

Memory Recording Unit

Operating Instructions

Owner's record

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

Model No. HVR- Serial No. _____

FOR
HDV / DVCAM / DV


PROGRESSIVE

HVR-MRC1

Table of contents

Overview	3
Names of parts	4
Memory Recording Unit / i.LINK Cradle	4
LCD screen display	5
Using in VIDEO mode	6
Connecting this unit to a camcorder	6
Inserting/removing optional memory media	6
Menu settings	6
Menu organization (VIDEO mode)	7
Recording images from the camcorder to this unit	9
Recording images (POWER switch at the ON side)	9
Playback the image recorded on a CompactFlash in this unit	12
Playback (POWER switch to ON)	12
Useful functions in combination with HVR-Z7/S270	13
Using in COMPUTER mode	16
Connecting to a computer	16
Menu organization (COMPUTER mode)	17
Folder saving format	18
Folder organization	18
Notes regarding COMPUTER mode	19
Power supply	20
Preparing the power supply	20
Trouble shooting	22
Power sources	22
Recording	22
Connecting a computer	23
Warning indicators	24
Self-diagnosis display	24
Caution message	25
About i.LINK	26
Optional CompactFlash	27
CompactFlash	27
Specifications	28
Precautions	29
Getting the best performance from the battery pack	30

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Integrated architecture to the camcorder

- The body is small and light with a weight of about 130 g and connects directly to a camcorder without a cable to provide camcorder mobility. Power is supplied from the camcorder so no additional battery is required; weight and size have thus been minimized. The power-saving design also enables longer recording time.
- The operational status such as operating mode, remaining CompactFlash capacity or recording format, etc. can be checked on the LCD screen of the camcorder. Not having to check the unit itself means you can concentrate more on what you are shooting.
- The camcorder used with this unit can output a record command without a tape inserted. This synchronizes the unit to the REC/STOP operation of the camcorder and so audio and video can be recorded on the CompactFlash unit only. A loop recording mode is also available which enables you to record repeatedly.

Recording on small, light and highly versatile CompactFlash

- CompactFlash used as recording media
- CompactFlash is less subject to strong vibration or high altitude and are highly resistant to impact such as being dropped. This enables recording in a wide range of environments.
- A highly versatile CompactFlash media (16GB) enables about 1 hour and 12 minutes of recording of an HDV/DVCAM/DV stream.
- Connecting the unit to a computer via a commercial CompactFlash reader allows faster data transfer to the computer than when using a tape. The data transfer time depends on the specifications of the CompactFlash media and CompactFlash reader.

Can also connect to the HVRA-CR1 i.LINK cradle

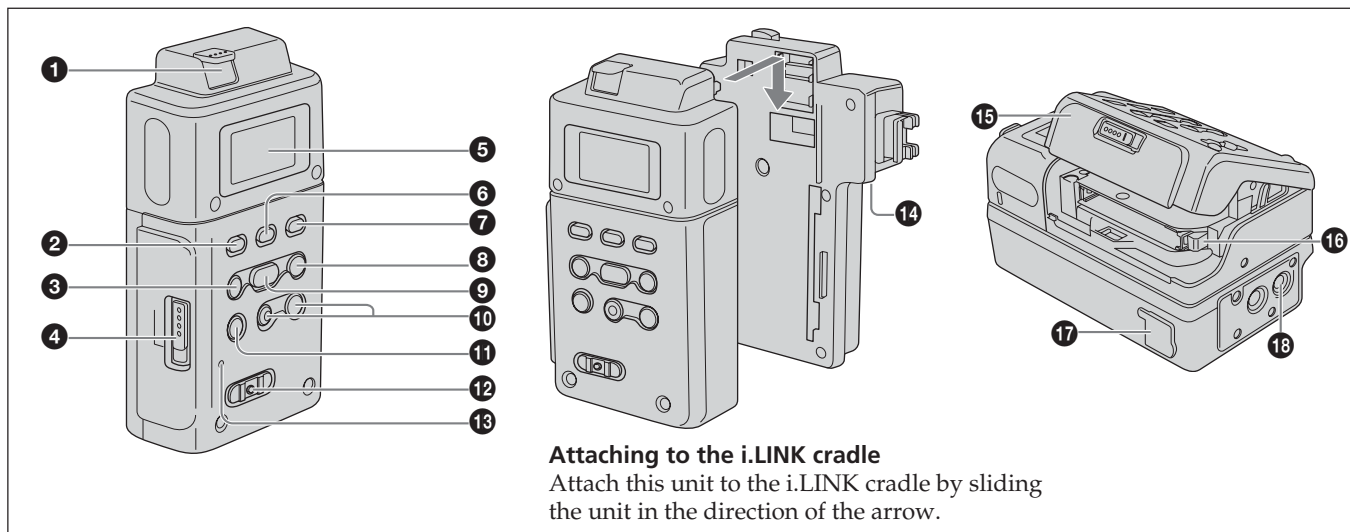
- The unit can be connected to a computer or camcorder via the HVRA-CR1 i.LINK cradle.
- The unit operates with a battery or AC adaptor via the HVRA-CR1 i.LINK cradle, which enables you to record in a wide range of environments.
- This unit has two operating modes, VIDEO mode and COMPUTER mode. The mode is automatically selected depending on which device is connected. The unit independently outputs playback video to the i.LINK interface.
- VIDEO mode is for recording and playback an HDV/DVCAM/DV stream via the i.LINK terminal of the camcorder.
- COMPUTER mode enables the unit to be recognized as an external drive when connected to a computer via an i.LINK terminal. This mode enables high-speed data transfer.

Supported models

- This unit can be connected to a camcorder via a special interface.
- Refer to the supplied "Guide to supported models and their functions" for details on supported models when connecting via an i.LINK terminal.

Names of parts

Memory Recording Unit / i.LINK Cradle



Attaching to the i.LINK cradle

Attach this unit to the i.LINK cradle by sliding the unit in the direction of the arrow.

1 RELEASE button

Press this button to remove this unit.

2 CAM LINK button

Press this button to switch to CAM LINK [ON] (FOLLOW/SYNCHRO) to record video in conjunction with the recording operation of the camcorder, or to CAM LINK [OFF] to record with this unit alone.
* Default setting is CAM LINK [ON].

3 PREVIOUS/REW button

Press this button during standby to go back to the previous clip.

Press this button during playback to stop playback and restart playback from the beginning of the current clip. Keep this button pressed down during playback to play the current clip backwards at triple the normal speed. When the menu screen is displayed on the LCD screen, press this button to move the cursor.

4 CompactFlash slot door OPEN latch

Slide the button to open the CompactFlash slot door. If the CompactFlash door is opened while the CompactFlash is being accessed, such as when recording or during playback, operations will stop.

5 LCD screen

6 MENU/LCD BACK LIGHT button

Press this button to display the menu screen on the LCD screen.
Press the MENU/LCD BACK LIGHT button long enough for the backlight of the LCD screen to come on or off.

7 REPEAT button

Press this button to change the auto repeat mode. Each time you press the button, the mode cycles through each of the following changes.
REPEAT1 (Repeatedly plays back the selected clip only)/ALL REPEAT (Repeatedly plays back all clips)/OFF

8 NEXT/FF button

Press this button during standby to go to the next clip. Press this button during playback to stop playback and restart playback from the beginning of the next clip. Keep this button pressed down during playback to play the current clip forwards at triple the normal speed. When the menu screen is displayed on the LCD screen, press this button to move the cursor.

9 PLAY/EXEC button

Press this button to play recorded files. Press this button during playback to pause playback. When the menu screen is displayed on the LCD screen, press this button to execute the selected menu item.

10 REC button

Press two buttons together to start recording.

11 STOP button

Press this button to return to the VIDEO mode screen. Press this button to stop recording or playback. When a menu is selected, press this button to cancel it.

12 POWER switch

Press this button to turn the power of this unit on or off. The VIDEO mode and COMPUTER mode switch automatically.

13 REC lamp/Access lamp

REC lamp/Access lamp comes on during recording in VIDEO mode.

REC lamp/Access lamp blinks while accessing the computer in COMPUTER mode.

14 i.LINK terminal

Connect to a camcorder or computer with an i.LINK cable.

15 CompactFlash slot door

16 Eject lever

Press this lever to eject the CompactFlash.

