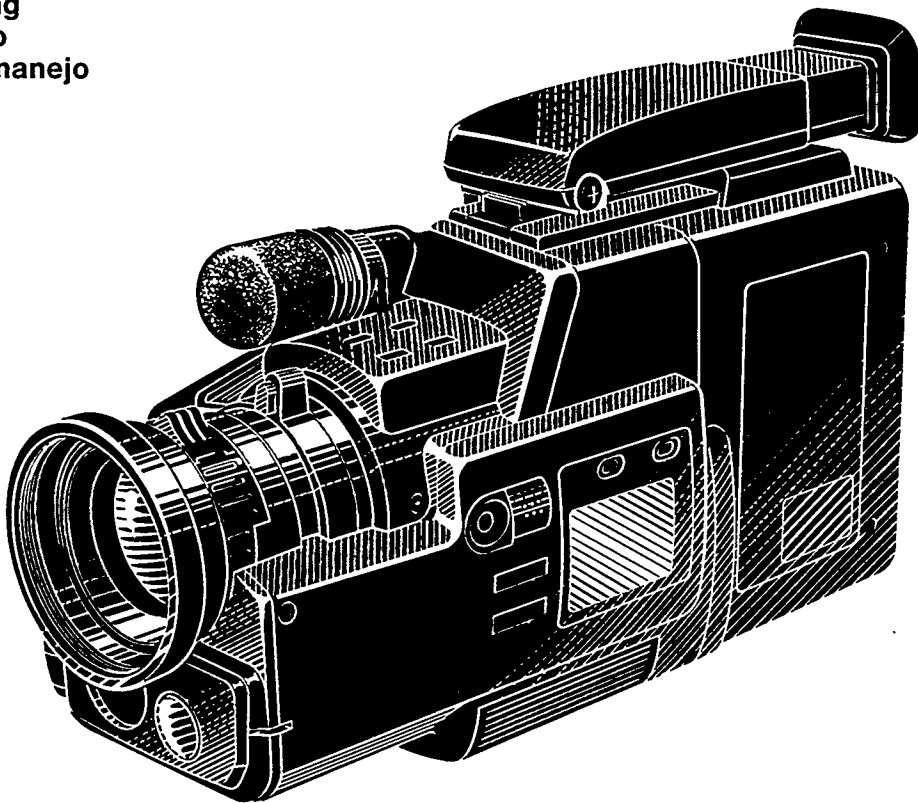


# PHILIPS



Operating instructions  
Bedienungsanleitung  
Mode d'emploi  
Gebruiksaanwijzing  
Istruzioni per l'uso  
Instrucciones de manejo  
Bruksanvisning

**VHS**  
PAL



# EXPLORER

C A M C O R D E R S

# VKR6865

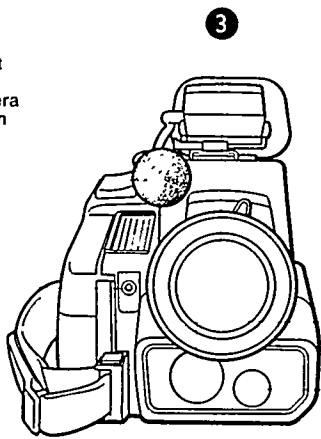
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# Controls and connectors

Front view  
 Vorderseite  
 Vue de face  
 Vooraanzicht  
 Lato frontale  
 Vista delantera  
 Sett framifrán

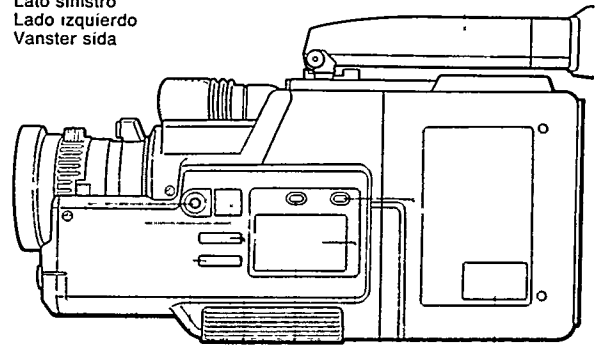
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- 1



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- 5

Left side  
 Linke Seite  
 Côté gauche  
 Linkerkant  
 Lato sinistro  
 Lado izquierdo  
 Vanster sida

- 6

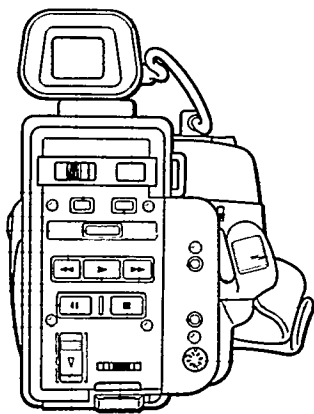


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- 10
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- 12
- 13
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Rear view  
 Rückseite  
 Vue de dos  
 Achteraanzicht  
 Lato posteriore  
 Vista trasera  
 Sett bakifrán

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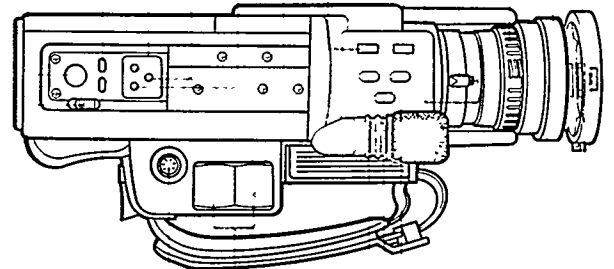


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Top view  
 Oberseite  
 Vue de dessus  
 Bovenaanzicht  
 Lato superiore  
 Vista superior  
 Sett ovanifrán

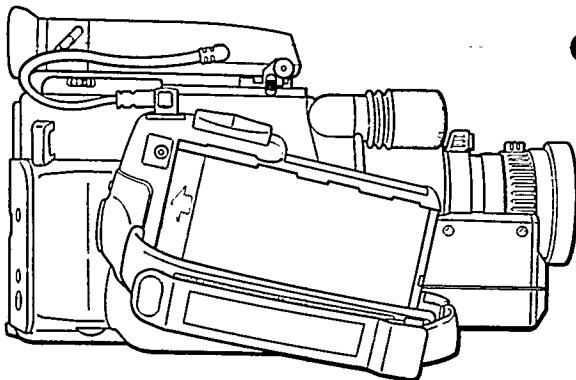
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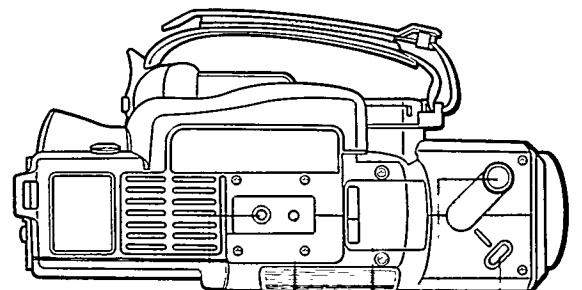
Right side  
 Rechte Seite  
 Côté droit  
 Rechterkant  
 Lato destro  
 Lado derecho  
 Hoger sida

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- 59
- 60

Bottom view  
 Unterseite  
 Vue de dessous  
 Onderaanzicht  
 Veduta parte inferiore  
 Vista inferior  
 Sett underifrán



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## Features

- Allows direct playback with no additional components necessary.
- Flying erase head for precise, quality assemble/insert editing.
- 3-page Digital superimpose function for mixing titles or illustrations into a live recording.
- Ultra-compact and ultra-lightweight: a mere 1.2 kg.
- Multi-speed electronic shutter for sharp, clear playback of fast-action shots: 1/50 (standard), 1/250, 1/500 and 1/1000.
- Insert editing function.
- Audio dubbing facility.
- Newly developed high-resolution 1/2 inch field-storage type CCD (Charge Coupled Device) pickup element.
- One-button full-auto operation of focus, exposure, and white balance.
- Powerful, two-speed 8:1 power zoom with macro function.
- HQ (High Quality) system for superlative picture quality.
- High-sensitivity/low-lag design: allows shooting in light as low as 10 lux.
- Image sensing auto-focus.
- Automatic colour tracking white balance with three preset positions.
- Backlight compensation button.
- Audio/video fader linked to start/stop trigger.
- Large, easy-to-read LCD display.
- Ultra-compact adjustable electronic viewfinder (monochrome CRT, 0.6-inch screen) with diopter control, also for instant on-the-spot playback.
- Selectable automatic date recording function.
- Recordable date/time display.
- Used time counter.
- Retake function for quick re-recording of scenes when necessary.
- Second recording start/stop button provided on top of the Camcorder.
- Dubbing mode switch provided for best results when dubbing.
- Selectable quick review function.
- One-button recording standby mechanism.
- Picture search in both directions.
- Unique battery pack doubles as palm grip, saving weight and space.
- Ergonomic design with palm grip and finger rest for trigger control.
- Trigger alarm informing the operator with electronic sound when the start/stop trigger is operated.
- Three-way power supply flexibility: battery pack, AC adapter, and car battery cord.

## Precautions

### For safety, strictly observe the following instructions.

- Do not open the cabinet.
- Prevent inflammables, water and metallic objects from entering the unit.
- Do not use the unit when there is lightning in the vicinity. Disconnect the power cable of connected equipment.

### Avoid using the unit under the following conditions.

- Places subject to excessive humidity or dust.
- Near appliances generating strong magnetic or electric fields (speakers, broadcasting antennas, etc.).
- Places subject to soot or steam such as near a cooking stove.
- Places subject to excessive shock or vibration.
- Near a television set (rolling pictures or howling might result).
- Extremely hot places.

### Do not expose the unit to high temperatures over 50°C for long periods.

If the unit should be subjected to direct sunlight, or left in a closed car in summer, or placed near a heater, the CCD and the auto-focus sensor may deteriorate and the cabinet may become deformed. Furthermore, this also may cause the transistors and other electronic and mechanical parts to malfunction. Remember the following:

- Do not leave the unit in places of over 50°C.
- Do not use the unit in places of over 40°C.
- Do not use the unit in places of below 0°C.
- Protect the unit from excessively dry or excessively humid conditions (below 35% or above 80% humidity).
- For long storage, select a place between -10°C and 30°C.

### Take special care for protection of the unit.

- Do not allow the unit to become wet.
- Do not leave the unit in closed cars on hot summer days.
- Take special care not to drop the unit or strike it against hard objects. Protect from shocks during transportation.

### Make it a rule to observe the following instructions.

- Do not remove the battery pack or disconnect other power supply units during recording or playback before pressing the POWER switch to OFF. If not observed, this will cause tape damage.
- When the unit is not in use, remove the battery pack.

### Keep the lens and viewfinder eyepiece always clean.

- When the lens is dirty or dusty, blow it off first and then gently wipe with a soft brush or lens cleaning paper.
- The lens is likely to become moldy if left dirty.

### Be careful not to damage the CCD and auto-focus sensor.

- Do not keep the lens directed at extremely bright objects such as the sun or other light sources for long periods. Although the CCD is less susceptible to such burn than a tube would be, caution should be exercised when using this unit. Most importantly, the lens should be capped except while actually shooting.
- Do not direct the eyepiece of the viewfinder at the sun.

## Video cassettes

### Auto-focus requires a bit of consideration.

- Do not touch the focus ring while the auto-focus mechanism is in operation as this could damage the auto-focus mechanism.
- When a filter or a special-effect lens is to be attached to the end of the lens, be sure to turn power off or switch from the Auto-focus mode to the Manual mode. NEVER attempt to attach a filter or lens while the auto-focus mechanism is operating as this will result in malfunctioning. (If a teleconversion or wide-angle conversion lens is attached, the Auto-focus mode cannot be used.)

### Handle the unit carefully.

- Protect the microphone from excessive shocks.
- Do not carry the unit by holding it only by the viewfinder.

### Moisture condensation disenables use of the unit.

- You have observed that pouring a cold liquid into a glass will cause drops of water to form on the glass's outer surface. This same phenomenon occurs on the head drum of a video recorder when the recorder is moved from a cool place to a warm place, after heating a cold room, under extremely humid conditions or in a place directly subjected to the cool air from an air conditioner
- Moisture on the head drum can cause severe damage to the video tape, and can lead to internal damage to the recorder itself.
- If moisture condensation occurs on the head drum, a condensation warning appears in the counter display and the unit enters the Stop mode, unable to function. In such a case, wait for a few hours until the indicator disappears.

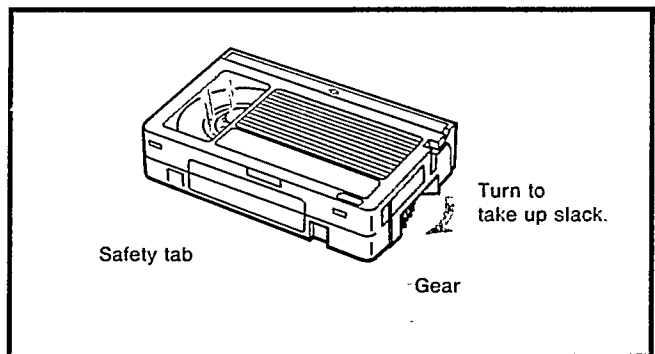
### Maintenance

- When the cabinet is dusty, clean by gently wiping with a soft cloth.
- Avoid the use of strong cleaning agents such as benzine or alcohol as they may damage the cabinet.
- Cleaning should be done only after the battery pack has been removed or other power units have been disconnected.

### Serious malfunctioning

If malfunctioning occurs, stop using the unit immediately and consult your local PHILIPS dealer.

- Recording onto prerecorded tapes automatically erases the previously recorded video and audio signals.
- An inverted cassette cannot be inserted.
- Do not load and unload the cassette repeatedly without allowing the tape to run at all. This will slacken the tape and thereby damage it.
- Make certain before loading the cassette that the tape is not slackened. If there is any slack, turn the gear on the cassette in the direction of the arrow to take up slack
- The cassette is equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording is impossible. If you wish to record on a cassette whose tab has been removed, use adhesive tape to reseal the slot.
- To avoid excessive exposure to dust and fingerprints, do not open the front tape cover.




### Storage of cassettes

- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid storing the cassettes in humid or dusty places
- Do not drop the cassettes. Do not expose them to violent vibrations or shocks.
- Do not expose the cassettes to strong magnetic fields (near a motor, transformer or magnet).
- Place the cassettes in cassette cases and position them vertically.

# Safety precautions

**WARNING:**  
**TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.**

This equipment should be used with DC 9.6 V  only.

The AC Adapter/Battery Charger should be used with 110 — 240 V ~ 50/60 Hz only.

**CAUTION:**

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

**IMPORTANT (In the United Kingdom)**

Mains Supply (240 V ~, 50 Hz only)

**IMPORTANT**

Do not make any connection to the larger terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:



Blue to N (Neutral) or Black.  
Brown to L (Live) or Red.

If these colours do not correspond with the terminal identifications of your plug, connect as follows:

Blue wire to terminal coded N (Neutral) or coloured Black.

Brown wire to terminal coded L (Live) or coloured Red.


If in doubt — consult a competent electrician.

**Note:**

We recommend that you should disconnect the AC cord from the outlet.

Before using this Camcorder, read this instruction booklet carefully so that you will obtain the best results from your Camcorder.



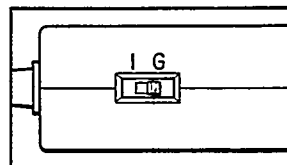
Cassettes marked  can be used with this Camcorder.

## Warning on lithium battery

The battery used in this device may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 100°C or incinerate.

Replace battery with CR2025; use of another battery may present a risk of fire or explosion.

- Dispose of used battery promptly.
- Keep away from children.
- Do not disassemble and do not dispose of in fire.



**ATTENTION:**

The system select switch on the side of the optional RF converter 22AV5158 has been set to G (Continental PAL, 5.5 MHz).

**CAUTION:**

To prevent shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified personnel.

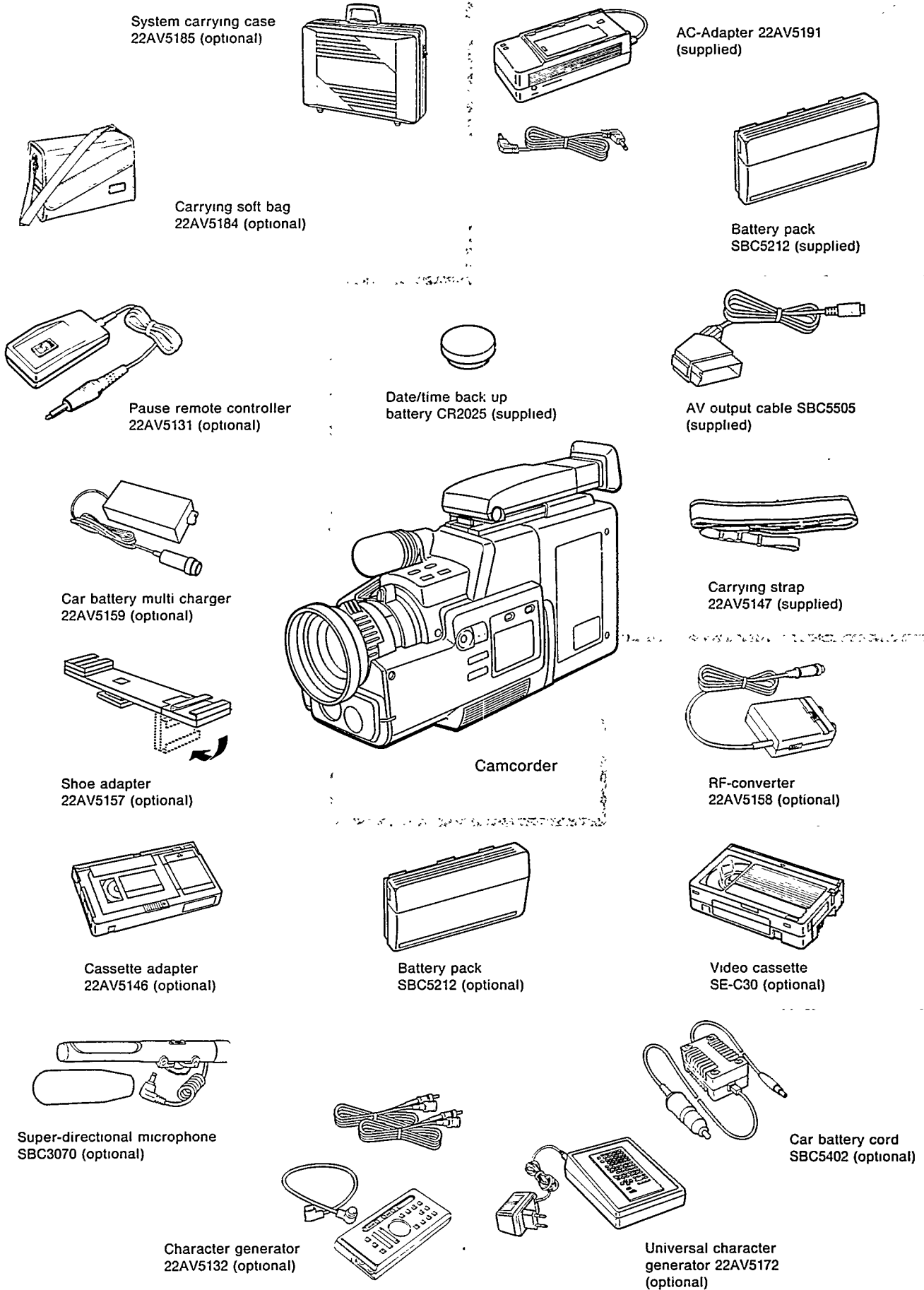
**Notes:**

- The rating plate (serial number plate) and safety caution of the main unit are on its bottom.
- The rating plate (serial number plate) of the viewfinder is on its bottom.
- The rating plate (serial number plate) of the AC adapter/battery charge is on its bottom.

