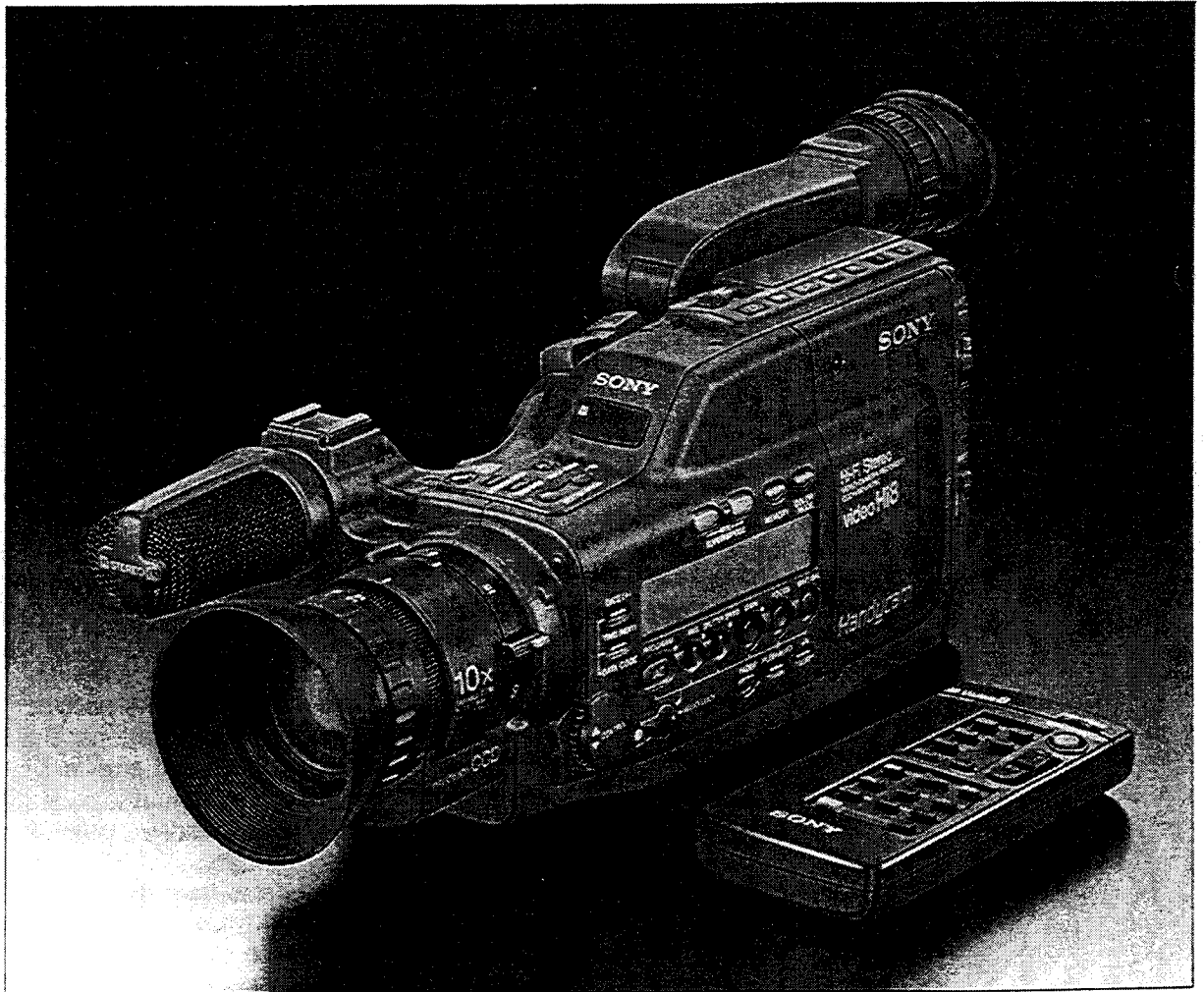


Video Camera Recorder **Hi8****CCD-V801****Operating Instructions**

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

**375216021****video Hi8 Handycam**

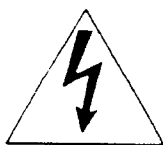
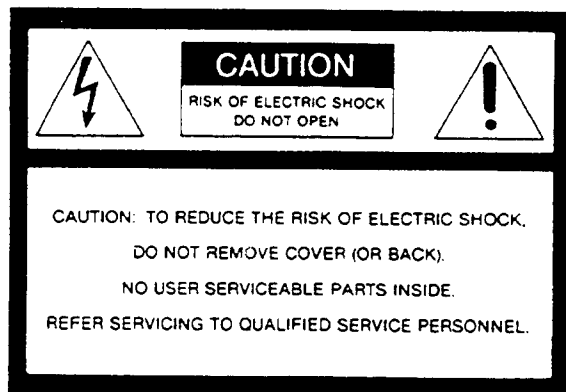
Owner's Record

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

Model No. CCD-V801 Serial No. _____

WARNING

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



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



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

INFORMATION for the customers in the U.S.A.

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

- Reorient the receiving antenna
- Relocate the equipment with respect to the receiver
- Move the equipment away from the receiver
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

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

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

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

For the customers in Canada

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

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Introduction

Overview of the CCD-V801

The CCD-V801 Video Hi8 handycam is a compact color video camera/recorder (camcorder). You can use it to shoot the pictures you want and play them back on your television set. It is equipped with a stereo recording system which offers high quality sound to match the Hi8 picture. The full featured camera section offers various camera adjustments to create just the kind of program you wish.

Who this Manual is for

This manual is designed for you. You can use this manual to find exactly the information you need, whether you are familiar with video equipment or not.

How this Manual is Organized

This manual consists of seven sections.

Section 1 explains the preliminary steps necessary to prepare for shooting and playback.

Section 2 explains the very basic techniques of shooting.

Section 3 explains how to playback the tape being shot in section 2.

Section 4 explains additional shooting techniques which will add flavor to your programs.

Section 5 explains the unique shooting techniques including the programmed AE mode and the manual mode.

Section 6 explains the techniques on how-to-edit your video programs.

Section 7 explains other useful information to enjoy the best of your camcorder.

If you have any problem during operation, see the "Trouble Checks" section.

If you are beginner, start with "Recording a picture with the automatic adjustments." If you are very familiar with camcorder operation, also refer to "Operating the Camera Section (2) and (3)" for advanced shooting techniques.

How this Manual Works

Refer to the information below to help you follow the instructions in this manual.

- Controls and settings on the camcorder are shown in capital letters:
ex. Set the **POWER** switch to **CAMERA**.
- The letter in an illustration corresponds to the letter in the text:
ex. **(A-1)** or **(B)**
- The step numbers in an illustration correspond to the step numbers in the text.
- Notes and cautions are enclosed with lines.
ex.

Note on batteries

Battery will not last as long in cold places.

Supplied Accessories

The camcorder is packed together with the following units. Check to see that everything is contained in the package.

- Wireless Remote Commander RMT-503 (1)
- Size AA (IEC designation R6) batteries for the Wireless Remote Commander (2)
- Battery pack NP-66H (1)
- AC power adaptor AC-V35/V35A (1)
- Lithium battery CR2025 (1)
- RFU adaptor RFU-90UC (1)
- A/V connecting cable (3 phono to 3 phono) (1)
- Video cable with S video connectors (4-pin mini DIN to 4-pin mini DIN) (1)
- Cassette tape (1)
- Shoulder strap (1)
- Jack covers* (1 set)
- Lens cap* (1)

Item with an asterisk (*) is attached to the unit.

Technical Information

Hi8 (High Eight) Video System

The 8 mm video system employs a metal powder tape. This means the video camera recorder is capable of recording a large amount of information and enhances picture quality. Taking advantage of the 8 mm video system, the Hi8 video system has been developed. The main characteristics of the Hi8 video system are as follows:

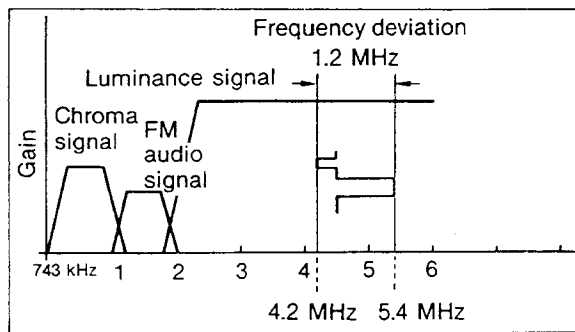
Super High Quality Picture

(A-1), (A-2)

The information capacity is a key element for picture improvement. It can be increased by shifting up the FM carrier frequency range. In the Hi8 video system, the FM carrier frequency range of the luminance signal is shifted up to 5.7–7.7 MHz. This is higher than the 4.2–5.4 MHz range of the standard 8 mm video system. Thanks to this, the horizontal resolution is improved to more than 400 lines.

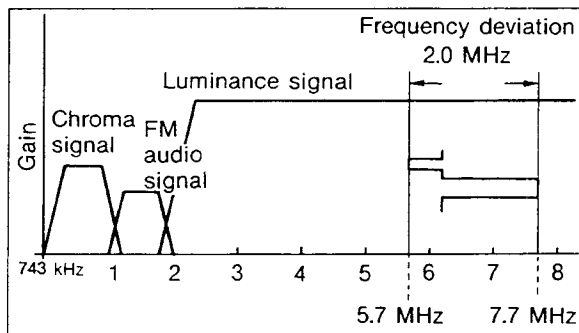
(A-1)

Frequency allocation of the standard 8 mm video system



(A-2)

Frequency allocation of the Hi8 video system



Technical Information

Use of High Grade Tape to Match the Hi8 Video System

Metal evaporated tape is ideal for video systems because it has large magnetic energy that allows for high-density recording. The Hi8 video camera recorder uses such high-grade tape for the Hi8 video system, covering a wide frequency range, to achieve a high-quality video signal for recording/playback.

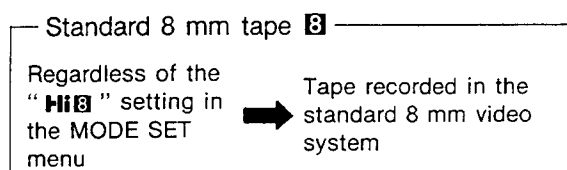
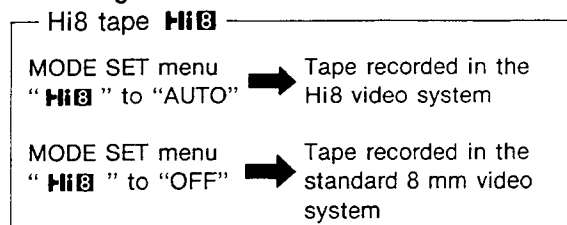
S VIDEO (Separate Luminance/Chroma Signal) Input/Output Connectors

Conventionally, video equipment exchanges the composite video signal containing the luminance (Y) signal and the chroma (C) signal mixed. The composite video signal is liable to produce interference resulting in picture quality loss. On the contrary, an S VIDEO connector transmits or receives the video signal separated into the luminance signal and the chroma signal. Flickers and color blur in the picture are minimized with the separated video signal, and sharpness is enhanced to such an extent that hair and fine stripes are clearly visible. The S VIDEO connector also assures an excellent editing quality with minimum picture quality loss.

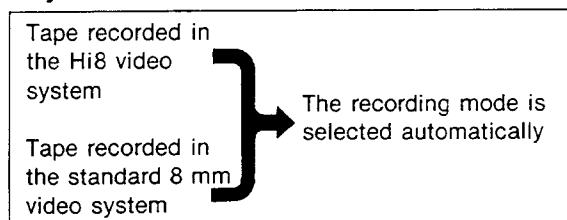
Compatibility with Conventional Video Camera Recorders

A high-quality picture can be recorded and played back on a tape for the Hi8 video system.

Recording with this unit



Playback with this unit

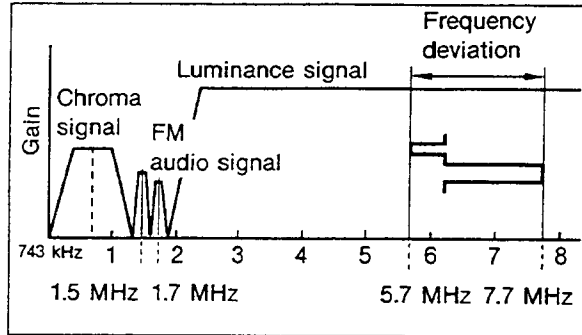


- A tape recorded in the Hi8 video system cannot be played back with a conventional 8 mm video camera recorder.
- A standard 8 mm tape **8** cannot be recorded in the Hi8 video system.
- A tape for the Hi8 video system **Hi8** cannot be recorded and played back in the Hi8 video system with a conventional video camera recorder.
- The recording tape speeds in the Hi8 video system are compatible with the conventional 8 mm format.
Recording/playback time is 2 hours using a E6-120/P6-120 tape or the equivalent.

Cassette used	With this unit		
	Recording		Playback
	Hi8	Normal	
Standard 8 mm tape 8	No	Yes	Yes
Hi8 tape Hi8	Yes	Yes	Yes

(A-3)

Frequency allocation of the hi-fi system



Hi-Fi Stereo System

On the 8 mm video standard track the sound is conventionally recorded/played back in AFM hi-fi monaural. On this camcorder, an AFM hi-fi stereo sound can be recorded on the standard track.

The AFM hi-fi stereo sound is recorded as L+R on the 1.5 MHz carrier and L-R on the 1.7 MHz carrier in FM as illustrated. (A-3) This method was adopted to maintain compatibility with the conventional AFM hi-fi monaural sound.

When playing back the tape recorded in this hi-fi stereo system, a matrix circuit is used to produce the L and R stereo sounds separately. When a conventional AFM hi-fi monaural model is used to play back a tape recorded by this camcorder in AFM hi-fi stereo, the playback sound will be in an L+R monaural sound. This is because the monaural models will play back only the sound recorded in the 1.5 MHz carrier.

The AFM hi-fi stereo system of this camcorder enables you to enjoy a live stereo sound atmosphere.

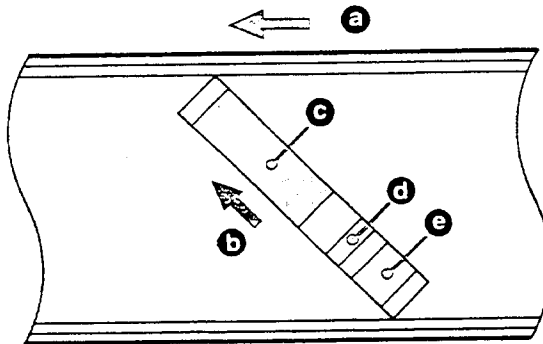
Compatibility with the conventional 8 mm video format

When you play back a tape recorded in AFM stereo hi-fi on a conventional 8 mm video equipment, the sound will be in monaural.

RC Time Code and Data Code

(A-4)

8 mm video tape format



The RC time code and data code are automatically marked during camera recording and video recording. Later, you can display these codes during playback, and edit the displayed codes onto another tape.

What the RC time code is

The RC time code indicates the absolute position of the tape with hour, minute, second and frame. Since the time code number exactly corresponds to every frame* of picture, it functions as an accurate tape counter.

You can write the RC time code on a prerecorded tape as necessary.

*The TV screen displays 30 frames of pictures per second. The RC time code number advances in accordance with each frame.

What is the data code

The data code indicates the date (year, month and day) and time (hour, minute and second) when a recording is done. The data code can be displayed during playback as necessary. It is useful when you want to know the recording date and time.

8 mm video tape format

An 8 mm video tape track is divided into several areas so that the specified information is to be recorded in each area. This camcorder records the RC time code and data code as well as index signals in one of the areas.

The 8 mm video tape format is shown in (A-4).

- a** Tape transport
- b** Head transport
- c** Video + audio (Hi-fi stereo) (Standard track)
- d** Index, RC time code and data code
- e** PCM audio (stereo) (not used with this unit)

Note on the RC time code

The "RC" time code stands for Rewritable Consumer time code.

This is a special time code for consumer 8 mm products, and is not compatible with the 8 mm time code for institutional 8 mm products.

Note on the editing of the RC time code and data code

The RC time code and data code can be duplicated on another tape only when they are displayed on the screen. The signals of these codes cannot be edited.

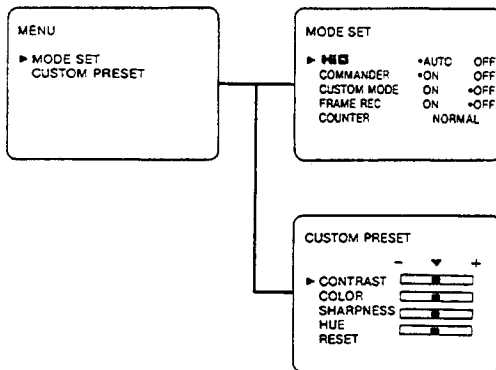
When editing a tape using the RC time code

Rewrite the RC time code from the beginning to the end of the tape before editing. Refer to "Writing the RC time code on a prerecorded tape" on page 64. When rewriting, the previously recorded data code and index signals are deleted.

On the Menu System

The menu system of this camcorder enables setting and adjustments to further enjoy the features and functions. The menu is displayed in the viewfinder or on the TV screen if connected to a TV. The menu consists of two main parts, one for use during camera recording and the other for use during playback and editing. Refer to the following section for a quick overview of the two menus.

(B-1)



Menu System for Camera Recording

(B-1)

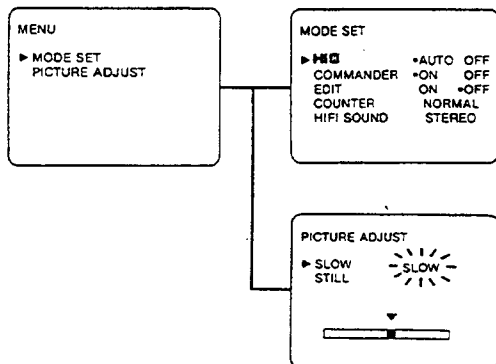
MODE SET

Various mode settings for camera recording is made in this menu.

CUSTOM PRESET

The camcorder can be adjusted to perform camera recording in the desired picture.

(B-2)



Menu System for Playback and Editing

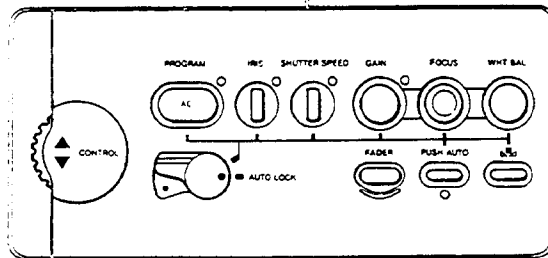
(B-2)

MODE SET

Various mode settings for playback and editing are made in this menu.

PICTURE ADJUST

The playback picture can be adjusted to obtain maximum quality.

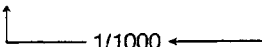


(C)

Plus, the programmed AE mode offers additional shooting techniques to enrich the creation of your video program.

When the AUTO LOCK switch is set to AUTO LOCK, aperture, gain, white balance, and focus is automatically adjusted and the shutter speed is locked to the normal speed (1/60).

By setting the AUTO LOCK switch down, each parameter can be adjusted manually.

IRIS
<ul style="list-style-type: none">• Each press of this button switches between automatic and manual adjustment.• 15 aperture values (F1.8 to F19) plus aperture close can be selected using the CONTROL dial in the manual mode.
SHUTTER SPEED
<ul style="list-style-type: none">• Each press of this button switches the shutter speed as follows:<div style="margin-left: 40px;">$1/60$ (No indication) $\rightarrow 1/100$ </div>• 27 shutter speeds (1/60 to 1/10000) can be selected using the CONTROL dial in the manual mode.

11

Selecting the Camera Recording Mode

GAIN

- Each press of this button switches between automatic and manual adjustment.
- 8 gain levels (–3 dB to +18 dB) can be selected using the CONTROL dial in the manual mode.

FOCUS

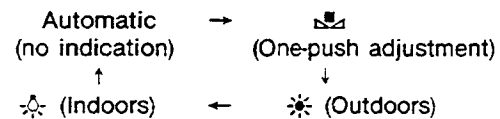
- Each press of this button switches between automatic and manual focusing.

PUSH AUTO


- When pressed during manual focusing mode, automatic focusing is activated for the extension that the button is pressed.

WHT BAL

- Each press of this button switches the mode as follows:



(One-push white balance)

- When pressed during  mode, the white balance can be adjusted manually.

Selecting the Camera Recording Mode

Programmed AE Modes

By setting the AUTO LOCK switch down, four programmed AE modes can be selected to match distinctive camera recording conditions.

Portrait mode

Use to focus on the subject and to have the background out of focus. The aperture and shutter speed is automatically adjusted to maintain the appropriate exposure according to the size and brightness of the subject.

Sports mode

Use to shoot subjects moving at high speeds and then play it back clearly in slow or still. The aperture and shutter speed is automatically adjusted to maintain the appropriate exposure according to the speed of the subject.

Aperture priority mode

Select the desired aperture (F1.8 to F19) with the CONTROL dial and the shutter speed will be automatically adjusted to maintain the appropriate exposure.

Shutter priority mode

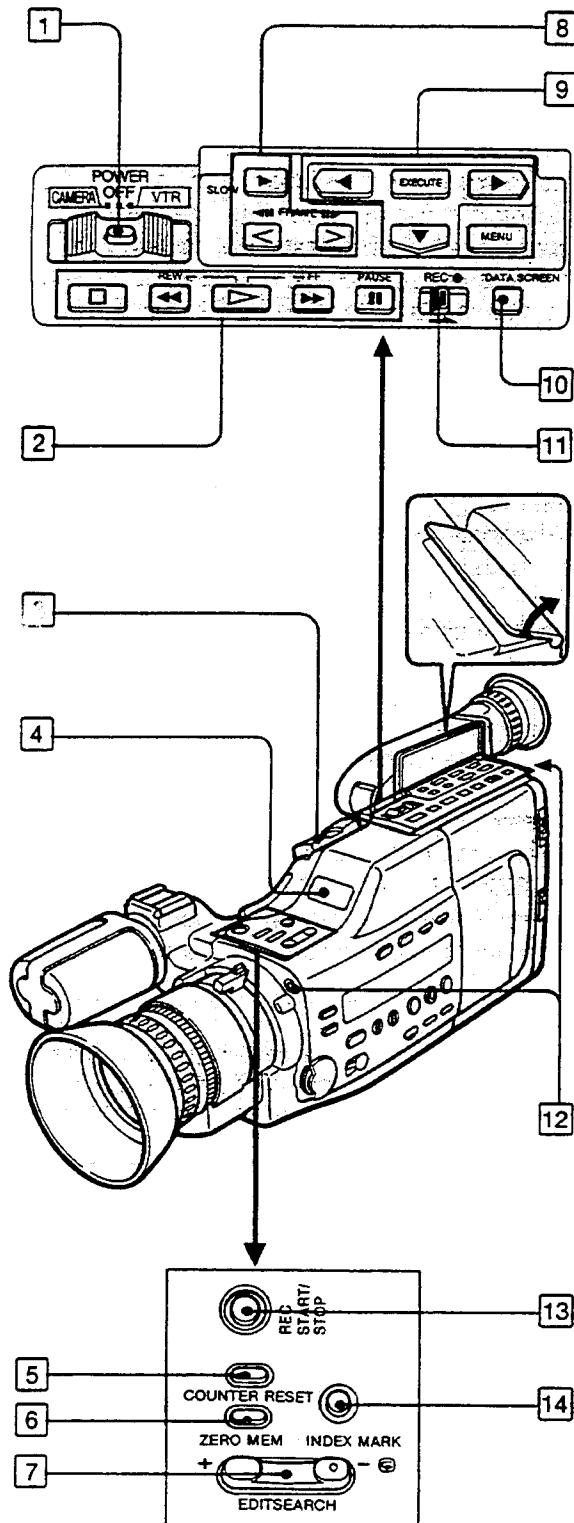
Select the desired shutter speed (1/60 to 1/10000) with the CONTROL dial and the aperture will be automatically adjusted to maintain the appropriate exposure.

Note

Focus and white balance can either be adjusted automatically or manually during the programmed AE mode. The adjusting method is same as those in the "Manual Adjustment Mode."

Identifying the Parts

(D-1)



(D-1)

For details of the use of each parts, refer to the pages indicated.

1 POWER switch

CAMERA: for camera recording
VTR: for playing back or editing tapes
OFF: power off

2 Tape transport buttons 48, 49

■ (stop)
◀◀ REW (rewind)
▶ (playback)
▶▶ FF (fast-forward)
|| PAUSE

3 Power zoom button 74

4 Remote control sensor 40

5 COUNTER RESET button 37, 52, 101

6 ZERO MEM (memory) button 37, 52, 101

7 EDITSEARCH (and recording review) buttons 35

8 Tape transport buttons 49

▶ SLOW (slow speed playback)
< ◀◀ / ▶▶ > FRAME (direction switch/frame-by-frame playback)

9 Menu operation buttons 43, 61

MENU
EXECUTE
◀ / ▶ / ▼

10 DATA SCREEN button 51

11 ● REC (recording) switch 100

Slide in the direction of the arrow.

12 Camera recording/battery lamps 107

Light during camera recording. Blink when the battery is exhausted, or the tape reaches its end.

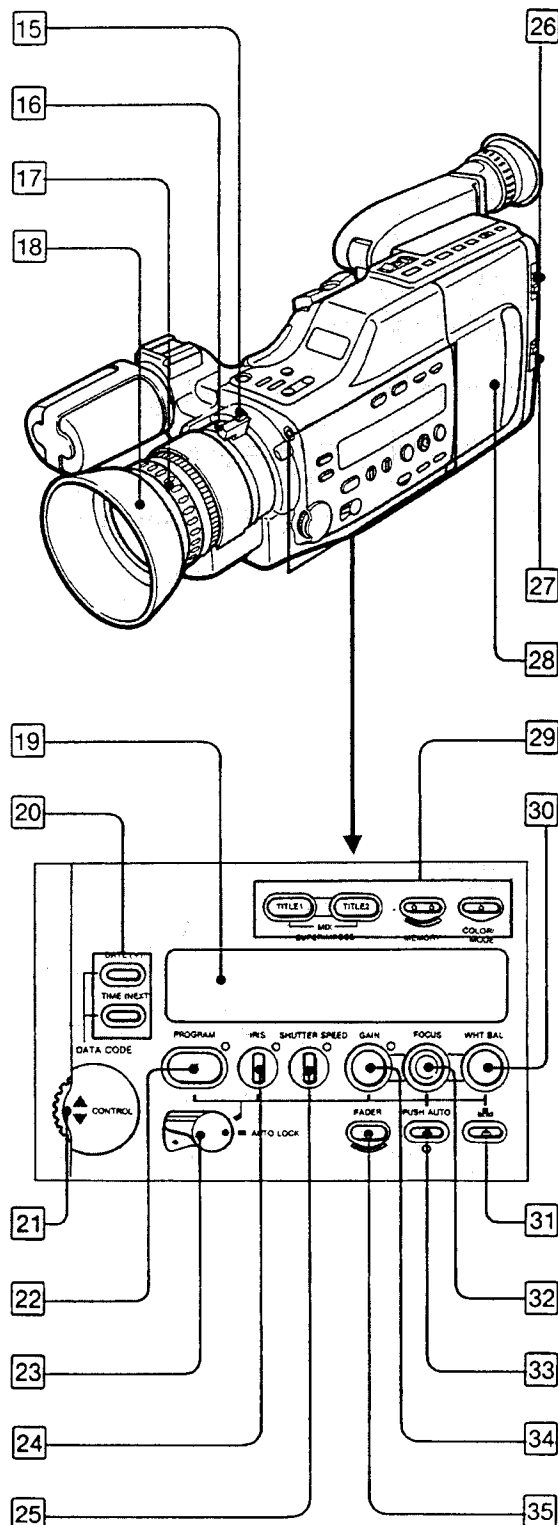
13 REC (recording) START/STOP button for low position camera recording 32

Use this button instead of the START/STOP button for low-position recording.

14 INDEX MARK button 39, 54

Identifying the Parts

(D-2)



(D-2)

15 Macro set button (green) 73

16 Zoom lever 74

17 Focus ring

18 Lens hood 75

19 Display window 76

20 DATE (+)/TIME (NEXT)/DATA CODE buttons 28, 35, 62

Use these buttons to set the date and time, display the date and time, or display the data code.

21 CONTROL dial 60

Move up or down to select the desired parameters during programmed AE mode and manual adjustment mode.

22 PROGRAM AE (programmed auto exposure) button 69

23 AUTO LOCK switch

To adjust the aperture, gain, focus, white balance automatically and the shutter speed locked to 1/60, set to AUTO LOCK.

24 IRIS button 103

25 SHUTTER SPEED button 103

26 EJECT (cassette eject) button 29

27 BATT (battery eject) knob 22

28 Cassette holder

29 SUPERIMPOSE buttons 80

TITLE 1 button

TITLE 2 button

MEMORY button

COLOR/MODE button

30 WHT BAL (white balance) button 71

31 (one-push white balance) button 72

32 FOCUS button 68

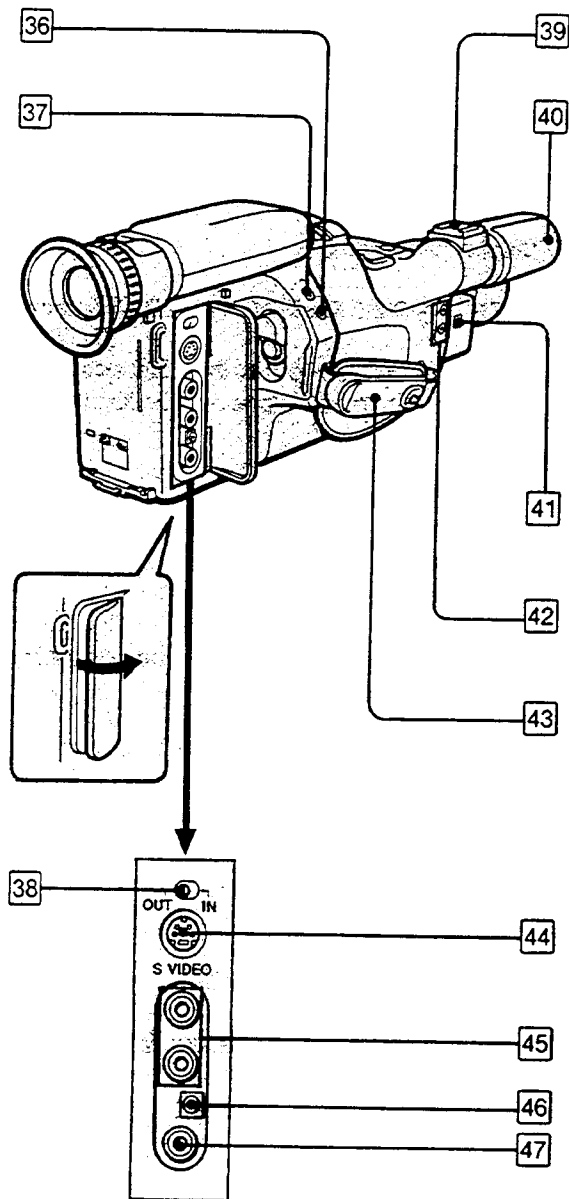
33 PUSH AUTO button 69

34 GAIN button 103

35 FADER button 76

Identifying the Parts

(D-3)



(D-3)

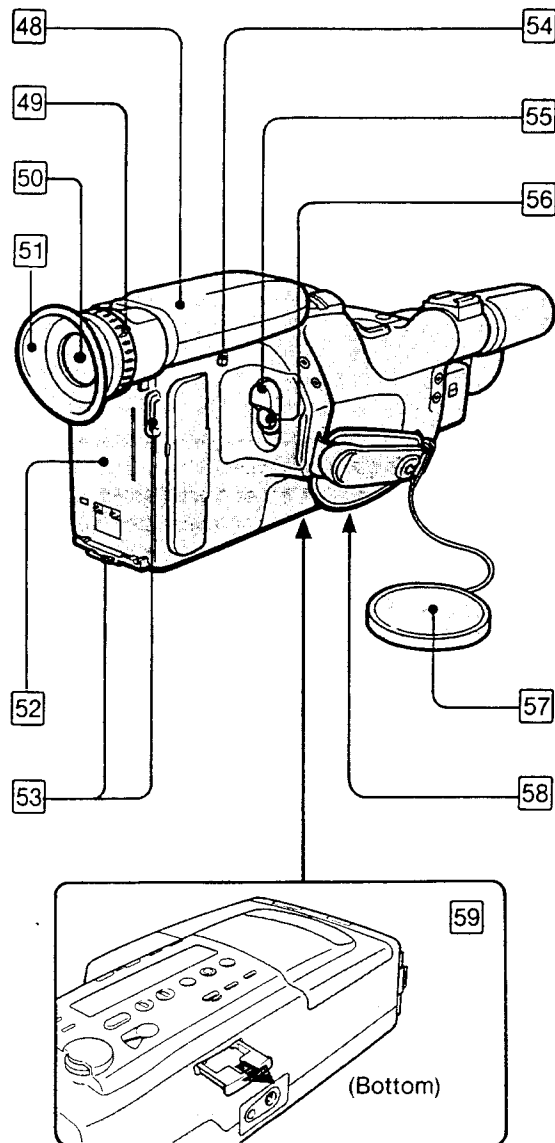
- 36** (headphones) jack (stereo mini jack)
- 37** REMOTE connector (stereo mini-minijack)
Connect a wired remote control unit, a editing controller (not supplied), etc.
- 38** IN/OUT (signal input/output) selector ,
- 39** Accessory shoe
Attach a video light, external microphone, (not supplied), etc.
- 40** Built-in one-point stereo microphone
- 41** BUILT-IN MIC (microphone)/WIND selector
- 42** EXT MIC and DC OUT (microphone power output) jack
Connect an external microphone (not supplied). The DC OUT jack supplies power to it.
When connecting "plug-in-power" microphones, use the MIC jack only.
- 43** Grip strap
- 44** S VIDEO connector (4-pin mini DIN connector)
- 45** AUDIO L/R input/output jacks (phono jacks) ,
- 46** RFU DC OUT (RFU adaptor DC output) jack (special minijack)
Attach the supplied RFU adaptor here.
- 47** VIDEO input/output jack (phono jack) ,

About the (LANC) mark

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

Identifying the Parts

(D-4)



(D-4)

48 Viewfinder

The picture being recorded or played back can be monitored in black and white in here.