17 DC IN (DC power input) terminal

Connect the AC adaptor etc. to supply power to this unit.

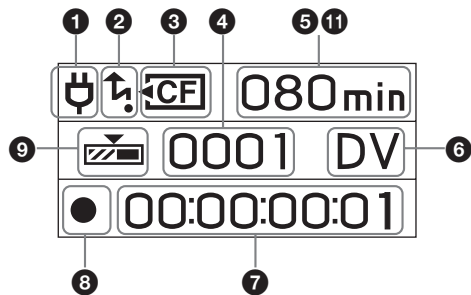
18 Attachment screw hole

This unit enables mounting to the camcorder equipped a cold shoe or to directly mount to a tripod using the optional shoe adaptor.
Use a tripod with 5.5 mm or shorter screws.

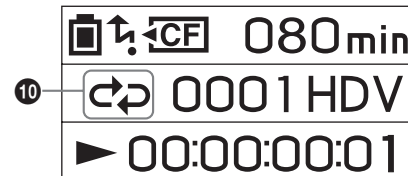
LCD screen display

VIDEO mode

During recording





During playback



1 Power supply display

This icon is not displayed when this unit is connected directly to the camcorder.
Displays the power supply icons when connected to a PC or camcorder using the i.LINK cradle.

-  Battery pack in use
Display the remaining battery capacity.
-  AC adapter connected

2 CAM LINK mode display

When the CAM LINK is set to ON, this icon is on.
When the CAM LINK is set to OFF, this icon is off.

3 CompactFlash display

Remains on under normal conditions.
Starts blinking in the following situations.

- When the remaining recording time is less than 5 minutes
- When the CompactFlash slot door is open
- When the clip number is 9999

4 Clip number display

Displays the selected clip number or recording/playback clip number.

5 Remaining CompactFlash capacity display

Displays the remaining recording time (in minutes).

6 Format type display

Displays the recording/playback clip format.

7 TC (time code) display

Displays the time code.




8 Status display

Displays the status with an icon.

- Power is on and playback/recording is stopped
- Recording
- ▶ Playback
- ▶▶ Pausing playback
- ▶▶▶ Fast-forward
- ◀◀ Rewind



9 REC mode display

Displays REC mode setting in the menu.
NORMAL Not displayed.

-  Cache recording mode
-  Interval recording mode
-  Loop recording mode

10 Repeat mode display

Displays the repeat status during playback.

-  REPEAT 1
-  REPEAT ALL

11 Loop recording display

Time display of 5 is the total time recorded by loop recording.

Displays [L] to the left of the time display.

Using in VIDEO mode

Connecting this unit to a camcorder

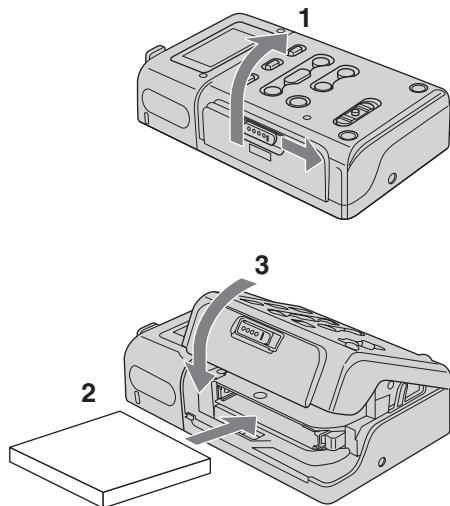
Refer to the operating instructions of the camcorder. Connecting the shoe connector of the unit enables the camcorder to supply power and a stream signal.

Inserting/removing optional memory media

- Although this unit has been tested with CompactFlash, Sony does not guarantee its operation with all CompactFlash. The operation of this unit with Sony CompactFlash has been checked.
- CompactFlash with 133x 2GB or more specifications are recommended for this unit. (A speed of less than 133x is not guaranteed; space less than 2GB is not guaranteed.)
- Always format a new CompactFlash with this unit before use.
- Do not remove the CompactFlash while the access lamp is blinking.

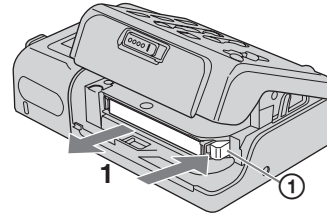
Inserting the CompactFlash

- 1 Open the CompactFlash slot door while sliding the OPEN latch.
- 2 Push the CompactFlash in the correct direction until it clicks into place.
- 3 Close the CompactFlash slot door.



Removing the CompactFlash

- 1 Open the CompactFlash slot door and push the eject lever ① to remove the CompactFlash.
- 2 Close the CompactFlash slot door.



CompactFlash capacity and available recording time

CompactFlash	available recording time
2GB	Approx. 9 min.
4GB	Approx. 18 min.
8GB	Approx. 36 min.
16GB	Approx. 72 min.

Notes

Do not repeatedly insert or remove the CompactFlash over a short amount of time. Doing so may cause mis-recognition of the CompactFlash and memory malfunction. If you open the CompactFlash slot door while the unit is recording or in playback, operations will stop. If that occurs, be sure that the status on the LCD screen changes to ■ (playback/recording is stopped) before removing the CompactFlash. When ejecting the CompactFlash, forcefully pressing the eject lever and allowing the CompactFlash to be pointed downward when ejected will cause the CompactFlash to fall.

Menu settings

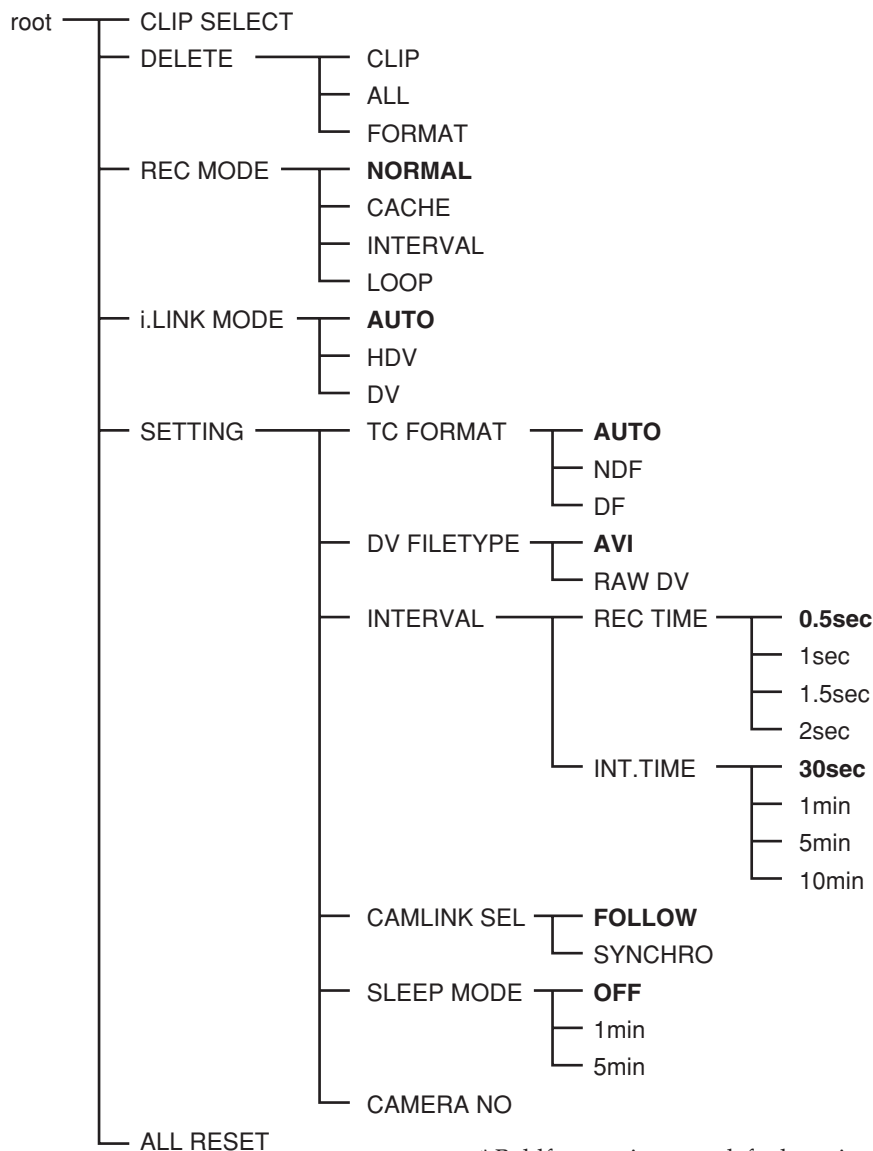
Check the individual settings and change them if necessary. For details, see page 7.

