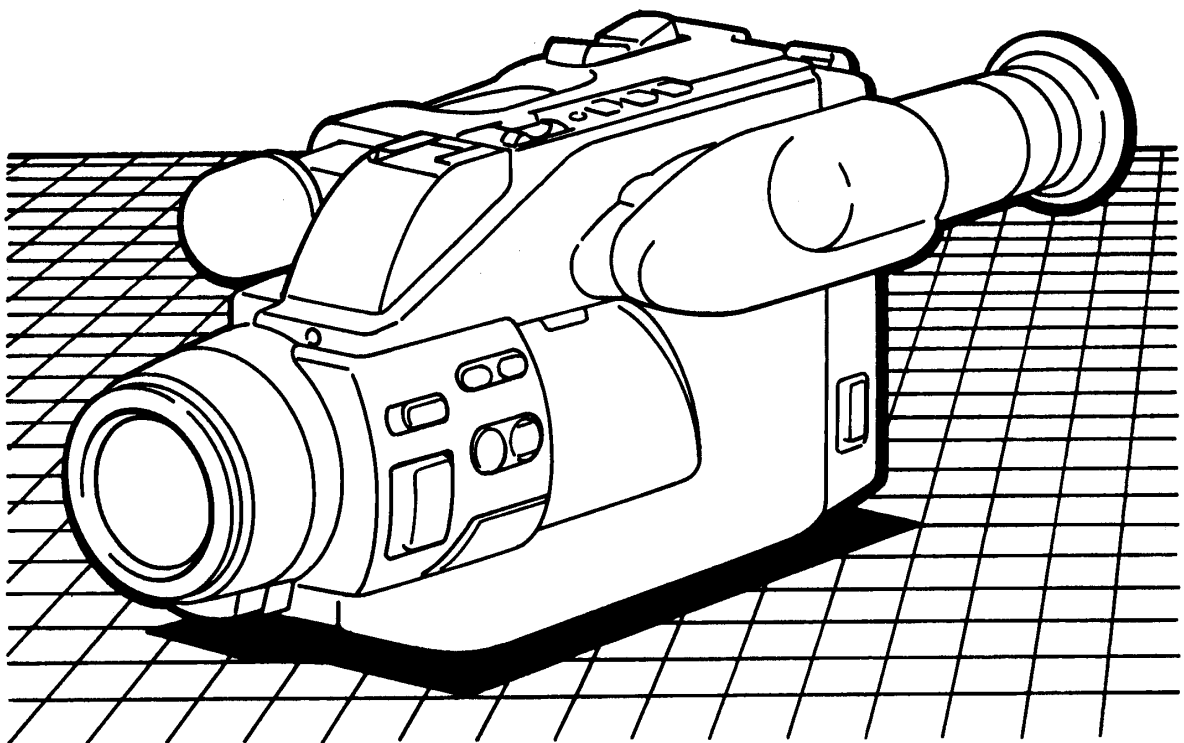


SANYO

Instruction Manual

8 mm
Camcorder

VM-D90P



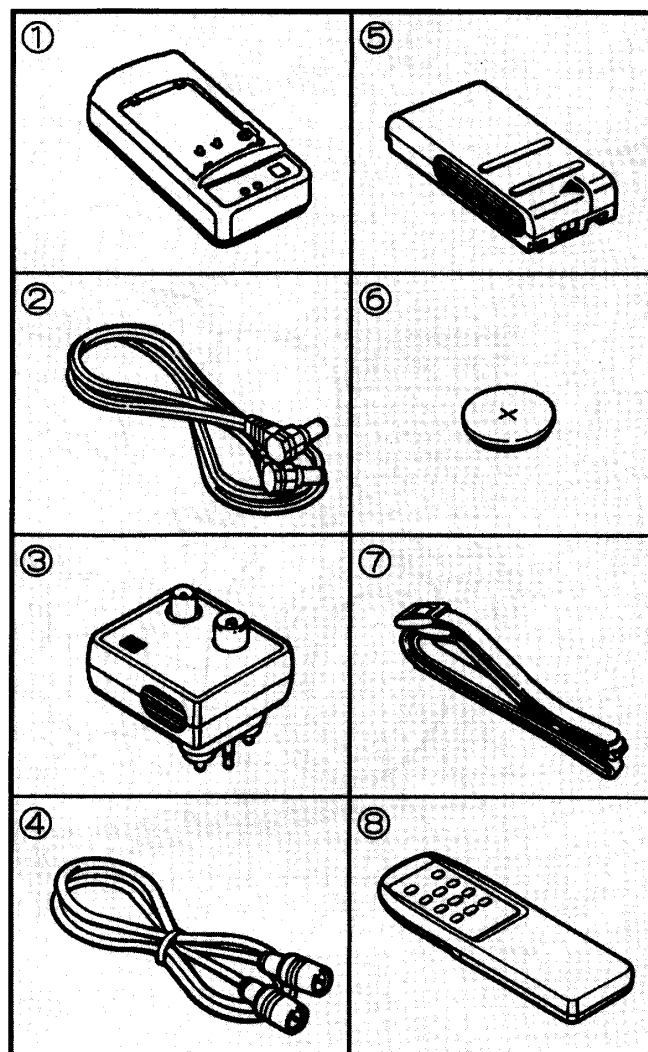
8 PAL

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ACCESSORIES

- ① AC adaptor/charger (VAR-S15B)
- ② DC connecting cord
- ③ RF converter
- ④ RF connecting cable
- ⑤ Battery pack (NP-55)
- ⑥ Lithium battery (CR2025)
- ⑦ Shoulder belt
- ⑧ Remote control unit



Features

8x power zoom

Fuzzy logic system

- Auto-focus
- Auto exposure
- Auto white balance

Full range auto-focus

User-friendly operation

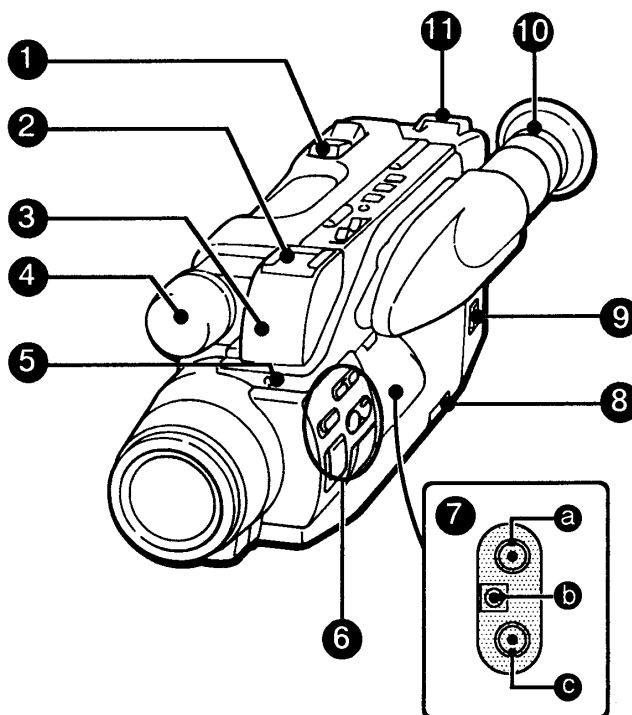
- Auto zoom reset
- Preset modes
- Stand-by switch

Infrared remote control

PARTS NAMES AND FUNCTIONS

Front

- ① Power zoom button (T, W)
- ② Accessory shoe
Depending on the shape of the attachment part of the light (sold separately) to be installed, the cassette compartment cover may not open, making loading and unloading of the cassette difficult.
- ③ Remote control sensor
- ④ Microphone
- ⑤ Recording indicator
- ⑥ Control panel
- ⑦ Output terminals
To have access to the output terminals, pull the top of the cover to open it.
 - a Video output terminal (yellow)
 - b DC output terminal
 - c Audio output terminal (white)
- ⑧ Lithium battery tray
- ⑨ Battery release button (BATT)
- ⑩ Eyesight compensation ring
- ⑪ Shoulder belt hook



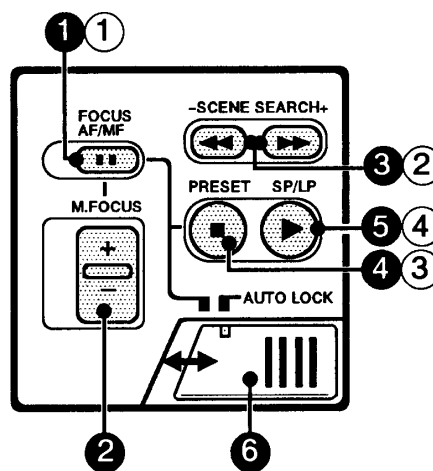
Control panel

When the **POWER** switch is set to the "CAMERA" position, the buttons and the switch have the functions identified by the words on the camcorder.

- ① Auto-focus/Manual-focus select button (FOCUS AF/MF)
- ② Manual-focus adjustment button (M.FOCUS +, -)
- ③ Scene search buttons (SCENE SEARCH -, +)
- ④ Camcorder preset button (PRESET)
- ⑤ Tape speed select button (SP/LP)
- ⑥ Auto lock switch (AUTO LOCK)

When the **POWER** switch is set to the "PLAYER" position, the buttons have the functions identified by the symbols on the buttons.

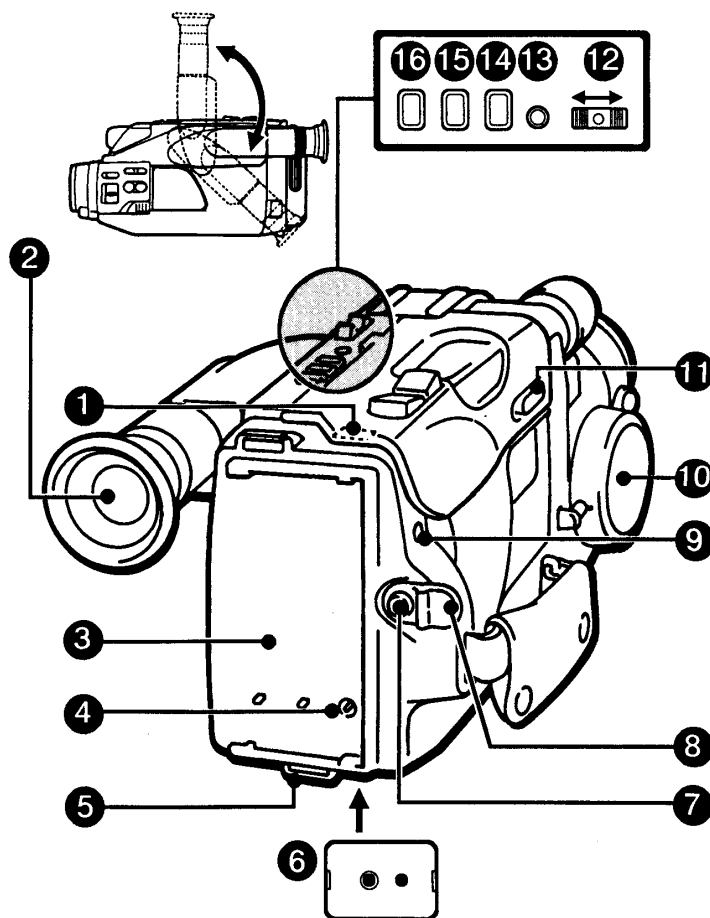
- ① Still button (II)
- ② Rewind/Reverse search (◀) and Fast-forward/Forward search buttons (▶)
- ③ Stop button (■)
- ④ Playback button (▶)