Caution indicators, tape operation modes, function modes, menu are also displayed.

49 Viewfinder lens adjustment ring

50 Sports finder

You can look through the finder without touching your eye to it.

51 Eyecup

52 Battery mounting surface

53 Hooks for shoulder strap

54 PUSH SLIDE button

Press this button and slide the viewfinder to the desired position.

55 STANDBY switch

Slide up to set the camcorder to the standby mode.

56 START/STOP button

Press to start and stop camera recording.

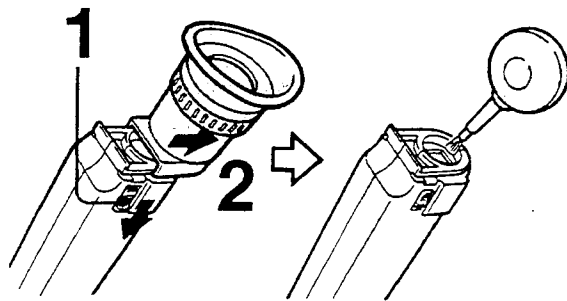
57 Lens cap

58 Tripod receptacle (bottom)

59 Lithium battery compartment (bottom)

Identifying the Parts

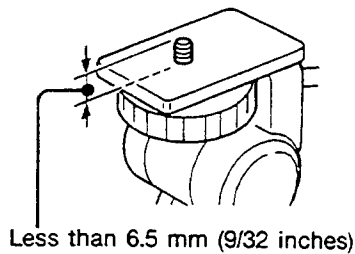
(D-5)



To remove the dust from inside the sports finder (D-5)

Detach the eyecup as illustrated and clean the surface of the screen with a blower.

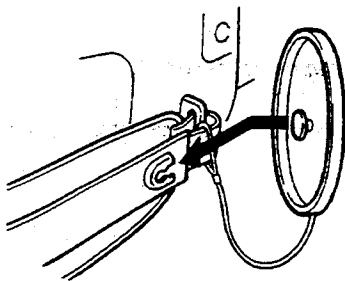
(D-6)



Note on attaching a tripod (D-6)

When attaching a tripod other than Sony's, make sure that the length of the camera mounting screw is less than 6.5 mm (9/32 inches). Otherwise, the screw may damage the inner parts of the camcorder.

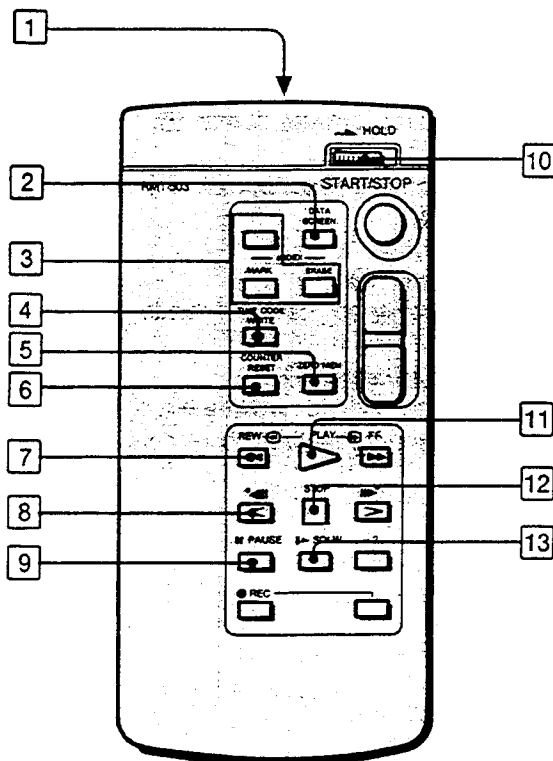
(D-7)



When the lens cap is removed (D-7)

Attach the lens cap to the grip strap.

(D-8)



Wireless Remote Commander

(D-8)

You can record or play back a tape from a distance. The buttons on the Commander with the same name or mark as those on the camcorder have the same function. The buttons with an asterisk (*) is available on the Commander only.

When you use the Commander

Be sure to select "COMMANDER ON" in the MODE SET menu (page 41 and 59) and then start operating the camcorder. Point the Commander to the remote sensor on the camcorder.

1 Transmitter

2 DATA SCREEN button 61

3 INDEX buttons 63, 64
INDEX button*
INDEX MARK button
INDEX ERASE button*

4 RC TIME CODE WRITE button* 64

5 ZERO MEM (memory) button 67, 62, 121

6 COUNTER RESET button 67, 62, 121

7 << REW (rewind) button 48

8 </<||| (reverse direction/reverse frame) button 49

9 || PAUSE button 49

10 HOLD switch*

Slide in the direction of the arrow to prevent the buttons from being accidentally depressed.

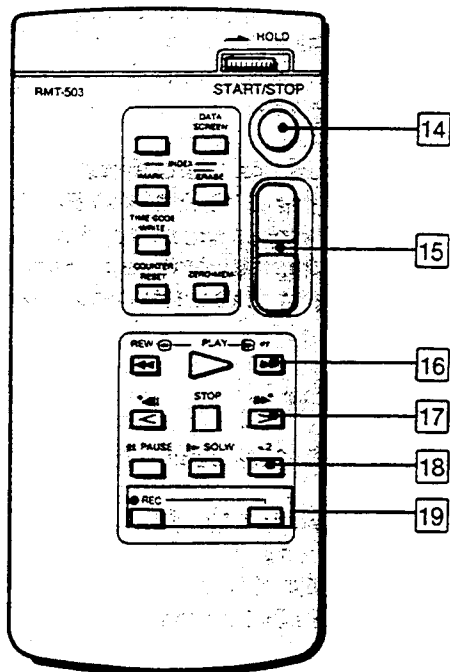
11 > PLAY button 49

12 ■ STOP button 49

13 >> SLOW button 49

Identifying the Parts

(D-9)



(D-9)

14 START/STOP button

Press to start and stop camera recording.

15 Power zoom button

16 FF (fast forward) button

17 >||| (forward direction/forward frame) button

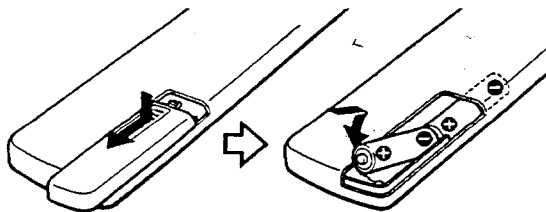
18 X 2 button

Provided only on the Commander.

19 Recording buttons

Press both buttons simultaneously when recording from another equipment.

(D-10)



Inserting batteries

(D-10)

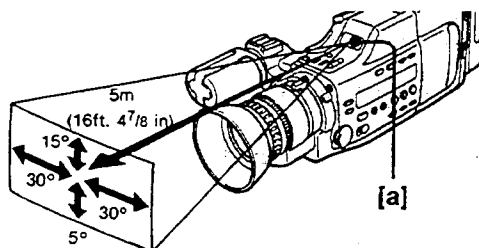
Insert two size AA (R6) batteries with polarity positioned correctly.

Remotely controllable range

(D-11)

Point the Commander towards the remote sensor. [a]

(D-11)



Notes on the Remote Commander

- The batteries will last for about six months under normal operation. However, if the Commander will not be used for a long period, remove the batteries to avoid possible damage from battery leakage.
- Do not let direct sunlight or strong light source light the camcorder's remote control sensor. Remote control with the Commander may not be effective.
- The command mode of the Commander is VTR 2. Avoid using Sony VCRs with the same command mode at the same time.

Connecting the Power Sources

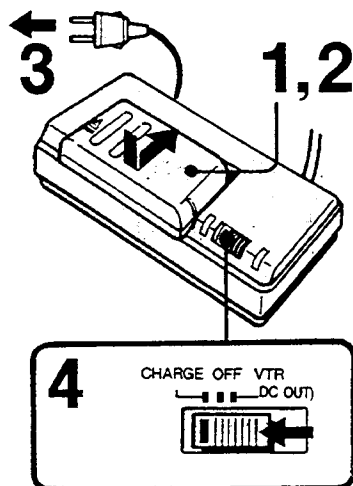
First Choose the Power Source

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-66H (supplied), NP-77H NP-77, or NP-55
	Alkaline batteries	Battery case EBP-55
Indoors	House current	AC power adaptor AC-V35/V35A (supplied), AC-V30, or AC-V55
In the car	12 V or 24 V car battery	DC pack DCP-77, or AC power adaptor AC-V55 and car battery cord DCC-16AW

Note on power sources

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

(E-1)



Using the Battery Pack

Step 1

Charge the battery pack. (E-1)

- 1 Align the groove on the battery pack with those on the AC power adaptor.
- 2 Slide in the battery pack to the right as illustrated.
- 3 Connect the AC power adaptor to a wall outlet.
- 4 Set the CHARGE/VTR selector to CHARGE.

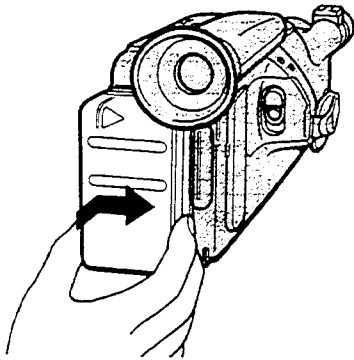
	NP-66H (supplied)	NP-55	NP-77	NP-77H
Required charging time	100	60	120	140

(approx. minutes using AC-V35/V35A)

Refer to the operating instructions of the AC power adaptor for details.

Connecting the Power Sources

(E-2)



Step 2

Mount the battery pack on the camcorder. (E-2)

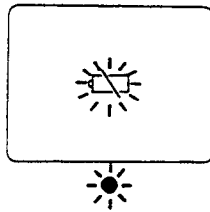
1 Align the right side of the battery pack with the line on the camcorder.

2 Slide in the battery pack to the right as illustrated.

Notes

- Make sure that the battery fits completely on the mounting surface of the camcorder. Imperfect mounting may damage the projections of the camcorder.
- If your nose touches the battery pack, adjust the position of the viewfinder by sliding it while pressing PUSH SLIDE.

(E-3)



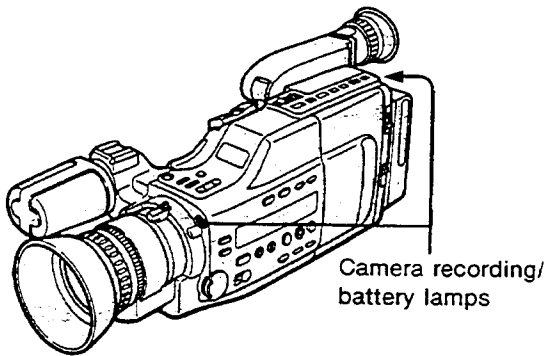
Battery life


A fully charged battery pack lasts for:

	NP-66H (supplied)	NP-55	NP-77	NP-77H
Battery life	75	40	80	100

(approx. minutes, continuous recording when used indoors)

(E-4)

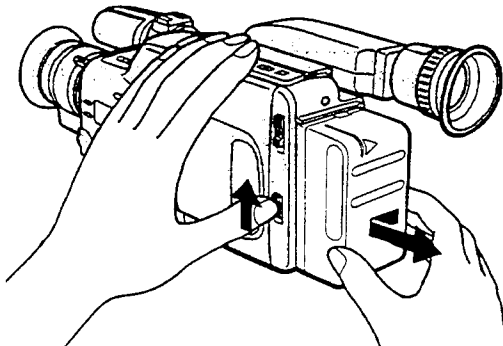


When the battery becomes weak, the  indication and the red lamp in the viewfinder (E-3) and the camera recording/battery lamps (E-4) flash. Replace the battery pack with a fully charged one.

To remove the battery pack (E-5)

Hold the BATT knob up, and slide the battery pack to the left.

(E-5)



Other options

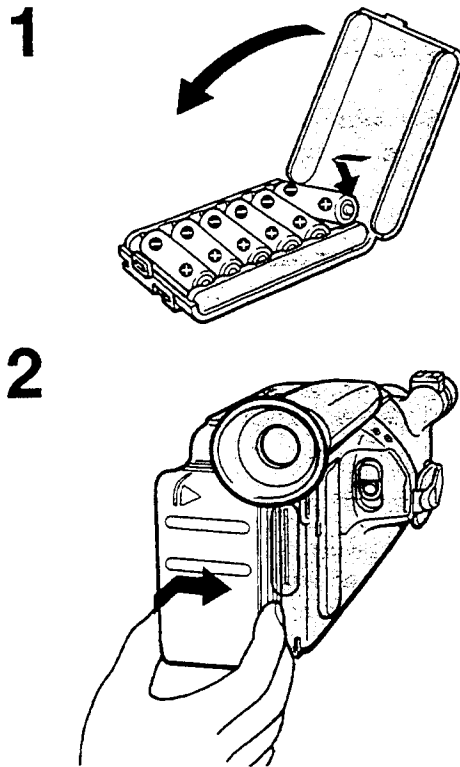
- AC-V55 AC power adaptor:
You can charge two battery packs.
- BC-55, BC-77 portable battery charger:
You can charge a battery pack on 100–240 V AC.
- DC-V30 car battery pack:
You can charge a battery pack by connecting the car battery charger to the cigarette lighter socket.

If you have an NP-4000

You can use it for long outdoor recording.

Connecting the Power Sources

(E-6)



Using Alkaline Batteries

(E-6)

The EBP-55 battery case (not supplied) is required.

Manganic batteries cannot be used with the battery case.

- 1 Insert size AA (R6) alkaline batteries into the battery case.
- 2 Attach the battery case in the same way as the battery pack.

Battery life when using alkaline batteries

Approximately 40 minutes under continuous recording indoors.

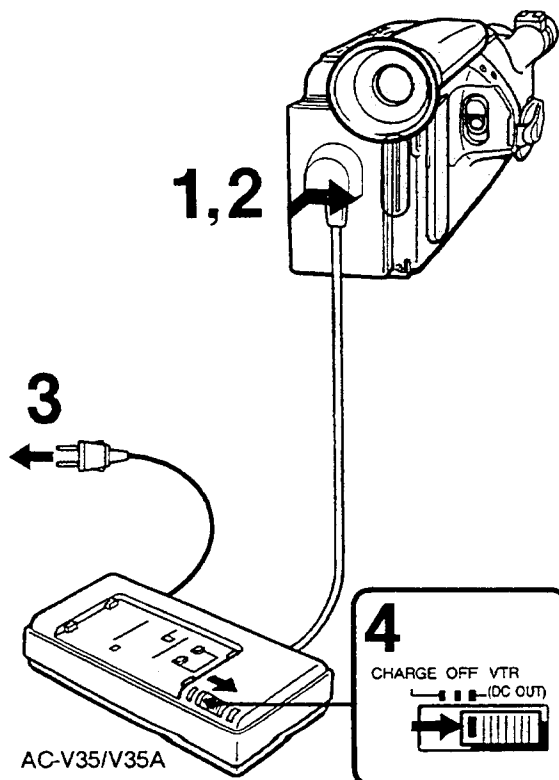
To remove the battery case

Proceed in the same manner as the battery pack.

Notes on battery life while using the battery case

- Batteries do not last long in cold places.
- No indication appears in the viewfinder to warn of a weak battery.

(E-7)



Using the House Current

(E-7)

The supplied AC-V35/V35A AC power adaptor is required.

- 1 Align the right side of the connecting plate with the line on the camcorder.
- 2 Slide in the connecting plate to the right.
- 3 Connect the AC power adaptor to a wall outlet.
- 4 Set the CHARGE/VTR selector on the AC power adaptor to VTR.

See the operating instruction of the AC power adaptor for further information.

To remove the connecting plate

Proceed in the same manner as the battery pack.

Other power sources

The AC-V30 or AC-V55 AC power adaptor can also be used.

Connecting the Power Sources

Using the Car Battery

(E-8)

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

- 1 Align the right side of the DC pack with the line on the camcorder and slide it to the right.
- 2 Connect the car battery cord to the cigarette lighter socket of a car (12 V or 24 V).

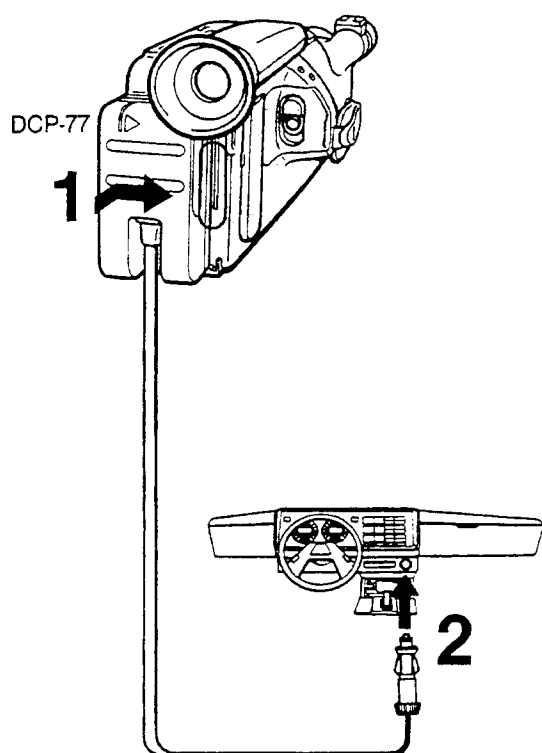
To remove the DC pack

Proceed in the same manner as the battery pack.

Other options

The AC-V55 AC power adaptor and the DCC-16AW car battery cord can also be used to operate this camcorder on a 12 V or 24 V car battery.

(E-8)

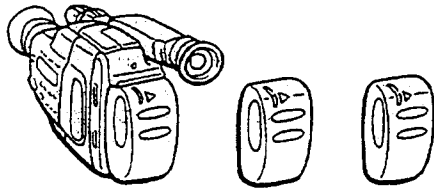


Using the Best of the Battery Pack

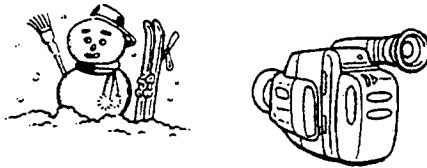
How to prepare the rechargeable battery packs

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

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

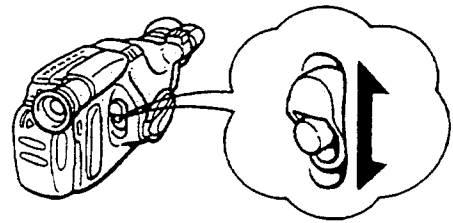


Battery life is shorter in a cold climate. Battery efficiency is decreased and the battery will be used up more quickly.




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

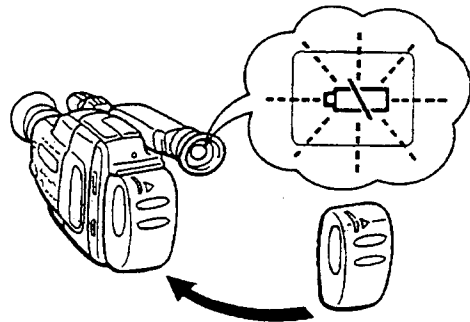
A smooth recording can be made even if recording is stopped and started again. While positioning the subject, selecting an angle, or looking through the viewfinder, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.



When the rechargeable battery pack should be replaced

When the  mark in the viewfinder changes from slow flashing to rapid flashing while you are recording.



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

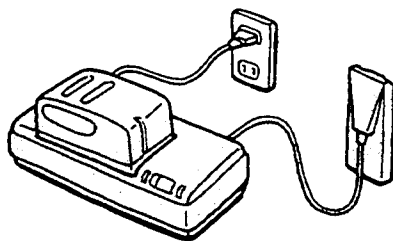


Notes on charging

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

Recharge the battery pack when it is exhausted.

- If recording is completed before the  mark appears in the viewfinder, it is recommended that you remove the tape, set POWER to CAMERA, slide up STANDBY, and leave the camcorder until the  mark and the red lamp in the viewfinder flash rapidly.
- **Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you fully discharge and fully charge the battery again.**



Recharge the battery pack before using.

If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged. Charge it again but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Keep the terminals clean

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

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

Notes on the rechargeable battery pack

Why the battery pack heats up

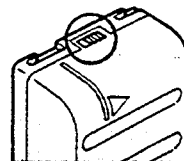
During charging or recording, the battery pack heats up. This means energy has been generated and a chemical change has occurred inside the battery pack, but this is not dangerous.

How to care for the battery pack


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

How to use the switch on the battery pack

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



How many times can the battery pack be recharged

It can be fully charged and discharged about 500 times under normal temperatures. If the  mark 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.

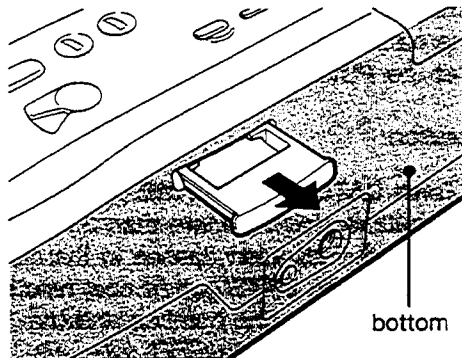
Temperature during charging

Lower temperature require a longer charging time. Charging under temperatures ranging from 10°C to 30°C (50°F to 86°F) is recommended.

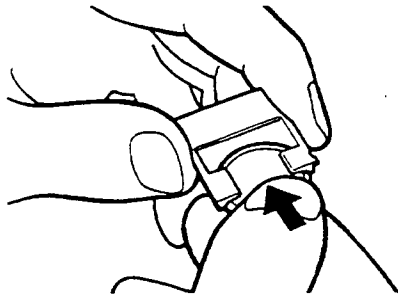
Setting the Date and Time

(F-1)

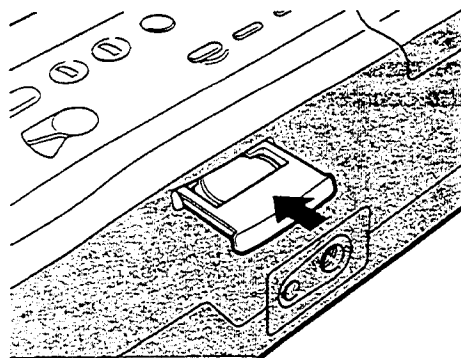
1



2



3



Inserting the Lithium Battery

(F-1)

This camcorder uses a lithium battery to activate the clock and to keep the titles in the memory.

Install the supplied lithium battery before operating it for the first time.

1 Pull out the lithium battery holder from the bottom of the camcorder.

2 Install the supplied CR2025 lithium battery with the + side downwards.

3 Install the lithium battery holder to the bottom of the camcorder.

To remove the lithium battery

Pull out the lithium battery holder from the bottom of the camcorder and pull out the lithium battery.

Note on lithium battery life

The battery lasts for approximately 1 year under normal operation. When the lithium battery becomes weak, the time indication keeps flashing in the display window and flashes in the viewfinder for about 5 seconds when the POWER switch is set to CAMERA. In this case, keeping the battery pack or another power source connected, replace the lithium battery with a Sony CR2025 or a Duracell DL-2025. Use of other batteries may present a risk of fire or explosion. If the battery pack or other power sources were not connected during lithium battery exchange, readjust the date and time after installing a new battery.

Cautions

- Keep the lithium battery out of the reach of children.
Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.

WARNING

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

(F-2)

- Check that a power source is installed to the camcorder.
- Set the **POWER** switch to **CAMERA** or **OFF**.

- 1 Press DATE (+) and TIME (NEXT) simultaneously for more than 3 seconds.** The date indication flashes in the display window. The DATE button now functions as + (advance the number) and the TIME button functions as NEXT (execute). If you went passed the desired number, keep pressing the + button. The number eventually returns to the original one.

3 Press **NEXT** to set the seconds to "00".
The clock starts operating.

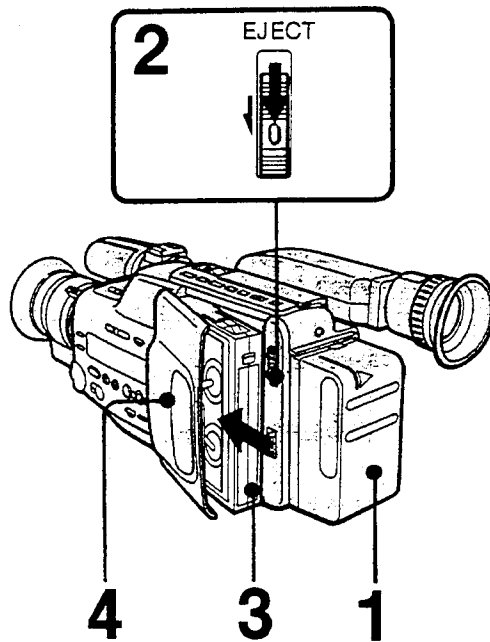
To advance the digits faster
Keep pressing +.

To check the preset date and time
Press DATE or TIME. When you press the same button again, the indication is changed to the counter indication.



Inserting Tapes

(G-1)



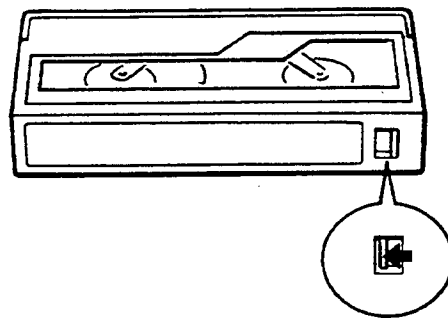
(G-1)

- 1 Check that a power source is installed.
- 2 Press and slide the EJECT button.
The cassette holder automatically opens.
Do not open it forcibly while it is moving.
- 3 Insert a cassette with the window facing outside.
- 4 Press the PUSH mark to close the cassette holder.

Ejecting the Tape

- 1 Check that a power source is installed.
- 2 Press and slide the EJECT button.
The cassette holder automatically opens.
- 3 Take out the tape.
- 4 Press the PUSH mark to close the cassette holder.

(G-2)



Preventing Accidental Erasure

(G-2)

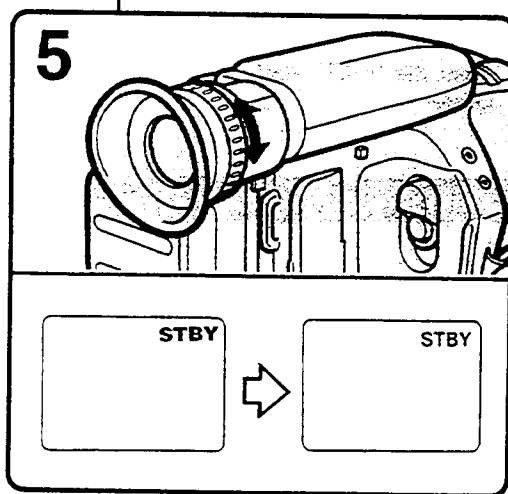
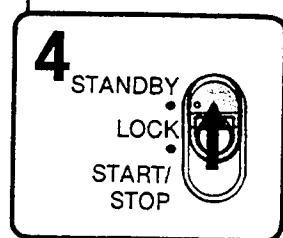
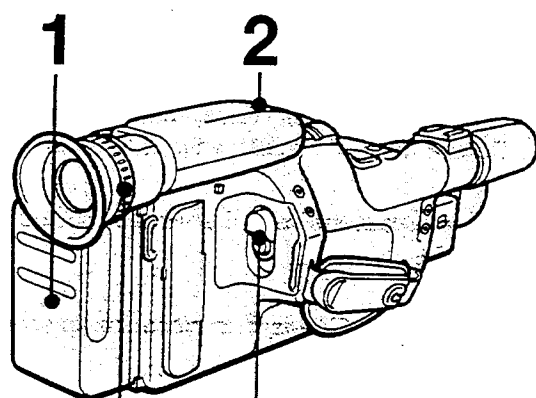
Slide the tab in exposing the red mark on the cassette. This will prevent recording. To re-record on this tape, slide the tab back out covering the red mark.

Notes on cassette handling

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

Adjusting the Viewfinder Lens

(H)



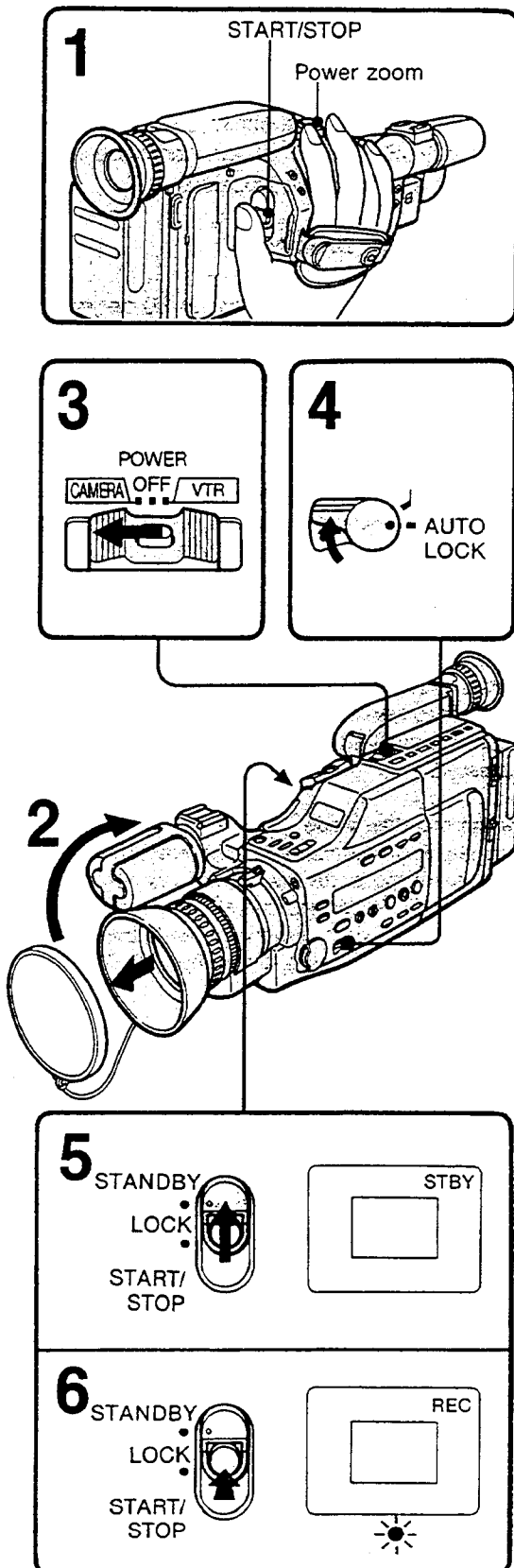
(H)

The position of the viewfinder lens for optimum vision varies depending upon the person. Adjust it when using the camcorder for the first time, or when using it after someone else.

- 1 Check that a power source is installed.
- 2 Hold down the green button and slide the POWER switch to CAMERA.
- 3 Insert a cassette.
- 4 Slide the STANDBY switch up.
- 5 Turn the viewfinder lens adjustment ring so that the "STBY" indication in the viewfinder comes into focus.

Recording a Picture with the Automatic Adjustments

(I-1)



(I-1)

Before recording "once-only" events, we strongly recommend making a trial recording and checking that everything is working perfectly.

- 1 Hold the camcorder as illustrated.**
Put your hand through the grip strap and check that your thumb easily touches the START/STOP button.
- 2 Remove the lens cap and attach it to the grip strap.**
- 3 Hold down the green button and slide the POWER switch to CAMERA.**
- 4 Set the AUTO LOCK switch to AUTO LOCK and turn the zoom lever downwards.**
- 5 Slide the STANDBY switch up.**
"STBY" and the auto-focus frame appear in the viewfinder. The camcorder is now set to the recording standby mode. The automatic focusing functions within the objects inside the auto-focus frame. Do not turn or stop the focus ring forcibly.
- 6 Press the START/STOP button.**
"REC" appears and the red lamp lights in the viewfinder. The camcorder is recording.

To stop recording momentarily

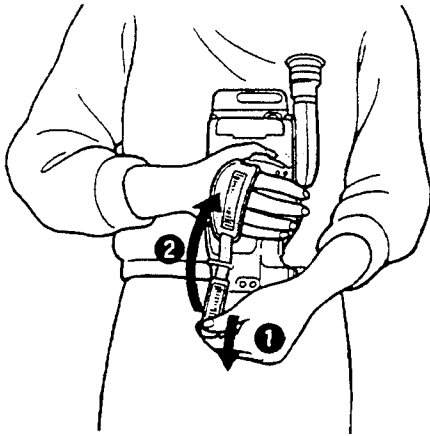
Press the START/STOP button again. The camcorder enters the standby mode with "STBY" indication in the viewfinder.

To stop recording

Slide the STANDBY switch down and set the POWER switch OFF.

Recording a Picture with the Automatic Adjustments

(I-2)



How to fix the grip strap

(I-2)

In step 1 on the previous page, hold the camcorder pressed to your body and pull the grip strap upwards.

When the viewfinder touches your nose

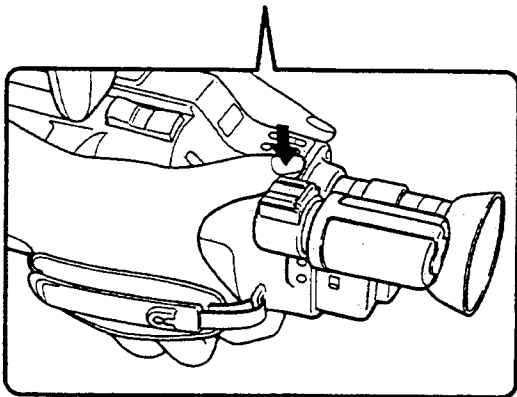
Press the PUSH SLIDE button and slide the viewfinder to the desired position.

For low-position shooting

(I-3)

The viewfinder can be turned up 90 degrees. Press the REC START/STOP button in the front of the camcorder instead of the START/STOP button to start and stop the camera recording.

(I-3)



Notes on recording

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

Note on standby mode

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

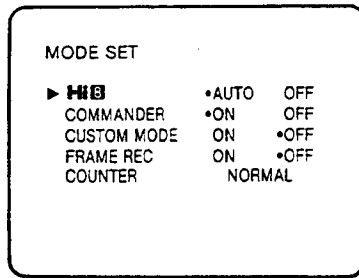
Note on the microphone

The microphone is fixed to the camcorder. Do not turn the microphone or hold the camcorder by the microphone. This may damage the camcorder.