- 1 Display the menu screen on the LCD screen by pressing the MENU button.
- 2 Select the desired setting by pressing the PREVIOUS/REW button or the NEXT/FF button and press the PLAY/EXEC button.
- 3 Select the desired item by pressing the PREVIOUS/REW button or the NEXT/FF button and press the PLAY/EXEC button.
- 4 Return to the VIDEO mode screen by pressing the STOP button. Press the MENU button to close the menu screen.

Notes

You cannot record or play back movies while the menu screen is displayed on the LCD screen. Also, you cannot change to the menu screen on the LCD screen during recording or playback.

Menu organization (VIDEO mode)



* Boldface settings are default settings.

CLIP SELECT

You can select the clip number directly. Press the PREVIOUS/REW (previous clip/rewind) or NEXT/FF (next clip/fast-forward) button to select the number and press the PLAY/EXEC (playback/execute) button. Select the digits one by one. The display returns to the menu after four digits are selected. If there is no clip number, the previous clip number is selected.

DELETE

Deletes the recorded data or formats the CompactFlash.

- CLIP
Displays the three clip numbers from those displayed on the normal screen.
Selects and deletes clips.
- ALL
Deletes all the recorded clips.
- FORMAT
Formats the CompactFlash.

REC MODE

- NORMAL
Sets the normal recording mode.
- CACHE
Sets the cache recording mode.
- INTERVAL
Sets the interval recording mode. Only DVCAM/DV format is valid.
- LOOP
Sets the loop recording mode.

Notes

When inputting the stream signal from the i.LINK, INTERVAL and LOOP is valid.

i.LINK MODE

- AUTO Automatically switches to the camcorder recording/playback format.
- HDV Plays back HDV format only.
- DV Plays back DVCAM (DV) format only.

If there is no clip, you cannot make a selection.

SETTING

TC FORMAT

Follows the DF/NDF of the time code from the camcorder connected to this unit.

- AUTO Follows the time code format of the camcorder.
- NDF Records the time code in NDF format.
- DF Records the time code in DF format.

Notes

The default [AUTO] setting is NDF. If time code information from the camcorder is not obtained, this unit is set to the most recent recording setting.

DV FILE TYPE

Changes the DV recording format.

- AVI Records video in AVI format.
- RAW DV ... Records video in DV format.

INTERVAL

- REC TIME

Selects the interval recording time.

You can select [0.5sec], [1sec], [1.5sec] or [2sec].

- INT.TIME

Selects the interval time between recordings.

You can select [30 sec], [1 min], [5 min], or [10 min].

CAM LINK SEL

When CAM LINK is set to [ON], select the type of camcorder-linked operation.

- FOLLOW Uses this setting when connecting to a camcorder that has no "external REC control" function. The unit follows the camcorder operation.
- SYNCHRO ... Uses this setting when connecting to a camcorder that has an "external REC control" function. The unit operates simultaneously with the camcorder.

SLEEP MODE

Switches the sleep mode ON/OFF.

- OFF

Sleep mode is set to OFF.

- 1min

If the i.LINK cable is disconnected and no operation is done for more than one minute, this unit automatically switches to SLEEP status.

- 5min

If the i.LINK cable is disconnected and no operation is done for more than five minutes, this unit automatically switches to SLEEP status.

To return to normal status, reconnect the i.LINK cable to this unit or turn the POWER switch off and back on.

Notes

In SLEEP MODE, this unit is not completely switched off but continues to run using low power consumption.

CAMERA NO

You can assign a number to the data clip name when recording.

Use this mode to assign non-overlapping numbers to clip names recorded simultaneously on more than one camcorder, or to manage clip data by assigning numbers.

Press the PREVIOUS/REW (previous clip/rewind) or NEXT/FF (next clip/fast-forward) button to select the number and press the PLAY/EXEC (playback/execute) button.

Select the digits one by one. The display returns to the menu after two digits are selected.

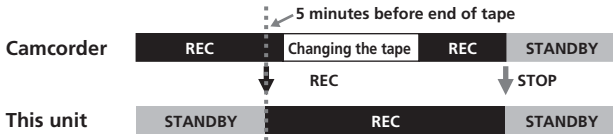
The factory default setting is [00].

ALL RESET

Restores all default settings.

Recording on this unit during camcorder tape replacement

When connected to a camcorder that has an external REC control function, you can record video on this unit only while changing the tape of the camcorder.



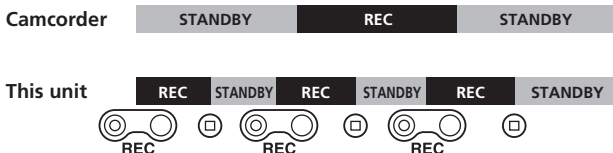
- 1 Press the CAM LINK button of this unit and set it to ON.
- 2 Set the [CAM LINK SEL] setting of this unit to [SYNCHRO].
- 3 Set the [EXT REC CTRL] setting of the camcorder to [RELAY].
- 4 Connect the camcorder to this unit via an i.LINK cable.
- 5 Press the REC START/STOP button of the camcorder to start recording.
 - When the remaining time of the tape is less than 5 minutes, the camcorder sends a command to this unit to start recording.
 - The recording by this unit can be stopped from the camcorder after changing the tape or by pressing the STOP button of this unit.
 - The noise of the tape change is recorded.
 - The above Step 3 is for the HVR-Z7/S270 series. For details on another camcorder you want to connect to this unit, refer to the operating instructions supplied with that camcorder.
 - For details on camcorders that have an "external REC control" function and on motion detection, refer to the "Guide to supported models and their functions" supplied with this unit.

Notes

- During RELAY recording, the cache recording cannot be operated.

Recording video from this unit

You can use this unit to start or stop recording a video input signal from an i.LINK without linked operation to a device connected via i.LINK.



- 1 Press the CAM LINK button of this unit and set it to OFF.
- 2 Slide the REC button to start recording.

Cache recording mode

The most recent approximately maximum 14 seconds of video and audio captured by the camcorder are held in a buffer memory and automatically recorded when the recording button is pressed.

To set cache recording

Select [CACHE] from [REC MODE] on the menu screen.

Notes

- After cache recording, it may take about 30 seconds to write data of the cache part.

Interval recording mode

Records a series of videos at regular intervals. This function is useful to observe things like cloud movements or daylight changes. Only DVCAM/DV format is valid.

Selecting an interval recording time

Select [SETTING] → [INTERVAL] → [REC TIME] on the menu screen to set the time.

You can select [0.5sec], [1sec], [1.5sec] or [2sec].

Setting the interval time

Select [SETTING] → [INTERVAL] → [INT TIME] on the menu screen to set the time.

You can select [30sec], [1min], [5min] or [10min].

Setting interval recording

Select [INTERVAL] from [REC MODE] on the menu screen.

LCD screen display in interval recording mode

Remains on during recording and blinks during standby



Loop recording mode

Repeats overwrite-recording using the available space on the CompactFlash.

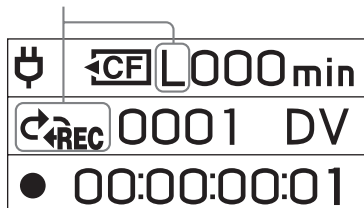
You cannot select this mode if the remaining recording time is less than 5 minutes (CompactFlash icon is flashing).

Setting loop recording mode

Select [LOOP] from [REC MODE] on the menu screen.

LCD screen display in loop recording mode

Remains on during recording



Notes

- The speed will slow according to the volume of data being written because of limitations of the CompactFlash capacity. For that reason, the following usages are recommended when operating loop recording;
 - Use a new CompactFlash (more than 300x).
 - Format a CompactFlash before starting loop recording.
- CAM LINK is turned OFF automatically while in the interval and loop recording modes. Press the REC button to starting recording.
- The data recorded by loop recording mode is updated at regular intervals. When updating the data, the whole recording time may be shortened.
- Updates the data regardless of update intervals when starting recording by a camcorder during loop recording mode in HDV.