PARTS NAMES AND FUNCTIONS

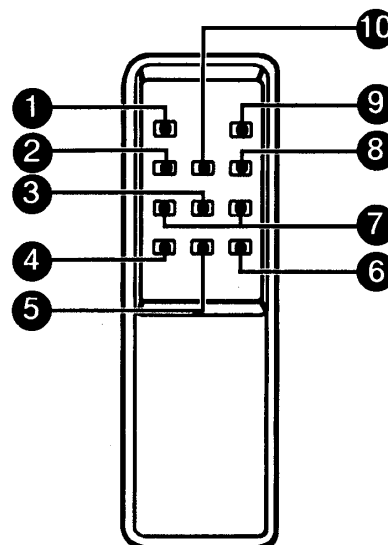
Rear

- 1 Cassette eject button (**EJECT**)
- 2 Viewfinder
The viewfinder can be raised up to 90°, or lowered to 45° for comfortable filming from different angles.
- 3 Battery pack holder
- 4 DC input terminal
- 5 Shoulder belt hook
- 6 Tripod screw mount
- 7 Recording start/stop button (**REC START/STOP**)
- 8 Stand-by switch (**READY, HOLD**)
- 9 Earphone jack (🎧)
- 10 Lens cap
- 11 Cassette compartment cover open button (**OPEN**)
- 12 Power switch (**POWER; CAMERA, OFF, PLAYER**)
To set the **POWER** switch, move it while pressing on the green button.
- 13 Date and time adjustment button (**ADJ**)
- 14 Date and time display select button (**DATE/TIME**)
- 15 Counter reset button (**COUNTER RESET**)
- 16 Counter memory button (**COUNTER MEMORY**)

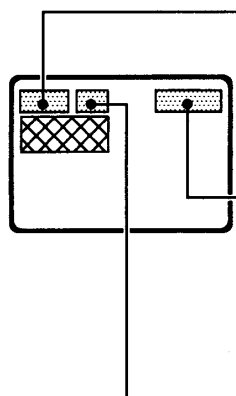


Remote control

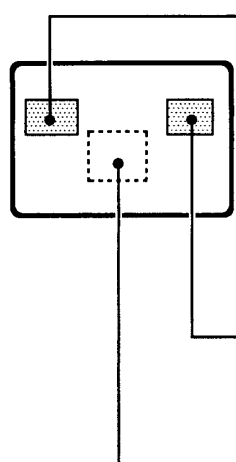
- 1 Recording start/stop button (**REC START/STOP**)
- 2 Rewind/Reverse search button (**◀ REW**)
- 3 Still button (**■ STILL**)
- 4 On-screen display button (**DATA ON SCREEN**)
- 5 Counter reset button (**COUNTER RESET**)
- 6 Counter memory button (**COUNTER MEMORY**)
- 7 Scene search buttons (**SCENE SEARCH - , +**)
- 8 Fast-forward/Forward search button (**FF ▶▶**)
- 9 Stop button (**■ STOP**)
- 10 Playback button (**PLAY ▶**)



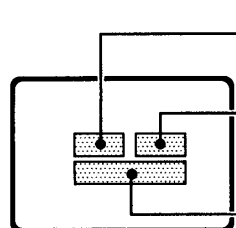
VIEWFINDER INDICATIONS



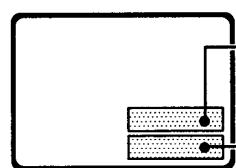
Indication	Meaning	Notes	Page
REC	When in recording mode.	When the AUTO LOCK switch is set to the "AUTO LOCK" position, and the REC START/STOP button is pressed to start recording, or to stop recording, for about 3 seconds the indication "REC" or "PAUSE" will be displayed, at double the size, below in the location identified by ☒.	15
PAUSE	When in recording pause mode.		
PLAY	When in playback mode.		20
STOP	When in stop mode.		
FF	When the player is in fast-forward mode.		
REW	When the player is in rewind mode.		
Hours, minutes and seconds	Counter; it indicates the tape run time in hours, minutes and seconds.		17
- (minus)	Indicates a negative value of the tape counter. The counter will display a negative value when the memorized zero point (0:00:00) of the counter is passed while rewinding the tape.		
M	Memory indicator; when this indicator is displayed the rewind or fast-forward mode will stop when the counter reaches the zero point (0:00:00).		
LP	When in Long Play tape speed mode.		16
SP	When in Standard Play tape speed mode. The SP indicator will be displayed flashing for a few seconds.		



	Sports mode	These indicators are only displayed when the camcorder is in the preset mode.	19
HS	Auto High Speed Shutter mode		
	Close-up mode		
	Low Light mode		
F	Flickerless mode		
+ , -	In manual-focus mode, it indicates the manual-focus direction, when pressing the M.FOCUS (+, -) button.		18
MF	Manual-focus mode. Displayed when the FOCUS AF/MF button is pressed to set the camcorder to manual-focus mode. Press the FOCUS AF/MF button again to return to auto-focus mode. In the auto-focus mode no indication is displayed.		
[]	Sports mode auto-focus frame. Displayed when the camcorder preset mode is set to "Sports mode". When filming fast-moving subjects, the focus will be set on what is included in the frame.		19



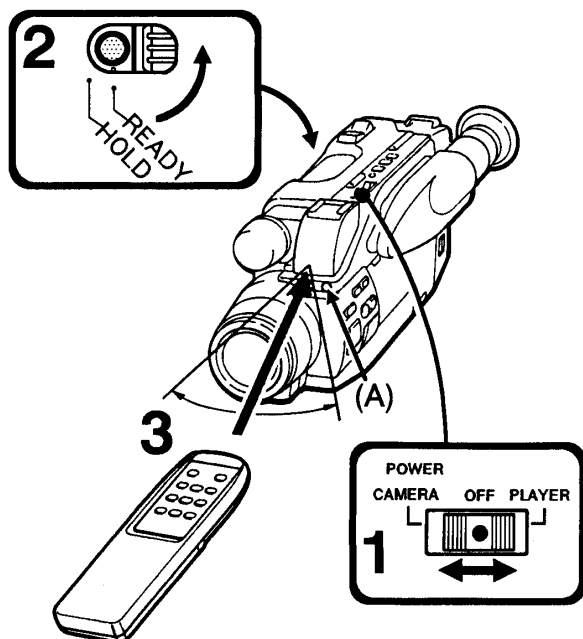
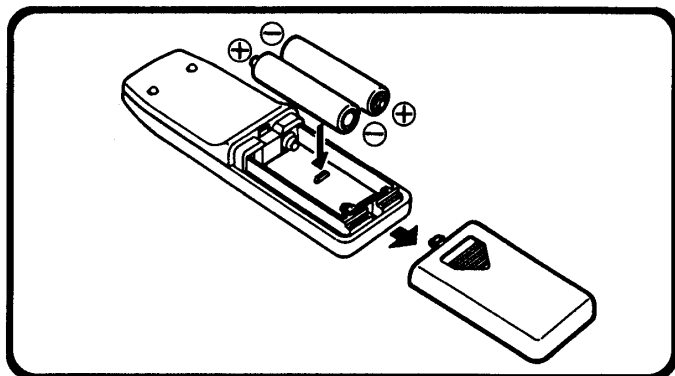
	Comes on before the charge of the battery pack runs out.		8
	A cassette has not been loaded in the unit, or a cassette with the erasure-prevention switch set to the red position has been loaded. Dew condensation has formed inside the cassette.		11
	Indicates the presence of dew condensation inside the unit.		24
TAPE	The tape is within about 5 minutes from the end.		
TAPE END	The inserted tape has reached the end.		



Hours, minutes, seconds	Clock; it is displayed or erased by pressing the DATE/TIME button.		12
Day, month, year	Date; it is displayed or erased by pressing the DATE/TIME button.		
88:88	The lithium battery is expired or not installed properly, or the date and time have not yet been set.		7

Inserting the batteries

Open the battery compartment lid, insert two AA 1.5 volt batteries respecting the (+) and (-) signs shown inside the compartment, then close the battery compartment lid.



Operating the remote control

Operate the remote control unit from within approximately 5 m and within a range of 30° from the front of the camcorder. If the operating range decreases, replace the batteries.

- 1 Set the **POWER** switch on the camcorder, to the "**CAMERA**" or "**PLAYER**" position depending on the desired mode to operate. Insert the tape to record on or to play back.
- 2 In camera mode, set the stand-by switch on the camcorder to the "**READY**" position. Remote control operation will not function if the switch is set to the "**HOLD**" position.
- 3 Aim the remote control unit at the infrared remote control sensor on the camcorder, then press the desired button to operate.

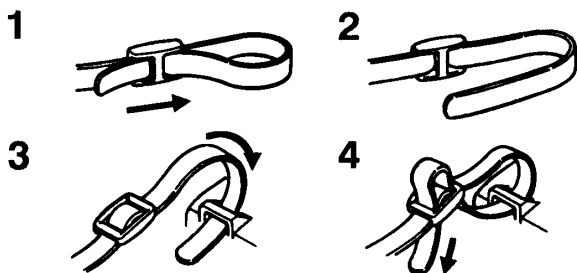
Notes:

- In camera mode, when pressing the **REC START/STOP** button (remote control operation only) to record, the recording indicator (A) will illuminate.
- In camera mode, if a recording pause continues for more than 5 minutes, the power is cut to prevent the tape from being damaged. To resume recording press the **REC START/STOP** button twice. If pressed only once, the unit will return to recording pause mode.
- In player mode, if still picture playback continues for more than 5 minutes, the unit is switched to stop mode to prevent the tape from being damaged.
- To prevent battery leakage, remove the batteries if the remote control unit is not to be used for a long period of time.
When the batteries need to be changed, make sure to replace both batteries with new ones.
- Remote control operation is not possible in the following conditions:
 - If a strong light or sunlight is directed to the remote control sensor.
 - If there is any obstacle between the remote control unit and the camcorder.

PREPARATIONS

Installing the shoulder belt

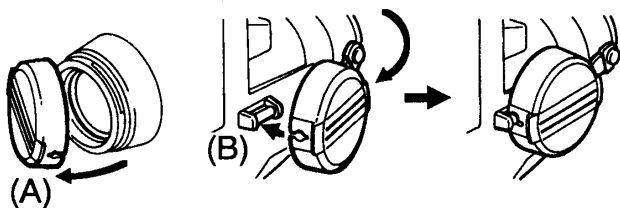
Install the shoulder belt as illustrated.



Lens cap

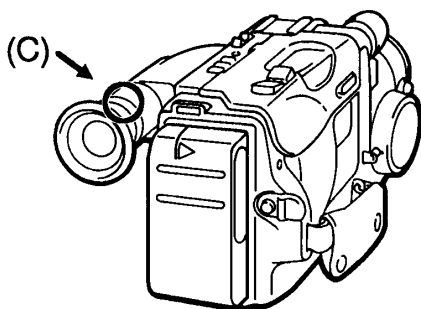
To protect the lens from scratches and dust, the cap should always be left on when not using the camcorder to film.

To remove the lens cap, press on tab (A), then pull it straight, turn it to the side and attach it to snap (B) on the side of the camcorder.



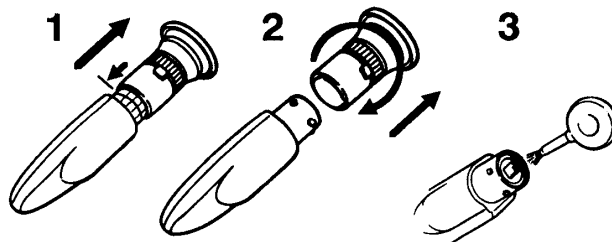
Eyesight compensation ring

Turn the ring (C), to the right or to the left, so that the indications in the viewfinder are clear.