Notes on light sources

- A vertical band may appear when a subject such as a candle flame or a light is shot against a dark background.
- If you shoot an object under bright lighting conditions just after shooting in a dark place, the picture may not appear in the viewfinder. In this case, point the camcorder to another direction.

(I-4)



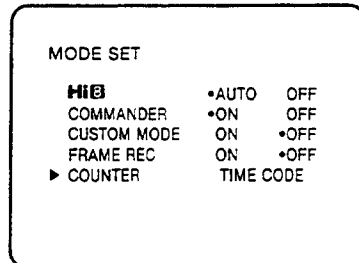
How to record in the Hi8 mode

(I-4)

The camcorder is set to record in the AUTO mode which automatically records in the Hi8 mode when a Hi8 tape is used. To record in the standard mode with the Hi8 tape change the setting in the menu.

See "Using the Menu during Camera Recording" on page 41. On the playback compatibility of Hi8 tape and standard tape refer to page 7.

(I-5)



How to display the RC time code during recording

(I-5)

During camera recording, the RC time code and data code (recording date and time) are automatically recorded on the tape. If you want to display the RC time code in the viewfinder and display window during recording, change the setting of the COUNTER mode to TIME CODE. See "Using the Menu during Camera Recording" on page 41.

To record the RC time code on a prerecorded tape, see page 64.

Note

The data code cannot be displayed during recording.

Recording mode

This unit records in the SP mode (approximately 1.43 cm/second) and can play back in the SP mode and the LP mode (approximately 0.72 cm/second).

The quality of the playback picture in the LP mode, however, will not be as good as that in the SP mode.

Notes on PCM recording and playback

PCM recording or playback is not possible with this unit.

The PCM sound recorded or after-recorded with another video recorder cannot be played back with this unit.

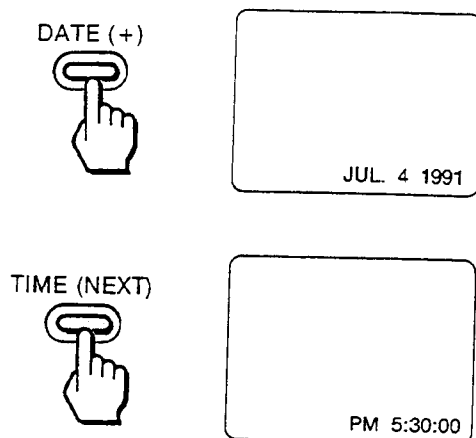
Recording a Picture with the Automatic Adjustments

Brightness Levels

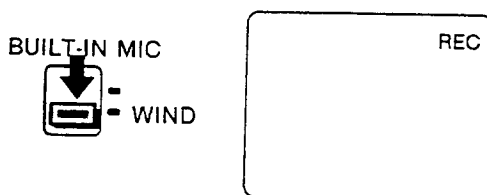
The single greatest influence on picture quality is the brightness level. Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording.

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

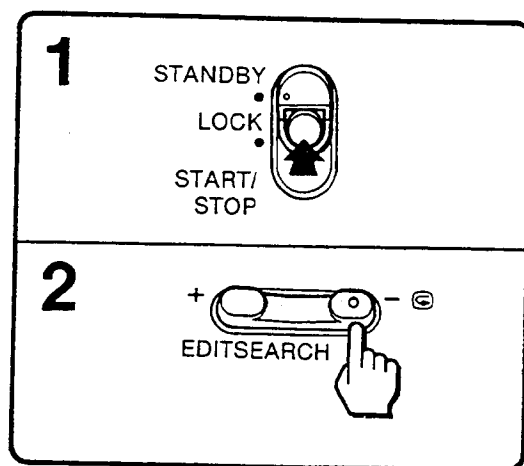
(I-6)



(I-7)



(I-8)



Recording a Picture with the Automatic Adjustments

To Record Date and Time

(I-6)

- 1 Set the camcorder in the camera recording standby or camera recording mode.
- 2 Press the **DATE** button to indicate the date and **TIME** button to indicate the time. The date or time displayed in the viewfinder will be recorded together with the picture.

To stop recording date or time

Press the **DATE** or **TIME** button. The indication is cleared and the recording continues.

When there is Strong Wind

(I-7)


Set the **BUILT-IN MIC** selector to **WIND**.

The noise resulting from the wind will be reduced.

After recording, set it to the upper (green) position.

To Check the Last Portion of the Recording

(I-8)

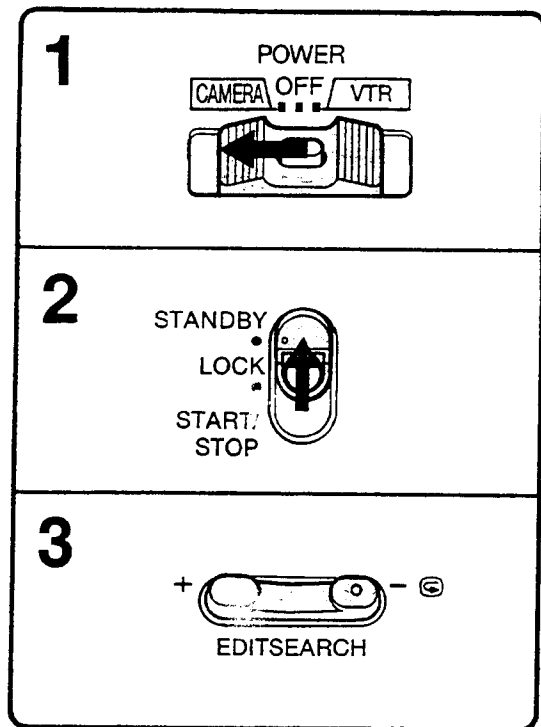
- 1 Set the camcorder in the recording pause mode by pressing the **START/STOP** button.
- 2 Press the  side of the **EDITSEARCH** button.

The last few seconds of the recorded portion is rewound and then is played back in the viewfinder. After a few seconds of playback, the camcorder returns to the recording pause mode.

If the picture was not recorded

the video heads may be contaminated. Clean the heads using the Sony V8-25CLH video head cleaning cassette or the equivalent.

(I-11)



Recording a Picture with the Automatic Adjustments

Playing Back the Picture Instantly

(I-11)

You can check the recorded picture in the viewfinder. The sound is not heard.

- 1 Hold down the green button and slide the POWER switch to CAMERA.
- 2 Slide the STANDBY switch up.
- 3 Keep pressing the + or - side of the EDITSEARCH button to playback the picture.
 - + side: To view the playback picture.
 - side: To view the playback picture in reverse.

To stop playback

Release the EDITSEARCH button.

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

- 1 Connect the headphones to the jack.
- 2 Hold down the green button and slide the POWER switch to VTR.
- 3 Press to rewind the tape and press where you want start playing back.
- 4 Press to start playback.

Marking Index Signals

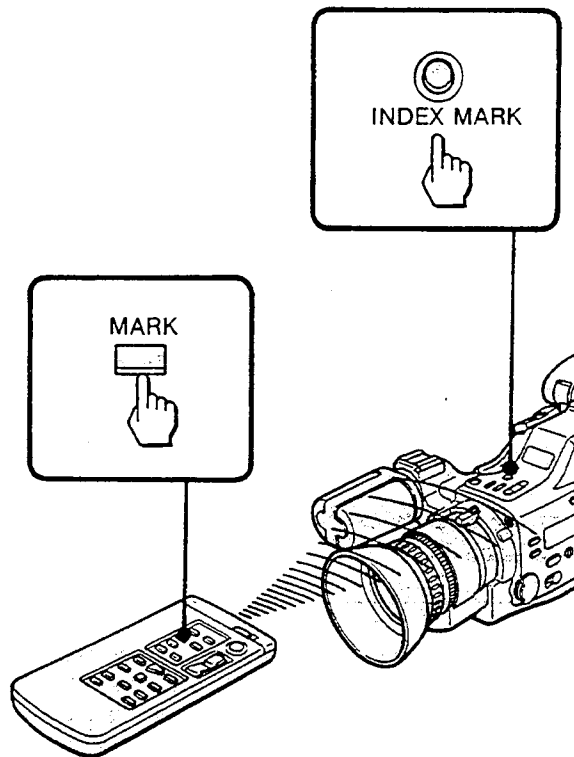
The beginning of the desired program can be located easily by marking an index signal and searching for it later.

To Mark an Index Signal during Camera Recording

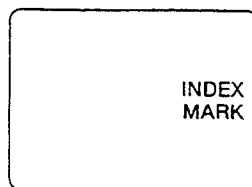
(J-1)

Press the **INDEX MARK** button on the camcorder or the Commander at the point you wish to locate later.

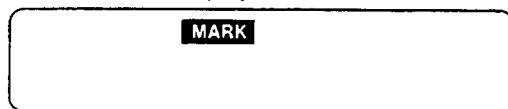
The **INDEX MARK** indication appears in the viewfinder and **MARK** appears in the display window to indicate that the index signal is being marked.



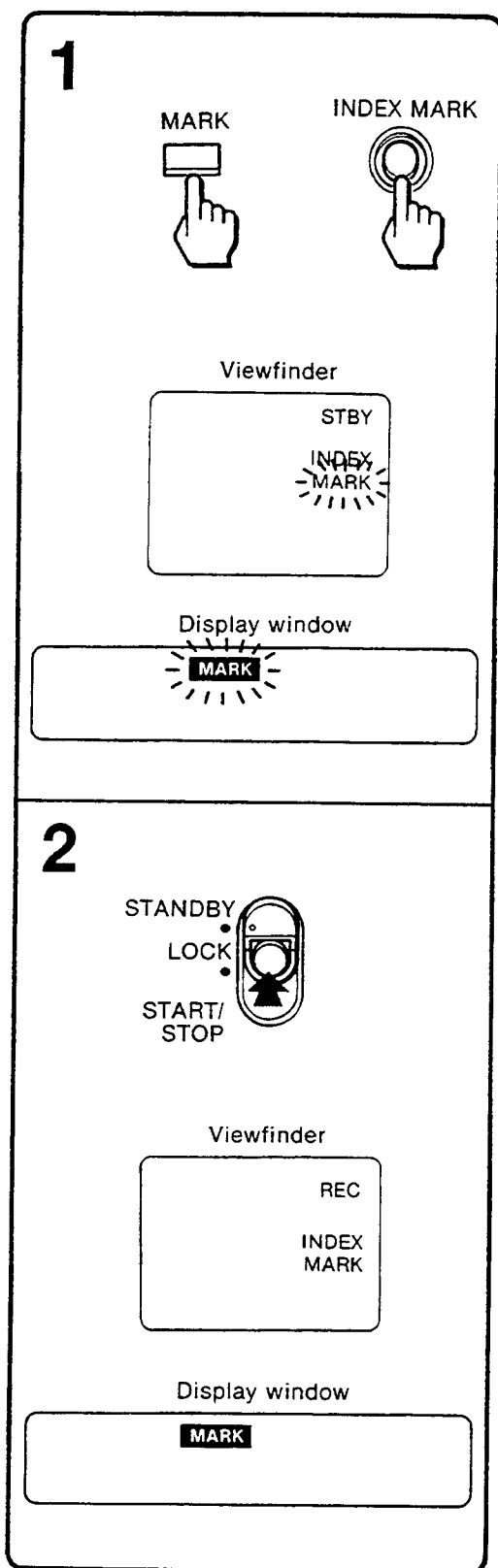
Viewfinder



Display window



(J-2)



Marking Index Signals

To Mark an Index Signal at the Beginning of Camera Recording

(J-2)

- 1 Press the **INDEX MARK** button on the camcorder or the Commander after setting the camcorder in the camera recording standby mode.

The **INDEX MARK** indication appears in the viewfinder with **MARK** flashing and **MARK** flashes in the display window.

- 2 Press the **START/STOP** button to release the camera recording standby mode.

The **MARK** indication stops flashing to indicate that the index signal is being marked.

For other operations using the index signal
See page 54.

Notes

- The index signals can be marked at any desired point. But make sure there is more than 2 minutes of space between two index signals. If there are two or more index signals marked within an interval of 2 minutes on a normal tape run, these signals cannot be searched correctly.
- The **INDEX MARK** indication disappears automatically.
Continue to record until the **INDEX MARK** indication disappears so that the recorded index signal can be searched correctly in the playback mode.

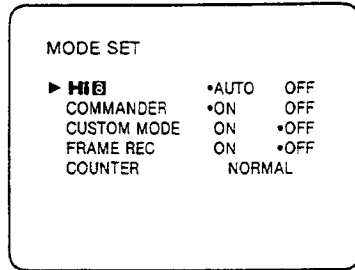
When the POWER switch is set to VTR, the index signal is automatically marked at the beginning of recording.

If the **REC** switch is pressed to start recording in the stop mode, an index signal will be automatically marked at the beginning of the tape.

Using the Menu during Camera Recording

MODE SET menu and CUSTOM PRESET menu can be used during camera recording. In the MODE SET menu, various settings to further enjoy the features of the camcorder can be selected. In the CUSTOM PRESET menu, the camcorder can be set to record in the desired picture tone.

(K-1)




MODE SET Menu

(K-1)

Hi8 AUTO/OFF

- Select AUTO to set the recording mode (Hi8 or normal) automatically depending upon the tape being used.
- Select OFF if you wish to record in the normal mode regardless of the type of tape being used.

COMMANDER ON/OFF

- Select ON when using the supplied Commander for camera recording.
- Select OFF when the supplied Commander will not be used for camera recording or when you connect the receiver of the remote control kit (not supplied) to the REMOTE  control connector.

CUSTOM MODE ON/OFF

- Select ON to perform camera recording based on the setting made in the CUSTOM PRESET menu. See page 115.
- Select OFF to perform camera recording without the setting made in the CUSTOM PRESET menu.

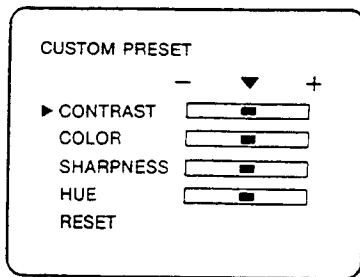
FRAME REC ON/OFF

- Select ON to perform frame recording. See page 77.
- Select OFF when frame recording will not be performed.

COUNTER NORMAL/TIME CODE

- Normally set to NORMAL to display the linear time counter in the viewfinder and display window.
- Select TIME CODE to display the RC time code in the viewfinder and display window, and output from the REMOTE connector.

(K-2)

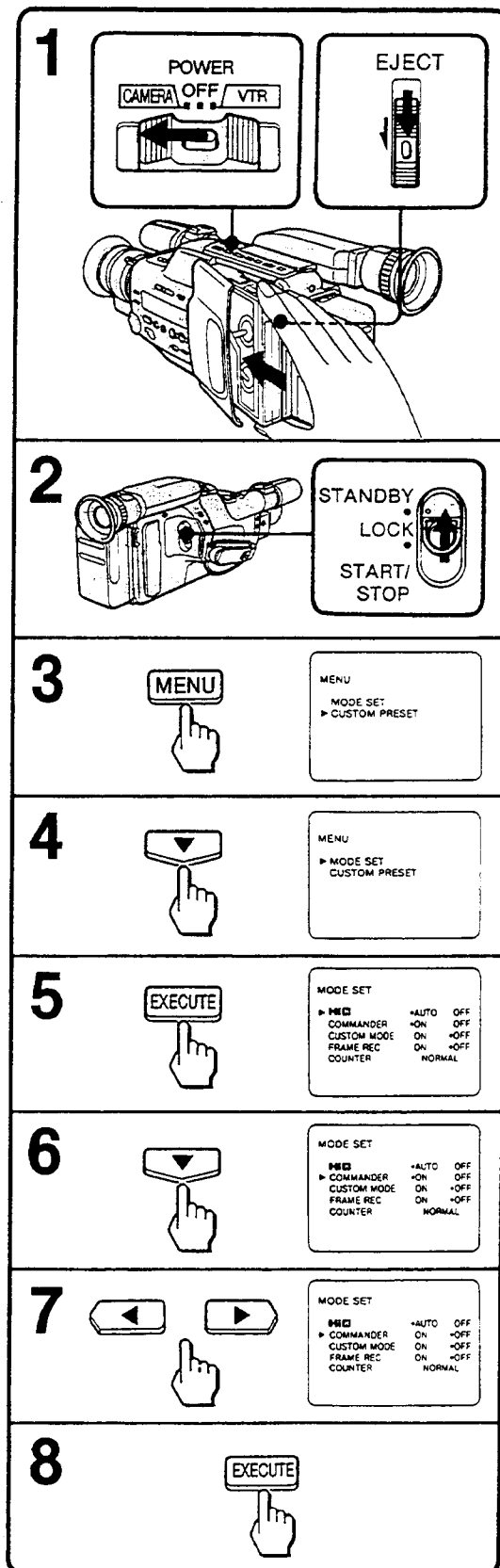


CUSTOM PRESET Menu

(K-2)

The camera can be preset to record in the desired picture using the CUSTOM PRESET menu. The items that can be preset are CONTRAST, COLOR, SHARPNESS, and HUE. See "Custom Preset Function" on page 115 for details.

(K-3)



How to Call Up the Menu Display

(K-3)

Press the DATA SCREEN button to display the menu on the TV screen.

Example: To select COMMANDER OFF.

- 1** Set the POWER switch to CAMERA and insert a cassette.
- 2** Slide the STANDBY switch up.
- 3** Press the MENU button.
The MENU display appears.
- 4** Press ▼ and move cursor to the desired item.
- 5** Press the EXECUTE button.
The selected menu appears.
- 6** Press ▼ and move cursor to the desired item.
- 7** Press ◀ or ▶ to select the desired setting.
- 8** Press the EXECUTE button.
The setting is stored in the camcorder and the menu display is cleared.

The setting is stored in the memory for about 5 minutes even if the POWER switch is set to OFF or the power source is removed, as long as the lithium battery is installed.

To display another menu

Start from step 1 in "How to Call Up the Menu Display."

To return to the original screen

Press the MENU button.

To make multiple settings within one menu

After step 7 in "How to Call Up the Menu Display", press ▼ and move cursor to the desired item.

Connections for Playback

To view the playback picture on the TV screen, the camcorder and TV and/or the VCR must be connected properly. Check the following connecting examples and go to the appropriate section to make the connections required.

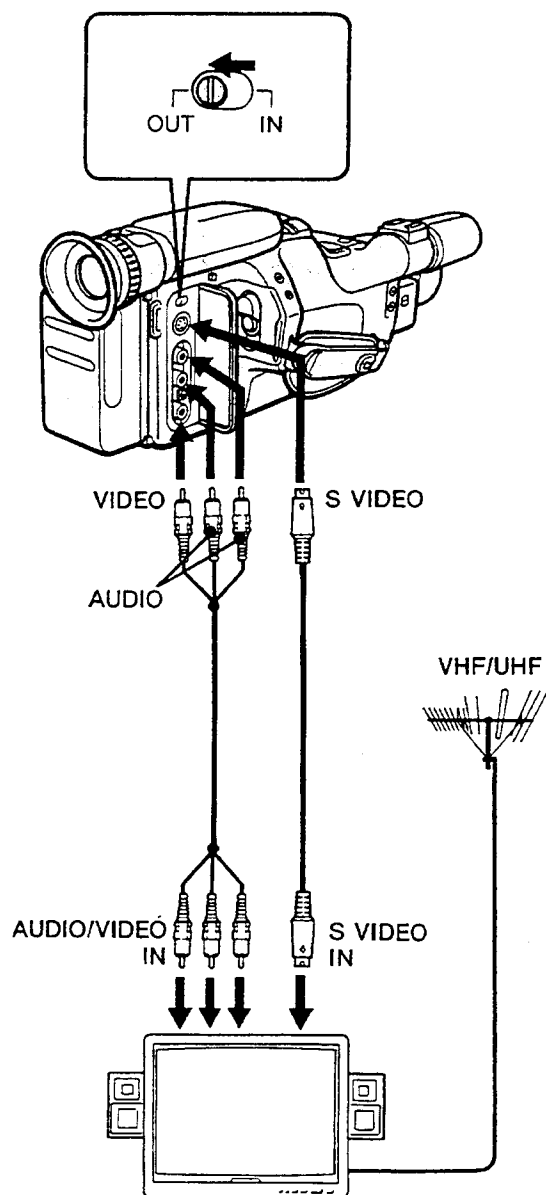
Case 1: Connecting the camcorder to a TV with video/audio input jacks.

Case 2: Connecting the camcorder to a TV without video/audio input jacks.

Case 3: Connecting the camcorder to a TV via a VCR that has an input selector.

Case 4: Connecting the camcorder to a TV via a VCR that does not have an input selector.

(L-1)



Case 1: Connection to a TV with Video/Audio Input Jacks

(L-1)

1 Connect the camcorder and the TV using the supplied AV connecting cable.

- If your TV has an S video input jack, connect the S VIDEO jack on the camcorder and the S video input jack on the TV using the supplied S VIDEO connecting cable.
- If your TV is a monaural type, connect only the white plug for audio on the TV, and select "HIFI SOUND 1" in the menu. See "Selecting the Monitor Sound" on page 51.

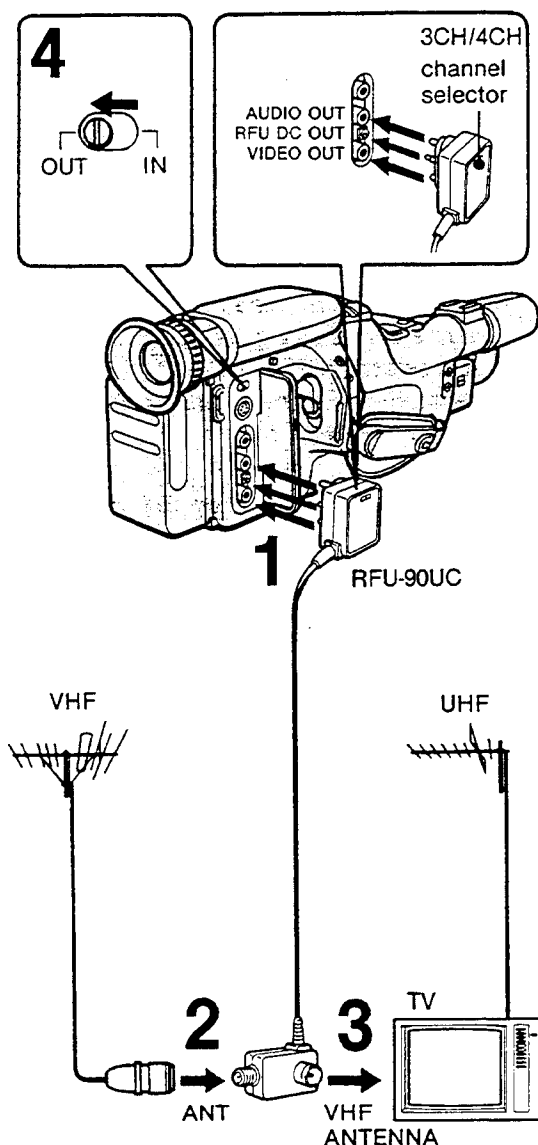
2 Set the IN/OUT selector on the camcorder to OUT.

3 Set the TV/VIDEO selector on the TV to VIDEO.

Note

For details on the TV, refer to the operating instructions of the TV.

(L-2)



Connections for Playback

Case 2: Connection to a TV without Video/Audio Input Jacks

(L-2)

Step 1

Connecting the camcorder, the RFU adaptor (RFU-90UC, supplied), and the TV.

- 1 Connect the RFU adaptor to the camcorder.
- 2 Connect the VHF antenna and the RFU adaptor.
- 3 Connect the RFU adaptor to the TV.
- 4 Set the IN/OUT selector on the camcorder to OUT.

Step 2

Selection of the TV channel to monitor the camcorder playback.

- 1 Set the RF unit selector on the RFU adaptor to either channel 3 or 4, whichever is not active in your area.
- 2 Select the same channel on the TV.

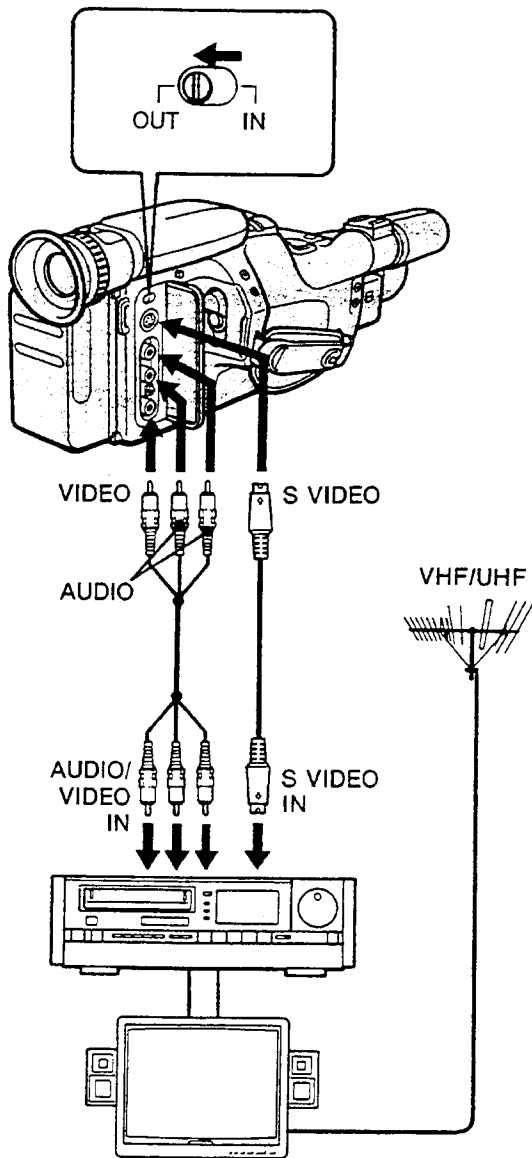
Step 3

Whenever playing back a tape, be sure to set the TV to the channel that you have selected in step 2.

Notes

- In this connection, the sound will be in monaural.
- When you watch a TV program, turn off the camcorder or disconnect the RFU adaptor from the camcorder.

(L-3)



Case 3: Connection to a TV via a VCR with an Input Selector

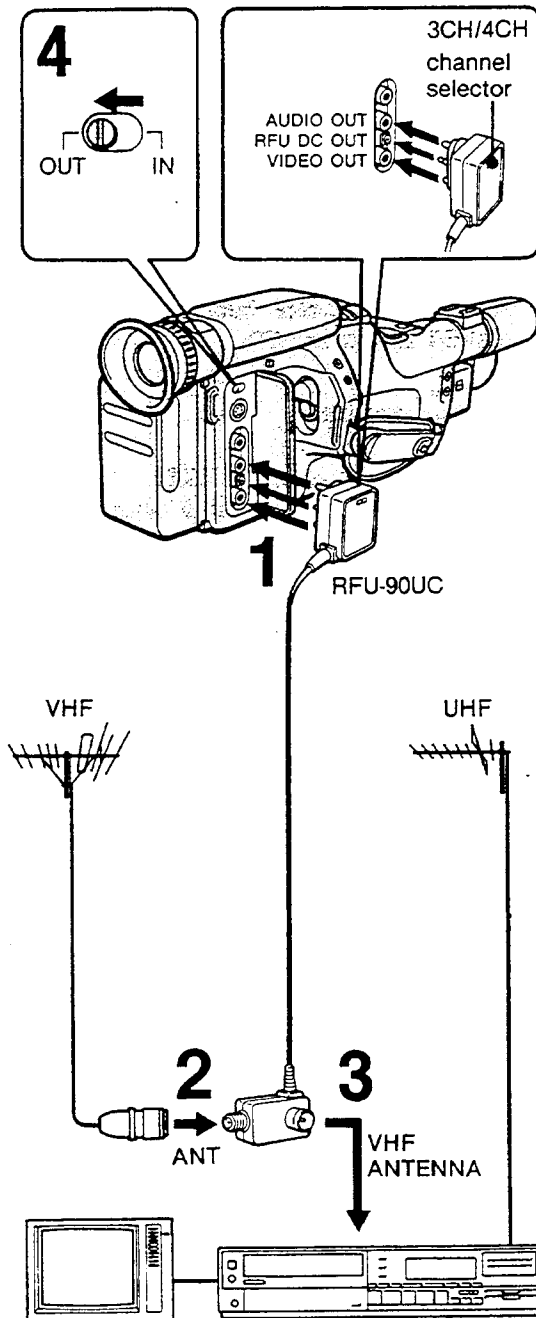
(L-3)

- 1 **Connect the camcorder to the VCR using the supplied AV connecting cable.**
 - If your VCR has an S video input jack, connect the S VIDEO jack on the camcorder and the S video input jack on the VCR using the supplied S VIDEO connecting cable.
 - If your TV is a monaural type, connect only the white plug for audio on the TV, and select "HIFI SOUND ☐ 1" in the menu. See "Selecting the Monitor Sound" on page 51.
- 2 **Set the IN/OUT selector on the camcorder to OUT.**
- 3 **Set the input selector on the VCR to LINE and set the TV/VIDEO selector on the TV to VIDEO.**

Connections for Playback

Case 4: Connection to a TV via a VCR without an Input Selector

(L-4)



(L-4)

Step 1

Connecting the camcorder, the RFU adaptor (RFU-90UC, supplied), and the VCR.

- 1 Connect the RFU adaptor to the camcorder.
- 2 Connect the VHF antenna and the RFU adaptor.
- 3 Connect the RFU adaptor to the VCR.
- 4 Set the IN/OUT selector on the camcorder to OUT.

Step 2

Selection of the channel to monitor the camcorder playback.

- 1 Set the RF unit selector on the RFU adaptor to either channel 3 or 4, whichever is not active in your area.
- 2 Select the same channel on the VCR.

Step 3

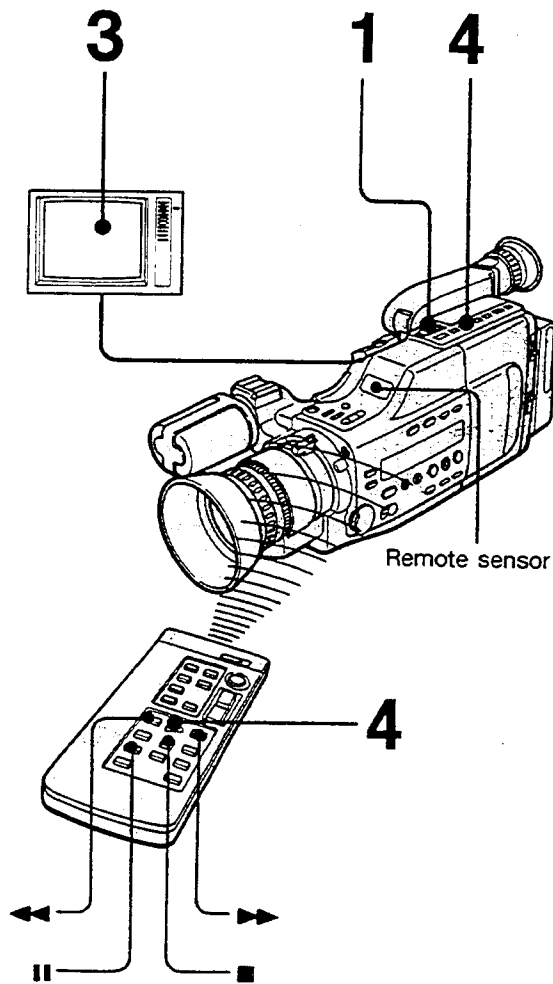
Whenever playing back a tape, be sure to set the VCR to the same channel that you have selected in step 2.

Notes

- In this connection, the sound will be in monaural.
- When you watch a TV program, turn off the camcorder or disconnect the RFU adaptor from the camcorder.

Playing Back a Tape

(M-1)



Use the buttons on the camcorder as well as the buttons on the Commander. The Commander is useful when operating the camcorder from a distance. Be sure to select COMMANDER ON in the menu before operation. (See page 59.)

- When you use the AC power adaptor, set the CHARGE/VTR selector to VTR.

(M-1)

- 1 Hold down the green button and slide the POWER switch to VTR.
- 2 Insert a cassette.
- 3 Turn on the TV (and the VCR).
 - For a TV with video/audio input jacks: Set the TV/VIDEO selector to VIDEO.
 - For a TV without video/audio input jacks: Select the channel for playing back the camcorder.
- 4 Press \triangleright . Playback starts. The \triangleright on the camcorder can also be used.

To view a still picture

Press II during playback.

To resume playback

Press \triangleright or II again.

To stop playback

Press \blacksquare .

To rewind the tape

Press \ll .

To advance the tape rapidly

Press \gg .

After playback

Set the POWER switch on the camcorder and the CHARGE/VTR selector on the AC power adaptor to OFF.

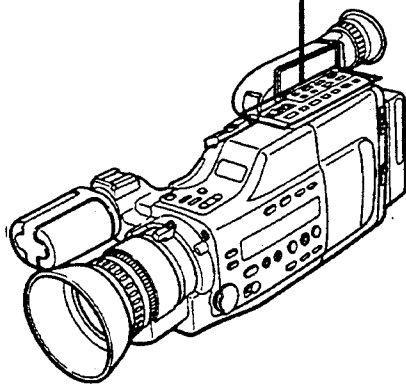
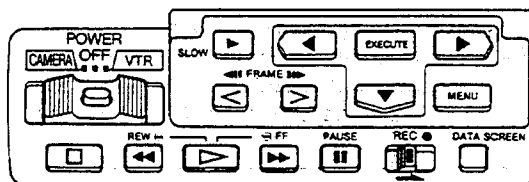
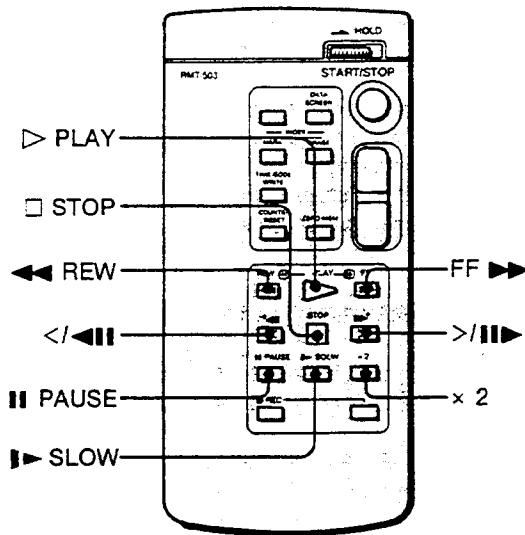
Notes

- When the still picture lasts for 5 minutes or more, the camcorder automatically enters the stop mode.
- This camcorder plays back a tape recorded in the SP and LP modes. The playback mode is automatically switched depending upon the mode of the recorded tape inserted.