The provided viewfinder is the VF-9000/20. Do not use any other viewfinder with this Camcorder.

This equipment has been produced to comply with Directive number 87/308/EEC.




# Camcorder accessories





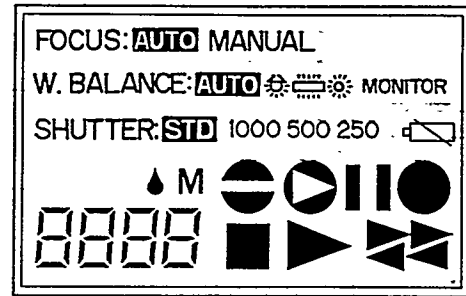
# Controls and connections

Refer to the diagrams on the front foldout page.

- 1 External microphone jack (MIC)
- 2 Exclusive microphone  
Omnidirectional condenser microphone for simultaneous sound recording.
- 3 8:1 zoom lens  
F1.4, f=8.5 — 68 mm, filter diameter: 52 mm
- 4 Auto-focus sensor window  
Allows light to enter for measuring the camera-to subject distance.
- 5 White balance sensor window  
Allows light to enter for white balance adjustment.
- 6 Electronic viewfinder  
For monitoring scenes being shot or the playback picture after recording. Several on screen indicators are included, as well as the date/time or used time if selected.
- 7 FULL AUTO button  
Pressing this button puts the focus and white balance under automatic control and selects the standard shutter speed. Auto-focus can be cancelled by pressing the FOCUS button; auto white balance can be cancelled by pressing the W.BALANCE button; the high-speed shutter can be selected by pressing the SHUTTER button. Pressing the FULL AUTO button in the full-auto mode has no effect.
- 8 FOCUS select button  
Switch to AUTO for automatic focus, and switch to MANUAL to focus manually. Check on the LCD. The focus mode is reversed each time this button is pressed. The auto-focus mode can also be selected (together with the auto-white mode) by pressing the FULL AUTO button.
- 9 SHUTTER select button  
Pressing this button switches the shutter between 1/1000 (1000), 1/500 (500), 1/250 (250)-second high-speed shutter and 1/50-second (STD) speeds, as display on the LCD. The standard shutter speed can also be selected by pressing the FULL AUTO button.
- 10 W.BALANCE select button  
The white balance is manually selectable using this button. Press once to display the current white balance mode in the LCD. Continue pressing to cycle through the available modes.  
 : Halogen or tungsten lighting.  
 : Fluorescent lighting.  
 : Daylight.  
 AUTO : Automatic white balance adjustment.
- 11 Counter MEMORY button  
Press this button after resetting the counter to "0" at a point on the tape you want to locate later, and the tape will stop automatically at the counter reading of around "0" during rewind or fast forward.

## 12 LCD (liquid crystal display)

White balance (W.BALANCE) mode indicator    SHUTTER mode indicator  
Focus mode indicator                                    Monitor indicator


















Tape counter    Memory mark    Battery warning

Condensation warning

Symbolic mode indicator

- Tape counter: Shows from "0" to "9999".  
 Battery warning: Blinks when the battery power becomes insufficient for normal operation.  
 Condensation warning: Appears when excessive condensation occurs inside the unit.  
 Memory mark: Appears when the MEMORY button is pressed.

## Symbolic mode indicator

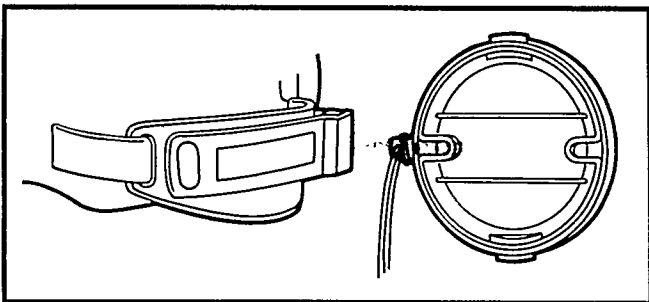
STOP: 	QUICK REVIEW:  Blinking	RETAKE RE-WIND:  Blinking
PLAY: 	REWIND: 	RETAKE FORWARD:  Blinking
PAUSE (STILL): 	FAST FORWARD: 	TAPE END WARNING:  Blinking
RECORD: 	REVERSE PICTURE SEARCH: 	INSERT: 
RECORD PAUSE: 	FORWARD PICTURE SEARCH: 	AUDIO DUB: 

- 13 Counter RESET button**
- 14 Cassette holder**  
Insert a VHS-C video cassette for recording or playback.
- 15 POWER switch**  
Slide to turn the power on. The Stop indicator appears on the LCD display. Slide again to switch off power.
- 16 REC standby button**  
Press to engage the Recording standby mode. To start recording, press the recording start/stop buttons **27** or **33**.
- 17 INSERT/MONITOR button**  
Push this button when you wish to monitor shots before actually recording them. This function allows you to view the scene on the viewfinder without recording it. Push the STOP button to release it. To enter the Insert Edit mode, press this button while in the Recording Standby mode.
- 18 AUDIO DUB. button**  
Press this button together with the PLAY button for audio dubbing.
- 19 RECORD REVIEW button**  
If you want to review the end of the recorded segment for confirmation, press this button from the Record-Pause mode, the tape will be rewound for about two seconds of programme time and played back automatically for this section after which it will stop in the Record-Pause mode in standby for the next shot.
- 20 REW/PICTURE SEARCH button**  
Pressing this button in the Stop mode rewinds the tape; pressing it in the Play mode allows fast play-back in reverse.
- 21 PLAY button**  
Press to start playback. When this button is pressed when the unit is in the Recording pause mode, the unit will enter the Recording mode.
- 22 FF/PICTURE SEARCH button**  
Pressing this button in the Stop mode fast-forwards the tape; pressing it in the Play mode allows fast playback.
- 23 PAUSE/STILL button**  
Press to view a still picture during playback or pause playback. When this button is pressed in the Recording mode, the unit will enter the Recording pause mode.
- 24 STOP button**  
Press to engage the Stop mode.
- 25 EJECT switch**  
To open the cassette holder.
- 26 EDIT ON/OFF switch**  
Normally, set to OFF. For best picture quality when dubbing, set it to the ON position.
- 27 REMOTE control jack**  
For connection of the optional 22AV5131 pause remote controller.
- 28 Earphone jack (PHONE)**
- 29 AV OUT connector**  
Both audio and video signals can be delivered from this connector.  
For playback with a TV set not equipped with AV terminals, connect the RF-converter 22AV5158 (optional) to this connector and to the TV. To dub from this unit, connect the AV input connectors of a second recorder to this connector, using the provided AV output cable. To play back from this unit to a TV set, make a connection between this connector and a TV's AV input terminal using the AV output cable.

- 30 ALARM ON/OFF switch**  
Switch to ON to engage the trigger alarm system. Switch to OFF when you do not wish to use this system. When this switch is set to ON, an electronic alarm beeps when the Recording start/stop button is pressed to begin recording. The electronic alarm beeps twice when the Recording start/stop button is pressed for record pause. This alarm helps prevent recording errors.
- 31 Thumb rest**  
Place your thumb on this grooved area next to the start/stop switch between switch operations.
- 32 Recording start/stop button**  
Press this button in the Recording Standby mode to start recording. Pressing it again re-engages the Recording Standby mode.
- 33 Second recording start/stop button (sub trigger)**  
Functions exactly as the other recording start/stop button, for use when recording with the Camcorder held low.
- 34 DATE/TIME REC ON/OFF button**  
Press this button when you do not wish to record the date/time. This will remove date/time indications from the viewfinder. Press again to record date/time. Date/time will reappear in the viewfinder.
- 35 DATE/TIME SELECT button**  
Use to select the portion of the clock or date setting to be changed. Cycles through the year, month, day, hour, and minute settings. To end adjustment, press once after selecting the minute portion.
- 36 DISPLAY SELECT button**  
Press this button to select the date/time display and Recording mode. It cycles through the modes in the following order:  

Auto date  
record  
reserve
→
Date  
display
→
Date/time  
display
→
Time  
display
- The auto-date-record function automatically displays and records the date for 5 seconds upon turning on the power and beginning recording. Before recording begins this mode is indicated in the viewfinder by auto date record reserve indication "—.—.—."
- 37 DATE/TIME SET button**  
Use to set the built-in clock and date function
- 38 Viewfinder mount**  
Attach the provided viewfinder.
- 39 TITLE PAGE button**  
Press this button to select which page of memory you wish to store your title in. This button only functions when the title is displayed in the viewfinder.
- 40 TITLE ON/OFF button**  
Press to mix memorized title or illustration with action being recorded. Press again to end mixing process.
- 41 Macro button**  
Turn the zoom ring while pressing this button for macro shooting.
- 42 Manual zoom lever**  
Use to turn the zoom ring manually.
- 43 Manual focus ring**  
Use to turn the focus ring manually.

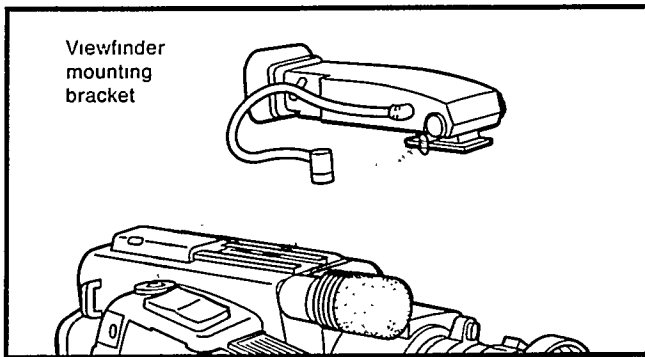
- 44 Lens hood**
- 45 USED TIME ON/OFF switch**  
When this switch is set to ON, the viewfinder displays the elapsed recording time. Switch to OFF to cancel the display. Unloading the cassette resets the display to "00.00". Note that this convenience functions only when camera shooting is performed.
- 46 REC TIME RESET button**  
Press this button to reset the elapsed recording time to zero.
- 47 Viewfinder cable connector**  
Connect the viewfinder cable.
- 48 Power zoom buttons (W/T)**  
For automatic zooming at slow speed, press lightly. For regular speed zooming press firmly. "T" is for telephoto zooming and "W" is for wide-angle zooming.
- 49 IMAGE REVERSE button**  
Press this button to activate the title reverse effect. The function will switch from positive to negative mode with successive pressing of this button.
- 50 TITLE MEMORY button**  
Up to three "pages" of memorized titles can be stored. The digital memory is maintained by the lithium battery which powers the unit's clock. Each time this button is pressed, a previously stored title will be erased, and a new one will be stored in its place in the designated page of memory.
- 51 COLOR button**  
Press this button to select the color for a title or illustration. The color choices cycle as follows:  
black, white, yellow, cyan blue, green, magenta, red, blue.  
Press this button repeatedly until the desired color appears.
- 52 Lens cap**  
Cap the lens when not in use.
- 53 Dioptic adjustment knob**  
Adjusts the viewfinder lens to suit the operator's eyesight.
- 54 Slots for carrying strap**
- 55 TRACKING control**  
Minimizes noise bars, if observed, during playback.
- 56 DC IN terminal**  
For connection of the provided AC adapter/battery charger 22AV5191 and optional car battery cord SBC5402 for DC power supply.
- 57 Grip strap**  
Secures the operator's hand to the hand grip. Adjusts to fit hand size.
- 58 Grip-type battery mount**  
The battery pack serves as a contoured handgrip when attached to the battery mount.
- 59 Lens cap hook**  
This keeps the lens cap from swinging during shooting.
- 60 Battery pack release lever**
- 61 Tripod mounting socket**
- 62 Stud hole**
- 63 CLOCK BATTERY compartment**  
Holds the lithium battery that powers the date and time function.
- 64 BLC button**  
Iris control is always automatic. For backlight compensation press this button. While it is being pressed, the iris is 1—2 F-stops wider than the automatic setting.
- 65 FADER button**  
To fade out the picture to black blank screen, press this button, then press the recording start/stop button to start fading out. To fade in from a black blank screen, press this button, then press the recording start/stop button to start fading in.



# Basic preparations

Switch off the power before mounting or removing the viewfinder.

## Mounting the viewfinder

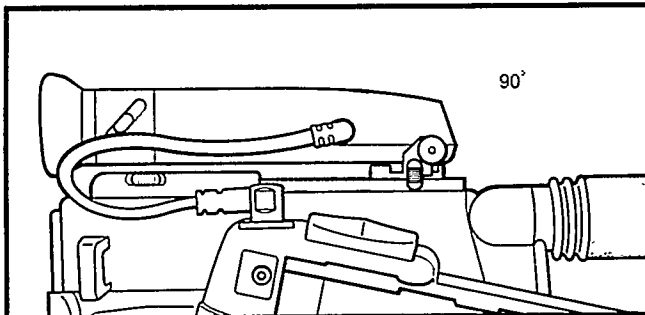


- 1 Align the viewfinder's coupling fixture with the mounting bracket on the body and slide the fixture into the bracket while pressing the knob.
- 2 Connect the viewfinder cable to the viewfinder cable connector (EVF).

### To remove the viewfinder:

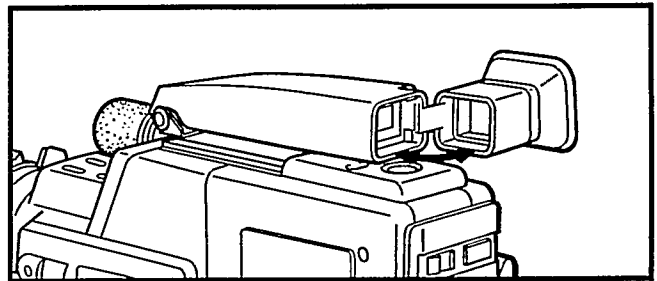
Pull out the viewfinder cable and slide the viewfinder out of the bracket while pressing the knob.

## Viewfinder adjustment



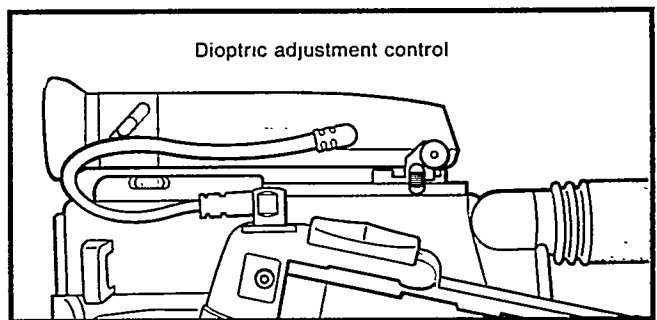
The viewfinder can be positioned for best visibility. It can slide forward or back and can be tilted up 90°.

## Opening the eyepiece



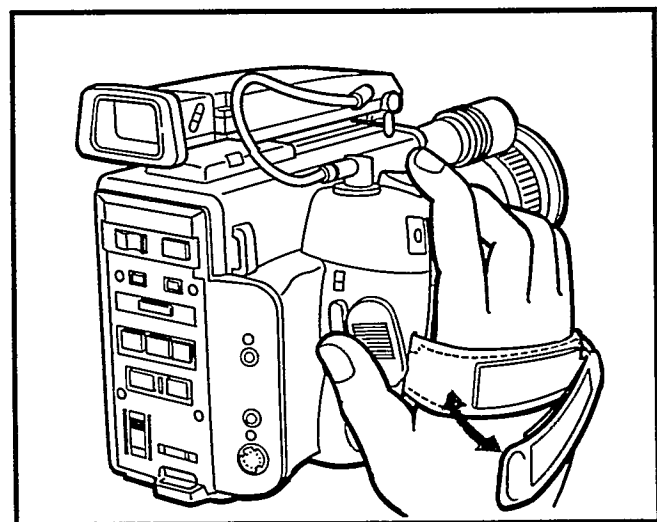
The viewfinder eyepiece can be opened for cleaning or better visibility in playback.

## Dioptric adjustment



The viewfinder lens can be adjusted to suit the operator's eyesight by sliding the dioptric adjustment control.

## Adjusting the grip strap



- 1 Separate the Velcro strip to expand the loop.
- 2 Pass your right hand through the loop and grasp the hand grip. Adjust the length of the strap to suit your hand size and refasten the Velcro strip.

# Power supply system

The convenient 3-way power supply system gives you a choice of the most appropriate power supply unit, depending on the application.

## CAUTIONS:

- No function is available without power supply.
- Do not use any power supply other than specified.
- Never attempt to use these power supply units with any equipment other than the Camcorder.

## Where AC power is not available

Use the battery packs:

- SBC5212 (Super High-capacity)

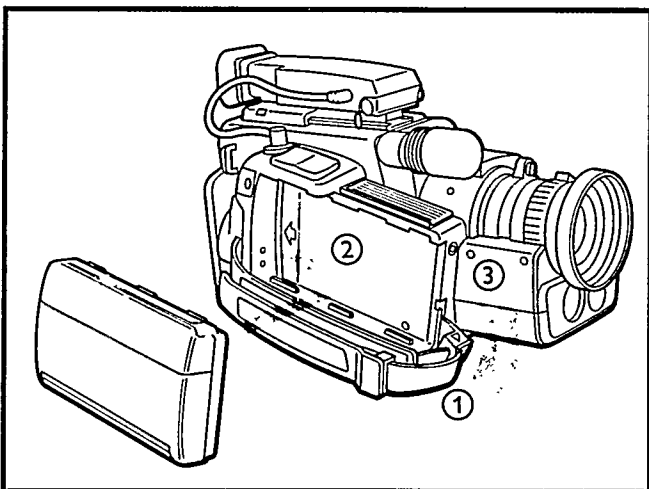
## Note:

The battery pack has been kept in the uncharged state for shipment. Therefore, before use, be sure to charge it. See page 12.

