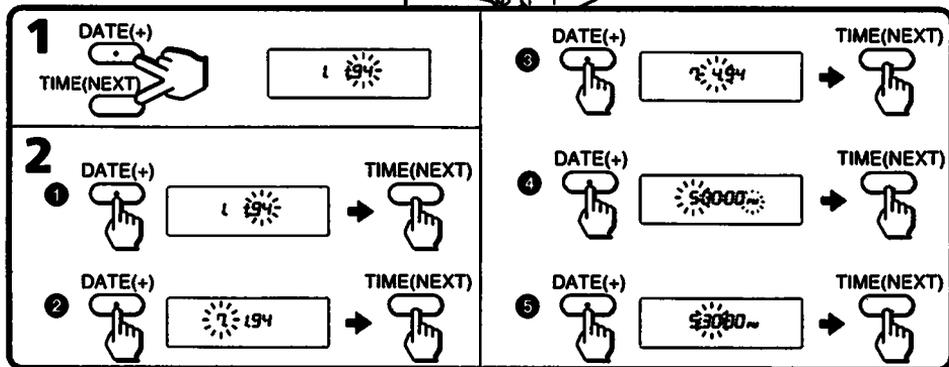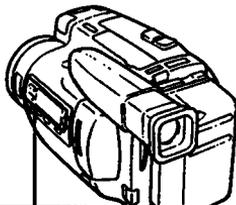
To Correct the Date and Time Settings
Repeat steps 1 and 2.

To Check the Preset Date and Time
Press DATE (+) to display the date indicator in the display window and the viewfinder.
Press TIME (NEXT) to display the time indicator.
When you press the same button again, the indicator goes off.

Note on the setting of the year
When you set the year, each time you press DATE (+) the digits change as follows.

1994 → 1995 → ---- → 2023

Note on the time indicator
The internal clock of the camcorder operates on a 12-hour cycle.
12:00:00 AM stands for midnight. 12:00:00 PM stands for noon.

Usable Cassettes and Recording/Playback Modes

Selecting Cassette Types

This Hi8 system is an extension of the standard 8 mm system, and was developed for higher-quality pictures.
You can use Hi8 video and standard 8 mm cassettes. When you want to record in the Hi8 system, use only Hi8 video cassettes. You cannot record on standard 8 mm cassettes in the Hi8 system.
If you are going to play back the tape using a standard 8 mm video recorder/player, you should record the tape in the standard 8 mm system.
If you want to use a Hi8 cassette with the standard 8 mm recording system, set the Hi8 mode to OFF in the menu system befor recording (p.21).

To play back in	Record using cassette type	Set Hi8 setting to
Hi8	**Hi8**	AUTO
Standard 8	**Hi8**	OFF
	8	AUTO (or OFF)

To Prevent Accidental Erasure
Slide the tab on the cassette to expose the red mark.
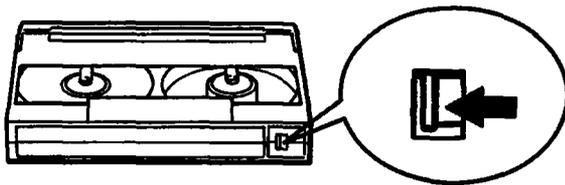
If you try to record with the red mark exposed, the 🔲 and ▲ indicators flash in the viewfinder, and you cannot record on the tape. To re-record on this tape, slide the tab back out to cover the red mark.

When You Play Back

The playback mode is selected automatically according to the recording system (Hi8/standard 8 mm) in which the tape was recorded.

Notes on AFM Hi-Fi stereo
When you play back the tape, the sound is in monaural if:
• you record the tape using this camcorder, then play it back on an AFM Hi-Fi monaural video recorder/player.
• you record the tape on an AFM Hi-Fi monaural video recorder, then play it back on this camcorder.

Tips for Using the Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the Battery Pack

Always Carry Additional Batteries
Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

Battery Life is Shorter in Cold Environment
Battery efficiency is decreased and the battery will be used up more quickly if you are recording in a cold environment.

To Save Battery Power
Turn the STANDBY switch on the camcorder down when not recording to save battery power. [a]
A smooth transition between scenes can be made even if recording is stopped and started again. While positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.
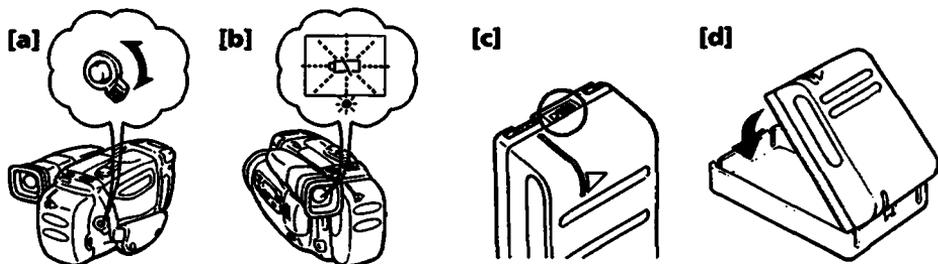
When to Replace the Battery Pack