Playing Back a Tape

Various Playback Modes

(M-2)



(M-2)

To view a still picture — playback pause
Press **||** during playback.

||◀ or **▶||** appears in the viewfinder.

To resume normal playback, press **▷** or **||**.

To change the playback direction

Press **</||** for the reverse or **>/||** for the forward direction during playback.

-x1 or **x1** appears in the viewfinder.

To resume normal playback, press **▷**.

To view the picture at 1/5 speed — slow playback

Set the playback direction with **</||** or **>/||**, and then press **||** during playback.

◀|| or **||▶** appears in the viewfinder.

When slow playback lasts for 1 minute or more, forward or reverse playback at normal speed starts automatically, according to the tape direction.

To resume normal playback, press **▷**.

To view the picture at double speed (Commander only)

Set the playback direction with **</||** or **>/||**, and then press **x2** on the Commander.

-x2 or **x2** appears in the viewfinder.

To resume normal playback, press **▷**.

To view the picture frame-by-frame

Press **</||** or **>/||** in the still picture mode. Each press of the button moves the picture one frame. **◀||** or **||▶** appears in the viewfinder. If you keep pressing **</||** or **>/||**, playback at 1/30 speed starts.

To resume normal playback, press **▷**.

To locate the desired scene — Picture search

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

To resume normal playback, release the button.

To locate the desired scene quickly — Skip scan

Press **◀◀** while rewinding or **▶▶** while advancing the tape rapidly. **◀◀** or **▶▶** appears in the viewfinder.

To resume normal playback, press **▷**.

Playing Back a Tape

Notes during the above playback

- Sound can be heard in the double speed forward playback, but is little noisy.
- Noise may appear in the still picture.
- Streaks may appear when pressing the ◀◀ or ▶▶ button.
- Streaks may appear when playing back a tape recorded in the LP mode in the still, frame-by-frame, or slow mode.
- The color of the picture may change during still, frame-by-frame, slow or when using the ◀◀ or ▶▶ button.

If picture is noisy during frame-by-frame or slow playback

Adjust the picture referring to "PICTURE ADJUST menu" (page 60) while playing back the tape in slow speed.

The noise may not be completely eliminated if the tape was recorded on another VCR.

Notes on the RC time code or data code display

- "----" (bars) may be displayed instead of the RC time code or data code during various playback modes.
 - A horizontal noise band appears in the center of the screen during reverse playback.
 - The RC time code and data code cannot be displayed with a tape recorded in the LP mode. "----" (bars) appear for the RC time code or data code display.
-

Playing Back a Tape

Displaying the Information in the Viewfinder onto the TV Screen

(M-3)

Connect the camcorder and the TV properly and press the DATA SCREEN button. The indication in the viewfinder is superimposed on the TV screen. This function is convenient to monitor the indications in the viewfinder during menu operations or when the camcorder is remotely operated by the Commander.

To clear the indication

Press the DATA SCREEN button again.

Note

When using the camcorder as a playback VCR during editing, be sure to clear the indications from the TV screen. Otherwise, the indications will be recorded with the picture.

Selecting the Monitor Sound

(M-4)

The playback sound can be selected by the menu.

Refer to "Using the Menu during Playback or Editing" (page 59) for details.

When playing back an AFM Hi-Fi stereo sound recorded tape

Select STEREO.

When playing back a dual sound recorded tape

Select **1** or **2** to monitor the desired sound.

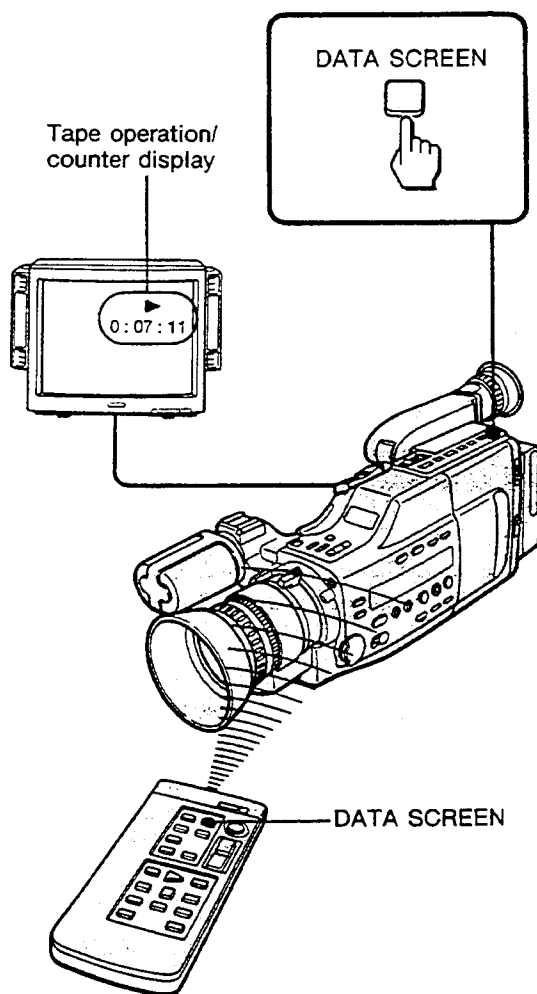
Note

Always return the setting to STEREO. Otherwise, the tape recorded in stereo will not be played back properly.

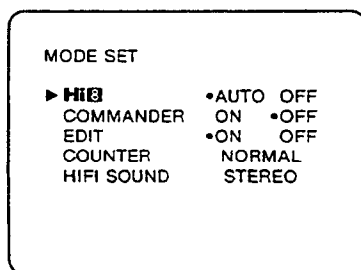
Note on PCM recording and playback

This camcorder cannot perform PCM recording or playback.

(M-3)



(M-4)



Using the Linear Time Counter

The linear time counter in the viewfinder and the display window indicates the elapsed time of the recording or playback.

To display the counter, set the COUNTER mode to NORMAL in the menu. (See page 59.)

To Index the Entire Tape

Press the COUNTER RESET button at the beginning of the tape so that the counter shows "0:00:00".

Write down the counter reading at a particular point so that you can easily find that point later by referring to the counter.

To Return to a Pre-registered Point

(N)

1 During playback, press the COUNTER RESET button at the point to be located later.

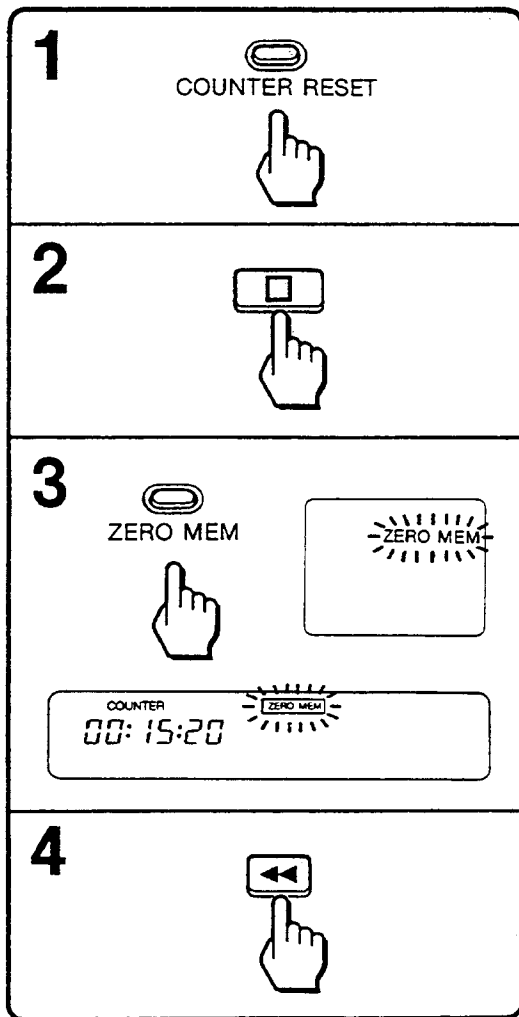
2 Press ■ when the playback is finished.

3 Press the ZERO MEM button.
The "ZERO MEM" indication flashes in the viewfinder and the display window.

4 Press ◀◀ or ▶▶.
The tape rewinds or advances and stops automatically when the counter reaches approximately "0:00:00".

To cancel the ZERO MEM function
Press the ZERO MEM button.

(N)



Notes on the linear time counter and the ZERO MEM button

- The counter reading and the actual point on the tape may not correspond exactly. Use the counter as a guide. There will be a lag of several seconds especially when fast-forward and rewind operation is repeated or when playing back a tape with both the SP mode and LP mode recording.
- Be sure to press the ZERO MEM button after the tape stops. It does not function during recording or playback.
- The ZERO MEM mode is automatically canceled after each operation.

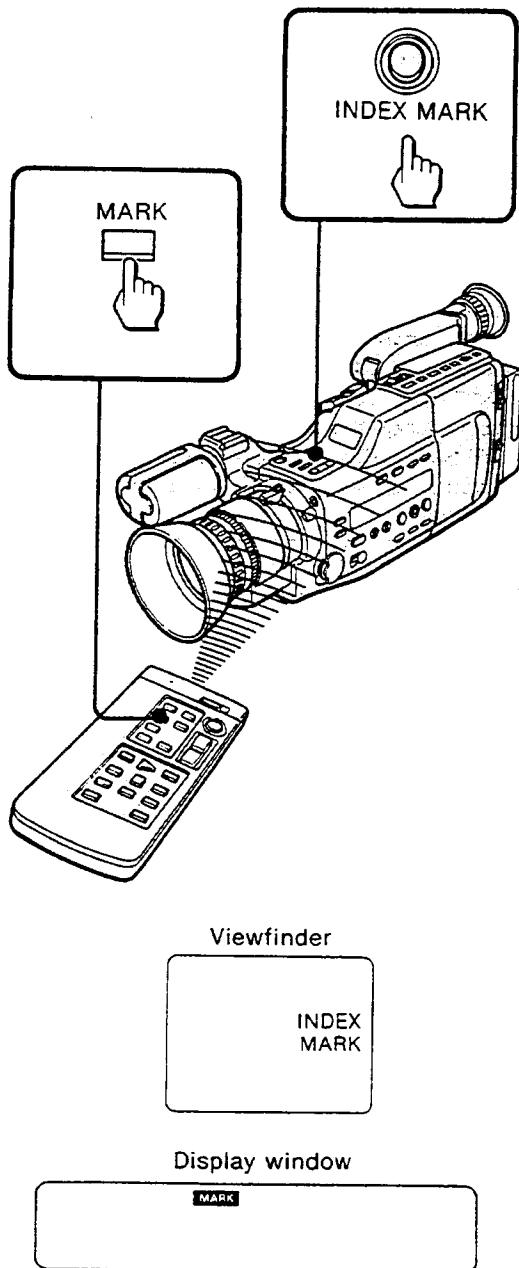
Notes on the RC time code and the ZERO MEM functions

- The COUNTER RESET and ZERO MEM buttons are not operative when the RC time code or data code is displayed. To use the ZERO MEM function, reset the COUNTER mode in the menu to NORMAL (See page 59).
 - If you change the COUNTER mode from NORMAL to TIME CODE when the ZERO MEM indication flashes, the ZERO MEM mode is canceled.
-

Marking Index Signals during Playback

The beginning of the desired program can be located easily by marking an index signal and searching for it later.

(O-1)



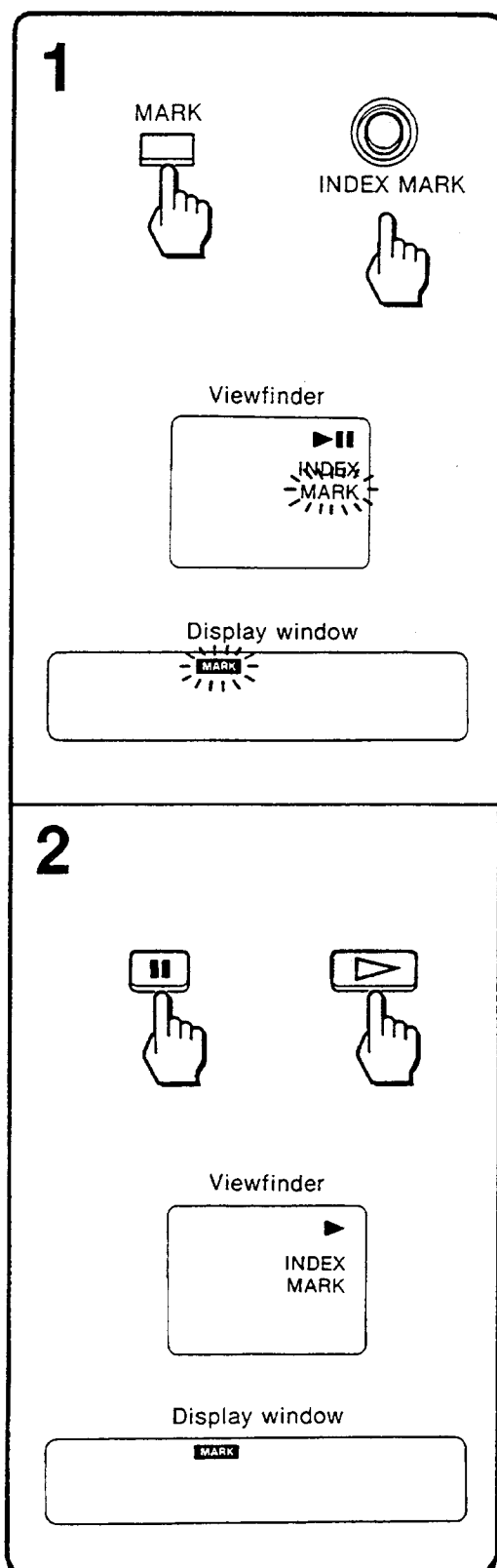
To Mark an Index Signal during Playback

(O-1)

Press the **INDEX MARK** button on the camcorder or the **Commander** at the point you wish to locate later.

The **INDEX MARK** indication appears in the viewfinder and **MARK** appears in the display window to indicate that the index signal is being marked.

(O-2)



Marking Index Signals during Playback

To Mark an Index Signal at the Beginning of the Playback

(O-2)

- 1 Press the INDEX MARK button on the camcorder or the Commander in the playback pause mode.**
The INDEX MARK indication appears in the viewfinder with MARK flashing and MARK flashes in the display window.
- 2 Press II or ▷ to release the playback pause mode.**
The MARK indication stops flashing to indicate that the index signal is being marked.

Notes

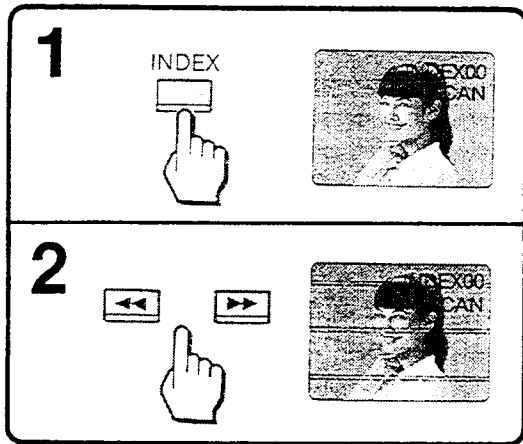
- The index signals can be marked at any desired point. But, make sure there is more than 2 minutes of space between two index signals. If there are two or more index signals marked within an interval of 2 minutes on a normal tape run, these signals cannot be searched correctly.
- The index signals cannot be marked on a tape with the red mark on the cassette exposed, or on a tape recorded in the LP mode.
- During index signal marking or erasing, a horizontal black band appears on the bottom of the TV screen and the sound is not heard. This does not affect the recorded picture and sound.

If an index signal is marked on a tape with the data code recorded

The camcorder erases the data code and marks the index signal instead. If you play back the portion of the tape on which the data code has been erased, 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 display will then change to "-----" (bars).

Marking Index Signals during Playback

(O-3)



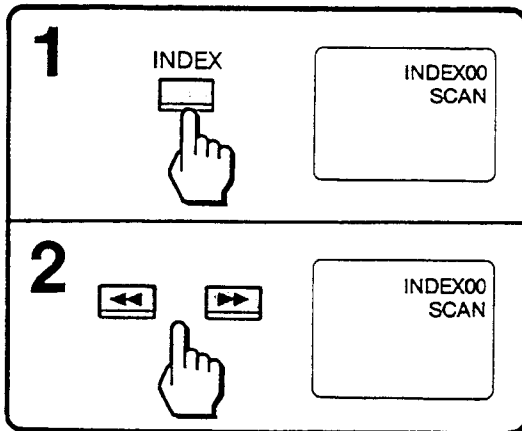
Scanning or Searching the Beginning of a Program during Playback

To scan the beginning of each program while monitoring the picture — Index scan (1)

(O-3)

- 1 Press the INDEX button on the Commander during playback or playback pause mode.
- 2 Press ◀◀ or ▶▶.
The tape is played back for approximately 10 seconds from the point where the index signal was marked.
- 3 Press ▷ when the desired program is displayed to continue playback.
When no button is pressed, the picture is automatically scanned to the next or previous program.

(O-4)



To scan the beginning of each program in sequence — Index scan (2)

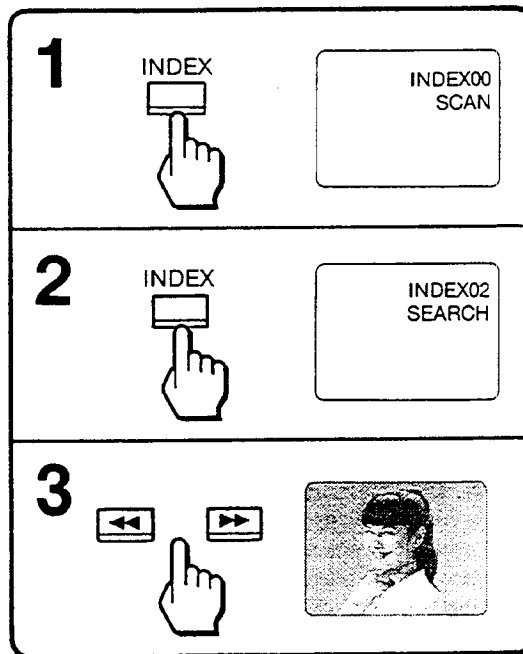
(O-4)

- 1 Press the INDEX button on the Commander during stop mode.
- 2 Press the ◀◀ or ▶▶ button.
The tape is played back for approximately 10 seconds from the point where the index signal is marked.
- 3 Press ▷ when the desired program is displayed to continue playback.
When no button is pressed, the picture is automatically scanned to the next or previous program.

To cancel the index scan mode

Press ▷.

(O-5)

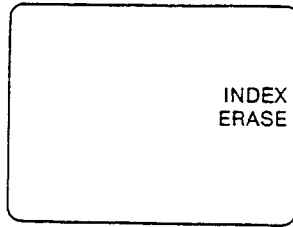


To locate the desired program — Index search (O-5)

- 1** Press the **INDEX** button on the Commander once during stop or playback mode.
- 2** Press the **INDEX** button on the Commander until the index number of the desired program is displayed in the viewfinder.
- 3** Press **◀◀** or **▶▶**.
The playback starts from the beginning of the desired program.

To correct the index number
Press **■** and repeat the steps above.

(O-6)



Erasing the Index Signals

(O-6)

- 1 Locate the index signal to be erased by index scan or index search.
- 2 Press the INDEX ERASE button on the Commander within approximately 10 seconds while the tape is being played back.
- 3 After the index signal is erased, the camcorder returns to index scan or index search, whichever was used in step 1.

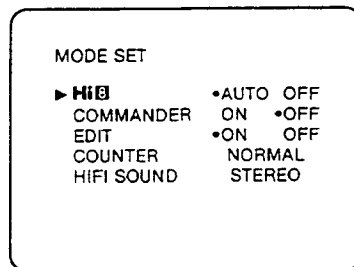
Notes when erasing index signals

- Press the ERASE button more than 2 seconds after the playback begins in step 2.
- The index signals cannot be erased if the red mark on the cassette is exposed.
- The recorded sound cannot be heard and a black band appears in the bottom of the picture while the index signal is being erased. This will not affect the recorded sound or picture.
- Index signals marked with VCRs such as the EV-S900 series can be detected but cannot be erased with this camcorder.
Index signals marked with this unit can be detected but cannot be erased with VCRs such as the EV-S900 series.
- Index signal may be erased when PCM after recording is made in the portion where the index signal is marked.
- While an index signal is erased, the RC time code and data code on the same portion of the tape are erased as well. The "----" (bar) indication will appear when that portion is played back.

To use that tape for editing using an editing controller, rewrite the RC time code referring to page 64.

Using the Menu during Playback or Editing

(P-1)



MODE SET menu and PICTURE ADJUST menu can be used during playback or editing. In the MODE SET menu, various settings to further enjoy the features of the camcorder can be selected. In the PICTURE ADJUST menu, the picture in the still or slow mode can be adjusted.


MODE SET Menu

(P-1)

Hi8 AUTO/OFF

- Select AUTO to set the recording mode (Hi8 or normal) automatically depending upon the tape being used.
- Select OFF if you wish to record in the normal mode regardless of the type of tape being used.

COMMANDER ON/OFF

- Select ON when using the supplied Remote Commander for playback or editing.
- Select OFF when the supplied Remote Commander will not be used for playback or recording or when you connect the receiver of the remote control kit (not supplied) to the REMOTE  control connector.



EDIT ON/OFF

- Select ON when performing editing with the camcorder as the playback VCR to keep the degradation of picture resulting from editing to the minimum.
- Select OFF otherwise.

COUNTER NORMAL/TIME CODE

- Normally set to NORMAL to display the linear time counter in the viewfinder and display window.
- Select TIME CODE to display the RC time code or data code in the viewfinder and display window, and output the RC time code from the REMOTE connector.

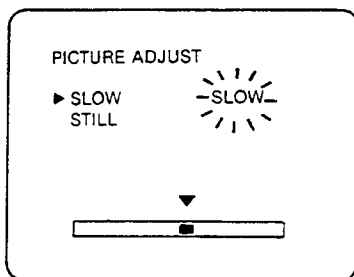
HiFi SOUND STEREO/1/2

- Normally select STEREO. The tape recorded in AFM Hi-Fi stereo will be played back in stereo.
- Select  or  to play back the desired sound of the dual sound recorded tape.

Note

Always return the setting to STEREO. Otherwise, the tape recorded in stereo will not be played back properly.

(P-2)



PICTURE ADJUST Menu

(P-2)

SLOW

Press ◀ or ▶ to clear out the noise bands that may appear on the top or bottom of the picture during slow playback. Adjustable only in the slow playback mode.

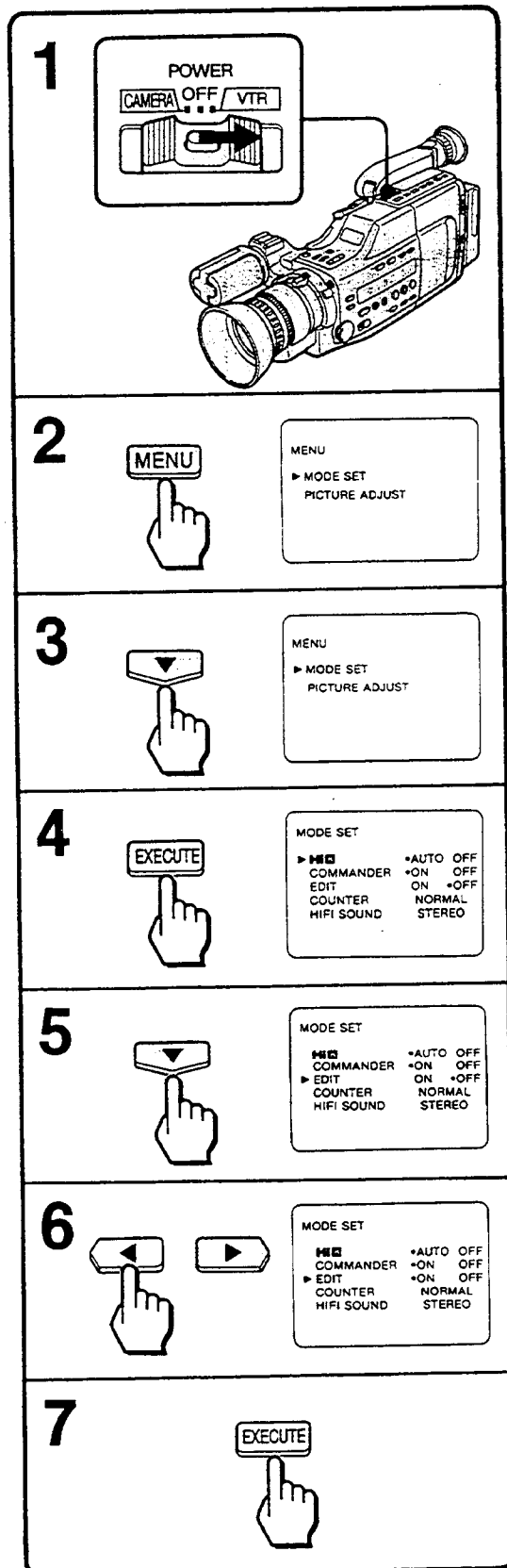
STILL

Press ◀ or ▶ so that the vertical shaking of the picture during still mode will stop. Adjustable only in the still mode.

Note

When playing back a still picture of a tape recorded in the LP mode, this camcorder automatically adjusts the picture to reduce vertical shaking to the minimum. Therefore, the STILL adjustment of the PICTURE ADJUST menu is not operable.

(P-3)



How to Call Up the Menu Display

Press the DATA SCREEN button to display the menu on the TV screen.

(P-3)

Example: To select EDIT ON.

- 1 Set the POWER switch to VTR and insert a cassette.
- 2 Press the MENU button.
The MENU display appears.
- 3 Press ▼ and move cursor to the desired item.
- 4 Press the EXECUTE button.
The selected menu appears.
- 5 Press ▼ and move cursor to the desired item.
- 6 Press ◀ or ▶ to select the desired setting.
- 7 Press the EXECUTE button.
The setting is stored in the camcorder and the menu display is cleared.

The setting is stored in the memory for about 5 minutes even if the POWER switch is returned to OFF or the power source is removed, as long as the lithium battery is installed.

To display another menu

Start from step 1 in "How to Call Up the Menu Display."

To return to the original screen

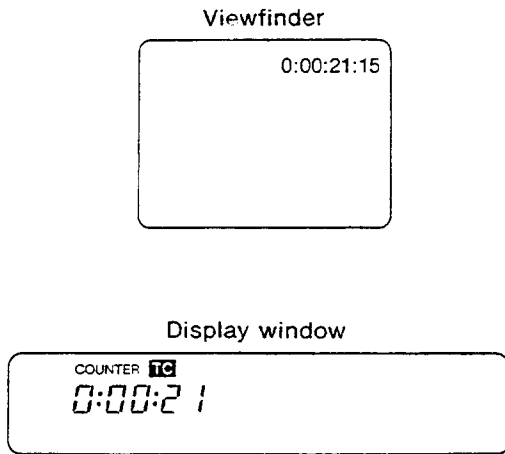
Press the MENU button.

To make multiple settings within one menu

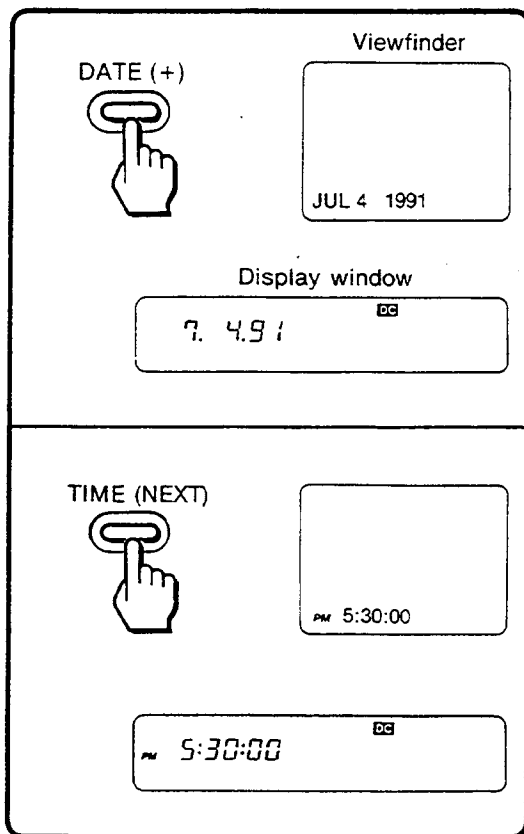
After step 6 in "How to Call Up the Menu Display", press ▼ and move cursor to the desired item.

Displaying the RC Time Code/Data Code

(Q-1)



(Q-2)



The RC time code and data code (recording date and time) recorded on a tape can be displayed in the viewfinder and display window during playback or editing. You can easily locate the desired tape program by observing the RC time code and data code.

You can also edit the RC time code and data code on another tape while they are displayed. (The signals of these codes cannot be edited.)

To Display the RC Time Code

(Q-1)

Set the COUNTER mode to TIME CODE in the menu, referring to "How to Call up the Menu Display" on page 61.

The **TC** indication appears in the display window and the RC time code is displayed in the viewfinder and display window.

The frame digits are displayed only in the viewfinder.

To display the RC time code on the TV screen
Press the DATA SCREEN button.

To Display the Data Code

(Q-2)

- 1 Set the POWER switch to VTR.
- 2 Set the COUNTER mode to TIME CODE in the menu, referring to "How to Call up the Menu Display" on page 61.
- 3 Press the DATE button to display the date, or the TIME button to display the time.
The **DC** indication appears in the display window with the date or time.

To clear the data code indication
Press the same button again.

To display the data code on the TV screen

- During normal or various mode playback, simply press the DATE or TIME button.
- In stop, fast-forward, rewind, recording or recording pause mode, first press the DATA SCREEN button and then press the DATE or TIME button.

Notes on the data code

- The data code cannot be displayed when the POWER switch is set to CAMERA.
- In the picture search or skip scan mode, streaks may cover the data code on the screen.

When bars (----) appear in place of the RC time code or data code indication

- A blank portion of the tape is played back.
- The tape is recorded in the LP mode.
- The data code on the tape is illegible due to tape damage or noise.
- The current date and time are not set.
- The tape is in fast-forward or rewind mode.

When the remote control unit provided with the counter display is connected

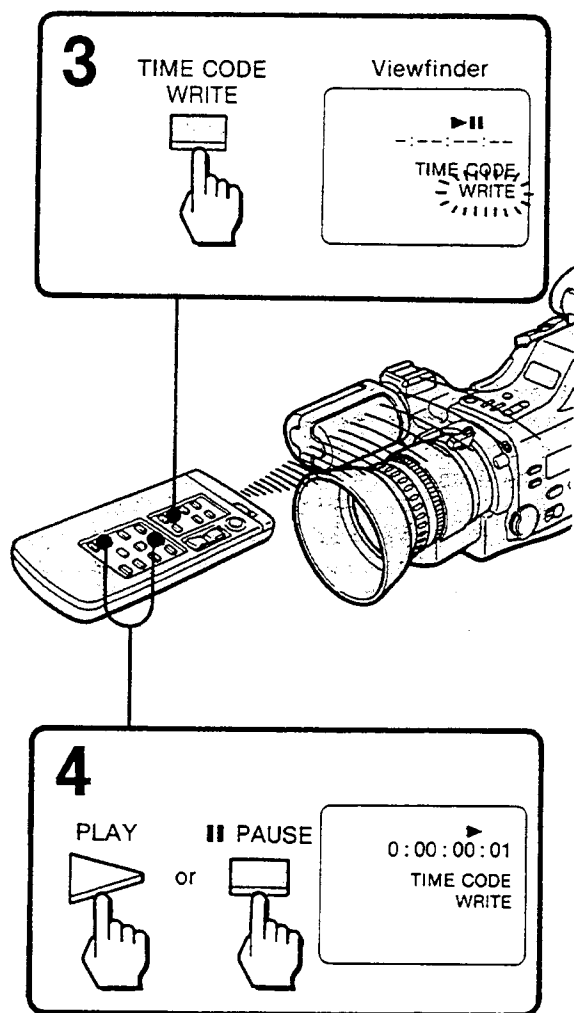
The counter indication on the remote control unit can be switched to the RC time code indication by setting the COUNTER mode to TIME CODE on this camcorder. In this case, "F:FF:FF" indication may appear on certain units. This is not a failure of the camcorder or the remote control unit.

Notes on RC time code difference

There may be a difference of several frames between the recorded frame number and the frame number of the actual picture. This is because during playback, the frame number display switches by several frames on the screen. When playing back the tape in still picture, picture search or slow playback mode, however, the frame number corresponds to the actual picture.

Writing the RC Time Code on a Prerecorded Tape

(R)



You can write the RC time code on a tape without affecting the prerecorded picture and sound.

To Write the RC Time Code from the Beginning of the Tape

(R)

- 1 Rewind the tape to the beginning.
- 2 Set the camcorder to the playback pause mode.
- 3 Press the **TIME CODE WRITE** button on the Commander.
The **TIME CODE WRITE** indication appears in the viewfinder with **WRITE** flashing.
- 4 Press the **▷** button or the **||** button to start playback.
The **WRITE** indication stops flashing and the RC time code writing starts from 0:00:00:00.

To stop the RC time code writing

Press the **□** button (or another tape transport button).

To Write the RC Time Code from the End of the RC Time Code Prerecorded Portion

Rewind the tape up to the portion on which the RC time code has been written, and follow steps 2 to 4 of "To Write the RC Time Code from the Beginning of the Tape". The RC time code is written continuously.