## Attaching the battery pack

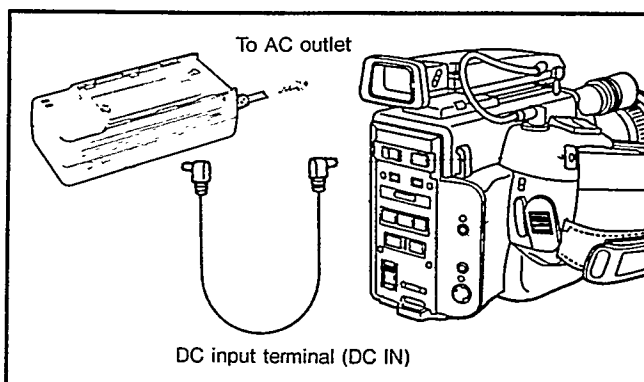
- ① Pull down the battery pack release lever.
- ② Align the battery pack over the outline in the battery pack mount, and slide the battery pack into place in the direction of the arrow.
- ③ Push up on the battery pack release lever, until it locks into place.

To remove the battery pack, pull down the battery pack release lever and slide out the battery.



## With AC Adapter

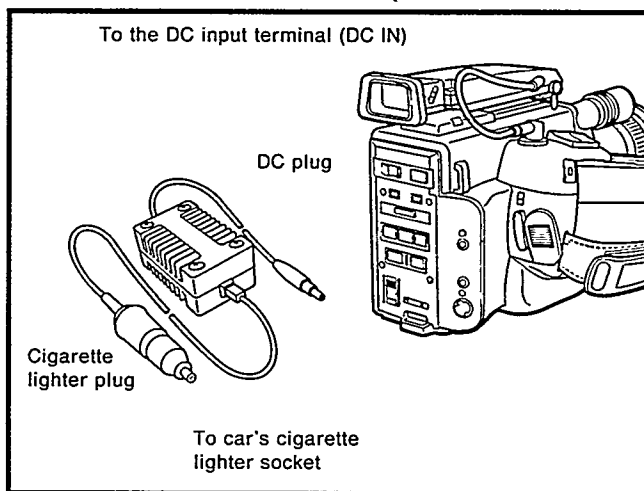
Use the provided AC adapter/battery charger 22AV5191.



## In a car

Use the optional SBC5402 car battery cord.

- Leave the car's engine idling when using the car battery. (For use with 12 V negative-grounded cars only.)

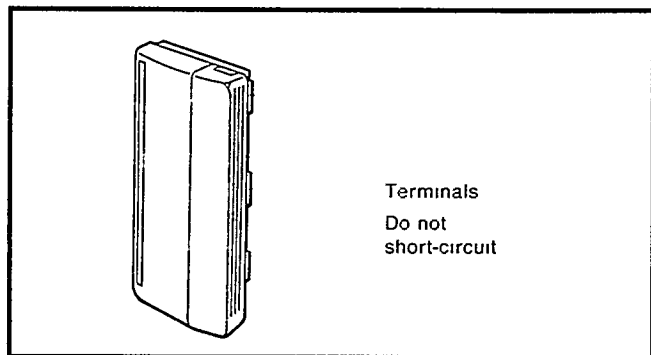


# Charging the battery pack

To charge the battery pack, use the exclusive AC power adapter/battery charger (provided).

## A WORD ON THE EXCLUSIVE BATTERY PACKS

The battery packs are nickel-cadmium batteries. Give attention to the following to make the most of their characteristics.



### Temperature ranges:

The recharging time is based on room temperature of 20°C.

The lower the temperature, the longer the recharging time.

For charging 10°C to 35°C

For operating 0°C to 40°C

For storing -10°C to 30°C

The battery pack has been kept in the uncharged state for shipment. Therefore, before use, charge it.

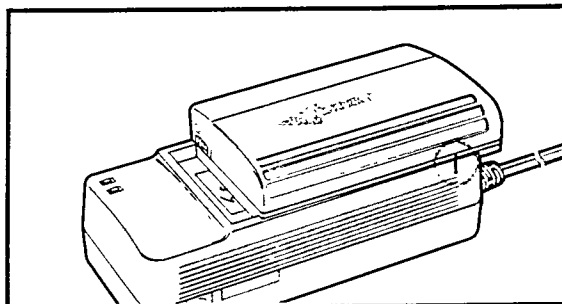
**BE SURE TO CAREFULLY READ THE CAUTION ATTACHED TO THE BATTERY PACK.**

## Charging procedure

### Charging time

SBC5212 80 min.

- The charging time differs depending on the ambient temperature and the condition of the battery pack.



- 1** Connect the AC power cord to a wall outlet. (The POWER indicator will light.)
- 2** Align the marks on the battery pack and the adapter.
- 3** Slide the battery pack in the direction of the arrow until it locks in place.
- 4** When charging is completed, the CHARGE indicator that is red turns to green.

## PRECAUTIONS

- If used near a radio, the provided power adapter/battery charger may interfere with reception.
- Prevent inflammables, water and metallic objects from entering the unit.
- Do not disassemble or modify the unit.
- Do not apply shocks to the unit.
- Do not subject the unit to direct sunlight.
- Avoid using the unit in extremely hot or humid places.
- Avoid using the unit in places subject to vibrations

### Note:

The optional car battery charger can charge the batteries from a car battery. For details refer the instructions of the 22AV5159

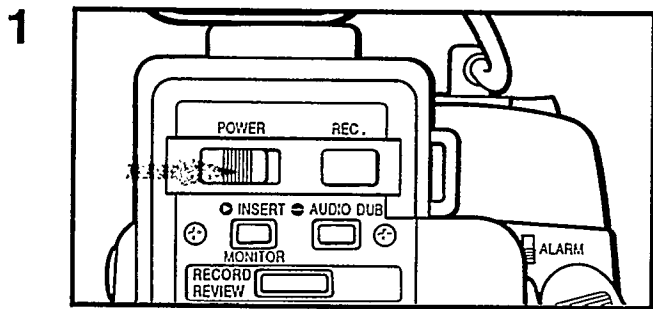
## Recording time for the Camcorder

SBC5212 80 min.

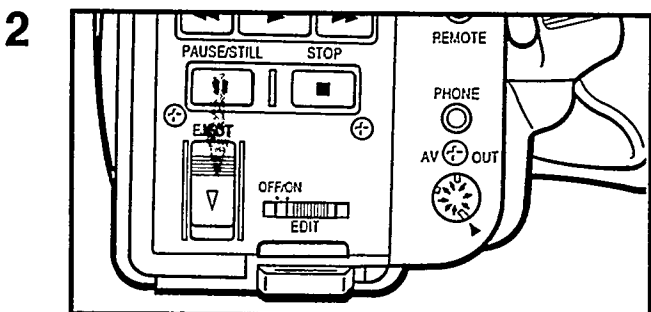
- The recording time per charge is influenced by the duration of recording standby, frequency of zooming, etc. It is safer to have spare battery packs.

# Loading and unloading a video cassette

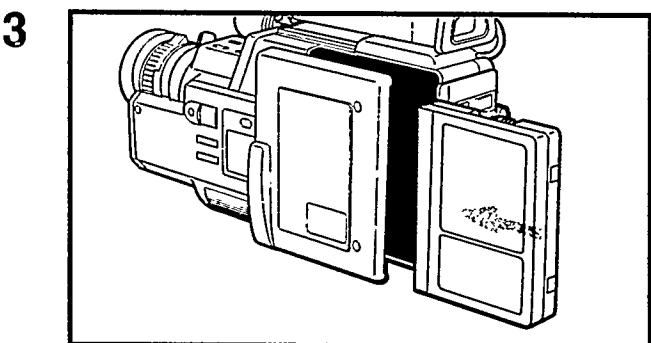
## LOADING



Slide the POWER switch to turn the power on.



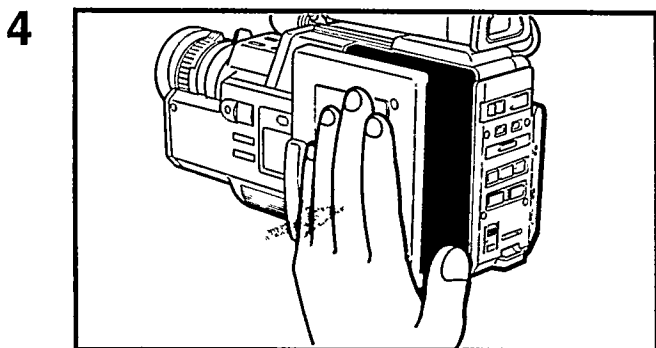
Open the cassette holder by pressing the EJECT button.



Insert the cassette with its label facing outward.

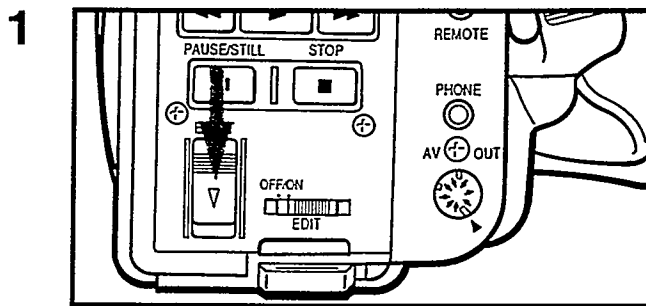
**Note:**

Ensure that tape is not slack inside the cassette, then load the cassette correctly. See page 4.

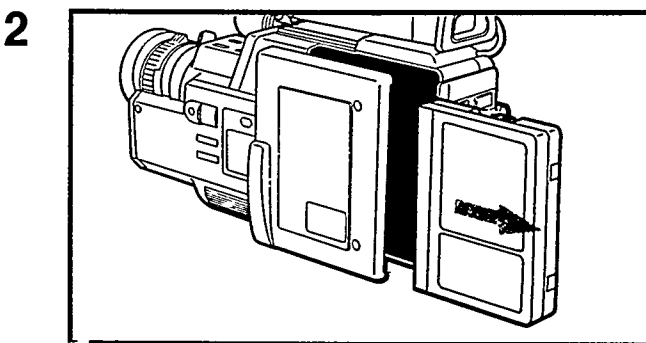


Close the cassette holder by pushing its centre area.

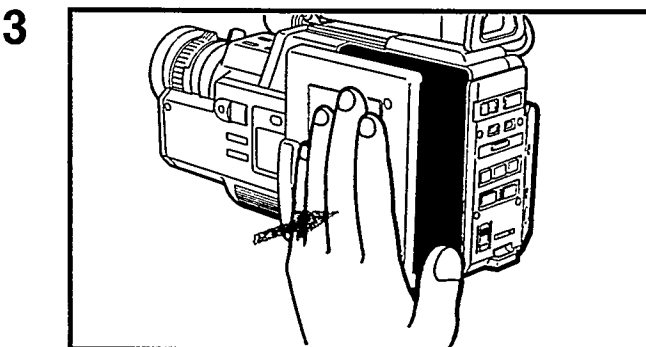
## UNLOADING



Make sure the unit is in the Stop mode. Press the EJECT button. The cassette holder will open.



Remove the cassette.



Close the cassette holder by pushing its centre area.

- When not in use, switch off the power.

**Note:**

Do not repeat loading and unloading of the cassette without running the tape as this will slacken the tape, causing tape damage.

# Viewfinder indications

## Focus mode

- ▶ : Camera is focused beyond subject
- : Focus is correct
- ◀ : Camera is focused in front of subject
- ▶ ■ ◀ : Low contrast warning  
(Manual/Auto focus)

No indication: Auto-focus is operating

## White balance mode setting

- ☀ : Daylight
  - ☀ (with lines) : Fluorescent lighting
  - ☀ (with dots) : Halogen or tungsten lighting
- No indication : Auto white balance is operating.

## Fading mode

- FADER : Fade function is engaged
- FADER : Fading is being performed
- No indication : Fade function is not engaged

**BATTERY**...Low battery warning

## Title Page indications

- 1...First page
- 2...Second page
- 3...Third page

## Title Color indications

- BK...Black
- WH...White
- YL...Yellow
- CY...Cyan blue
- GR...Green
- MG...Magenta
- RD...Red
- BL...Blue

**LIGHT**...Low-light warning

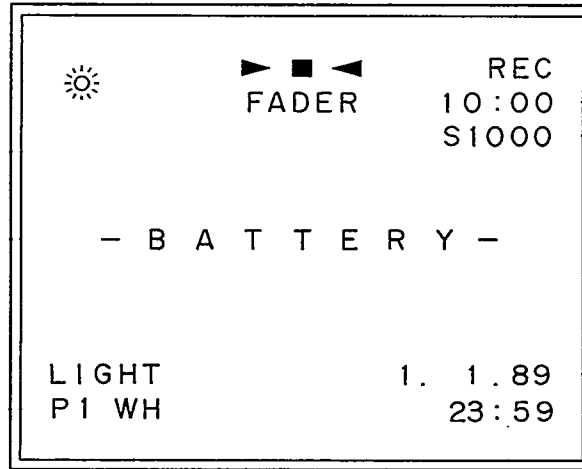
## Operation mode

- REC...Recording is being performed in SP mode
- ...Recording standby in SP mode is engaged
- REC...Tape end warning (blinking will begin a few minutes before tape ends)
- No indication...Stop or Play mode is engaged

## Used Time Indicator

### Lithium battery warning

- ▶ E...Lithium battery is exhausted, or not yet installed.



S1000...1/1000 shutter mode is engaged

S500...1/500 shutter mode is engaged

S250...1/250 shutter mode is engaged

No indication...1/50 (standard) shutter mode is engaged

## Date Indications

### Time indications

24 hour indications

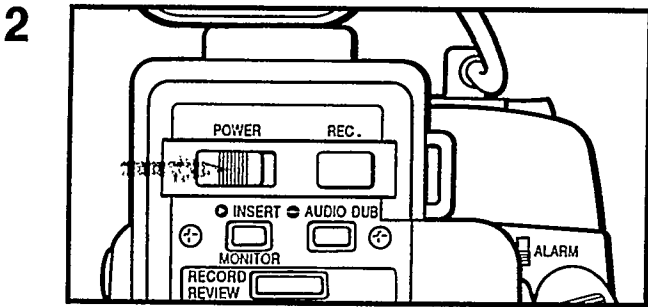
—, —, —...Auto Date Rec is engaged



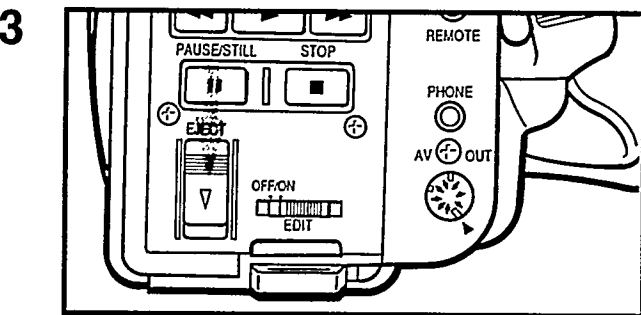
# Recording operation

## Preparations

- 1 Attaching the battery pack or AC power adapter.

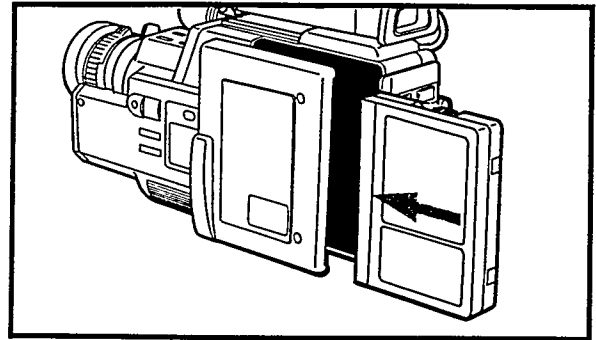


Slide the POWER switch to turn the power ON.



Open the cassette holder by pressing the EJECT button.

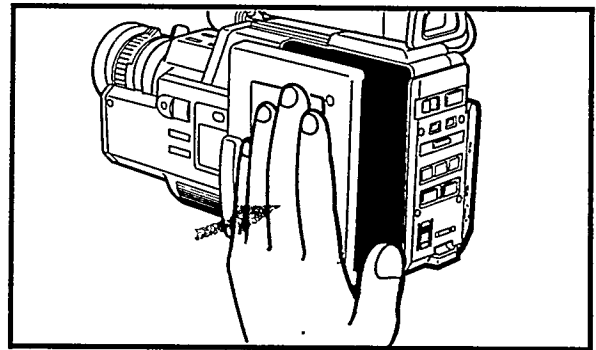
4



Insert the cassette with its printed arrow facing outward.

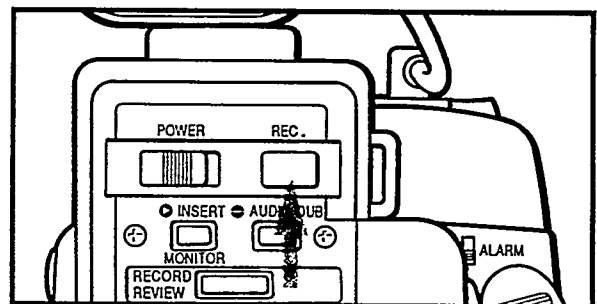
First remove tape slack, then insert the cassette correctly. See page 4. (with its safety tab in place.)

5



Close the cassette holder by pushing its center area.

6

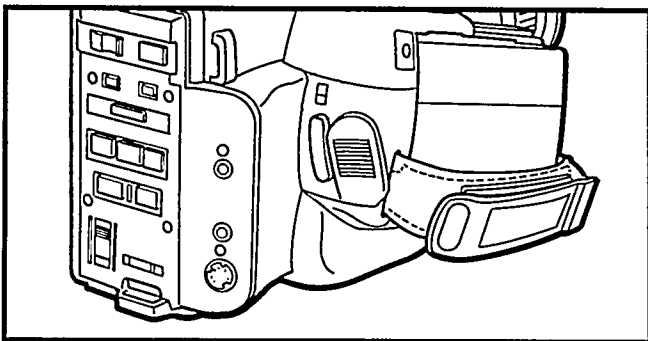


Press the REC Standby button. The unit enters the Recording Standby mode.

