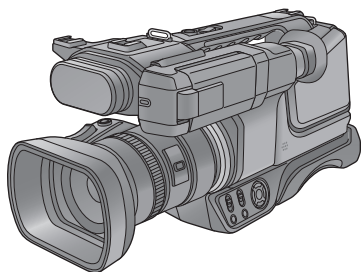


Panasonic®

Operating Instructions High Definition Video Camera

Model No.

HC-MDH2 HC-MDH2M



Please read these instructions carefully before using this product, and save this manual for future use.

AVCHD™
Progressive

HDMI

**SD
XC™**

**DOLBY
DIGITAL**

VQT5E10

Read this first

■ About the recording format for recording motion pictures

You can record motion pictures with AVCHD recording formats using this unit. (→ 27, 54)

- AVCHD Progressive (1080/50p) supported.

AVCHD Progressive:

It is possible to record video with highest quality (1080/50p) possible with this unit.

■ Indemnity about recorded content

Panasonic does not accept any responsibility for damages directly or indirectly due to any type of problems that result in loss of recording or edited content, and does not guarantee any content if recording or editing does not work properly. Likewise, the above also applies in a case where any type of repair is made to the unit (including any other non-built-in memory related component).

■ About security

Be careful about the possibility of theft or loss of the unit, and be careful not to leave the unit unattended. Please note that Panasonic does not accept any responsibility for the compromise, manipulation, and loss of information caused by these events.

■ Handling of built-in memory [HC-MDH2M]

This unit is equipped with the built-in memory. When using this component, pay attention to the following points.

Back up data periodically.

The built-in memory is temporary storage. In order to avoid erasing data due to static electricity, electromagnetic waves, breakage, and failures, back up the data to a PC or DVD disc. (→ 96)

- Access lamp (→ 9) illuminates while the built-in memory is being accessed (initialisation, recording, playback, deleting etc.). Do not perform the following operations when the lamp illuminates. It may damage the built-in memory or cause a malfunction in the unit.
 - Turn the unit off (remove the battery)
 - Insert and remove the USB cable
 - Expose the unit to vibrations or shock
- About disposing of or giving away this unit. (→ 129)

■ About Condensation (When the lens, the viewfinder or LCD Monitor is fogged up)

Condensation occurs when there is a change in temperature or humidity, such as when the unit is taken from outside or a cold room to a warm room. Please be careful, as it may cause the lens, the viewfinder or LCD monitor to become soiled, moldy, or damaged.






When taking the unit to a place which has a different temperature, if the unit is accustomed to the room temperature of the destination for about one hour, condensation can be prevented. (When the difference in temperature is severe, place the unit in a plastic bag or the like, remove air from the bag, and seal the bag.) When condensation has occurred, remove the battery and/or the AC adapter and leave the unit like that for about one hour. When the unit becomes accustomed to the surrounding temperature, fogginess will disappear naturally.

■ Cards that you can use with this unit

SD Memory Card, SDHC Memory Card and SDXC Memory Card

- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.
- Refer to page 16 for more details on SD cards.

■ For the purposes of these operating instructions

- SD Memory Card, SDHC Memory Card and SDXC Memory Card are referred to as the "SD card".
- Function that can be used for Motion Picture Recording Mode: 
Function that can be used for Still Picture Recording Mode: 
- Function that can be used for the Playback Mode: 
Function that can be used for the Playback Mode (motion pictures only): 
Function that can be used for the Playback Mode (still pictures only): 
- Scene(s) recorded in 1080/50p or 1080/50i: "AVCHD scene(s)"
- Pages for reference are indicated by an arrow, for example: → 00

These operating instructions are designed for use with models **HC-MDH2** and **HC-MDH2M**. Pictures may be slightly different from the original.

- The illustrations used in these operating instructions show model **HC-MDH2**, however, parts of the explanation refer to different models.
- Depending on the model, some functions are not available.
- Features may vary, so please read carefully.
- Not all models may be available depending on the region of purchase.

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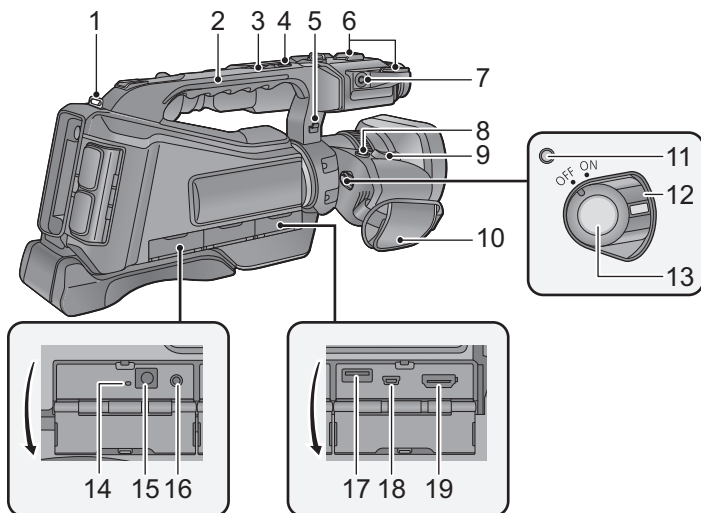
Menu





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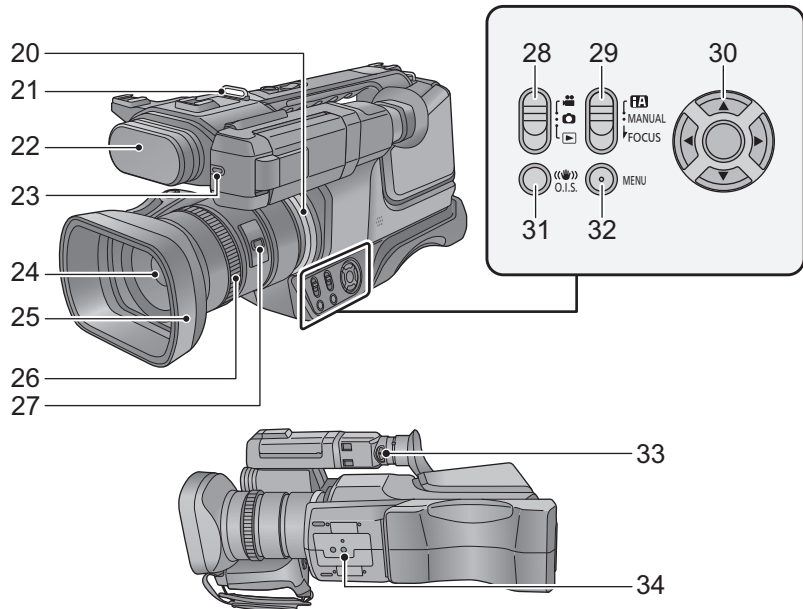
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Names and Functions of Main Parts

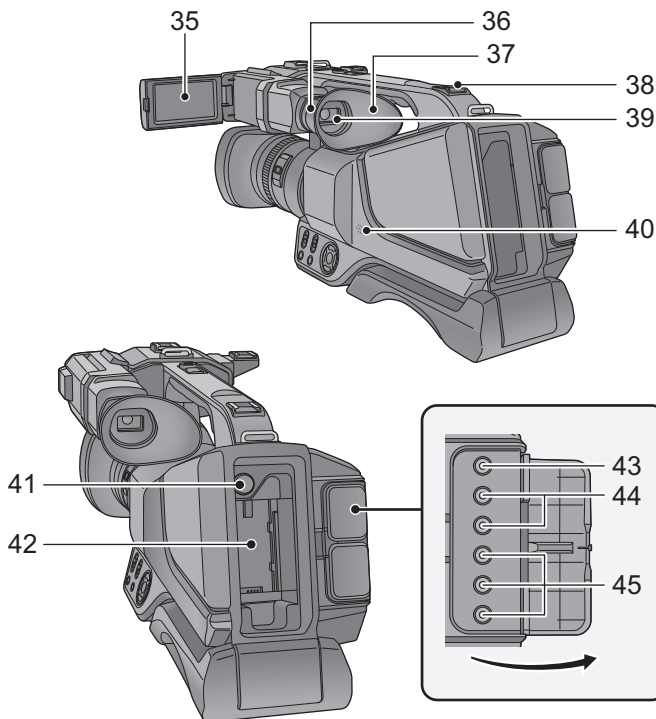


- 1 Shoulder strap fixture**
- 2 Handle**
- 3 Sub zoom lever [W/T] (→ 36, 110)**
 - This lever functions in the same manner as the zoom lever.
- 4 Sub recording start/stop button (→ 24, 110)**
 - This button functions in the same manner as the recording start/stop button.
- 5 Microphone cable holder**
- 6 Accessory shoe**
- 7 External microphone terminal [EXT MIC] (→ 11)**
 - A compatible plug-in powered microphone can be used as an external microphone.
 - When the unit is connected with the AC adaptor, sometimes noise may be heard depending on the microphone type. In this case, please switch to the battery for the power supply and the noise will stop.
- 8 Photoshot button [] (→ 29)**
- 9 Zoom lever [W/T] (In Recording Mode) (→ 36)**
Volume lever [+VOL-]/Thumbnail display switch [ / ] (In Playback Mode) (→ 34, 35)
- 10 Grip belt (→ 10)**
- 11 Status indicator (→ 18)**
- 12 Power switch (→ 18)**
- 13 Recording start/stop button (→ 27)**
- 14 Charging lamp [CHG] (→ 13)**
- 15 DC input terminal [DC IN] (→ 13)**
 - Do not use any other AC adaptors except the supplied one.
- 16 Headphone terminal [] (→ 48)**
- 17 USB terminal [HOST]/[USB 2.0] (→ 82)**
- 18 USB terminal [DEVICE]/[USB 2.0] (→ 90, 98)**
- 19 HDMI terminal [HDMI] (→ 75)**

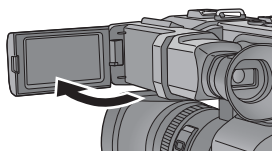


- 20** Ring LED (→ 113)
- 21** Shoulder strap fixture
- 22** Internal microphones
- 23** Recording lamp (→ 113)
- 24** Lens (→ 10)
- 25** Lens hood
- 26** Multi manual ring (→ 39, 43)
- 27** Camera function button
[CAMERA FUNCTION] (→ 39)
- 28** Mode switch (→ 18)
- 29** Intelligent auto/Manual/Manual focus
switch [iA/MANUAL/FOCUS] (→ 31)
- 30** Cursor button
- 31** Optical Image Stabilizer button
[((())) O.I.S.] (→ 38)
- 32** Menu button [MENU] (→ 23)
- 33** Eyepiece corrector lever (→ 21)
- 34** Tripod receptacle

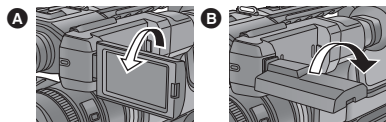
- Attaching a tripod with a screw length of 5.5 mm or more may damage the unit.



35 LCD monitor (Touch screen) (→ 19)



- It can open up to 90°.



- It can rotate up to 180° **A** towards the lens or 90° **B** towards the opposite direction.

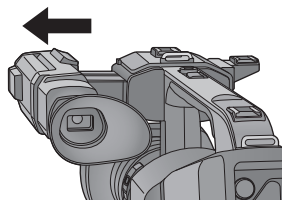
36 Eye cup attachment part (→ 10)

37 Eye cup (→ 10)

38 Accessory shoe

39 Viewfinder (→ 21)

- Extend the viewfinder before use.



40 Speaker

41 Battery release button [PUSH] (→ 12)

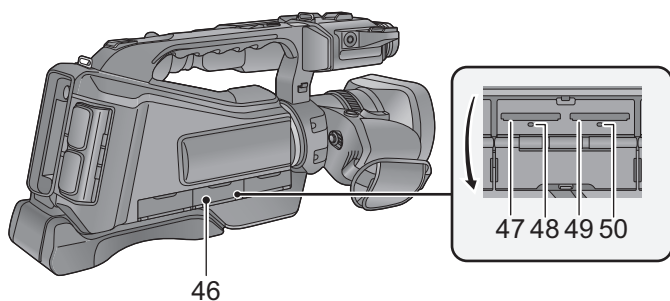
42 Battery holder (→ 12)

43 Video output terminal [VIDEO OUT] (→ 75)

44 Audio output terminal [AUDIO OUT] (→ 75)

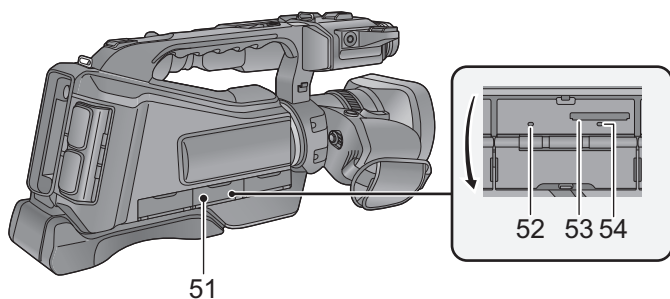
45 Component terminal [Y]/[PB/CB]/[PR/CR] (→ 75)

HC-MDH2



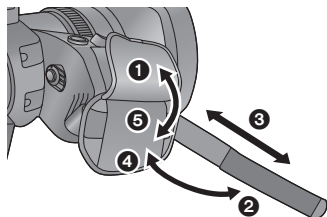
- 46 SD card cover (→ 17)
- 47 Card slot 2 (left) (→ 17)
- 48 Access lamp (card 2) (→ 17)
- 49 Card slot 1 (right) (→ 17)
- 50 Access lamp (card 1) (→ 17)

HC-MDH2M



- 51 SD card cover (→ 17)
- 52 Access lamp [BUILT-IN MEMORY]
- 53 Card slot (→ 17)
- 54 Access lamp (SD card) (→ 17)

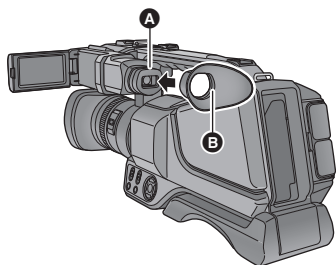
■ **Adjust the length of the grip belt so that it fits your hand.**



- 1, 2 Flip the belt cover and the belt.
- 3 Adjust the length.
- 4, 5 Replace the belt.

■ **Attaching the eye cup**

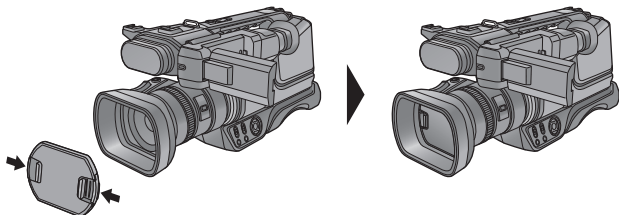
Attach by aligning the notch of the eye cup attachment part with the protrusion at the inside of the eye cup.



- A Notch
- B Protrusion

■ **Attaching the lens cap**

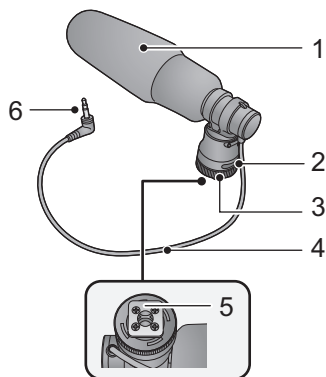
Protect the lens surface with the lens cap while the unit is not used.



Attach or remove it by pinching on it.

■ About the external stereo microphone

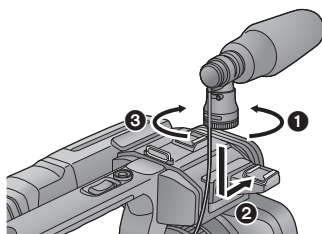
External stereo microphone



- 1 Microphone condenser
- 2 Cable Holder
- 3 Lock ring
- 4 Mini plug and Cable
- 5 Shoe
- 6 Plug section

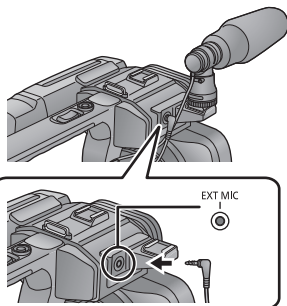
Attaching the external stereo microphone to the unit

1 Attach the microphone to the accessory shoe.



- 1 Loosen the lock ring.
- 2 Attach the microphone.
- 3 Firmly tighten the lock ring.
- Do not apply excessive force on the lock ring.
- Make sure that the microphone is securely attached.

2 Connect the plug to the external microphone terminal.



- Check that the unit is turned off. Connecting or removing the microphone while the unit is turned on may cause malfunction.
- You can fasten the excess cable by tucking it into the cable holder.
- When removing the microphone, disconnect the plug, and then remove the microphone in reverse order of attaching.
- Hold the lock ring when mounting or removing the microphone.

Power supply

■ About batteries that you can use with this unit

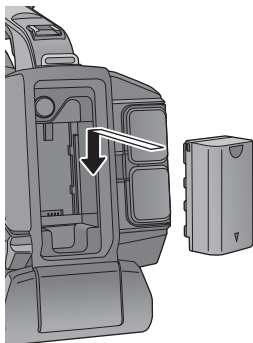
The battery that can be used with this unit is VW-VBD29/CGA-D54s.

It has been found that counterfeit battery packs which look very similar to the genuine product are made available to purchase in some markets. Some of these battery packs are not adequately protected with internal protection to meet the requirements of appropriate safety standards. There is a possibility that these battery packs may lead to fire or explosion. Please be advised that we are not liable for any accident or failure occurring as a result of use of a counterfeit battery pack. To ensure that safe products are used we would recommend that a genuine Panasonic battery pack is used.

Inserting/removing the battery

- Set the power switch to OFF to turn off the unit. (→ 18)

Install the battery by inserting it in the direction shown in the figure.

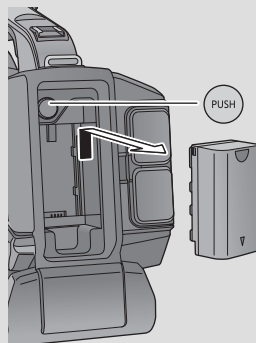


Insert the battery until it clicks and locks.

Removing the battery

Be sure to set the power switch to OFF and the status indicator goes off. Then remove the battery while supporting the unit to prevent it from dropping.

While pressing the battery release button, remove the battery.



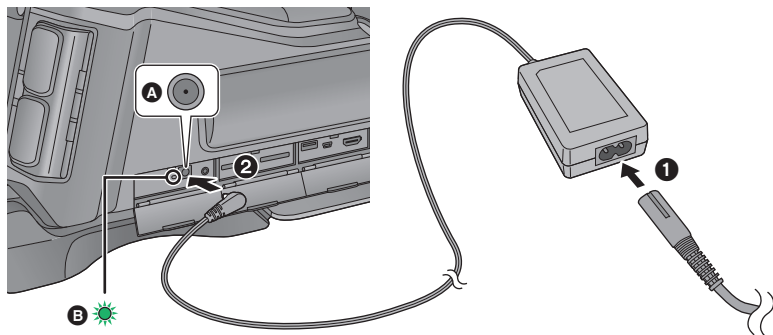
Charging the battery

When this unit is purchased, the battery is not charged. Charge the battery fully before using this unit for the first time.

The unit is in the standby condition when the AC adaptor is connected. The primary circuit is always "live" as long as the AC adaptor is connected to an electrical outlet.

Important:

- Use the supplied AC adaptor. Do not use the AC adaptor of another device.
- Do not use the AC cable with any other equipment as it is designed only for this unit. Also, do not use the AC cable from other equipment with this unit.
- The battery can be charged if the unit is turned on.
- It is recommended to charge the battery in a temperature between 10 °C and 30 °C. (The battery temperature should also be the same.)



- A DC input terminal
- B Charging lamp

1 Connect the AC cable to the AC adaptor, then the AC outlet.

2 Connect the AC adaptor to the DC input terminal.

- As the charging lamp lights up green, charging starts. It will turn off when the charging is completed.
- When the charging lamp is flashing at approximately 4 second intervals (off for approx. 2 seconds, on for approx. 2 seconds), the battery is over discharged or the temperature of the battery is too high or low. It can be charged, but it may take a few hours to complete the charging normally. When the charging lamp is flashing at approximately 0.5 second intervals (off for approx. 0.25 seconds, on for approx. 0.25 seconds), the battery is not charged. Please refer to page 130.

■ Connecting to the AC outlet

It is possible to use this unit with power supplied from the AC outlet by turning on the unit with the AC adaptor connected.

When recording for a long time, keep the AC adaptor connected and use it together with the battery. This allows you to continue the recording even if a power failure occurs or the AC adaptor is unplugged from the AC outlet by accident.

- We recommend using Panasonic batteries (→ 14).
- If you use other batteries, we cannot guarantee the quality of this product.

- Do not heat or expose to flame.
- Do not leave the battery(ies) in a car exposed to direct sunlight for a long period of time with doors and windows closed.

Charging and recording time

■ Charging/Recording time










- Temperature: 25 °C/humidity: 60%RH
- When using the viewfinder (times in parentheses are when using the LCD monitor)
- These charging times are for when the unit is turned off.

Battery model number [Voltage/Capacity (minimum)]	Charging time	Recording format	Maximum continuous recordable time	Actual recordable time
Supplied battery [7.2 V/2900 mAh]	4 h	[1080/50p]	5 h 25 min (5 h 10 min)	3 h 20 min (3 h 10 min)
		[PH 1080/50i]	5 h 45 min (5 h 25 min)	3 h 35 min (3 h 20 min)
		[HA 1080/50i]	5 h 45 min (5 h 30 min)	3 h 35 min (3 h 20 min)
		[HG 1080/50i]/ [HE 1080/50i]	5 h 50 min (5 h 30 min)	3 h 35 min (3 h 25 min)
		[SA 576/50i]/ [SX 576/50i]	6 h 10 min (5 h 50 min)	3 h 50 min (3 h 35 min)
CGA-D54s (optional) [7.2 V/5400 mAh]	7 h	[1080/50p]	10 h 40 min (10 h 10 min)	6 h 35 min (6 h 15 min)
		[PH 1080/50i]	11 h 15 min (10 h 40 min)	7 h (6 h 35 min)
		[HA 1080/50i]	11 h 20 min (10 h 45 min)	7 h (6 h 40 min)
		[HG 1080/50i]	11 h 25 min (10 h 50 min)	7 h 5 min (6 h 40 min)
		[HE 1080/50i]	11 h 30 min (10 h 55 min)	7 h 5 min (6 h 45 min)
		[SA 576/50i]/ [SX 576/50i]	12 h 5 min (11 h 25 min)	7 h 30 min (7 h 5 min)

- "h" is an abbreviation for hour and "min" for minute.
- These times are approximations.
- **The indicated charging time is for when the battery has been discharged completely. Charging time and recordable time vary depending on the usage conditions such as high/low temperature.**
- If the unit is turned on, charging will take twice to three times longer than the table above.