Writing the RC Time Code on a Prerecorded Tape

Notes on RC time code writing

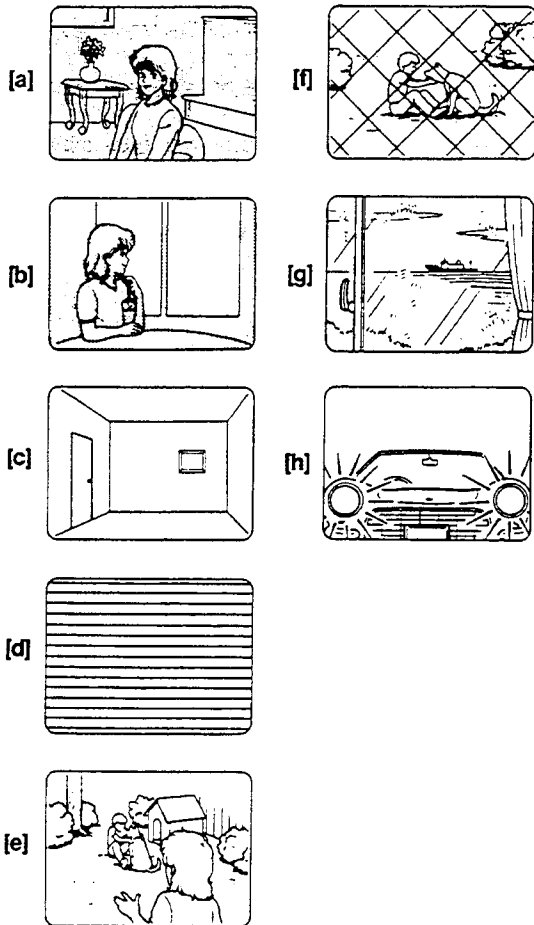
- If you start RC time code writing from the portion on the tape without a time code, the time code is written from 0:00:00:00 even when the tape is not at its beginning.
- The RC time code cannot be written on a tape recorded in the LP mode.
- By writing the RC time code, the data code and the index signals recorded on the tape are erased.
- If the RC time code writing is performed on a blank portion of a tape, the time code is written correctly, although the screen is noisy.
- If you intend to write the RC time code from the middle of a tape without a time code, writing starts several frames before the current picture.

The RC time code writing is canceled when:

- you press the TIME CODE WRITE button again in the playback pause mode.
 - you press the INDEX button on the Commander in the playback pause mode.
 - you change the playback mode to another mode.
-

Manual Focusing

(S-1)



When the AUTO LOCK switch is set to AUTO LOCK, the auto-focusing functions to easily get an in-focused picture under most shooting conditions. But manual focusing is recommended under the following cases:

[a] to [h] correspond to the illustrations. (S-1)

- [a] Insufficient light
- [b] Strong illumination from behind the object
- [c] Objects with little contrast such as a wall, sky, etc.
- [d] Finely detailed repetitive patterns, horizontal stripes, diagonal subject
- [e] One object is close and the other is at a distance but is in the center
- [f] Objects beyond nets, or another object passes just in front of the camcorder
- [g] Object beyond frosted glass
- [h] Bright object or object reflecting light
- [i] Under special shooting conditions:
 - When using conversion lenses or effect filters
 - When shooting close-ups
 - When shooting a stationary objects using a tripod
 - To prevent battery wear

Note on automatic focusing

While recording with the auto focusing function, do not touch the focus ring forcibly.

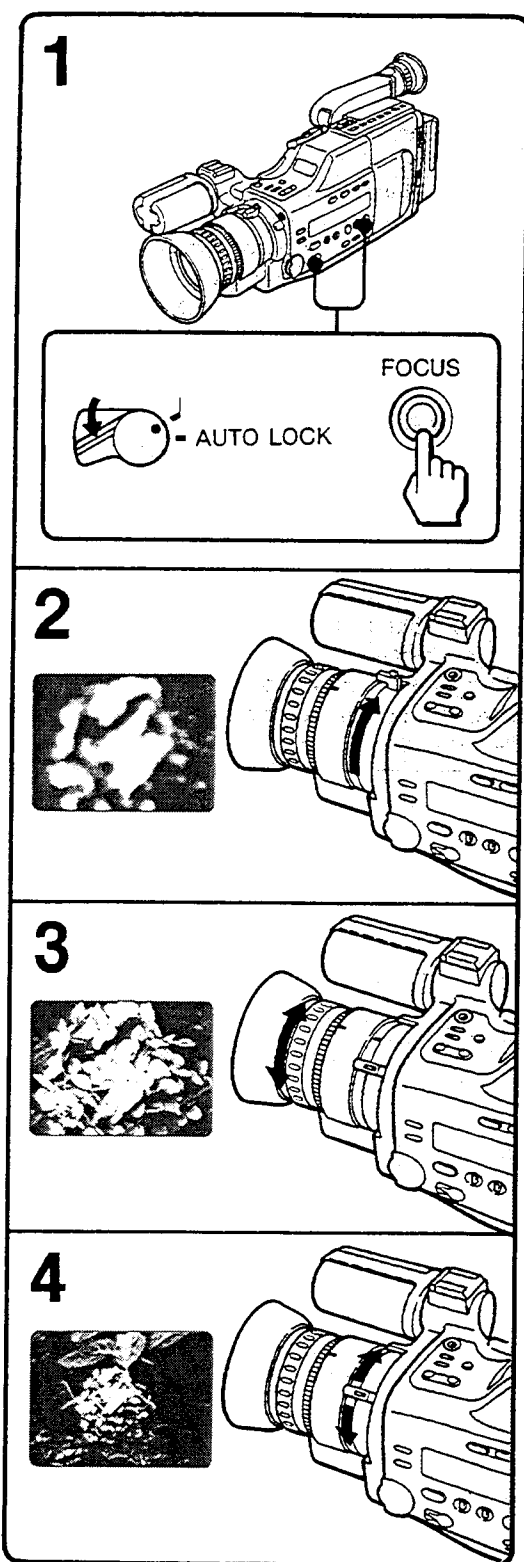
When the auto focusing does not function momentarily

- Shutter speed setting is changed.
- Programmed AE mode is changed.
- Aperture value is changed.
- Gain setting is changed.
- Lighting condition changes quickly.
- Zooming from wide to telephoto.
- The camcorder is rapidly panned from a distant subject to a nearby subject with less contrast.
- Shooting fast moving objects.

Some helpful hints

- When shooting relatively dark places, such as indoors, the depth of field in proper focus is very shallow.
 - When shooting with auto focusing with the zoom lever set to the wide angle position, the focus ring will be fixed around the 2 m position and may not exactly match the actual object-to-camera distance.
 - The figures on the focus ring indicate the distance between the object and the Φ mark on the camcorder.
-

(S-2)



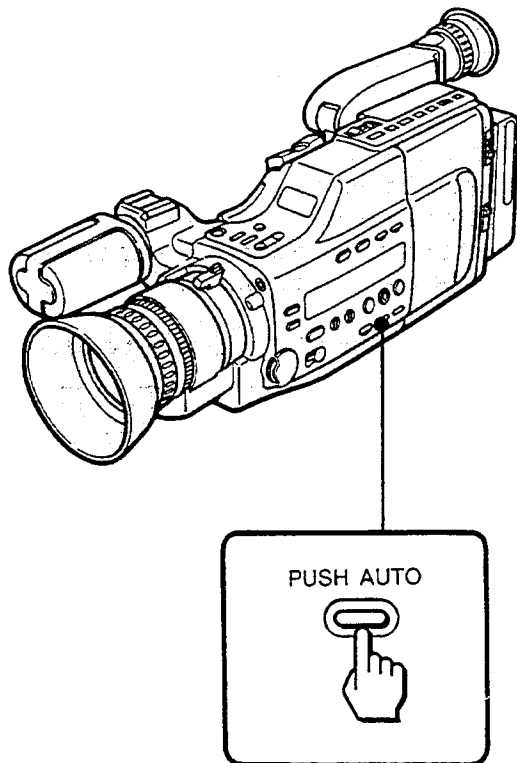
Manual Focusing

Focusing Manually

(S-2)

- 1 Set the **AUTO LOCK** switch down and press the **FOCUS** button.
Check that the auto focus frame is cleared from the viewfinder.
- 2 Turn the manual zoom lever fully to the telephoto position.
- 3 Turn the focus ring to achieve sharp focus.
- 4 Move the zoom lever to set to the desired shot length.

(S-3)



Manual Focusing

Shooting with Auto Focusing Momentarily

(S-3)

While shooting with manual focusing, press the PUSH AUTO button.

The auto focus functions while you are pressing the PUSH AUTO button.

When the button is released, manual focusing will resume. Use this button when focusing on one object to the other for natural focusing. Shutter speed, white balance, gain, aperture, and/or programmed AE modes will be retained to the previous setting.

When the camcorder focuses on the background during auto focusing

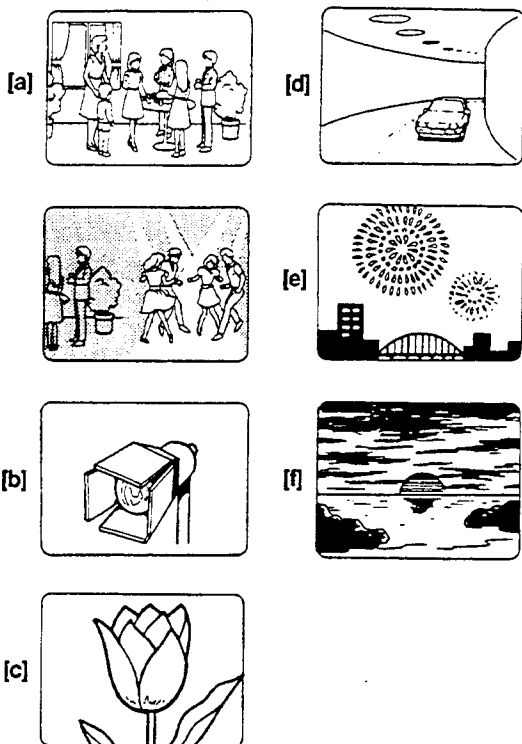
To focus on the subject on the foreground, first shoot the subject on the foreground or set the focus ring to 1.3 m manually. Then set the AUTO LOCK switch to AUTO LOCK or press the PUSH AUTO button.

When the camcorder focuses on the foreground during auto focusing

To focus on the background, first shoot the distant view or set the focus ring to ∞ manually. Then set the AUTO LOCK switch to AUTO LOCK or press the PUSH AUTO button.

Adjusting the White Balance

(T-1)



In order to record the color of the object as it is, the common method is to adjust the camcorder to record the white color as white in various shooting conditions. This is accomplished by adjusting the white balance. When the AUTO LOCK switch is set to AUTO LOCK, the auto white balance functions adjust the white balance under most shooting conditions. But to record the color of the subject more precisely, without being affected by the color temperature of the ambient light, adjust the white balance manually.

[a] to [f] correspond to the illustrations. (T-1)

	Conditions	Indication in the viewfinder
[a]	Lighting conditions change quickly	
[b]	Too bright, such as in photograph studios	
[c]	Monochromatic subject or background	
[d]	Under a sodium lamp	
	Under a mercury lamp	
	Under a color matching fluorescent lamp	
[e]	Recording outdoors: a night view, neon signs, or fireworks	
[f]	Recording outdoors: scenes after sunset or before sunrise	

Adjusting the White Balance

Adjusting the White Balance Manually

(T-2)

1 Set the AUTO LOCK switch down.

2 Set to the appropriate white balance mode by pressing the WHT BAL button.

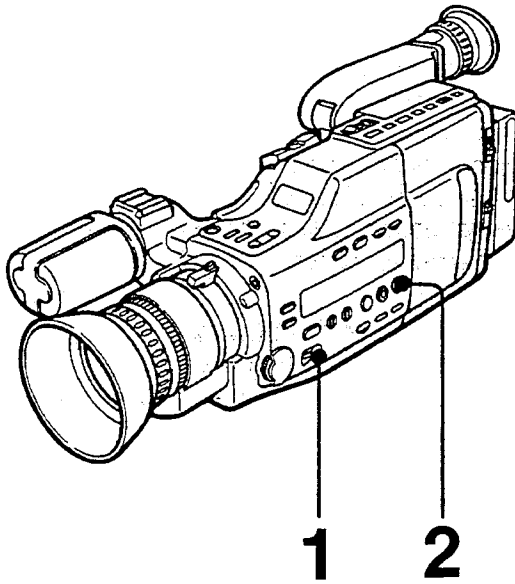
The indication changes in the order below each time the button is pressed.



Note on manual white balance adjustment

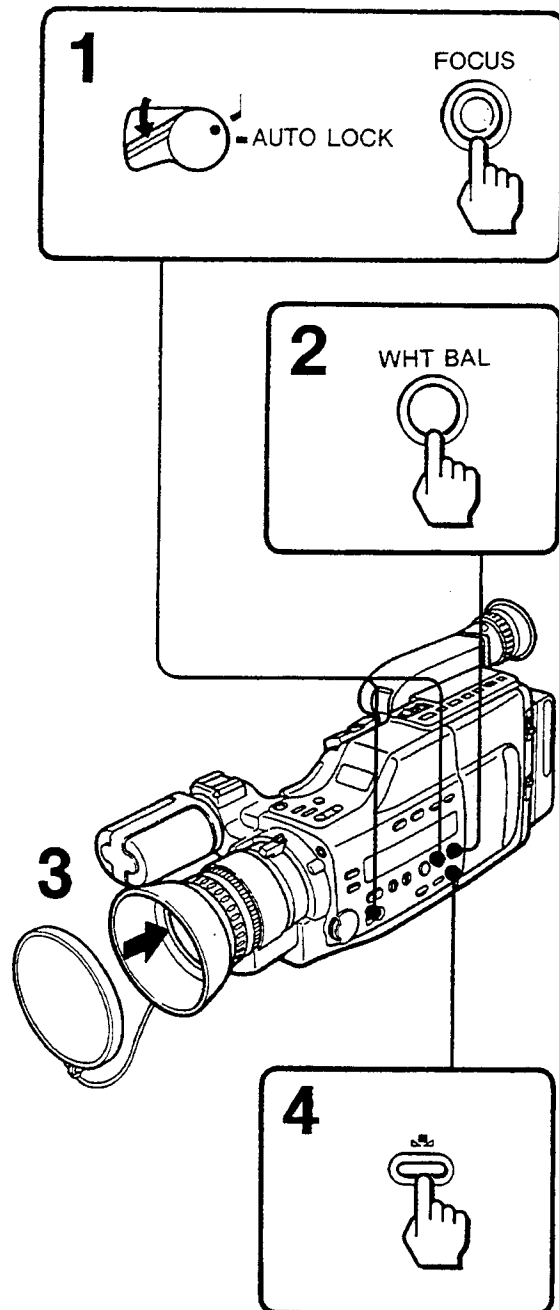
Each time the shooting conditions change, for example when moving from indoors to outdoors or vice versa, the white balance should be reset to the new lighting condition. First, set the AUTO LOCK switch to AUTO LOCK. Then set it down again for manual white balance adjustment.

(T-2)



Adjusting the White Balance






(T-3)



Adjusting the White Balance Precisely

(T-3)

The one-push white balance function adjusts the white balance at the press of the button and maintains that condition. When the lighting condition changed or when recording subjects with different color temperature, use the one push white balance function to achieve recording with natural colors without being affected by the ambient light.

- 1 Set the AUTO LOCK switch down and press the FOCUS button.**
The camcorder enters the manual focus mode.
- 2 Press the WHT BAL button to call up the  indication.**
The  indication is flashing slowly.
- 3 Attach the white lens cap to the camcorder and point the it to a subject (outdoors) or to the light source (indoors).**
- 4 Press the  button in the recording standby mode.**
The  indication will flash rapidly.
- 5 The  indication stops flashing to indicate that the new white balance is stored in the memory.**
The memory is retained for approximately 1 hour even if the POWER switch is set to OFF or if the battery pack is removed.

When recording under fluorescent light

- Press the WHT BAL button to clear the white balance indication and return to automatic white balance adjustment.
- Use the one push white balance function.
- Set the AUTO LOCK switch to AUTO LOCK.

(T-4)


Color temperature (K)	Light source
10,000	Clear sky
8,000	
Blue	Slightly overcast
7,000	Cloudy, rainy
6,000	Fluorescent lamp (daylight)
5,000	
White	Direct sunlight
4,000	Fluorescent lamp (daylight)
3,500	1 hr. after/before sunrise/sunset
	Fluorescent lamp (off-white)
	Studio lamp
	Halogen lamp
3,200	
3,000	
Yellow	Tungsten lamp
2,500	30 min. after/before sunrise/sunset
Red	Sunrise/sunset
2,000	Candlelight

White Balance and Color Temperature


(T-4)

The color temperature indicates the relative reddishness or bluishness of light measured in Kelvin degrees (K). It increases as the light source gets bluish and decreases as the light source gets redder. It has no direct relation with brightness of the light. The camcorder automatically adjusts the white balance within the range shown in the diagram on the left.

What the indication means

- Slow flashing: white balance not adjusted
- Fast flashing: white balance being adjusted by the  button.
- Stops flashing: white balance adjusted

When the indication does not stop flashing

The white balance cannot be adjusted and the  indication does not stop flashing.



- When shooting in a dark place.
- When the camcorder was pointed to an object that was not white.
- When white balance adjustment was attempted without the white lens cap.

In these cases, point the camcorder to a bright light source or point the camcorder to a white object.

If the indication still does not stop flashing

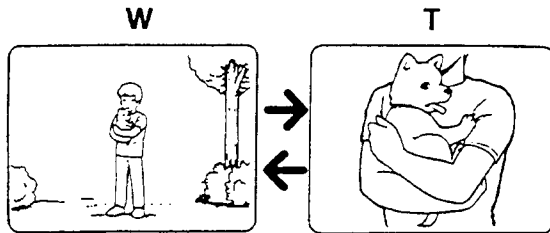
- Press the WHT BAL button to clear the white balance indication and return to automatic white balance adjustment.
- Set the AUTO LOCK switch to AUTO LOCK.

When the lighting condition changed

- Readjust the white balance by the  button during the recording standby mode. The  button does not function during recording.
- The white balance adjustment is effected by the setting of the aperture and shutter speed. When the aperture or shutter speed is adjusted manually, and the camcorder was moved from indoors to outdoors or vice versa, the white balance setting may not be correct. In this case, set the AUTO LOCK switch to AUTO LOCK again and readjust the white balance automatically.

Zooming

(U-1)

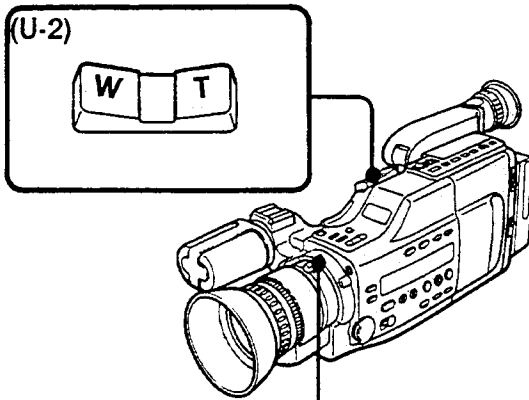


(U-1)

The size of the subject in the screen can be changed. Use “zoom-in” for dramatic close-ups and “zoom-out” for panoramic long shots. Also, use zooming during manual focusing. The camcorder’s zoom button offers a variable speed zooming; pressing it firmly for high speed zooming and softly for relatively slow zooming.

Power Zooming — for Smooth and Constant Zooming

(U-2)



(U-2)

Press the T side of the power zoom button for telephoto.

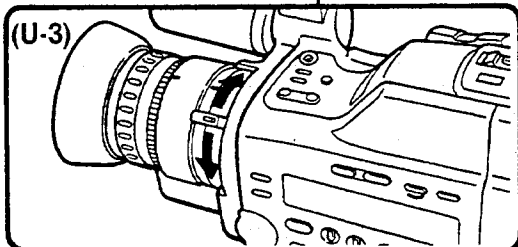
This gives a close up shot of an object far from the lens.

Press the W side of the power zoom button for wide.

This gives a broad view of the scene.

Manual Zooming — to Create a Dramatic Effect

(U-3)



(U-3)

Turn the manual zoom lever upward for telephoto and downward for wide.

Focal length of this camcorder

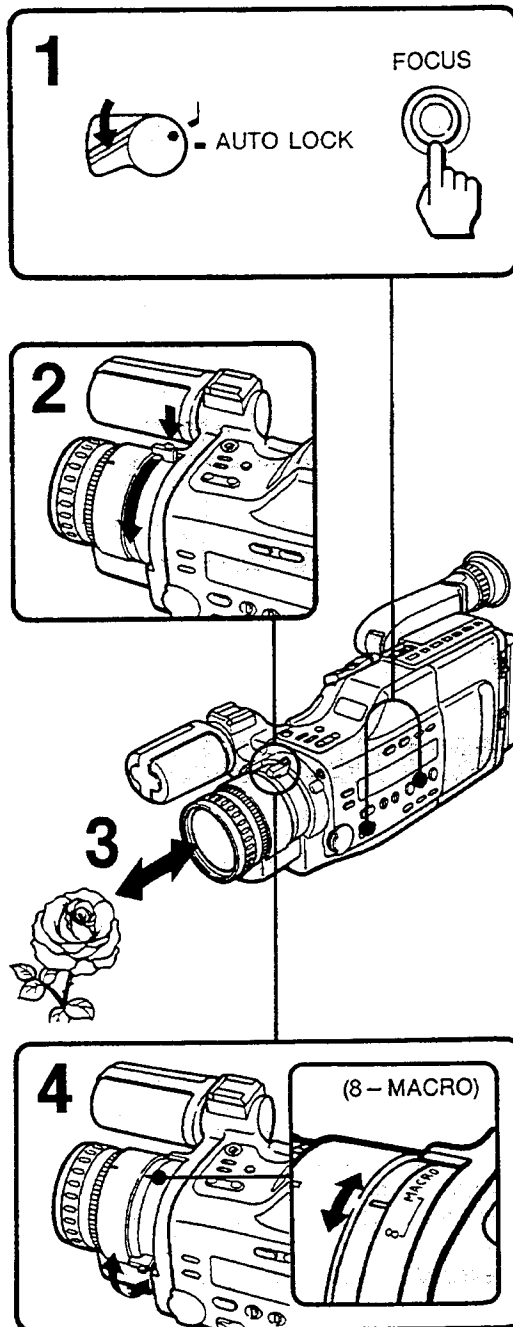
The focal length is 8 mm to 80 mm (11/32 to 2 3/4 inches). This is approximately 43 mm to 430 mm (1 7/8 to 14 1/2 inches converted to the focal length of a 35 mm camera.

Using the zoom button on the Commander

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

Close-ups (Macro)

(V-1)



Tiny objects such as flowers, insects, and images in photographs, can literally fill the screen using the close-up function. It is also useful when recording a title.

(V-1)

- 1** Set the **AUTO LOCK** switch down and press the **FOCUS** button.
Check that the auto focus frame is cleared from the viewfinder.
- 2** Turn the zoom lever, while pressing the green macro button, as far as it will go into the **MACRO** range.
- 3** Bring the camcorder as close as necessary to the subject to obtain the desired subject size.
The subject can be as close to the lens surface at approximately 10 mm (13/32 inch).
- 4** Turn the zoom lever within the **MACRO** range to focus sharply.

Notes

- Auto focusing does not function in macro shooting.
- If the object is closer than 10 mm (13/32 inch), it cannot not be brought in focus.

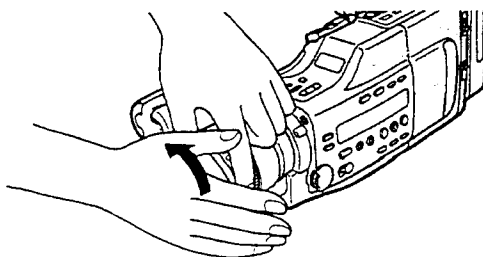
If the lens hood touches the object (V-2)

Remove the lens hood. Hold the focus ring and turn the hood by pressing it with your palm. Do the same when attaching or removing the filter or conversion lens (not supplied).

Recommended accessory

When shooting in macro, the depth of field is very shallow. Pay attention to focusing. To keep the object in focus, use a tripod.

(V-2)



Fade-in and Fade-out

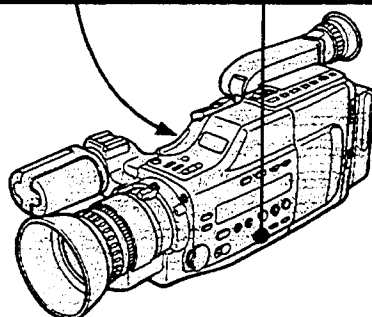
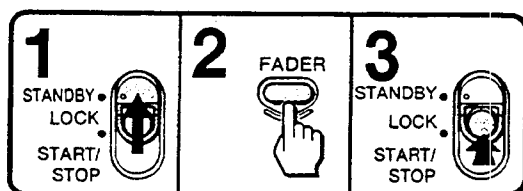
(W-1)

FADE IN

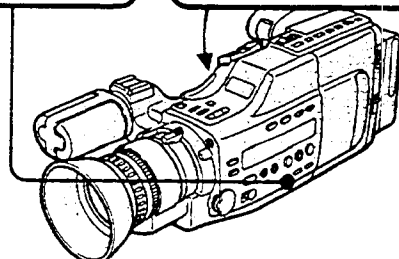
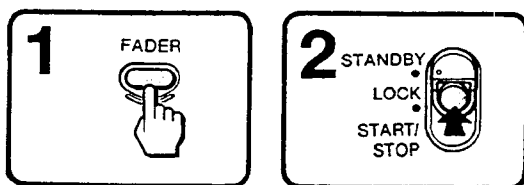
(W-2)

FADE OUT

(W-3)



(W-4)



When fading-in, the picture will gradually appear from a black screen. The sound will gradually increase in accordance with the picture. **(W-1)**

When fading-out, the picture will gradually disappear into a black screen. The sound will gradually decrease in accordance with the picture. **(W-2)**

Use this function to give a professional effect to your recording.

To Fade-in

(W-3)

- 1 Slide the **STANDBY** switch up.
The camcorder enters the recording standby mode.
- 2 Press the **FADER** button.
- 3 Press the **START/STOP** button.
Fade-in is performed and recording starts.

To Fade-out

(W-4)

- 1 Press the **FADER** button while recording.
- 2 Press the **START/STOP** button to stop recording.
Fade-out is performed and then recording stops.

When the FADER function works

The FADER function works only when the camcorder is in the recording standby mode or recording mode.

It does not function in the stop mode.

To cancel the fade-in/fade-out function before it is preformed

Press FADER before pressing START/STOP.

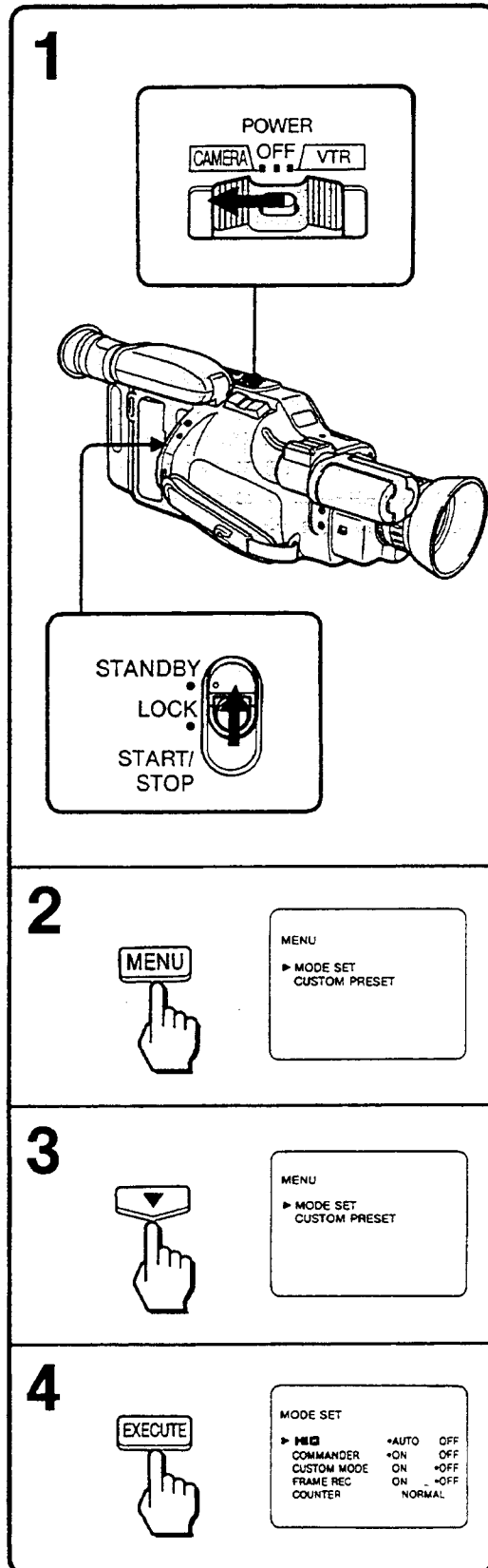
To use the fade-in/fade-out function repeatedly
Start from step 1 each time.

When the title, date or time is displayed

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

Frame Recording

(X)



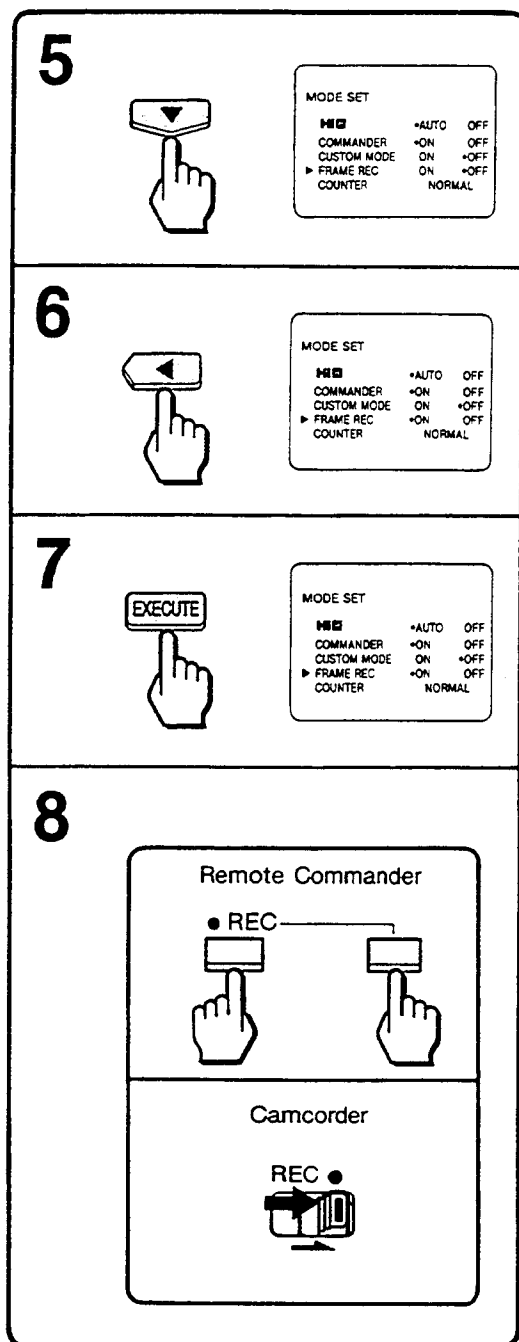
(X)

A recording of approximately 4 frames can be performed with this camcorder. With this function, an animated effect can be recorded by performing frame recording after moving the subject little by little. Fix the camera at one point and use the Commander for effective frame recording.

- 1** Set the POWER switch to CAMERA and slide the STANDBY switch up.
- 2** Press the MENU button.
- 3** Press ▼ and move cursor to MODE SET.
- 4** Press the EXECUTE button.
MODE SET menu appears.

Continued on the next page

Frame Recording



5 Press ▼ and move cursor to FRAME REC.

6 Press ◀ or ▶ and select ON.
When performing frame recording using the Remote Commander, select COMMANDER ON.

7 Press the EXECUTE button.
The setting is stored in the memory and the menu display in the viewfinder disappears.

8 Start camera recording with the camcorder or the Remote Commander.
Recording of approximately 4 frames is performed. After frame recording is completed, the camcorder will enter the recording standby mode with STBY indication in the viewfinder.

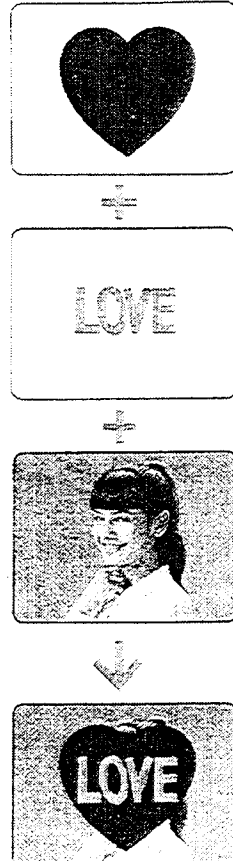
9 Move the subject and repeat step 8.

To record input signals from the VIDEO, AUDIO, S VIDEO jacks

- 1 Connect the camcorder and the external video source referring to page 120.
- 2 Set the POWER switch to VTR.
- 3 Set the camcorder to the recording pause mode with ● REC and PAUSE.
- 4 Repeat step 8 above.