While you are using your camcorder, the remaining battery indicator in the viewfinder [1] and in the display window [2] decreases gradually as battery power is used up.
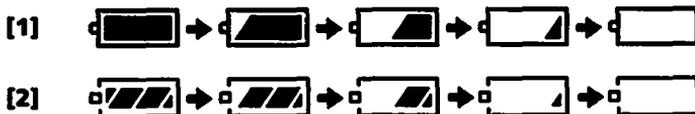
When the remaining battery indicator reaches the lowest point, the ⏚ indicator appears and starts flashing in the viewfinder. [b]
When the ⏚ indicator in the viewfinder changes from slow flashing to rapid flashing while you are recording, slide the POWER switch to OFF on the camcorder and replace the battery pack. Leave the tape in the camcorder to obtain smooth transition between scenes after the battery pack is replaced.

Note on the remaining battery indicator
The remaining battery indicator of the camcorder may indicate a different remaining capacity for some battery pack. The indicator for that battery pack is more accurate.

Note on the Rechargeable Battery Pack

The Battery Heats Up

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Care

• Remove the battery pack from the camcorder after using the battery pack, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is set to OFF, which shortens battery life.
• The battery pack is always discharging even when it is not in use after charging. Therefore, you should charge the battery right before using the camcorder.

How to Use the Switch on the Battery Pack

This switch is provided so that you can mark the charged battery. 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 (or in whichever direction you want to remind yourself). [c] on page 46.

The Life of the Battery Pack

The battery pack can be fully charged and discharged about 500 times under normal temperatures. If the battery indicator flashes 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.

Charging Temperature

You should charge batteries at temperatures from 50°F to 86°F (from 10°C to 30°C). Lower temperatures require a longer charging time.

Sony Batteries are Recommended

Use of non-Sony batteries may damage your Handycam camcorder.

Note on Charging

A Brand-new Battery

A brand-new battery pack is not charged. Before using the battery pack, charge it completely.

Before Recharging a Used Battery Pack

• Make sure to use up the battery before recharging.
• If recording is completed before the ⊂⊃ indicator appears in the viewfinder, you should remove the tape, slide the POWER switch to CAMERA, turn up the STANDBY switch, and leave the camcorder until the battery indicator flashes rapidly.
• When you use the AC-S10 power adaptor or the DC-S10 car battery charger, you can use the discharging function.
• **Charging the usable battery causes a lowering of battery capacity. Battery capacity can be recovered if you fully discharge and charge the battery again.**

After Long Storage

Recharge the battery pack after a long period of storage. If the battery pack is charged fully but not used for a long time (about 1year), 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.

Note on the Terminals

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, repeat installing and removing the battery pack. This improves the contact condition. Also, wipe the + and – terminals with a soft cloth or paper.

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. [d] on page 46.**
• 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.

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.

Inside the Camcorder
When the ▣ and ≜ indicators flash in the viewfinder, moisture has condensed inside the camcorder. If this happens, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour in a dry place.
The camcorder can be used again if the ▣ indicator does not appear when the power is turned on again.
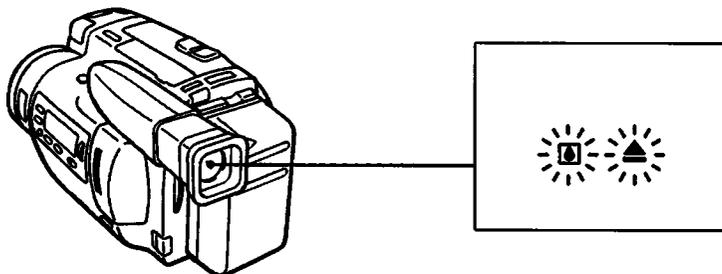
On the Surface of the Tape
If there is moisture on the surface of the tape, when the cassette is inserted and a tape transport button is pressed, the ≜ indicator in the viewfinder flashes.
In this case, no other functions except for tape ejection will work. **Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least one hour in a dry place.** The camcorder can be used again if the ≜ indicator does not appear when you insert the cassette and press one of the tape transport buttons.

On the Lens
If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off the power and do not use the camcorder for about one 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 1 hour).

Tips for Using the Battery Pack/Maintenance Information and Precautions

Video Head Cleaning

To ensure normal recording and clear pictures, clean the video heads diligently. When you find that you can not record normally, ⊗ appears in the viewfinder or playback pictures are "noisy" or hardly visible as the pictures below, the video heads may be contaminated.

[a] ━━━━━━━━━━━━━━━▶ [b]

[a] Slight contamination
[b] Critical contamination

If this happens or not to happen, clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied). After checking the picture, if it is still "noisy", repeat the 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.