- The actual recordable time refers to the recordable time when repeatedly starting/stopping recording, turning the unit on/off, moving the zoom lever etc.
- The batteries heat up after use or charging. This is not a malfunction.

Battery capacity indication

- The display changes as the battery capacity reduces.  →  →  →  → 
If the battery discharges, then  will flash red.
- If the unit is charged while it is turned on,  will be displayed on the screen.  will disappear after charging is complete.
- As long as the charging lamp is flashing, charging is not complete even after  has disappeared. For more details, please refer to page [130](#).

Recording to a card

The unit can record still pictures or motion pictures to an SD card or built-in memory. To record to an SD card, read the following.

Cards that you can use with this unit

Use SD cards conforming to Class 4 or higher of the SD Speed Class Rating* for motion picture recording.

Card type	Capacity
SD Memory Card	512 MB/1 GB/2 GB
SDHC Memory Card	4 GB/6 GB/8 GB/12 GB/16 GB/24 GB/32 GB
SDXC Memory Card	48 GB/64 GB

* SD Speed Class Rating is the speed standard regarding continuous writing. Check via the label on the card, etc.

e.g.:

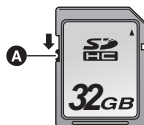


- Please check the latest information on the support website below.

http://panasonic.jp/support/global/cs/e_cam

(This website is in English only.)

- **When using an SDHC Memory Card/SDXC Memory Card with other equipment, check the equipment is compatible with these Memory Cards.**
- An Eye-Fi X2 series SD card is required to use functions related to Eye-Fi. (→ 93)
- We do not guarantee the operation of SD cards other than the ones above. Further, SD cards with a capacity of less than 32 MB cannot be used for motion picture recording.
- 4 GB or more Memory Cards that do not have the SDHC logo or 48 GB or more Memory Cards that do not have the SDXC logo are not based on SD Memory Card Specifications.
- When the write-protect switch **A** on SD card is locked, no recording, deletion or editing will be possible on the card.
- Keep the Memory Card out of reach of children to prevent swallowing.



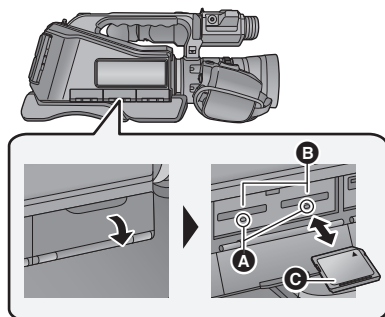
Inserting/removing an SD card

When using an SD card not from Panasonic, or one previously used on other equipment, for the first time on this unit, format the SD card. (→ 25) When the SD card is formatted, all of the recorded data is deleted. Once the data is deleted, it cannot be restored.

Caution:

Check that the access lamp has gone off.

HC-MDH2

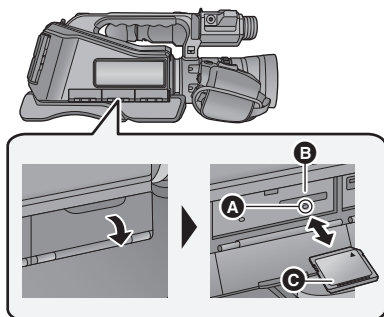


Access lamp A

- When this unit is accessing the SD card, the access lamp lights up.

- 1 Open the SD card cover and insert (remove) the SD card into (from) the card slot B.

HC-MDH2M



- HC-MDH2

One SD card can be inserted into each of the card slot 1 and the card slot 2.

- Face the label side C in the direction shown in the illustration and press it straight in as far as it will go.
- Press the centre of the SD card and then pull it straight out.

- 2 Securely close the SD card cover.

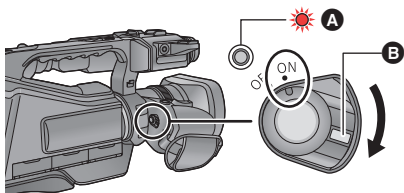
- Securely close it until it clicks.

- Do not touch the terminals on the back of the SD card.
- Do not apply strong shocks, bend, or drop the SD card.
- Electrical noise, static electricity or the failure of this unit or the SD card may damage or erase the data stored on the SD card.
- When the card access lamp is lit, do not:
 - Remove the SD card
 - Turn the unit off
 - Insert and remove the USB cable
 - Expose the unit to vibrations or shockPerforming the above while the lamp is on may result in damage to data/SD card or this unit.

- Do not expose the terminals of the SD card to water, dirt or dust.
- Do not place SD cards in the following areas:
 - In direct sunlight
 - In very dusty or humid areas
 - Near a heater
 - Locations susceptible to significant difference in temperature (condensation can occur.)
 - Where static electricity or electromagnetic waves occur
- To protect SD cards, return them to their cases when you are not using them.
- About disposing of or giving away the SD card. (→ 131)

Turning the unit on/off

Set the power switch to ON while pressing the lock release button **B** to turn on the unit.



To turn off the unit

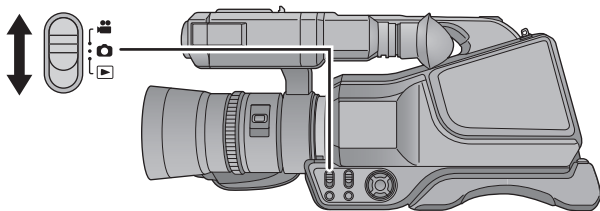
Set the power switch to OFF while pressing the lock release button. The status indicator goes off.




A The status indicator lights on.

- To turn on the unit again after the [ECONOMY (BATT)] or [ECONOMY (AC)] is activated, set the power switch to OFF once, and then to ON again. (→ 114)

Selecting a mode

Operate the mode switch to change the mode to ,  or .



	Motion Picture Recording Mode (→ 27)
	Still Picture Recording Mode (→ 29)
	Playback Mode (→ 33, 63)

Using the LCD monitor/Viewfinder

The viewfinder is turned off and the LCD monitor is turned on when the LCD monitor is opened.
The viewfinder is turned on when the LCD monitor is closed.

How to use the touch screen

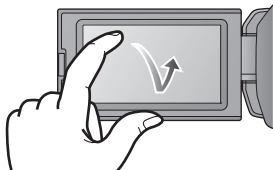
You can operate by directly touching the LCD monitor (touch screen) with your finger.

- The unit supports both operations using the cursor buttons and operations using the touch screen. Select the optimal method according to the situation.
- In this operating instructions, the majority of functions are described on the basis of operations using the cursor buttons.

■ Touch

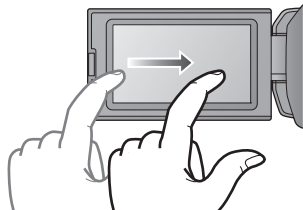
Touch and release the touch screen to select icon or picture.

- Touch the centre of the icon.
- Touching the touch screen will not operate while you are touching another part of the touch screen.



■ Slide while touching

Move your finger while pressing on the touch screen.



■ About the operation icons

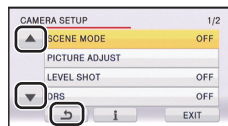
- To operate the following icons using the cursor buttons, select the desired icon using the cursor buttons and then press the button in the centre. (Excluding some functions)



These icons are used to switch the menu and thumbnail display page, for item selection and setting etc.



This icon is used to return to the previous screen such as when setting menus.



- Do not touch on the LCD monitor with hard pointed tips, such as ball point pens.

LCD monitor adjustment

- These settings will not affect the images actually recorded.

[POWER LCD]

This makes it easier to view the LCD monitor in bright places including outdoors.

Select the menu. (→ 23)



MENU : [SW & DISP SETUP] → [POWER LCD] → desired setting

[+2]* (Makes even brighter) / [+1]* (Makes brighter) / [0]* (Normal) / [-1]* (Makes less bright) /
[A]* (Automatic adjustment)

* It is not displayed in the Manual Mode or in the Playback Mode.

- When the AC adaptor is in use, the LCD monitor is set to [+1]* automatically.
- Recordable time with the battery is shortened when the LCD is made brighter.

[LCD SET]

It adjusts brightness and colour density on the LCD monitor.

1 Select the menu. (→ 23)



MENU : [SW & DISP SETUP] → [LCD SET]

2 Select the desired setting items and press the button in the centre.

[BRIGHTNESS]: Brightness of the LCD monitor

[COLOUR]: Colour level of the LCD monitor

3 Adjust settings using the cursor button right or left.

4 Select [ENTER] and press the button in the centre.

- Select [EXIT], then press the button in the centre or press the MENU button to complete the setting.



Viewfinder adjustment

- These settings will not affect the images actually recorded.

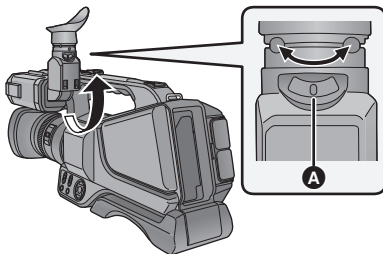
Adjusting the field of view

It adjusts the field of view to show the image on the viewfinder clearly.

1 Adjust the viewfinder to suit your vision so that you can see the display images clearly.

- Be careful not to trap your fingers when moving the viewfinder.
- The viewfinder can be lifted vertically up to approximately 90°.
- Close the LCD monitor and turn on the viewfinder.

2 Adjust the focus by operating the eyepiece corrector lever.



A Eyepiece corrector lever

[EVF SET]

Brightness of the viewfinder can be switched.

Select the menu. (→ 23)



MENU : [SW & DISP SETUP] → [EVF SET] → desired setting

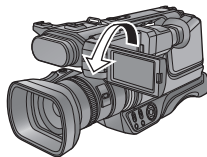
[BRIGHT]/[NORMAL]/[DARK]

Recording yourself

- Change the mode to

Rotate the LCD monitor towards the lens side.

- Displaying during the recording yourself can be switched by setting [SELF SHOOT]. (→ 110)



- Only some indications will appear on the screen when the [SELF SHOOT] is set to [MIRROR]. When appears, return the direction of the LCD monitor to normal position and check the warning/alarm indication. (→ 122)

Setting date and time

The clock is not set at the time of purchase. Make sure to set the clock.

1 Select the menu. (→ 23)

 MENU : [OTHER FUNCTION] → [CLOCK SET]

2 Select the date and time to be set using the cursor button right or left, then adjust the desired value using the cursor button up or down.

- The year can be set between 2000 and 2039.



3 Select [ENTER] using the cursor button right or left, then press the button in the centre.

- The screen may switch to the setting screen for the [TIME ZONE]. Using cursor button and set the [TIME ZONE].
- Select [EXIT], then press the button in the centre or press the MENU button to complete the setting.




- When the unit is turned on for the first time, a message asking you to set the date and time will appear. Select [YES] and perform Steps 2 to 3 to set the date and time.
- The date and time function is driven by a built-in lithium battery.
- If the time display becomes [- -], the built-in lithium battery needs to be charged. To recharge the built-in lithium battery, connect the AC adaptor or attach the battery to this unit. Leave the unit as it is for approx. 24 hours and the battery will maintain the date and time for approx. 6 months. (The battery is still being recharged even if the unit is off.)
- The way that time is displayed can be changed in the menu settings. (→ 108)
[SW & DISP SETUP] → [DATE/TIME] or [DATE FORMAT]

Time zone

Time difference from the Greenwich Mean Time can be set.

1 Select the menu. (→ 23)

 MENU : [OTHER FUNCTION] → [TIME ZONE]

- If the clock is not set, set the clock to current time first.

2 Select the region to record using the cursor button right or left.

3 Select [ENTER] and press the button in the centre.

- Select [EXIT] and press the button in the centre to complete the setting.



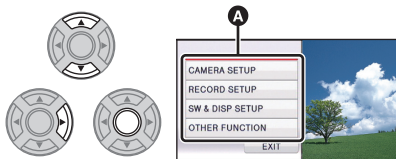
- When the time zone setting is changed, the date/time setting of the unit also changes automatically.

Using the menu screen

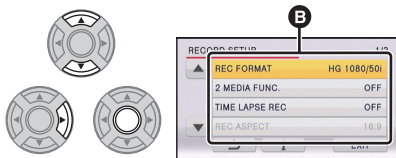
- You can also perform operations by touch operation. (→ 19)



1 Press the MENU button.  MENU

2 Select the desired top menu **A** using the cursor button, then press the cursor button right or press the button in the centre.

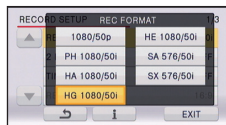


3 Select the submenu item **B**, then press the cursor button right or press the button in the centre.




- Next (previous) page can be displayed by using  / .

4 Select the desired item, then press the button in the centre to enter the setting.



5 Select [EXIT], then press the button in the centre or press the MENU button to exit the menu setting.

■ About guide display

After selecting  and press the button in the centre, selecting the submenus and items and press the button in the centre will cause function descriptions and settings confirmation messages to appear.

- After the messages have been displayed, the guide display is cancelled.

Before recording

■ Basic camera positioning

Normal recording

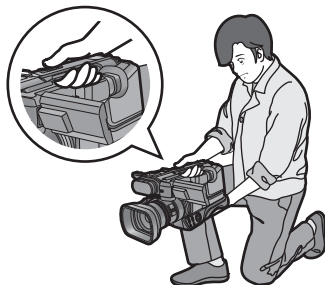


- Place the unit on your right shoulder and hold it firmly with both hands.

Recording from a high position



Low-angle recording



- For easier low-angle recording, the sub recording start/stop button and the sub zoom lever can be used.

- When recording, make sure your footing is stable and there is no danger of colliding with another person or object.
- Hold the eye cup of the viewfinder as close as possible to your right eye.
- Adjust the angle of the LCD monitor according to the position in which the unit is held.
- When you are outdoors, record pictures with the sunlight behind you. If the subject is backlit, it will become dark in the recording.
- Keep your arms near your body and separate your legs for better balance.
- For stable images, it is recommended to use a tripod whenever possible.

Formatting cards

If you use the SD cards for the first time for recording with this unit, format the cards. Please be aware that if a medium is formatted, then all the data recorded on the medium will be erased and cannot be restored. Back up important data on a PC, DVD disc etc. (→ 98)

1 Select the menu.



MENU : [OTHER FUNCTION] → [FORMAT MEDIA]

2

HC-MDH2

Select [SD CARD 1] or [SD CARD 2] and press the button in the centre.

HC-MDH2M

Select [SD CARD] and press the button in the centre.



- When formatting is complete, select [EXIT] and press the button in the centre to exit the message screen.
- For details on how to format the external drive, please refer to page 84.
- For details on how to format the built-in memory, please refer to page 112.

- Do not turn this unit off or remove the SD card, while formatting. Do not expose the unit to vibrations or shock.

Use this unit to format media.

Do not format an SD card using any other equipment such as a PC. The card may not be used on this unit.

Selecting a media to record

HC-MDH2

[SD CARD 1] and [SD CARD 2] can be selected separately to record motion pictures or still pictures.

HC-MDH2M

[SD CARD] and [Built-inMemory] can be selected separately to record motion pictures or still pictures.

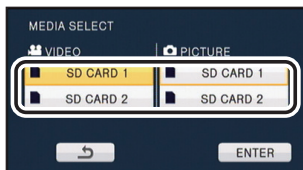
1 Change the mode to  or .

2 Select the menu. (→ 23)

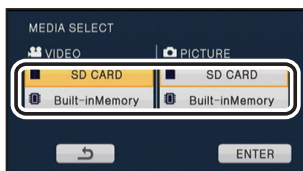
 MENU : [SW & DISP SETUP] → [MEDIA SELECT]

3 Select the media you want to record motion pictures or still pictures on by using the cursor button, and press the button in the centre.

HC-MDH2



HC-MDH2M



- The media is selected separately to motion pictures or still pictures is highlighted in yellow.

4 Select [ENTER] and press the button in the centre.

Recording motion pictures

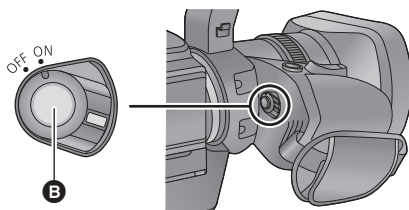
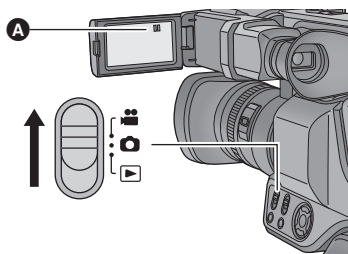
1 Change the mode to .

2 Open the LCD monitor.

3 Press the recording start/stop button **B** to start recording.

- Recording will stop when you press the recording start/stop button again.

A When you begin recording, changes to .



Screen indications in the Motion Picture Recording Mode

SCN 0:00:00	Recording time elapsed • Each time the unit is put into recording pause, the counter display will be reset to 0:00:00.
1 (White)	Media where the motion picture is recorded (→ 26)
R 1h20m	Approximate remaining recordable time • When the remaining time is less than 1 minute, R 0h00m flashes red.
	Recording format



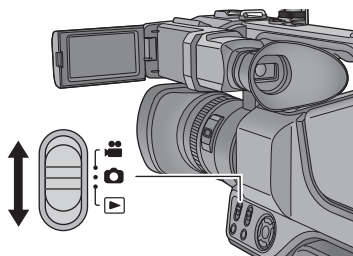
-
- **To change the recording format, change the [REC FORMAT]. (→ 54)**
 - **Still pictures can be recorded while recording the motion picture. (→ 30)**
 - The images recorded between pressing the recording start/stop button to start recording and pressing it again to pause recording become one scene.
 - Maximum number of recordable scenes: Approx. 3900
Maximum number of different dates: Approx. 900 (→ 72)
When either of them reaches to the maximum limit, more scenes cannot be recorded.
(In the case of SD cards it is the maximum number of recordable scenes per card.)
 - Please refer to page 133 about approximate recordable time.



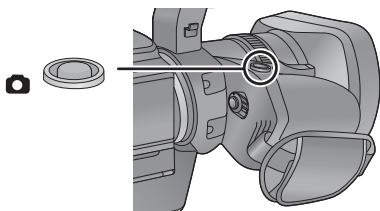
Recording still pictures

1 Change the mode to .

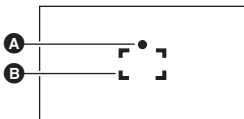
2 Open the LCD monitor.



3 Press the button.



Focus indication:



- A** Focus indication:
 - (The white lamp flashes.): Focusing
 - (The green lamp lights up.): When in focus
 - No mark: When focusing is unsuccessful
- B** Focus area (area inside brackets)

- If you set the Optical Image Stabilizer function (→ 38) to 1 ([MODE1]), then the Image Stabilizer function will be more effective. ((MEGA Optical Image Stabilizer) will be displayed when the button is pressed.)
- Using a tripod is recommended when recording still pictures in dark places because the shutter speed becomes slow.
- The still picture recording time may be long depending on the picture size.
- The focus indication and the focus area may not be displayed depending on the recording conditions or the menu settings.

■ About the screen indications in Still Picture Recording Mode

	Still picture operation indicator (→ 119)
1 (White)	Media where the still picture is recorded (→ 26)
R3000	Remaining number of still pictures • Flashes in red when [0] appears.
1	Optical Image Stabilizer (→ 38)
20.4m	Size of still pictures (→ 59)
MEGA	MEGA Optical Image Stabilizer (→ 29)



■ About the focusing area

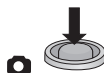
When there is a contrasting object ahead or behind the subject in the focus area, the subject may not be focused. If so, move the contrasting object out of the focus area.

Recording still pictures in Motion Picture Recording Mode

◇ Change the mode to .

Press the button to take the picture.

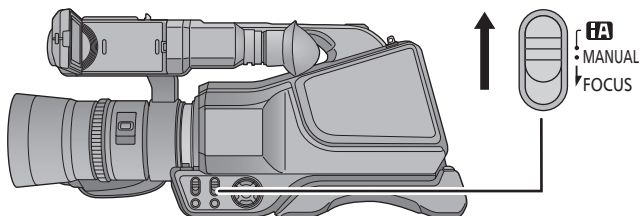
- It is possible to record still pictures while recording motion pictures.
(Simultaneous recording)
- When photos are being recorded, the remaining recordable number of photos and the photo operation display are displayed.
- No shutter sound is emitted when recording still pictures.



- While recording motion pictures or during the PRE-REC operation, image quality is different from ordinary still pictures so that motion picture recording takes preference over still picture recording.
- If simultaneous recording is used while recording a motion picture, the recordable time remaining will shorten. If the unit is turned off or the mode switch operated, the recordable time remaining may lengthen.
- The still picture recording time may be long depending on the picture size.
- Maximum number of recordable pictures that can be displayed is 9999. If the number of recordable pictures exceeds 9999, R 9999+ is displayed. The number will not change when the picture is taken until the number of recordable pictures is 9999 or less.
- The recording time may be long depending on the recording condition.







Intelligent Auto Mode

The following modes (appropriate for the condition) are set just by pointing the unit to what you want to record.



IA/MANUAL/FOCUS switch

Slide the switch to change the Intelligent Auto Mode/Manual Mode/Manual Focus Mode.

Mode	Effect
 Scenery	The whole landscape will be recorded vividly without whiting out the background sky, which may be very bright.
 ^{*1} Spotlight	Very bright object is recorded clearly.
 ^{*1,*3} Low Light	It can record very clearly even in a dark room or twilight.
 ^{*2} Macro	This allows recording at very close proximity to the object of recording.
 ^{*1} Normal	In modes other than those described above, the contrast is adjusted to give a clear picture.
 ^{*2} Normal	

^{*1} In Motion Picture Recording Mode only

^{*2} In Still Picture Recording Mode only

^{*3} When [AUTO SLOW SHTR] (→ 60) is [OFF], Low Light Mode will not be entered.

- Depending on the recording conditions, the unit may not enter the desired mode.