## Trigger alarm system

When the ALARM ON/OFF switch is set to ON, an electronic alarm beeps when the Recording start/stop button is pressed to begin recording.

The electronic alarm beeps twice when the Recording start/stop button is pressed for record pause. This alarm helps prevent possible recording errors.



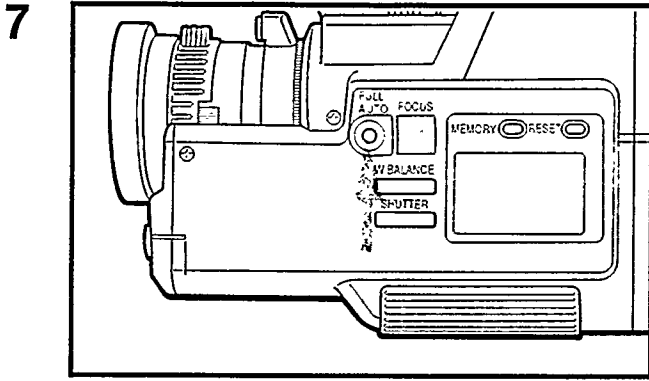
## Used time display

The accumulated recording time (elapsed or used time) can be displayed on the viewfinder.

1. Set the USED TIME ON/OFF switch to ON.  
The recording time is displayed on the viewfinder screen.
2. If you wish to reset it to "00:00", press the REC TIME RESET button.

### Notes:

- When you wish to disengage the Used time display mode, set the USED TIME ON/OFF switch to OFF.
- Unloading the cassette also resets the display to "00:00".



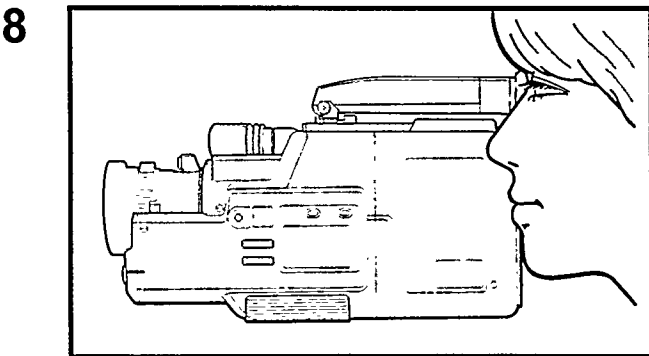
For full-auto operation, press the FULL AUTO button.

For manual override, use the W. BALANCE and FOCUS buttons.

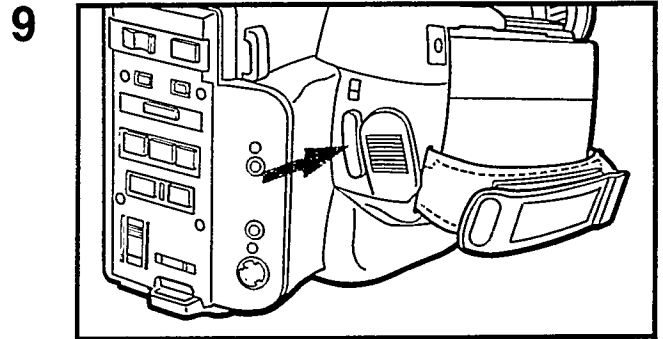
- Press the W. BALANCE button so that the required symbol appears on the viewfinder and on the LCD display.
  - ☀ when the subject is illuminated by a halogen or tungsten lamp.
  - ☁ when the subject is illuminated by a fluorescent lamp when you shoot in the daytime outdoors.
- When shooting under fluorescent light, always use the fluorescent light setting in the manual white balance mode for best results.
- For manual focus, press the FOCUS button so that MANUAL is shown on the LCD display. A focus-aid indicator will appear in the viewfinder. (See page 21.)
- Iris control is always automatic. Therefore, possible combinations of auto and manual functions are as follows:

Control	FULL AUTO	W. BALANCE	FOCUS	FOCUS W. BALANCE
White balance	Auto	Manual	Auto	Manual
Focus	Auto	Auto	Manual	Manual
Iris	Auto	Auto	Auto	Auto

- Be careful not to cover the white balance sensor window, otherwise correct white balance will not be obtained in the auto focus mode.
- For high-speed electronic shutter, see page 23.

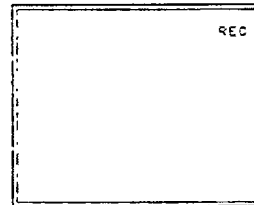


Determine the focus and composition by referring to the viewfinder image. For zooming, see page 22. For date/time recording, see page 24.

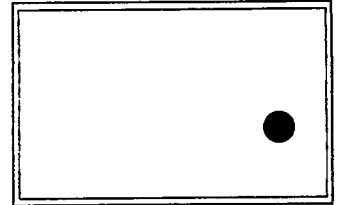


Press the start/stop button.

- This causes the recording indicator to appear on the viewfinder screen and the LCD, showing that recording is actually taking place.



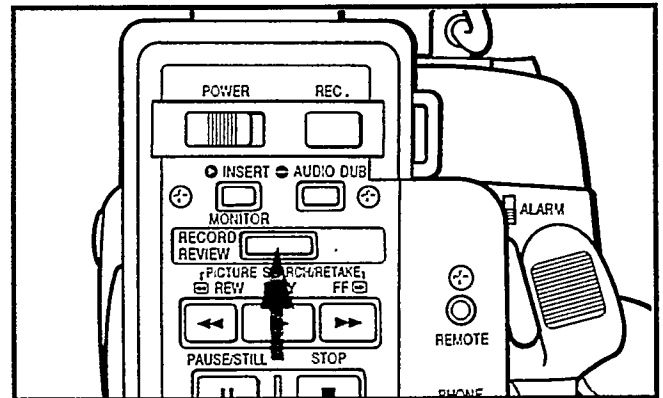
Viewfinder



LCD display

- 10** To stop recording temporarily, press the start/stop button once again.

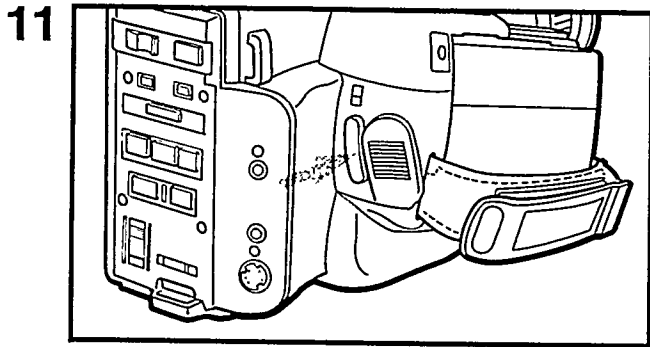
### Record review function



- If you want to review the end of the last recording for confirmation, press the RECORD REVIEW button from the Recording Standby mode, the tape will be rewound for about 2 seconds of programme time and played back automatically for this section, after which it will stop in the Recording Standby mode for the next shot.

#### Notes:

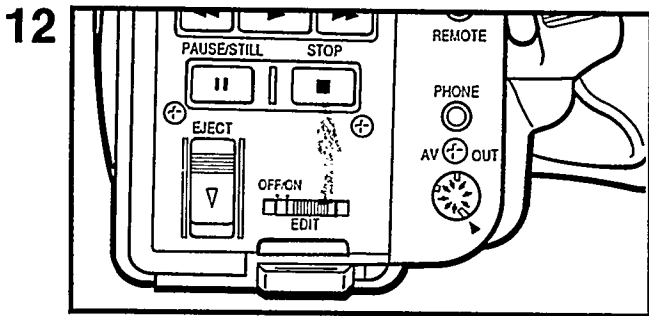
- The tracking control should be at its centre position.
- Distortion might occur when playback starts. This is normal



- To restart recording, press the start/stop button.
- For a pause longer than 3 minutes, press the POWER switch to OFF.
  - If the Recording Standby mode continues for longer than about 5 minutes, the unit switches itself off automatically. To restart recording, slide the power on and press the start/stop button. This makes clean assembled recordings possible even after a long pause.

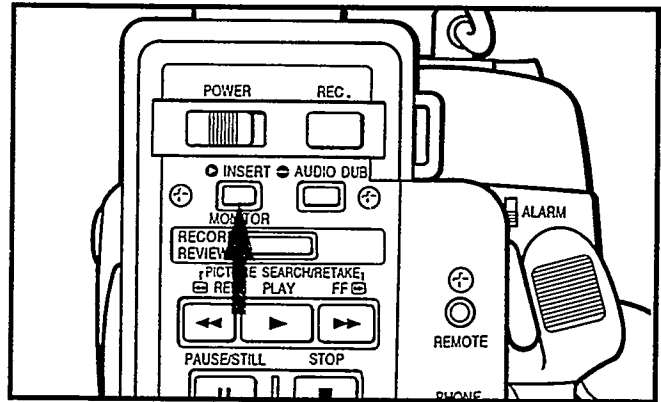
### Assemble recordings

- Repeating steps 9 — 11 produces assemble recordings.
- If recording is restarted from the Stop mode, a few frames of the previously recorded picture is replaced with a new recording. To avoid this, follow the technique described in "Assemble Recording Technique — 2" on page 19.



- To end recording, press the STOP button.
- After making sure that the tape has stopped, slide the POWER switch to OFF.

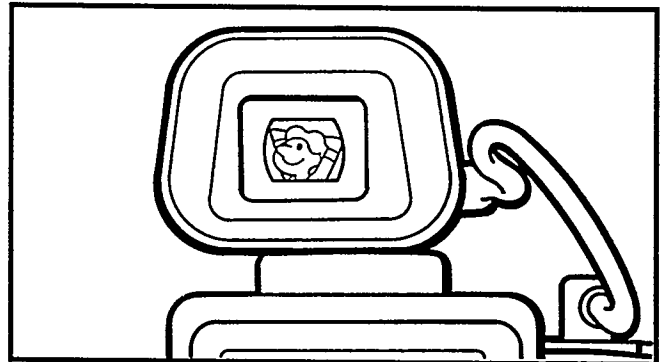
### Monitoring



If you wish to monitor shooting angles, compose scenes, etc., without actually recording on the tape, press the MONITOR button, instead of REC standby button. The aimed-at scene will appear on the viewfinder screen. For full-auto monitor, also press the FULL AUTO button. To engage the Recording Standby mode from monitor, press the REC standby button. To disengage the Monitor mode, press the STOP button.

- Monitoring is possible whether a cassette is loaded or not.
- With a cassette loaded, monitoring is not possible during rewind or fast forward.
- The power save circuit does not function during monitoring. (For power save function, see page 18.)

### Viewfinder monitoring



- Rewind the tape to a point from which you want to check the recording.
- Press the PLAY button, and you can view the playback picture on the viewfinder screen.

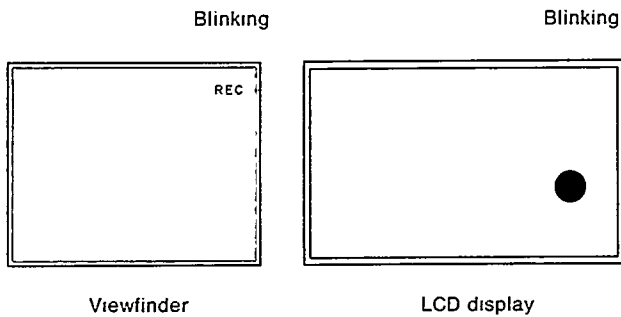
#### Notes:

- Pressing the PAUSE/STILL button during playback stops the picture on the viewfinder screen.
- Picture search is also possible in both directions.

## Power save and tape protection circuit

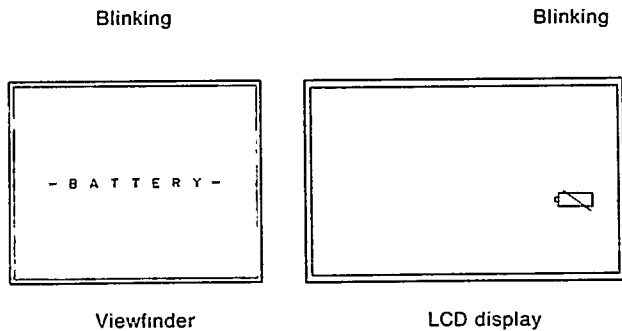
### Warnings

#### Tape-end warning



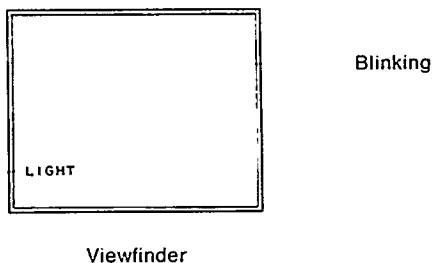
- The recording indicator blinks on the viewfinder screen and the LCD a few minutes before the end of the tape.
- When the end of the tape is reached during recording, the Stop mode engages automatically.

#### Battery warning



- When the battery power is coming to an end, a battery warning indication appears in both the viewfinder and the LCD. Replace the battery pack with a fully charged one.
- After these indications appear, the power turns off automatically. In this state, however, pressing the POWER switch while holding EJECT button pressed turns the power on and ejects the cassette.

#### Low-light warning



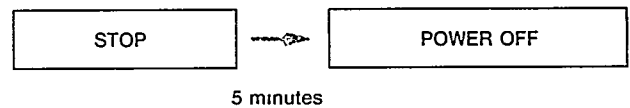
- If the blinking "LIGHT" indicator appears on the viewfinder screen, the amount of light is insufficient. Increase the lighting.

- To save battery power, the Camcorder (when battery operated) switches itself off automatically in the following situations:
  - (1) When left for longer than 5 minutes in the Stop mode.
  - (2) When left for longer than 5 minutes in the Recording Standby mode.

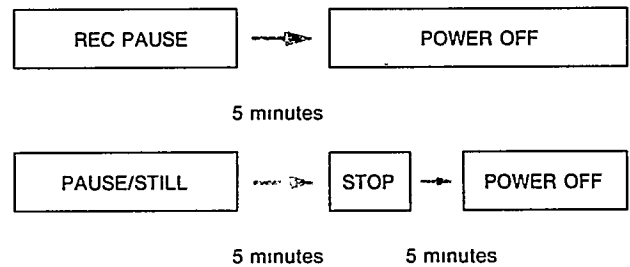
- To protect the tape, the Camcorder (regardless of whether battery operated or AC powered) releases tape tension slightly and switches itself off automatically if left for longer than 5 minutes in the Recording Standby mode.

- For the same reason, the Camcorder enters the Stop mode and switches itself off automatically if left for longer than 5 minutes in the Still (Play-pause) mode.

#### Battery operation



#### Battery/AC operation



## Assemble recording technique — 1

(To replace the battery pack during recording)

- 1 If the battery warning appears in the viewfinder or the LCD display while recording, stop recording by sliding the POWER switch to OFF, not the STOP button.
- 2 Replace the battery pack with a charged one.
- 3 Slide the POWER switch to ON.
  - The unit will be in the Recording Standby mode.
- 4 Press the recording start/stop button to start recording.

## Assemble recording technique — 2

(To search for the assemble point with the "Retake" function)

After reviewing a recorded segment, you may decide to re-record it immediately. The Retake function is convenient for this.

- 1 Make sure the Camcorder is in the Recording Standby mode. (If not, engage the mode.)
- 2 Press either REW/FF button to reach the point where you wish a new recording to start. When the REW/FF button is released the Camcorder will enter the Recording Standby mode again.
- 3 Press the start/stop button to start recording.

## Assemble recording technique — 3

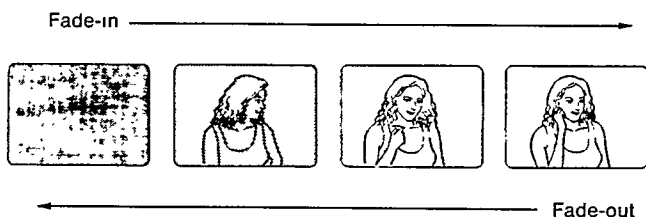
(To record onto a partially recorded tape)

- 1 Play back the tape to a point where you wish a new recording to start.
  - Use the PICTURE SEARCH button for faster location.
- 2 Press the PAUSE/STILL button at the located point.
  - The unit will enter the Still mode.
- 3 Press the REC standby button.
  - The unit will enter the Recording Standby mode.
- 4 Press the Recording start/stop button to start recording.

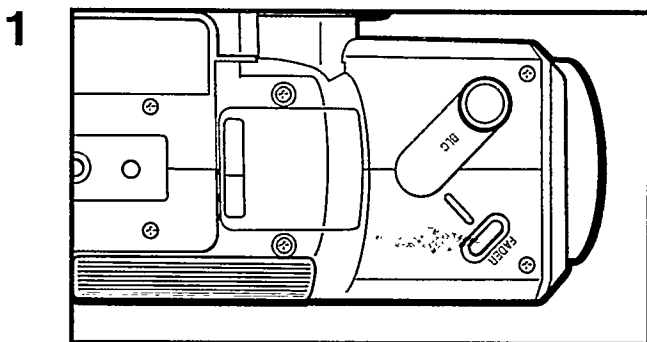
# Advanced videography techniques

## Fade-in/out

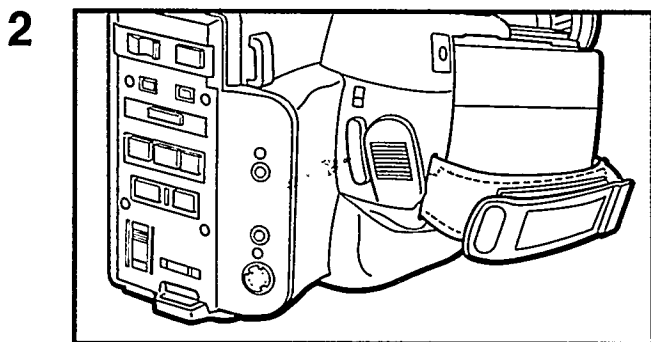
The Camcorder is equipped with an automatic fade mechanism for allowing smooth fade-in and fade-out with a black-coloured blank screen. Audio also fades in sync with video.



## Automatic fade-in



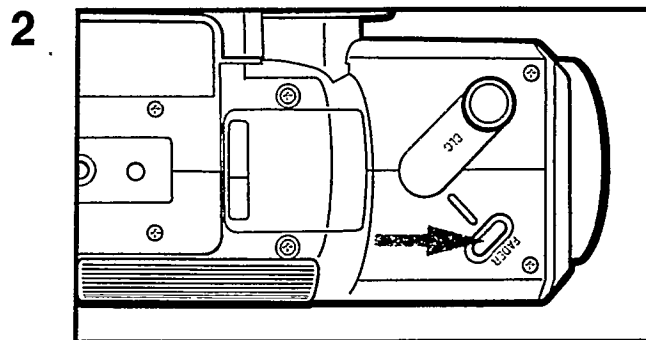
Determine the composition in the Recording Standby mode and press the FADER button to reserve the Fade-in mode.