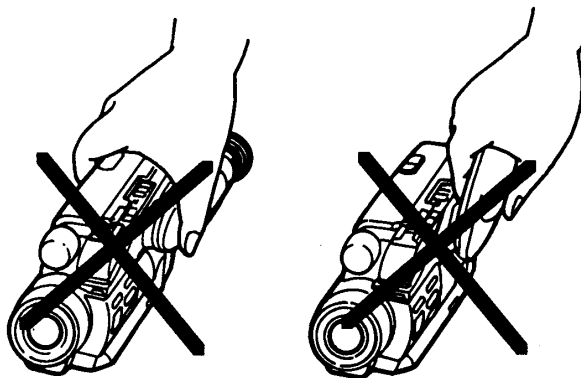
Cleaning the viewfinder

- 1 Fully pull out the eye-piece, then push it back slightly.
- 2 Turn it towards the left (in the direction of the arrow), then remove it.
- 3 Use an air blower (sold separately) to remove any dust accumulated on the viewfinder. Reassemble in the reverse order of disassembly.



Holding the camcorder

Use the grip belt to carry the camcorder. Holding it in any of the illustrated fashions might damage the camcorder or some of its components. Remove the cassette tape when the unit is not being used.



Installing the lithium battery

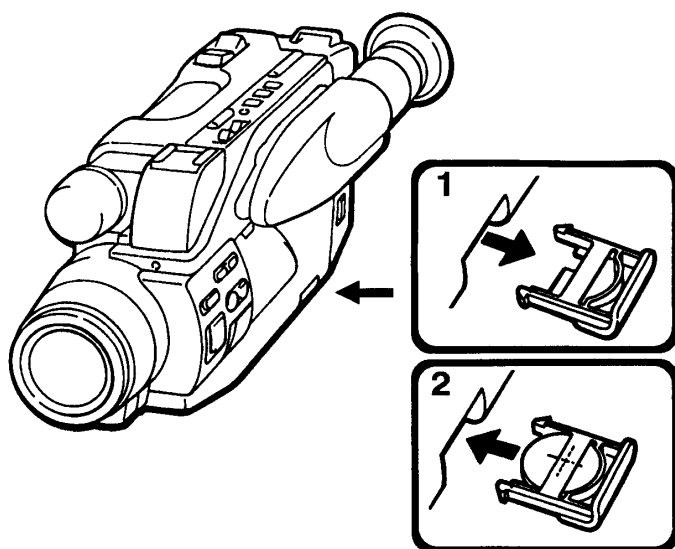
The date and time feature requires a lithium battery for continuous power alimentation in order to maintain the memory when external power to the unit is disconnected.

Under normal conditions, the lithium battery should last about 1 year. When the battery is expired the date display will show "88:88". After the lithium battery has been replaced, the date and time will need to be reset. (See page 12)

- 1 Pull out the battery tray.
- 2 Insert the lithium battery in the tray with the (+) sign facing up, then insert the tray back in the camcorder.

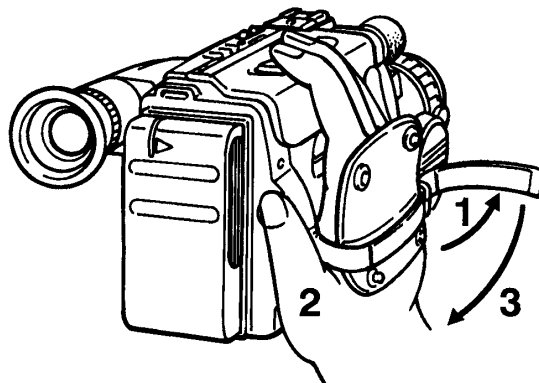
Notes:

- The battery should only be replaced with a SANYO lithium battery, part number CR2025 [3 V].
- Never use metallic tweezers to hold the battery, and never short circuit the (+) and (-) sides of the battery.
- For best contacts, wipe the battery clean, before inserting it, with a dry soft cloth.



Adjusting the grip belt

Adjust the grip belt so that it is tight around the hand when the **REC START/STOP** button and the power zoom button are reached with the tip of the fingers.



WARNING:

- **WHEN REPLACING THE BATTERY USE ONLY THE SAME TYPE.** Use of another lithium battery may present a risk of fire or explosion.
- If swallowed promptly see a doctor.
- The lithium battery may explode resulting in a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, heat above 100°C (212°F) or incinerate.
- Dispose of used lithium batteries promptly. Keep away from children. Do not disassemble and do not dispose of in fire.
- Lithium battery. Danger of explosion if handled carelessly. Replace the battery with one of the same manufacturer and type. Return the old battery to the supplier.

POWER SOURCE

The following power sources can be used with this unit.

- A **battery pack** (supplied) for using the unit outdoors.
- An **AC adaptor/charger** (supplied) when using the unit indoors or where an AC outlet is available.

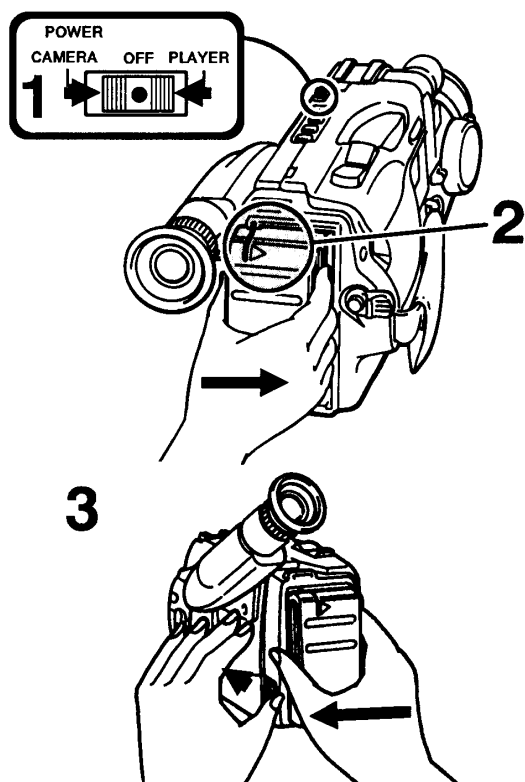
Battery pack

Use the battery pack for outdoor recording.

Installing the battery pack

The supplied battery pack has not been charged, make sure to charge it before using the camcorder for the first time. (See page 9)

- 1 Set the **POWER** switch to the "OFF" position.
- 2 Align the marks on the battery pack with the ones on the camcorder and slide it in the direction of the arrow, until a click is heard.
- 3 To remove the battery pack, push and maintain the **BATT** button then slide the battery pack in the opposite direction of the arrow.



Low power indicator

The low power indicator  comes on when the remaining charge of the battery pack is low. The battery pack should be recharged, or replaced with a charged one.

AC adaptor/charger

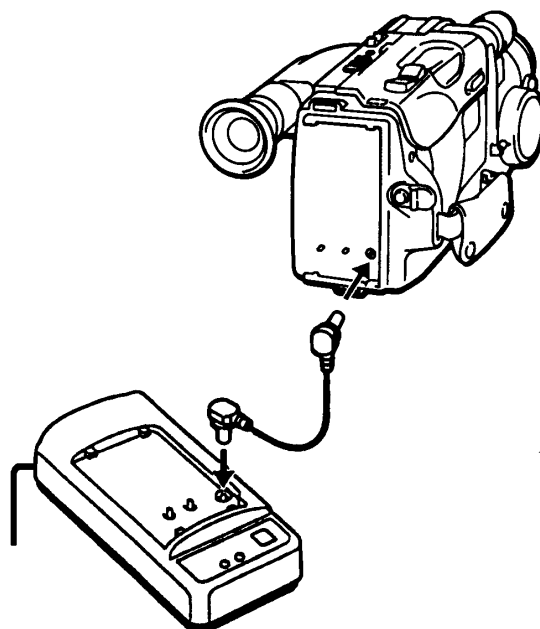
The supplied AC adaptor/charger can be used in any country where the standard voltage is between 100 V and 240 V AC. In countries where different-shaped plugs are used, use a commercially available plug adaptor.

For this product use the supplied AC adaptor/charger (conforming to EIAJ, with a unified polarity type plug). Use of other AC adaptor/charger may cause trouble.



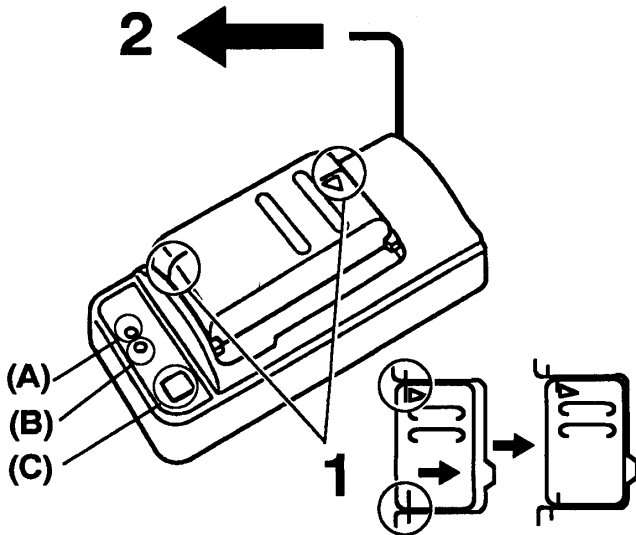
Note: Make sure the AC adaptor/charger cord is not damaged by heavy objects, heat sources, etc.

When using the AC adaptor/charger to power the camcorder, connect the DC connecting cord (supplied) from the terminal on the top of the AC adaptor/charger, to the terminal on the rear of the camcorder.



Installing the battery pack on the AC adaptor/charger

- 1 Align the marks on the battery pack with the ones on the AC adaptor/charger and while pressing it down, slide it in the direction of the arrow until a click is heard.
- 2 Plug the AC adaptor/charger power cord into an AC outlet. The **POWER** indicator (A) lights.



Recharging the battery pack

When the battery pack is installed on the AC adaptor/charger and the power cord is plugged in an AC outlet, the **CHARGE** indicator (B) will light and the battery pack is automatically recharged. When it is fully charged, the indicator will go off. Remove the battery pack in the reverse order of installation.

Refreshing the battery pack

Install the battery pack on the AC adaptor/charger, then press the **REFRESH** button (C). The **CHARGE** indicator (B) will flash (slow cycle), and the remaining charge of the battery pack is discharged, then the **CHARGE** indicator will stop flashing and the battery pack is automatically recharged.

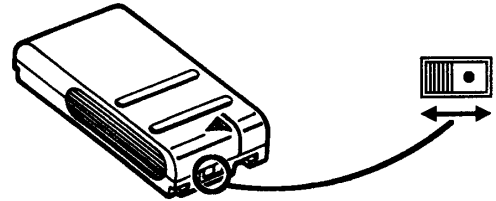
Notes:

- If the **CHARGE** indicator flashes rapidly, remove the battery pack immediately, then try again making sure the battery pack is correctly installed. If the **CHARGE** indicator still flashes rapidly it may indicate that the battery pack cannot be used. Please consult your dealer for assistance.
- When finished, make sure to unplug the AC adaptor/charger power cord from the AC outlet.
- Do not use the AC adaptor/charger for a purpose other than charging the battery pack or supplying power to the camcorder.