Recording a Title

(Y-1)



(Y-1)

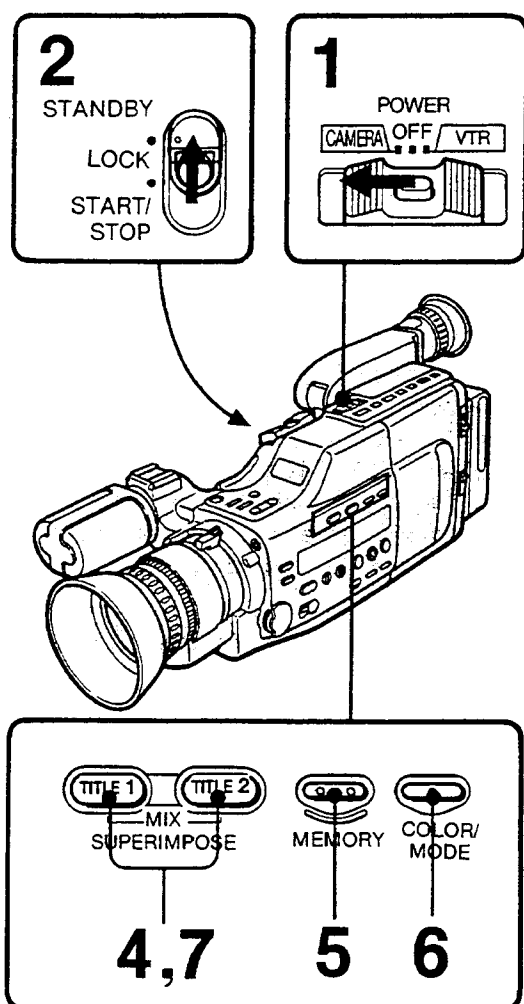
Original hand-lettered message or illustration can be superimposed over the picture. Two titles can be stored and 8 different colors can be used for the titles.

This function can be used during the following situations.

- (1) During camera recording.
- (2) During playback.
- (3) During camera recording, superimpose a title.
Then superimpose different titles during playback.
- (4) During editing, use the camcorder as a playback VCR. Titles can be superimposed over the playback picture (with or without a title superimposed) and then recorded together onto the recording VCR.

Before recording, store the desired title in the camcorder.

(Y-2)



Recording a Title

Storing a Title

(Y-2)

Before storing

- Prepare title cards.
Use a plain, white card and draw titles in dark color and with thick lines. Street signs and printed materials with high contrast can be used as a title.
- Install the lithium battery (page 27).
The titles cannot be kept in the memory unless the lithium battery is installed.

Operation

- 1 Hold down the green button and slide the POWER switch to CAMERA.**
- 2 Slide the STANDBY switch up.**
The camcorder enters the recording standby mode.
- 3 Point the camcorder to the title card and adjust the focus.**
To focus on the title, use the macro function. (page 75).
- 4 Press the TITLE 1 or TITLE 2 button.**
- 5 Press the MEMORY button.**
The title is stored to the button pressed in step 4.
- 6 Press the COLOR/MODE button to select the color of the title.**
Each time you press the button, the indication in the viewfinder changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN
↑
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED
- 7 Press the TITLE 1 or TITLE 2 button, whichever was pressed in step 4, to clear the title from the viewfinder.**
The title is stored to that button until you store another one over it.

Recording a Title

To check the title

Press the TITLE 1 or TITLE 2 button, whichever was pressed in step 4, in the standby mode. To clear the title from the viewfinder, press the same button again.

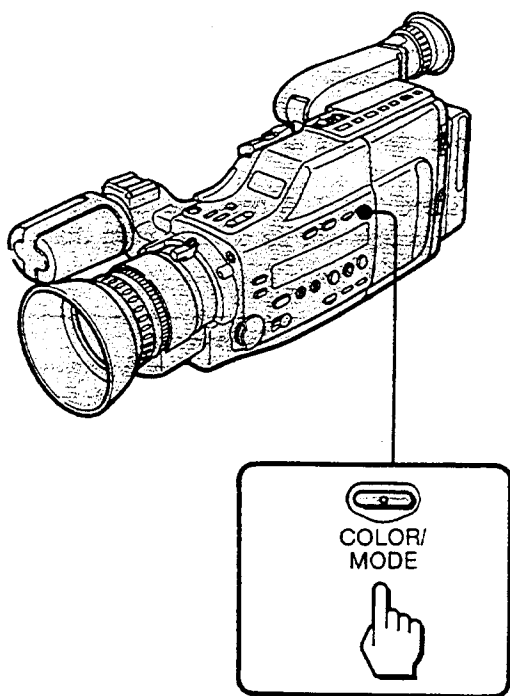
To store a new title to the TITLE 1 or TITLE 2 button

Repeat steps 1 to 7. A new title is stored and the previous title will be deleted from that button.

When storing a title in the memory

When a cassette is installed, the camcorder will return to the power off mode after 5 minutes. Take out the cassette if more than 5 minutes will be needed to store the title.

(Y-3)



Recording a Title

Function of the COLOR/MODE Button

(Y-3)

The COLOR/MODE button works in two ways. When a title is displayed in the viewfinder, the color of the title can be changed. When the title is not displayed, the title display mode can be changed.

To select the color

1 Press the TITLE 1 or TITLE 2 button to display the title.

2 Press COLOR/MODE.

Each time the button is pressed, the color indication changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN
↑
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

To select the display mode

1 If the title is displayed, press the TITLE 1 or TITLE 2 button to clear the title.

2 Press COLOR/MODE.

Each time the button is pressed, the mode indication in the viewfinder changes as follows.

↑: Scroll up the title.

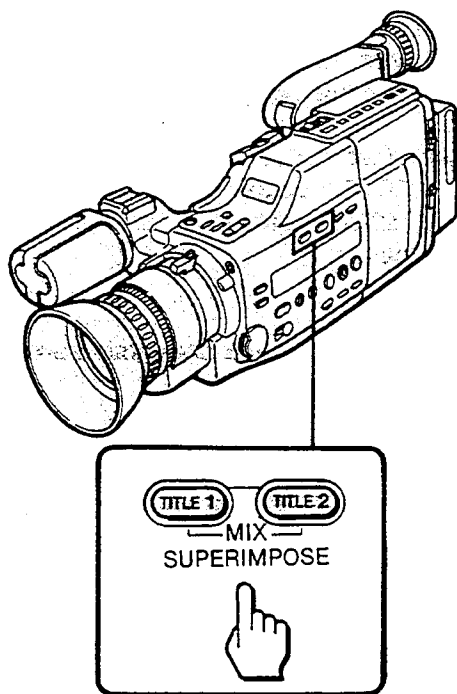
↓: Scroll down the title.

⏮: Reverse the title.

⏮↑: Reverse the title and scroll it up.

⏮↓: Reverse the title and scroll it down.

(Y-4)



Recording a Title

Superimposing One Title

(Y-4)

- 1 During playback or recording, press the TITLE 1 or TITLE 2 button at the point from which you want to use the title.

The title is displayed. During recording the title will be recorded onto the tape. During playback the title will not be recorded on the tape.

- 2 Press the same button pressed in step 1 at the point you wish to clear the title.

When recording the title at the beginning
We recommend the following method:

- 1 Set the camcorder in the standby mode.
- 2 Display the title referring to step 1 above.
- 3 Release the standby mode.
- 4 Clear the title referring to step 2 above.

When recording a title onto the playback picture

The title can be superimposed on the playback picture but cannot be recorded with this camcorder alone. Make connections for editing and record the picture with title superimposed on another VCR. (See page 118).

About the color indication

- The color indication in the viewfinder is not recorded.
- Even after the title is displayed, the color can be changed by pressing the COLOR/MODE button.

When displaying the title in the playback mode

The title is cleared if you press ◀ or ▶, and appears again when normal playback resumes.

Recording a Title

Layering One Title over the Other

The title stored in the TITLE 1 button and the TITLE 2 button can be displayed at the same time with one title layered on the other.

Example: When a blue heart is stored in the TITLE 1 button and a white title "LOVE" is stored in the TITLE 2 button.

To display TITLE 1 in the background and TITLE 2 in the foreground

(Y-5)

1 During playback or recording, hold down the TITLE 1 button and press the TITLE 2 button.

2 Press the TITLE 1 or TITLE 2 button at the point you wish to clear the title.

To display TITLE 2 in the background and TITLE 1 in the foreground

(Y-6)

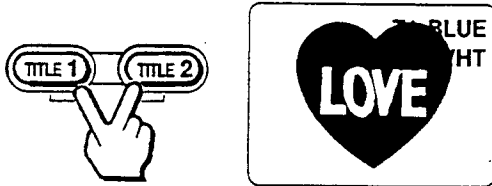
1 During playback or recording, hold down the TITLE 2 button and press the TITLE 1 button.

In this case, TITLE 2 "LOVE" is hidden behind TITLE 1 and is not shown. Before using this function, check whether the title stored in the memory is appropriate for this application.

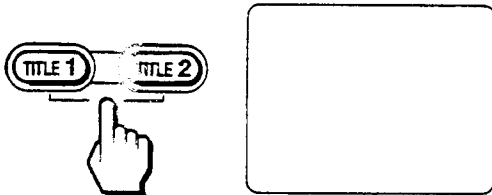
2 Press the TITLE 1 or TITLE 2 button at the point you wish to clear the title.

(Y-5)

1

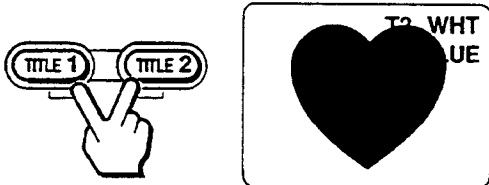


2

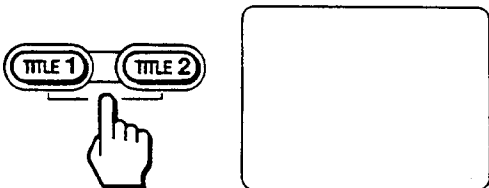


(Y-6)

1



2



Recording a Title

To Change the Color of the Title after Layering One Title over the Other

Example: When a blue heart is stored in the TITLE 1 button and a white title "LOVE" is stored in the TITLE 2 button.

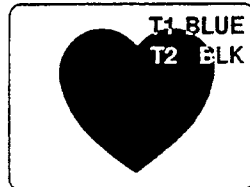
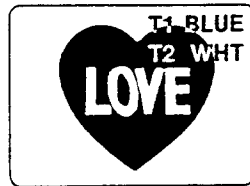
To change the color of the title in the foreground

(Y-7)

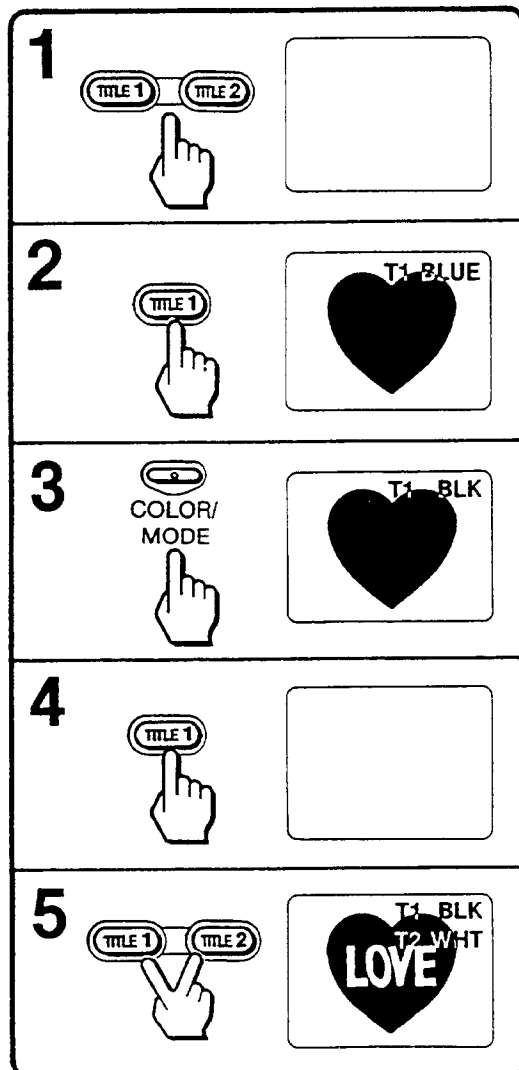
Press the **COLOR/MODE** button.

Each press of COLOR/MODE will change the color of "LOVE".

(Y-7)



(Y-8)

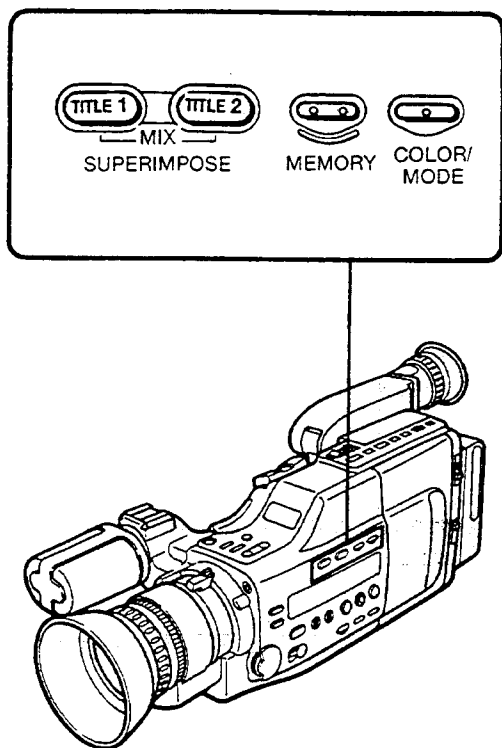


To change the color of the title in the background

(Y-8)

- 1 Press the TITLE 1 or TITLE 2 button to clear the title.
- 2 Press the TITLE 1 button.
TITLE 1, blue heart, is displayed.
- 3 Press the COLOR/MODE button to change the color of TITLE 1.
The color of TITLE 1, blue heart, changes.
- 4 Press the TITLE 1 button.
TITLE 1, black heart, is cleared from the picture frame.
- 5 Hold down the TITLE 1 button and press the TITLE 2 button.

(Y-9)



Recording a Title

Various Title Display Modes

Follow the steps below to enjoy the various title display modes.

(Y-9)

Step 1

During camera recording or playback, press the COLOR/MODE button to select the title display modes. Refer to the following page for the available modes.

Step 2

Call up the title.

To display one title:

Press the TITLE 1 or TITLE 2 button.

To layer one title over the other:

Call up the title referring to page 84.

Step 3

Clear the title.

When one title is displayed:

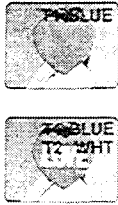
Press the same button pressed in step 2.

When one title is layered over the other:

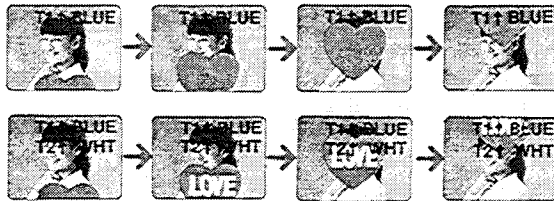
Press the TITLE 1 or TITLE 2 button.

Recording a Title

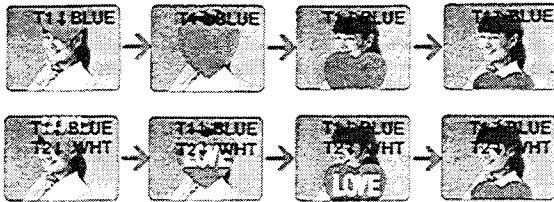
(Y-10)



(Y-11)



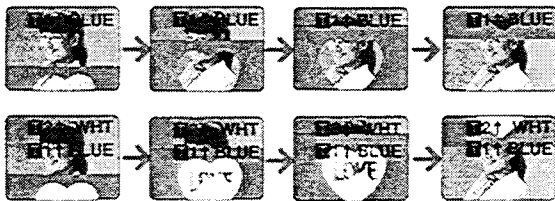
(Y-12)



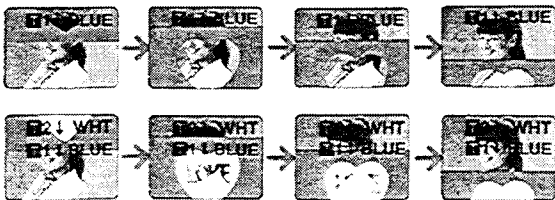
(Y-13)



(Y-14)



(Y-15)



Title display modes

Each press of the COLOR/MODE button in step 1 changes the title display modes in the following order.

- Normal title display (Y-10)

- Scrolling up the title (Y-11)

Step 1: The ↑ indication is displayed.

Step 2: The title is scrolled upwards to the center and stops.

Step 3: The title is scrolled up and out of the picture frame.

- Scrolling down the title (Y-12)

Step 1: The ↓ indication is displayed.

Step 2: The title is scrolled downwards to the center and stops.

Step 3: The title is scrolled down and out of the picture frame.

- Reversing the title with the picture (Y-13)

Step 1: The ▢ indication is displayed.

Step 2: The reversed title is displayed.

Step 3: The title is cleared from the picture frame.

- Scrolling up the reversed title (Y-14)

Step 1: The ▢↑ indication is displayed.

Step 2: The reversed title is scrolled upwards to the center.

Step 3: The reversed title is scrolled up and out of the picture frame.

- Scrolling down the reversed title (Y-15)

Step 1: The ▢↓ indication is displayed.

Step 2: The reversed title is scrolled downwards to the center.

Step 3: The reversed title is scrolled down and out of the picture frame.

Recording a Title

To scroll up or down through the picture frame
Press the TITLE 1 or TITLE 2 button twice successively. The title does not stop on the center, but is scrolled up or down and out of the picture frame.

When displaying one title over the other

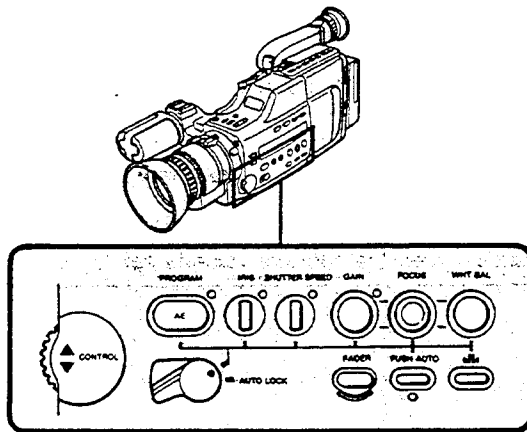
- TITLE 1 and TITLE 2 cannot be called up in the different title display mode at the same time. For example, calling up TITLE 1 in the reverse mode and TITLE 2 in the scroll up mode at the same time is not possible.
- When scrolling the two titles layered, press the second title button before the first title starts to scroll.

Notes on scrolling

- You can scroll the title only when the camcorder is in the recording standby, recording, or normal playback mode. Only normal title display mode (no indication) and reverse title display mode (■) can be performed during modes other than the three above. (Refer to "Various Playback Modes" on page 48.)
 - If you select the scroll mode first, and then set the camcorder to the modes other than the three above, the scroll mode will be canceled automatically.
-

Recording a Picture Using Programmed AE and Manual Modes

(Z-1)

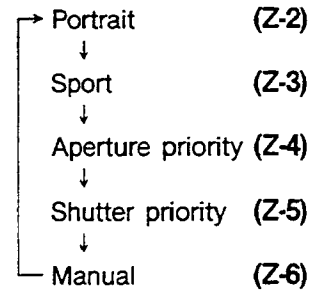


(Z-1)

A variety of camera recording modes can be selected for this camcorder, from the full automatic mode to the programmed AE mode in which camera recording modes most suited for the subject and/or the condition is adjusted automatically. In addition, the manual mode enables independent setting of the aperture value, shutter speeds, and gain. Setting of a single parameter or a combination of two or three parameters at one time is possible.

Camera Recording Modes Available

With the AUTO LOCK switch set down, each press of the PROGRAM AE button changes the camera recording mode as follows.



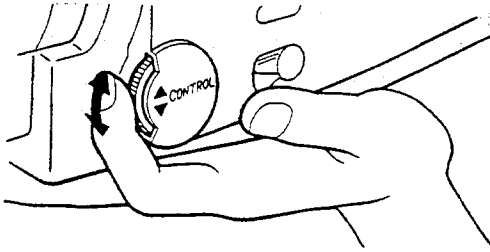
The selected parameters are displayed

Viewfinder	Display window
(Z-2) 	
(Z-3) 	
(Z-4) Example [AE] A 500 ▶ F8	Example
(Z-5) Example [AE] S ▶ 500 F8	Example
(Z-6) Example 250 ▶ F4 0dB	Example

During programmed AE and manual modes

Focus and white balance can be adjusted independently from the programmed AE mode or the manual mode. Manual adjustment of focus and white balance is recommended.

(Z-7)



How to use the CONTROL dial (Z-7)

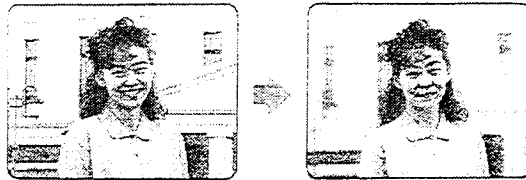
Move the dial slowly using the tip of your index finger. If the dial is released immediately after holding it to the maximum position, the sound of the dial returning to the normal position may be recorded.

When recording in the aperture priority mode or the manual mode

Do not point the lens at the sun or other light sources when the aperture value is set to F1.8.

Portrait Mode

(a-1)



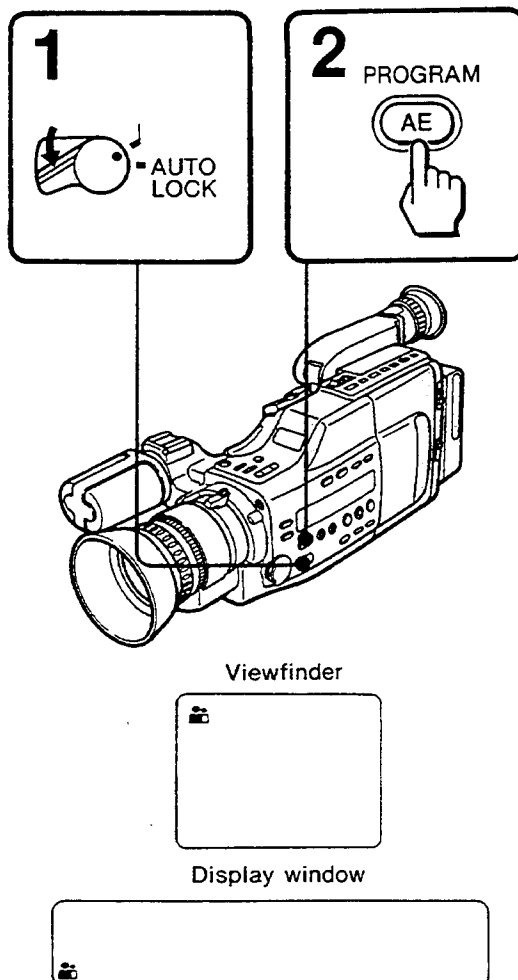
(a-1)

In the portrait mode, the subject is in focus and the background is out of focus. The aperture (opening of the iris) and the shutter speed is automatically adjusted to maintain the appropriate exposure according to the size and brightness of the subject. The portrait mode is most effective when used outdoors.

Portrait Mode Applications

- To shoot a subject with not much movement, such as a portrait of a person or a close up of a flower.
- To zoom in a subject with the telephoto mode.
- To shoot a subject with an obstruction in the foreground.

(a-2)



Operation

(a-2)

- 1 Set the AUTO LOCK switch down.
- 2 Press the PROGRAM AE button until the indication is displayed in the viewfinder and the display window.
The camcorder enters the portrait mode.

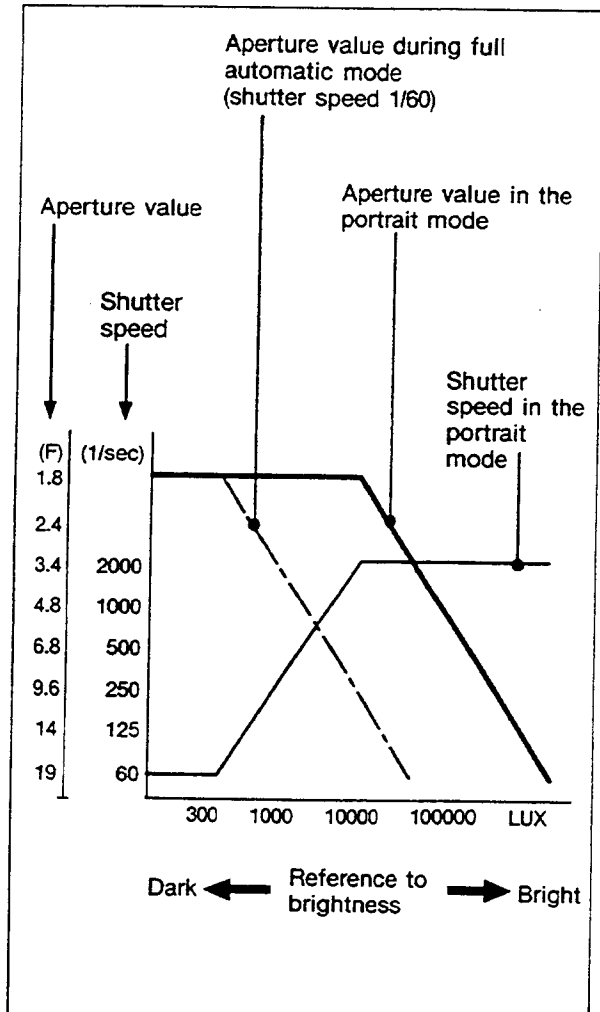
To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the portrait mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the portrait mode
Focus and white balance can be adjusted manually. See page 68 (focus) and page 71 (white balance) for details.

Portrait Mode

(a-3)



Hint for effective camera work

Use of the portrait mode with the following method will gradually make the background out of focus while keeping the subject in focus.

- 1 Enter the portrait mode referring to page 91.
- 2 Set the AUTO LOCK switch to AUTO LOCK and start recording.
- 3 Set the AUTO LOCK switch down.
The camcorder will enter the portrait mode and make the background out of focus.

The theory of the portrait mode

(a-3)

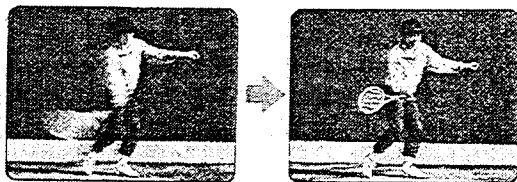
When shooting outdoors under bright sunlight in the full automatic mode, the aperture tends to close and both the subject and the background come into focus (deep depth of field). This is a result of excessive light. In order to bring the subject in focus and keep the background out of focus (shallow depth of field), the aperture should be opened. In the portrait mode, the aperture is controlled to open by automatically selecting the shutter speed (between 1/60 and 1/2000 that matches the shooting situation) to maintain the appropriate exposure.

When recording under fluorescent, sodium, or mercury lamps

- The brightness of the recorded picture may flicker.
- The color of the recorded picture may vary.

Sports Mode

(b-1)



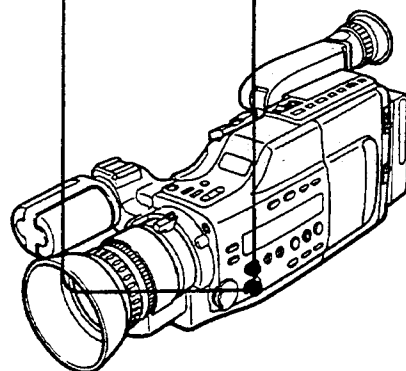
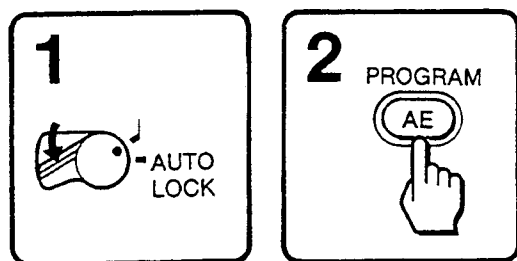
(b-1)

By recording in the sports mode, a subject moving at high speed can be recorded and the picture can be observed more clearly with less picture shaking in the still or slow mode compared to the full automatic mode. The shutter speed and the aperture are automatically adjusted to maintain the appropriate exposure according to the speed of the subject.

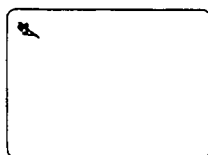
Sports Mode Applications

- To shoot outdoor sports scenes, such as football, tennis, and golf.
- To shoot the scenery from inside a moving automobile.

(b-2)



Viewfinder




Display window



Operation

(b-2)

- 1 Set the AUTO LOCK switch down.
- 2 Press the PROGRAM AE button until the  indication is displayed in the viewfinder and the display window.
The camcorder enters the sport mode.

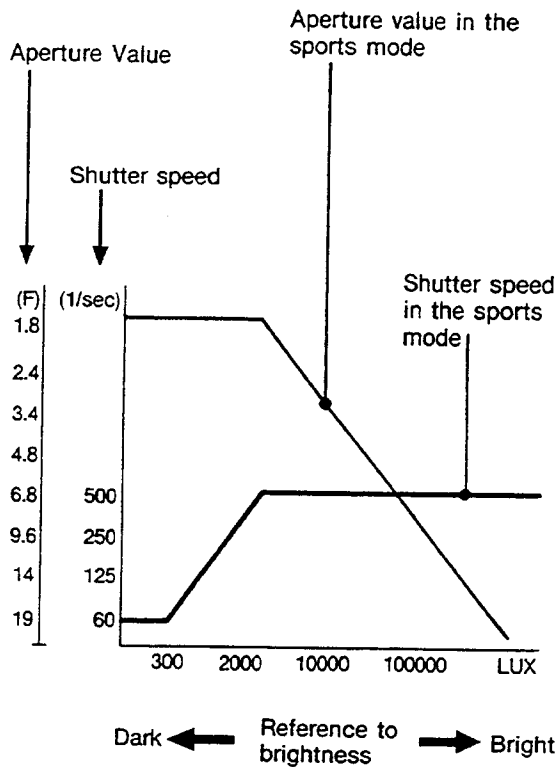
To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the sports mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the sports mode
Focus and white balance can be adjusted manually. See page 68 (focus) and page 71 (white balance) for details.

Sports Mode

(b-3)



Hint for effective camera work

When shooting athletic matches from a distance, such as a football game, we tend to zoom from the wide to the telephoto position to catch the once-only events. Even under these circumstances, by using the sports mode, a sharp picture without camera wobble can be obtained when played back later in the slow or still mode.

The theory of the sports mode (b-3)

When the shutter speed is shifted to a faster speed, subjects moving at high speed, such as a tennis racket or golf club, can be recorded and then played back clearly with less picture shaking compared to the full automatic mode. With this camcorder, the shutter speed can also be set independently from the aperture. However, the picture may become dark when the lighting condition is insufficient. In the sports mode, the fastest shutter speed that matches the shooting situation (between 1/60 and 1/500) is selected to maintain the appropriate exposure.

Note

- The sports mode is effective under sufficient lighting, such as under sunlight. When used under extremely dark conditions, the shutter speed may not be shifted to high speeds.

When recording under fluorescent, sodium, or mercury lamps

- The brightness of the recorded picture may flicker.
- The color of the recorded picture may vary.

Aperture Priority Mode

(c-1)



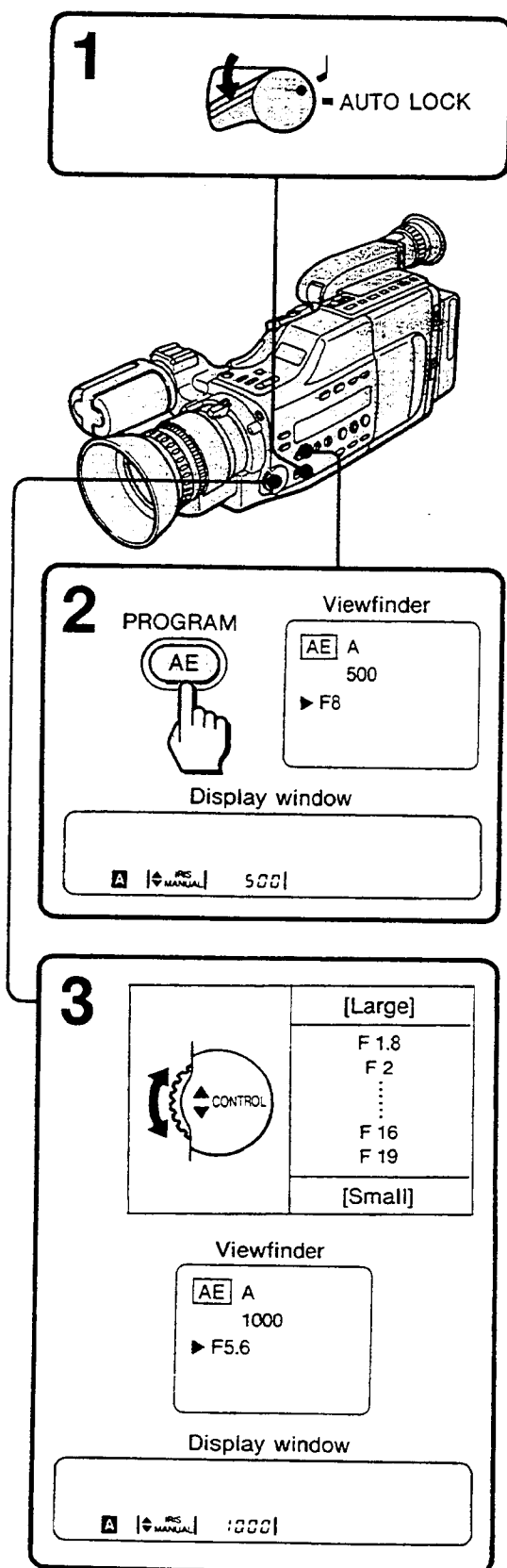
(c-1)

The aperture priority mode enables to select the aperture which determines the depth of field. 15 aperture values, from F1.8 to F19, can be selected. The shutter speed is automatically set (between 1/60 and 1/2000) in combination with the aperture value to maintain the appropriate exposure.

Aperture Priority Application

To shoot the picture with different depths of field.

(c-2)



Aperture Priority Mode

Operation

(c-2)

- 1** Set the AUTO LOCK switch down.
- 2** Press the PROGRAM AE button until the **AE A** indication is displayed in the viewfinder and **A** in the display window. The camcorder enters the aperture priority mode.
- 3** Move the CONTROL dial to set to the desired aperture value.
The selectable aperture values are:
F1.8, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, F14, F16, F19

The shutter speed indication corresponds to the change of the aperture value.

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the aperture priority mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the aperture priority mode
Focus and white balance can be adjusted manually.

See page 68 (focus) and page 71 (white balance) for details.

Hints for effective camera work

- **Understanding the depth of field**

The depth of field is the area in which the objects are in focus. A shallow depth of field shows the subject in focus and the background out of focus. The greatest depth of field shows everything in focus.