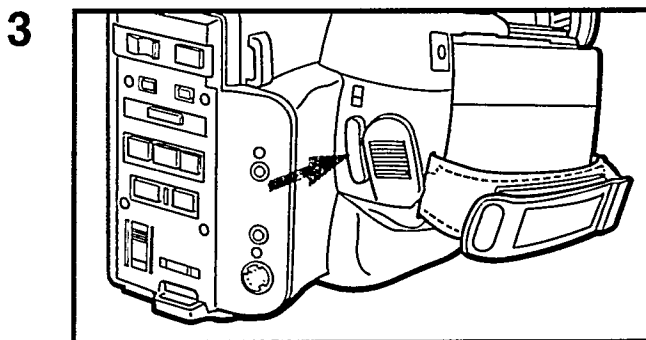
Press the start/stop button. The screen will quickly become black and recording begins. When the start/stop button is released, fade-in will start. It will be completed in about 5 seconds. If the start/stop button is not released when pressed, the black picture will remain on the screen and be recorded.

## Automatic fade-out

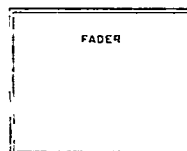
1 Start shooting as usual.



Press the FADER button to reserve the Fade-out mode.



Press the start/stop button. Fade-out will start and be completed in about 5 seconds. When completed, Recording Standby mode is entered. If the start/stop button is not released when pressed, the final black picture remains on the screen and continues to be recorded, until the button is released.



FADER is displayed in the viewfinder when fading is reserved, and continues to be displayed until fading in or out is completed.

## Focus

### Auto-focus

#### Focus detection zone



- A small area around the center of the picture, which varies depending on the zoom and focus conditions, is used to detect focus. (No actual indication provided on the screen.)

#### CAUTIONS:

- Do not touch the focus ring while the auto-focus mechanism is in operation.
- Be careful not to cover the auto-focus sensor window, otherwise accurate focusing will not be possible.
- When not in use, do not leave the Camcorder in the auto-focus mode with power on; otherwise light entering the auto-focus sensor window will operate the auto-focus mechanism, consuming power.

Correct focus may not be obtained in the following situations. In such cases manual focusing should be performed to obtain proper focus.

	Two subjects at different distances overlap in the same scene.
	Slanted lines only.
	Low illumination where the under-exposure indicator appears on the Viewfinder screen.
	Minute patterns or identical patterns that are regularly repeated.
	Low-contrast subjects for which the low-contrast indicator appears, such as a smooth, single-colour wall or the blue sky.

#### Note:

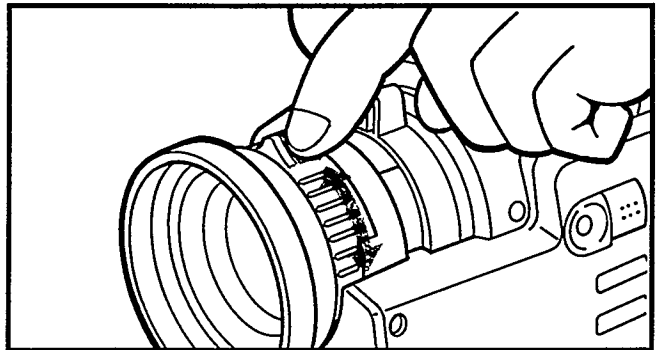
If the lens and/or auto-focus sensor window are smeared with stain or blurred with condensation, accurate focusing is not possible. Keep them clean. If they become dirty, wipe with a piece of soft cloth. When condensation occurs, dry them by wiping with a soft cloth or wait for conditions in which they become dry.

#### CAUTION:

Be careful not to touch any buttons inadvertently during shooting.

### Manual focus

If the manual focus mode is selected, proceed as follows:



- ① Zoom in on a subject by pressing the "T" button.
- ② Focus onto it by turning the focus ring. Refer to the focus aid indication chart below.
- ③ Determine the composition by pressing the "W" button.

#### CAUTION:

Covering the white balance sensor while manually focusing will result in poor colour reproduction.

#### Note:

When you use the manual focus mode, be sure to focus the lens in the maximum telephoto position. If you focus in on a certain subject in the wide-angle position, sharply-focused images cannot be obtained when zoomed up because the depth of field is reduced at longer focal lengths.

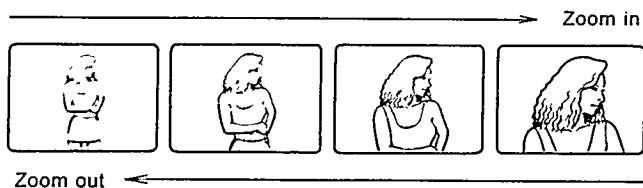
### FOCUS INDICATORS

The focus indicators on the viewfinder screen function in the manual focus mode.

Condition	Indication	Corrective operation
Focus point behind the subject		Turn the focus ring clockwise until the center square lights.
Correct focus		Keep the focus ring in the same position.
Focus point in front of the subject		Turn the focus ring counterclockwise until the center square lights.
Indication not possible because of low contrast		Estimate the subject distance and set the focus ring referring to the distance scale on it.

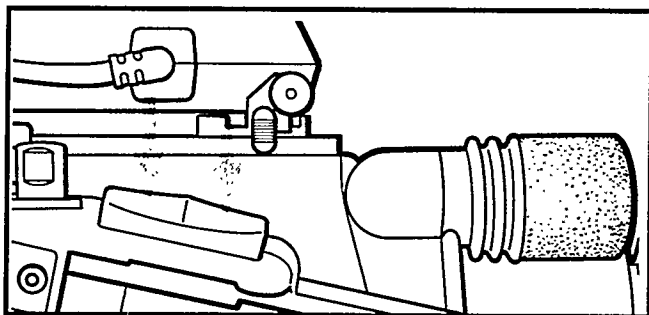
## Zooming

When the focal length of the lens is varied by turning the zoom ring, the image appears to come nearer to or retreat from the viewer.



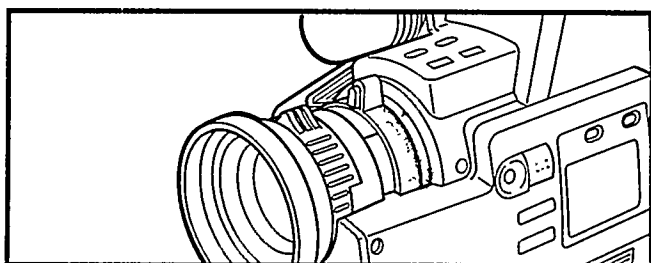
## Power zooming

Press "T" for zooming in and "W" for zooming out. Two zooming speeds are available. For slow-speed zooming, press lightly. For regular-speed zooming, press firmly.



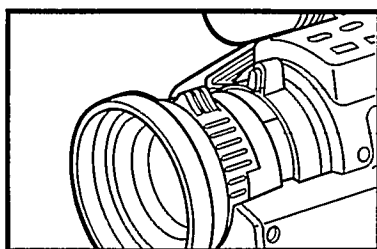
## Manual zooming

Rotate the zoom lever downwards for zooming in and upwards for zooming out.



## Macro Shot

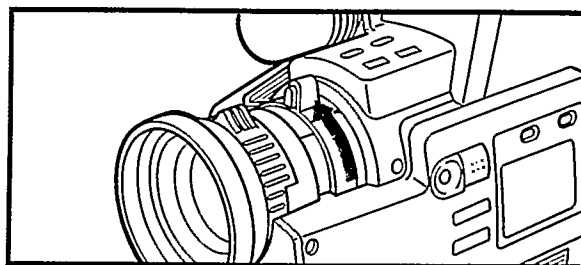
Normally, focusing is possible only for subjects that are more than 1.1 m away from the Camcorder. By setting the lens to the Macro mode, it is possible to manually focus in on any subject located inside that limit, right up to the front of the lens. The MACRO and ZOOM ranges combined give continuous shooting ability from close-up to infinity.



Zoom lever  
MACRO button  
Index line

## Engage MACRO

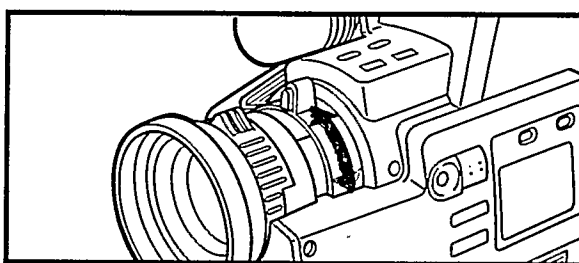
1



While pressing in the MACRO button, turn the zoom lever in the direction of the arrow until the number "8.5" on the zoom ring passes the index line.

## Focus

2

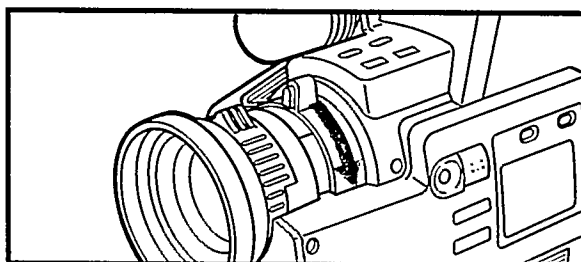


Focus by turning the zoom lever slowly. Use the zoom lever to focus in the MACRO range.

- Turning the focus ring will slightly alter the angle of view of the lens.
- The auto-focus mechanism does not function during macro shooting.
- For best results, it is advisable to increase illumination when shooting in macro.

## Release MACRO

3

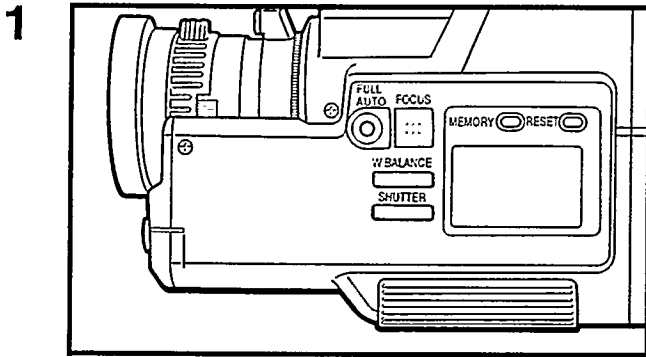


To release the Macro mode, turn the zoom lever in the direction of the arrow until the number "8.5" passes the index line.



## High-speed electronic shutter

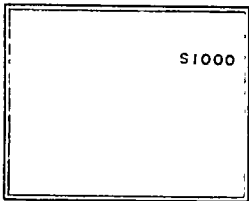
The Camcorder is equipped with a selectable high-speed shutter that allows better recording of quick movements for sharp, clear stills or slow-motion playback. Select it when taping fast-action shots that you want to play back later in Still or Slow-motion mode.



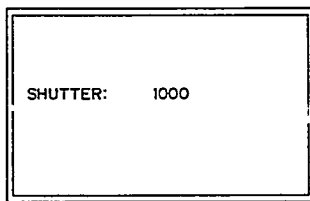
Press the SHUTTER button to switch to the desired electronic shutter speed. This can be done while recording or in any other mode. It continues at the selected speed until switched to another speed.

- 2** When finished recording the fast-action scene, switch back to the standard shutter speed by pressing the SHUTTER button until STD appears on the LCD.

When selected, the High-speed shutter mode is indicated on the viewfinder screen and LCD.

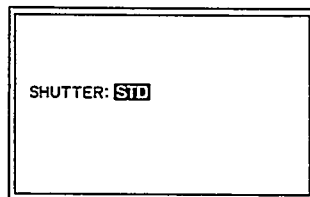


Viewfinder



LCD display

The standard shutter mode is indicated by STD on the LCD.

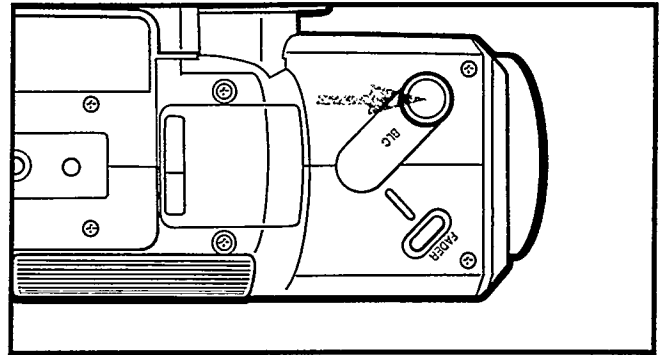


LCD display

### Notes:

- The High-speed shutter mode requires slightly more subject illumination than the standard Shutter mode. Therefore, the low-light warning may blink in the viewfinder. If so, switch to the standard Shutter mode.
- Picture color may be adversely affected in the High speed shutter mode when the subject is lit by alternating discharge-type light sources such as fluorescent or mercury-vapor lights.
- When playing back a section recorded in the High-speed shutter mode, movement of subjects in the picture may not be smooth. This is not due to any defect of the unit.
- Pressing the FULL AUTO button also restores the shutter speed to the standard level.

## Backlight compensation



- Press the BLC button. While it is being pressed, the iris is 1—2 F-stops wider than that adjusted automatically.

When excessive lighting is located in back of the subject, correct exposure may not be obtainable. To compensate for this, use BLC.



Without BLC



With BLC

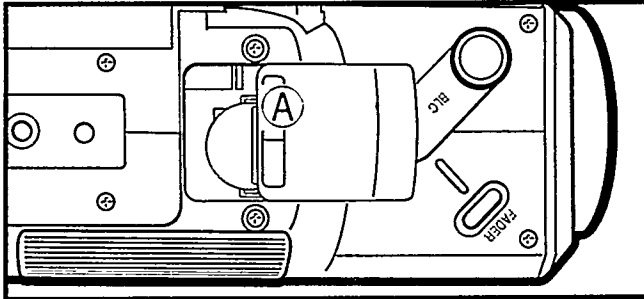
# Special recording functions

## Warning on lithium battery

- Dispose of used battery promptly.
- Keep away from children.
- Do not disassemble and do not dispose of in fire.

## Recording the date/time

### Battery insertion



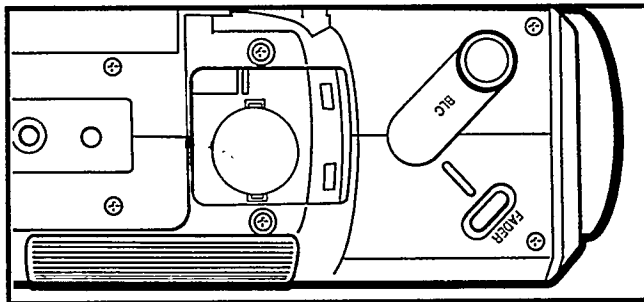
This battery powers the date/time function.

1. Slide the cover of the CLOCK BATTERY compartment on the bottom of the Camcorder by pressing lightly on the section labelled **A** in the diagram.
2. Insert the provided lithium battery with the plus (+) side up.
3. Slide the cover on until it clicks.

#### Note:

Switch off the unit's power before inserting the battery.

### Battery replacement



The battery lasts for about one year. When the lithium battery warning (▶ E) appears in the viewfinder, this battery needs to be replaced. Obtain a new CR2025 lithium battery and follow the following procedure.

1. Remove the battery by pressing the knob in the direction of the arrow.
2. Insert the new CR2025 with the plus (+) side up.
3. Slide the cover back until it clicks.

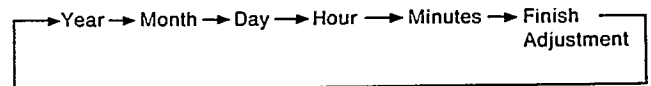
#### Notes:

- Switch off the unit's power before removing the old battery.
- Replace battery with CR2025 only. Use of another battery may present risk of fire and explosion.

## Date/time setting

Before adjusting the date and time for the first time or after replacing the batteries, 1. 1. 89 blinks in the viewfinder, indicating the clock needs to be set.

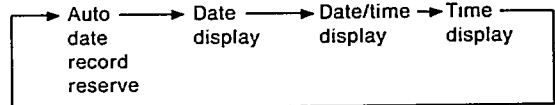
1. Switch the unit's power on, 1. 1. 89 will blink in the viewfinder. Press the MONITOR button to enter monitor mode.
2. Press the DATE/TIME SELECT button — the year blinks.
3. Press the DATE/TIME SET button to choose the correct number.
4. Press the DATE/TIME SELECT button to select the next item to change. The item will be changed in the following sequence:



5. Repeat steps 2 and 3 to set all items. After the minute setting has been performed, press the DATE/TIME SELECT button, and items will cease blinking. For the Auto date record mode, the auto date record reserve indicator will appear. When the battery is inserted, the clock will begin functioning.


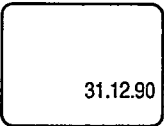
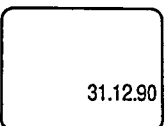
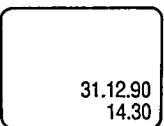
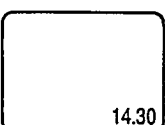
## Date/time recording

The date, time, or date and time can be displayed and recorded according to the selected mode. Press the DISPLAY SELECT button to cycle through the modes in the following order:



- When the auto-date-record function is selected, "— . — . — ." appears in the viewfinder, until recording begins. As long as this function is chosen, the date will be automatically displayed and recorded for about 5 seconds following the first operation of the recording start/stop button after the power is switched on.
- Auto-date-record reserve indication will cease to be displayed if the DATE/TIME REC ON/OFF button is set to OFF unless power is provided again.

## Date/time recording indications

Auto-date-record	
Auto-date-record reserved	Auto-date-record executed
	
Date display	Date/time display
	
Time display	
	

## Digital Superimpose

The Camcorder digital superimpose function allows 3 titles to be superimposed on a recording in a choice of 8 colors and either positive or negative (reversed) styles for more creative video opportunity.



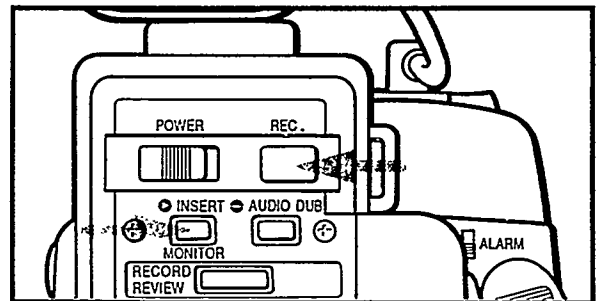
### Creating Titles

Make note of the following guidelines to assure best results.