Charge condition indicator switch

When the battery pack is fully charged, slide the switch on the end of the battery in order to reveal the red circle. Once it is exhausted, slide the switch to cover the red circle.

This switch is used as a reminder only, it has no function in the operation of the battery pack.



Notes:

- Do not short-circuit the battery pack terminals, and never try to disassemble or modify it.
- Do not throw in the fire, as it may explode.
- Before recharging the battery pack, exhaust the available charge or use the Refresh function of the AC adaptor/charger. Recharging a battery pack when it is not completely discharged will shorten the operating time it provides.
- If a charged battery pack is not used for 2-3 months or more, its charge will last shorter than normal. To restore the charge to its original level, it should be used until completely discharged and recharged two or three times.

THIS PLUG IS NOT WATERPROOF-KEEP DRY

This cord is already fitted with a moulded plug incorporating a fuse, the value of which is indicated on the pin face of the plug. Should the fuse need to be replaced, an ASTA approved BS 1362 fuse must be used of the same rating, marked thus .

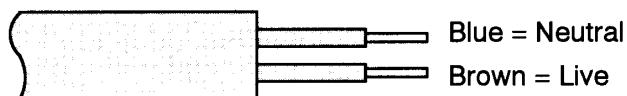
If the fuse cover is detachable, never use the plug with the cover omitted. If a replacement fuse cover is required ensure, it is of the same colour as that visible on the pin face of the plug (ie red or orange). Fuse covers are available from the Parts Department Indicated in your User Instructions.

If the plug supplied is not suitable for your socket outlet, it should be cut off and destroyed. The end of the flexible cord should be suitably prepared and the correct plug fitted.

WARNING: A PLUG WITH BARED FLEXIBLE CORDS IS HAZARDOUS IF ENGAGED IN A LIVE SOCKET OUTLET.

IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:



As these colours may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured Blue must be connected to the terminal in the plug which is marked with the letter N or coloured Blue or Black. The wire which is coloured Brown must be connected to the terminal which is marked with the letter L or coloured Brown or Red.

WARNING: DO NOT CONNECT EITHER WIRE TO THE EARTH TERMINAL WHICH IS MARKED WITH THE LETTER E, BY THE EARTH SYMBOL  OR COLOURED GREEN OR GREEN/YELLOW.

Charging/Recording time

When the battery pack is fully charged, the available recording time (the camcorder in recording mode), at normal temperatures, is as described below.

Battery pack model	Refresh time	Charging time	Recording time
NP-55 (supplied)	210 min.	60 min.	60 min.
NP-77 (sold separately)	420 min.	120 min.	120 min.

- All indicated times are approximate.
- Recording in manual-focus mode.

The following modes and the following operations also require power, and they will shorten the actual recording time.

- Recording pause mode
- Recording in auto-focus mode
- Using the power zoom
- Loading and unloading the cassette

It is therefore recommended to have available charged battery packs to last 2 or 3 times the actual planned recording duration.

Notes concerning the battery pack

- Charging the battery pack is possible within a temperature range of 5°C ~ 35°C (41°F ~ 95°F). For best results, a temperature range of 10°C ~ 30°C (50°F ~ 86°F) is recommended.
- When the battery pack is used for the first time the recording time will be slightly shorter than normal. Exhaust the charge and recharge the battery pack 2 or 3 times to get the full capacity of the battery pack.
- Battery packs last shorter when used in low temperatures.
- Even if the **POWER** switch is set to the "OFF" position, a very small amount of power is consumed and it could discharge the battery pack if the camcorder is stored for a long period. Remove the battery pack when storing the camcorder for a long period.
- Do not store a battery pack where it could reach high temperatures.

CASSETTE TAPES

Only 8 mm video cassette tapes can be used with this unit.

Erasure prevention switch

To prevent accidental erasure of recorded material, use the erasure-prevention switch, as described below.

(A): Recording is possible

(B): Recording is not possible (Red position)



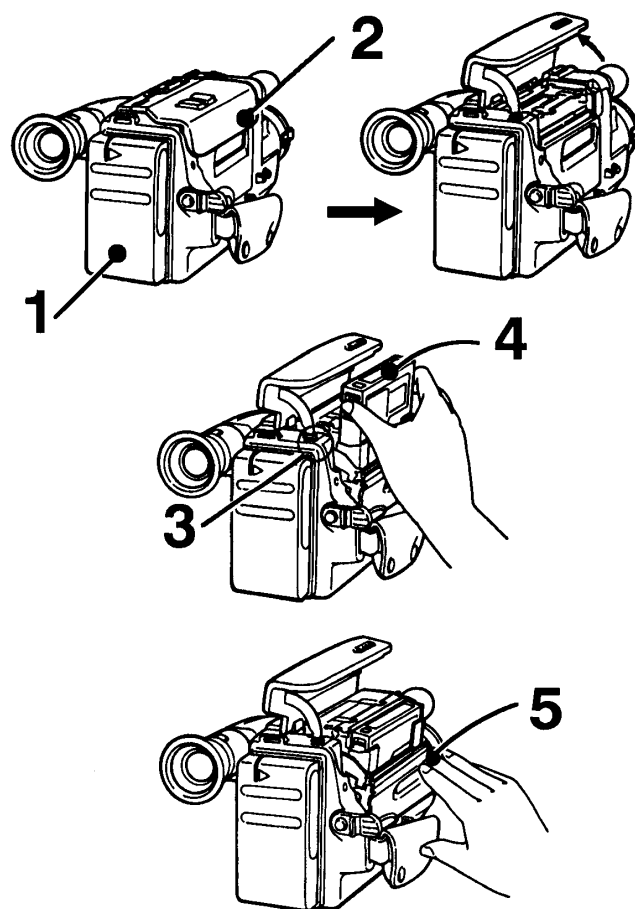
Notes:

- Do not cover the holes on the bottom of the cassette. These holes are provided to determine the type and length of the tape and whether recording is possible or not.
- Store the cassettes in their case, standing upright (vertical). This to prevent dust from entering, as well as uneven tape winding.
- Do not leave the cassettes where they will be subject to direct sunlight or heat.
- When loading a cassette tape (especially a new one) check that the tape is not loose. Uneven tape winding can be eliminated by turning with a finger one of the two reels in the bottom of the cassette.

Loading a cassette

- 1 Install the battery pack.
- 2 Slide the **OPEN** button in the direction of the arrow and fully open the cassette compartment cover.
- 3 Press the **EJECT** button to open the cassette holder.
- 4 Insert the cassette fully, the flap towards the bottom and the window facing outside.
- 5 Gently press on the indication "**PUSH**" on the cassette holder until it clicks into place.
- 6 When the cassette holder is fully retracted, close the cassette compartment cover completely.

Note: When loading a cassette tape fully wound on a different unit, the cassette holder will open one more time. In that case close it again before closing the cassette compartment cover.



Unloading the cassette

- 1 Slide the **OPEN** button in the direction of the arrow and fully open the cassette compartment cover.
- 2 Press the **EJECT** button to open the cassette holder.
- 3 Remove the cassette.
- 4 Gently press on the indication "**PUSH**" on the cassette holder until it clicks into place.
- 5 When the cassette holder is fully retracted, close the cassette compartment cover completely.

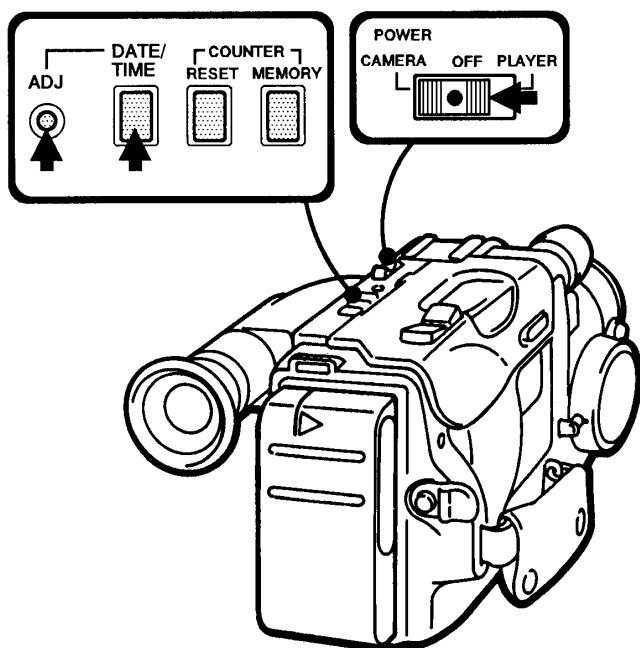
SETTING THE DATE AND TIME

If "88:88" is flashing in the bottom right corner of the viewfinder, it means that the date and time have not yet been set or that the lithium battery is exhausted or not properly installed. If necessary, replace or correctly install the lithium battery (see page 7), then set the date and time.

Set the **POWER** switch to the "CAMERA" position, and the stand-by switch to the "READY" position.

Example: Setting the date and time to 14:10, December 24, 1993.

- 1 Press the **ADJ** button for about one second. The reset date (1. 1. 1992) and time (0:00:00) will be displayed and the day setting will start flashing.
- 2 Use the **ADJ** button to select the setting to modify, and the **DATE/TIME** button to modify the selected setting.
 - A: Press the **DATE/TIME** button until the desired day (24) is set, then press the **ADJ** button.
 - B: Press the **DATE/TIME** button until the desired month (12) is set, then press the **ADJ** button.
 - C: Press the **DATE/TIME** button until the desired year (1993) is set, then press the **ADJ** button.
 - D: Press the **DATE/TIME** button until the desired hour (14) is set, then press the **ADJ** button.
 - E: Press the **DATE/TIME** button until the desired minutes (10) are set.

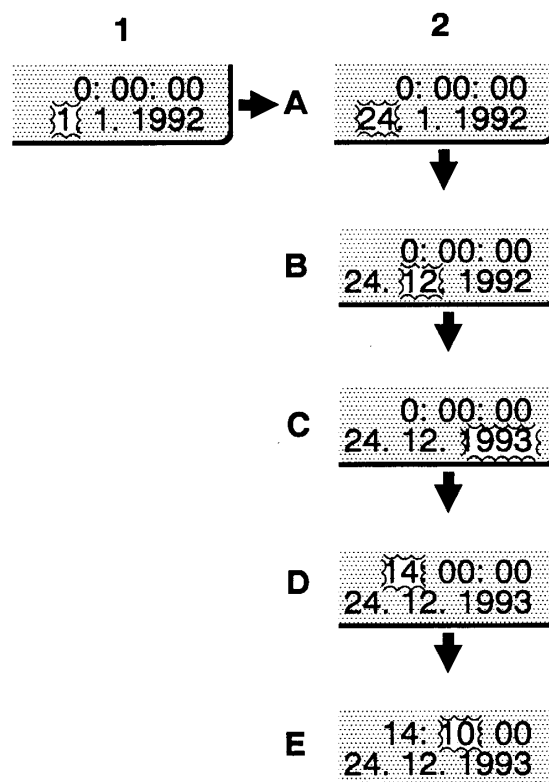


The seconds counter will start counting from "00" when the **ADJ** button is pressed after setting the minutes. To set the seconds accurately, press the **ADJ** button in coordination with the actual time indication (radio signal, etc.).