Removing Dust from inside the Viewfinder

(1) While pressing down the hook, slide the viewfinder barrel in the direction of the arrow and remove it from the viewfinder. (2) Clean the surface with a commercially available blower.
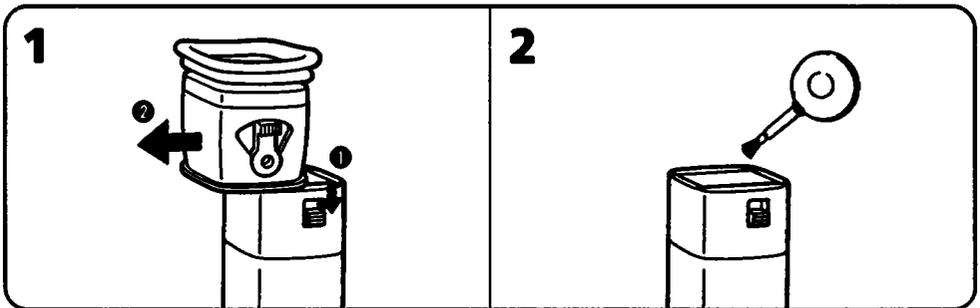
Precautions

Camcorder 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 get inside the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the POWER switch set to OFF when not using the camcorder.
- 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.

On Handling Tapes
Do not insert anything in the small holes on the rear of the cassette. These holes are used to sense the type, thickness of tape, or if the tab is out or in, etc.

Camcorder Care
- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections 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.

AC Power Adaptor
Charging
- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you use the battery completely and charge it fully again.**
- Charge the battery pack on a flat place without vibration.
- The battery pack will get hot during charging. This is normal.
- Video equipment cannot be operated while charging the battery pack.

Do not continuously recharge a charged battery pack as that will cause the battery pack efficiency to deteriorate.

Others
- The AC power cord should only be changed at a qualified service shop.
- The nameplate indicating operating voltage, power consumption, etc. is located on the bottom.
- A negligible amount of electric current will flow into the AC power adaptor (even with the selector in the center position) as long as the AC power adaptor is plugged into the wall outlet.
- Unplug the unit from the wall (mains) outlet when not in use for a long time. To disconnect the cord (mains lead), pull it out by the plug. Never pull the cord itself.
- Do not operate the unit with a damaged cord or if the unit has been dropped or damaged.
- Be sure that nothing metallic comes into contact with the metal parts of the connecting plate. If this happens, a short may occur and the unit may be damaged.
- Always keep the metal contacts clean.
- Do not disassemble the unit.
- Do not apply mechanical shock or drop the unit.
- While the unit is in use, particularly during charging, keep it away from AM receivers and video equipment because it will disturb AM reception and video operation.
- The unit becomes warm while in use. This is normal.
- Do not place the unit in locations that are:
  - Extremely hot or cold
  - Dusty or dirty
  - Very humid
  - Vibrating
If any difficulty should arise, unplug the unit and contact your nearest Sony dealer.

Using Your Camcorder Abroad

Each country has its own electricity and TV color systems. 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.
Use a commercially available AC plug adaptor [a], if necessary, depending on the design of the wall outlet [b].

```
|AC-V35/V35A|——————⊏IIII)⊏ → ⊏╟⊏ → (··)
              [a]            [b]
```
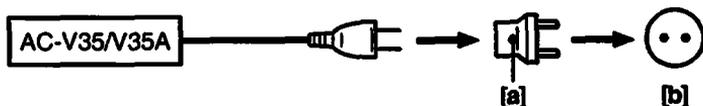
Difference in Color Systems

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, the 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, Guyana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

Trouble Check

If you run into any problems using the camcorder, use the following table to troubleshoot the problem.

	Symptom	Cause	Corrective Actions	page
Power	The power will not turn on.	The battery is not attached.	Attach the battery.	8
		The battery is exhausted.	Use a charged battery.	6
		The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.	20
	The power turns off.	The camcorder has been in the recording pause mode for more than 5 minutes.	Turn STANDBY down once and turn it up again.	11
		The battery is exhausted.	Use a charged battery.	6
	The battery pack is quickly discharged.	The ambient temperature is too low.	—	46
		The battery pack has not been charged fully.	Charge the battery pack again.	6
		The battery pack is completely dead, and cannot be recharged.	Use another battery pack.	47
Operation	START/STOP does not operate.	The tape is stuck to the drum.	Eject the tape.	9
		The tape has run out.	Rewind the tape or use a new one.	17
		The POWER switch is set to VTR.	Set it to CAMERA.	11
		The tab on the cassette is out (red).	Use a new cassette or slide the tab.	45
	The cassette cannot be removed from the holder.	The battery is exhausted.	Use the charged battery or the AC power adaptor.	6, 20
	No function except for cassette ejection works.	Moisture condensation has occurred.	Eject the tape and do not use the camcorder for about an hour.	49
	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.	17
		The tape has run out.	Rewind the tape or use a new one.	17
	The STEADY SHOT function does not activate.	The STEADY SHOT switch is set to OFF.	Set the STEADY SHOT switch to ON.	25
	The auto focusing function does not work.	Shooting conditions are not suitable for autofocusing operation.	Open the AUTO LOCK cover and press FOCUS to adjust the focus manually.	27
		The AUTO LCOK cover is opened.	Close the AUTO LOCK cover.	11
		The lens inside the focus ring is dirty.	Clean the lens with a dry, soft cloth.	50
	No sound or only low sound is heard when playing back a tape.	The stereo tape is played back with the camcorder set to HiFi SOUND "1" or "2" in the menu system.	Set to STEREO in the menu system.	21