Playback the image recorded on a CompactFlash in this unit

To play back video clip recorded on a CompactFlash in this unit, you need to connect this unit to a playback device via an i.LINK cable.

Playback (POWER switch to ON)

The playback method is as follows.

- Standard playback
- Trick playback
- Repeat playback

To select the playback format

Select **i.LINK MODE** on the menu screen and select the desired setting, **AUTO**, **HDV** or **DV**.

For details on selecting the menu, see page 6.

- **AUTO**
Automatically switch the HDV/DV format signal during playback.
- **HDV**
Only play back the part recorded in HDV format.
- **DV**
Only play back the part recorded in DVCAM (DV) format.

Standard playback

In this mode, the recorded clip in this unit is output to the i.LINK depending on the type of format.

To play back normally

Select the clip number in **CLIP SELECT** of the menu, or display the desired clip number on the LCD screen by pressing **◀◀** or **▶▶**.

Play back the image by pressing the **▷** button on this unit.

- When you pause during playback with this unit, no stream is output.
- During playback, the screen may become momentarily blue or frozen for about 0.5 second at the transition between scenes (when switching clips).

Trick playback

When the playback image is output to i.LINK, the clip is played at 3x, 6x, and 9x the normal speed.

To play back at the changed speed

Keep pressing **◀◀** or **▶▶** button during playback to start playback at the changed speed.

- The sequence of change is 3x, 6x, 9x and then back to 3x.
- It takes a few seconds for playback to start at the changed speed.
- The screen may not be displayed correctly during trick playback or playback. If that situation occurs, stop the playback once and try to replay.

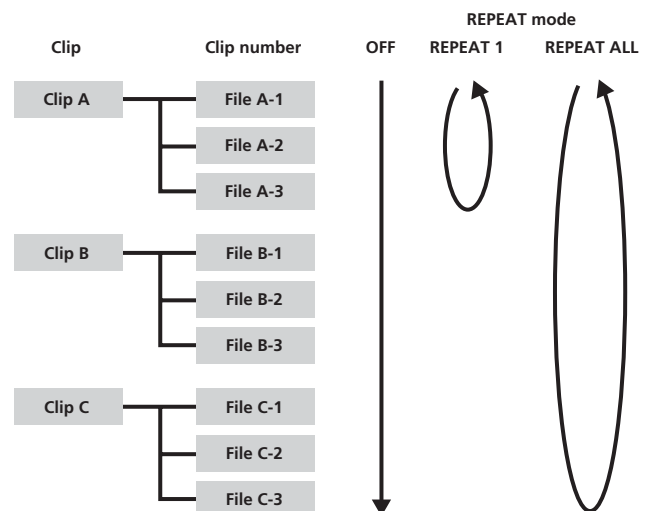
Repeat playback

This unit can automatically repeat playback of all or one clip in this unit.

To set repeat mode

Display **↻1** or **↻** on the LCD screen by pressing the **REPEAT** button on this unit.

- **↻1 REPEAT 1**
The recorded image in the desired clip is repeatedly playback.
- **↻ ALL REPEAT**
ALL REPEAT plays back all recorded images in this unit to the last clip then goes back to the first clip and repeats playback.
- **OFF**
Start playback from the desired clip and stop it after playback of the last clip.



Useful functions in combination with HVR-Z7/S270

Tapeless external REC control

Even if there is no tape in the HVR-Z7/S270, you can start or stop recording the image on this unit.

Set the EXT REC CTRL setting of the HVR-Z7/S270 as follows.

- REC CTRL MODE EXT ONLY
You can start or stop recording the image on a CompactFlash in this unit with START/STOP button only. (If there is a tape in the HVR-Z7/S270, you can start recording video data with REC button of the video camera operation part, stop recording video data with STOP button of the video camera operation part on the tape.)

Tips

If there is no tape in the SYNCHRONOUS or RELAY settings, you can start or stop recording the image on a CompactFlash in this unit.

- STBY COMMAND Desired setting
- * For details, refer to the operating instructions for the external REC control of the HVR-Z7/S270.

Set this unit as follows.

- CAM LINK SEL SYNCHRO
- Press the CAM LINK button to set to CAM LINK [ON].

You can record the time code of the HVR-Z7/S270 without a tape in the HVR-Z7/S270.

If you want to record video using the time code of the HVR-Z7/S270, set the time code setting of the HVR-Z7/S270 as follows.

Time code value always advances.

- TC MAKE PRESET
- TC RUN FREE RUN

Time code value only advances during recording.

- TC MAKE PRESET
- TC RUN REC RUN

In combination with the time code settings of the HVR-Z7/S270, this unit operates as follows.

TC MAKE	TC RUN	Time code of this unit with a tape in the HVR-Z7/S270	Time code of this unit without a tape in the HVR-Z7/S270
REGENERATE	–	When starting recording on a tape, video is recorded using the time code of the tape base. If the time code of the tape base cannot be read, the time code starts from 00:00:00:01.	The internal time code of this unit runs automatically.
PRESET	REC RUN	When starting recording on a tape or CompactFlash in this unit, the time code value advances from the preset time code of the HVR-Z7/S270.	When starting recording on CompactFlash in this unit, the time code value advances from the preset time code of the HVR-Z7/S270.
	FREE RUN	The preset time code value advances constantly and data is recorded using the data code.	The preset time code value advances constantly and data is recorded using the data code.

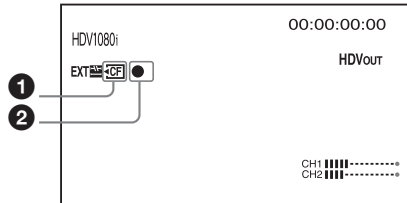
- If you want to use REC RUN with a tape in the HVR-Z7/S270, set REC CTL MODE of the HVR-Z7/S270 to [SYNCHRONOUS] and set CAM LINK SEL of this unit to [SYNCHRO].

Display the operational status of this unit on the HVR-Z7/S270 LCD screen

CAMERA mode

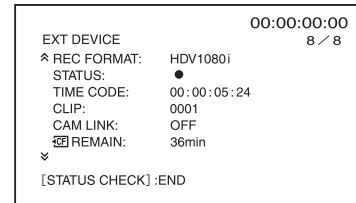
– Indicators

- The following information can be displayed on the LCD screen of the HVR-Z7/S270.



– Status check indicator

- The following information can be displayed on the status check indicator (CAMERA mode) of the HVR-Z7/S270.



1 CompactFlash connecting status

This icon blinks when the remaining recording time of the CompactFlash is low or an error has occurred in this unit.

2 CompactFlash mode

The same icon as the mode icon of this unit is displayed.

CompactFlash mode	Mode icon
STANDBY	■
REC	●

REC FORMAT

Displays the recording format of this unit.

STATUS

Displays the status (recording, playback etc.)

TIME CODE

Displays the time code during recording.

CLIP

Displays the clip number during recording.

CAM LINK

Displays the CAM LINK status of this unit. (When CAM LINK [OFF] is set, you cannot record from the HVR-Z7/S270.)

CF REMAIN

Displays the CompactFlash remaining recording time.

BATTERY REMAIN

Displays the battery level.

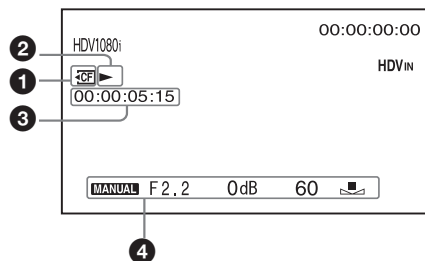
(When connected to an AC adaptor/charger, "AC" is displayed.)

Not displayed when this unit is connected to the camcorder. It is displayed when the unit is connected to the i.LINK cradle.

VCR mode

– Indicators

- The following information can be displayed on the LCD screen of the HVR-Z7/S270.



1 CompactFlash connecting status

This icon blinks when the remaining recording time of the CompactFlash is low or an error has occurred in this unit.

2 CompactFlash mode

The same icon as the mode icon of this unit is displayed.