■ Intelligent Auto Mode

When switching to Intelligent Auto Mode, the Automatic White Balance and Auto Focus operate and automatically adjust the colour balance and focusing.

Depending on the brightness of the subject etc., the aperture and shutter speed are automatically adjusted for an optimum brightness.

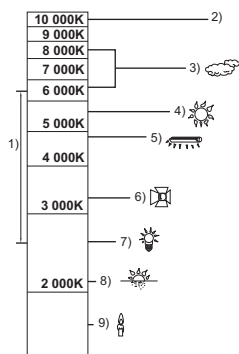
- Colour balance and focus may not be adjusted automatically depending on light sources or scenes. If so, manually adjust these settings. (→ 41, 43)

Automatic White Balance

The illustration shows the range over which Automatic White Balance functions.

- 1) The effective range of Automatic White Balance adjustment on this unit
- 2) Blue sky
- 3) Cloudy sky (rain)
- 4) Sunlight
- 5) White fluorescent lamp
- 6) Halogen light bulb
- 7) Incandescent light bulb
- 8) Sunrise or sunset
- 9) Candlelight

If the Automatic White Balance is not functioning normally, adjust the White Balance manually. (→ 41)



Auto Focus

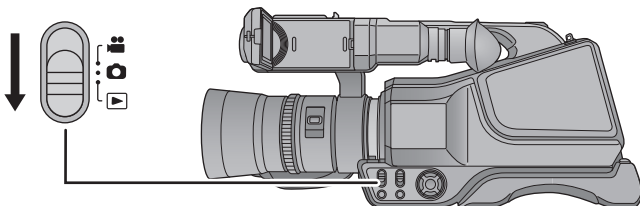
The unit focuses automatically.

- Auto Focus does not work correctly in the following situations.
Record pictures in the Manual Focus Mode. (→ 43)
 - Recording distant and close-up objects at the same time
 - Recording a subject behind dirty or dusty window
 - Recording a subject that is surrounded by objects with glossy surfaces or by highly reflective objects

Motion picture/Still picture playback

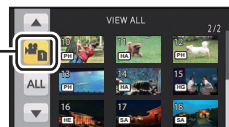


- You can also perform operations by touch operation. (→ 19)



- Change the mode to .
- Select the play mode select icon **A** using the cursor button, then press the button in the centre.
- Select the media type **B** and press the button in the centre.
- Select the still picture **C** or the recording format of the motion picture **D** you wish to play back and press the button in the centre.

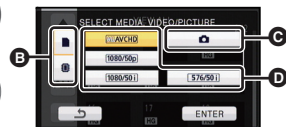
- Select [ENTER] and press the button in the centre.



HC-MDH2

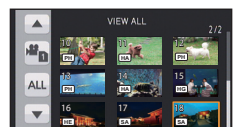


HC-MDH2M



- Select the scene or the still picture to be played back and press the button in the centre.

- The recording format is displayed in the thumbnail display of the motion pictures. ([PH], [HA], etc.)
- Next (previous) page can be displayed by using / .



6 Select the playback operation by selecting the operation icon and press the button in the centre.



E Operation icon

- Operation icons and screen display will disappear when no operation is performed for a specific period of time. To display them again, press the cursor button.

Motion picture playback	Still picture playback
▶▶: Fast forward playback* ◀◀: Fast rewind playback* ■: Stops the playback and shows the thumbnails. ▶/ : Playback/Pause	 ▶: Plays back the next picture. ◀ : Plays back the previous picture. ■: Stops the playback and shows the thumbnails. ▶/ : Slide show (playback of the still pictures in numerical order) start/pause.

* If ◀◀/▶▶ is selected during fast rewinding/fast forwarding and the centre of the cursor button is pressed again, the fast rewind/fast forward speed will increase. (The screen display changes to ◀◀ / ▶▶.)

Change the thumbnail display

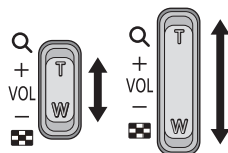
While the thumbnail is displayed, the thumbnail display changes in the following order if the zoom lever or sub zoom lever is operated to side or side.

20 scenes ↔ 9 scenes ↔ 1 scene ↔ Scene information display*

* Detailed information of the scene is displayed when playing back motion pictures. Following information is displayed.

- DATE
- TIME ZONE
- DURATION
- FORMAT

- 9 scenes display returns if the unit is turned off or the mode is changed.
- By displaying in 1 scene, recording date and time are displayed when playing back motion pictures, and recording date and file number when playing back still pictures.

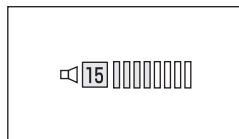
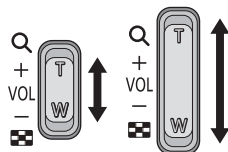


■ Speaker/Headphone volume adjustment

Operate the volume lever or the sub zoom lever to adjust the speaker/headphone volume during Motion Picture Playback Mode.

Towards “+”: Increases the volume

Towards “-”: Decreases the volume



- Sound will be heard only during normal playback.
- If pause play is continued for approx. 5 minutes, the screen returns to the thumbnails.
- The elapsed time for playback indication will be reset to SCN 0:00:00 each scene.
- When played back with [ALL AVCHD] selected, the screen may become black momentarily at the time the scene switches.
- The speaker of this unit does not output sounds when connected to a TV.

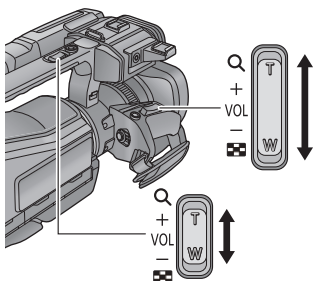
Motion picture compatibility

- This unit is based on AVCHD Progressive/AVCHD format.
- Even if the devices used have compatible standards, when playback of motion pictures recorded using another device is performed using this unit, or when motion pictures recorded using this unit is played back in another device, playback may not proceed normally, or may not be possible. (Please check compatibility in the operating instruction of your device.)

Still picture compatibility

- This unit is compliant with the unified standard DCF (Design rule for Camera File system) established by JEITA (Japan Electronics and Information Technology Industries Association).
- The file formats of still pictures supported by this unit is JPEG. (Not all JPEG formatted files will be played back.)
- This unit may degrade or not play back still pictures recorded or created on other products and other products may degrade or not play back still pictures recorded on this unit.

Using the zoom



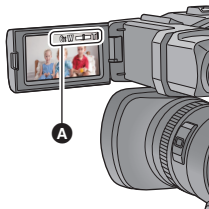
Zoom lever/Sub zoom lever

T side:

Close-up recording (zoom in)

W side:

Wide-angle recording (zoom out)

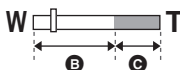


A Zoom bar

- Maximum zoom ratio for recording motion pictures can be set with [ZOOM MODE]. (→ 58)

About the zoom bar

The zoom bar is displayed during the zoom operation.



- B** Motion Picture Recording Mode: i.Zoom OFF (White)
Still Picture Recording Mode: Optical Zoom (White)
- C** Motion Picture Recording Mode: i.Zoom/Digital zoom (Blue)
Still Picture Recording Mode: Extra Optical Zoom (Blue)

About the zoom speed

- The zoom speed varies depending on the range over which the zoom lever is moved.
- Zoom speed of the sub zoom lever will vary depending on the setting of [SUB ZOOM]. (→ 110)

Ring zoom




Zoom operation can be done using the multi manual ring.

You can set your preferred rotational directions for the zoom operation in [ZOOM RING].

In Manual Mode, use the CAMERA FUNCTION button to set the ring operation icon to ZOOM.

(→ 106)

		[ZOOM RING]	
Rotational direction of the ring		[DOWN TELE]	[UP TELE]
	A side	Wide-angle recording (zoom out)	Close-up recording (zoom in)
	B side	Close-up recording (zoom in)	Wide-angle recording (zoom out)

- This function's default setting is [DOWN TELE].
- The zoom speed varies depending on the speed you rotate the ring.

Zoom ratio during the Still Picture Recording Mode



The zoom ratio can be expanded up to 50× without degrading the picture quality for the Still Picture Recording Mode. (Extra Optical Zoom)

- Extra Optical Zoom ratio varies depending on the setting of [PICTURE SIZE] and [ASPECT RATIO]. (→ 59, 60)

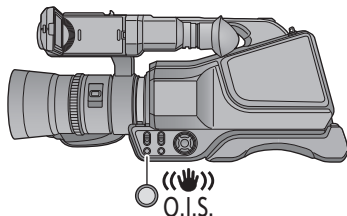
- If you take your finger off the zoom lever during zoom operation, the operation sound may be recorded. When returning the zoom lever to the original position, move it quietly.
- When the zoom magnification is at its maximum, the subjects are focused at about 1.5 m or more.
- When the zoom magnification is 1×, this unit can focus on a subject approx. 3 cm away from the lens.

Image Stabilizer Function

Use the Image Stabilizer to reduce the effects of shake during recording.

This unit is equipped with Hybrid Optical Image Stabilizer.

Hybrid Optical Image Stabilizer is a hybrid of Optical and Electrical Image Stabilizer.



Optical Image Stabilizer button

Press the button to turn Optical Image Stabilizer on/off.

(Motion Picture Recording Mode)

◀ (Hand icon) / (Hand icon) → (setting cancelled)

- When [HYBRID O.I.S.] is [ON], (Hand icon) is displayed. When [OFF], (Hand icon) is displayed.
- When recording with a tripod in Motion Picture Recording Mode, we recommend that you set the Image Stabilizer off.

(Still Picture Recording Mode)

(Hand icon) 1 / (Hand icon) 2 → (setting cancelled)

- When [O.I.S.] is [MODE1], (Hand icon) 1 is displayed. When [O.I.S.] is [MODE2], (Hand icon) 2 is displayed.

Changing Image Stabilizer Mode

(Motion Picture Recording Mode)



MENU : [RECORD SETUP] → [HYBRID O.I.S.] → [ON] or [OFF]

When set to [ON], you can further improve image stabilization for recording while walking, or holding the unit and recording a distant subject with zoom.

- This function's default setting is [ON].

(Still Picture Recording Mode)




MENU : [RECORD SETUP] → [O.I.S.] → [MODE1] or [MODE2]

[MODE1]:

The function works all the time.

[MODE2]:

The function works when the  button is pressed. We recommend using this mode when you are recording yourself or recording with a tripod in Still Picture Recording Mode.

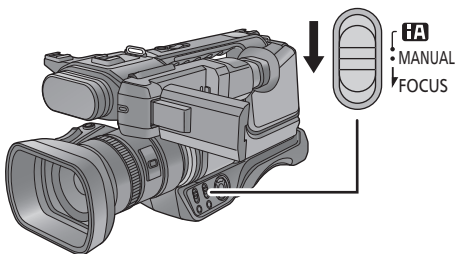
Manual recording

The operation sequence differs for the multi manual ring and manual icons.

- The **Manual Focus, White Balance, Shutter Speed, Brightness (Iris and Gain) settings and Zoom operation are retained when you change between Motion Picture Recording Mode and Still Picture Recording Mode.**

Set the iA/MANUAL/FOCUS switch to manual mode.

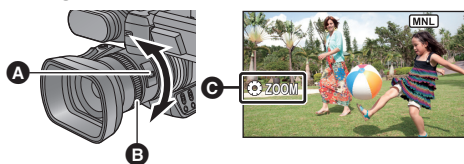
- **MNL** is displayed in the Manual Mode.



■ When using the multi manual ring

- 1 Press the CAMERA FUNCTION button to select the desired item.**






- Selected item changes whenever the CAMERA FUNCTION button is pressed.
- The selected ring operation icon is displayed in area **C**.



- A** CAMERA FUNCTION button
B Multi manual ring

- 2 Rotate the multi manual ring to select the setting.**

- When a manual icon is displayed, operation using the multi manual ring is not possible.

C Ring operation icons	
 FOCUS ^{*1}	Focus (→ 43)
 WB	White Balance (→ 41)
 SHUTTER	Manual Shutter Speed (→ 42)
 IRIS	Iris/Gain Adjustment (→ 42)
 ZOOM ^{*2}	Zoom (→ 36)





^{*1} This can be set only in Manual Focus Mode.

^{*2} This can also be operated in Intelligent Auto Mode.

■ When using the manual icons

- 1 Press the cursor button to display the manual icons on the screen.
- 2 Select the desired item to be set and press the button in the centre.
- 3 Select an icon on the screen, and adjust the setting to the desired level.



A Manual icons	
	Focus (→ 43)
	White Balance (→ 41)
	Manual Shutter Speed (→ 42)
	Iris/Gain Adjustment (→ 42)

White Balance



Automatic White Balance function may not reproduce natural colours depending on the scenes or lighting conditions. If so, you can adjust the White Balance manually.

- Set the iA/MANUAL/FOCUS switch to Manual Mode.
- For how to perform the settings when using the manual icons, refer to page 40.

- 1 Select [WB] pressing the CAMERA FUNCTION button.
- 2 Select white balance mode using the multi manual ring.



Icon	Mode/Recording conditions
AWB	Automatic White Balance adjustment
	Sunny mode: Outdoors, under a clear sky
	Cloudy mode: Outdoors, under cloudy sky
	Indoor mode 1: Incandescent light, video lights like in the studio, etc.
	Indoor mode 2: Colour fluorescent lamps, sodium lamps in gymnasiums etc.
	Manual adjustment mode: <ul style="list-style-type: none">● Mercury-vapor lamps, sodium lamps, some fluorescent lights● Lights used for wedding receptions at hotels, stage spotlights in theaters● Sunrise, sunset, etc.

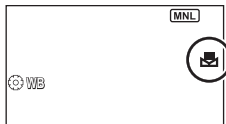
- To return to auto setting, set to **AWB** or set the iA/MANUAL/FOCUS switch to Intelligent Auto Mode.

■ To set the White Balance manually

- 1 Select using the multi manual ring, fill the screen with a white subject.

- 2 Pressing and holding the CAMERA FUNCTION button.

- When operating with the cursor button, select the flashing display and press the button in the centre.
- When the screen turns black instantly and the display stops flashing and then lights constantly, the setting is complete.
- If the display continues flashing, the White Balance cannot be set. In this case, use other White Balance Modes.



- When the display flashes, the Manual White Balance previously adjusted is stored. Whenever recording conditions change, re-set the White Balance.
- When setting both the White Balance and the iris/gain, set the White Balance first.

Manual shutter speed/iris adjustment



Shutter Speed:

Adjust it when recording fast-moving subjects.

Iris:

Adjust it when the screen is too bright or too dark.

- Set the iA/MANUAL/FOCUS switch to Manual Mode.
- For how to perform the settings when using the manual icons, refer to page 40.

1 Select [SHUTTER] or [IRIS] pressing the CAMERA FUNCTION button.

2 Adjust settings using the multi manual ring.

SHTR : Shutter speed:

1/50 to 1/8000

- If [AUTO SLOW SHTR] is set to [ON], the shutter speed will be set between 1/25 and 1/8000.
- The shutter speed closer to 1/8000 is faster.
- The shutter speed will be set between 1/2 and 1/2000 in Still Picture Recording Mode.

IRIS : Iris/Gain value:

(Motion Picture Recording Mode)

CLOSE ↔ (F12 to F1.9) ↔ OPEN ↔ (0dB to 30dB)

(Still Picture Recording Mode)

CLOSE ↔ (F12 to F1.9) ↔ OPEN ↔ (0dB to 12dB)

- Depending on the brightness of the subject, the screen may appear too bright or blurry. When this occurs, increasing the shutter speed or using an ND filter (optional) will reduce the brightness and the blur.
- Value closer to CLOSE darken the image.
- Value closer to 30dB brighten the image.
- When the iris value is adjusted to brighter than OPEN, it changes to the gain value.
- To return to auto setting, set the iA/MANUAL/FOCUS switch to Intelligent Auto Mode.

-
- When setting both the shutter speed and the iris/gain value, set the shutter speed and then set the iris/gain value.
 - When [SHUTTER] or [IRIS] is selected, the selected shutter speed or iris/gain value can be adjusted automatically by pressing and holding the CAMERA FUNCTION button.

Manual shutter speed adjustment

- When the shutter speed is set lower than 1/12 in the Still Picture Recording Mode, using a tripod is recommended. Also, White Balance cannot be set. The shutter speed will be set to 1/25 when the unit is turned on again.
- You may see a band of light around an object that is shining very bright, or highly reflective.
- During normal playback, image movement may not look smooth.
- If you record an extremely bright object or record under indoor lighting, colour and screen brightness may change or a horizontal line may appear on the screen. In this case, record in the Intelligent Auto Mode or set the shutter speed to 1/100 in areas where the power supply frequency is 50 Hz, or 1/125 in areas of 60 Hz.
- Brightness of the image displayed on the LCD monitor may be different from brightness of the image actually recorded during the Still Picture Recording Mode. Confirm the image on the playback screen after recording.

Manual iris/gain adjustment

- If the gain value is increased, the noise on the screen increases.
- Depending on the zoom magnification, there are iris values that are not displayed.

Recording with Manual Focus



If auto focusing is difficult due to the conditions, then use Manual Focus.

- Set the iA/MANUAL/FOCUS switch to Manual Mode.

1 Slide the iA/MANUAL/FOCUS switch to FOCUS to set Manual Focus Mode.

2 Select [⦿ FOCUS] pressing the CAMERA FUNCTION button.

3 Adjust the focus by using the multi manual ring.

- To restore Auto Focus, slide the iA/MANUAL/FOCUS switch to FOCUS again or set the iA/MANUAL/FOCUS switch to Intelligent Auto Mode.

■ When using the manual icon

1 Select [FOCUS] and press the button in the centre.

2 Select [MF] and press the button in the centre to change to Manual Focus.

- MF appears on the screen.

3 Adjust the focus by selecting $\overset{\text{MF}}{+}$ / $\overset{\text{MF}}{-}$ and press the button in the centre.

$\overset{\text{MF}}{+}$: To focus on a close subject

$\overset{\text{MF}}{-}$: To focus on a faraway subject

- To restore Auto Focus, select [AF] and press the button in the centre in Step 2 or set the iA/MANUAL/FOCUS switch to Intelligent Auto Mode or slide the iA/MANUAL/FOCUS switch to FOCUS again.

Recording functions of operation icons

Select the operation icons to add different effects to the images to be recorded.

1 Press the cursor button to display the operation icons on the screen.







2 Select an operation icon and press the button in the centre.




(e.g. Level Gauge)

- The operation icons that are displayed can be changed.
([SELECT OPERATION ICONS]: → 107)
- To cancel the function, select the operation icon again, and press the button in the centre.
To display or hide Guidelines, refer to page 46.
- The icon is displayed when the operation icon is set.




Operation icons


FA	Focus Assist
	Fade* ¹
	DRS* ¹
	PRE-REC* ¹
	Intelligent Exposure* ²
	Backlight Compensation
	Guidelines* ²

	Zebra
Hist	Histogram
Mark	Marker
	Level Gauge
Menu	Menu
	Headphone volume adjustment/ Microphone level adjustment* ³

*¹ Not displayed in Still Picture Recording Mode.

*² Not displayed in Motion Picture Recording Mode.

*³ It is displayed only when a headphone is connected to the headphone output terminal. [MIC LEVEL] (→ 62) is set to anything other than [AUTO],  is displayed as the operation icon, and adjustment of input level of the microphone is possible.

- If you turn off the unit or change the mode to , Backlight Compensation function is cancelled.
- If you turn off the unit, the Fade function is cancelled.
- It is possible to set from the menu. (Except for the Level gauge, Menu, Headphone volume adjustment.)

The in-focus area is displayed in blue.



A Part displayed in blue

- The blue display does not appear on the images actually recorded.
- The blue display does not appear on TV.



Fade




When you start recording, the image/audio gradually appears. (Fade in)

When you pause recording, the image/audio gradually disappears. (Fade out)

- The Fade setting is cancelled when the recording stops.

■ To select the colour for fade in/out

 MENU : [SW & DISP SETUP] → [FADE COLOUR] → [WHITE] or [BLACK]

(Fade in)



(Fade out)



- The thumbnails of scenes recorded using fade in become black (or white).



DRS



This brightens parts that are in shadow and difficult to see and suppresses white saturation in bright parts at the same time. Both bright and dark parts can be recorded clearly.

- If there are extremely dark or bright parts or the brightness is insufficient, the effect may not be clear.



PRE-REC

This prevents you from missing a shot.



This allows recording of the pictures and sound to start approximately 3 seconds before the recording start/stop button is pressed.

- appears on the screen.

- **Aim the unit at the subject beforehand.**
- There is no beep sound.
- PRE-REC is cancelled in the following case.
 - After 3 hours have passed
- If you start recording within approximately 3 seconds after performing operations such as setting PRE-REC, turning on the unit or switching the mode, the 3 second-image will not be recorded fully.
- Images displayed on the thumbnail in Playback Mode will differ from the motion pictures displayed at the start of playback.



Intelligent Exposure



This brightens dark areas so the image can be recorded clearly.

- If there are extremely dark parts or the brightness is insufficient, the effect may not be clear.



Backlight Compensation



This makes the image brighter to prevent darkening of a backlit subject.



Guidelines



You can check if the image is level while recording motion pictures and still pictures. The function can also be used to estimate the balance of the composition.

It will switch every time the icon is selected.

→ → → Setting cancelled

- The guidelines do not appear on the images actually recorded.
- In Motion Picture Recording Mode, the guidelines can be set from the menu.

Zebra



Parts where white saturation (colour saturation) is likely to occur (extremely brightly lit or shiny parts) are displayed with diagonal lines (zebra pattern).

- You can record an image with little white saturation if you manually adjust the shutter speed or brightness (Iris/Gain) (→ 42).
- The zebra pattern does not appear on the images actually recorded.



A

A Zebra pattern

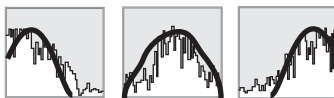
Hist Histogram



A graph with brightness as horizontal axis and number of pixels at that brightness as vertical axis is displayed. It is possible to determine the exposure of the whole image by looking at the distribution in the graph.

Adjust the brightness using iris setting. (→ 42)

■ Example of the display



B

A

C

A Normal

B Dark

C Bright

Mark Marker

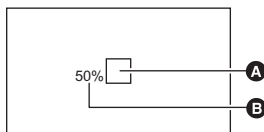


Displays the luminance level of the centre of the screen (luminance display frame) in %.