- **Depth of field and aperture value**

A large aperture provides a shallow depth of field and a small aperture provides a deep depth of field.

- **Depth of field and object-to-camera distance**

When the object-to-camera distance is near, the depth of field will be shallow. When the object-to-camera distance is far, the depth of field will be great.

- **Depth of field and zooming**

The depth of field will be shallow in the telephoto position. The depth of field will be great in the wide position.

- **Summary**

	A shallow depth-of-field	A deep depth-of-field
Aperture	Towards open	Towards closed
Object-to-camera distance	Near	Far
Zoom	Telephoto	Wide

Aperture Priority Mode

When the ► indication in the viewfinder is flashing

The lighting condition is insufficient or excessive for the aperture priority mode. In this case, move the CONTROL dial and reset the aperture.

- **Insufficient light (when the picture inside the viewfinder is dark)**

Decrease the aperture.

- **Excessive light (when the picture inside the viewfinder is too bright)**

Increase the aperture.

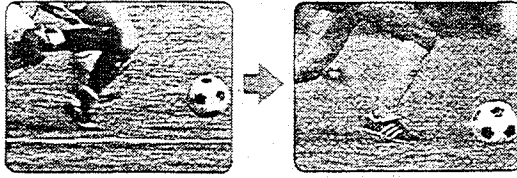
Although we recommend camera recording without the ► indication flashing, camera recording can be performed even when the ► indication is flashing. Check the picture in the viewfinder before recording.

When recording under fluorescent, sodium, or mercury lamps

- The brightness of the recorded picture may flicker.
 - The color of the recorded picture may vary.
-

Shutter Priority Mode

(d-1)



(d-1)

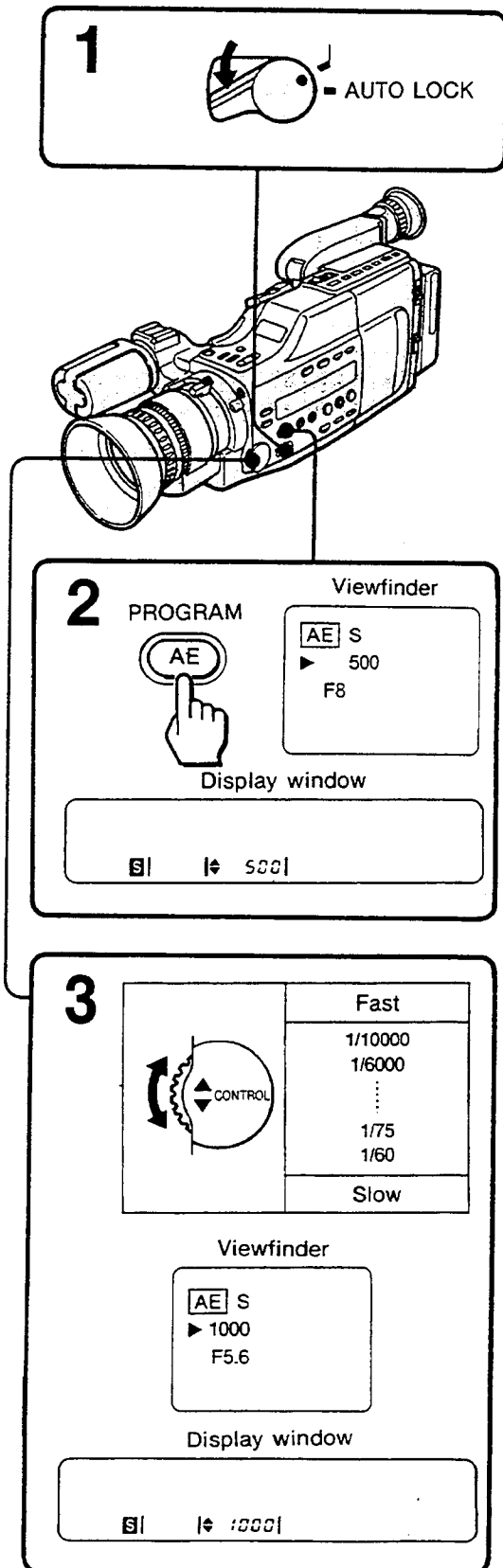
The shutter priority mode enables selection of the shutter speed. 27 shutter speeds can be selected from 1/60 (normal speed) to 1/10000. When a fast shutter speed is selected, subjects moving at high speed can be recorded and the picture can be observed more clearly with less picture shaking in the still or slow modes compared to slower shutter speeds. The aperture value is automatically set (between F1.8 and F19) in combination with the shutter speed to maintain the appropriate exposure.

Shutter Priority Applications

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

Shutter Priority Mode

(d-2)



Operation

(d-2)

- 1** Set the AUTO LOCK switch down.
- 2** Press the PROGRAM AE button until the **AE S** indication is displayed in the viewfinder and **S** in the display window. The camcorder enters the shutter priority mode.
- 3** Move the CONTROL dial to set to the desired shutter speed.
The selectable shutter speeds are:
1/60, 1/75, 1/90, 1/100, 1/125, 1/150, 1/180, 1/215, 1/250, 1/300, 1/350, 1/425, 1/500, 1/600, 1/725, 1/850, 1/1000, 1/1250, 1/1500, 1/1750, 1/2000, 1/2500, 1/3000, 1/3500, 1/4000, 1/6000, 1/10000

The aperture value indication corresponds to the change of the shutter speed.

Shutter Priority Mode

To return to the full automatic mode

Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the shutter priority mode

Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the shutter priority mode

Focus and white balance can be adjusted manually. See page 68 (focus) and page 71 (white balance) for details.

Hints for effective camera work

Refer to the chart below for the appropriate shutter speed for the object. Check the brightness of the picture in the viewfinder.

When to use	Recommended speed
<ul style="list-style-type: none">• On clear days, recording golf or tennis scenes. (To view the hit ball clearly in the slow or still mode, select shutter speeds between 1/1000 and 1/4000)• Recording the skiers.	1/10000 to 1/600
<ul style="list-style-type: none">• On overcast days, recording a moving merry-go-round or a roller coaster.• Recording outdoors stably from inside a moving automobile.• General athletic scenes, marathon, etc.	1/500 to 1/125
<ul style="list-style-type: none">• Used in place of the ND2 filter to reduce the exposure to approximately 1/2.• Recording indoors for stable recording.	1/100
<ul style="list-style-type: none">• Recording under bright sunlight. To avoid out-of-focus pictures while recording with small aperture.	1/90 to 1/75

Shutter Priority Mode

When the ► indication in the viewfinder is flashing

The lighting condition is insufficient or excessive for the shutter priority mode. In this case, move the CONTROL dial and reset the shutter speed.

Although we recommend camera recording without the ► indication flashing, camera recording can be performed even if the ► indication is flashing. In this case, check the picture in the viewfinder before recording.

When is shutter speed 1/60 indicated?

1/60 indication is displayed only when the shutter speed is set to 1/60 using the CONTROL dial. Even though the shutter speed is set to 1/60 during the full automatic mode, the indication will not be displayed.

When the shutter speed is set 1/250 or faster

Try to shoot under sunlight outdoors, and with the video light indoors.

When shooting a very bright object

A vertical band (smear) may appear on the screen if shot at high speeds.

When the shutter speed is changed when shooting a TV screen

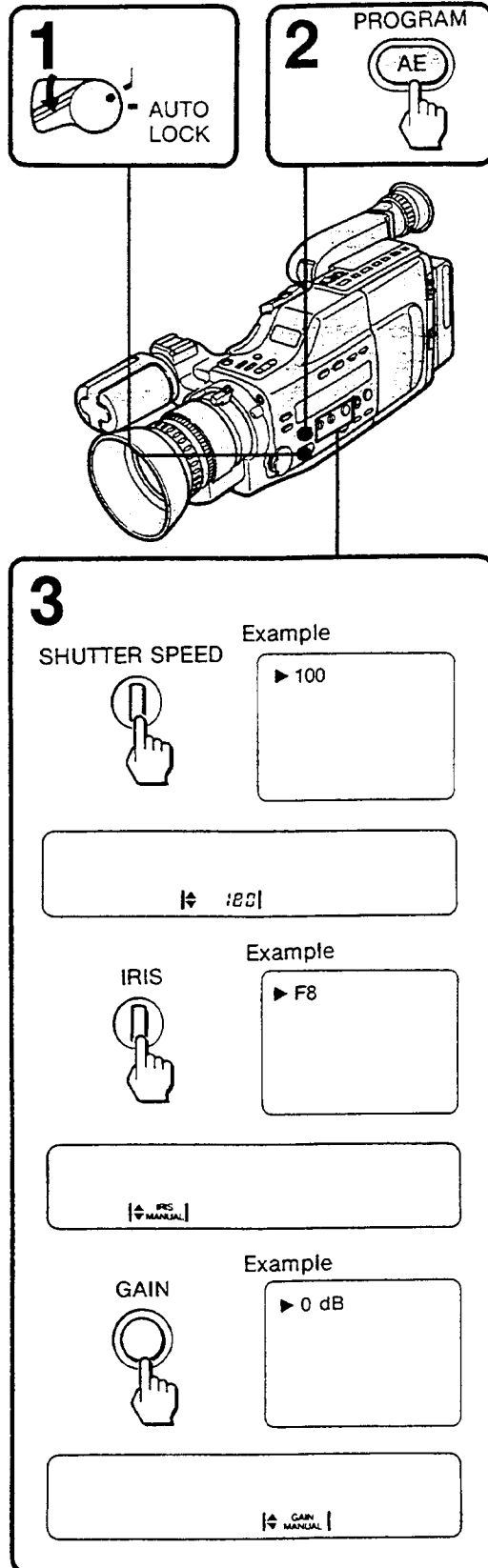
The brightness of the recorded picture may vary.

When recording under fluorescent, sodium, or mercury lamps

- The brightness of the recorded picture may flicker.
 - The color of the recorded picture may vary.
-

Manual Mode

(e-1)



In the manual mode, independent setting of the aperture value, shutter speeds, and gain can be performed. Setting of a single parameter or a combination of two or three parameters at one time is possible.

Setting One Parameter

(e-1)

- 1** Set the AUTO LOCK switch down.
- 2** Press the PROGRAM AE button until nothing is indicated in the upper left hand corner of the viewfinder.
The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

- 3** Press the button of the parameter to be set.

To set the shutter speed

The first press of the SHUTTER SPEED button sets the shutter speed to 1/100 speed and the second press sets it to 1/1000. To set to other speeds, go to step 4.

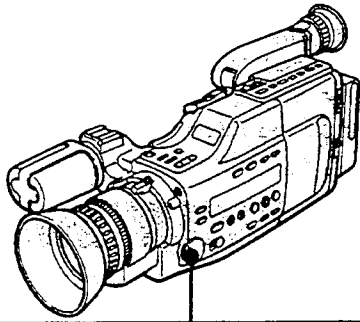
To set the aperture value

Press the IRIS button. The aperture is set to the value at the instant the button was pressed.

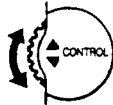
To set the gain

Press the GAIN button. The gain is set to the level at the instant the button was pressed.

Continued on the next page



4



27 shutter speeds

Fast

1/10000
1/6000



1/75
1/60

Slow

16 aperture value

Large

F 1.8
F 2



F 19
CLOSE

Small

8 gain levels

High

+18dB
+15dB



0dB
-3dB

Low

4 Select the desired setting by the CONTROL dial.

The indication in the viewfinder changes as shown in the illustration and below.

Selectable shutter speeds

1/60, 1/75, 1/90, 1/100, 1/125, 1/150, 1/180, 1/215, 1/250, 1/300, 1/350, 1/425, 1/500, 1/600, 1/725, 1/850, 1/1000, 1/1250, 1/1500, 1/1750, 1/2000, 1/2500, 1/3000, 1/3500, 1/4000, 1/6000, and 1/10000

Selectable aperture value

F1.8, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, F14, F16, F19, and CLOSE

Selectable gain level

-3 dB, 0 dB, +3 dB, +6 dB, +9 dB, +12 dB, +15 dB, and +18 dB

(e-2)

SHUTTER SPEED



IRIS



GAIN



To return to the full automatic mode

Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the manual mode

Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the manual mode

Focus and white balance can be adjusted manually. See page 68 (focus) and page 71 (white balance) for details.

The buttons pressed and the indication in the viewfinder

(e-2)

- **When the SHUTTER SPEED button is pressed**

The first press of this button sets the camcorder to the 1/100 shutter speed. The second press sets the camcorder to the 1/1000 shutter speed. For a quick access to the desired shutter speed, first press the button and set to the shutter speed whichever is closer to the desired speed and then turn the CONTROL dial.

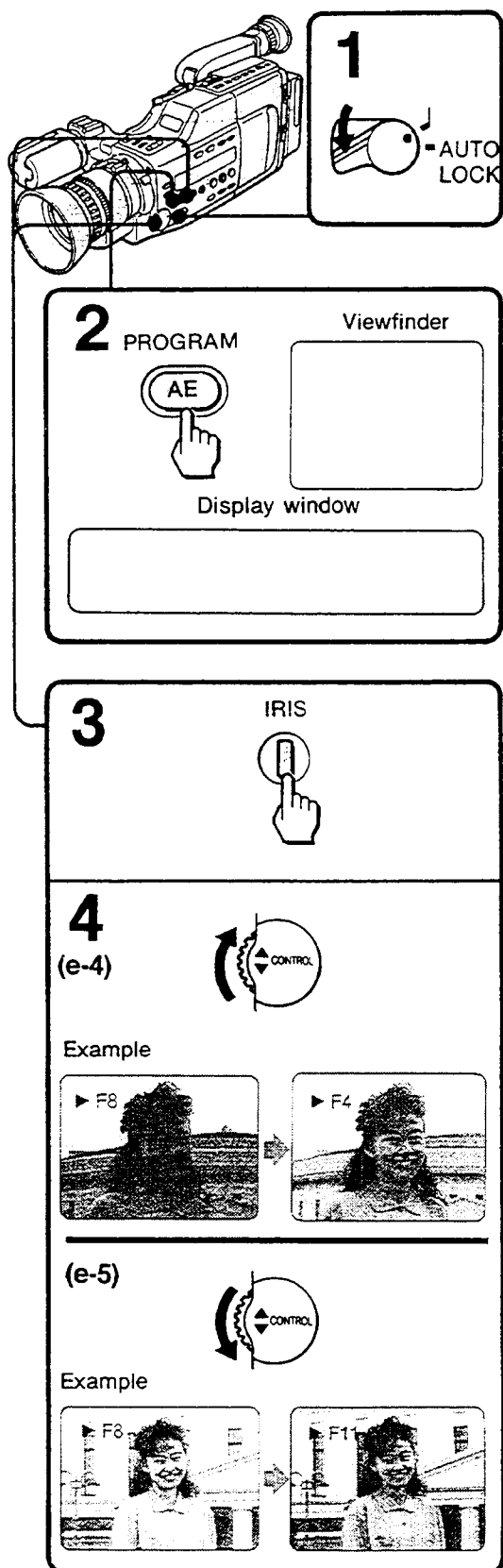
- **When the IRIS button is pressed**

The camcorder indicates the aperture value that was last detected when the camcorder was controlling the aperture automatically. At the same moment, though there is no indication, the gain level will be locked to match the aperture above to maintain the appropriate aperture.

- **When the GAIN button is pressed**

The camcorder indicates the gain level that was last detected when the camcorder was controlling the gain level automatically. If aperture value was set first, the gain level to match that aperture value to maintain the appropriate exposure will be indicated in the viewfinder.

(e-3)



Manual Mode

Aperture Control Applications

(e-3)

Adjust the exposure when there is an extreme difference in the brightness between the subject and the background.

- 1** Set the **AUTO LOCK** switch down.
- 2** Press the **PROGRAM AE** button until nothing is indicated in the upper left hand corner of the viewfinder. The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

- 3** Press the **IRIS** button.
- 4** Move the **CONTROL** dial to set the aperture to the appropriate value.

Illumination from behind the subject and opposite the camera (Back light)

(e-4)

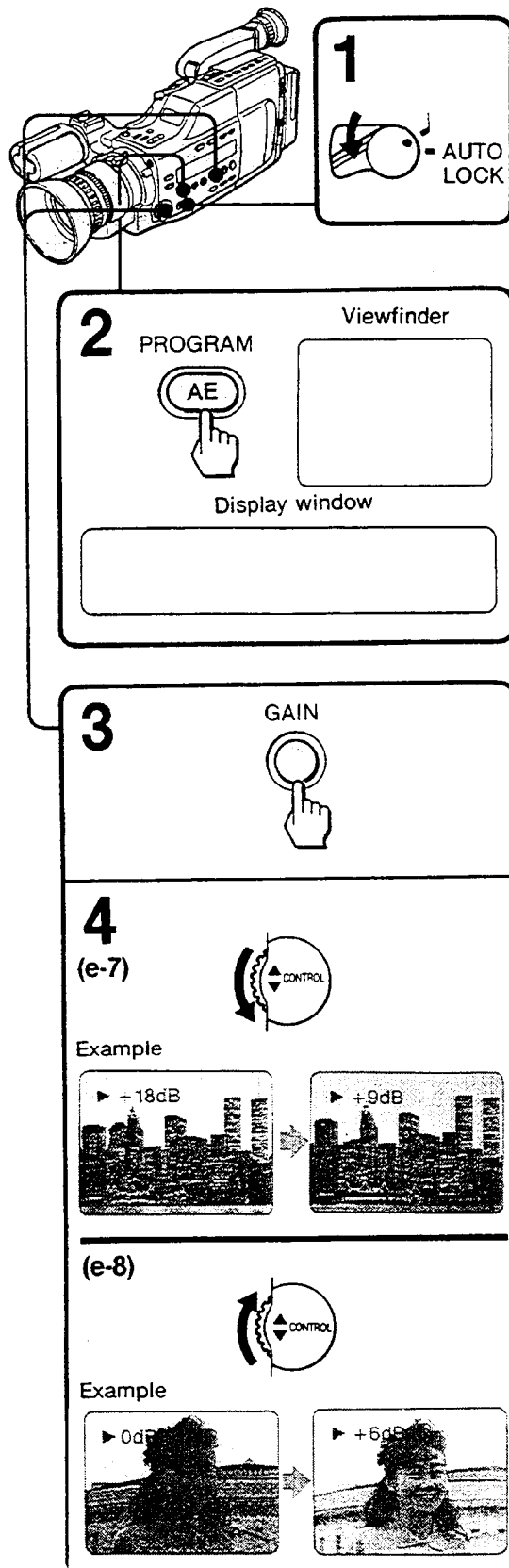
Move the **CONTROL** dial up to decrease the aperture value.

Illumination too strong

(e-5)

Move the **CONTROL** dial down to increase the aperture value.

(e-6)



Gain Level Control Applications

(e-6)

This camcorder automatically raises the gain level to capture the subject clearly when the shooting condition is dark. Due to this function, the recorded picture may seem brighter than the actual shooting condition. In these cases, set the gain level to reproduce the actual atmosphere. The gain level control can also be applied to adjusting the picture under back light condition without changing the depth of field.

1 Set the **AUTO LOCK** switch down.

2 Press the **PROGRAM AE** button until nothing is indicated in the upper left hand corner of the viewfinder.

The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

3 Press the **GAIN** button.

4 Move the **CONTROL** dial to set the gain to the appropriate level.

Shooting the picture in the dark effectively (e-7)

Move the **CONTROL** dial down to lower the gain level.

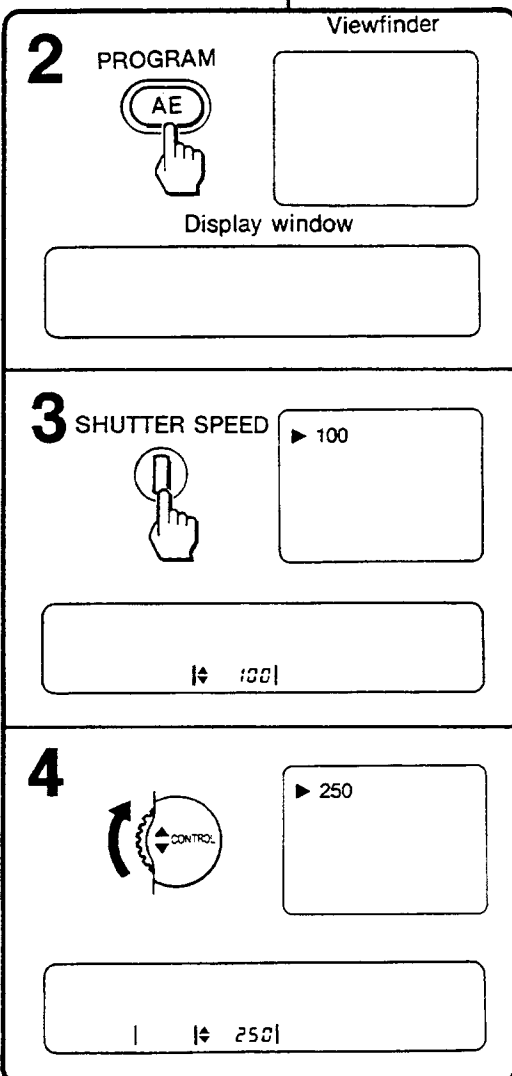
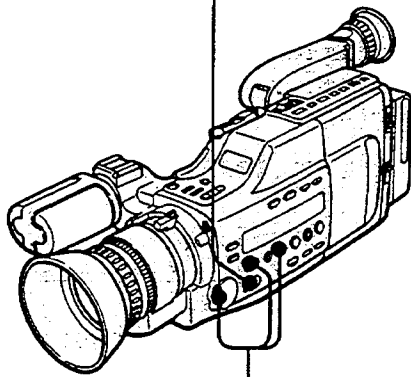
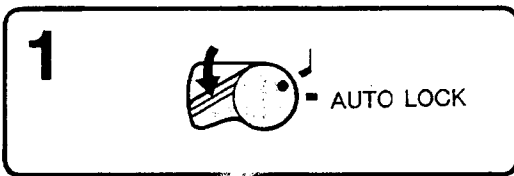
Illumination from behind the subject and opposite the camera (Back light) (e-8)

Move the **CONTROL** dial up to raise the gain level.

When the gain level is too high
The picture may become distorted.

Manual Mode

(e-9)



Setting Multiple Parameters

(e-9)

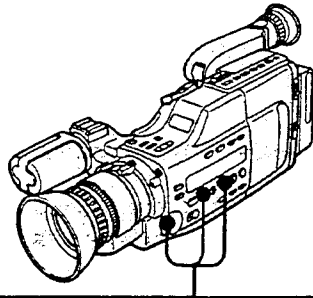
Example: To set the shutter speed to 1/250, aperture value to F4, and gain level to +6dB.

- 1** Set the **AUTO LOCK** switch down.
- 2** Press the **PROGRAM AE** button until nothing is indicated in the upper left hand corner of the viewfinder.
The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.
- 3** Press the **SHUTTER SPEED** button.
- 4** Move the **CONTROL** dial and set the shutter speed to 250.

Continued on the next page

Manual Mode



5

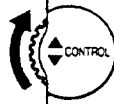
IRIS



250
► F5.6

| IRIS MANUAL | 250 |

6



250
► F4

| IRIS MANUAL | 250 |

7

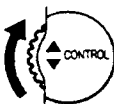
GAIN



250
F4
► 0dB

| IRIS MANUAL | 250 | GAIN MANUAL |

8



250
F4
► +6dB

| IRIS MANUAL | 250 | GAIN MANUAL |

5 Press the IRIS button.

6 Move the CONTROL dial and set the aperture value to F4.

7 Press the GAIN button.

8 Move the CONTROL dial and set the gain level to +6dB.

Camera recording will be performed under this setting even when the shooting condition changes.




To return to the full automatic mode

Set the AUTO LOCK switch to AUTO LOCK.

What parameter to set first

Setting can be performed from any parameter. Press the button of the desired parameter. The indication when the button is pressed is the same as those explained in page 105.

(e-10)

Parameter	Indications in the Viewfinder (setting examples)
SHUTTER SPEED 	<div>▶ 250</div> <div>→</div> <div></div>
	<div>▶ 250 F4</div> <div>→</div> <div>▶ F4</div>
	<div>▶ 250 0dB</div> <div>→</div> <div>▶ 0dB</div>
	<div>▶ 250 F4 0dB</div> <div>→</div> <div>▶ F4 0dB</div>
IRIS 	<div>▶ F1.8</div> <div>→</div> <div></div>
	<div>500 ▶ F1.8</div> <div>→</div> <div>▶ 500</div>
	<div>▶ F1.8 +3dB</div> <div>→</div> <div>▶ +3dB</div>
	<div>500 ▶ F1.8 +3dB</div> <div>→</div> <div>500 ▶ +3dB</div>
GAIN 	<div>▶ +6dB</div> <div>→</div> <div></div>
	<div>F2.8 ▶ +6dB</div> <div>→</div> <div>▶ F2.8</div>
	<div>1000 ▶ +6dB</div> <div>→</div> <div>▶ 1000</div>
	<div>1000 F2.8 ▶ +6dB</div> <div>→</div> <div>1000 ▶ F2.8</div>

To change the setting

- Parameter with the ▶ indication:
Move the CONTROL dial to change the setting.

- Parameter without the ▶ indication:

- 1 Press the button of the desired parameter to move the ▶ indication to that parameter.

- 2 Then move the CONTROL dial to change the setting.

To quit the setting

(e-10)

- Parameter with the ▶ indication:
Press the button of that parameter. The indication is erased from the viewfinder.

- Parameter without the ▶ indication:

- 1 Press the button of the parameter to be erased to move the ▶ indication to that parameter.

- 2 Then press the same button to erase that parameter from the viewfinder.

When the parameter is erased

The adjustment of that parameter will be as follows.

- Shutter speed: Locked to 1/60.
- Aperture value: Automatic adjustment
- Gain level: Automatic adjustment. However, when the aperture value is in the viewfinder (i.e. locked to a certain value), gain will be set to the corresponding level to maintain the appropriate exposure.

(e-11)

	Aperture value	Shutter speed	Gain level
Selectable steps	16 steps	27 steps	8 steps
Variation of exposure (in terms of EV steps)	0.5 EV steps	0.25 EV steps	0.5 EV steps
		0.5 EV steps*	
Towards bright (+ EV) ↑ ↓ Towards dark (- EV)	F1.8 ↑ ↓ F19	1/60 ↑ ↓ 1/10000	+18 dB ↑ ↓ -3 dB

*For shutter speeds between 1/4000 and 1/10000.

Advanced Application of the Manual Mode

The manual adjustment function offers an advanced video camera recording technique by controlling the exposure with the balance of shutter speed, aperture value and gain level.

Understanding the relation between aperture value, shutter speed, and gain

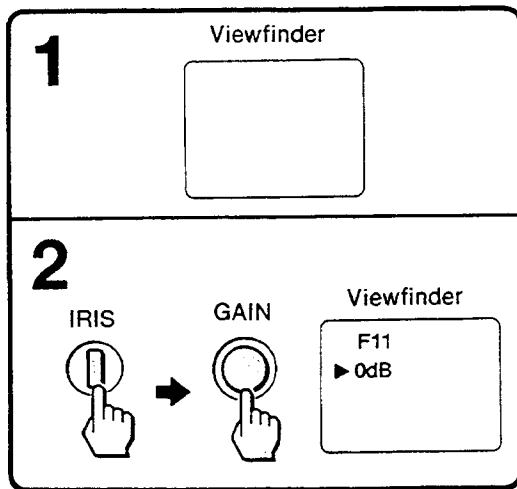
Exposure is measured in the units of Exposure value (EV). In this camcorder, the total EV can be varied or kept at a constant level by controlling the balance of the parameters.

Refer to the chart on the left (e-11) for an overview of the relation between aperture value, shutter speed, and gain of this camcorder.

The relation between exposure and the aperture, shutter speed, and gain can be concluded as:

$$\text{EV (Exposure value)} = \text{Aperture control} + \text{Shutter speed control} + \text{Gain control}$$

(e-12)



Example: To change the setting without changing the exposure
(e-12)

1 Set the camcorder to the manual mode referring to page 104.

2 Press the IRIS and GAIN buttons.
At this point, the shutter speed is set to 1/60, the aperture and gain are set to the shooting condition. Let's suppose the aperture value is F11 and the gain level is 0 dB.

The setting at this point becomes the basic reference to perform the following setting.

Let's set the exposure at this point at 0 EV.

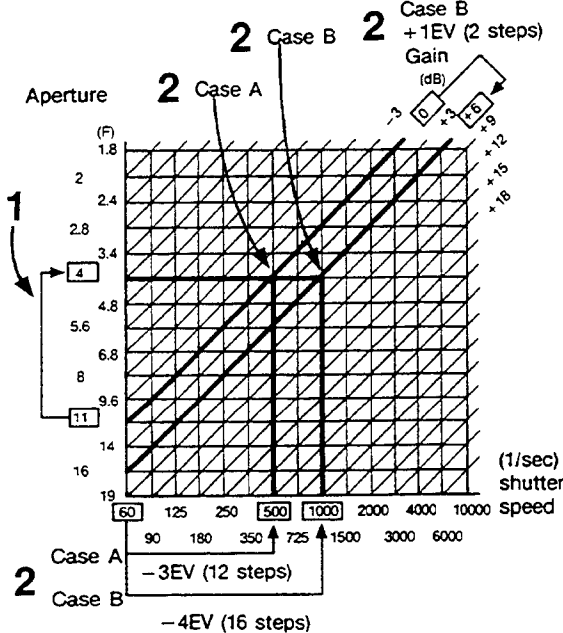
$$0 \text{ EV} = \text{Aperture control} + \text{Shutter speed control} + \text{Gain control}$$

In order to maintain the same exposure, the total exposure should be kept to 0 EV in any case.

3 Refer to the diagram on the left (e-13) to choose the setting.

(e-13)

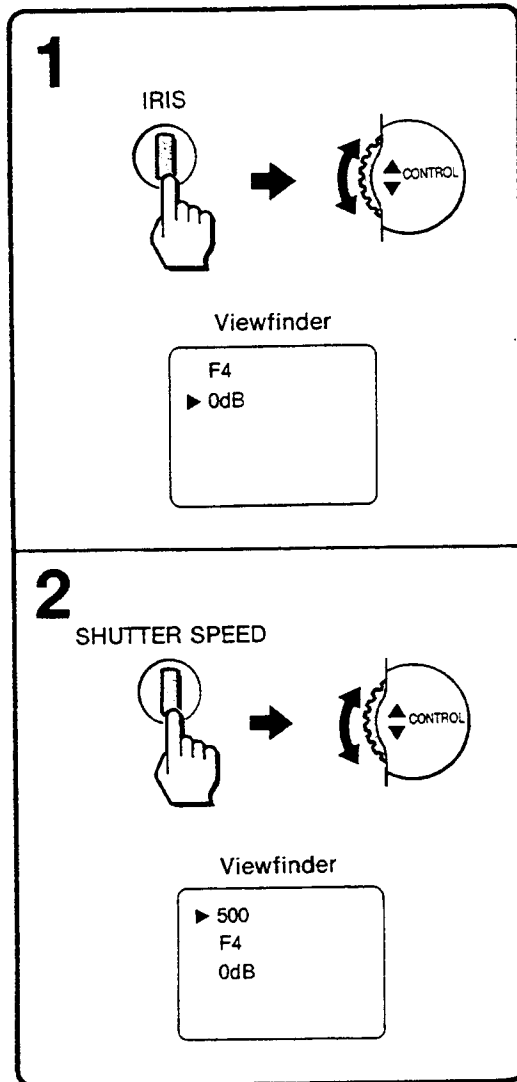
Relation between exposure (aperture/gain), and shutter speed



Setting in step 2
Aperture value: F11
Shutter speed: 1/60
Gain level: 0dB

Vertical axis: Aperture value in 0.5EV/step
Horizontal axis: Shutter speed in 0.25EV/step for shutter speeds between 1/60 and 1/4000, 0.5EV/step for shutter speeds between 1/4000 and 1/10000
Diagonal axis: Gain level in 0.5 EV/step

(e-14)



To set the aperture to F4 without changing the exposure

(e-14)

1 Press the IRIS button and move the CONTROL dial to set the aperture to F4. When shifting the aperture from F11 to F4, the exposure becomes 6 steps brighter. This means that in terms of EV, the total exposure becomes +3 EV. In order to keep the total exposure to 0 EV, reduce the exposure by -3 EV with shutter speed or gain.

2 Case A: To reduce the exposure by shutter speed

How it works:

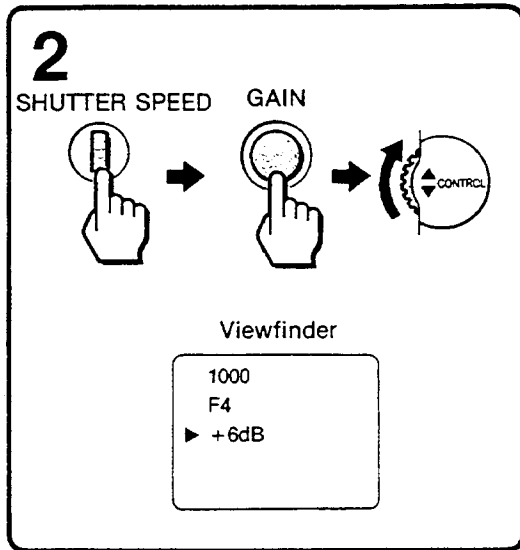
What is required here is to reduce the exposure by -3 EV, i.e. 12 steps, by shifting the shutter speed from 1/60 to 1/500.

Operation:

Press the SHUTTER SPEED button and move the CONTROL dial to set the shutter speed to 1/500.

0 EV =	Aperture control	+	Shutter speed control
	F11 to F4		1/60 to 1/500
	+3 EV		-3 EV

Continued on the next page



Case B: To keep the shutter speed at 1/1000 and to reduce the exposure by gain level.

How it works:

When setting the shutter speed to 1/1000, the total exposure is reduced to -4 EV. This means that +1 EV, i.e. 2 steps, should be added by controlling the gain level. Therefore, shift the gain level from 0 dB to +6 dB.

Operation:

Press the SHUTTER SPEED button twice and set the shutter speed to 1/1000. Then press GAIN and set the gain level to +6 dB using the CONTROL dial.