When recording, the date and time indications can be imprinted on the tape. To record the date and time, press the **DATE/TIME** button. The indication of the date and time appearing in the viewfinder, in the bottom right corner, will be imprinted on your recording. (See page 17)

Notes:

- The date and time need to be set only once. However it will need to be reset if the lithium battery is exhausted or replaced.
- When holding the **DATE/TIME** button to set the date and time, the numbers will change rapidly. When the desired setting approaches, release the button, then press it repeatedly so that the desired number is not missed.
- The date and time cannot be set while in recording or playback mode.
- The date and time are not displayed when the **POWER** switch is set to the "PLAYER" position.



Holding the camcorder

- a: Keep your feet slightly apart, and the upper arms close to the body. Hold the camcorder horizontally.
- b: When possible rest your elbows on a table, etc. to keep the camcorder steady.
- c: For filming from different angles, it is possible to raise the viewfinder up to 90° or lower it to 45°.
- d: Rest your back on a wall, etc. for more stability.
- e: Use a tripod (sold separately) for stable images.



Zooming

Up to 8 times zoom is possible. Use the power zoom button (T, W) to change from a wide-angle shot to a close-up shot and vice versa.

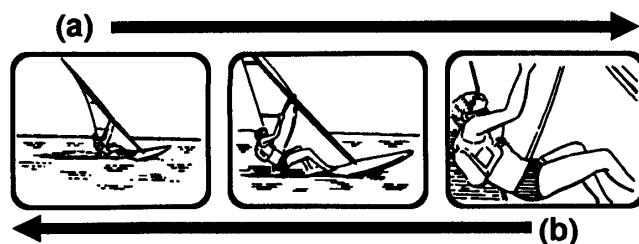
(a) Zoom-in

To focus attention on a specific subject.

(b) Zoom-out

To include the surroundings in the final shot.

For better pictures, keep a steady image for a few seconds after a zoom-in or zoom-out.

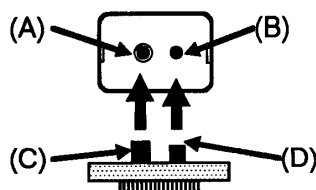


Notes:

- Image vibration is more noticeable when zooming in to film a close-up shot. If possible, use a tripod or make sure that the camcorder is kept steady.
- When in the manual-focus mode, make sure to adjust the focus on the close-up shot. Then, the image will be in focus when filming from a wide-angle to the close-up. Adjusting the focus on a wide-angle shot will give a blurred image on close-up.

Installing the tripod

Align the tripod mounting hole (A) and stopper hole (B) in the bottom of the unit with the tripod mounting screw (C) and stopper (D). Then, tighten the mounting screw securely.



Correct light and lighting conditions are very important to achieve good images.

Lighting

Outdoors filming (natural light)

When shooting outdoors, the camcorder will automatically adjust to the lighting conditions.

For best results, select a filming angle where the sun is behind the camcorder, shining evenly on the subject.

If the sun is very bright, as on a beach, or a ski slope, it is recommended to use a filter so that the image does not appear over exposed (too bright). ND filters, such as an ND4 filter (size: 37 mm) good for most conditions, should be used. For more details consult your SANYO dealer.

Indoors filming (artificial light)

It is possible to film indoors, using the available fluorescent lamps. However, for better contrast, additional lighting is recommended.

Additional lighting

Flat reflector lights, for lighting a wide area. Easy to use, and very convenient it is recommended for beginners.

Spotlights, for lighting a certain area, or to create special effects.

Directing the lights

When using one light; it should be directed diagonally from the front, higher than the subject. One light will give stronger contrast and create some shadows.

When using two or more lights, direct the first light as described above, then place the other one on the opposite side of the subject, in order to eliminate unwanted shadows.

Note: Do not place the camcorder too close to a light as the heat from the reflector might damage it.

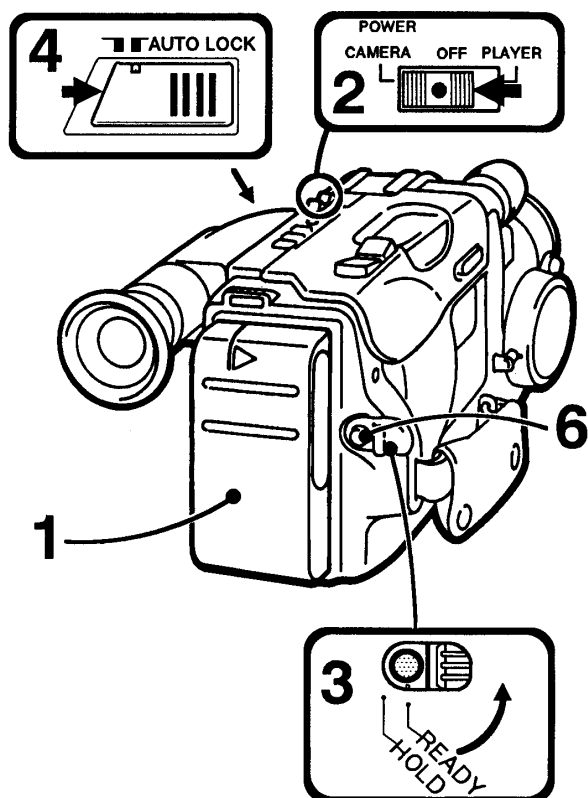
Conditions	Lighting (unit: lux)	Note
ND filter recommended	—	Snow-covered mountain Ski slope Beach on a clear summer day
No additional lighting necessary	100,000	Clear-sky, at noon
	65,000	Clear-sky, at 10 in the morning
	35,000	Clear-sky, at 3 in the afternoon
	32,000	Cloudy-sky, at noon
	25,000	Cloudy-sky, at 10 in the morning
	2,000	Cloudy-sky, 1 hour after dawn
	1,000	Inside an office (fluorescent lights), next to a window
Additional lighting recommended	400~500	Clear-sky, 1 hour before sunset Inside an office (fluorescent lights)
	300	In a room lighted by two 30 W fluorescent lights Inside a subway station
	150~200	In a shopping arcade
	50~100	Under a street light
Additional lighting necessary	15~35	Inside a movie theater during the intermission
	15	Up to 30 cm from a lighter flame
	10~15	Up to 20 cm from a candle light

Recording

- 1 Install the battery pack.
- 2 Set the **POWER** switch to the "**CAMERA**" position.
- 3 Set the stand-by switch to the "**READY**" position.
- 4 Set the **AUTO LOCK** switch to the "**AUTO LOCK**" position.
- 5 Load a cassette tape. (See page 11)
The camcorder will be in recording stand-by mode.
- 6 Press the **REC START/STOP** button to start recording.
The "**REC**" indication will appear in the viewfinder.

Notes:

- Vertical stripes may appear when filming in a dark place a light source such as a candle light, etc.
- When the lighting conditions change, or when filming a plain white subject, the colours might turn reddish or bluish. To reset the colours to normal, film a well lit and contrasted subject.



Recording pause

Press the **REC START/STOP** button again to go into recording pause mode. The filming angle can then be changed and start recording again by pressing the **REC START/STOP** button.

Repeat this operation as often as desired for smooth transition between shooting angles.

Note: If a recording pause mode continues for more than 5 minutes, the power is cut to prevent the tape from being damaged. To resume recording press the **REC START/STOP** button twice. If pressed only once, the unit will return to recording pause mode.

After recording

Remove the cassette from the unit and set the **POWER** switch to the "**OFF**" position.

Using the stand-by switch

When the camcorder is in the camera mode, the stand-by switch can be used as follows:

READY position:

When using the **REC START/STOP** button to record, or to go into recording pause mode.

HOLD position:

The power to the viewfinder is cut in order to save the battery pack charge. To resume recording, reset the stand-by switch to the "**READY**" position.

When the stand-by switch is set to the "**HOLD**" position, the zoom, the preset mode, the selected auto-focus or manual-focus mode for recording, will remain unchanged.

Smooth transition

This feature is useful when undesired images have been recorded. Follow the instructions for a smooth transition between a previous recording (wanted images) and the beginning of the new recording (new images to replace the undesired images previously recorded).

- 1 Set the camcorder to recording pause mode.
- 2 By pressing the **SCENE SEARCH** (- or +) button, and watching the image in the viewfinder, it is possible to locate the point where to resume recording.

A: Press the (-) button for a reverse search

B: Press the (+) button for a forward search

When releasing the **SCENE SEARCH** button, the camcorder will return to recording pause mode at the exact location viewed in the viewfinder.

Note: During the scene search operations, the image in the viewfinder might show some noise bars (white bars), and no sound will be reproduced, this is normal and does not indicate a malfunction of the unit.

- 3 Press the **REC START/STOP** button to start recording.

All recordings following that point will be replaced with the new images. The transition will be almost unnoticeable.

Recording review

If the camcorder is in recording pause mode, press and release the **SCENE SEARCH** (-) button to review, in the viewfinder, the last 2 seconds of the recording. Then, the camcorder will automatically return to recording pause mode at the exact point where it previously was.

Note: Do not hold the **SCENE SEARCH** (-) button as the camcorder will go into scene search mode.

Setting the recording tape speed

Two different tape speeds can be selected by pressing the **SP/LP** button. The tape speed cannot be changed while recording.

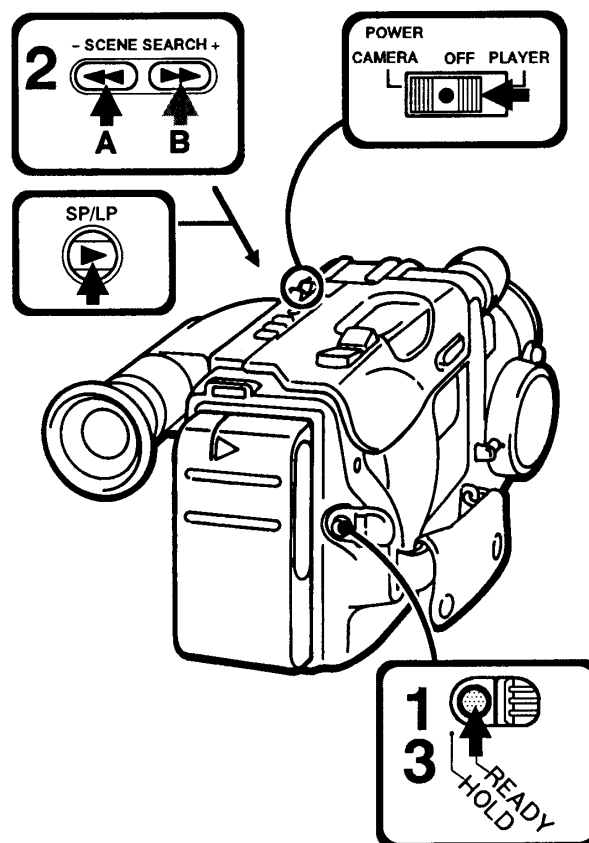
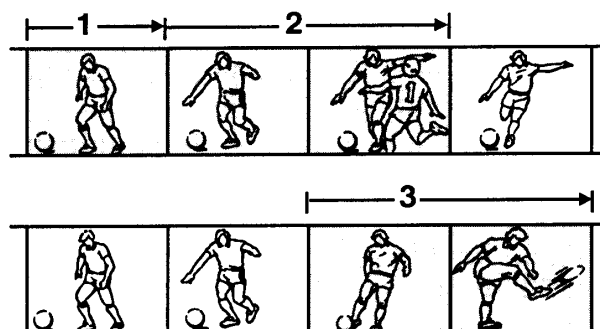
SP mode; This mode gives the best image and sound quality.

LP mode; This mode gives the longest recording duration (double the standard recording time).