It makes the adjustment of the brightness of the object easier, by checking the luminance level of the object, when recording same object in different surroundings.

Adjust the brightness using iris setting. (→ 42)

- Luminance level is displayed between 0% and 99%. It will be displayed as 99% ↑ when it is over 99%.



A Luminance display frame

B Luminance level



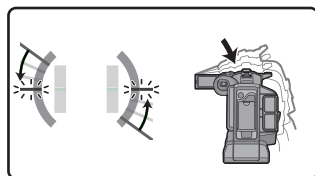
Level Gauge



This function displays the horizontal/vertical tilt of the unit with the electronic level.

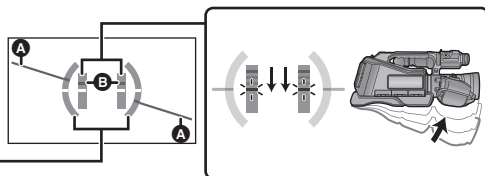
■ To correct the tilt

(Horizontal direction)



When correcting the leftward tilt

(Vertical direction)



When correcting the downward tilt

- The horizontal tilt display **A** and vertical tilt display **B** appear yellow when there is a tilt, and appear green when there is almost no tilt.
 - The maximum tilt display angles are approximately 45 ° in horizontal direction and 10 ° in vertical direction.
 - The electronic level does not affect the actual recorded images.
-
- When [SELF SHOOT] is set to [MIRROR] while you are recording yourself or when the LCD monitor is closed with the screen facing out, this item is not displayed.
 - Even when the tilt is in the corrected state, an error may occur.
 - In the following cases, the electronic level may not be displayed correctly:
 - When moving this unit
 - When pointing this unit up or down at an angle closer to perpendicular
 - When [LEVEL SHOT] is set to [ON], this function cannot be set.



Menu



The menu can be displayed.

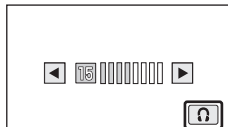


Headphone volume adjustment



Adjust the volume of the headphone while recording.

- ▶: Increase the volume
- ◀: Decrease the volume
- Actual volume to be recorded does not change.



Recording functions of [CAMERA SETUP] menus

[SCENE MODE]














When you record images in different situations, this mode automatically sets optimum shutter speeds and apertures.

- **Switch to Manual Mode.** (→ 39)



MENU : [CAMERA SETUP] → [SCENE MODE] → desired setting

[OFF]:	Cancel the setting
 Sports:	To make fast moving scenes less shaky with slow playback and pause of playback
 Portrait:	To make people stand out against the background
 Soft Skin:	To makes skin colours appear softer for a more attractive appearance
 Spotlight:	Improved quality when subject is brightly illuminated.
 Snow:	Improved image quality when shooting in snowy locations.
 Beach:	To make blue in the sea or sky vibrant
 Sunset:	To make red in the sunrise or sunset vibrant
 Scenery:	For spatial scenery
 Fireworks:	To capture the fireworks in the night sky beautifully
 Night Scenery:	To capture the evening or night scenery beautifully
 Low Light:	For dark scenes, such as at dusk (In Motion Picture Recording Mode only)

- **(Sports/Portrait/Soft Skin/Spotlight/Snow/Beach/Sunset/Scenery)**
 - The shutter speed is 1/6 or more in Still Picture Recording Mode.
- **(Sunset/Low Light)**
 - The shutter speed is 1/25 or more in Motion Picture Recording Mode.
- **(Sunset/Scenery/Fireworks/Night Scenery)**
 - Image may get blurry when close object is recorded.
- **(Sports)**
 - During normal playback, the image movement may not look smooth.
 - Colour and screen brightness may change under indoor lighting.
 - If the brightness is insufficient, the Sports Mode does not function. The  display flashes.
- **(Portrait)**
 - Colour and screen brightness may change under indoor lighting.

- **(Soft Skin)**

- If the background or anything else in the scene has colours similar to the skin colour, they will also be smoothed.
- If the brightness is insufficient, the effect may not be clear.
- If you record a person in the distance, the face may not be recorded clearly. In this case, cancel Soft Skin Mode or zoom in on the face (close-up) to record.

- **(Fireworks)**

- The shutter speed is 1/25.
- Image may get washed out when recorded in bright surrounding.

- **(Night Scenery)**

- The shutter speed is 1/2 or more in Still Picture Recording Mode.
- Using a tripod is recommended.

[Intelligent Auto Plus]



You can add manually-adjusted brightness and colour balance settings to the Intelligent Auto Mode, and record.

Please refer to page 31 for details about the effect of each mode.

(Scenery) / (Spotlight)^{*1} / (Low Light)^{*1} / (Macro)^{*2} / (Normal)^{*1} / (Normal)^{*2}

^{*1} In Motion Picture Recording Mode only

^{*2} In Still Picture Recording Mode only

- **Switch to Intelligent Auto Mode. (→ 31)**

1 Select the menu.



MENU : [CAMERA SETUP] → [Intelligent Auto Plus] → [SET]

2 Select the desired setting items and press the button in the centre.

[EXPOSURE]: Adjust the exposure.

[COLOUR]: Adjust the colour balance.

- (When adjusting the colour balance)

R side: Sets the balance to a reddish tone.

B side: Sets the balance to a bluish tone.

3 Adjust settings using the cursor button right or left.



4 Select [ENTER] and press the button in the centre.

- Select [EXIT], then press the button in the centre or press the MENU button to complete the setting.

[PICTURE ADJUST]



Adjust the quality of the image while recording.

Adjust by outputting to a TV while adjusting the quality of the image.

- This setting is retained when you change between Motion Picture Recording Mode and Still Picture Recording Mode.

- Switch to Manual Mode. (→ 39)

1 Select the menu.



MENU : [CAMERA SETUP] → [PICTURE ADJUST]


2 Select the desired setting items and press the button in the centre.

[SHARPNESS]:	Sharpness of the edge
[COLOUR]:	Depth of the colour of the image
[EXPOSURE]:	Brightness of the image
[WB ADJUST]:	Picture colour balance

3 Adjust settings using the cursor button right or left.



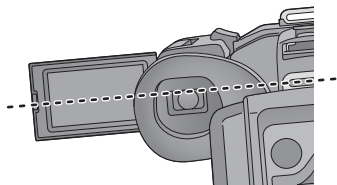
4 Select [ENTER] and press the button in the centre.

- Select [EXIT] and press the button in the centre or press the MENU button to complete the settings.
-  appears on the screen.

[LEVEL SHOT]



This function detects the horizontal tilt of the unit, and automatically corrects it to the level position before recording.



————— : When this function is set to on.

- - - - - : When this function is set to off.



MENU : [CAMERA SETUP] → [LEVEL SHOT] → [ON]

- Select [EXIT] and press the button in the centre or press the MENU button to complete the settings.
- Icon is displayed in **A** position.
 - When the tilt is corrected:
 - When the tilt is above the correction range:
- When the tilt exceeds the correction range, move the unit to the position where is displayed.



- The range that this icon can be displayed correctly the slope is about 45 ° to the vertical direction.
- The image may move while zooming depending on the tilt of this unit.
- To record a level image with a tripod, attach this unit by using "Level Gauge" (→ 48), and then use Level Shot Function.

[COLOUR NIGHT VIEW]



This function allows you to record colour images in very low light situations. (Minimum required illumination: approx. 1 lx)

- Switch to Manual Mode. (→ 39)



MENU : [CAMERA SETUP] → [COLOUR NIGHT VIEW] → [ON]

- Select [EXIT] and press the button in the centre or press the MENU button to complete the settings.
- **Recorded scene is seen as if frames were missed.**
- If set in a bright place, the screen may become washed out for a while.
- Bright dots that are usually invisible may be seen, but this is not a malfunction.
- This function cannot be used when [TIME LAPSE REC] is used.
- Using a tripod is recommended.
- In darker areas, Auto Focus may focus a bit slower. This is normal.

A more impressive image can be obtained by focusing on the object only in close-up and shading off the background.



MENU : [CAMERA SETUP] → [TELE MACRO] → [ON]

- Select [EXIT] and press the button in the centre or press the MENU button to complete the settings.
 - The unit can focus on the subject at a distance of approx. 60 cm.
 - When the Tele Macro is set with the zoom magnification less than 26× in Motion Picture Recording Mode, it will automatically be set to 26×.
 - When the aspect ratio is [4:3], [3:2] during the Still Picture Recording Mode and Tele Macro is set with the zoom magnification less than 21×, the zoom magnification will automatically be set to 21×. When the aspect ratio is [16:9], the zoom magnification will be 26×.
-
- The Tele Macro function is automatically cancelled when the zoom magnification becomes lower than 26× in Motion Picture Recording Mode.
 - Tele Macro function is automatically cancelled when the zoom magnification becomes lower than the size below in Still Picture Recording Mode:
 - Less than 21× (when the aspect ratio is [4:3] or [3:2])
 - Less than 26× (when the aspect ratio is [16:9])

Recording functions of [RECORD SETUP] menus

[REC FORMAT]




Switch the picture quality and recording format of the motion pictures to record.



 MENU : [RECORD SETUP] → [REC FORMAT] → desired setting

[1080/50p]^{*}:



Set the recording format to 1080/50p.

 ←————→ 
 [PH 1080/50i]/[HA 1080/50i]/[HG 1080/50i]/[HE 1080/50i]:

Set the recording format to 1080/50i.

 ←————→ 
 [SA 576/50i]/[SX 576/50i]:

Set the recording format to 576/50i.

-  Image quality prioritised
-  Recording time prioritised

* This option allows you to record in 1080/50p (1920×1080/50 progressive), which is the highest picture quality for this unit.

• Recordable time using the battery (→ 14)

- This function's default setting is [HG 1080/50i] mode.
- Please refer to page 133 for details about approximate recordable time.
- When the unit is moved a lot or moved quickly, or when a fast-moving subject is recorded (particularly when recording in [HE 1080/50i] or [SX 576/50i] mode), mosaic-type noise may appear at playback.



You can set the relay recording and backup recording.

HC-MDH2

- Insert SD cards to card slot 1 and card slot 2.

HC-MDH2M

- Set [MEDIA SELECT] to [Built-inMemory]. (→ 26)
- Insert SD cards to card slot.



MENU : [RECORD SETUP] → [2 MEDIA FUNC.] → desired setting

[OFF]:	Cancel the setting.
[RELAY]:	Set the relay recording.
[BACKUP]:	Set the backup recording.

■ Relay recording

HC-MDH2

It is possible to continuously record on the SD card in the other card slot even when the available capacity of the SD card runs out during the recording.

HC-MDH2M



It is possible to continuously record motion picture to an SD card when there is no space available in the built-in memory. (It allows you to record only to SD card from built-in memory.)

- ➡ is displayed on the media to record the motion picture. ➡ will disappear when the recording media is switched and the relay recording is started.
- Relay Recording can only be performed once.
- **Combine the scenes that were relay-recorded using the [RELAY SCENE COMBINE] into the external drive. (→ 87)**
- If [DELETE RELAY SCENE] or [RELAY INFO CANCEL] is performed after [RELAY SCENE COMBINE] is performed, Relay Recording will be available again. If [RELAY SCENE COMBINE] is not performed and [RELAY] in [2 MEDIA FUNC.] is selected, a message will be displayed. You will be able to perform Relay Recording by selecting [YES] and press the button in the centre, but you will not be able to perform the [RELAY SCENE COMBINE] after that.
- If an SD card containing the first portion of a relay-recorded scene is inserted into a card slot when [RELAY] is set, a message confirming whether to cancel the relay information is displayed. Selecting [YES] will cancel the relay information from the scene, while selecting [NO] will set [RELAY] to [OFF].

■ Backup recording



HC-MDH2

The same motion picture can be recorded on two SD cards.

-   is displayed on the cards the motion pictures is recorded.
- If [SD CARD 1] has been selected as a recording destination for motion pictures in [MEDIA SELECT] (→ 26), the backup will be recorded on [SD CARD 2].
- It is recommended to record on the SD cards that are same speed class and same capacity when performing the backup recording.

HC-MDH2M

The same motion picture can be recorded on the built-in memory and the SD card.

-   is displayed on the recording destination media of the motion picture.
- If [SD CARD] has been selected as a recording destination for motion pictures in [MEDIA SELECT] (→ 26), the backup will be recorded on [Built-inMemory].

(Relay recording)

- After Relay Recording, a recording destination for still pictures will also be switched to the other media.

(Backup recording)

- Backup recording will not be performed for still pictures.
- When performing backup recording, even in the case where an error has occurred in one of the media and recording has stopped, recording can be continued using the other media.
- When one of the media reaches its maximum recording time, the backup recording stops. If free space on the other media is still available, the recording will continue.

[TIME LAPSE REC]



A scene that moves slowly for long period of time is recorded frame by frame with an interval, and is recorded as a short time motion picture.

- A frame is recorded with a set recording interval. 25 frames will make up a motion picture of 1 second.
- **Switch to Manual Mode.** (→ 39)




MENU : [RECORD SETUP] → [TIME LAPSE REC] → desired setting

[OFF]:

Cancel the setting.

[1 SECOND]/[10 SECONDS]/[30 SECONDS]/[1 MINUTE]/[2 MINUTES]:

Change the recording interval.

-  appears on the screen.
- After recording, the setting of Interval Recording is cancelled.

Setup example	Setup time (recording interval)	Recording time	Recorded time
Sunset	1 s	1 h	2 min
Blooming	30 s	3 h	12 s

- "h" is an abbreviation for hour, "min" for minute and "s" for second.
 - These times are approximations.
 - Maximum recordable time is 12 hours.
-
- Audio cannot be recorded.
 - [REC FORMAT] is set to [HA 1080/50i].
 - The shortest motion picture recording time is 1 second.
 - [TIME LAPSE REC] is cancelled in the following cases.
 - If you turn the unit off
 - If you change the mode
 - The colour balance and focus may not be adjusted automatically depending on the light source or scene. If so, manually adjust those settings. (→ 41, 43)

[REC ASPECT]



Image aspect ratio for the recording format [SA 576/50i] or [SX 576/50i] can be changed.

- Set [REC FORMAT] to [SA 576/50i] or [SX 576/50i]. (→ 54)



MENU : [RECORD SETUP] → [REC ASPECT] → desired setting

[16:9]/[4:3]

- When using the LCD monitor, when the aspect ratio is set to [4:3], black bands are displayed on the left and right of the screen.

[ZOOM MODE]



Set the maximum zoom ratio for the Motion Picture Recording Mode.



MENU : [RECORD SETUP] → [ZOOM MODE] → desired setting


[i.Zoom OFF]:	Up to 26×
[i.Zoom 50×]:	This zoom function allows you to maintain high-definition picture quality. (Up to 50×)
[D.Zoom 60×]:	Digital zoom (Up to 60×)
[D.Zoom 1500×]:	Digital zoom (Up to 1500×)

- The larger the digital zoom magnification, the more the image quality is degraded.
- This function cannot be used in Still Picture Recording Mode.

The higher the number of pixels, the higher the clarity of the picture when printing.










- The number of recording pixels that can be set changes depending on selected screen aspect ratio. (→ 60)

■ Picture size and Maximum zoom ratio in Still Picture Recording Mode

- Change the mode to .



MENU : [RECORD SETUP] → [PICTURE SIZE] → desired setting

Picture size		Aspect ratio	Extra Optical Zoom (→ 37)
	4480×3360	4:3	—*
	2784×2088		—*
	640×480		50×
	4752×3168	3:2	—*
	3456×2304		—*
	1728×1152		26.2×
	6016×3384	16:9	26×
	4096×2304		26×
	1920×1080		28.9×




* Extra Optical Zoom cannot be used. The maximum zoom magnification is 21×



■ Picture size in Motion Picture Recording Mode

- Change the mode to .



MENU : [RECORD SETUP] → [PICTURE SIZE] → desired setting

Picture size		Aspect ratio	Recording format
	4096×2304	16:9	[1080/50p]/[PH 1080/50i]/[HA 1080/50i]/[HG 1080/50i]/[HE 1080/50i]
	1920×1080		[1080/50p]/[PH 1080/50i]/[HA 1080/50i]/[HG 1080/50i]/[HE 1080/50i]/[SA 576/50i]/[SX 576/50i]
	1440×1080	4:3	[SA 576/50i]/[SX 576/50i]

- This function's default settings are  in Still Picture Recording Mode and  in Motion Picture Recording Mode.
- The recording will become longer depending on the recording pixels.
- Please refer to page 134 for details about the number of recordable pictures.

[ASPECT RATIO]



This allows you to select the aspect ratio of the pictures to suit printing or the playback method.



MENU : [RECORD SETUP] → [ASPECT RATIO] → **desired setting**

- [4:3]:** Aspect ratio of 4:3 television
- [3:2]:** Aspect ratio of conventional film camera or prints (such as L-size print)
- [16:9]:** Aspect ratio of high-definition television, etc.

- This function's default setting is [16:9].
- When the aspect ratio is set to [4:3] or [3:2], black bands may appear on the left and right of the screen.
- The edges of still pictures recorded on this unit with a [16:9] aspect ratio may be cut at printing. Check the printer or photo studio before printing.

[AUTO SLOW SHTR]



You can record bright pictures even in dark places by slowing the shutter speed.



MENU : [RECORD SETUP] → [AUTO SLOW SHTR] → **[ON]**

- The shutter speed is set to 1/25 or more depending on the surrounding brightness.
-
- This function cannot be used in Still Picture Recording Mode.
 - When the shutter speed becomes 1/25, the screen may be seen as if frames are missed and afterimages may appear.

[Wind Noise Canceller]





This will reduce the wind noise coming into the built-in microphones while maintaining the realism.

- **Switch to Manual Mode.** (→ 39)



MENU : [RECORD SETUP] → [Wind Noise Canceller] → desired setting

[Strong]:	When a strong wind is detected, this option effectively reduces the wind noise by minimising the low-pitched sound.
[Normal]:	This option extracts and reduces only the wind noise without deteriorating the sound quality.
[OFF]:	Cancel the setting.

- When [Normal] is set,  will be displayed on the screen. When [Strong] is set,  will be displayed on the screen.

- This function's default setting is [Normal].
- When switching to Intelligent Auto Mode, [Wind Noise Canceller] is set to [Strong], and the setting cannot be changed.
- You may not see the full effect depending on the recording conditions.
- This function cannot be set when using an external microphone.

[MIC SETUP]



Recording setting of the built-in microphone can be adjusted.



MENU : [RECORD SETUP] → [MIC SETUP] → desired setting

[STEREO MIC]:	Records sound from two forward directions.
[ZOOM MIC]:	Sound is recorded with changing the directionality in conjunction with the zoom operation. Sounds near the front of the unit are recorded more clearly if you zoom in (close-up) and surrounding sounds are recorded more realistically if you zoom out (wide angle).

[MIC LEVEL]



When recording, the input level from the built-in microphones and the external microphone terminal can be adjusted.

1 Select the menu.



MENU : [RECORD SETUP] → [MIC LEVEL] → desired setting

[AUTO]:

ALC is activated, and the recording level is adjusted automatically.

[SET]:

The desired recording level can be set. ALC is activated, and sound distortions are reduced.

[SET]:

The desired recording level can be set. Sounds are recorded in natural quality.

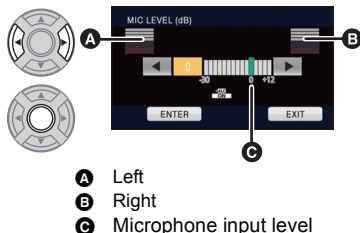
2 (When [SET]/[SET] is selected)

Adjust the microphone input level using the cursor button right or left.

- Adjust the microphone input level so that the last 2 bars of the gain value are not red. (Otherwise, the sound is distorted.) Select a lower setting for microphone input level.

3 Select [ENTER] and press the button in the centre.

- Select [EXIT] and press the button in the centre to complete the setting.



- When [MIC SETUP] is [ZOOM MIC], the volume will be different depending on the zoom rate.
- The microphone input level meter shows the larger of the inputs from the 2 built-in microphones.
- You cannot record with the audio completely muted.

[LOWCUT]



This function reduces the low-pitched sound when using an external microphone.

- Switch to Manual Mode. (→ 39)



MENU : [RECORD SETUP] → [LOWCUT] → [ON]















- This function can be set only when using an external microphone.


Playback Operations

Motion picture playback using operation icon



For details on the basic playback operations, refer to page 33.

Playback operation	Playback display	Operating steps
Skip playback (to the start of a scene)	During Playback    	<ol style="list-style-type: none"> 1) Open the LCD monitor. 2) Touch the LCD monitor and slide from right to left (from left to right) during playback. (This operation can be performed only by touch operation.)
Slow-motion Playback	During Pause    	<p>With the playback paused, select  and continue pressing the button in the centre. ( is for slow rewind playback)</p> <p>Playback is slow while pressing the button in the centre.</p> <ul style="list-style-type: none"> • Normal playback is restored when you select  and press the button in the centre. • When Slow-motion pictures are played back in reverse, they will be shown continuously at approximately 2/3rd the speed of normal playback (intervals of 0.5 seconds).
Frame-by-frame Playback		<p>With the playback paused, select  and press the button in the centre. (Select  and press the button in the centre to advance the frames one at a time in the reverse direction.)</p> <ul style="list-style-type: none"> • Normal playback is restored when you select  and press the button in the centre. • When the frames are advanced one at a time in the reverse direction, they will be shown in intervals of 0.5 seconds.

Playback operation	Playback display	Operating steps
Direct playback	<p>During Playback</p> 	<ol style="list-style-type: none"> 1) Open the LCD monitor. 2) Touch the direct playback bar or slide it while touching. <p>(This operation can be performed only by touch operation.)</p> <ul style="list-style-type: none"> • The playback pauses temporarily and skips to the position touched or slid to while touching. • Playback will start by releasing your touching or sliding finger.


Creating still picture from motion picture



A single frame from the recorded motion picture can be saved as a still picture.

Picture size of the still picture to be created will differ depending on the recording mode of the recorded motion picture.

Recording format	Aspect ratio	Picture size after creating still picture	
[1080/50p]/ [PH 1080/50i]/ [HA 1080/50i]/ [HG 1080/50i]/ [HE 1080/50i]	16:9	2.1M	1920×1080
[SA 576/50i]/ [SX 576/50i]	16:9	0.2M	640×360
	4:3	0.3M	640×480

Press the  button at the location to be saved as a still picture during playback.