Trouble Check

	Symptom	Cause	Corrective Actions	page
Picture	The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.	10
	A vertical band appears when a subject such as lights or candle flame is shot against a dark background.	The contrast between the subject and background is too high: The camcorder is not malfunctioning.		—
	The color of the playback picture is strange.	Shooting conditions were not suitable for auto white balance operation.	—	30
	The playback picture is not clear.	EDIT is set to ON in the menu system.	Set it to OFF.	21
		The channel for the VCR is not adjusted on the TV.	Adjust the TV.	—
	The picture is noisy.	The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH cleaning cassette.	50
Others	There is dust inside the viewfinder.	—	Remove the viewfinder barrel and clean the viewfinder screen cover or viewfinder lens.	50
	The supplied Remote Commander does not function.	Something interrupts the infrared rays.	Take off the obstacles.	61
		The batteries are not inserted with the correct polarity.	Insert the batteries with the correct polarity.	61
		Thje batteries are dead.	Insert new batteries.	61
		The HOLD switch is working.	Set the switch in the opposite direction of the arrow.	17
	Bubbles appear inside the lens.	When you use the camcorder where the air pressure is low such as on a mountain or in an airplane, you may find bubbles inside the lens. This is not a malfunction, and will not hinder recording. Bubbles will usually disappear after about a week. But, how long it takes depends on the air pressure and use.	—	—

AC Power Adaptor

	Symptom	Cause	Corrective Actions	page
AC Power Adaptor	The POWER lamp does not light.	—	Set the selector to the center position and disconnect the power cord. After about one minute, reconnect the power cord and set the selector to CHARGE again.	—
	The CHARGE lamp flashes.		See the following chart.	

When the CHARGE Lamp Flashes
Check through the following chart.

```
┌─────────────────────────────┐      ┌──────────────────────┐
│ Remove the battery pack from │ ───▶ │ Install the same      │
│ the AC power adaptor.        │      │ battery pack again.   │
└─────────────────────────────┘      └──────────────────────┘
         │                                      │
         ▼                                      ▼
┌─────────────────────────────┐      ┌────────────────────────────────┐
│ If the CHARGE lamp flashes   │      │ If the CHARGE lamp lights up and│
│ again, install another battery│      │ goes out after a while, the battery pack│
│ pack.                        │      │ is operating correctly.*        │
└─────────────────────────────┘      └────────────────────────────────┘
         │
         ▼
┌─────────────────────────────┐      ┌────────────────────────────────┐
│ The CHARGE lamp lights up.   │ ───▶ │ If the CHARGE lamp goes out after a│
│                              │      │ while, the problem is with the battery│
│                              │      │ pack firstly installed.         │
└─────────────────────────────┘      └────────────────────────────────┘
         │
         ▼
┌─────────────────────────────┐      ┌────────────────────────────────┐
│ The CHARGE lamp flashes.     │ ───▶ │ The problem is with the AC power │
│                              │      │ adaptor.                         │
│                              │      │ Please contact your nearest Sony dealer.│
└─────────────────────────────┘      └────────────────────────────────┘
```

* If you use a battery pack which you have just bought or which has been, left unused for a long time, the CHARGE lamp may flash at the first charging. But this is not a problem. Repeat again to charge with the same battery pack.

Specifications

Video camera recorder

System

Video recording system
    Two Rotary heads, Helical scanning
    FM system
Audio recording system
    Two Rotary head, Helical scanning FM
    system

Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassette (Hi8 or standard 8 mm)
Tape speed	SP mode: Approx. 1.43 cm (19/32 in)/second
	LP mode: Approx. 0.72 cm (5/16 in)/second
Recording time	SP mode: 2 hour (E6/P6-120)
Playback time	SP mode: 2 hour (E6/P6-120)
	LP mode: 4 hours (E6/P6-120)

Fast-forward/rewind time
    Approx. 6 minutes 30 seconds
    (E6/P6-120)

Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (color)
Lens	Combined 10 x power zoom lens f= 6.1 to 61 mm (1/4 to 2 7/16 inches) (44 to 440 mm when converted to a 35 mm still camera) F 1.6 to 3.1 Filter diameter 52 mm (2 1/8 inches) TTL autofocus system inner focus wide macro system

Colour temperature
    Auto, HOLD, Indoor ☼ 3,200 K,
    Outdoor ☀ 5,800 K
Minimum illumination
    3 lx (F 1.6)
Illumination range
    3 lx to 100,000 lx
Recommended illumination
    More than 100 lx
Aperture correction
    Auto

Input and output connectors

S video input/output
    4-pin mini DIN
    Luminance signal: 1 Vp-p, 75 ohms,
    unbalanced, sync negative
    Chrominance signal: 0.286 Vp-p
    75 ohms, unbalanced
Video input/output
    Phono jack, 1 Vp-p, 75 ohms,
    unbalanced sync negative
Audio input/output
    Phono jacks (2: stereo L and R),
    Input: -7.5 dBs, input impedance more
    than 47 kilohms
    Output: -7.5 dBs, (at load impedance
    47 kilohms) impedance less than 2.2
    kilohms