1. Create titles using dark colors on light backgrounds — black writing on white paper, for example.
2. Letters should be drawn with broad strokes.

### Storing Titles

1

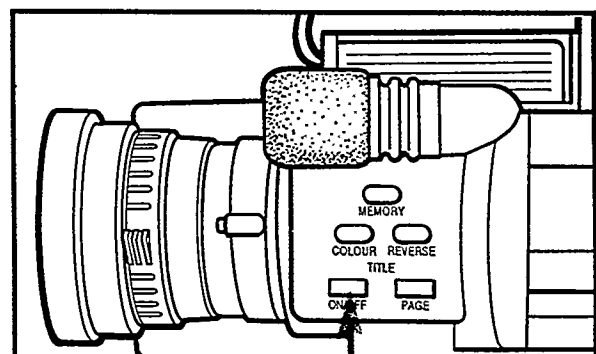


Put the unit into the Recording Standby or Monitor mode.



When the "▶ E" indication (lithium battery warning) appears in the viewfinder, titles cannot be stored. Insert the lithium battery, or replace the inserted one with a new one according to the instructions on page 24.

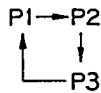
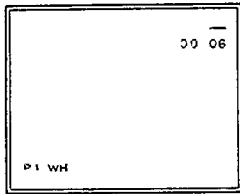
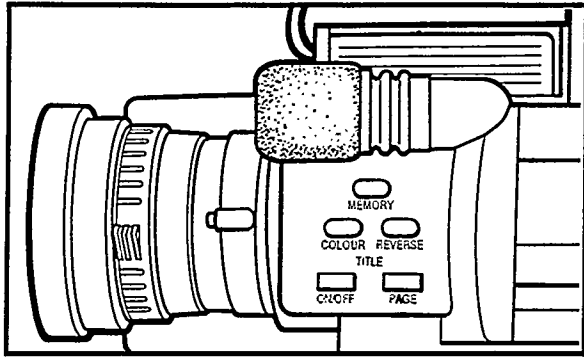
2



Press the TITLE ON/OFF button.

Even without the lithium battery, the random pattern picture of an old title may appear. This is not a malfunction.

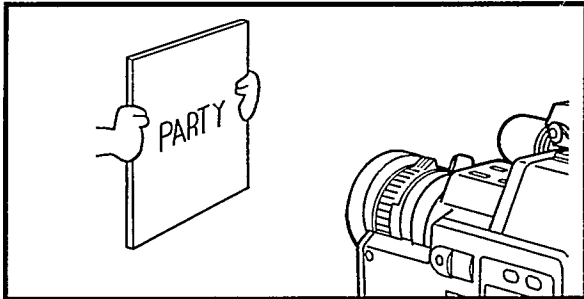
3



Use the TITLE PAGE button to select the page of memory in which you want your title to be stored. The page number will appear on the viewfinder screen.

- The page selection can be changed when the TITLE ON/OFF button is ON.
- When a page of memory contains nothing, it is "empty", and a pattern of vertical stripes will appear in the viewfinder.
- When the power is switched off or the unit is put into the Stop mode, then the Page mode returns to the page 1 position.

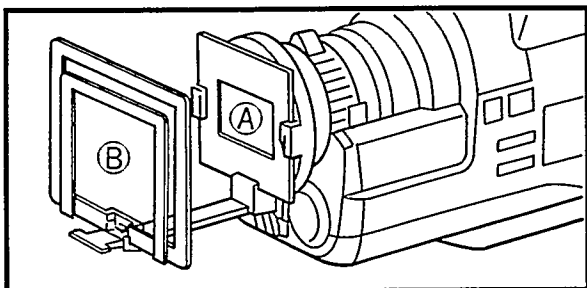
4



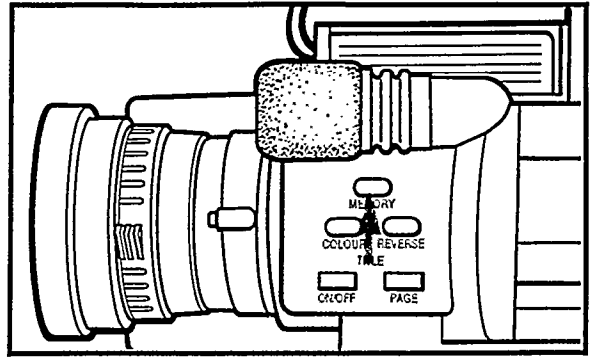
Aim the unit at your title in as well-lit a location as possible. You may also use the provided title easel for this purpose.

- At this point, if the vertical stripes or an old title appearing in the viewfinder prove bothersome, press the TITLE ON/OFF button to switch it off.
- When storing a title, the scene visible in the viewfinder may differ slightly from that which will be recorded on the tape.

A photographic slide can be recorded by inserting it in **A** and inserting a blank white card in **B** of the provided title easel. Slide up to 1/8" thick can be used. Illuminate **B** from behind for best results.



5

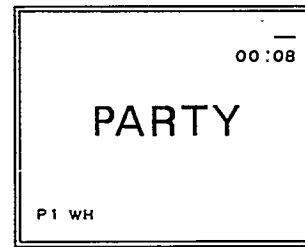


Press the TITLE MEMORY button for about 1 second to store the title.

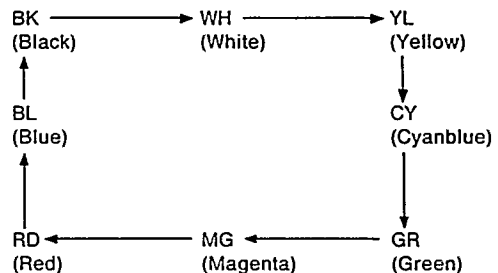
- When a title is stored poorly, check to see that the lighting is adequate and that the title is drawn with bold strokes, then shoot the title again.
- Every time the TITLE MEMORY button is pressed, the previously recorded title stored in that page of memory will be erased, and replaced with the new title.

6

Press the COLOR button to select the color in which you want your title to appear.



The colors will cycle in the following order:



7

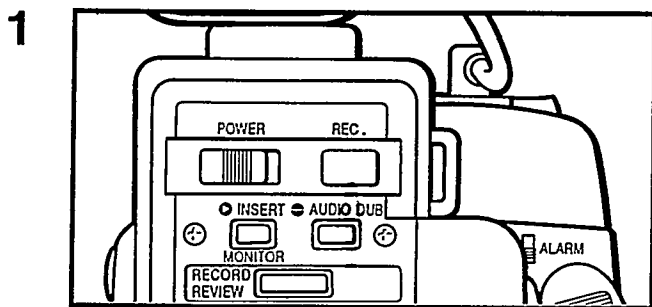
Press the IMAGE REVERSE button to choose negative or positive style.

To store additional titles, in digital memory pages 2 — 3, repeat steps 3 — 7 as above.

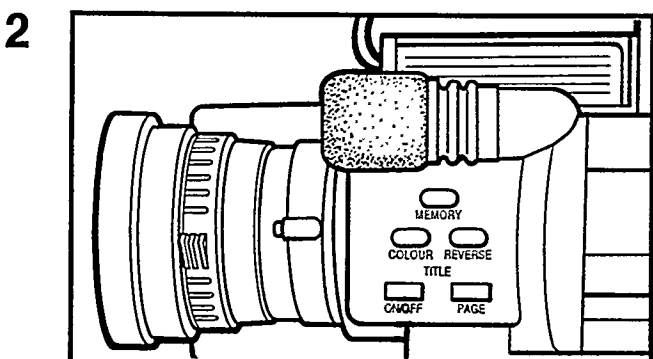
- The TITLE MEMORY button works in both the Recording Standby and Monitor modes; care should be exercised not to press TITLE MEMORY accidentally as this will erase stored titles.

## Mixing a title into a recording

- Starting at the beginning of a recording.

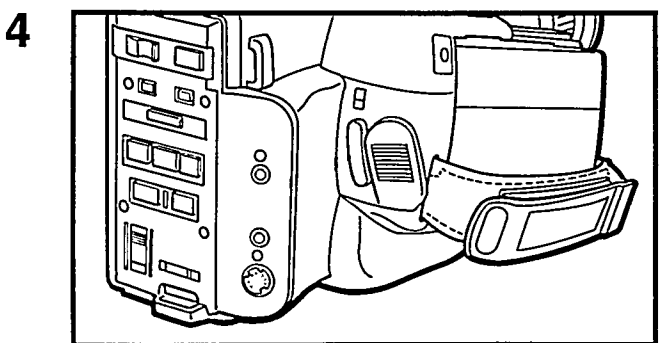
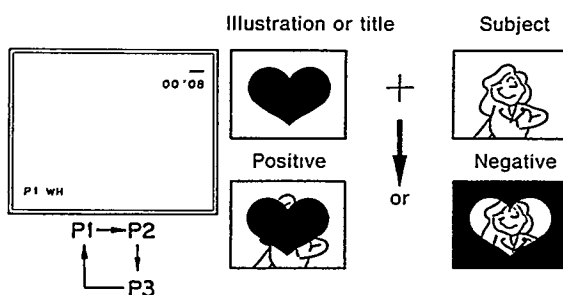


Put the unit into the Recording Standby mode.



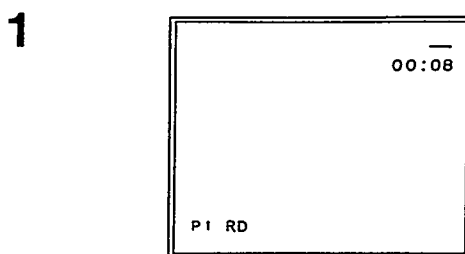
Press the TITLE ON/OFF button to display your title on the viewfinder screen.

- 3
- Press the TITLE PAGE button until the title you wish to use is displayed. The pages will cycle from 1 to 3. Confirm the page, the color, and the neg/posi style. Color choice and neg/posi style can be changed at this point: press the COLOR button to select a different color, and the IMAGE REVERSE button to choose neg/posi style.

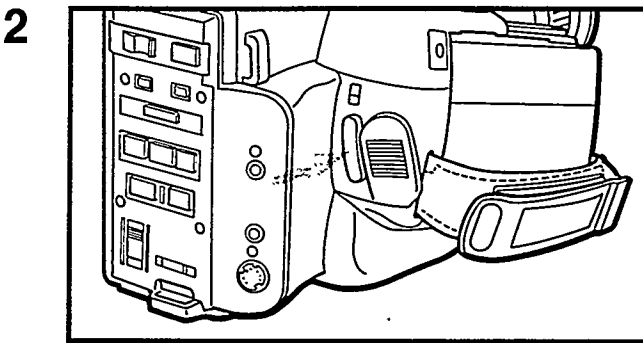


Press the recording start/stop button to begin recording. The title will now be mixed with what you are recording. Press the TITLE ON/OFF button when you wish to end the titled portion of your recording.

## Mixing in the middle of a recording

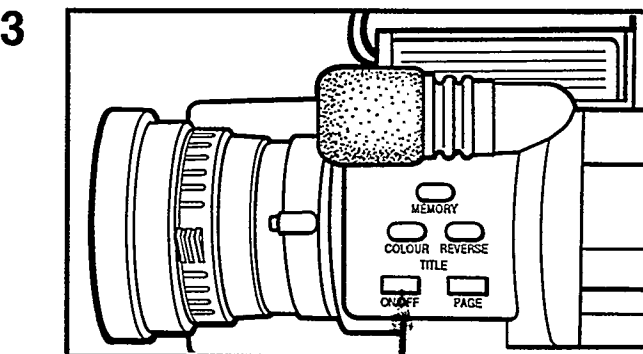


Confirm the page, color, and neg/posi style of your title. Press the TITLE ON/OFF button to switch it off.



Shoot your live scene by pressing the recording start/stop button.

Press the TITLE ON/OFF button when you wish to insert your title. It will be inserted into your ongoing recording at exactly that point.



Press the TITLE ON/OFF button again to end the mixing of your title with the action you are recording.

### Notes:

- Color choice, page number, and image reverse selections can be changed when the title is displayed in the viewfinder.
- The "Color" and "Page number" indications displayed in the viewfinder will not be recorded on the tape.
- When an "empty" page is called from memory, a pattern of vertical stripes will appear in the viewfinder.
- When the lithium battery for the unit's clock is exhausted, stored titles may be lost. For best results, replace the lithium battery before its one year required replacement date. When the lithium battery warning appears in the viewfinder, as long as power is still supplied to the unit by the main battery pack, or from an AC source (even if the unit's power switch is off), the digital memory will be retained, however, the lithium battery should be replaced at this time.

# Editing techniques

## Insert editing

Insert editing means recording a new scene into a section of prerecorded tape so that a part of the original recording can be replaced with a new sequence without excessive picture distortion at the edit-in and edit-out points. In the Insert edit mode, the original audio on the normal audio track remains unchanged.

- 1 Located the desired edit-out point on the Camcorder's tape and press PAUSE/STILL button.
- 2 Press RESET button to obtain a "0" reading, then press MEMORY button to obtain an "M" indication on the LCD.
- 3 Press REW/PICTURE SEARCH button to rewind the tape a little beyond the beginning of the scene you wish to insert.
- 4 Press PAUSE/STILL button exactly at the beginning of the scene you wish to insert .
- 5 While holding INSERT/MONITOR button pressed, press PAUSE/STILL button. The INSERT indicator lights and the Camcorder enters the Insert edit mode with the scene at which the Camcorder is aimed appearing on the screen for monitoring.
- 6 Press Recording start/stop button to insert the new sequence.
- 7 When the counter reading of "0" is reached, insert editing stops automatically and the Camcorder enters the Playback mode.

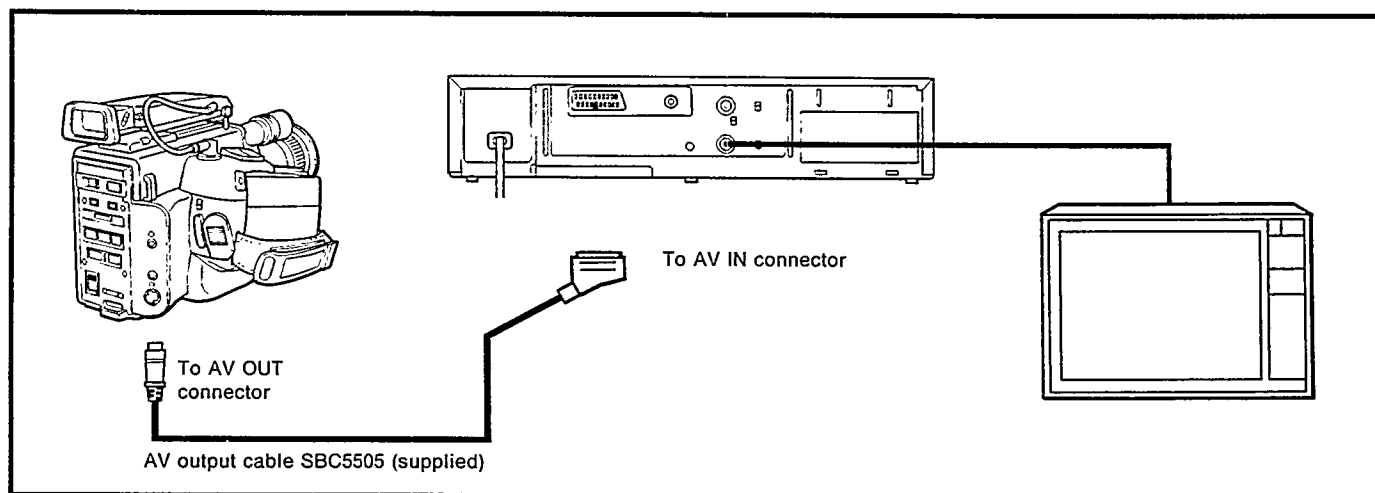
### Notes:

- When the tape reaches the preset edit-out point during the editing operation, it may stop slightly before or after the designated point on the tape.
- Only video signals are recorded in the Insert edit mode. When the sound is to be recorded, press the AUDIO DUB and PAUSE/STILL buttons simultaneously in the Insert pause mode. When INSERT/MONITOR and PAUSE/STILL buttons are pressed simultaneously again, the unit reenters the Insert edit mode.

## Tape dubbing

### Connection

1. Set the EDIT ON/OFF switch to ON.
2. Connect the AV OUT connector of the Camcorder to the AV IN connector of the video recorder using the AV output cable SBC5505 (supplied).
3. Connect a television to the video recorder to monitor the picture while dubbing.



### Operation

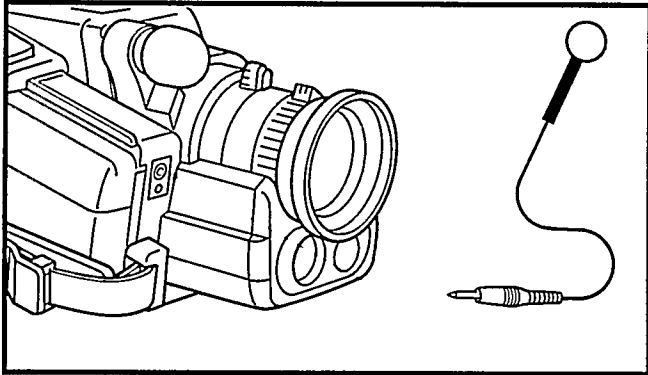
- Put the Camcorder in the Play mode and the connected recorder in the Record mode to copy the recording. To edit out unwanted material, press the recorder's PAUSE/STILL button.

## Audio dubbing

Audio dubbing means recording a new soundtrack on a pre-recorded tape, i.e. replacing the original sound with new audio material.

### Precautions

- Tapes with their safety tabs removed cannot be audio dubbed. Reseal the safety tab slot to perform the dubbing.
- If whistling or howling is heard during audio dubbing, reduce the TV volume or move the microphone farther away from the TV.
- When dubbing from a microphone, connect the microphone to the Camcorder as shown below.