- It is convenient to use Pause, Slow-motion Playback and Frame-by-frame Playback.
- Date the motion picture was recorded will be registered as date of the still picture.
- Quality will be different from the normal still picture.


Repeat Playback



Playback of the first scene starts after playback of the last scene finishes.



MENU: [VIDEO SETUP] → [REPEAT PLAY] → [ON]

The  indication appears on the full screen views.

- All the scenes are played back repeatedly. (When playing back motion pictures by date, all the scenes on the selected date are played back repeatedly.)

Resuming the previous playback



If playback of a scene was stopped halfway, the playback can be resumed from where it was stopped.



MENU: [VIDEO SETUP] → [RESUME PLAY] → [ON]

If playback of a motion picture is stopped,  appears on the thumbnail view of the stopped scene.

- The memorised resume position is cleared if you turn off the unit or change the mode. (The setting of [RESUME PLAY] does not change.)

Highlight Playback



Part that was recognised as clearly recorded is extracted from multiple scenes, and it can be played back or stored in a short time with effects and music added.

It is also possible to create an original Highlight Playback by checking your favourite scenes and setting up to extract those scenes.

- Highlight Playback cannot be used for recorded in [SA 576/50i] or [SX 576/50i].

1 Select the menu.



MENU : [VIDEO SETUP] → [HIGHLIGHT]

2 Select the desired effect and press the button in the centre.

[POP]:	Recommended for party scene.
[NATURAL]:	Recommended for scenery.
[CLASSICAL]:	Recommended for slow moving scene.
[DYNAMIC]:	Recommended for fast moving scene such as sports scene.
[CUSTOM]:	Set the combination of the effect and the music. (→ 67)

- The scenes matching the effect will be extracted and displayed in the thumbnail view.
- Effects such as fade, slow-motion, still (pause), or digest playback are inserted.
- It will be played back with the date of last recording to change the settings, refer to page 68.

3 Select in the thumbnail view and press the button in the centre.

4 Select the playback operation. (→ 33, 63)

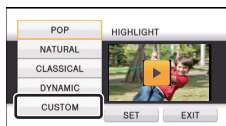
- When the playback is finished or stopped, the screen to select [REPLAY], [SAVE] (→ 71), [SELECT AGAIN] or [EXIT] is displayed. Select the desired item and press the button in the centre.

- Playing back of all the scenes returns if the unit is turned off or the mode is changed.
- Slow-motion Playback and Frame-by-frame Playback are not possible.

■ Setting up the custom effect

It is possible to enjoy the Highlight Playback with your favourite effect by setting up the combination of an image effect and music.

- 1 **Select [CUSTOM] and press the button in the centre.**
- 2 **Select [EFFECT SETUP] or [MUSIC SELECT] and press the button in the centre.**
- 3 (When [EFFECT SETUP] is selected)
Select the desired effect and press the button in the centre.



- When [EFFECT SETUP] is changed, [MUSIC SELECT] will be set the same as [EFFECT SETUP]. (To set [EFFECT SETUP] and [MUSIC SELECT] to different settings, change [MUSIC SELECT] after setting [EFFECT SETUP].)
- Select [ENTER] and press the button in the centre.

(When [MUSIC SELECT] is selected)

Select the desired sound and press the button in the centre.

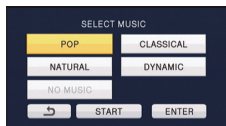
- When [EFFECT SETUP] is set to [NONE], you will be able to select [NO MUSIC]. When [NO MUSIC] is selected, the audio recorded at the time of shooting is played back.
- To adjust the volume of the music during playback or viewing, operate the volume lever or the sub volume lever. (→ 35)
- Select [ENTER] and press the button in the centre.

(To test the music audio)

Select [START] and press the button in the centre.

- Select the other music option and press the button in the centre to change the music to be tested.
- When you select [STOP] and press the button in the centre, the music playback stops.

- 4 **Select [ENTER] and press the button in the centre.**



Playing back with the settings changed

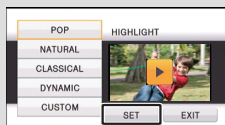
Select [SET] to select the item to change and press the button in the centre.

[SCENE SETUP]:

Select the scene or date to be played back.

[FAVOURITE SCENE SETUP]:

Set up the favourite scenes. (→ 69)



[FAVOURITE SCENE PLAY]:

Set up if the favourite scenes are to be included in the Highlight Playback or not. (→ 69)

[PRIORITY SETUP]:

Select the target to give priority to play back. (→ 69)

[PLAYBACK TIME]:

Select the time to play back. (→ 70)

[TITLE SETUP]:

Select the title sheet to be displayed at the beginning, and enter the title. (→ 70)

■ Scene setting

- 1 (Only when Highlight Playback is started from [ALL AVCHD])

Select the recording format of the scene to be played back and press the button in the centre.

[1080/50p]/[1080/50i]

- 2 **Select [SELECT DATE] or [SELECT SCENES] and press the button in the centre.**

- 3 (When [SELECT DATE] is selected)

Select the date to be played back and press the button in the centre.

- A maximum of 7 days can be selected.
- When the button in the centre is pressed, the date is selected (indicated by a red frame).
To cancel the operation, select the date and press the button in the centre again.
(When [SELECT SCENES] is selected)

Select the scenes to be played back and press the button in the centre.

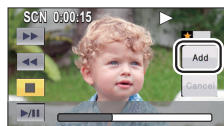
- Up to 99 scenes can be selected in succession.
- When the button in the centre is pressed, the scene is selected (indicated by ✓).
To cancel the operation, select the scene and press the button in the centre again.

- 4 **Select [Enter]/[ENTER] and press the button in the centre.**

■ Checking the favourite scenes

- 1 Select the scenes to be played back and press the button in the centre.
- 2 Select [Add] and press the button in the centre and add the favourite part.

- Approximately 4 seconds before and after selecting [Add] and press the button in the centre will be added as favourite.
- Number of favourite scenes that can be added are 1 to 14. (Number of scenes that can be added differs depending on the scenes selected.)
- Favourite check display ✓ (A) is displayed in orange, and favourite check display ⑤ is displayed on the slide bar.
- To cancel the favourite, play back to the position checked as favourite, and select [Cancel] and press the button in the centre.
- It is convenient to use Slow-motion Playback and Frame-by-frame Playback. (→ 63)



- 3 Select [Stop] and press the button in the centre and stop the playback.

- It will return to the thumbnail display screen and ★ is displayed on the scenes added as favourite scenes.

- 4 Select [Return] and press the button in the centre.

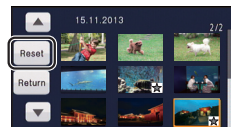
To clear the favourite scenes from the thumbnail display

- 1 Select [Reset] and press the button in the centre.
- 2 Select [RESET ALL] or [RESET SELECTED] and press the button in the centre.

- The check on all the favourite scenes will be cleared when [RESET ALL] is selected.

- 3 (When [RESET SELECTED] is selected in Step 2)

Select the scene to be cleared and press the button in the centre.



- All the scenes checked as favourite may not be played back depending on the playback time setting. (→ 70)

■ Playing back the favourite scenes

Select [ON] or [OFF] and press the button in the centre.

[ON]:	Include the scenes added in the [FAVOURITE SCENE SETUP] into the Highlight Playback.
[OFF]:	Do not include the scenes added in the [FAVOURITE SCENE SETUP] into the Highlight Playback.

■ Priority settings

Select [FACE] and press the button in the centre.

- If you select [FACE], any detected face is given priority on playback.



■ Playback time setting

Select the playback time and press the button in the centre.

[APPROX 90 SEC.]/[APPROX 3 MIN.]/[AUTO]


- The playback time of [AUTO] is a maximum of approx. 5 minutes.
- Playback time may become shorter than the setting, or it may not even be played back if the part recognised as clearly recorded is short.

■ Setting up the title

- 1 Select  /  and press the button in the centre to select your favourite title sheet.

[NONE]/[PICTURE 1]/[PICTURE 2]/[PICTURE 3]/[PICTURE 4]




- Title and date will not be displayed when [NONE] is selected.
- 2 Select [TITLE] and press the button in the centre.
 - 3 Enter the title.

- Use the text entry icon  to enter the title.
- Select [Enter] and press the button in the centre after entering the title.



 Text entry icon

Entering text

Icon	Description of operation
[A] etc.	Enters a character.
 / 	Moves the cursor to left or right.
[A/a]	Switches between [A]/[a] (alphabet) and [&/1] (symbols/numbers).
	Enters a space.
[Delete]	Deletes a character. Deletes the previous character if the cursor is in an empty space.
[Enter]	Ends text entry.

- A maximum of 18 characters can be entered.

- 4 Select [ENTER] to end registration and press the button in the centre.

- The date of the first scene of the Highlight Playback will be displayed as the date.

- The entered title will be cleared when the unit is turned off or the Highlight Playback is finished.

Saving the Highlight Playback

Scenes put together as Highlight Playback can be saved as a single scene.

HC-MDH2

Recorded scenes can be saved in the SD card selected as a recording destination for motion pictures.

HC-MDH2M

Recorded scenes can be saved in the built-in memory.

1 Stop the playback of the Highlight Playback or wait until the Highlight playback is finished.

2 Select [SAVE] and press the button in the centre.

- Scenes recorded in 1080/50p are converted to 1080/50i (picture quality [HA 1080/50i] of [REC FORMAT]) and saved.
- Motion pictures are recorded in [HA 1080/50i] regardless of [REC FORMAT] ([PH 1080/50i]/[HA 1080/50i]/[HG 1080/50i]/[HE 1080/50i]) of a scene. (The image quality remains the same.)

3 Select [YES] and press the button in the centre.

- Playback operation is not possible while playing back the scenes to be saved.

4 **HC-MDH2**

Select [EXIT] and press the button in the centre.

HC-MDH2M

Select [COPY] or [EXIT] and press the button in the centre.

- The Highlight Playback saved in the built-in memory can be copied to the SD card. To copy to the SD card, select [COPY].
- Operate according to the message and select [EXIT] at the end and press the button in the centre.

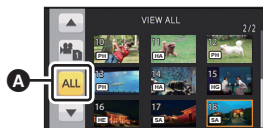
-
- **HA** is displayed on the thumbnail of the scenes saved by the Highlight Playback.

Playing back motion pictures/still pictures by date



The scenes or the still pictures recorded on the same day can be played back in succession.

- 1 Select the date select icon and press the button in the centre.**



A Date select icon

- 2 Select the playback date and press the button in the centre.**


The scenes or the still pictures recorded on the date selected are displayed as thumbnails.

- 3 Select the scene or the still picture to be played back and press the button in the centre.**


-
- Playing back of all the scenes or the still pictures returns if the unit is turned off or the mode is changed.
 - In cases such as those described below, scenes and still pictures are grouped separately on the date list, and -1, -2... may be added after the date:
 - When the number of scenes exceeds 99
 - When the number of still pictures exceeds 999
 - When [REC FORMAT] is changed
 - When [TIME LAPSE REC] is used
 - When [REC ASPECT] is changed
 - When [NUMBER RESET] is performed
 - The following scenes and still pictures are grouped separately on the date list, and icons are displayed according to the category:
 - Still pictures created from motion pictures:

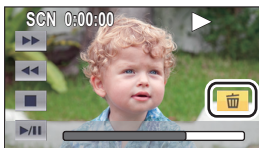
Deleting scenes/still pictures

Deleted scenes/still pictures cannot be restored, so perform appropriate confirmation of the contents before proceeding with deletion.

◇ Change the mode to  .


■ To delete the scene or still picture being played back

Select  and press the button in the centre while scenes or still pictures to be deleted are being played back.



■ To delete scenes or still pictures from the thumbnail display


1 Select the menu.

 MENU : [VIDEO SETUP] or [PHOTO SETUP] → [DELETE] → [ALL SCENES], [MULTI] or [SINGLE]

- All the scenes or still pictures displayed as thumbnails will be deleted by selecting [ALL SCENES].
(In case of playing back scenes or still pictures by date, all the scenes or still pictures on the selected date will be deleted.)
- Protected scenes/still pictures cannot be deleted.

2 (When [MULTI] is selected in Step 1)

Select the scene/still picture to be deleted and press the button in the centre.

- When the button in the centre is pressed, the scene/still picture is selected (indicated by  on the thumbnail).
- To cancel the operation, select the scene/still picture and press the button in the centre again.
- Up to 99 scenes can be selected to be deleted.

(When [SINGLE] is selected in Step 1)

Select the scene/still picture to be deleted and press the button in the centre.

3 (When [MULTI] is selected in Step 1)

Select [Delete] and press the button in the centre.

- To continuously delete other scenes/still pictures, repeat Steps 2-3.


When you stop deleting halfway:

Select [CANCEL] and press the button in the centre while deleting.

- The scenes or still pictures that have already been deleted when the deletion is cancelled cannot be restored.

To complete editing:

Select [Return] and press the button in the centre.


-
- During Highlight Playback, scenes/still pictures cannot be deleted.
 - Scenes that cannot be played back (the thumbnails are displayed as ) cannot be deleted.
 - In case of [ALL SCENES], the deletion may take time if there are many scenes or still pictures.
 - If you delete scenes recorded on other products or still pictures conforming to DCF standard with this unit, all the data related to the scenes/still pictures may be deleted.
 - When still pictures recorded on an SD card by other products are deleted, a still picture (other than JPEG) that cannot be played back on this unit, may be erased.

Protecting scenes/still pictures



Scenes/still pictures can be protected so that they are not deleted by mistake.

(Even if you protect some scenes/still pictures, formatting the media will delete them.)

- Change the mode to  .


1 Select the menu.



MENU: [VIDEO SETUP] or [PHOTO SETUP] → [SCENE PROTECT]*

* If an Eye-Fi card that has been set on the computer as a card used for transferring selected files is in the unit when [PHOTO SETUP] is selected, [TRANSFER/PROTECT] is displayed.

2 Select the scene/still picture to be protected and press the button in the centre.

- When the button in the centre is pressed, the scene/still picture is selected (indicated by  on the thumbnail).
- To cancel the operation, select the scene/still picture and press the button in the centre again.
- Select [Return] and press the button in the centre to complete the settings.

Watching Video/Pictures on your TV



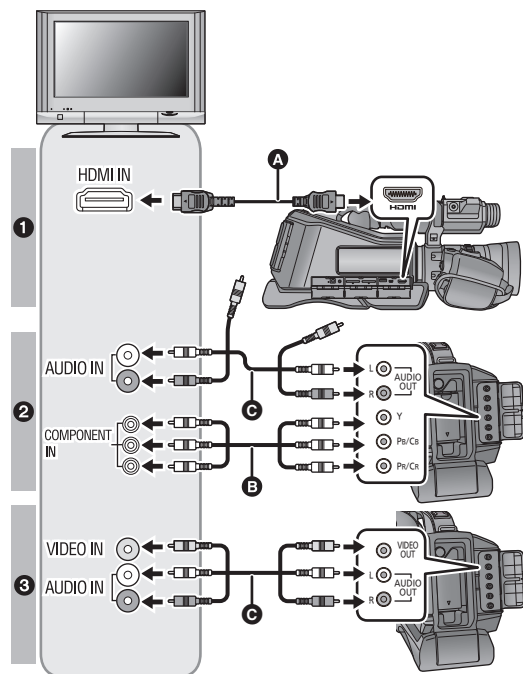
Confirm the terminals on your TV and use a cable compatible with the terminals. Image quality may vary with the connected terminals.

- A** High quality
- 1** HDMI terminal
- 2** Component terminal
- 3** Video terminal



- Use the AV cable (supplied) or HDMI cable (commercially-available) and check the output settings.
- HDMI is the interface for digital devices. If you connect this unit to a HDMI compatible high-definition TV and then play back the recorded high-definition images, you can enjoy them in high resolution with high quality sound.

1 Connect this unit to a TV.



- A** HDMI cable (commercially-available)
- Be sure to connect to the HDMI terminal.
- Connecting with a HDMI cable (→ 77)
- Playback using VIERA Link (→ 78)

- B** Component cable (commercially-available)
- C** AV cable (supplied)

Picture quality

- 1** High-definition images when connecting to HDMI terminal
- 2** High definition images when connecting to component terminal compatible with 1080i
Standard images when connecting to component terminal compatible with 576i
- 3** Standard images when connecting to video terminal

- Check that the plugs are inserted as far as they go.
- Please use "High Speed HDMI Cables" that have the HDMI logo (as shown on the cover). Cables not conforming to the HDMI standard will not work. Panasonic HDMI cable is recommended. Part No.: RP-CHE15 (1.5 m)
- When connecting to the component terminal of the TV, the yellow plug of the AV cable is not required.
- Do not use any other AV cables except the supplied one.

2 Select the video input on the TV.

• Example:

Select the [HDMI] channel with a HDMI cable.

Select the [COMPONENT] channel with a component cable.

Select the [Video 2] channel with an AV cable.

(The name of the channel may differ depending on the connected TV.)

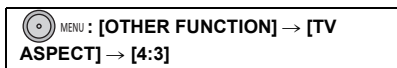
- Check the input setting (input switch) and the audio input setting on the TV. (For more information, please read the operating instructions for the TV.)

3 Change the mode to to play back.

- When connected to the TV, sound in Playback Mode is not output from this unit. Also, since the volume cannot be adjusted with this unit, adjust the volume of the TV.



■ To watch images on a regular TV (4:3) or when both sides of the images do not appear on the screen

Change the menu setting to display the images correctly. (Check the TV setting.)



- If you set the option to [4:3] and connect this unit and the TV with the AV cable, images may be displayed in a reduced size.

Example of images with a [16:9] aspect ratio on a regular TV (4:3)

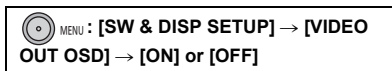
[TV ASPECT] setting	
[16:9]	[4:3]
	

* The screen is displayed this way when [TV ASPECT] is set to [4:3] and [DOWN CONV.] is set to [LETTERBOX]. (→ 115)

- If a wide-screen TV is connected, adjust the aspect setting on the TV. (Refer to the operating instructions of the TV for details.)
- When [4:3] is set, the aspect ratio of an image displayed on the TV can be changed through the [DOWN CONV.] setting.
- When [DOWN CONV.] is set to [SIDE CROP], the sides of an image will be cut off, causing some icons on the TV to be hidden from the TV screen.

■ To display the on-screen information on the TV

When the menu setting is changed, the information displayed on the screen (operation icon and Counter display etc.) can be displayed/not displayed on the TV.



Refer to the following support site for information about Panasonic TVs with an SD card slot for playing back your pictures.

<http://panasonic.net/>

- It may not be possible to play back scenes on the TV depending on the [REC FORMAT].
- For details on how to play back, please read the operating instructions for the TV.

Connecting with a HDMI cable

Select the desired method of HDMI output.



MENU : [OTHER FUNCTION] → [HDMI RESOLUTION] → desired setting

[AUTO]/[1080p]/[1080i]/[576p]

- [AUTO] determines the output resolution automatically based on information from the connected TV.
If the images are not output on the TV when the setting is [AUTO], switch to the method [1080p], [1080i] or [576p] which enables the images to be displayed on your TV. (Please read the operating instructions for the TV.)
- Images may not be displayed on the television for several seconds in some cases, such as when changing between scenes.

Connecting with the component cable

Component output setting can be changed.



MENU : [OTHER FUNCTION] → [COMPONENT OUT] → desired setting

- | | |
|-----------------|---|
| [576i]: | When connecting to the component terminal on the TV compatible with 576i.
(Playback is in standard quality.) |
| [1080i]: | When connecting to the component terminal on the TV compatible with 1080i.
(Playback is in high definition quality.) |

Playback using VIERA Link



What is the VIERA Link (HDAVI Control™)?

- This function allows you to use your remote control for the Panasonic TV for easy operations when this unit has been connected to a VIERA Link compatible device using a HDMI cable (commercially-available) for automatic linked operations. (Not all operations are possible.)
- VIERA Link is a unique Panasonic function built on a HDMI control function using the standard HDMI CEC (Consumer Electronics Control) specification. Linked operations with HDMI CEC compatible devices made by other companies are not guaranteed.
When using devices made by other companies that are compatible with VIERA Link, refer to the operating instructions for the respective devices.
- This unit supports "VIERA Link Ver.5" function. "VIERA Link Ver.5" is the standard for Panasonic's VIERA Link compatible equipment. This standard is compatible with Panasonic's conventional VIERA Link equipment.

◇ Change the mode to .

1 Select the menu.

MENU : [OTHER FUNCTION] → [VIERA Link] → [ON]

- If you are not using VIERA Link, set to [OFF].

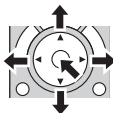
2 Connect this unit to a Panasonic TV compatible with VIERA Link with a HDMI cable. (→ 75)

- It is recommended to connect this unit to an HDMI terminal other than the HDMI1 if there are 2 or more HDMI input terminals on the TV.
- VIERA Link must be activated on the connected TV. (Read the operating instructions of the TV for how to set etc.)

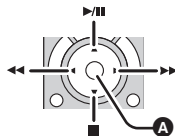
3 Operate with the remote control for the TV.

- You can select the scene or picture you want to play back by pressing the button up, down, left or right, and then the button in the centre.

(When selecting scenes)



(When playing back)



A Display/Cancel operation icons

- The following operations are available by pressing the colour buttons on the remote control.

Green	• Switching the number of scenes/still pictures in thumbnail display (9 thumbnails → 20 thumbnails → 9 thumbnails...)
Yellow	• Deleting scenes/still pictures

■ Other linked operations

Turning the unit off:

If you use the remote control for the TV to turn off the power, this unit also turns off.

Automatic input switching:

If you connect with a HDMI cable and then turn on this unit, the input channel on the TV automatically switches to this unit's screen. If the TV's power is in standby status, it will turn on automatically (if [Set] has been selected for the TV's [Power on link] setting).

- Depending on the HDMI terminal on the TV, the input channel may not switch automatically. In this case, use the remote control for the TV to switch the input channel.

-
- If you are unsure whether or not the TV and AV amplifier you are using are compatible with VIERA Link, read the operating instructions for the devices.
 - Available linked operations between this unit and a Panasonic TV is different depending on the types of Panasonic TVs even if they are compatible with VIERA Link. Refer to the operating instructions of the TV for the operations that support on the TV.
 - Operation is not possible with a cable that is not based on the HDMI standard.