CompactFlash mode	Mode icon
STANDBY	■
PLAY	▶
FF	▶▶
REW	◀◀
PLAY PAUSE	▶
REC	●

3 Time code of the playback signal of this unit

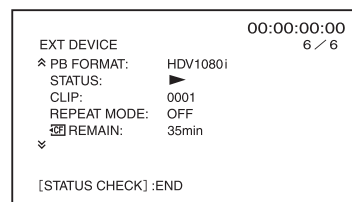
This time code is displayed during playback of a video recorded by this unit.

4 Data code

This data code is displayed during playback of a video recorded by this unit.

– Status check indicator

- The following information can be displayed on the status check indicator (VCR mode) of the HVR-Z7/S270.



PB FORMAT

Displays the playback format of this unit.

STATUS

Displays the status (recording, playback etc.)

CLIP

Displays the clip number during playback.

REPEAT MODE

Displays the playback mode. ("1" means "repeat 1 clip," "ALL" means "repeat all clips.")

CF REMAIN

Displays the CompactFlash remaining recording time.

BATTERY REMAIN

Displays the battery level.

(When this unit is connected to an AC adaptor/charger, "AC" is displayed.)

Not displayed when this unit is connected to the camcorder. It is displayed when the unit is connected to the i.LINK cradle.

Using in COMPUTER mode

Connecting to a computer

You can transfer recorded images on this unit as a file in HDV or DV format to a nonlinear editing system or computer.

1 Attach the HVRA-CR1 i.LINK cradle and optional AC adaptor to this unit.

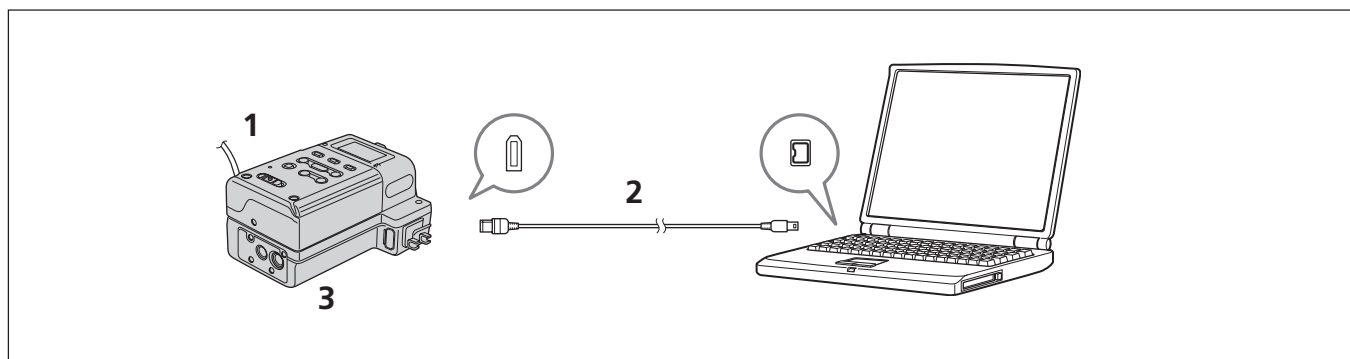
For extended use, the AC adaptor is recommended. This unit can still be operated with the battery pack attached.

2 Connect this unit to the computer via the optional i.LINK cable.

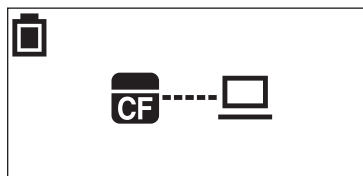
3 Slide the POWER switch of this unit to ON.

Note

This unit cannot receive power from the computer.



When this unit is set to COMPUTER mode, the following screen is displayed on the LCD screen.



Computer requirements

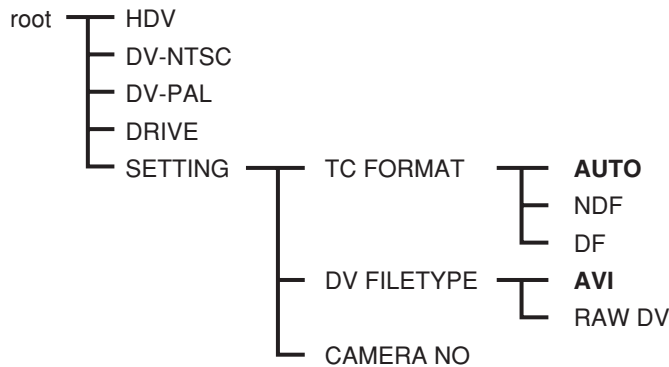
For Windows users

- OS: Windows 2000 Professional (Service Pack 4 or later) / Windows XP Home Edition (Service Pack 2 or later) / Windows XP Professional (Service Pack 2 or later) / Windows Vista
- Standard installation is required.
Operation is not assured if the above OS has been upgraded.

For Macintosh users

- OS: Mac OS X (v10.3 or later)

Menu organization (COMPUTER mode)



*Boldface settings are default settings.

HDV

Operate in the VIDEO mode. Set this mode when reading or writing HDV stream data on a CompactFlash in this unit using editing software.

DV-NTSC

Operate in the VIDEO mode. Set this mode when reading or writing DV (NTSC format) stream data on a CompactFlash in this unit using the editing software.

DV-PAL

Operate in the VIDEO mode. Set this mode when reading or writing DV (PAL format) stream data on a CompactFlash in this unit using the editing software.

DRIVE

Operate as an external removable media of the computer. (Default setting)

SETTING

You can set this when in VIDEO mode. Settings are reflected in setting in the VIDEO mode operation when connecting to a camcorder. For details about setting, refer to "Menu organization (VIDEO mode)."

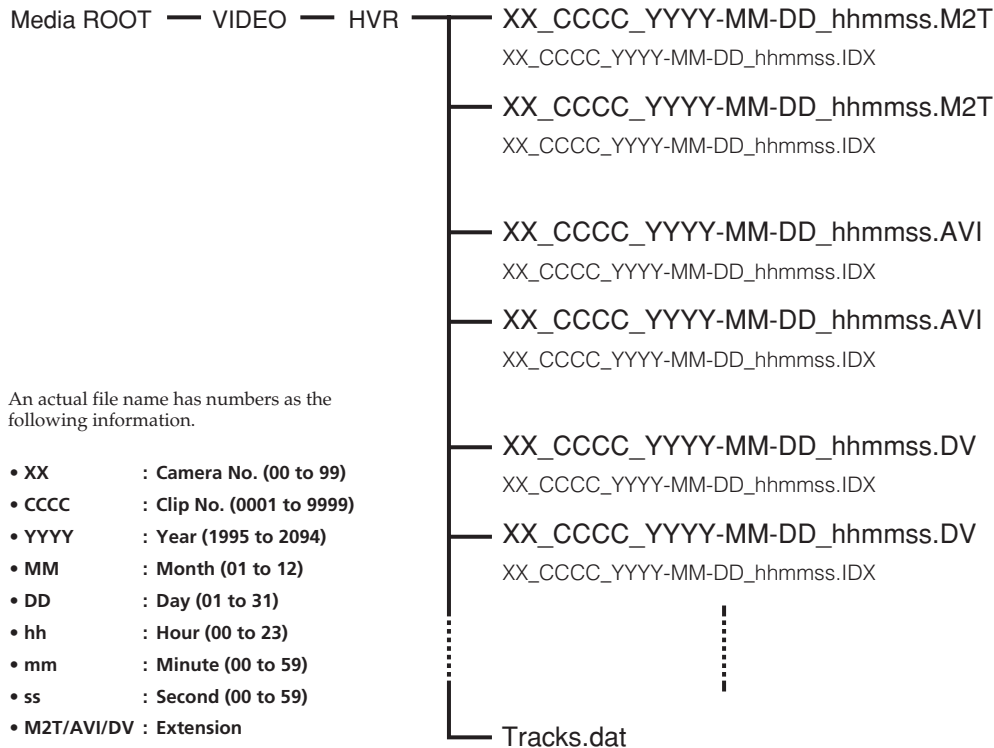
Notes

- For the following cases, operate "Safety remove Device (for Windows)" or "Remove by putting the media icon into the trash (for Mac OS)" etc., and check that the access lamp turns off.
 - When switching the each modes DRIVE, HDV or DV-NTSC, DV-PAL
 - When disconnecting the i.LINK cable from the computer
 - When turning off the power of this unitTo recognize this unit again after these operations, disconnect i.LINK cable from the computer once, then reconnect it.
- Depending on the video editing software, this unit may not be recognized without switching the mode before starting the software.
- If you change the operation mode frequently, the computer and this unit may not communicate correctly. Switch the mode of this unit at intervals about 5 seconds or more.
- HDV, DV-NTSC, and DV-PAL mode may not be recognized because of a limitation of the computer when switching them directly. If that situation occurs, disconnect this unit from the computer, then select the mode.
- If the combination of the settings of the editing software (HDV/DV-NTSC, DV-PAL) and this unit are incorrect, images may be distorted or recognized incorrectly.