RFU DC OUT	Special mini-jack, DC 5 V
Headphones jack	Stereo mini-jack (ø 3.5)
Remote jack	Stereo mini-mini-jack (ø 2.5)
MIC jack	Stereo mini-jack, -66 dBs low impedance with 2.5 to 3 V DC, output impedance 6.8 kilohms (ø 3.5)

General

Power requirements
    On battery mounting surface
    6.0 V (Battery pack)
    7.5 V (AC power adaptor)
    9.0 V (Alkaline batteries)
Power consumption
    6.5 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 +104°F)
Dimensions	Approx. 109 x 109 x 216 mm (w/h/d) (4 3/8 x 4 3/8 x 8 5/8 inches)
Mass	Approx. 930 g (2 lb) excluding the battery pack, lithium battery, cassette, lens cap, jack cover and shoulder strap Approx. 1,300 g (2 lb 13 oz) including the battery pack NP-66, lithium battery CR2025, cassette, lens cap, jack cover and shoulder strap
Microphone	Electret condenser microphone, stereo type

Supplied accessories
    See page 5.

AC power adaptor

Power requirements
    110 – 240 V AC*, 50/60 Hz
Power consumption
    20 W

|	
Output voltage	DC OUT: 7.5 V, 1.6 A in operating mode Battery charge terminal: 10 V, 1.1 A in charge mode
Application	Sony battery pack NP-66, NP-80, NP-80D, NP-77H, NP-66H, NP-60D, NP-55H
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. 170 x 41.6 x 82 mm (w/h/d) (6 3/4 x 1 11/16 x 3 1/4 inches) including projecting parts and controls
Mass	Approx. 520 g (18 oz)

* Canadian Standard Association (CSA) certifies 120 V
AC only.

Design and specifications are subject to change without
notice.

Identifying the Parts
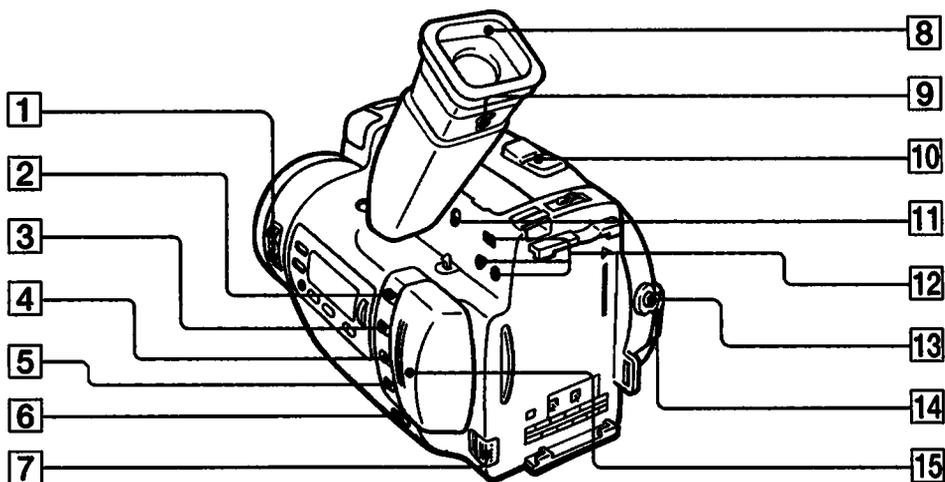
① **POWER switch** (p.11, 17)

② **FOCUS button** (p.27)

③ **EXPOSURE button** (p.28)

④ **PROGRAM AE button** (p.29)

⑤ **WHT BAL (white balance)** (p.31)

⑥ **STEADY SHOT switch** (p.25)

⑦ **BATT (battery eject) knob** (p.8)

⑧ **Eyecup** (p.14)

⑨ **Viewfinder lens adjustment lever** (p.10)

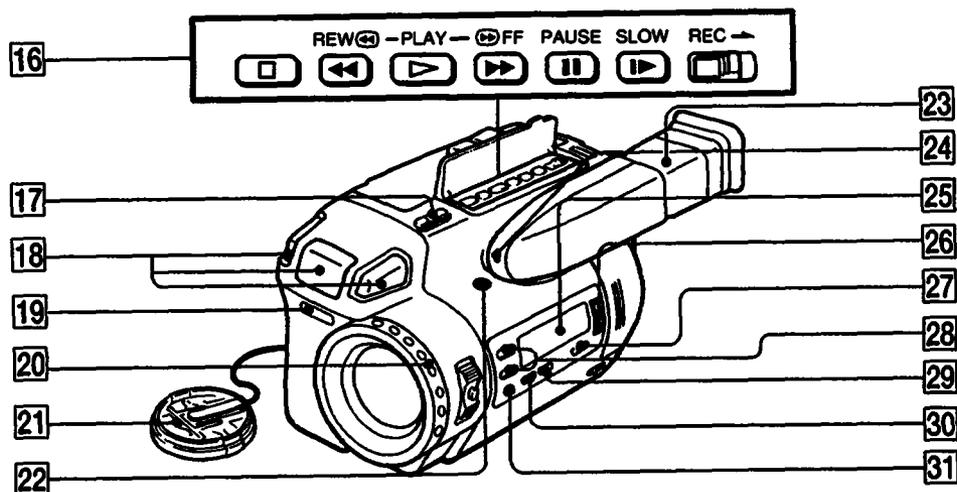⑩ **Power zoom button** (p.13, 27)