Copying between SD card and Built-in Memory [HC-MDH2M]



Motion pictures or still pictures recorded with this unit can be copied between an SD card inserted in this unit and a built-in memory.

■ Check the used space of the copy destination

It is possible to check the used space of the SD card or built-in memory by [MEDIA STATUS]. (→ 113)

- By displaying in 1 scene, recording date and time are displayed when playing back motion pictures, and recording date and file number when playing back still pictures.
- Depending on the media condition, some remaining capacity of the SD card or built-in memory may not be used.
- If the remaining capacity on a single SD card is not enough, you can copy to multiple SD cards following the instruction on the screen. In this case, the last scene copied to an SD card is automatically divided to fit the space on the SD card.
- If you copy by scene selection, it is possible to copy matching the remaining capacity of the media.

Copying

- If there is little or no remaining capacity in the SD card, a confirmation message asking to copy after deleting all data on the SD card is displayed. Be aware that deleted data cannot be restored.
- Refer to page 81 for approximate time for copying.

1 Change the mode to .

- Use a sufficiently charged battery or the AC adaptor.

2 Select the menu.



MENU: [COPY] → [Copy selected files]

- [Simple copy] and [RELAY SCENE COMBINE] can only be selected when an external drive is connected. (→ 82)

[→]	When copying from the SD card to the built-in memory
[→]*	When copying from the SD card to the external drive
[→]	When copying from the built-in memory to the SD card
[→]*	When copying from the built-in memory to the external drive

* Displayed only when connecting an external drive. (→ 82)

3 Following the instructions on the screen, select the desired items and press the button in the centre.

- It will return to the previous step by selecting  and press the button in the centre.
- (When [SELECT SCENES] is selected)
When the button in the centre is pressed, the scene/still picture is selected (indicated by  on the thumbnail).
- To cancel the operation, select the scene/still picture and press the button in the centre again.
- Up to 99 scenes/still pictures or 99 dates can be set in succession.
- If 2 or more SD cards are necessary to copy, change the card following the instructions on the screen.

4 Select [EXIT] and press the button in the centre when the copy complete message is displayed.

- The thumbnail view of the copy destination is indicated.


When you stop copying halfway

Select [CANCEL] and press the button in the centre while copying.

Approximate time for copying

When copying a recorded motion picture of full 4 GB size:

Approx. 5 minutes to 15 minutes

To copy approx. 600 MB still pictures (Picture size ):

Approx. 3 minutes to 5 minutes

If you will delete the motion pictures or still pictures after copying is complete, be sure to play back the motion pictures or still pictures to check that they have been copied to correctly before deleting.

- Depending on the following conditions, the time it takes for copying may be longer.
 - The number of recorded scenes is large.
 - The temperature of the unit is high.
- If some motion pictures or still pictures have already been recorded to the copy destination, then the same date may be assigned or images may not display by date when the list by date is selected.
- Motion pictures that have been recorded on another device may not be copied.
- The settings for the copied motion pictures and still pictures will be cleared if the protected motion pictures or still pictures are copied.
- The order in which the scenes or still pictures were copied cannot be changed.

Copying/playing back with an external drive



If you connect an external drive (commercially-available) to this unit, you can copy motion pictures and still pictures recorded on this unit to an external drive.

It can also play back the scenes and still pictures copied to the external drive.

- You can copy scenes and still pictures recorded with this unit while maintaining the image quality.
- You can supply power to the external drive from this unit.
- A USB HDD or USB Flash Drive can be used as an external drive.
- Please read the operating instructions of the external drive for how to use it.

Preparing for copying/playing back

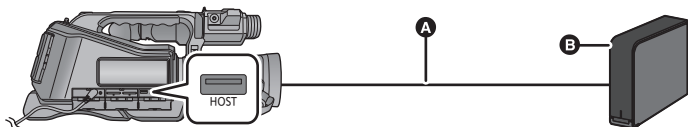
For the latest compatible external drive recommended by Panasonic, check the support website below.

http://panasonic.jp/support/global/cs/e_cam
(This Site is English only)

- In the following cases, an external drive cannot be used by connecting it to this unit:
 - An external drive with a capacity of below 512 MB or above 2 TB
 - When an external drive has two or more partitions
 - If an external drive is in a format other than FAT32
 - When connected by using a USB hub

When an external drive that requires formatting is connected, a message is displayed. Follow the instructions on the screen to format it.

IMPORTANT: Formatting the external drive will erase all data/content previously stored on the external drive and cannot be recovered. Back up important data on your computer before formatting the external drive. Panasonic will not be liable for lost data/content.



- A** USB Connection Cable (supplied with recommended external drive)
- B** Recommended external drive (commercially-available)

1 Connect this unit to the AC adaptor and change the mode to .

- When the AC adaptor is not connected to this unit, the external drive cannot be used.

2 Set [USB MODE] to [HOST]. (→ 110)

3 Connect this unit to the external drive with the USB Connection Cable (supplied with external drive).

- Connect the USB Connection Cable to the HOST slot of this unit's USB terminal.
- It may take several minutes until the connection is completed.

4 Select the desired item and press the button in the centre.

[Simple copy]:	Copies all scenes and still pictures recorded with this unit that have not been copied yet. (→ 84)
[Copy selected files]:	Allows you to select desired scenes/still pictures, and then copy. (→ 85)
[Playback from External Drive]:	Plays back scenes and still pictures stored in an external drive on this unit. (→ 86)
[Safe Removal]:	Allows you to safely remove this unit and an external drive.

- Following can be performed by connecting the external drive with the scenes and still pictures copied from this unit to other devices.
 - Playback on Panasonic TV with a USB terminal
 - Dub onto the Panasonic Blu-ray disc recorder with a USB terminal

When the external drive is connected to other devices such as Blu-ray disc recorder, a message prompting to format the external drive may display. All the scenes and still pictures recorded on the external drive will be erased if formatted. Do not format as important data will get erased and it will be impossible to restore.

■ Points to check before copying

- When using an external drive for the first time, or using an external drive that has been used with other devices, a message is displayed. Follow the on-screen instructions to format the external drive.
- Before copying, go to [MEDIA STATUS] to check the amount of free space on the external drive.
- In the following cases, copying may take longer:
 - There are lots of scenes
 - The temperature of this unit is high
- If you copy protected scenes or still pictures, the protection setting of the copied scenes or still pictures are cancelled.
- The order in which the scenes were copied cannot be changed.

Before you delete the data on the media after copying is complete, be sure to play back the external drive to check that they have been copied to correctly. (→ 86)

■ Formatting

This is for initialising the external drive.

- **Please be aware that if a media is formatted then all the data recorded on the media is erased and cannot be recovered. Back up important data on a PC etc.**
- **Connect this unit to the external drive and select [Playback from External Drive] and press the button in the centre.**



MENU : [OTHER FUNCTION] → [FORMAT MEDIA] → [EXTERNAL]

- When formatting is complete, select [EXIT] and press the button in the centre to exit the message screen.
- Connect this unit and the external drive to format.
You may no longer be able to use the external drive if you format them on another device such as a PC etc.

■ Displaying media information

The used space of the external drive can be checked.

- **Connect this unit to the external drive and select [Playback from External Drive] and press the button in the centre.**



MENU : [OTHER FUNCTION] → [MEDIA STATUS]

- **[HC-MDH2]**
If you select [CHANGE MEDIA] and press the button in the centre, you can switch the display between the SD card 1, SD card 2 and external drive.
[HC-MDH2M]
If you select [CHANGE MEDIA] and press the button in the centre, you can switch the display between the SD card, built-in memory, and external drive.

Simple copy

- 1 Connect this unit to the external drive to prepare for copying. (→ 82)**
- 2 Select [Simple copy] and press the button in the centre.**
 - When [Copy selected files] or [Playback from External Drive] is selected, terminate the connection with the external drive (→ 86), and then perform the operation of Step 1.
- 3 Select the media you want to copy and press the button in the centre.**
- 4 Select [YES] and press the button in the centre.**
- 5 Select [EXIT] and press the button in the centre when the copy complete message is displayed.**
 - The thumbnail view of the copy destination is indicated.


When you stop copying halfway:

Select [CANCEL] and press the button in the centre while copying.

Copy selected files



1 Connect this unit to the external drive to prepare for copying. (→ 82)

2 Select [Copy selected files] and press the button in the centre.

- You can also copy scenes or still pictures by pressing , selecting [COPY] → [Copy selected files].



3 Select the media you want to copy and press the button in the centre.



HC-MDH2

[ → ]: When copying from the SD card 1 to the external drive.

[ → ]: When copying from the SD card 2 to the external drive.



HC-MDH2M

[ → ]: When copying from the SD card to the external drive.

[ → ]: When copying from the built-in memory to the external drive.

- Please refer to page 80 for information on copying files between the SD card/built-in memory.

4 Following the instructions on the screen, select the desired items and press the button in the centre.

- It will return to the previous step by selecting  and press the button in the centre.
- (When [SELECT SCENES] is selected)
When pressed the button in the centre, the scene/still picture is selected and the  indication appears on the thumbnail. Select the scene/still picture and press the button in the centre again to cancel the operation.
- (When [SELECT DATE] is selected)
When pressed the button in the centre, the date is selected and surrounded by red. Select the date and press the button in the centre again to cancel the operation.
- Up to 99 scenes/ 99 dates can be selected continuously.
- When the selected scenes include a scene recorded as the first portion of relay-recording, a message is displayed. Selecting [NEXT] and pressing the button in the centre will recombine the relayed portions into one scene and copy it to the external drive. If the other media has no second portion of the relay-recorded scene, only the first portion will be copied. Regardless of the presence of the second portion, the relay information will not be cancelled. To relay-record a new scene, perform [RELAY INFO CANCEL] (→ 87).

5 Select [EXIT] and press the button in the centre when the copy complete message is displayed.

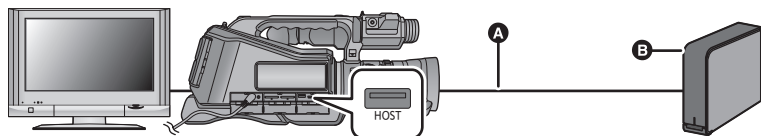
- The thumbnail view of the copy destination is indicated.

When you stop copying halfway

Select [CANCEL] and press the button in the centre while copying.

Playing back the external drive

- Only motion picture/still picture that have been copied by connecting this unit to the external drive can be played back.



- A** USB Connection Cable (supplied with recommended external drive)
- B** Recommended external drive (commercially-available)

1 Connect this unit to the external drive to prepare for playback. (→ 82)


- When playing back on a TV, connect this unit to the TV. (→ 75)

2 Select [Playback from External Drive] and press the button in the centre.


3 Select the scene or still picture to be played back and press the button in the centre, then play it back.

- The playback operation is performed the same as when playing back motion pictures or still pictures. (→ 33, 63)

To terminate the connection between this unit and the external drive

- Select the play mode select icon and press the button in the centre.
- Select  and press the button in the centre.

- Disconnect the USB Connection Cable from this unit.


- It is also possible to switch the media to play back by selecting the play mode select icon and press the button in the centre.
When the external drive is connected, the  (external drive) can be selected from the displayed media types. (→ 33)

HC-MDH2

If scenes on the external drive are saved as a Highlight Playback scene, it will be saved in the SD card selected as a recording destination for motion pictures.

HC-MDH2M

If scenes on the external drive are saved as a Highlight Playback scene, it will be saved in the built-in memory. Once saved, the Highlight Playback scene can be copied to the SD card by selecting [COPY] and pressing the button in the centre.

- Deleting scenes and still pictures on the external drive may take time.
- You cannot set the following items during playback of  (external drive).
 - [SCENE PROTECT]
 - [RELAY INFO CANCEL]
 - [USB MODE]

Relay scene combining



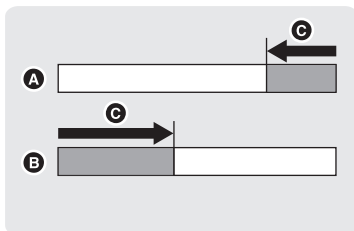
HC-MDH2

When a scene is relay-recorded (→ 55) from either of the SD cards to the other, the divided pieces can be recombined into one scene in an external drive.

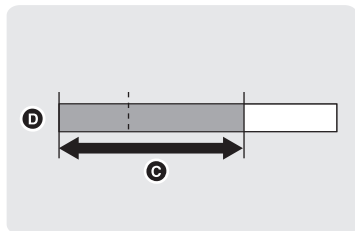
HC-MDH2M

When a scene is relay-recorded (→ 55) from the built-in memory to the SD card, the divided pieces can be recombined into one scene in an external drive.

Relay-recorded scene



Relay scene combining



- A First media of relay-recording
- B Second media of relay-recording
- C Range of Relay Recording
- D External drive

1

HC-MDH2

Insert SD cards containing relay-recorded scenes into card slot 1 and card slot 2.

HC-MDH2M

Insert the SD card that was used for Relay Recording.

2

Connect this unit to the external drive to prepare for playback (→ 82).

3

Select [Playback from External Drive] and press the button in the centre.

4

Select the menu.



MENU: [COPY] → [RELAY SCENE COMBINE]

5

When the confirmation message appears, select [YES] and press the button in the centre.

6 When the relayed scene combining operation is complete, a screen asking you to select **[DELETE RELAY SCENE]**, **[RELAY INFO CANCEL]**, or **[EXIT]** appears.

[DELETE RELAY SCENE]:	The relay-recorded scene is deleted.
[RELAY INFO CANCEL]:	Relay information is deleted from the relay-recorded scene.
[EXIT]:	Select this item to exit the relayed scene combining operation and return to the thumbnail screen.




- The thumbnail view of the external drive is indicated.

Combining of the relay scene cannot be performed if the available space on the external drive is less than the volume of the relayed scene.
Use an external drive with sufficient free space.

Dubbing with a Blu-ray disc recorder, video device, etc.

■ Check before dubbing

Check the equipment used for dubbing.

Equipment used for dubbing	Dubbing picture quality	To dub
Equipment with SD card slot	High-definition picture quality*	Insert the SD card directly (→ 90) 
Equipment with USB terminal	High-definition picture quality*	Connect with supplied USB cable (→ 90) 
Equipment without SD card slot or USB terminal	Standard picture quality This can be played back on equipment incompatible with high-definition (AVCHD), so it is convenient if you are dubbing for distribution.	Connect with AV cable (supplied) (→ 92) 

* Some equipment may not be compatible with high-definition (AVCHD) picture quality. In such a case, connect with the AV cable (supplied) and dub with standard picture quality. (→ 92)

- For the positions of the SD card slot, USB terminal, or terminal for connecting the AV cable, refer to the operating instructions of the equipment used.

You can dub using a Panasonic Blu-ray disc recorder or high-definition (AVCHD) compatible DVD recorder.

- Depending on the recorders or the media to be copied to, you may not be able to copy in high-definition (AVCHD) picture quality. For further details, see the operating instructions of your recorder.
- The scenes recorded in 1080/50p recording format can only be dubbed to a Blu-ray disc using the AVCHD Progressive compatible devices. The scenes recorded in 1080/50p recording format are not displayed when connected to the product that is not compatible with AVCHD Progressive.
- The scenes recorded in [PH 1080/50i] can only be dubbed to a Blu-ray disc.
- Note that the equipment described may not be available in certain countries and regions.

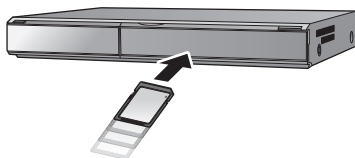


■ To dub using equipment with an SD card slot

You can dub by directly inserting an SD card.

- **HC-MDH2M**

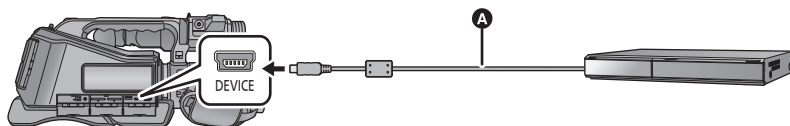
To copy scenes or still pictures from the built-in memory to an SD card, see page 80.



■ To dub using equipment with a USB terminal

You can dub by connecting a USB cable.

- Use the AC adaptor to free you from worrying about the battery running down.
- Turn on the unit.



A USB cable (supplied)

- Insert the plugs as far as they will go.

1 Set [USB MODE] to [DEVICE]. (→ 110)

2 Connect the unit to the Blu-ray disc recorder or high-definition (AVCHD) compatible DVD recorder.

- The USB function selection screen will appear on the screen of the unit.

3 Select on the screen of this unit [RECORDER] and press the button in the centre.

- When you select an option other than [RECORDER], reconnect the USB cable.



4 Select the media you wish to dub and press the button in the centre.

- When using the battery, the LCD monitor turns off after about 5 seconds. Press the cursor button to turn the LCD monitor on.

5 Dubbing through operations on the Blu-ray disc recorder or high-definition (AVCHD) compatible DVD recorder.

- Do not select [CHANGE MEDIA] on the screen of this unit during dubbing.

About the screen indication of the unit

- When the unit is accessing the SD card, card access icon () appears on the unit screen or the access lamp is on.
- **HC-MDH2M**
When the unit is accessing the built-in memory, built-in memory access icon () appears on the unit screen or the access lamp is on.
- Be careful not to disconnect the USB cable, AC adaptor or battery while the unit is accessing the media, as this may result in the loss of recorded content.

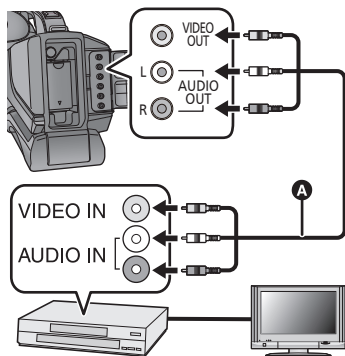
-
- Do not use any other USB cables except the supplied one. (Operation is not guaranteed with any other USB cables.)
 - For details on dubbing and playback methods, read the operating instructions of the Blu-ray disc recorder or DVD recorder.
 - When you connect the unit to a Blu-ray disc recorder, a dubbing operations screen may appear on the television connected to the Blu-ray disc recorder. In this case as well, perform the operations of Steps 2 to 5.
 - You cannot change the mode of the unit or turn off the unit while it is connected to a Blu-ray disc recorder or DVD recorder. Disconnect the USB cable before performing either of these operations.
 - If the battery runs down during dubbing, a message will appear. Operate the Blu-ray disc recorder to cancel the dubbing.



■ Dubbing using equipment without an SD card slot or a USB terminal, or using a video device

You can dub by connecting an AV cable (supplied).

- **Images are dubbed in standard quality.**
- Use the AC adaptor to free you from worrying about the battery running down.



Change the video input on the video device and TV that this unit is connected to.

- The channel set will differ depending on the terminal to which the unit is connected.
- See the operating instructions of the video device for details.
- Insert the plugs as far as they will go.
- **A** AV cable (supplied)

- Change the mode to .

1 Connect this unit to a video device and start playback on this unit.

2 Start recording on the connected device.

- To stop recording (dubbing), stop playback on this unit after stopping recording on the recorder.

-
- If the date and time display and function indication are not wanted, cancel them before dubbing.
(→ 76, 108)

If the dubbed images are played back on a wide-screen TV, the images may be stretched vertically.

In this case, refer to the operating instruction for the device you are connecting to or read the operating instructions of the wide-screen TV and set the aspect ratio to 16:9.

Using the Eye-Fi card

By using an Eye-Fi card (commercially-available), you can record motion pictures and still pictures on the card, and save them on a PC or upload them on a file-sharing website via a wireless network.

- The functions of the Eye-Fi card (including wireless transmission) are not guaranteed to work on this product. In the case of a malfunction of the card, please contact the card manufacturer.
- To use the Eye-Fi transfer feature, a broadband wireless LAN environment is required.
- To use the Eye-Fi card, permission from the national or regional government is required. Do not use if you have not obtained permission. If you are unsure as to whether use is permitted, please check with the card manufacturer.
- To prevent the interception of communications, misuses, identity thefts, etc., we strongly recommend you configure the appropriate security settings (encryption settings). For details, refer to the manuals of your Eye-Fi card and access point.
- **Install the software supplied with the Eye-Fi card in advance on your PC, and configure the Eye-Fi settings. (For settings methods etc., please read the card operating instructions or consult the card manufacturer)**


HC-MDH2

- **Insert an Eye-Fi card (commercially available) into card slot 2 of the unit.**
- (When using in the Motion Picture Recording Mode or Still Picture Recording Mode)
Set the [SD CARD 2] to be used as the recording media. (→ 26)
(When using in the Playback Mode)
Select the play mode select icon from the thumbnail screen, and set the media to [SD CARD 2]. (→ 33)

HC-MDH2M




- **Insert an Eye-Fi card (commercially available) in the unit.**
- (When using in the Motion Picture Recording Mode or Still Picture Recording Mode)
Set the card to be used as the recording media. (→ 26)
(When using in the Playback Mode)
Select the play mode select icon from the thumbnail screen, and set the media to [Eye-Fi] (card). (→ 33)

Select the menu.

 MENU : [SW & DISP SETUP] → [Eye-Fi TRANSFER] → [ON]

- When [Eye-Fi TRANSFER] is set to [ON], the transferable files will be transferred automatically.
- To cancel the transferring of a file, turn off the unit or set [Eye-Fi TRANSFER] to [OFF].
- The setting at the time of purchase is [OFF]. Every time the Eye-Fi card is removed from the unit, this setting is set to [OFF].
- Eye-Fi transfers are not available during motion picture recording.

- You can check the file transfer status on the thumbnail screen.

	File has been transferred
	File waiting for transfer
	File cannot be transferred

■ Using Eye-Fi direct mode

The files can be transferred directly from the Eye-Fi card to a smartphone without going through the wireless access point when necessary setting is performed in a PC in advance.

- **Install the software supplied with the Eye-Fi card on your PC, and configure the Eye-Fi direct mode settings.**


Select the menu.

 MENU: [SW & DISP SETUP] → [Eye-Fi DIRECT]
--

- This mode is displayed only when [Eye-Fi TRANSFER] is set to [ON].
- The mode will be cancelled using the following steps.
 - When the unit is turned off
 - If you start recording motion picture
 In addition to the steps above, the mode may also be cancelled by the Eye-Fi card.
- When connected via Eye-Fi direct mode, [ECONOMY (BATT)]/[ECONOMY (AC)] are disabled.