Normally only the "LP" indicator is displayed in the viewfinder. No indication means that the **SP** mode is selected.

- In **SP** mode, no indication, press and hold the **SP/LP** button for about 2 seconds until the "LP" indicator is displayed.
- In **LP** mode, the "LP" indicator displayed, press and hold the **SP/LP** button for about 2 seconds until the "SP" indicator is displayed. After a few seconds the "SP" indicator will disappear.

Note: The tape speed will remain as set, as long as the lithium battery doesn't run out.



Linear time counter

The tape run time is indicated in hours, minutes and seconds. If you reset the counter (0:00:00) at the beginning of the tape, when recording or playing back, you can determine the remaining tape time, the recording or playback duration, or easily find a recorded scene.

To determine the recording or playback duration, or to find the beginning of a desired scene

- 1 Press the **COUNTER RESET** button to reset the counter to "0:00:00" at the starting point of the recording or playback, or of the desired scene. The elapsed recording or playback time will be indicated by the counter.
- 2 To return to the starting point, press the **COUNTER MEMORY** button to display the letter "M" at the left of the counter indication.
- 3 If the camcorder is in camera mode, set the **POWER** switch to the "PLAYER" position.
- 4 Press the (◀▶) button. The tape will be rewind and will automatically stop at the counter reading "0:00:00".
If the counter reading indicates a minus "-" value, press the (▶▶) button.

Notes:

- There may be a small difference between the actual tape running time and the counter indication.
- The **COUNTER MEMORY** button can be pressed at any time, to display the letter "M" before rewinding the tape. Press the **COUNTER MEMORY** button again to cancel the memory mode.
- The tape might not stop at the exact memorized location. Use the (◀▶) or (▶▶) button to get the tape to the desired position.
- It is possible to determine the remaining tape time by resetting the counter to "0:00:00" when the tape is fully rewind.

Recording the date and time

The date and time will be recorded on the tape as displayed in the viewfinder. Press the **DATE/TIME** button to select the desired display mode.

A: The date only

24. 12. 1993



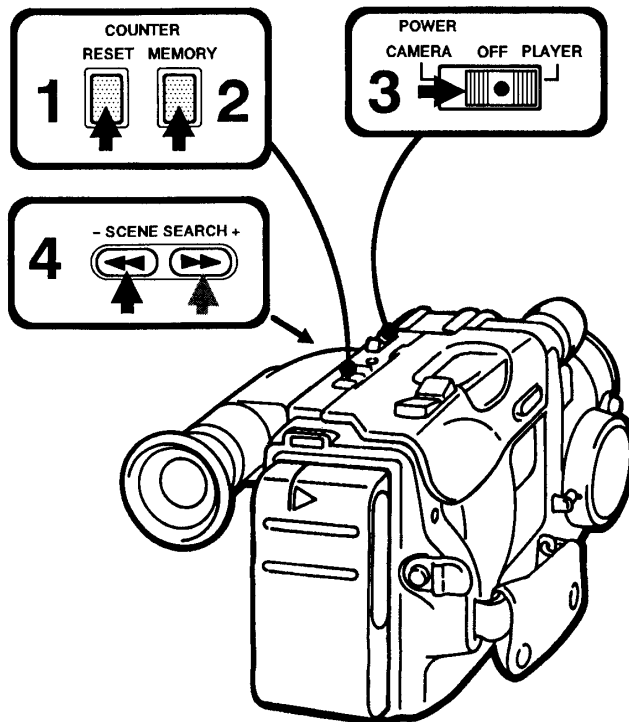
B: The date and time

14: 10: 00
24. 12. 1993



C: Neither date nor time

Note: If "88:88" is displayed flashing in the bottom right corner of the viewfinder, please see page 12 "SETTING THE DATE AND TIME".

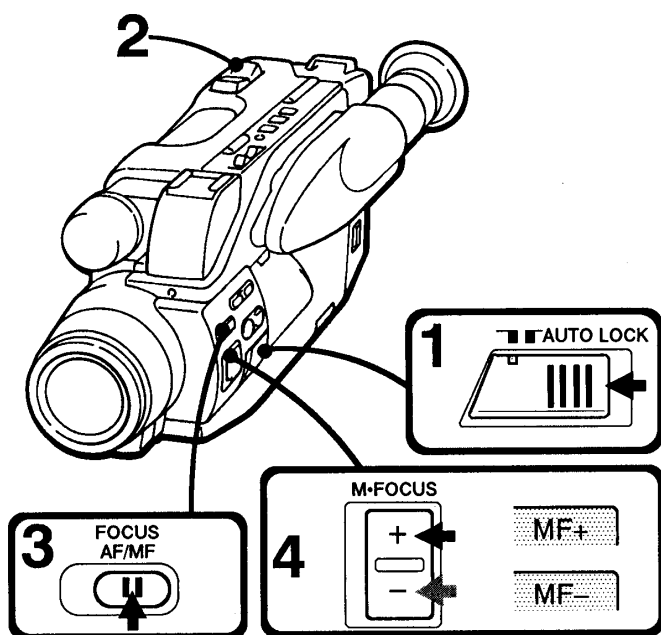


Auto-focus

Set the **AUTO LOCK** switch to the "AUTO LOCK" position. When using the camcorder in camera mode, it will automatically focus on the filmed subject.

Notes:

- The camcorder will automatically focus on any subject at a distance of 1 m or more from the lens. When the subject is closer than 1 m, press the power zoom button (W) to change to a wide-angle position where the subject will be in focus. At full wide-angle, the focus is automatically set on subjects as close as 1 cm from the lens.
- It is recommended not to use the auto-focus feature when filming fast moving subjects, when moving the camcorder rapidly, or when objects are passing between the camcorder and the subject being filmed.
- When zooming-up, from a wide-angle position, to film a distant subject, the auto-focus might not function properly due to the instability of the image. In that case, let the auto-focus adjust itself at the full zoomed-in position and use a tripod for stable images. The images will then stay in focus while the power zoom is used to change the filming angle.



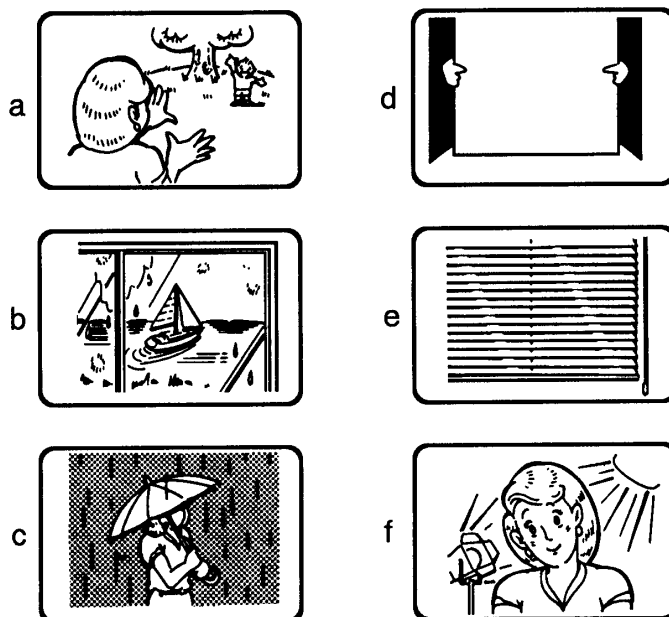
Manual-focus

- 1 Set the **AUTO LOCK** switch to the left (T) position.
- 2 Press the power zoom button "T" to zoom-in on the subject.
- 3 Press the **FOCUS AF/MF** button, to select manual-focus.
The "MF" indicator is displayed in the viewfinder.
- 4 Adjust the focus using the **M.FOCUS** (+, -) button.
- 5 Press the power zoom button (T, W) to select the desired filming range.

When using filters or conversion lenses, and in the following conditions, the auto-focus will not function properly. It is therefore recommended to use the manual-focus for clear pictures.

- a: When filming two subjects, one nearby and one distant.
- b: When filming through a dirty or wet window.
- c: When filming a dark subject.
- d: When filming subjects without contrast (a white wall, etc.).
- e: When filming a horizontally striped subject.
- f: When filming very bright subjects.

Note: In manual-focus mode, when the **POWER** switch is reset to the "OFF" position, the focus mode will be automatically reset to auto-focus when the power is restored. It will remain selected when the stand-by switch is set the "HOLD" position.



CAMCORDER PRESET MODES

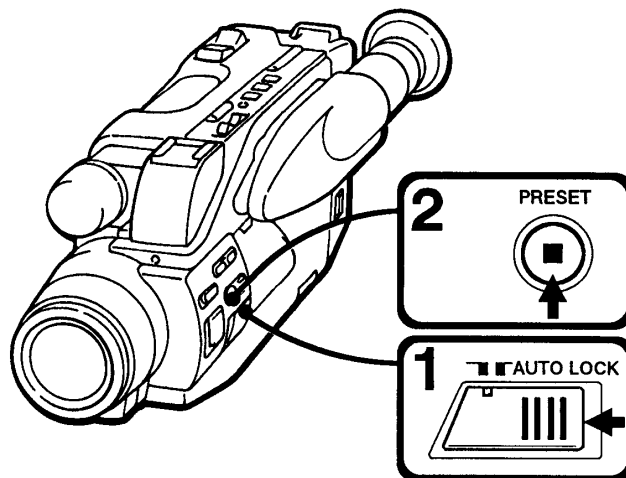
In the camcorder preset modes, manual-focus or the auto-focus features can be used.

Setting the camcorder preset modes

- 1 Set the **AUTO LOCK** switch to the left (■) position.
- 2 Select the mode by pressing the **PRESET** button. The selected mode will change (A to F) every time the **PRESET** button is pressed.

Notes:

- If any of the preset modes (B to F) is selected when setting the **POWER** switch to the "OFF" position, when the power is restored the Auto mode (A) will be automatically selected. But the preset mode setting will remain selected when the stand-by switch is set the "HOLD" position.
- In any of the preset modes (A to F) the manual or auto-focus mode can be selected. However, the auto-focus mode will be automatically reset every time a different preset mode is selected.



Mode/shutter speed	Viewfinder Indication	Auto-focus range	Note
A: Auto 1/50 sec.	No indication	1 cm ~ ∞	Used under normal conditions.
B: Sports 1/50 ~ 1/250 sec. (Depending on the brightness)		2.5 m ~ ∞ center frame area only	For filming football games, etc. ● Colours may change if this mode is used indoors with fluorescent lighting.
C: Auto high speed shutter 1/250 ~ 1/10,000 sec. (Depending on the brightness)		1 cm ~ ∞	For capturing fast movements such as a golf swing, a tennis stroke etc. ● Colours may change if this mode is used indoors with fluorescent lighting.
D: Close-up 1/50 sec.		1 cm ~ 2 m	For filming subjects, such as flowers or insects, at a short distance. ● This mode automatically sets the zoom to the wide-angle position and the focus to about 5 cm, then the focus is adjusted on any subject in a range from 1 cm to 2 m from the lens.
E: Low light 1/50 sec.		1 cm ~ ∞	For best results when filming indoors, under low light conditions. ● If the focus setting becomes too sensitive, eg too many focus adjustments, it may indicate that the subject is too bright. In that case, use the Auto mode.
F: Flickerless 1/120 sec.		1 cm ~ ∞	For filming by fluorescent lighting in a foreign country if a flickering image is seen in the viewfinder.

You can easily review your recordings by viewing the playback in the viewfinder.

Set the **POWER** switch to the "PLAYER" position.