⑪ **REC START/STOP button** (p.14)

⑫ **Menu operation buttons** (p.21)

⑬ **START/STOP button** (p.11)

⑭ **STANDBY switch** (p.11)

⑮ **AUTO LOCK cover** (p.11, 26)

16 Tape transport buttons (p.17)
  □ (stop)
  ◀◀ REW (rewind)
  ▷ PLAY (playback)
  ▶▶ FF (fastforward)
  II PAUSE
  I▶ SLOW (slow playback)
  ● REC (recording)
  This button will function in VTR mode.

17 EDITSEARCH button (p.15)

18 Built-in microphone (stereo/zoom)

19 Remote sensor (p.61)
  Aim the Remote commander here for remote control

20 FOCUS ring (p.27)

21 Lens cap (p.11)

22 FADER button (p.24)

23 Viewfinder (p.10)

24 Camera recording/battery lamp

25 Display window (p.62, 63)

26 Exposure dial (p.28)

27 INDEX MARK button (p.35)

28 DATE(+) and TIME(NEXT) buttons (p.44)

29 COUNTER/TIME CODE button (p.12)

30 ZERO MEM (Zero memory) (p.33, 34)

31 COUNTER RESET button (p.33, 34)
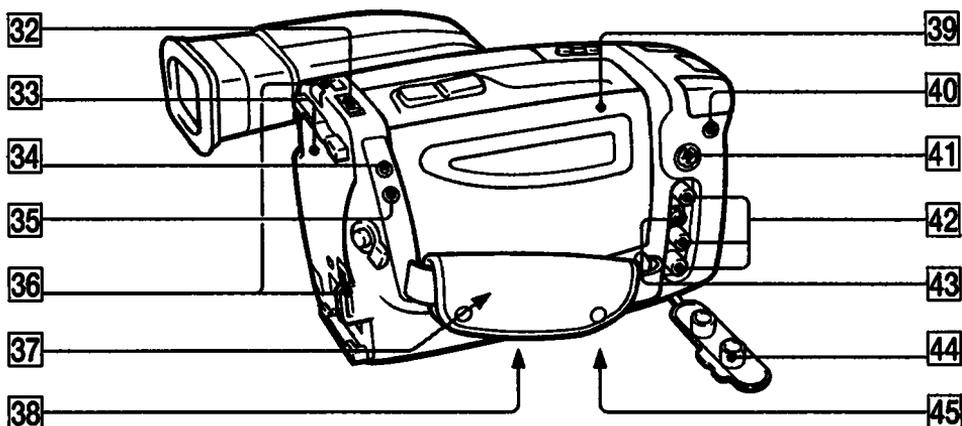
32 EJECT switch (p.9)

33 Battery mounting surface (p.8)

34 REMOTE ⎍ (LANC) control jack
⎍ stands for Local Application Control Bus System. The ⎍ control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the jack indicated as CONTROL L or REMOTE.

35 ∩ (headphones) jack (stereo mini jack) (p.15)

36 Hooks for shoulder strap

37 Grip strap (p.14)

38 Tripod receptacle (p.14)

39 Cassette holder (p.9)

40 MIC jack (PLUG IN POWER)
Connect an optional external microphone (stereo or monaural). This jack also accepts a "plug-in-power" microphone.

41 S VIDEO output jack (p.16)

42 Audio/Video output jacks (p.16)

43 RFU DC OUT (RFU adaptor DC output) jack (p.16)

44 Jack cover

45 Lithium battery compartment (p.43)

Attaching the Shoulder Strap

Attach the supplied shoulder strap to the hooks for the shoulder strap (**36**)
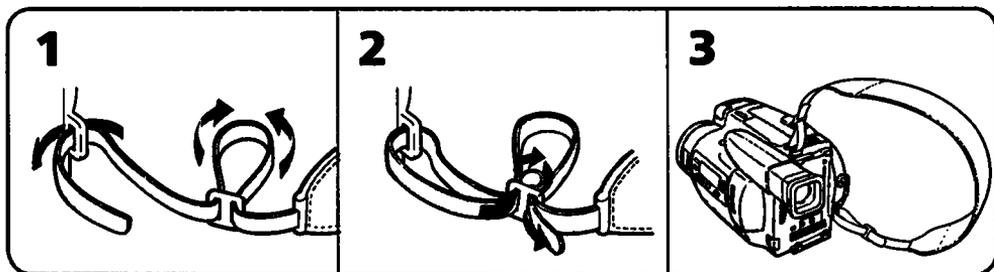
Wireless Remote Commander
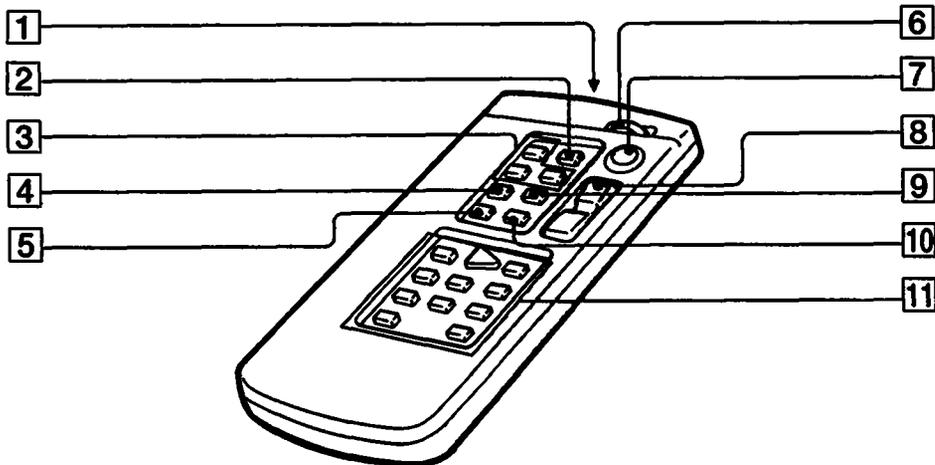
[1] Transmitter
Point toward the remote sensor to control the camcorder after turning on the camcorder.