■ Selecting files to transfer

If you perform the required settings in advance on your PC, you can transfer selected files alone. For settings methods etc., please read the card operating instructions or consult the card manufacturer.

- **Install the software supplied with the Eye-Fi card on your PC, and configure the selection transfer settings.**
- **Change the mode to .**


Select the menu.

 MENU: [PHOTO SETUP] → [TRANSFER/PROTECT]


- The setting method is the same as that for the scene protect settings. (→ 74)
- If the selected transfer setting is not configured on the computer, [SCENE PROTECT] is displayed and the selected transfer setting cannot be configured.
- When the write protect switch on the Eye-Fi card is on the LOCK side, [SCENE PROTECT] is displayed and selected transfer setting is disabled. Please unlock the write protect switch.
- The protect setting is also applied to the files for which [TRANSFER/PROTECT] is set. To delete a file, first cancel [TRANSFER/PROTECT] and then perform the operation.

■ Using the [Eye-Fi FILE SIZE] function

You can select the maximum file size recorded on the Eye-Fi Card.

- **Change the mode to .**

Select the menu.


 MENU: [SW & DISP SETUP] → [Eye-Fi FILE SIZE] → desired settings
--

[4GB]:	The file is created with the maximum size of 4 GB. Set 2 GB since video files over 2 GB cannot be transferred.
[2GB]:	The file is created with the maximum size of 2 GB.

- When using the Eye-Fi card for recording, the maximum size of a file that can be recorded on other media also follows the setting of this menu.
- When [REC FORMAT] is set to [SX 576/50i], the maximum file size will be limited to 2 GB even if [Eye-Fi FILE SIZE] is set to [4GB].

■ Using the [Eye-Fi Power Management] function

Set the power source for Eye-Fi transfers.

- Change the mode to  .

Select the menu.










MENU: [SW & DISP SETUP] → [Eye-Fi Power Management] → desired settings

[BOTH]: Eye-Fi transfers are possible with either the AC adaptor or the battery.

[AC]: Eye-Fi transfers are possible only when the AC adaptor is in use.

- The Eye-Fi menu only appears when an Eye-Fi card is used.
- The Eye-Fi transfer feature cannot be guaranteed to continue to operate in the future due to changes to the card specification etc.
- Update the firmware of the Eye-Fi card to the latest one using the software supplied with the Eye-Fi card before use.
- When the endless memory function of the Eye-Fi card is set to on, the files transferred from the card may be deleted automatically.
- The Eye-Fi card may heat up as a result of the files being transferred. Note that the use of an Eye-Fi card accelerates the battery drain, so we recommend you use the card in Playback Mode.
- The Eye-Fi setting can be checked while pausing the recording.

Displayed icons	Eye-Fi setting
	[Eye-Fi TRANSFER] is set to [OFF]
 (White)/  * (White)	[Eye-Fi TRANSFER] is set to [ON] and the unit is not connected to the network.
 (Green)/  * (Green)	[Eye-Fi TRANSFER] is set to [ON] and the unit is connected to the network or is transferring a file.
 /  *	[Eye-Fi TRANSFER] is set to [ON] and a file transfer has been interrupted.

* These are displayed only when [Eye-Fi DIRECT] is used.

- If the Eye-Fi card is removed and then reinserted into the unit, set functions related to Eye-Fi again from the menu.
- When using the Eye-Fi card, please be sure to unlock the write-protect switch. (→ 16)
- Before deleting the files, please confirm they have been transferred to your PC and uploaded to the sharing site.
- Do not use the Eye-Fi card in locations where the use of wireless devices is forbidden, such as inside aircraft etc.
- Depending on network conditions, the transfer may take some time. Also, if network conditions deteriorate, the transfer may be suspended.

Connecting to a PC

(File transfer/nonlinear editing)

When this device and a computer for editing are connected using a USB Connection Cable, image data in the SD card and built-in memory can be transferred.

- Concerning non-linear editing, refer to the instruction manual of your editing software.
- It is impossible to write data to the SD card and built-in memory on this unit from a PC

Operating environment (mass storage)

■ If using Windows

PC	IBM PC/AT compatible PC
OS	Windows 8 (32 bit/64 bit) Windows 7 (32 bit/64 bit) or SP1 Windows Vista (32 bit) (SP2)
CPU	1 GHz or higher 32-bit (x86) or 64-bit (x64) processor (including compatible CPU)
RAM	Windows 8/Windows 7: 1 GB or more (32 bit)/2 GB or more (64 bit) Windows Vista Home Basic: 512 MB or more Windows Vista Home Premium/Business/Ultimate/Enterprise: 1 GB or more
Interface	USB port
Other requirements	Mouse or equivalent pointing device

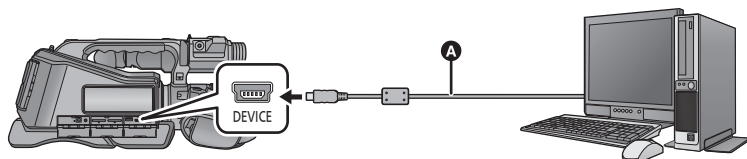
- Even if the system requirements mentioned in these operating instructions are fulfilled, some PCs cannot be used.
- Operation is not guaranteed in the following cases.
 - When 2 or more USB devices are connected to a PC, or when devices are connected through USB hubs or by using extension cables.
 - Operation on an upgraded OS.
 - Operation on an OS other than the one pre-installed.
- This software is not compatible with Microsoft Windows 3.1, Windows 95, Windows 98, Windows 98SE, Windows Me, Windows NT and Windows 2000.
- This software is not guaranteed on Microsoft Windows XP.
- The USB equipment operates with the driver installed as standard in the OS.

■ If using Mac

PC	Mac
OS	Mac OS X 10.8.4
CPU	Intel Core 2 Duo or better
RAM	2 GB or more
Interface	USB port
Other requirements	Mouse or equivalent pointing device

- Even if the system requirements mentioned in these operating instructions are fulfilled, some PCs cannot be used.
- The USB equipment operates with the driver installed as standard in the OS.

Connecting to a PC



A USB cable (supplied)

- Insert the plugs as far as they will go.

1 Connect this unit to the AC adaptor.

- Use the AC adaptor to free you from worrying about the battery running down.

2 Turn on the unit.

3 Set [USB MODE] to [DEVICE]. (→ 110)

4 Connect this unit to a PC.

- The USB function selection screen will appear.

5 Select [PC] on the screen of this unit and press the button in the centre.


- This unit is automatically recognised as an external drive of the PC. (→ 100)
- When you select an option other than [PC], reconnect the USB cable.
- When using the battery, the LCD monitor turns off after about 5 seconds. Press the cursor button to turn the LCD monitor on.

-
- Do not use any other USB cables except the supplied one. (Operation is not guaranteed with any other USB cables.)
 - When performing reading/writing between a PC and an SD card, be aware that some SD card slots built into PCs and some SD card readers are not compatible with the SDHC Memory Card or SDXC Memory Card.
 - If you are using an SDXC Memory Card, some PC may not recognise the data. Make sure your PC supports SDXC cards.


■ To disconnect USB cable safely

(If using Windows)

HC-MDH2

Select the  icon in task tray displayed on the PC, and then click [Eject HC-MDH2].

HC-MDH2M

Select the  icon in task tray displayed on the PC, and then click [Eject HC-MDH2M].

- Depending on your PC's settings, this icon may not be displayed.



(If using Mac)

Drag [CAM_SD] disk icon to the [Trash], and then disconnect the USB cable.

HC-MDH2M

Drag [CAM_MEM] disk icon to the [Trash], and then disconnect the USB cable.

About the screen indication of the unit

- Do not disconnect the USB cable, battery, or AC adaptor while the access lamp is on or card access icon () appears on the unit screen.
- **HC-MDH2M**
Do not disconnect the USB cable, battery, or AC adaptor while the access lamp is on or built-in memory access icon () appears on the unit screen.
- If the screen does not change when the unit is operated while connected to a PC, disconnect the battery and/or AC adaptor, wait approximately 1 minute, reconnect the battery and/or AC adaptor, wait approximately 1 minute again, and then turn the unit back on. (Data may be destroyed when above operation is performed while accessing the SD card or built-in memory.)

About the PC display

When the unit is connected to a PC, it is recognised as an external drive.

- Removable disk (Example:  CAM_SD (F:)) is displayed in [Computer].

Data recorded using AVCHD format has excellent compatibility with computers, due to its file form; however, it contains not just image and sound data, but also various important information, and it is associated using a folder structure which is like a figure. If even part of this information is changed or erased, faults may occur; for example, it may not be possible for the data to be recognised as AVCHD data, or it may no longer be possible for the SD card to be used in an AVCHD device.

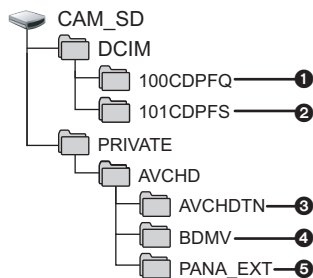
Data from a computer cannot be written to the SD card of this device.

The following data will be recorded.

- JPEG format still pictures (up to 999 still pictures can be recorded. ([S1000001.JPG], etc.))**
- JPEG format still pictures created from the motion picture**
- The motion picture thumbnails**
- AVCHD format motion picture files ([00000.MTS] etc.)**
- For management**

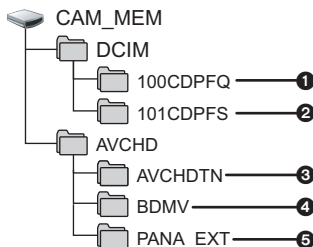
- Do not delete the SD card's folders. Doing so may make the SD card unusable in this unit.
- When data not supported by this unit has been recorded on a PC, it will not be recognised by this unit.
- Always use this unit to format SD cards.

Example folder structure of an SD card:



HC-MDH2M

Example folder structure of built-in memory:



Using the Menu


Refer to page 23 for how to set up the Menu.

All default settings are indicated with underlined text.

Camera Setup



Menu items displayed are different depending on the position or setting of the mode switch.

 MENU : **[CAMERA SETUP]** → **desired setting**

[SCENE MODE]



When you record images in different situations, this mode automatically sets optimum shutter speeds and apertures. (→ 49)

- Switch to Manual Mode. (→ 39)

[OFF] /  /  /  /  /  /  /  /  /  /  /  /  /  /  /  / 

[Intelligent Auto Plus]



You can add manually-adjusted brightness and colour balance settings to the Intelligent Auto Mode, and record. (→ 50)

- Switch to Intelligent Auto Mode. (→ 31)

[SET]/[OFF]

[PICTURE ADJUST]



Adjust the quality of the image while recording. (→ 51)

- Switch to Manual Mode. (→ 39)

[LEVEL SHOT]



This function detects the horizontal tilt of the unit, and automatically corrects it to the level position before recording. (→ 52)

[ON]/[OFF]

[DRS]



This brightens parts that are in shadow and difficult to see and suppresses white saturation in bright parts at the same time. Both bright and dark parts can be recorded clearly. (→ 45)

- Switch to Manual Mode. (→ 39)

[ON]/[OFF]

[I.EXPOSURE]



This brightens dark areas so the image can be recorded clearly. (→ 46)

- Switch to Manual Mode. (→ 39)

[ON]/[OFF]

[COLOUR NIGHT VIEW]



This function allows you to record colour images in very low light situations. (Minimum required illumination: approx. 1 lx) (→ 52)

- Switch to Manual Mode. (→ 39)

[ON]/[OFF]

[TELE MACRO]



A more impressive image can be obtained by focusing on the object only in close-up and shading off the background. (→ 53)

[ON]/[OFF]

[BACKLIGHT COMPENS.]



This makes the image brighter to prevent darkening of a backlit subject. (→ 46)

[ON]/[OFF]

Recording Setup



Menu items displayed are different depending on the position or setting of the mode switch.



MENU: [RECORD SETUP] → desired setting

[REC FORMAT]



Switch the picture quality and recording format of the motion pictures to record. (→ 54)

[1080/50p]/[PH 1080/50i]/[HA 1080/50i]/[HG 1080/50i]/[HE 1080/50i]/[SA 576/50i]/[SX 576/50i]

[2 MEDIA FUNC.]



You can set the relay recording and backup recording. (→ 55)

[OFF]/[RELAY]/[BACKUP]

[TIME LAPSE REC]



A scene that moves slowly for long period of time is recorded frame by frame with an interval, and is recorded as a short time motion picture. (→ 57)

- Switch to Manual Mode. (→ 39)

[OFF]/[1 SECOND]/[10 SECONDS]/[30 SECONDS]/[1 MINUTE]/[2 MINUTES]

[REC ASPECT]



Image aspect ratio for the recording format [SA 576/50i] or [SX 576/50i] can be changed. (→ 57)

[16:9]/[4:3]

[ZOOM MODE]



Set the maximum zoom ratio for the Motion Picture Recording Mode. (→ 58)

[i.Zoom OFF]/[i.Zoom 50×]/[D.Zoom 60×]/[D.Zoom 1500×]

[PRE-REC]



This allows recording of the pictures and sound to start approximately 3 seconds before the recording start/stop button is pressed. (→ 46)

[ON]/[OFF]

[O.I.S.]



You can select the Optical Image Stabilizer setting. (→ 38)

[MODE1]/[MODE2]

[PICTURE SIZE]



The higher the number of pixels, the higher the clarity of the picture when printing. (→ 59)

(Motion Picture Recording Mode)

[9.4M] / [2.1M] / [1.4M]

(Still Picture Recording Mode)

[15.1M] / [5.8M] / [0.3M] / [15.1M] / [8M] / [2M] / [20.4M] / [9.4M] / [2.1M]

[ASPECT RATIO]



This allows you to select the aspect ratio of the pictures to suit printing or the playback method.
(→ 60)

[4:3]/[3:2]/[16:9]

[HYBRID O.I.S.]



You can set the Hybrid Optical Image Stabilizer. (→ 38)

[ON]/[OFF]

[AUTO SLOW SHTR]



You can record bright pictures even in dark places by slowing the shutter speed. (→ 60)

[ON]/[OFF]

[Wind Noise Canceller]



This will reduce the wind noise coming into the built-in microphones while maintaining the realism.
(→ 61)

- Switch to Manual Mode. (→ 39)

[Strong]/[Normal]/[OFF]

- This item is not displayed when an external microphone is connected.

[MIC SETUP]



Recording setting of the built-in microphone can be adjusted. (→ 61)

[STEREO MIC]/[ZOOM MIC]

[MIC LEVEL]



When recording, the input level from the built-in microphones and the external microphone terminal can be adjusted. (→ 62)

[AUTO]/[SET ]/[SET ]

[LOWCUT]



This function reduces the low-pitched sound when using an external microphone. (→ 62)

- Switch to Manual Mode. (→ 39)

[ON]/[OFF]

Switch and display setting

Menu items displayed are different depending on the position or setting of the mode switch.



MENU : [SW & DISP SETUP] → **desired setting**

[MEDIA SELECT]



[HC-MDH2]

[SD CARD 1] and [SD CARD 2] can be selected separately to record motion pictures or still pictures. (→ 26)

[HC-MDH2M]

[SD CARD] and [Built-inMemory] can be selected separately to record motion pictures or still pictures. (→ 26)

[ZOOM RING]



Sets the rotation direction and zoom operation of the multi manual ring. (→ 37)



[DOWN TELE]:

Close-up images can be recorded when it is turned toward B.

[UP TELE]:

Close-up images can be recorded when it is turned toward A.

[SHUTTER RING]



Sets the rotation direction and shutter speed control of the multi manual ring. (→ 42)



[DOWN SLOW]:

Shutter speed will be slow when it is turned toward B.

[UP SLOW]:

Shutter speed will be slow when it is turned toward A.

[IRIS RING]



Sets the rotation direction and iris control of the multi manual ring. (→ 42)



[DOWN OPEN]:

Iris will open when it is turned toward B.

[UP OPEN]:

Iris will open when it is turned toward A.

[SELECT OPERATION ICONS]



You can change the operation icons (→ 44) to display on the screen.

Register 4 favourite operation icons.

- The default settings are, **FA** (Focus Assist), (DRS), (Level Gauge) and **Menu** (Menu) for Motion Picture Recording Mode, and **FA** (Focus Assist), (Intelligent Exposure), (Level Gauge) and **Menu** (Menu) for Still Picture Recording Mode.

- 1 Select [SELECT OPERATION ICONS] and press the button in the centre.**
- 2 Select the operation icon you would like to change to cancel the setting.**
- 3 Select the operation icon to be set.**
 - To cancel, select the operation icon again.
- 4 Select [ENTER] and press the button in the centre.**

[ZEBRA]



Selects the brightness level of the left-leaning zebra patterns on the screen. (→ 47)

[ON]/[OFF]

[MARKER]



Displaying of the luminance level display marker can be switched. (→ 47)

[ON]/[OFF]

[FADE]



When you start recording, the image/audio gradually appears. (Fade in)

When you pause recording, the image/audio gradually disappears. (Fade out)

Please refer to page 45.

[ON]/[OFF]

[FADE COLOUR]



You can select the colour for fade in/out. (→ 45)

[WHITE]/[BLACK]

[GUIDE LINES]



You can check if the image is level while recording or playing back motion pictures and still pictures.

The function can also be used to estimate the balance of the composition. (→ 46)

[OFF] / / /

[HISTOGRAM]



A graph with brightness as horizontal axis and number of pixels at that brightness as vertical axis is displayed. It is possible to determine the exposure of the whole image by looking at the distribution in the graph. (→ 47)

[ON]/[OFF]

[FOCUS ASSIST]



The in-focus area is displayed in blue. (→ 45)

[ON]/[OFF]

[SAFETY ZONE]



Display of the range that can be displayed with the common household TV (safety zone) can be switched.

Aspect ratio	Safety zone
[16:9]	[16:9 90%]/[4:3 100%]/[4:3 90%]/[OFF]
[4:3]	[4:3 90%]/[OFF]

- The safety zone is not displayed on the images that is actually recorded.

[VIDEO OUT OSD]



When the menu setting is changed, the information displayed on the screen (operation icon and Counter display etc.) can be displayed/not displayed on the TV. (→ 76)

[ON]/[OFF]

[DATE/TIME]



It is possible to change the date and time display mode.

[OFF]/[TIME]/[DATE]/[DATE&TIME]

[DATE FORMAT]



It is possible to change the date format.

[Y/M/D]/[M/D/Y]/[D/M/Y]

[LEVEL METER]



Select to display the audio level meter.

[ON]/[OFF]

- This item is not displayed when a still picture is selected in Playback Mode.

[LENS STATUS]



Display relating to lens can be switched. (Zoom Display, Optical Image Stabilizer, Focus Display, White Balance, Iris, Gain, Auto Iris, Shutter Speed, Level Shot Function)

[ON]/[OFF]

[MEDIA & BATTERY]



Display can be switched between the remaining recordable time of the SD card and the remaining battery capacity indication.

[ON]/[OFF]

[OTHER DISPLAY]



Display which remains displayed even when [SELECT OPERATION ICONS], [GUIDE LINES], [SAFETY ZONE], [DATE/TIME], [LEVEL METER], [LENS STATUS] and [MEDIA & BATTERY] are set to [OFF] can be switched.

[ON]/[OFF]

[POWER LCD]



This makes it easier to view the LCD monitor in bright places including outdoors. (→ 20)

[+2]* / [+1]* / [0]* / [-1]* / [Δ]* *

* It is not displayed in the Manual Mode or in the Playback Mode.

[LCD SET]



It adjusts brightness and colour density on the LCD monitor. (→ 20)

[EVF SET]



Brightness of the viewfinder can be switched. (→ 21)

[BRIGHT]/[NORMAL]/[DARK]

[SELF SHOOT]



Switches the mirror function of the LCD monitor when recording yourself. (→ 21)

The image on the LCD monitor is displayed mirrored horizontally during recording of yourself when it is set to [MIRROR].

[MIRROR]/[NORMAL]

[SUB REC BUTTON]



Enable/disable of the sub recording start/stop button on the handle can be switched.

[ON]: The sub recording start/stop button is enabled.

[OFF]: The sub recording start/stop button is disabled.

[SUB ZOOM]



Enable/disable of the sub zoom lever on the handle can be switched. Zoom speed will be different depending on the setting.

[OFF]: Sub zoom lever is disabled.

[LOW]: Sub zoom lever is enabled. (Zoom speed: Slow)

[MID]: Sub zoom lever is enabled. (Zoom speed: Standard)

[HIGH]: Sub zoom lever is enabled. (Zoom speed: Fast)

[USB MODE]



The unit's USB terminal to which a USB cable will be connected can be switched.

Switch the terminal according to the shape of the USB cable's plug you intend to connect to the unit.

[DEVICE]: For connecting to the USB terminal (Type mini B) of the unit

[HOST]: For connecting to the USB terminal (Type A) of the unit

[Eye-Fi TRANSFER]



This item is displayed only when an Eye-Fi card is inserted.

Please refer to page 93.

[ON]/[OFF]

[Eye-Fi DIRECT]



This item is displayed only when an Eye-Fi card is inserted.

Please refer to page 94.

[Eye-Fi FILE SIZE]



This item is displayed only when an Eye-Fi card is inserted.
Please refer to page [94](#).

[4GB]/[2GB]

[Eye-Fi Power Management]



This item is displayed only when an Eye-Fi card is inserted.
Please refer to page [95](#).

[BOTH]/[AC]

Other Functions

Menu items displayed are different depending on the position or setting of the mode switch.



MENU : [OTHER FUNCTION] → **desired setting**

[FORMAT MEDIA]



The SD cards, built-in memory or external drive can be formatted.

- Please be aware that if a medium is formatted, then all the data recorded on the medium will be erased and cannot be restored. Back up important data on a PC, DVD disc etc. (→ 96)

HC-MDH2

[SD CARD 1]/[SD CARD 2]/[EXTERNAL]*

HC-MDH2M

[Built-inMemory]/[SD CARD]/[EXTERNAL]*

* Displayed when connecting an external drive. (→ 82)

- When formatting is complete, select [EXIT] and press the button in the centre to exit the message screen.
- Perform a physical formatting of the SD card when the SD card is to be disposed/ transferred. (→ 131)
- **HC-MDH2M**
Perform a physical formatting of the built-in memory when this unit is to be disposed/ transferred. (→ 129)

- Do not turn this unit off or remove the SD card, while formatting. Do not expose the unit to vibrations or shock.

Use this unit to format media.


Formatting built-in memory is only available with this unit.