Folder saving format

Folder organization

The file/folder organization of this unit is as follows.



When not setting the clock set, file name will be "xx_cccc_0000-00-00_000000.extension."

When the file is separated, the bottom number of the file name will be counted up.

When cache recording in HDV format, the cache part may be separated as a 14-second file (maximum).

Files

The maximum file size is 4 GB. If a file size exceeds 4 GB, that file is automatically divided.

XX_CCCC_YYYY-MM-DD_hhmmss.M2T

Data recorded in HDV format
When playback, HDV compatible playback software is needed.

XX_CCCC_YYYY-MM-DD_hhmmss.AVI

DV format data recorded when DV FILE TYPE is set to AVI

XX_CCCC_YYYY-MM-DD_hhmmss.DV

DV format data recorded when DV FILE TYPE is set to RAW DV
For playback on Windows, Raw DV compatible playback software is needed.

XX_CCCC_YYYY-MM-DD_hhmmss.IDX and Tracks.dat

Information files of recording data in folders (number of files, number of frames, starting time code, etc.)
Used with a connection tool. Do not delete this file.

Notes

- During HDV recording, a new file will be created at the recording starting point of the tape.
- Segmented files recorded from HDV stream
Some computer applications cannot play back the transitions between segmented files properly. If this happens, join the files using the "Sony Recording Unit Utility" or "M2T File Connection Tool" (*).
* Available from the Sony support page

Notes regarding COMPUTER mode

- Do not save other data files in the HVR folder.
- Do not transfer data from a computer to this unit in COMPUTER mode.
Write back data from a computer to this unit by streaming.
Write back data after selecting HDV or DV-NTSC, DV-PAL format in PC MODE in the menu.
- Do not change folder or file names on your computer.
Delete data or format a CompactFlash on this unit to increase the capacity of the CompactFlash.
- When removing the CompactFlash media by OS operation from a computer, do not disconnect i.LINK cable or switch the mode of this unit.
- Do not use defragmentation on your computer.
- Due to the limitations of Windows, this unit may not be detected when normal computer operation is restored after standby or hibernation. For this reason, hibernation is not supported by this unit.
- Due to the specifications of Mac OS X, to disconnect this unit from a Mac with Mac OS X and connect it again, perform the following steps.

To reuse this unit

- 1 To use this unit, restart the computer or use Disk Utility. To use Disk Utility, follow the steps.**
- 2 Start Disk Utility (/Applications/Utilities/).**
- 3 Click the triangle mark on the left of the CompactFlash icon to display the CompactFlash volume and partition name.**
- 4 Select grayed out partition name ("VIDEO") from Disk Utility window.**
- 5 Select [Mount] from the [Option] menu. The selected name "VIDEO" is displayed on the desktop again.**
(If it is still unmounted, select [Unmount] and then select [Mount] again.)
- 6 Exit Disk Utility.**

Power supply

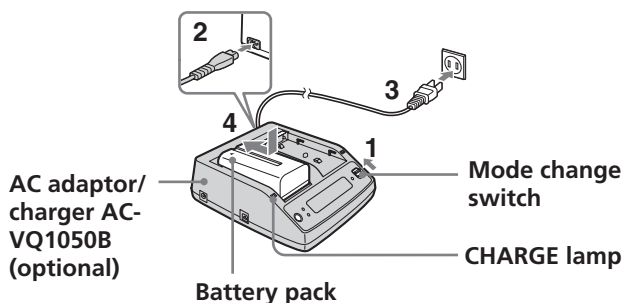
Preparing the power supply

The following will explain the optional AC-VQ1050 AC adaptor/charger.

To charge the battery pack

When using an "InfoLITHIUM" battery pack (L-series, optional) as the power supply for this unit, charge the battery back as follows before use.

When charging the battery pack, refer to the operating instructions supplied with the AC adaptor/charger (optional).



- 1 Set the mode change switch of the AC adaptor/charger to CHARGE.

Notes

You cannot charge when the mode change switch is set to VCR/CAMERA.

- 2 Connect the AC power cord to the AC adaptor/charger.
- 3 Connect the AC power cord to a wall outlet.
- 4 When installing the battery pack, press it down while sliding it in the direction of the arrow.
Charging begins and the CHARGE lamp on the AC adaptor/charger comes on.
When charging is completed, all of the segments of the battery life indicator appear in the display window (normal charge).
The CHARGE lamp goes off, but if you continue charging until the "FULL" battery life indicator appears, the battery capacity will be slightly longer (full charge).
- 5 When charging is completed, remove the battery pack from the AC adaptor/charger.

Notes

- This unit can be used with an "InfoLITHIUM" battery pack (L-series), but does not support the battery info function.
- This unit cannot be used to charge the battery pack installed.

Remaining battery time indication in the AC adaptor/charger display window

This indication is provided by data communications between the AC adaptor/charger and the "InfoLITHIUM" battery pack.

This unit does not have a data communications function, so the displayed time may differ from the actual remaining time. This is not a malfunction.

Charging time

Charging times for a completely exhausted "InfoLITHIUM" battery pack (NP-F570, NP-F770, NP-F970) are as follows.

Battery pack	Time for full charge	(Time for normal charge)
NP-F570	Approx. 145 minutes	(Approx. 85 minutes)
NP-F770	Approx. 230 minutes	(Approx. 170 minutes)
NP-F970	Approx. 310 minutes	(Approx. 250 minutes)

Operating times for continuous recording

Operating times for continuous recording using an "InfoLITHIUM" battery pack (NP-F570, NP-F770, NP-F970) are as follows.

Battery pack	Operating time from full charge	(Operating time from normal charge)
NP-F570	Approx. 420 minutes	(Approx. 380 minutes)
NP-F770	Approx. 870 minutes	(Approx. 780 minutes)
NP-F970	Approx. 1,320 minutes	(Approx. 1,180 minutes)

Battery pack

Before changing the battery pack, slide the POWER switch to OFF (CHG).

Charging/recording/playback time

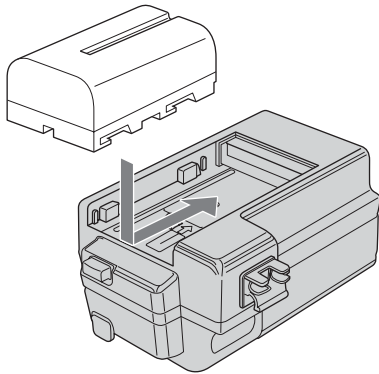
- Times measured with the camcorder at 25°C (77°F) (Recommended range is 10°C to 30°C (50°F to 86°F)).
- Recording and playback times are shorter at lower temperatures.
- Recording and playback times are shorter depending on the conditions of use of this unit.
- Except for the NP-F570/F770/F970, operating time is not ensured.

AC adaptor/charger

Do not short-circuit the DC plug of the AC adaptor/charger or battery terminal with any metallic objects. This may cause a malfunction.

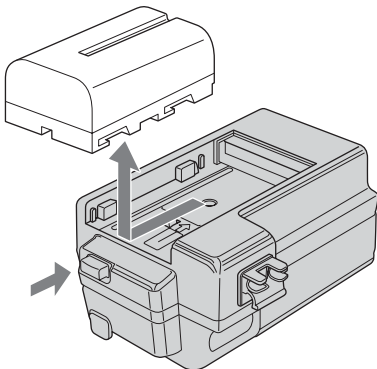
To install the battery pack to this unit

Slide the battery pack in the direction of the ◀ mark on the battery pack.



To remove the battery pack from this unit

Press the BATT RELEASE button of this unit and slide the battery pack in the direction of the arrow.