[2] DISPLAY button

[3] INDEX button (p.35, 36, 37, 38)
INDEX: Press to scan or search for the desired program on the tape on which index signals were marked.
INDEX MARK: Press to mark an index signal.
INDEX ERASE: Press to erase the index signal.

[4] TIME CODE WRITE button (p.39)
To write the RC time code on a prerecorded tape, set the camcorder to playback pause mode, press this button and press ▷ or II.

[5] COUNTER RESET button

[6] HOLD switch
Slide this switch in the direction of the arrow to prevent the buttons from being accidentally pressed.
Before using this Remote Commander, slide in the direction opposite the arrow.

[7] START/STOP button

[8] Power zoom button

[9] DATA CODE button (p.19)
To display the recording date or time in the viewfinder during playback, press this button. Each time you press it, the display changes to the date, time and no indicator, cyclically.

[10] ZERO MEM button

[11] Tape transport buttons X2 (p.17, 18)
Other buttons function the same as those on the camcorder.

Using the Remote Commander

Make sure that the COMMANDER mode is set to ON in the menu system on the camcorder, and that the HOLD switch on the Remote Commander is not working.

Installing the size AA (R6) Batteries into the Remote Commander

To use the Remote Commander, you must install two size AA (R6) batteries. Use the supplied size AA (R6) batteries.
(1) Remove the battery cover from the Remote Commander. **(2)** Install both of the size AA (R6) batteries with correct polarity. **(3)** Put the battery cover back onto the Remote Commander.
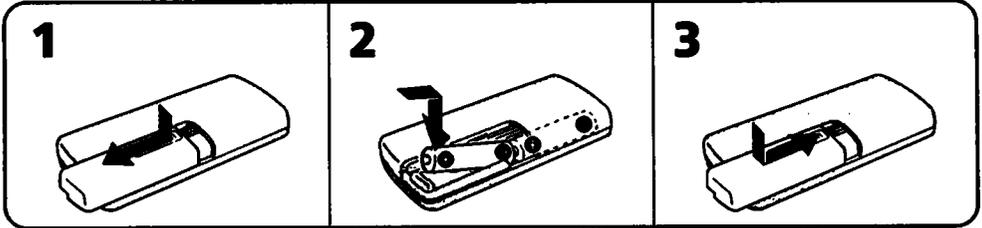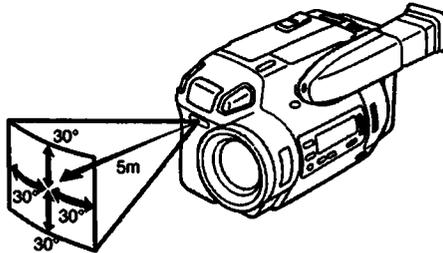

Battery Life

The batteries for the Remote Commander last about 6 months under normal operation. When the batteries become weak or dead, the Remote commander does not work.
To avoid damage from possible battery leakage
Remove the batteries when you will not use the Remote Commander for a long time.

Remote Control Direction

Notes on the Remote Commander

• Keep the remote sensor away from strong light sources such as direct sunlight or illumination. Otherwise, the remote control may not be effective.
• Be sure that there is no obstacle between the remote sensor and the Remote Commander.
• This camcorder works at commander mode VTR 2. The commander modes (1, 2 and 3) are used to distinguish this camcorder from other Sony VCRs to avoid remote control misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.
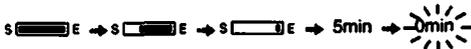
In the Display Window and the Viewfinder
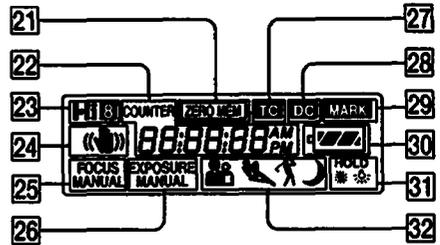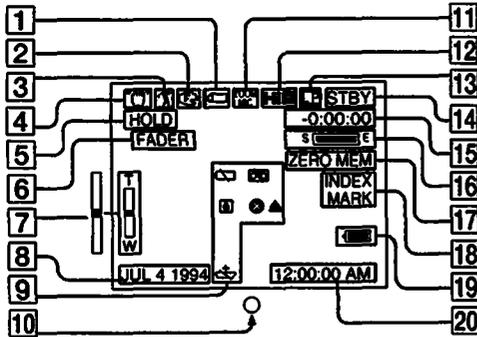
1 Wind indicator (p.12)