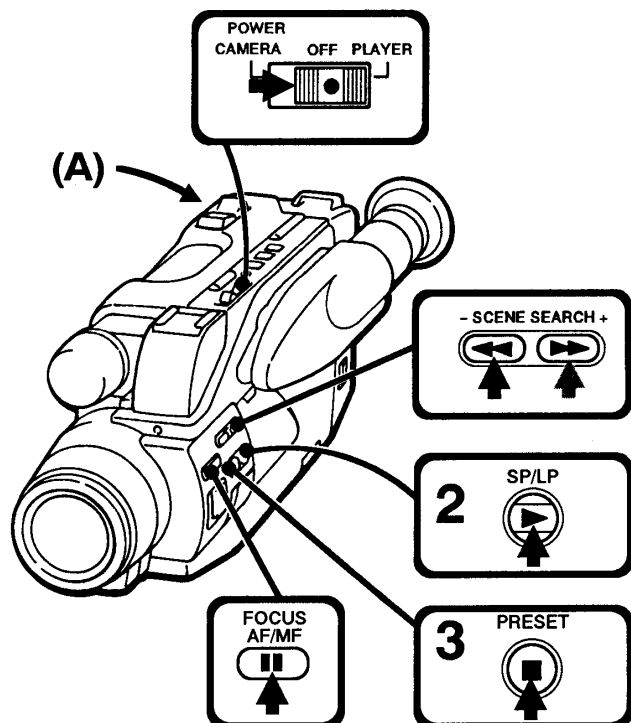
The **PLAY** (▶), (◀◀) **REW**, **FF** (▶▶), (II) **STILL** and **STOP** (■) buttons on the camcorder, or on the remote control, can now be used, as on a standard VCR, to play back the tape.

Playback

- 1 Load or rewind the recorded tape, if necessary. (See page 11 on how to load a cassette.)
- 2 Press the **PLAY** (▶) button to start the playback.
- 3 When finished, press the **STOP** (■) button.
 - To rewind the tape, press the (◀◀) button. During rewind "REW" is displayed in the viewfinder.
 - To advance (fast-forward) the tape, press the (▶▶) button. During fast-forward "FF" is displayed in the viewfinder.

To stop the tape, press the **STOP** (■) button.

Note: If you wish to listen to the recorded sound while monitoring playback in the viewfinder, connect an earphone (sold separately) to the earphone jack (A). It can also be used to listen to the sound being recorded while filming.



Special playback modes

Still picture

During playback, press the (II) **STILL** button. A still picture can be viewed.

To resume normal playback, press the (II) **STILL** button or the **PLAY** (▶) button.

Reverse picture search 1

While rewinding the tape or in still picture mode, press and hold the (◀◀) **REW** button.

The picture can be viewed while the tape is rewound at a fast speed.

To resume normal rewind or still picture, release the (◀◀) **REW** button.

Forward picture search 1

During fast-forward operation or in still picture mode, press and hold the **FF** (▶▶) button.

The picture can be viewed while the tape is advanced at a fast speed.

To resume normal fast-forward or still picture, release the **FF** (▶▶) button.

Reverse picture search 2 (remote control only)

While in still picture mode, press and hold the **SCENE SEARCH** (-) button on the remote control.

The picture can be viewed while the tape is rewound.

To resume still picture mode, release the **SCENE SEARCH** (-) button.

Forward picture search 2 (remote control only)

While in still picture mode, press and hold the **SCENE SEARCH** (+) button on the remote control.

The playback picture can be viewed.

To resume still picture mode, release the **SCENE SEARCH** (+) button.

Notes:

- During special playback operation, noise bars (horizontal white lines) or vibration will appear in the picture. This is normal and cannot be avoided.
- During special playback operation, the sound is muted.

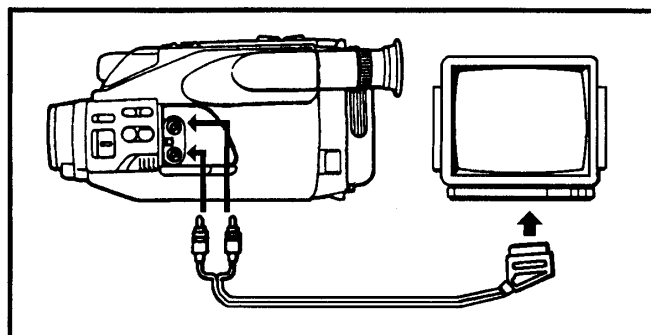
TAPE PLAYBACK

The camcorder can be used for viewing the recorded tape on a TV receiver.

Connections

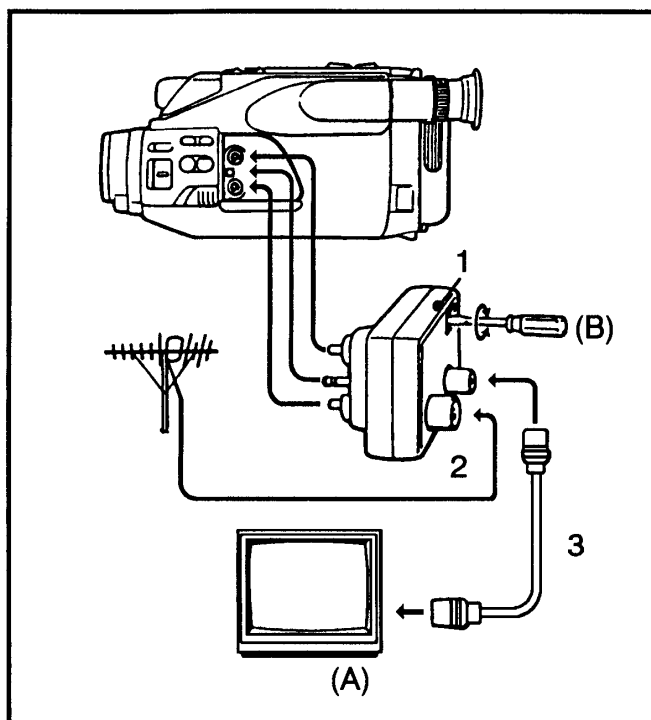
■ If your TV has a SCART terminal

Connect the camcorder to the TV, as illustrated, using the SCART cable (sold separately).



■ If your TV doesn't have a SCART terminal

- 1 Connect an RF converter (supplied) to your camcorder.
- 2 Unplug the aerial cable from your TV and reconnect it to the **ANT IN** terminal on the RF converter.
- 3 Connect an RF connecting cable (supplied) to the **ANT OUT** terminal on the RF converter and to the **ANT IN** terminal on your TV.
- 4 Turn the TV receiver on, and play back a tape on the camcorder.
A: Select an available channel on the TV, e.g. not used for broadcasting.
B: Use a small screwdriver to turn the RF channel screw on the RF converter until the image from the camcorder can be seen on the TV.



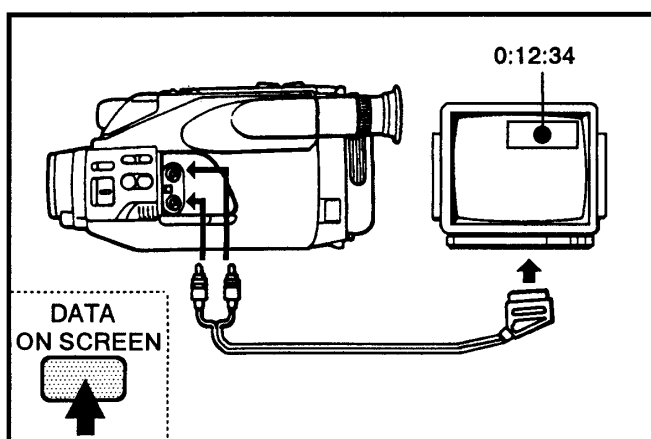
Playback

For playback and special playback modes please refer to page 20.

On-screen display

When the camcorder is connected to a TV receiver, the indications appearing in the viewfinder can be displayed on the TV screen.

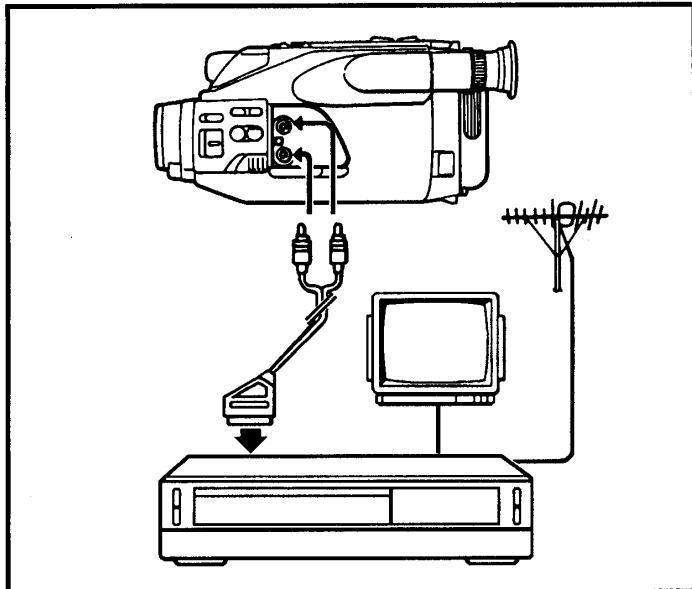
- 1 Connect the camcorder to the TV.
- 2 Press the **DATA ON SCREEN** button on the remote control.
To erase the on-screen display, press the **DATA ON SCREEN** button again.



Connections

■ If your VCR has a SCART terminal

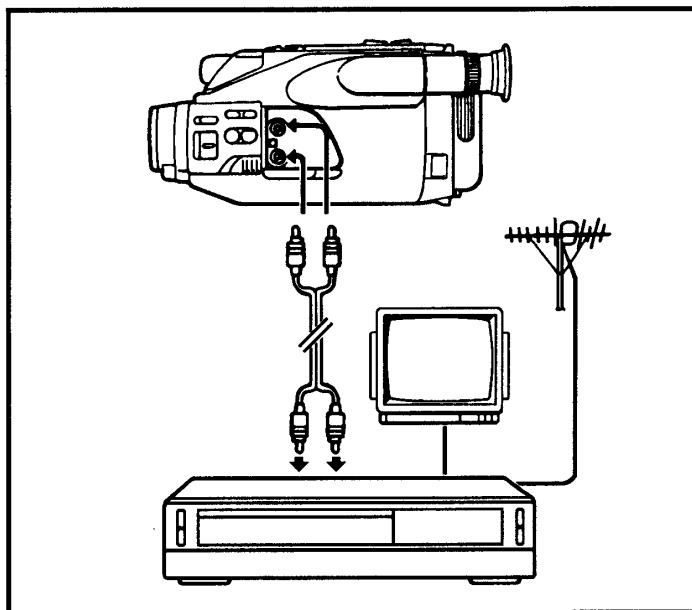
Connect the camcorder to the VCR, as illustrated, using the SCART cable (sold separately).



■ If your VCR has audio/video terminals

Connect the camcorder to the VCR, as illustrated, using an AV cable (sold separately).

- Connect the yellow terminal (video) on the camcorder to the **VIDEO IN** terminal on your VCR.
- Connect the white terminal (audio) to the **AUDIO IN** (left) terminal on your VCR.



Copying a tape

- 1 Connect the camcorder to the VCR.
- 2 Set the **POWER** switch on the camcorder to the "**PLAYER**" position.
Insert the original recorded tape in the camcorder.
- 3 A: Turn the VCR on.
B: Load a blank tape in the VCR.
C: Set the VCR to external input mode.
D: Set the VCR to record pause mode.
- 4 Press the **PLAY** (▶) button on the camcorder to start playback.
- 5 When the desired recording start position is reached on the camcorder, start recording on the VCR.