To connect this unit to a wall outlet

For prolonged operation, such as playing the recorded images, you can operate this unit from a domestic wall outlet without worrying about battery life.

- 1 Set the mode change switch of the AC adaptor/charger to VCR/CAMERA.

Notes

When the mode change switch is set to CHARGE, there is no power supply.

- 2 Connect the DK cable to the DC IN jack on this unit.
- 3 Connect the DK cable to the AC adaptor/charger.
- 4 With the power cord, connect the AC adaptor/charger to a wall outlet.

Notes

You can leave the battery pack installed while operating from AC power. The power supply to the DC IN jack has priority.

To use the AC adaptor/charger from a vehicle power supply

For details, refer to the operating instructions supplied with the AC adaptor/charger.

Notes on battery pack/AC adaptor

- Avoid the following while the ACCESS lamp is lit. Failure to do so may cause malfunction.
 - Removing the battery pack
 - Removing the AC adaptor (while charging with the AC adaptor)
- Always turn off the POWER switch before removing the battery pack or the AC adaptor.

Trouble shooting

Please check the following before contacting your Sony dealer.

Note in case of repairs

- Some kinds of repair work may require that the CompactFlash be formatted or replaced. In either case, all data on the CompactFlash will be deleted. Back-up your data from the CompactFlash before sending it for repairs. Sony does not guarantee against data being deleted during repair work.
- During repair work, Sony may perform a minimal check of the data on a CompactFlash in order to verify improvements or the occurrence of defective symptoms. However, Sony never copies or saves the data.

Power sources

Symptom	Cause/Remedy
This unit gets warm.	<ul style="list-style-type: none">• This unit may get warmer while you use it. This is not a malfunction.
The remaining battery time indicator does not indicate the correct time.	<ul style="list-style-type: none">• The ambient temperature is too high or too low, or the battery pack has not been charged enough. This is not a malfunction. → Fully charge the battery pack again. If the problem persists, the battery pack may be worn out. Replace it with a new one (p. 20).• The indicated time may not be correct in certain circumstances.
The battery pack discharges too quickly.	<ul style="list-style-type: none">• The ambient temperature is too high or too low, or the battery pack has not been charged enough. This is not a malfunction. → Fully charge the battery pack again. If the problem persists, the battery pack may be worn out. Replace it with a new one (p. 20).

Recording

Symptom	Cause/Remedy
Pressing the REC switch does not start recording.	<ul style="list-style-type: none">• This unit is writing the video you just shot to the CompactFlash. → Wait for a while and then slide the REC switch.• The CompactFlash of the unit is full. → Delete unnecessary images. → Format this unit by selecting DELETE and then FORMAT.
The ACCESS lamp remains on even when you stop recording.	<ul style="list-style-type: none">• This unit is recording the image you just shot. → Do not remove the AC adaptor or the battery pack while the lamp is turned on.
Recording stops.	<ul style="list-style-type: none">• Fragmentation has occurred. → Format this unit by selecting DELETE and then FORMAT.

Connecting a computer

Symptom	Cause/Remedy
An error message appears when you place the supplied CD-ROM in your computer.	→ Set the computer display as follows: – 1024 × 768 dots or more, high color (16 bits, 65,000 colors) or more.
The image or sound on this unit cannot be played back correctly.	<ul style="list-style-type: none">• Depending on the computer you are using, the played back image or sound may stop temporarily, but this does not affect the images or sound copied to your computer.• Playback software is not installed on your computer. → Install playback software on your computer.
The extension of a file is not displayed on your computer.	→ To display the extension, follow the steps below. ① In the window folder, click [Tools] → [Folder option...] → [View] tab. ② Under Advanced Settings, uncheck [Hide file extensions for known file types]. ③ Click [OK].

Warning indicators

Self-diagnosis display

When an error occurs the following warning indicators may appear on the LCD screen.

Message	Cause/Corrective Action
A:□□:□□/I:□□:□□/P:□□:□□/ M:□□:□□/F:□□:□□/X:□□:□□ (Self-diagnosis display)	<p>If an error recurs after you repeat corrective action several times, contact Sony Customer Service or the place of purchase.</p> <p>A:12:□</p> <ul style="list-style-type: none"> CompactFlash-related error has occurred. <ul style="list-style-type: none"> → Transfer speed of the CompactFlash may be slow. Be sure that the CompactFlash you are using is the recommended type. <p>A:19:□</p> <ul style="list-style-type: none"> The CompactFlash you are using is not recognized. <ul style="list-style-type: none"> → Check the type you are using. <p>I:12:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>P:12:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>P:21:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>M:21:□</p> <ul style="list-style-type: none"> Recorded image was not processed correctly. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>F:11:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>F:12:□</p> <ul style="list-style-type: none"> There is a conflict in the CompactFlash logic structure. <ul style="list-style-type: none"> → Move the required data to the computer and reformat the CompactFlash using this unit. <p>F:21:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>F:22:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>F:29:□</p> <ul style="list-style-type: none"> Firmware is not recorded. <p>F:91:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>F:92:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>X:91:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on. <p>X:99:□</p> <ul style="list-style-type: none"> Internal error has occurred. <ul style="list-style-type: none"> → Turn this unit off and then back on.


Caution message

Message	Cause/Corrective Action
MEDIA INCOMPATIBLE	<ul style="list-style-type: none"> • Displays when inserting an incompatible CompactFlash into this unit. → Use the recommended type of CompactFlash.
FORMAT ERROR	<ul style="list-style-type: none"> • Displays when not formatting a CompactFlash with this unit etc. → Format the CompactFlash using this unit. * When this message is displayed, press the STOP button on this unit to display the screen for formatting a CompactFlash.
MEDIA ERROR	<ul style="list-style-type: none"> • The CompactFlash you are using may be damaged. → Check the type you are using.
CLIP NUMBER FULL	<ul style="list-style-type: none"> • Displays 9999 at the clip number when no more recording is possible. → Delete all of the clips recorded by this unit or format the CompactFlash after copying clips recorded in the CompactFlash to a computer or other suitable media.

If the above symptoms do not improve, try with a different CompactFlash.

If the above symptoms still do not improve even several attempts are made, contact your Sony dealer.

About i.LINK

The  HDV/DV jack provided on this unit is an i.LINK-compliant jack. This section describes the i.LINK standard and its features.

What is i.LINK?

i.LINK is a digital serial interface for sending and receiving digital video, digital audio, and other data between this unit and other equipment equipped with an i.LINK terminal. You can also control other equipment using i.LINK.

i.LINK-compatible equipment can be connected using an i.LINK cable. Possible applications are operations and data exchange with various digital AV equipment.

When two or more i.LINK-compatible equipment are connected to this unit, operations and data exchange are possible with equipment directly connected to this unit and also with equipment connected to this unit via other equipment.

Note, however, that the method of operation may vary depending on the characteristics and specifications of the equipment to be connected. Also, there are cases where operations and data exchange may not be possible even if the connection is made.

Notes

- Normally, only one device can be connected to this unit using i.LINK cable. When you connect this unit to HDV/DVCAM (DV)-compliant equipment that allows multiple connections, refer to the operating instructions of the equipment to be connected.
- i.LINK is an easy-to-remember term for the IEEE 1394 proposed by Sony, and is a trademark approved by many corporations in Japan and overseas.
- IEEE 1394 is an international standard standardized by the Institute of Electrical and Electronics Engineers.

About the i.LINK baud rate

The maximum baud rate of i.LINK varies depending on the equipment. There are three types.

S100 (Approximately 100 Mbps*)

S200 (Approximately 200 Mbps)

S400 (Approximately 400 Mbps)

The baud rate is listed under "Specifications" in the operating instructions of individual equipment. It may be indicated near the i.LINK interface on some equipment.

The baud rate may vary from the indicated value when this unit is connected to equipment with a different maximum baud rate.

* What is Mbps?

Mbps stands for "megabits per second." It is the volume of data that can be sent or received in 1 second. For example, a baud rate of 100 Mbps means that 100 megabits of data can be sent in 1 second.