2 Manual focusing (p.27)

3 PROGRAM AE indicator (p.29)

4 STEADY SHOT indicator (p.25)

5 White balance mode (p.31)

6 Fade indicator (p.24)

7 Power zoom indicator (p.13)/Exposure indicator (p.28)

8 Data code (p.19)

9 Warning indicators (p.63)

10 Recording lamp/Battery lamp

11 ZOOM MIC indicator (p.13)

12 Playing back or recording in Hi8 format

13 When you play back a tape recorded in LP mode, the LP indicator appears in the viewfinder.

14 Tape transport mode

15 Tape counter and RC time cord (p.12)

16 Remaining tape indicator

17 ZERO MEM indicator (p.32, 33, 34)

18 INDEX MARK indicator (p.35)

19 Remaining battery indicator (p.46)

20 Date and Time (p.44)

21 ZERO MEM indicator (p.32, 33, 34)

22 Tape counter (p.12), time or date indicator (p.44) and RC time cord (p.12)

23 Playing back or recording in Hi8 format

24 STEADY SHOT indicator (p.25)

25 FOCUS MANUAL indicator (p.27)

26 EXPOSURE MANUAL indicator (p.28)

27 Time code indicator (p.12)

28 Data code indicator (p.19)

29 MARK indicator (p.35)

30 Remaining battery indicator (p.46)

31 White balance mode (p.31)

32 PROGRAM AE indicator (p.29)

Warning indicators

If indicators flash in the viewfinder and display window or a caution lamp on the camcorder flashes, check the following:

♪ : You can hear the beep sound when the BEEP is ON in the menu system.

1	2	3 ♪♪...	4
	5min	0min	
5 ♪♪...	6 ♪♪...	7	8 ♪♪...
9			
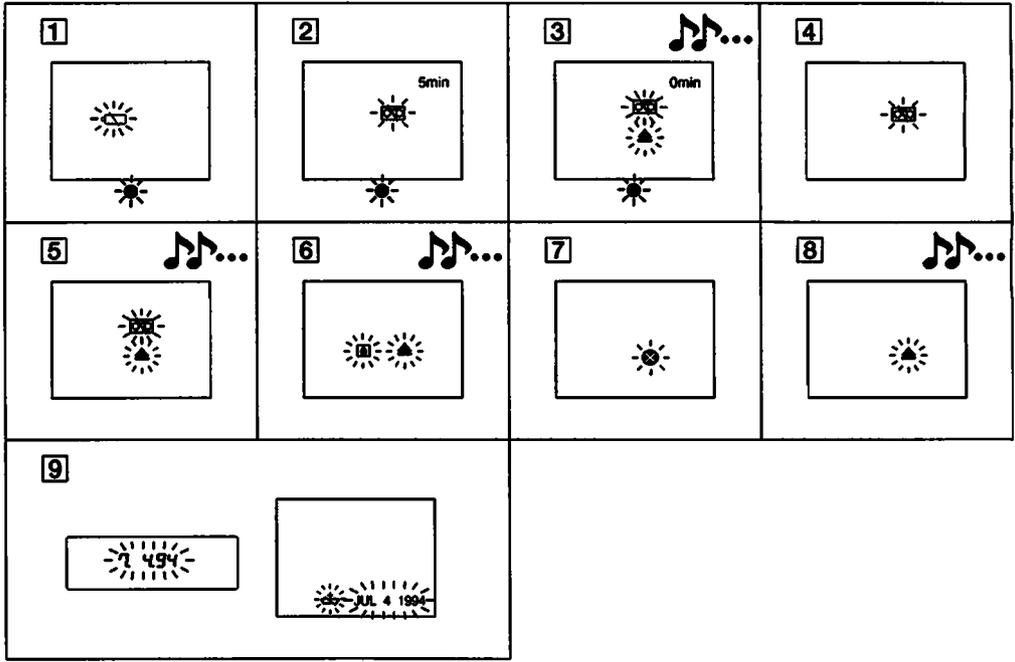
1. The battery is weak or dead.
   Slow flashing: The battery is weak.
   Fast flashing: The battery is dead.

2. The tape is near the end.
   The flashing is slow.

3. The tape has run out.
   The flashing becomes rapid.

4. No tape has been inserted.

5. The tab on the tape is out (red).

6. Moisture condensation has occurred. (p.49)

7. The video heads may be contaminated. (p.50)

8. Some other trouble has occurred.
   Disconnect the power source and contact your
   Sony dealer or local authorized facility.

9. The lithium battery is weak or is not installed.
   (p.43)

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