When the copy is completed, press the **STOP** (■) button on the camcorder and stop the VCR.

Notes:

- When copying a tape the recorded image and the sound will not be as good as on the original tape.
- Your recordings should only be used for personal purposes. The public showing of such material may be contrary to applicable laws.
- The unauthorized recording or copying of video tapes may infringe upon copyright or the rights of third parties.
- During tape editing, if the camcorder is left in pause mode for over 5 minutes, the power is cut automatically.
- For more details on connections and how to operate your VCR please refer to the instruction manual supplied with the VCR.

OPERATING PRECAUTIONS

Do not open the cabinet of this unit. It is not only harmful to the unit, but it is also dangerous.

Abnormal operation

If you notice anything unusual (smoke, strange noise or odor, etc.), stop using the unit and switch it off immediately. Consult the dealer where the unit was purchased, or contact a SANYO authorized service center.

Precautions during recording or playback

- Do not wrap the camcorder in a cloth, as the temperature inside may raise and damage the unit.
- Do not approach the camcorder to magnets, or magnetic fields as they may damage the recordings on the tape.
- Do not approach the camcorder to transmitting antennas, as this might cause the unit to malfunction.
- Do not use the unit for monitoring only. If the unit is used to record the same subject for a long time (e.g. for surveillance), the picture quality will deteriorate.

Foreign objects

- Do not allow rain, steam, dew, salt water, sand, oily smoke, metal objects, etc. to enter the unit.
- Do not place anything, except 8 mm video cassette tapes, in the unit.
- Do not let direct sunlight or strong light hit directly on the lens or the viewfinder, as that may cause damage to the unit.

Storage

Do not store the unit in the following locations:

- where it will be subject to direct sunlight (e.g. on a car dashboard, etc.),
- near bright light sources,
- in a closed car on warm or hot days,
- close to a heat source (e.g. heater, stove, etc.),
- where the humidity level is high,
- in presence of excessive dirt or dust,
- where it will be subject to strong vibrations,
- near strong magnetic fields.

Using the camcorder abroad

All you need for recording in a foreign country is a charged battery pack(s) and 8 mm video cassette tapes.

As the plug and the TV standards might be different, you may not be able to recharge the battery pack without using a plug adaptor (sold separately), or play back the recorded tape on a TV in a foreign country.

To recharge the battery pack in a foreign country

You may need a plug adaptor (sold separately) to use the AC adaptor/charger in that country. The AC adaptor/charger can be used in any country where the standard voltage is between 100 V and 240 V AC.

To view the tape playback on a TV receiver

It is always possible to view the tape playback in the viewfinder. But, to watch it on a TV, you will need to connect the camcorder to a TV using the **PAL** standard.

● Main countries using the PAL standard:

Australia, Austria, Belgium, Britain, China, Denmark, Germany, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand

● Main countries using the NTSC standard:

Canada, Japan, Korea, Mexico, the Philippines, Taiwan, U.S.A.

● Main countries using the SECAM standard:

Bulgaria, C.I.S., France, Hungary, Iran, Iraq, Luxembourg, Monaco, Poland

Caution concerning condensation

Condensation is the moisture that forms on the outside of a glass when you fill it with cold water. Condensation can also form inside a camcorder when it is suddenly moved from a cold place to a warm, humid one, or vice versa, or when a heater has been turned on to quickly heat the room.

Your camcorder incorporates a special safety device to protect the tape and internal mechanisms, when condensation is detected inside the unit.

The  indication will appear in the viewfinder, for as long as condensation is present inside the unit. The buttons and switches will be inoperative, except to eject the cassette, so it will be impossible to use the camcorder. In such a case, eject the cassette and wait for about 1 hour in order for the condensation to dry up.

Please note that if you notice condensation on the lens or the viewfinder, it indicates that it is also present inside the unit. Therefore, do not use the camcorder even if the condensation indicator is not displayed.

To prevent the formation of condensation

In places like ski slopes, where the camcorder is subject to temperature variations, place the camcorder in a plastic bag before using it outside. When bringing back the camcorder indoors, leave it in the plastic bag for about one hour.

Moisture on the tape

Moisture can also appear on the tapes when they are taken from a cold place to a warm place. If a tape, on which moisture is present, is inserted into the camcorder, the  indication will appear in the viewfinder. The buttons and switches will be inoperative, except to eject the cassette. Remove the cassette tape from the unit and let it dry naturally.

Video heads

- When the camcorder has been used for a long time the playback quality, of the image and the sound deteriorates. In such a case the video heads need to be cleaned.
- Be very careful when using commercially available video head-cleaning products, as some might not be effective or damage the heads. For information on the best suited cleaning cassette for your camcorder, please consult your SANYO dealer.
- Do not use commercially available wet-type video head cleaning cassettes. They may damage the video heads in your unit.
- Video heads wear in the same way as a turntable stylus. If the playback quality is poor, even after having cleaned the video heads, they might need to be replaced. For detailed information and assistance, please consult your SANYO dealer.

Inspection at 1000-hour intervals

For continued trouble free operation and beautiful images, it is recommended to have the unit inspected (including cleaning, lubrication and replacement of worn parts as necessary), every 1000 hours of use (approximately). For detailed information and assistance, please consult your SANYO dealer.



TROUBLESHOOTING GUIDE

If the camcorder seems not to be operating normally, please check the items below. After that, if operation is still abnormal, please consult the SANYO dealer where the unit was purchased.

Symptom	Check points (☞ Action)
No power	Is battery pack exhausted? ☞ Recharge the battery pack
The installed battery pack is charged, but the unit cannot be turned on	Was the POWER switch set to the "CAMERA" or "PLAYER" position when the battery pack was installed? ☞ Set the POWER switch to the "OFF" position, then reinstall the battery pack
The power is on, but the unit cannot be operated	Is the  indicator displayed in the viewfinder? ☞ Wait until the condensation inside the unit dries up Is the stand-by switch set to the "HOLD" position? ☞ Set the stand-by switch to the "READY" position
The power is cut during operation	Is the battery pack exhausted? ☞ Recharge the battery pack Was the recording pause mode for 5 minutes or more? ☞ Press the REC START/STOP button
Recording is not possible	Is the cassette tape loaded in the camcorder? ☞ Insert a cassette tape Is the tape wound to the end? ☞ Rewind the tape, or insert a new cassette tape Is the cassette erasure prevention switch set to the red position? ☞ Change the switch position, or insert a new cassette tape
Focusing is not working properly	Is the filmed subject difficult to focus on or too dark? ☞ Set the camcorder to manual-focus
Interference in the playback picture	Are the video heads dirty? ☞ Clean the video heads
The remote control doesn't operate	Are the batteries low? ☞ Replace the batteries Is the remote control operated from a distance superior to 5 m? ☞ Operate the control unit from within 5 m Is the remote control unit aimed at the remote control sensor? ☞ Aim the remote control unit at the detector on the camcorder, within the range of 30° from the front
The battery pack charge doesn't last the normal duration	Was the battery pack fully charged? ☞ Use the refresh feature of the AC adaptor/charger to fully charge the battery pack Is the camcorder used in low temperatures? ☞ Use the camcorder at normal temperatures
White spots in the viewfinder	Is there dust on the viewfinder? ☞ Clean the viewfinder

SPECIFICATIONS

Television system	PAL, CCIR
Video recording system	Rotating 2-head helical-scan system
Audio recording system	Rotating head FM system
Cassette type	8 mm video cassette tape
Tape speed	SP: 20.051 mm/sec. LP: 10.058 mm/sec.
Recording/playback time	90 minutes (P5-90 cassette) SP mode 180 minutes (P5-90 cassette) LP mode
Fast forward/rewind time	Approx. 7 minutes (P5-90 cassette)
Pickup element	CCD solid-state type (320,000 pixels)
Viewfinder	Electric (0.6 inch type, black and white)
Lens	Electro powered 8x zoom lens $f = 6 \text{ mm} \sim 48 \text{ mm}$ F1.8 Filter diameter: 37 mm
Focus	Full-range fuzzy logic auto-focus
White balance	Fuzzy logic auto white balance
Iris	Fuzzy logic auto iris
Minimum subject illumination	2 lux (Low light mode)
Subject illumination range	2 ~ 100,000 lux
Recommended subject illumination	300 lux or more (in normal mode, other modes such as Auto high speed shutter mode may need more light.)
Power supply voltage	DC input 6 V (battery pack)/6.5 V (AC adaptor/charger)
Power consumption	5.6 W during camera recording
Operation temperature range	0°C ~ 40°C (32°F ~ 104°F)
Storage temperature range	- 20°C ~ 60°C (- 4°F ~ 140°F)
Dimensions (W) × (H) × (D)	116 × 120 × 264 mm
Weight	780 g (1.72 lb) approximate not including battery pack and cassette
Microphone	Electret condenser type (omnidirectional)
Video terminal	Video output 1 Vp-p, 75 ohm unbalanced, negative sync
Audio terminal	Audio output - 7 dBs, 2.2 kohm or less
Earphone Jack	Mini jack, for 8 ohm earphone (monaural)

Because its products are subject to continuous improvement, SANYO reserves the right to modify product designs and specifications without notice and without incurring any obligation.

GUARANTEE TO CUSTOMER

Sanyo U.K. Sales Ltd. (the Company) guarantees to the initial retail purchaser that if this equipment is or becomes defective and that, in the opinion of the Company, the defect is due to faulty material or workmanship the Company will, for a period of 12 calendar months from the date of sale to the original purchaser repair or replace, at its sole option, free of charge, any such defective component part of the equipment, always provided that:-

1. The equipment has at all times been used in accordance with the operating instructions issued by the Company, and has not been connected to an electrical mains supply for which it has not been adjusted.
2. Accidental damage, or damage caused by negligence or misuse by the user, including leakage from exhausted batteries, is specifically excluded.
3. Unauthorised repairs, or any modification to the equipment which has not been expressly approved by the Company, shall render this guarantee null and void.
4. Failure due to fair wear and tear of any item, such as batteries, record playing styli, and tape recording, playback and erase heads and head cleaning is specifically excluded.

This guarantee is not transferable and is only applicable within the United Kingdom (and the Republic of Ireland). Nothing in this express guarantee affects the statutory rights available to the purchaser of this equipment.

Dear Customer

Thank you for buying Sanyo. This equipment should give you many years of pleasure and faithful service but in the event that a fault occurs, the following notes for your guidance may be helpful:-

1. PLEASE RETAIN YOUR PURCHASE RECEIPT WHICH WILL BE REQUIRED FOR SERVICE DURING GUARANTEE.
2. If your Sanyo equipment proves faulty during the period of guarantee, take it or send it back to the dealer who originally supplied it together with this guarantee and the proof of purchase. We have made arrangements with our approved dealers under which they will carry out in guarantee service repairs on our behalf. In this way, we hope to reduce to a minimum the amount of time you will be without your equipment.
3. If for some reason it is impossible to return the equipment to the original supplier, please contact our Service Administration Department at the address below for further advice.
4. Should the equipment require servicing after the expiry of the guarantee period, take or send it to the original supplier or any other Sanyo dealer. He will be pleased to give you a quotation for the repair. If you are in any doubt about what to do, write to us at the address below or telephone:

Sanyo U.K. Sales Ltd.

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SANYO

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