To use i.LINK functions of this unit

This unit can be connected to Sony i.LINK-compatible devices other than camcorders (e.g. VAIO computers). This unit may not be compatible with certain i.LINK video devices such as digital televisions, DVD recorders/players and MICROMV recorders/players even if they are equipped with an i.LINK jack. Before connecting to another device, confirm whether it is HDV/DVCAM (DV) compatible. For precautions on connecting and the availability of compatible software applications, refer to the operating instructions of the device to be connected.

Notes

- When connecting an i.LINK cable to this unit or a computer, check the direction of the jack. Forcibly inserting the jack may damage the terminal or cause a malfunction.
- Always connect the i.LINK cable to the computer first and then to this unit. Connecting the i.LINK cable to this unit first may cause this unit to malfunction because of static electricity.
- When using an i.LINK cable to connect this unit to a device equipped with an i.LINK jack, switch off the device and remove the power cord from the AC outlet before connecting or disconnecting the i.LINK cable. If the i.LINK cable is connected or disconnected while the power cord of the device is connected to the AC outlet, a high-voltage current (8 to 40 V) output from the i.LINK jack of the device will flow into this unit and damage it.
- Before changing the HDV/DV format etc. of the camcorder, disconnect the i.LINK cable. Changing the format after connecting the i.LINK cable, the video signal may not be recognized correctly.

Required i.LINK cable

Use a Sony i.LINK cable.

i.LINK and  are trademarks of Sony Corporation.

Optional CompactFlash

CompactFlash

- A CompactFlash 133x 2 GB or higher is recommended for use with this unit. (A speed of less than 133x is not guaranteed; space less than 2GB is not guaranteed.)
- When using a CompactFlash for the first time, be sure to format it with this unit.
- Data may be corrupted or the CompactFlash may not work in the following cases.
 - If you remove the CompactFlash during data reading/writing.
 - If you move the CompactFlash close to a strong magnetic field.
- The CompactFlash may become hot just after use. Handle with care.
- Do not peel the label off the CompactFlash or attach another label to it.
- When storing or carrying the CompactFlash, put it in the protective case supplied.
- Do not get water on the CompactFlash.
- Do not apply excessive force on the label surface of the CompactFlash.
- Do not touch the terminal of the CompactFlash with your hand or any metal object.

Specifications

System

File system	FAT32
CompactFlash	133x 2 GB or more The capacity is the value when 1 GB equals 1 billion bytes. The actual usable capacity may be slightly less because administrative files etc. are included.
File format	HDV recording MPEG-2TS (.m2t) DVCAM/DV recording AVI-Type1 (.AVI) RAW DV (.DV)
Input signal	
HDV recording/playback	
Video:	MPEG-2TS 1080/60i, 30p, 24p 1080/50i, 25p
Audio:	2 CH MPEG 1 Audio Layer2 Stereo (16 bit 48 kHz) (1/2 CH) 4 CH MPEG 2 Audio Layer2 Stereo (16 bit 48 kHz) (3/4 CH)
DVCAM/DV recording/playback	
Video:	DV embedded
Audio:	PCM digital (12/16 bit, 32k, 48k)
Recordable time	2 GB Approx. 9 minutes 4 GB Approx. 18 minutes 8 GB Approx. 36 minutes 16 GB Approx. 72 minutes

General

Power requirement	DC 7.2 V (battery pack) DC 8.4 V (AC adaptor)
Power consumption	2.2 W
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Operating humidity	20 % (20 °C) to 90 % (35 °C) (no condensation)
Dimensions	
HVR-MRC1 :	Approx. 57 × 102 × 34 mm (2 1/4 × 4 1/8 × 1 3/8 in.)
HVR-MRC1+HVRA-CR1:	Approx. 77 × 106 × 51 mm (3 1/8 × 4 1/4 × 2 1/8 in.) (including the projecting parts) (w/h/d)
Mass	
HVR-MRC1 :	Approx. 130 g (4 oz)
HVR-MRC1+HVRA-CR1:	Approx. 210 g (7 oz) (excluding CompactFlash and battery pack)
Input/output jack	i.LINK (IEEE1394 6-pin connector S400)
Optional accessories	AC adaptor/charger AC-VQ1050B Battery pack NP-F570/F770/F970

Design and specifications are subject to change without notice.

Precautions

On use and care

- Do not use or store this unit and accessories in the following locations.
 - Anywhere excessively hot or cold. Never leave them exposed to temperatures above 60 °C (140 °F), such as under direct sunlight, near heaters or in a car parked in the sun. They may cause malfunction or become deformed.
 - Near strong magnetic fields or mechanical vibration. This unit may cause malfunction.
 - Near strong radio waves or radiation. This unit may not be able to record properly.
 - Near AM receivers and video equipment. Noise may occur.
 - On a sandy beach or anywhere dusty. If sand or dust gets in this unit, the unit may permanently cause malfunction.
 - Near windows or outdoors, where the LCD screen may be exposed to direct sunlight. This damages the LCD screen.
 - Anywhere very humid.
- Operate this unit on DC 7.2 V (battery pack) or DC 8.4 V (AC Adaptor).
- For DC or AC operation, use the accessories recommended in these operating instructions.
- Do not let this unit get wet, for example, from rain or sea water. If this unit gets wet, it may permanently cause malfunction.
- If any solid object or liquid gets inside the casing, unplug this unit and have it checked by a Sony dealer before operating it any further.
- Avoid rough handling, disassembling, modifying, physical shock, or impact such as hammering, dropping or stepping on this unit.
- Keep the POWER switch setting to OFF when you are not using this unit.
- Do not wrap this unit with a towel, for example, and operate it. Doing so might cause heat to build up inside.
- When disconnecting the mains lead, pull it by the plug and not the lead.
- Do not damage the mains lead such as by placing anything heavy on it.
- Keep metal contacts clean.
- If the battery electrolytic liquid has leaked,
 - consult your local authorized Sony service facility.
 - wash off any liquid that may have contacted your skin.
 - if any liquid gets in your eyes, wash with plenty of water and consult a doctor.

■ When not using this unit for a long time

- Use up the battery pack completely before storing it.

LCD screen

- Do not exert excessive pressure on the LCD screen, as it may cause damage.
- If this unit is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using this unit, the back of the LCD screen may heat up. This is not a malfunction.

■ To clean the LCD screen

If fingerprints or dust make the LCD screen dirty, it is recommended you use the LCD Cleaning Cloth (optional) to clean it. When you use the LCD Cleaning Kit (optional), do not apply the cleaning liquid directly to the LCD screen. Use cleaning paper moistened with the liquid.

On handling the casing

- If the casing is soiled, clean this unit body with a soft cloth lightly moistened with water, and then wipe the casing with a dry soft cloth.
- Avoid the following to avoid damage to the finish.
 - Using chemicals such as thinner, benzene, alcohol, chemical cloths, repellent, insecticide and sunscreen.
 - Handling with above substances on your hands.
 - Leaving the casing in contact with rubber or vinyl objects for a long period of time.

Getting the best performance from the battery pack

- If the ambient temperature is low, the battery pack performance deteriorates, reducing the operating time. To maximize the operating time, the following techniques are recommended.
 - Keep the battery pack warm in a pocket, and load it into the unit immediately before shooting.
- The battery is depleted when this unit is in recording standby or playback pause. Always switch off the power supply to save energy.
- Have enough battery packs ready to last two or three times the expected shooting duration, and test shoot with them before the session.
- The battery packs are not waterproof. Be careful not to allow them to get wet.

Indication of remaining battery pack capacity

If the battery pack fails even though the indication suggests there is adequate capacity, fully recharge the battery pack. This will correct the remaining capacity indication. However, if the battery pack is used for a long time at high temperature, is left fully charged, or has been very heavily used, the indication may not be correctly restored. In this case, use the indication time as a rough guideline to estimate the remaining capacity.

Battery pack storage

- If the battery pack is not used for a long time, to maintain its performance, it should be fully charged and then fully discharged with this unit about once a year. Remove the battery pack from this unit, and store in a cool dry place.
- To fully discharge the battery pack with this unit, leave it powered on until the battery pack is exhausted.

Battery pack lifetime

- The battery pack has a limited lifetime. As it is repeatedly used over a long time interval, the capacity gradually reduces. When the operating time is much less than the original value, it is time to replace the battery pack.
- The lifetime varies from one individual battery pack to another, depending on the pattern of use, and how it has been stored.

Additional information on this product and answers to frequently asked questions can be found at our Customer Support Website.

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