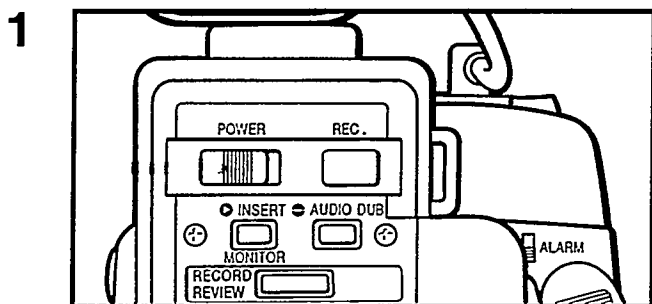
- 1** Locate the desired edit-out point on the Camcorder's tape and press PAUSE/STILL button.
- 2** Press RESET button to obtain a "0" reading, then press MEMORY button to obtain an "M" indication on the LCD.
- 3** Press REW/PICTURE SEARCH button to locate more quickly the place on the tape you want audio dubbing to begin.
- 4** Press PAUSE/STILL button at the exact beginning point for audio dubbing.
- 5** While pressing AUDIO DUB button, press PAUSE/STILL button to enter the Audio dub standby mode.
- 6** When you are ready with the new audio material, press PLAY button to begin audio dubbing.
- 7** When the counter reading of "0" is reached, audio dubbing stops automatically and the Camcorder enters the playback mode.

# Playback

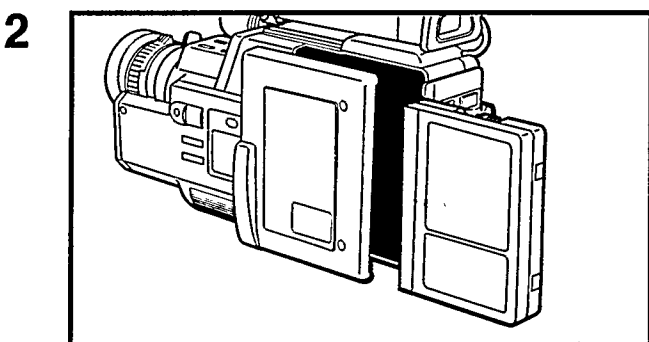
The Camcorder permits playback of recorded **VHS** video cassettes.  
For connections refer to pages 32 and 33.

## Preparations

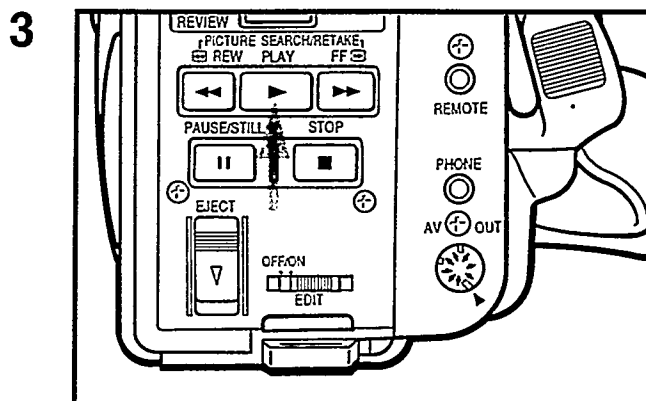
- With a television equipped with AV input connectors, set the television's TV/VIDEO switch to VIDEO.
- With a regular television receiver set the aerial select switch of the RF converter 22AV5158 to VIDEO and the TV receiver's channel selector to your video channel (specified AV channel).



Connect a power supply unit. (Battery or AC operation: see page 11.)  
Slide the POWER switch to ON.



Insert a pre-recorded cassette.  
First remove tape slack, then insert the cassette correctly.  
See page 13.

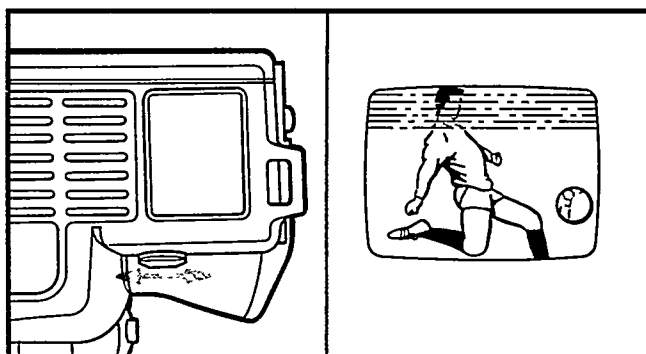


Press the PLAY button. Playback will start.

- When the end of the tape is reached during playback, the Rewind mode engages automatically.

## Tracking adjustment

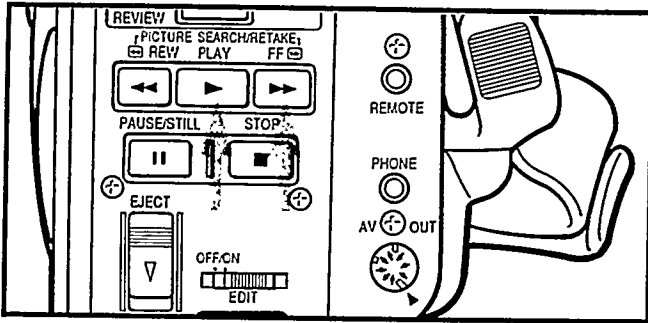
If noise bars appear on the screen, adjust the TRACKING control. Turn it slowly in either direction to minimize noise bars. After playing a particular tape, return the TRACKING control to the center position.





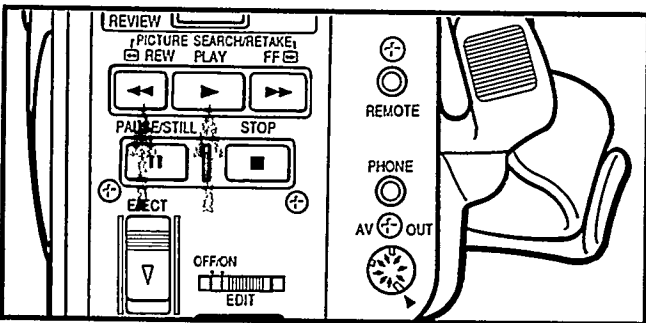
## Picture search

### Fast-speed playback in the forward direction



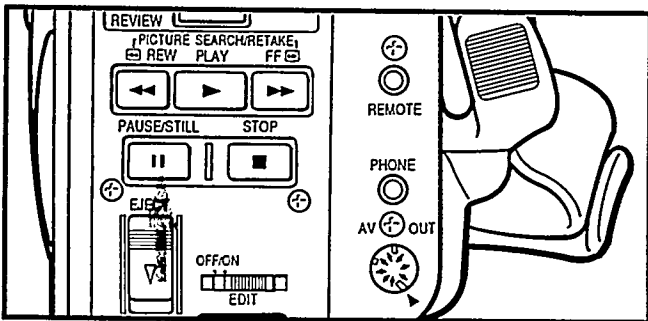
Press the FF button in the Play mode. Playback will be speeded up to 3 times normal speed, as long as the button is being pressed.

### Fast-speed reverse playback



Press the REW button in the Play mode. The tape will be played back in the reverse direction at 3 times normal speed as long as the button is being pressed.

### Still playback



Press the PAUSE/STILL button during playback. The picture will stop on the screen.

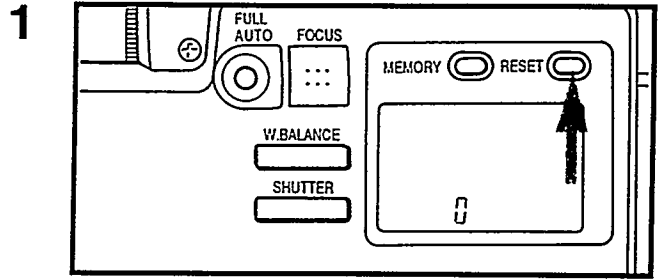
- After about 5 minutes of still playback, the unit enters the Stop mode automatically, for tape protection, and switches itself off.

#### Notes:

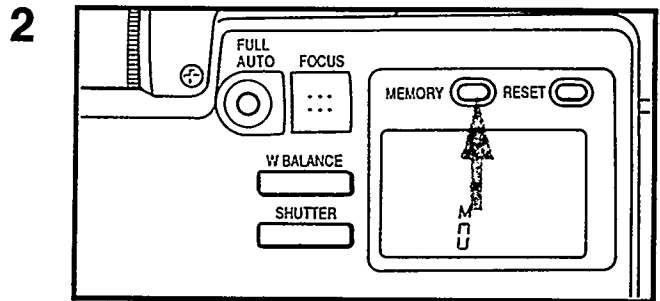
- Noise may appear on the screen during picture search and still playback. This is not due to any defect of the unit.
- Pictures may become monochrome during picture search. This is not due to any defect of the unit.
- For brief scanning, keep the PICTURE SEARCH button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

## Counter memory function

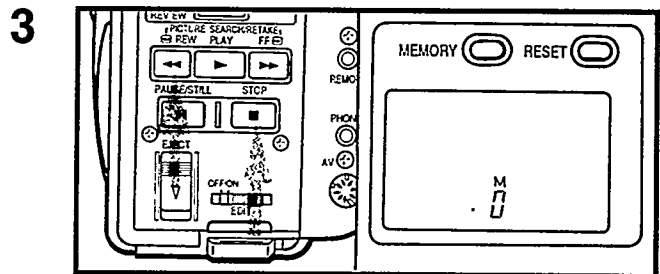
The Camcorder incorporates a counter memory mechanism which facilitates locating a specific tape segment.



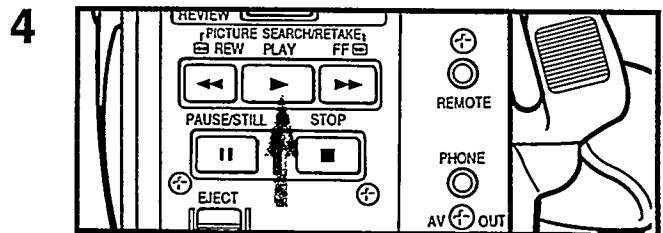
Press the RESET button to reset the counter to "0".



Press the MEMORY button. The "M" mark will appear.



After recording or playback, press the STOP button, then the REW button. The tape will automatically stop at the counter reading of around "0".



Press the PLAY button to start playback.

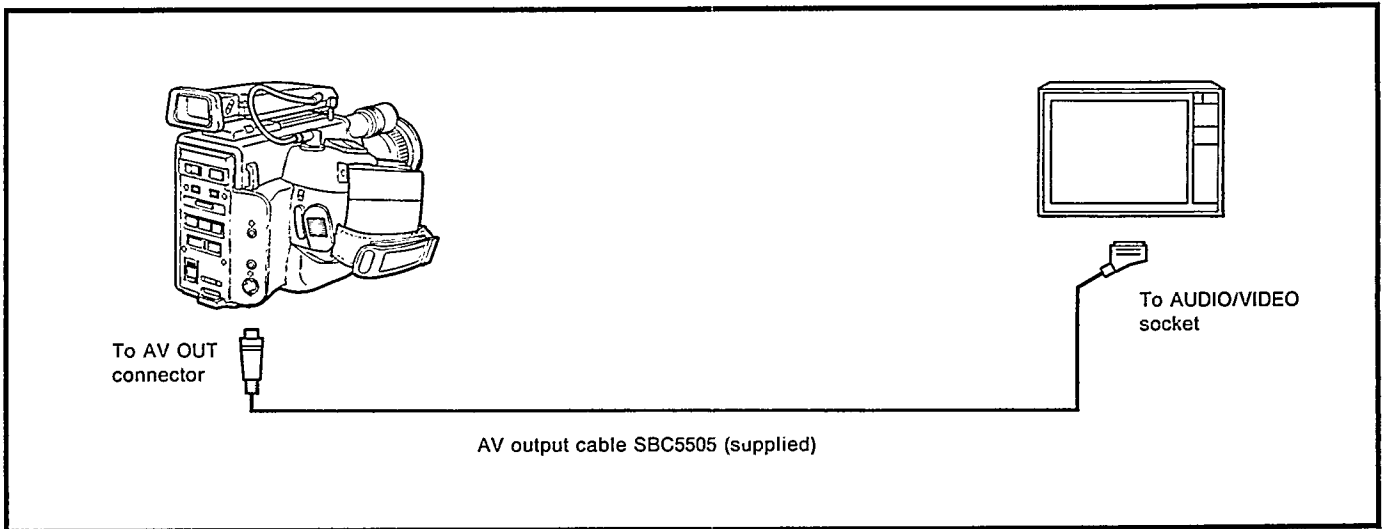
#### Notes:

- The counter memory function is effective in the Fast forward mode as well.
- To cancel the memory function, press the MEMORY button.
- When the power supply unit is disconnected, all indications on the LCD disappear and the counter memory function is instantly cancelled.

# Connections for playback

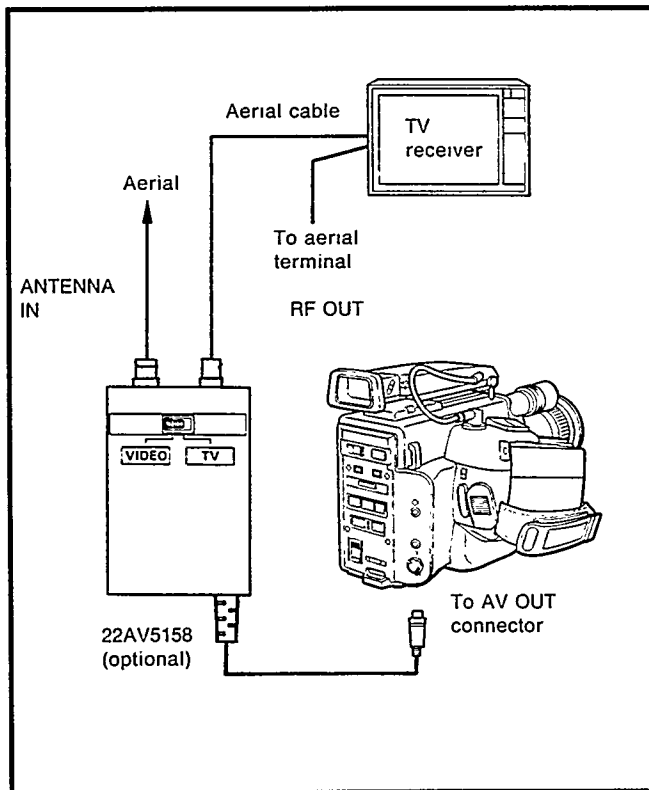
## ① When using an TV with Euroconnector

- Simply connect the AV OUT terminal of the Camcorder to the VIDEO and AUDIO IN connectors (21-pin, scart) of the television using the supplied AV output cable.

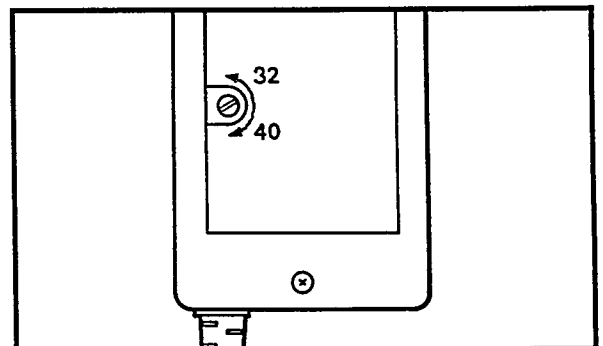


## ② Connection to a TV not equipped with AV input connectors

For this situation, use the 22AV5158 RF converter.



- 1 Remove the aerial cable from the TV receiver.
- 2 Connect the aerial cable to the ANTENNA IN terminal of the RF converter.
- 3 Connect the RF OUT terminal of the RF converter to the aerial terminal of the TV receiver using the provided aerial cable.
- 4 Connect the VIDEO/AUDIO INPUT cable of the RF converter to the AV OUT connector of the Camcorder.
- 5 Adjust the RF converter output channel according to your VIDEO CHANNEL.

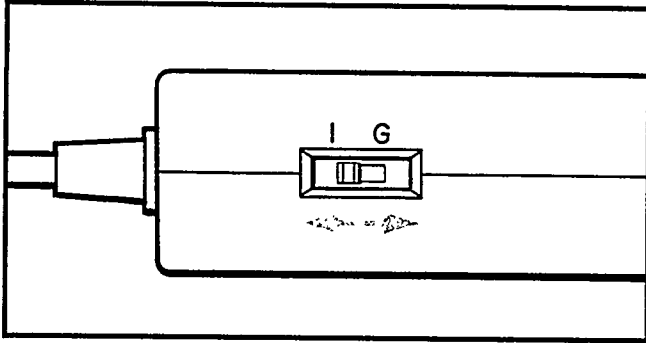


### ● RF converter channel adjustment screw

The RF converter permits playback of video and audio recordings through a TV receiver. The signals from the RF converter are viewed through a vacant channel not used for broadcasting in your area. The output frequency of the RF converter has been set to correspond to a broadcast on UHF channel 36. To view playback pictures from the Camcorder with your TV receiver, tune its specified AV channel to UHF channel 36. If channel 36 is employed for broadcasting in your area, readjust the RF converter output channel to one of the vacant channels between 32 and 40. To make this adjustment, remove the small cap on the back of the RF converter and turn the adjustment screw with a screwdriver to tune in a vacant channel.

### ● TV system select switch (I/G)

When you use a TV receiver built to the British PAL standard, shift the system select switch to "I".



### ● RF converter channel adjusting procedure

1. Set the AV channel of the TV receiver to one of the vacant channels.
2. Power the Camcorder.
3. Put the Camcorder in the Monitor mode (see page 17).
4. Set the VIDEO/TV switch of the RF converter to VIDEO.
5. While monitoring the output signal on the TV screen, turn the RF converter channel adjustment screw so that the monitored picture comes in most clearly.

#### CAUTION:

To view the Camcorder recordings with a TV receiver, use a TV receiver having a specified AV channel and employ this AV channel as your VIDEO CHANNEL, otherwise playback may be disturbed with vibrating or bending pictures. AV channels refer to channels exclusively for video playback; because of AFC circuits applied to these channels, the playback pictures can be stabilized. Recent TV receivers have one or more AV channels.

### OPERATION

#### Viewing video cassettes being played back with the Camcorder.

To view video cassettes or to monitor the recording, set the VIDEO/TV switch of the RF converter to VIDEO and the TV channel selector to the channel corresponding to the RF output channel.

#### Viewing television programmes

Set the VIDEO/TV switch to TV, and the TV receiver will function as usual.