Aperture control	Shutter speed control	Gain control
0 EV = F11 to F4	1/60 to 1/1000	0 dB to -6 dB
+3 EV	-4 EV	+1 EV

Hint for effective camera work

Gain can be used in terms of film sensitivity of a still camera.

Notes

- When shooting outdoors, the brightness of the object may change due to the change of weather.
- When the shooting condition changes, resetting of the parameters is recommended.

Custom Preset Function

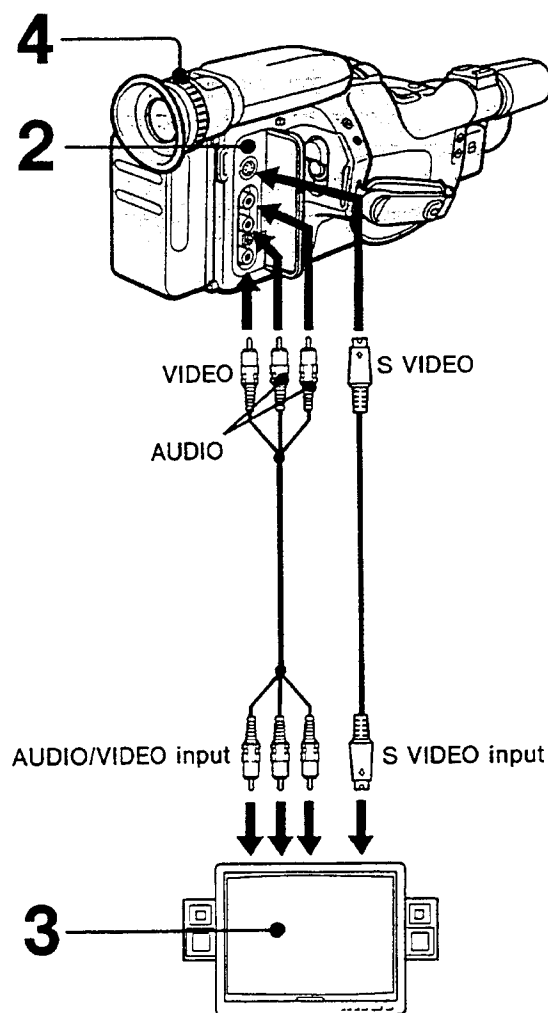
The camcorder can be preset to record the picture with the desired contrast, color, sharpness, and hue. Adjust the camera, if necessary, after making several trial recordings.

Connections

(f-1)

When using the custom preset function, adjust the picture by shooting a subject and checking the picture on a TV or a monitor.

- 1 Connect the camcorder and the TV or monitor referring to the illustration.
- 2 Set the IN/OUT selector to OUT.
- 3 Set the TV/VIDEO selector on the TV or monitor to VIDEO.
- 4 Press DATA SCREEN to display the CUSTOM PRESET menu indication in the viewfinder on the TV or monitor screen.



Understanding the setting in the CUSTOM PRESET menu

The custom preset function is effective only when the tape recorded in the CUSTOM PRESET mode is viewed on the TV or monitor that was connected to the camcorder at the time of the setting.

Therefore, the tape may not reproduce the picture in the expected contrast, color sharpness, or hue, when played back on a different TV or monitor.

Note

For details on the TV, refer to the operating instructions of the TV.

Custom Preset Function

Operation

(f-2)

1 Set the **POWER** switch to **CAMERA** and slide the **STANDBY** switch up.
The camcorder enters the recording standby mode.
In order to adjust the picture precisely, adjust the focus and white balance manually.

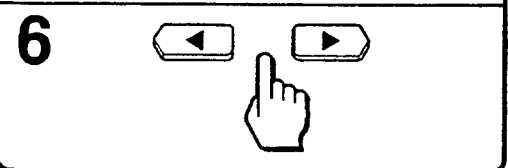
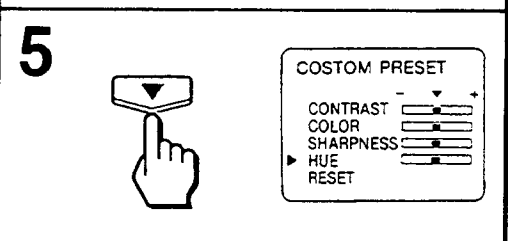
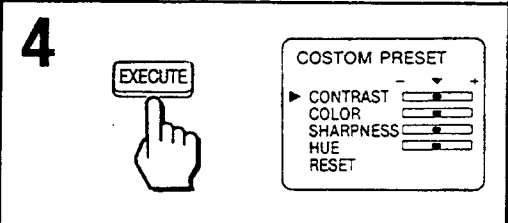
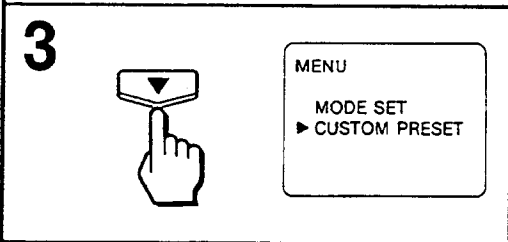
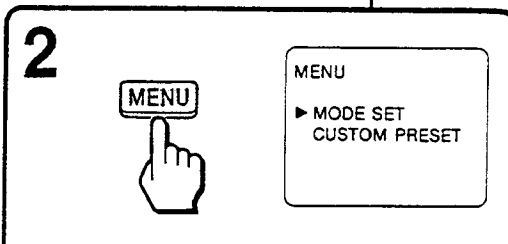
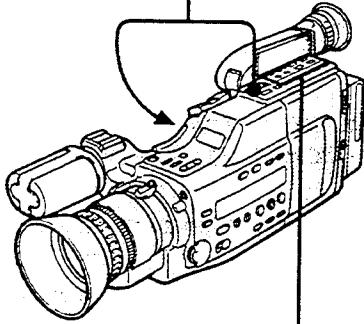
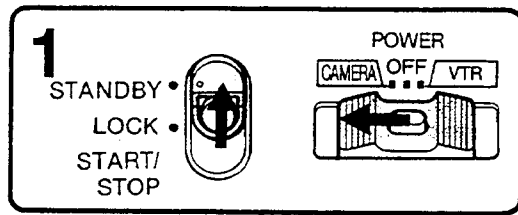
2 Press **MENU**.

3 Press **▼** and move cursor to **CUSTOM PRESET**.

4 Press **EXECUTE**.
The **CUSTOM PRESET** menu is displayed.

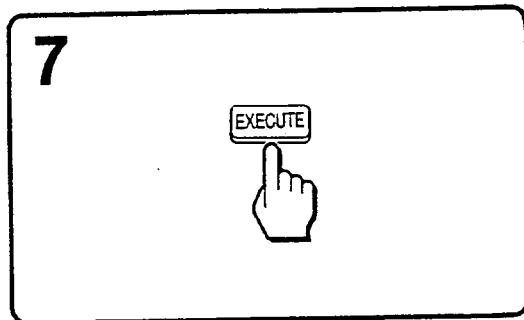
5 Press **▼** and move cursor to the item to be adjusted.
Each press of **▼** moves the cursor to the item below. When the cursor is at **RESET**, press **▼** again to move the cursor to **CONTRAST**.

6 Press **◀** or **▶** to adjust the picture shot by the camera by monitoring it on the TV or monitor screen.
Three steps each from the standard position can be selected.



Parameter	Function	◀ - ▼ + ▶
CONTRAST	To adjust the brightness	Darker Brighter
COLOR	To adjust the color intensity	Lighter Darker
SHARPNESS	To sharpen the outline	Softer Sharper
HUE	To adjust the hue	Purplish Greenish

Continued on the next page



- 7** Check the cursor is not set to RESET and press EXECUTE.
The CUSTOM PRESET menu is cleared and the new setting is stored in the memory.

To record in the setting made in the CUSTOM PRESET menu

- 1** Set the camcorder in the recording pause mode.
- 2** Call up the MODE SET menu referring to page 61.
- 3** Select "CUSTOM MODE ON".
- 4** Press EXECUTE.
- 5** Set the AUTO LOCK switch down.
The **CP** indication is displayed in the viewfinder.
- 6** Press START/STOP to start recording.

After recording

Reset the AUTO LOCK switch to AUTO LOCK.
The **CP** indication disappears, but the settings of the parameters are retained.

To return to the standard setting

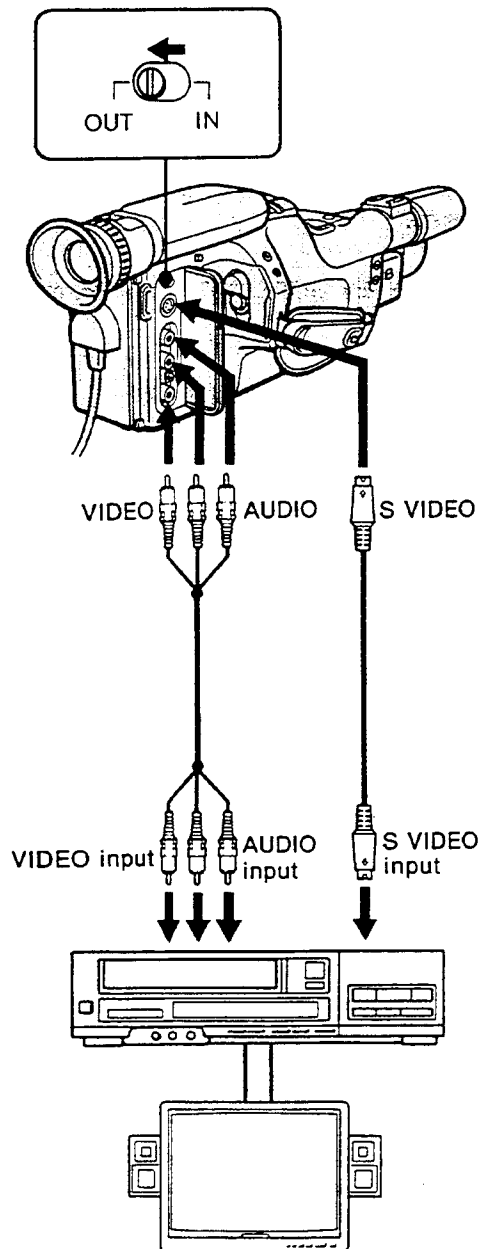
Set cursor to RESET in step 7 of "Operation" and press EXECUTE.
The CUSTOM PRESET menu is cleared. All of the parameters will be at the standard position the next time it is called up.

Note

The effect of the CUSTOM PRESET function may not be apparent depending upon the brightness, pattern, and color of the subject.

Editing onto Another VCR

(g)



You can create your own video program by editing with any other 8 mm, Betamax, or VHS format VCR.

Before You Begin

(g)

- Make connections using the supplied A/V connecting cable for stereo equipment. For monaural equipment, connect only the white plug for audio and select "HIFI SOUND **1**" in the menu. See "Selecting the Monitor Sound" on page 51.
- Use of the supplied AC power adaptor is recommended.
- Set the IN/OUT selector on the camcorder to OUT.
- Select "EDIT ON" in the MODE SET menu. See page 59.
- Press DATA SCREEN to clear the indication from the viewfinder. Otherwise, the indication will be recorded together with the picture on the recording VCR.
- Set the input selector of the VCR to LINE, if available.

Operation

- 1 Insert a tape for recording into the recording VCR.
- 2 Set the POWER switch on the camcorder to VTR and insert a source tape.
- 3 Play back the tape on the camcorder and locate the editing start point. Then set the camcorder to the playback pause mode.
- 4 Play back the tape on the recording VCR and locate the recording start point. Then set the VCR to the recording pause mode.
- 5 Release the pause mode on both VCRs. Editing starts.

To stop editing momentarily

Press **II** on the recording VCR.

To edit more scenes

Repeat steps 3 to 5.

To stop editing

Press **■** on both VCR.

To record a title

Use the camcorder as a player. Play back the tape and call up the title in the desired mode. The played back picture will be recorded on the recording VCR with the title superimposed. For details on the title, refer to pages 79 to 88.

Notes on edit function

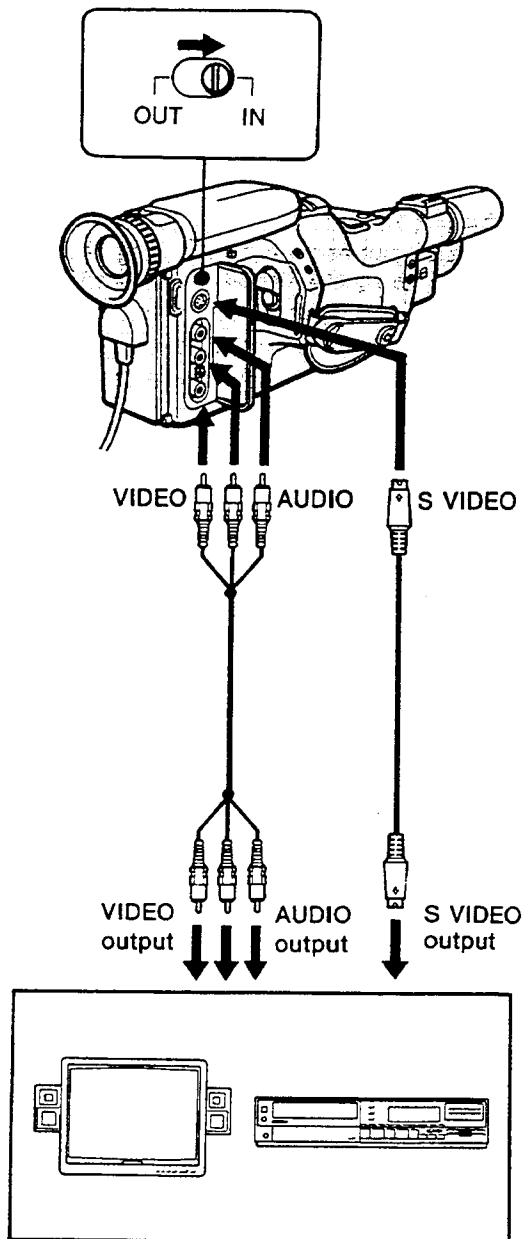
When using the camcorder as the playback VCR, selecting the "EDIT ON" in the MODE SET menu activates the edit function. Picture deterioration resulting from editing can be kept to the minimum. However, avoid using the edited tape for multiple generations of editing. Deactivate the edit function when not editing.

Notes on the RC time code and data code

The RC time code and data code recorded with this camcorder are not output from the S VIDEO connector or VIDEO jack.

Recording from Another VCR or a TV

(h)



Before You Begin

(h)

- Make connections using the supplied A/V connecting cable for stereo equipment. For monaural equipment, connect only the white plug for audio.
- Set the IN/OUT selector on the camcorder to IN.

Operation

- 1 Turn on the TV or VCR.
- 2 Select the TV channel or play back the tape to be recorded.
- 3 Set the POWER switch on the camcorder to VTR.
- 4 Insert a tape and slide REC ●. Recording starts.
The picture being recorded can be monitored in the viewfinder as well as on the TV screen.

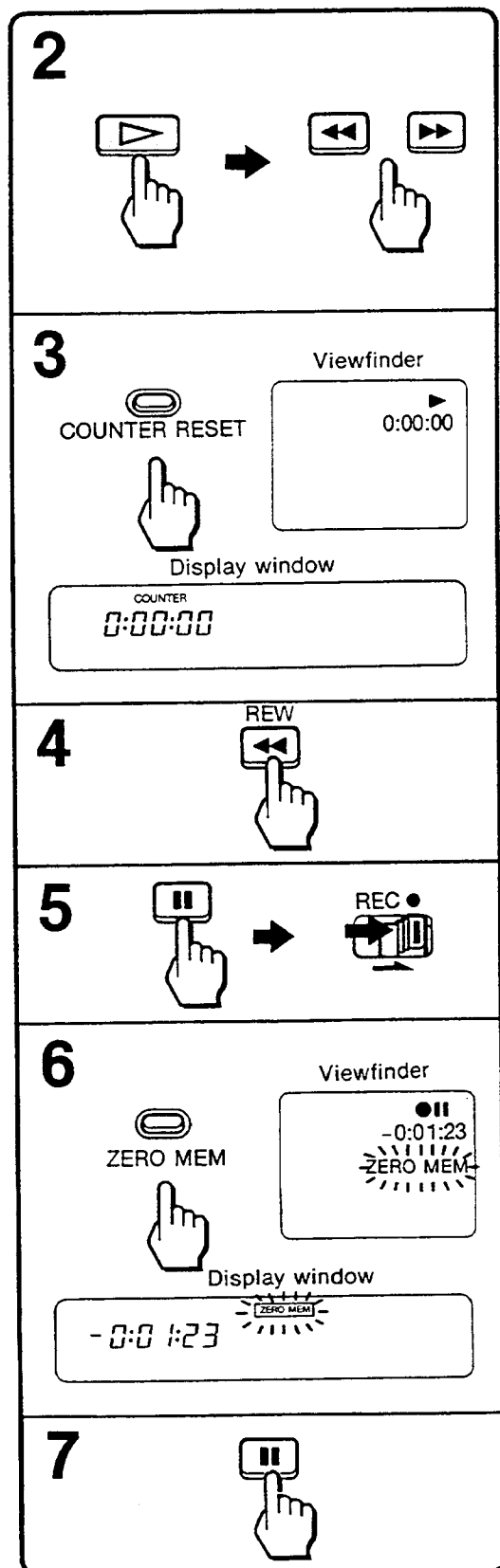
What to choose for Hi8 recording

Select "Hi8 AUTO" in the MODE SET menu. Recording in the Hi8 mode will be performed when a Hi8 tape **Hi8** is used. When a standard tape **8** is used, recording is performed in the normal mode.

Notes on connection

- When the TV or the playback VCR is monaural, make connection only to the L jack. Recording will be made in monaural.
- When connection is made both to the VIDEO jack and the S VIDEO connector, the video signal fed from the S VIDEO connector has priority.

(i)



Insert Recording

You can insert new scenes from a TV or a VCR onto your originally recorded tape.

Before You Begin

- Make the same connection explained in "Recording from Another VCR or a TV" page 120.
- Set the IN/OUT selector on the camcorder to IN.
- Make sure that the COUNTER mode is set to NORMAL in the menu. (See page 41.)

Operation

(i)

- 1 Follow steps 1 to 3 in "Recording from Another VCR or a TV – Operation".
- 2 Play back the tape in the camcorder and locate the point where the insert should end by pressing ⏮ or ⏭.
- 3 Press COUNTER RESET at the end point. The counter is reset to "0:00:00".
- 4 Rewind the tape in the camcorder and locate the point where the insert should begin.
- 5 Set the camcorder to the recording pause mode at the insert start point.
- 6 Press ZERO MEM. The insert end point is stored in the memory as the "0:00:00" point.
- 7 Release the pause mode of both units. Insert recording will start. The picture being recorded can be monitored in the viewfinder as well as on the TV screen.
- 8 The insert recording will stop automatically around the counter zero point.

To change the end point of the edit
Press ZERO MEM so that the ZERO MEM indication disappears. Start from step 2.

Notes and Precautions



Notes on 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 or the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors.




However, take the following precautions.

If moisture condenses inside the unit

(j-1)




Moisture is present inside the camcorder when the  and  indication in the viewfinder flashes. In this case, no function except for tape ejection will work.

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


The camcorder can be used again if the  and  indication does not appear when the power is turned on again. ( indication appears only when a tape is inserted.)

If moisture condenses on the surface of the tape

(j-2)

If moisture is present on the surface of the tape when the tape is inserted and a tape transport button (, , etc.) is pressed, the  indication flashes inside the viewfinder. In such a case, no function except for tape ejection will work.

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

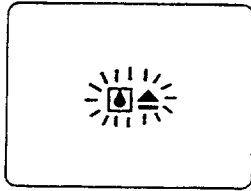
The tape can be used again if the  indication does not appear when the tape is inserted and a tape transport button is pressed.

If moisture condenses on the lens

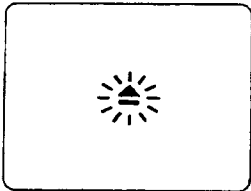
No caution indications will appear, but the picture becomes dim.

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

(j-1)



(j-2)



Notes on Video Head Cleaning

To ensure clear picture, clean the video heads periodically.

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

(j-3)

[a] Slight contamination

[b] Critical contamination

In such cases,

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

Caution

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

Note

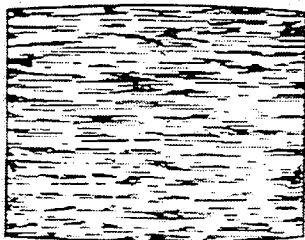
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

(j-3)

[a]



[b]



Precautions

On operation

- Operate the camcorder on 6.0 V (battery pack), 7.5 V (AC power adaptor), or 9.0 V (alkaline batteries).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder or the microphone.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap the camcorder and operate it because heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- Do not put the camcorder on the sand.

On care

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

Note on copyright

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

Using Your Camcorder Abroad

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

Power Sources

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

Difference in Color Systems

You can view the playback picture in the viewfinder. However, if you want to view the playback picture on a TV, it must be a NTSC system-based TV.

NTSC system countries

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

PAL system countries

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

PAL-M system countries

Brazil

PAL-N system countries




Argentina, Paraguay, Uruguay

SECAM system countries


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

Specifications

System

Video recording system	Rotary two heads Helical scanning FM system
Audio recording system	Rotary head, FM system (2 channels)
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassettes
Tape speeds	SP mode: Approx. 1.43 mm/sec. (1/16 inch/sec.) LP mode: Approx. 0.72 mm/sec. (1/32 inch/sec.) (playback only)
Recording time	SP mode: 2 hours (E6/P6 – 120)
Playback time	SP mode: 2 hours (E6/P6 – 120) LP mode: 4 hours (E6/P6 – 120)
Fast forward/rewind time	Approx. 7 min. (E6/P6 – 120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (Black and white)
Lens	Combined 10 × power zoom lens f = 8 to 80 mm, F1.8 with macro Filter diameter 46 mm
Auto focus system	TTL
Color temperature	Auto,  one push white balance,  3,200 K  5,800 K
Minimum illumination	4 lux (F1.8)
Illumination range	4 lux to 100,000 lux (0.4 to 9,294 footcandles)
Recommended illumination	More than 100 lux (9.3 footcandles)
Shutter speed control	1/60 to 1/10000 (27 steps)
Aperture control	Auto/manual (16 steps)
Gain control	Auto/manual (8 steps)

Input and Output Connectors

Video input/output	Phono jack, 1 Vp-p, 75 ohms unbalanced, sync negative
S video input/output	4-pin mini-DIN Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.3 Vp-p 75 ohms, unbalanced
Audio input	Phono jacks (2: stereo L and R), –7.5 dBs Input impedance more than 47 kilohms
Audio output	Phono jacks (2: stereo L and R), –7.5 dBs at 47 kilohms input impedance Impedance less than 1 kilohm
RFU DC OUT	Special mini jack, 5 V DC
Headphones jack	Stereo mini jack, 8-ohm impedance
REMOTE  jack	Stereo mini-mini jack
Microphone jack	External stereo microphone jack: mini jack, –66 dBs low impedance with 2.5 to 3 V DC, output impedance 6.8 kilohms
Microphone power output jack	Special mini jack, 5 V DC

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	6.7 W (camera recording, including the viewfinder)
Installation	Vertically, horizontally
Operating temperature	0° C to 40° C (32° F to 104° F)
Storage temperature	–20° C to 60° C (–4° F to +140° F)
Dimensions	Approx. 105 × 138 × 356 mm (w/h/d) (4 1/4 × 5 1/2 × 14 1/4 inches)
Weight	Approx. 1.2 kg (2 lb. 10 oz.) excluding the battery and the cassette
Microphone	Electret condensor microphone Uni-directional, stereo type
Accessories supplied	See page 4.

Design and specifications subject to change
without notice.

Trouble Indications

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

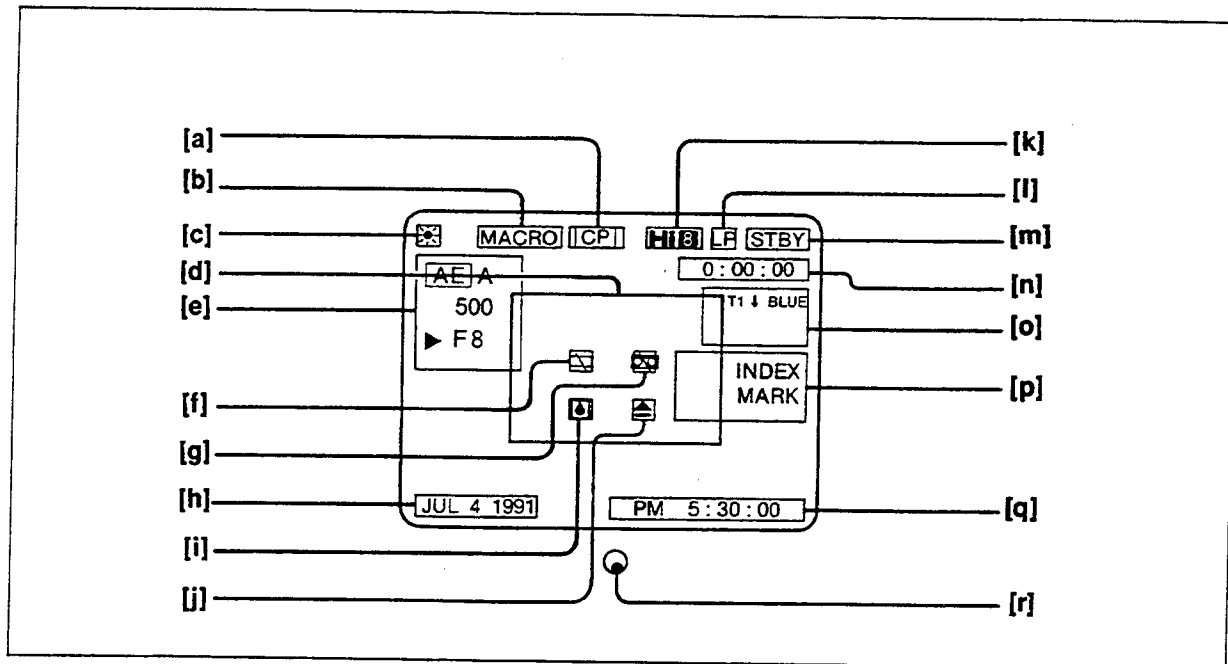
 slow flashing  fast flashing

	Symptom	Cause	Corrective actions
Camera/ VTR	 Camera recording/ battery lamps	The battery is weak.	Prepare a charged one.
	 Camera recording/ battery lamps	The battery is used up.	Use a charged battery.
Camera	 Camera recording/ battery lamps	The tape is at its end.	Use a new tape.
	 Camera recording/ battery lamps	The tape is near its end.	Prepare a new one.
		No tape is inserted.	Insert a tape.
		The red mark on the tape is exposed.	Slide the tab.
		The white balance has not been set correctly.	Adjust the white balance correctly.
		White balance is being set by the one push white balance function.	Do not move the unit until the flashing stops.
		Exposure is not appropriate in the aperture priority or shutter priority mode.	Adjust the aperture or shutter speed to obtain the appropriate exposure.
Camera/ VTR		Moisture condensation has occurred. (▲ indication appears only when a tape is inserted.)	Remove the tape and leave the recorder for at least an hour.
		Video head clogging.	Clean the head using the Sony V8-25CLH video head cleaning tape.
		Other troubles occurred.	Consult your nearest Sony dealer.
	"AM 12:00:00" flashes for 5 seconds in the viewfinder after setting the POWER switch to CAMERA. In the display window "0:00:00" or bar indication flashes.	The lithium battery is not installed. The lithium battery is exhausted.	Install the lithium battery.
	The current time flashes for 5 seconds in the viewfinder after setting the POWER switch to CAMERA.	The lithium battery is weak.	Use a new battery.


Indications in the Viewfinder and the Display Window

Indications in the Viewfinder


(k-1)





(k-1)


[a] Custom mode indication
()


[b] Macro mode indication
(MACRO)

[c] White balance mode indication
()


[d] Auto focus frame


[e] Fader and programmed **AE** and manual mode indications
(, , **AE** A, **AE** S, shutter speed, iris, gain, etc.)

[f] Battery indication
()

[g] Tape indication
()

[h] Data code (recording data or time)

[i] Moisture condensation indication
()

[j] Head clog and caution indication
()

[k] Hi8 mode indication
(**Hi8**)

[l] LP mode indication

[m] Tape operation mode, camera operation mode indication
(STBY, REC, etc.)

[n] Linear time counter and RC time code indication

[o] Title number, color, and mode indication
(T1, T2, ↑, ↓, WHT, etc.)

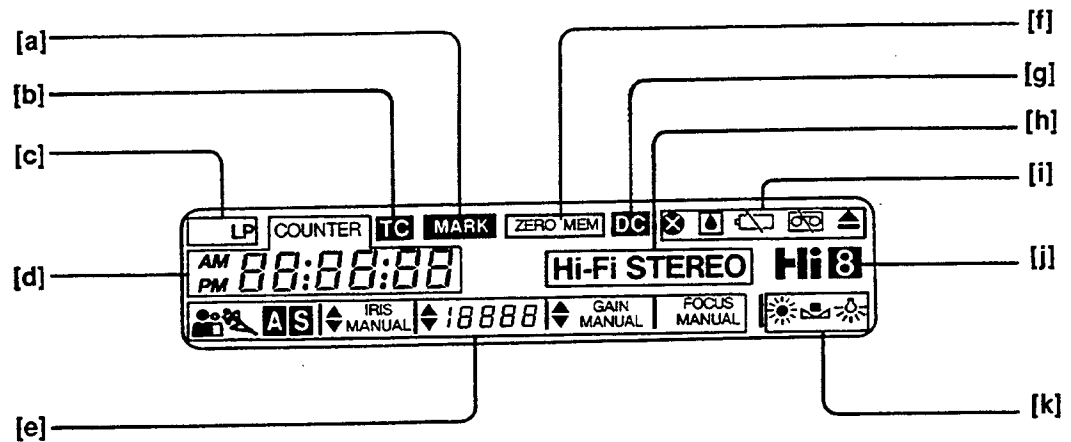
[p] Index operation and zero memory mode indication
(INDEX MARK, SCAN, SEARCH, ZERO MEM, etc.)

[q] Date and time

[r] Camera recording/battery lamp

Indications in the Display Window

(k-2)



(k-2)

- | | |
|--|-----------------------------------|
| [a] Index mark indication | [g] Data code mode indication |
| [b] RC time code mode indication | [h] Hi-fi stereo mode indication |
| [c] Tape speed indication | [i] Caution indication |
| [d] Time, date, linear time counter, RC time code and data code indication | [j] Hi8 mode indication |
| [e] Programmed AE and manual mode indications | [k] White balance mode indication |
| [f] Zero memory mode indication | |

Trouble Checks

If you think you have a problem, double-check before calling the serviceman.
You may have overlooked something relatively simple!

Symptom	Cause	Procedure
The power will not turn on.	The battery is not attached.	Attach the battery.
	The battery is exhausted.	Use a new battery.
	The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.
The START/STOP button does not operate.	The tape is affixed to the drum.	Remove the cassette with the EJECT button.
	The tape is at its end.	Rewind the tape or use a new one.
	The POWER switch is set to VTR.	Set it to CAMERA.
	The red mark on the cassette is exposed.	Use a new cassette or slide the tab.
The tape does not move when a tape transport button is pressed.	POWER switch is set to CAMERA or OFF.	Set it to VTR.
	The tape is at its end.	Rewind the tape or use a new one.
The power turns off.	While being operated in the CAMERA mode, the recorder has been in the pause mode for more than 5 minutes.	Slide down the STANDBY switch, and slide it up again.
	The battery is exhausted.	Use a charged battery.
A vertical band appears when a subject such as lights or a candle flame is shot against a dark background.	The contrast between the subject and background is too high; the camera is not malfunctioning.	—
The battery pack is quickly discharged.	The ambient temperature is too low.	—
	The battery pack has not been charged fully.	Charge the battery pack again.
The cassette cannot be removed from the compartment.	The battery is exhausted.	Use the charged battery or the AC power adaptor.
Automatic focus does not function.	The AUTO LOCK switch is not set to AUTO LOCK.	Set the AUTO LOCK switch to AUTO LOCK.
	The camcorder is in the macro mode.	Auto focus does not function in the macro mode. Adjust the focus manually.
	Shooting condition is not suited for automatic focusing. (See page 66.)	Adjust the focus manually. (See page 68).
The color of the playback is not appropriate.	The AUTO LOCK switch is not set to AUTO LOCK.	Set the AUTO LOCK switch to AUTO LOCK.
	Shooting condition is not suitable for auto white balance operation. (See page 70.)	Set the AUTO LOCK switch down and adjust the white balance manually. (See page 71.)
The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.
	Moisture has condensed on the lens.	Turn off the power and leave the camcorder unused for at least 1 hour.
The playback picture is not clear.	"EDIT ON" is selected in the MODE SET menu.	Select "EDIT OFF" to deactivate the edit function.
	The channel for the VCR is not adjusted on the TV.	Adjust the TV.

Symptom	Cause	Procedure
The picture is noisy.	The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH video head cleaning cassette. For details on cleaning, refer to the instructions furnished with the cleaning cassette. If the cleaning cassette is not available in your area, have the heads cleaned at the nearest Sony service facility.
No function except for cassette ejection works.	Moisture condensation has occurred. (See page 122.)	Remove the cassette and leave the unit for at least an hour.
The auto white balance function does not work.	<ul style="list-style-type: none"> • The AUTO LOCK switch is not set to AUTO LOCK. • Shooting condition are not suitable for auto white balance operation. 	<ul style="list-style-type: none"> • Set the AUTO LOCK switch to AUTO LOCK. • Adjust the white balance manually. (See page 71.)
The indication in the viewfinder is flashing.	No lithium battery installed.	Install a lithium battery.
	The lithium battery is exhausted.	Use a new battery.
No sound or only a 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 ."	Select "HIFI SOUND STEREO" in the MODE SET menu. (See page 51.)
Nothing can be viewed except for a black screen in the viewfinder.	The power of the camcorder was turned off with the aperture closed.	Open the aperture in the manual mode. (See page 103.)