### PRECAUTIONS FOR 22AV5158

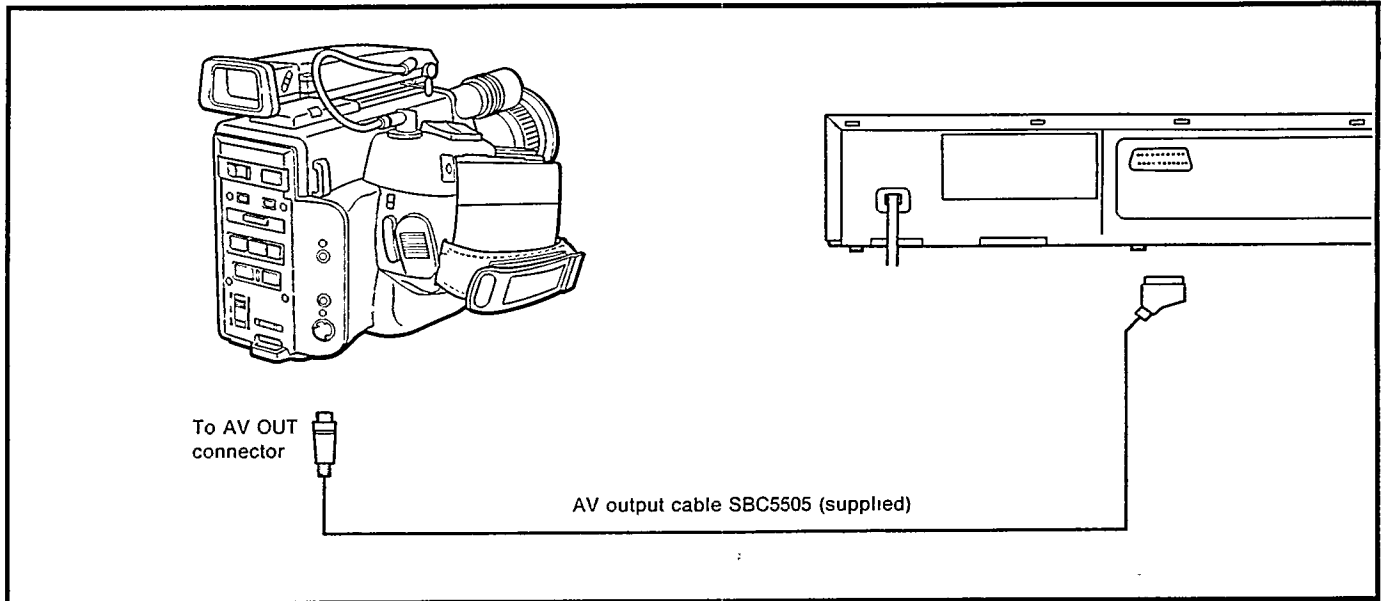
- For exclusive use with the Camcorder.
- Do not disassemble or remodel the 22AV5158.
- Do not expose it to strong shocks.
- Unplug the connected equipment during lightning storms. (Never touch the aerial cable.)

## Using the Camcorder as a video camera

For continuous documentation of longer events, the Camcorder can be used as an independent video camera in combination with either a deck-type or portable video recorder.

### Using a recorder not equipped with a remote pause terminal

- Connect the AV OUT connector of the Camcorder to the AV IN connector of the video recorder using the supplied AV output cable.



### Operation

1. Press the MONITOR button. The camera output signal is now available via the AV output cable.
2. Put the connected recorder in the Record mode. Recording will start. Tape start/stop should be controlled with the recorder's buttons.

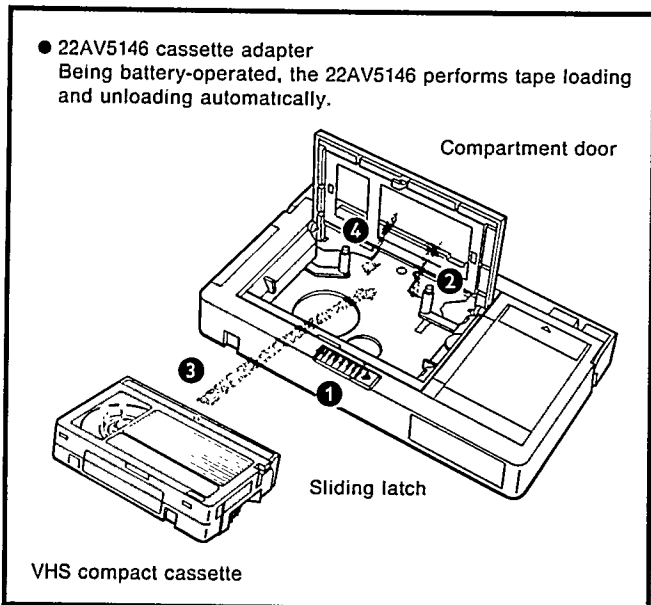
### Note:

*In this configuration, it is possible to obtain a continuous recording and an edited-out recording of the same event simultaneously, because the Camcorder's start/stop button only controls the tape inside itself while another tape loaded in the connected recorder continues running. To record on the Camcorder's tape, follow the same recording procedure as mentioned before; press REC standby and then the start/stop button*

## Using optional accessories

### Playback by the cassette adapter 22AV5146

The VHS compact video cassettes recorded with the Camcorder can be played back with a standard VHS VCR by using the optional cassette adapter (A compact video cassette installed in the cassette adapter is fully compatible with a standard VHS VCR for both recording and playback.)

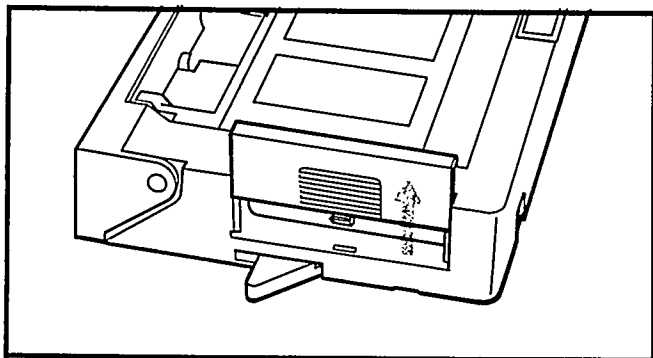


For more details refer to the instruction manual of the 22AV5146.

**Note:**

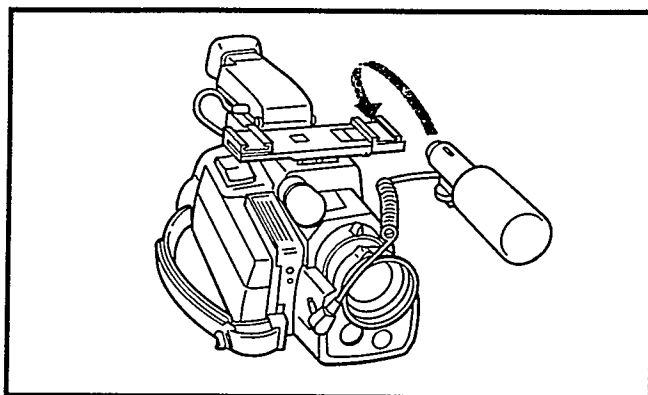
During special-effects playback (slow motion, still frame, etc.) the picture may vibrate or noise bars may appear on the screen.

### Inserting the battery into the cassette adapter



Remove the battery cover by sliding it up.  
Install one "R6" battery and reattach the cover.

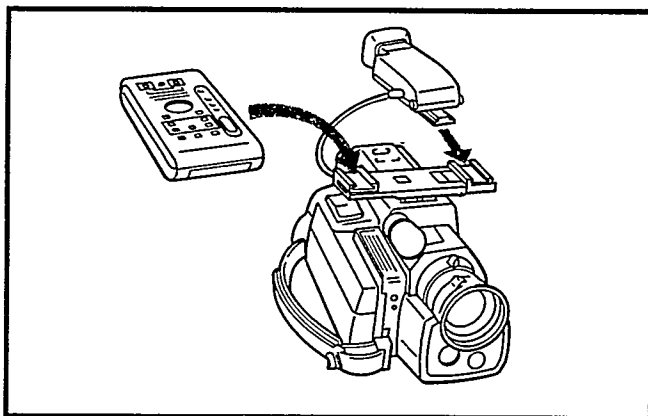
### Shoe adapter 22AV5157



Attaching external microphone using shoe adapter.

**CAUTION:**

Do not attach a video light, its heat could cause malfunctioning of the Camcorder.



Attaching the optional available character generator 22AV5132 using the shoe adapter.

**Notes:**

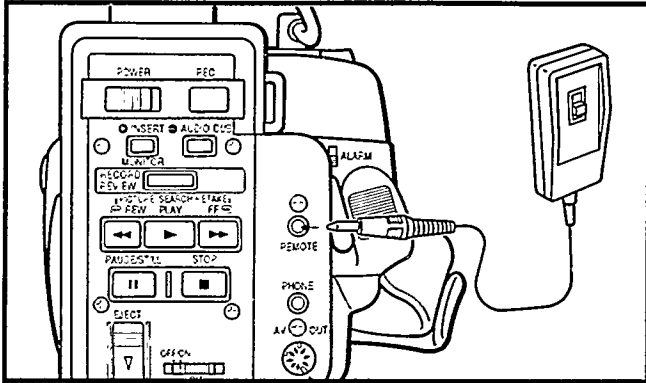
- Do not adjust the viewfinder angle while using the shoe adapter.
- Run the microphone cord behind the shoe adapter.

### RF converter 22AV5158

See page 32.

## Remote control unit 22AV5131

The remote control unit 22AV5131 (optional) permits recording start/stop to be controlled from a distance.

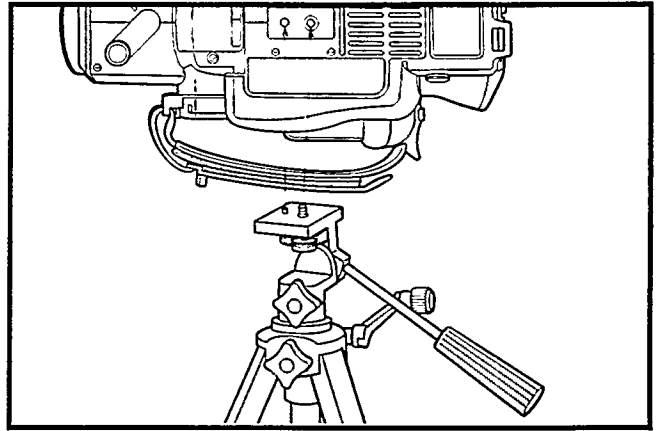


- 1** Plug the remote control cable into the REMOTE connector.
- 2** Press the REC standby button to engage the Recording standby mode.
- 3** To start recording, set the remote control's switch to REC; to stop temporarily, set it to PAUSE.

**Note:**

*FADER will not function when remote control unit is connected.*

## Tripod mounting



Align the screw and camera direction stud of the tripod with the Camcorder's tripod mounting socket and stud hole, and firmly tighten the screw.

# Supplemental information

## What is "color temperature"?

Light is composed of various color components in different proportions. A relationship exists between the temperature of a light source and the color components of the emitted light; as the temperature rises, the color of the light varies from red, orange, yellow, white to blue in that order. "Color temperature" is a value that expresses differences in color among light sources, measured in Kelvin. Bluish light has a higher color temperature than reddish light.

## What is "white balance"?

Making the colors look natural on TV is what white balance is all about. Because a camera is not as adaptable as the human eye, if a light source is reddish, white subjects in that light are recorded as reddish. White balance adjustment is performed to compensate for color temperature variations of light so that whites are reproduced as white. Correct white balance makes all other colors correct. The Camcorder can perform automatic white balance adjustment in the full-auto mode. However, if illumination is insufficient, white balance adjustment cannot be performed. To obtain correct colors, therefore, sufficient illumination is essential.

## What is "illuminance"?

"Illuminance" is the intensity or brightness of reflected light, expressed in lux. The Camcorder is designed to provide best pictures under the conditions of a 700-lux illuminance, although shooting is possible all the way down to 10 lux. To obtain good pictures in very bright light, the use of an ND (neutral density) filter is recommended. (See chart on this page.)

## How to get good color pictures

The simplest way is to provide sufficient lighting (close to the camera's reference illuminance) and accurately adjust the camera to the color temperature of that lighting. If light sources of different color temperatures are used together, accurate white balance adjustment is very difficult. For example, if natural light is mixed with artificial light, which is likely to occur next to windows, correct colors of the subject are difficult to obtain. It is recommended in such cases that curtains in the room be closed to shut out light from outside. Also, when artificial lighting devices are used, they should all have the same color temperature. For example, it is recommended that incandescent or halogen lamps not be used together with fluorescent lighting.

## Color temperatures of various artificial lighting

Type of illumination		Color temperature
Tungsten lamp for home use		2,800 K
Tungsten lamp for photographic use		3,200 K
Quartz-halogen lamp		
Blue lamp for photographic use		5,000 K
Fluorescent lamp	Warm white	3,500 K
	White	4,500 K
	Daylight type	6,500 K

## Illuminance chart

- The values on this chart are approximated to give you a rough reference.

ND filter desired	Unit: Lux		
Range for practical use	100,000 -	<ul style="list-style-type: none"> <li>● Clear sky, mid-day, under sunlight (100,000)</li> <li>● Clear sky (10:00 a.m.) under sunlight (65,000)</li> <li>● Clear sky (3:00 p.m.) under sunlight (35,000)</li> <li>● Cloudy sky (mid-day) under sunlight (32,000)</li> <li>● Cloudy sky (10:00 a.m.) under sunlight (25,000)</li> </ul>	
	10,000 -	<ul style="list-style-type: none"> <li>● By the window during the afternoon (3,500)</li> </ul>	
	2,000 -	<ul style="list-style-type: none"> <li>● Cloudy sky (one hour after sunrise) (2,000)</li> </ul>	
	1,000 -	<ul style="list-style-type: none"> <li>● Clear sky (one hour before sunset) (1,000)</li> </ul>	
	600 -	<ul style="list-style-type: none"> <li>● Counters at department stores (500 — 700)</li> </ul>	
	500 -	<ul style="list-style-type: none"> <li>● Bowling center (500)</li> </ul>	
	Lighting desired		<ul style="list-style-type: none"> <li>● Office under fluorescent light (400 — 500)</li> <li>● Library (400 — 500)</li> <li>● Direct light of a flashlight at 1 m distance (250)</li> </ul>
		100 -	<ul style="list-style-type: none"> <li>● Streetlights at night (150 — 200)</li> </ul>
		80 -	
		Minimum lighting for an object	
15 -		<ul style="list-style-type: none"> <li>● Cigarette lighter (at a distance of 30 cm)</li> </ul>	
	10 -	<ul style="list-style-type: none"> <li>● Candlelight (at a distance of 20 cm) (10 — 15)</li> </ul>	

## In case of difficulty

What may initially appear to be trouble is not always a real problem. Make sure first.

Symptoms	Check points
<b>Power</b>	
No power is supplied.	<ul style="list-style-type: none"> <li>● Is the battery pack correctly installed?</li> <li>● Is the battery pack charged?</li> <li>● Is the power supply unit correctly connected?</li> <li>● Is the POWER switch of the connected AC adapter set to ON?</li> </ul>
<b>Recording</b>	
Recording is impossible.	● Check to see if the cassette safety tab is in place. See page 4.
Picture colors greatly differ from actual subject colors.	● If in the manual white balance mode, check the setting of the W.BALANCE button.
No sound is recorded with an external microphone.	● Is the microphone's switch set to ON?
Recording does not start.	● Have you pressed the REC standby button first?
<b>Playback</b>	
Tape is running, but no playback picture appears.	<ul style="list-style-type: none"> <li>● Is the VIDEO/TV switch of the RF converter set to VIDEO?</li> <li>● Is the TV receiver set to your video channel?</li> </ul>
Noise bars appear in the playback picture.	● Use the TRACKING control to reduce noise bars.
Playback picture is blurred or interrupted, while TV programmes received are clear.	● Video heads may be dirty or worn out. For head cleaning or replacement, consult the qualified service personnel.
<b>Tape transport</b>	
Tape stops during fast forward or rewind.	<ul style="list-style-type: none"> <li>● Is the "M" indication visible in the tape counter?</li> <li>    If so, press the MEMORY button to cancel the memory function.</li> </ul>
Rewinding or fast forwarding is impossible.	● Check to see if the tape has already been fully wound on one reel or the other.
<b>Other</b>	
No function is available with more than two mode indicators lit.	<ul style="list-style-type: none"> <li>● If this should happen when using power supply units other than the battery pack, turn their POWER switch on and off.</li> <li>    With a battery pack, replace it with another charged one.</li> </ul>
Vertical white lines appear when shooting a very bright object.	● This may occur when the background contrasts very much with the object. This is normal.

The Camcorder is a microcomputer-controlled device. External noise and interference might prevent it from functioning properly. In such cases, first disconnect its power supply unit (battery pack, AC power adapter, etc.); and then reconnect it and proceed as usual from the beginning.



# Specifications

Format	: VHS standard
Power source	: DC 9.6 V $\equiv$
Power consumption	: 8.0 W
Signal system	: PAL-type colour signal
Cassette	: VHS-C cassettes
Tape speed (SP)	: 23.39 mm/sec
Recording time Max. (SP)	: 30 minutes (with SE-C30 cassette)

## VIDEO

Output	: 1 Vp-p, 75 ohms, unbalanced (via AV OUT connector)
S/N ratio	: More than 42 dB (with Rohde & Schwarz noise meter)

## AUDIO

Output	: -6 dBs, 1 k-ohm (via AV OUT connector)
Microphone input	: -68 dBs, high impedance, unbalanced
Pickup	: 1/2" — format CCD
Minimum required illumination	: 10 lux (at F/1.4)
Illumination range	: 10 — 100,000 lux
Lens	: F/1.4 — 2.0 f = 8.5 — 68 mm, 8:1 two-speed power zoom lens with auto iris control and macro position, filter diameter 52 mm
Viewfinder	: Electronic viewfinder with 0.6" black/white CRT
Selectable high-speed shutter:	1/1000, 1/500, 1/250 and 1/50 sec. (standard)
Colour temperature switching:	Switchable (3,200 K/4,500 K/5,500 K)
White balance adjustment	: Full-auto/preset standard
Operating temperature	: 0°C to 40°C
Operating humidity	: 35% to 80%
Storage temperature	: -20°C to 50°C
Weight	: 1.2 kg (with viewfinder)
Dimensions	: 111(W) x 150(H) x 253(D) mm (incl. viewfinder)

## AC adapter 22AV5191

Power requirement	: AC 110 — 240 V~, 50/60 Hz
Power consumption	: 23 watts
Output	: DC 14 V $\equiv$ 1.1 A (Charge) DC 9.6 V $\equiv$ 1.2 A (Camcorder)
Charging system	: Constant current, peak detection, timer controlled
Dimensions	: 69 (W) x 42 (H) x 150 (D) mm
Weight	: Approx. 380 g

Design and specifications subject to change without notice.



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