Do not format an SD card using any other equipment such as a PC. The card may not be used on this unit.

[MEDIA STATUS]



The used space and remaining recordable time of the SD card and built-in memory can be checked.

- **[HC-MDH2]**
Selecting [CHANGE MEDIA] and pressing the button in the centre switches the unit between the display for the SD card 1 and the display for the SD card 2.
 - **[HC-MDH2M]**
Selecting [CHANGE MEDIA] and pressing the button in the centre switches the unit between the display for the SD card and the display for the built-in memory.
 - When the mode switch is set to , remaining recordable time for the selected recording format is displayed.
 - Select [EXIT] and press the button in the centre to close the indication.
-
- The SD card or built-in memory requires some space to store information and manage system files, so the actual usable space is slightly less than the indicated value. The usable SD card/built-in memory space is generally calculated as 1 GB=1,000,000,000 bytes. The capacities of this unit, PCs and software are expressed as 1 GB=1,024×1,024×1,024=1,073,741,824 bytes. Therefore, the indicated value of the capacity appears to be smaller.

[REC LAMP]



The recording lamp lights up during recording.
When this is set to [OFF], it does not light during recording.

[ON]/[OFF]

[RING LED (BLUE)]



The ring LED lights up blue in Motion Picture Recording Mode or Still Picture Recording Mode.

[ON]/[5 SECONDS]/[OFF]

- When [5 SECONDS] is set, the ring LED lights up for 5 seconds after the unit is turned on or the recording mode is switched.
- When [RING LED (RED)] is set to [ON], the ring LED does not light up blue during recording.

[RING LED (RED)]



The ring LED lights up red during recording.

[ON]/[OFF]

-
- When the [REC LAMP] is set to [OFF], this item cannot be set.

[CLOCK SET]



Please refer to page 22.

[TIME ZONE]



Time difference from the Greenwich Mean Time can be set. (→ 22)

[ALERT SOUND]



Touch screen operation, starting and stopping of recording and unit on/off can be confirmed with this sound.

When [OFF] is selected, the sound is not output at the start/end of recording, etc.

- : **Volume low**
- : **Volume high**
- [OFF]:** **Cancel the setting.**

2 Beeps for 4 times

When an error occurs, follow the instructions displayed on the screen. (→ 122)

[SHTR SOUND]



You can add a shutter sound when recording still pictures.

- : **Volume low**
- : **Volume high**
- [OFF]:** **Cancel the setting.**

- No shutter sound is emitted in Motion Picture Recording Mode.

[ECONOMY (BATT)]



When about 5 minutes have passed without any operation, this unit automatically turns off to save battery life.

[ON]/[OFF]

- This unit will not automatically turn off even if [ECONOMY (BATT)] is set to [ON] in following cases:
 - Using the AC adaptor*
 - Using the USB cable for PC etc.
 - PRE-REC is used
- * When [ECONOMY (AC)] is activated, this unit automatically turns off.

[ECONOMY (AC)]





When about 30 minutes have passed without any operation while connecting AC adaptor with this unit, this unit automatically turns off.

[ON]/[OFF]

- This unit will not automatically turn off even if [ECONOMY (AC)] is set to [ON] in following cases:
 - Using the USB cable for PC etc.
 - PRE-REC is used

[QUICK POWER ON]



The unit is put into recording pause approx. 1 second when the unit is turned on with the mode set to  or .

[ON]/[OFF]

- Depending on the recording conditions, start time may be longer than 1 second.
- In the Quick Power On Mode, the zoom magnification becomes approx. 1×.

[TV ASPECT]



Please refer to page 76.

[16:9]/[4:3]

[DOWN CONV.]



This function allows you to select how to display images with a 16:9 aspect ratio on a TV with a 4:3 aspect ratio.

[SIDE CROP]/[LETTERBOX]/[SQUEEZE]

[HDMI RESOLUTION]



Select the desired method of HDMI output. (→ 77)

[AUTO]/[1080p]/[1080i]/[576p]

[COMPONENT OUT]



Component output setting can be changed. (→ 77)

[576i]/[1080i]

[INITIAL SET]



Set to [YES] for changing the menu settings back to the default condition.

- Settings for [REC FORMAT], [MEDIA SELECT], [CLOCK SET] and [LANGUAGE] will not be changed.

[VIERA Link]



This function allows you to use your remote control for the Panasonic TV for easy operations when this unit has been connected to a VIERA Link compatible device using a HDMI cable (optional) for automatic linked operations. (Not all operations are possible.) (→ 78)

[ON]/[OFF]

[NUMBER RESET]



Set the file number of the still picture recorded next to 0001.

- Folder number is updated and file number will start from 0001. (→ 100)
- To reset the folder number, format the SD card and built-in memory, and then perform [NUMBER RESET].

[Version Disp.]



The firmware version of this unit is displayed.

[Version Up]



You can update the firmware version of this unit.

For the latest update information, check the support website below. (As of September 2013)

http://panasonic.jp/support/global/cs/e_cam
(This Site is English only)

[H/PHONE MODE]



Selects the sound heard through the headphones.

[LIVE]: The sound which has been input from the microphone is output as is.
This setting is selected when delays in the sound are annoying.

[RECORDING]: The sound in the status which is to be recorded (the sound synchronised with the images) is output.

- When this unit is connected to a TV using the HDMI cable (optional), audio at the time of the [RECORDING] setting is output even if this setting is set to [LIVE].

[LANGUAGE]



You can select the language on the screen display and the menu screen.

[English]/[中文]/[العربية]/[فارسی]/[ไทย]/[हिन्दी]

Video Setup



- Change the mode to  and select the play mode select icon. (→ 33)



MENU: [VIDEO SETUP] → desired setting

[REPEAT PLAY]



Playback of the first scene starts after playback of the last scene finishes when set to [ON]. (→ 65)

[ON]/[OFF]

[RESUME PLAY]



If playback of a scene was stopped halfway, the playback can be resumed from where it was stopped when set to [ON]. (→ 65)

[ON]/[OFF]

[SCENE PROTECT]



Scenes can be protected so that they are not deleted by mistake.

(Even if you protect some scenes, formatting the SD card will delete them.) (→ 74)

[HIGHLIGHT]



Part that was recognised as clearly recorded is extracted from multiple scenes, and it can be played back or stored in a short time with effects and music added. (→ 66)

[DELETE]



Deletes a scene. (→ 73)

[RELAY INFO CANCEL]




To cancel relay information

- When the relay information is cancelled, combining of the relayed scenes will not be possible anymore.

Picture Setup

- Change the mode to  and select the play mode select icon. (→ 33) 

 MENU: [PHOTO SETUP] → desired setting

[SCENE PROTECT]



Still pictures can be protected so that they are not deleted by mistake.



(Even if you protect some still pictures, formatting the SD card will delete them.) (→ 74)


[DELETE]



Deletes a still picture. (→ 73)

Copy

- Change the mode to  . (→ 18) 

 MENU: [COPY] → desired setting

[Simple copy]



Copies all scenes and still pictures recorded with this unit that have not been copied yet. (→ 84)

[Copy selected files]



Allows you to select desired scenes/still pictures, and then copy. (→ 85)

[RELAY SCENE COMBINE]



[HC-MDH2]

When a scene is relay-recorded (→ 55) from either of the SD cards to the other, the divided pieces can be recombined into one scene in an external drive. (→ 87)

[HC-MDH2M]

When a scene is relay-recorded (→ 55) from the built-in memory to the SD card, the divided pieces can be recombined into one scene in an external drive. (→ 87)

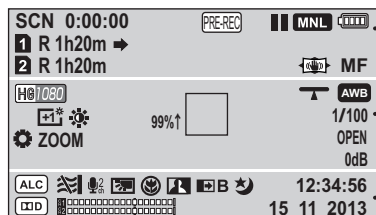
Indications

*1 **HC-MDH2** only

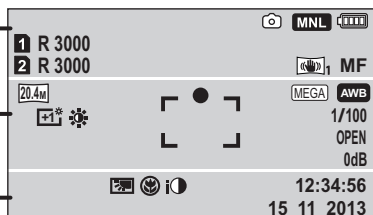
*2 **HC-MDH2M** only

■ Recording indications

Motion Picture Recording Mode



Still Picture Recording Mode



A



Intelligent Auto Mode (→ 31)



Intelligent Auto Plus Mode (→ 50)



Scene Mode (→ 49)

MNL

Manual Mode (→ 39)



Recording



Recording pause

SCN 0:00:00

Elapsed recording time (→ 27)



Remaining battery power (→ 15)



Battery charging icon (→ 15)



Built-in memory recording possible status*2



(White)

Card recording possible status*1



(Green)

Recognising the card*1



(White)

Card recording possible status*2



(Green)

Recognising the card*2

R 1h20m

Remaining time for motion picture recording (→ 27)

("h" is an abbreviation for hour and "m" for minute.)



Relay Recording (→ 55)



Backup recording (→ 56)



(White)

Still picture recording icon



(Red)

Recording still picture

R3000

Remaining number of still pictures (→ 30)



PRE-REC (→ 46)



Time Lapse Recording (→ 57)

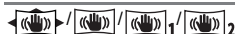


Image Stabilizer (→ 38)

MF

Manual Focus (→ 43)

AF

Auto Focus (→ 32)

B	
Power LCD (→ 20)	
	Picture Adjustment (→ 51)
	Level Shot Function (→ 52)
1/100	Shutter Speed (→ 42)
OPEN/F2.0	Iris value (→ 42)
0dB	Gain value (→ 42)
○ (White)/● (Green)	
Focus indication (→ 29)	
Eye-Fi transfer (→ 95)	
1080/50p / PH1080 / HA1080 / H61080 / HE1080 / SA / SX	
Motion Picture Recording Mode (→ 54)	
15.1M / 5.8M / 0.3M / 15.1M / 8M / 2M / 20.4M / 9.4M / 2.1M	
Number of recording pixels for still pictures (→ 30, 59, 64)	
In Playback Mode, the picture size is not displayed for still pictures recorded with other products that have different picture sizes from the sizes shown above.	
	MEGA OIS (→ 29)
99%↑	Marker (→ 47)
White Balance (→ 41)	
FOCUS/WB/SHUTTER/IRIS/ZOOM	
Ring operation icons (→ 39)	

C	
	Backlight Compensation (→ 46)
	Tele Macro (→ 53)
	DRS (→ 45)
	Microphone Level (→ 62)
	Fade (White), Fade (Black) (→ 45)
	Colour Night View function (→ 52)
	Intelligent Exposure (→ 46)
15 11 2013	Date indication (→ 22)
12:34:56	Time indication (→ 22)
	Zoom Microphone (→ 61)
	Stereo Microphone (→ 61)
	Wind Noise Canceller (→ 61)
	2 ch Microphone ALC (→ 62)
	Audio recording format (Dolby® Digital)

■ Playback indications


▶/||/▶▶/▶▶▶/◀◀/◀◀◀/▶/◀/▶▶/||◀◀/▶▶/◀||/◀||

Display during playback (→ 34, 63)


SCN 0:00:00 Playback Time (→ 34)

No.10 Scene Number

 Repeat Playback (→ 65)




 Resume Playback (→ 65)

100-0001 Still picture folder/file name

 Transfer/Protected motion pictures/still pictures (→ 74, 94)

 /  /  /  /  /  / 

Recording format (→ 33)


 /  /  Eye-Fi transfer status (→ 93)

■ Indication of connection to external drive

 External Drive Playback (→ 86)


■ Indication of connection to other devices


 Accessing the card (→ 91, 99)

 Accessing the built-in memory (→ 91, 99)*2

■ Confirmatory indications

-- (Time display) The built-in battery is low. (→ 22)

 Warning for recording of yourself (→ 21)

 SD card is not inserted or is incompatible.

 SD card is write-protected.

 SD card is non-compatible.

 SD card is full.

 Playback-only SD card

Messages

Major confirmation/error messages to be indicated on the screen in text.

* **HC-MDH2M** only

PERIODICALLY MAKE BACK UP OF DATA IN BUILT-IN MEMORY.*

We recommend backing up important recorded motion pictures and still pictures periodically to a PC, DVD disc etc. to protect it. (→ 98) This message does not indicate that there is a problem with this unit.

CHECK CARD.

This card is not compatible or it cannot be recognised by the unit.


If this message appears even though motion pictures and still pictures are recorded on an SD card, the card may be unstable. Reinsert the SD card, then turn the unit off and then on again.

THIS EXTERNAL DRIVE CANNOT BE USED./ PLEASE CHECK THE EXTERNAL DRIVE.

The external drive that this unit cannot recognise is connected. Check if the external drive can be connected and used with this unit and try to reconnect. (→ 82)



About recovery

If faulty management information is found, the messages may appear and a repair is performed. (Repairing may take time depending on the error.)

-  is displayed when abnormal management information is detected when the scenes are displayed in thumbnail.
- Use a sufficiently charged battery or the AC adaptor.
- Depending on the condition of the data, it may not be possible to completely repair the data.
- If recovery fails, it will not be possible to play back scenes recorded before the unit turned off.
- When data recorded on another device is recovered, it may not be possible to play back the data on this unit or the other device.
- If recovery fails, turn the unit off and on again after waiting awhile. If recovery fails repeatedly, format a media on the unit. Please be aware that if a media is formatted, then all the data recorded on the media will be erased.
- If the thumbnail information is recovered, displaying the thumbnails may become slower.




Troubleshooting



■ It is not a malfunction in following cases

A clicking sound is heard when the unit is shaken.	<ul style="list-style-type: none"> This is the sound of the lens moving and is not a defect. This sound will no longer be heard when the unit is turned on and change the mode to  or .
Object seems to be warped.	<ul style="list-style-type: none"> Object seems to be warped slightly when the object moves across the image very fast, but this is because the unit is using MOS for the image sensor. This is not a malfunction.
The lens or LCD monitor fog up.	<ul style="list-style-type: none"> This is due to condensation. It is not a malfunction. Please refer to page 2.


Power	
Problem	Check points
This unit cannot be turned on. This unit does not stay on long enough. Battery runs down quickly.	<ul style="list-style-type: none"> Charge the battery again to ensure it is sufficiently charged. (→ 13) In cold places, the battery using time becomes shorter. The battery has a limited life. If the operating time is still too short even after the battery is fully charged, the battery has worn out and needs to be replaced.
This unit is turned off automatically.	<ul style="list-style-type: none"> If the unit turns off when you turn off the power to the TV using the TV remote control, the VIERA Link is at work. If you are not using the VIERA Link, set [VIERA Link] to [OFF]. (→ 78)
This unit cannot be operated though it is turned on. This unit does not operate normally.	<ul style="list-style-type: none"> Remove the battery or AC adaptor, wait about 1 minute and then reconnect the battery or AC adaptor. Then about 1 minute later, turn on the unit again. (Conducting the above operation while the media is being accessed may damage the data on the media.) If normal operation is still not restored, detach the power connected, and consult the dealer who you purchased this unit from.
"ERROR OCCURRED. PLEASE TURN UNIT OFF, THEN TURN ON AGAIN." is displayed.	<ul style="list-style-type: none"> The unit has automatically detected an error. Restart the unit by turning the unit off and on. The unit will be turned off in about 1 minute if the unit is not turned off and on. Repair is needed if it is repeatedly displayed even if it is restarted. Detach the power connected, and consult the dealer who you purchased this unit from. Do not attempt to repair the unit by yourself.

Indication	
Problem	Check points
Function display (Remaining Display, Counter Display, etc.) is not displayed	<ul style="list-style-type: none"> • [MEDIA & BATTERY] or [OTHER DISPLAY] of the [SW & DISP SETUP] is [OFF]. (→ 109)

Recording	
Problem	Check points
The unit arbitrarily stops recording.	<ul style="list-style-type: none"> • Use an SD card that can be used for motion picture recording. (→ 16) • The recordable time may have shortened due to the deterioration of the data writing speed or repeated recording and deletion. Using the unit, format the SD card or built-in memory. (→ 112)
Auto Focus function does not work.	<ul style="list-style-type: none"> • Switch to Intelligent Auto Mode or Intelligent Auto Plus Mode. • If you are trying to record a scene which is hard to bring into focus in Auto Focus Mode, use the Manual Focus Mode to adjust the focus. (→ 32, 43)
Colour balance of images is strange when recording in a place such as a gymnasium.	<ul style="list-style-type: none"> • In a place with multiple light sources, such as a gymnasium or a hall, set the White Balance setting to  (Indoor mode 2). If you cannot record clearly with the  (Indoor mode 2), set it to  (Manual adjustment mode). (→ 41)
Colour or brightness of the image changes, or you may see horizontal bars in the image.	<ul style="list-style-type: none"> • Colour or brightness of the image may change, or you may see horizontal bars in the image when the object is recorded under fluorescent light, mercury light or sodium light, etc., but this is not a malfunction.
The LCD monitor flickers indoors.	<ul style="list-style-type: none"> • In Motion Picture Recording Mode, record in Intelligent Auto/ Intelligent Auto Plus Mode or set the shutter speed to 1/100 in areas where the power supply frequency is 50 Hz, or 1/125 in areas of 60 Hz. • In Still Picture Recording Mode, this will not affect the recorded image.

Playback	
Problem	Check points
Scenes/still pictures cannot be played back.	<ul style="list-style-type: none"> • Any scenes/still pictures where the thumbnails are displayed as  cannot be played back.
Scenes cannot be deleted.	<ul style="list-style-type: none"> • Release the protect setting. (→ 74) • Any scenes/still pictures where the thumbnails are displayed as  cannot be deleted. If the scenes/still pictures are unnecessary, format the media to erase the data. (→ 112) Please be aware that if a media is formatted then all the data recorded on the media is erased and cannot be recovered. Back up important data on a PC, disc etc.

With other products	
Problem	Check points
<p>Although this unit is correctly connected to a TV, images or sounds cannot be seen.</p> <p>The images are squeezed horizontally.</p>	<ul style="list-style-type: none"> ● Please read the operating instructions of your TV and select the channel that matches the input used for the connection. ● Change the [TV ASPECT] setting to match the aspect ratio of the TV. (→ 76) ● The audio during playback mode is not output from this unit when connected to a TV. Sound levels cannot be adjusted using this unit, so adjust the sound on the TV.
<p>If the SD card is inserted in another device, it is not recognised.</p>	<ul style="list-style-type: none"> ● Check that the device is compatible with the capacity or type of SD card (SD Memory Card/SDHC Memory Card/SDXC Memory Card) that you inserted. Refer to the operating instructions of the device for details.
<p>When connected by the USB cable, this unit is not detected by the other devices.</p>	<ul style="list-style-type: none"> ● When connected to other devices using only the battery, reconnect using the AC adaptor.
<p>VIERA Link does not work.</p>	<p>(Setting on this unit)</p> <ul style="list-style-type: none"> ● Connect with a HDMI cable (commercially-available). (→ 78) ● Press the MENU button, then select [OTHER FUNCTION] → [VIERA Link] → [ON] using the cursor button. (→ 78) ● Turn the unit off and then back on again. <p>(Setting on other devices)</p> <ul style="list-style-type: none"> ● If the TV input does not switch automatically, switch the input using the TV remote control. ● Check the VIERA Link setting on the connected device. ● Please refer to the operating instructions of the connected device.
<p>Cannot copy scenes on the SD card by connecting to other equipment with the USB cable.</p>	<ul style="list-style-type: none"> ● Other equipment might have not recognised the SD card. Unplug the USB cable once, and reconnect it.

With a PC	
Problem	Check points
When connected by the USB cable, this unit is not detected by the PC.	<ul style="list-style-type: none"> • After re-inserting the SD card into the unit, reconnect the supplied USB cable. • Select another USB terminal on the PC. • Check the operating environment. (→ 96, 97) • Connect the supplied USB cable again after restarting the PC and turning on this unit again.
When the USB cable is disconnected, an error message will appear on the PC.	<ul style="list-style-type: none"> • To disconnect the USB cable safely, double-click the  icon in the task tray and follow the instructions on the screen.

Others	
Problem	Check points
If the SD card is inserted in this unit, it is not recognised.	<ul style="list-style-type: none"> • If the SD card is formatted on a PC, it may not be recognised by this unit. Use this unit to format SD cards. (→ 25)

■ If AVCHD scenes do not change smoothly when played back on another device

The images may be still for several seconds at the joins between the scenes if the following operations are performed when multiple scenes have been continuously played back using another unit.

- Just how smoothly the scenes will be played back depends on the playback unit. Depending on the unit used, the images may stop moving and become still for a moment even when none of the following conditions are applicable.
- A continuous recording of motion picture data that exceeds 4 GB may momentarily stop at every 4 GB of data when played back with another device.

Principal reasons for not playing back smoothly
• When [REC FORMAT] is changed
• When the scenes were recorded on different dates
• When scenes lasting under 3 seconds have been recorded
• When PRE-REC was used for recording
• When the Time Lapse Recording is used
• When deleting scenes
• HC-MD2M When selected scenes are copied between an SD card and the built-in memory
• When scenes recorded more than 99 scenes on the same date

Cautions for use

About this unit

The unit and the SD card become warm during use. This is not a malfunction.

Keep this unit as far away as possible from electromagnetic equipment (such as microwave ovens, TVs, video games etc.).

- If you use this unit on top of or near a TV, the pictures and/or sound on this unit may be disrupted by electromagnetic wave radiation.
- Do not use this unit near cell phones because doing so may result in noise adversely affecting the pictures and/or sound.
- Recorded data may be damaged, or pictures may be distorted, by strong magnetic fields created by speakers or large motors.
- Electromagnetic wave radiation generated by microprocessors may adversely affect this unit, disturbing the pictures and/or sound.
- If this unit is adversely affected by electromagnetic equipment and stops functioning properly, turn this unit off and remove the battery or disconnect AC adaptor. Then reinsert the battery or reconnect AC adaptor and turn this unit on.

Do not use this unit near radio transmitters or high-voltage lines.

- If you record near radio transmitters or high-voltage lines, the recorded pictures and/or sound may be adversely affected.

Make sure to use the supplied cords and cables. If you use optional accessories, use the cords and the cables supplied with them.

Do not extend the cords and the cables.

Do not spray insecticides or volatile chemicals onto the unit.

- If the unit is sprayed with such chemicals, its body may be marred and the surface finish may peel off.
- Do not leave rubber or plastic products in contact with the unit for a long time.

When you use the unit in a sandy or dusty place such as a beach, do not let sand or fine dust get into the body and terminals of the unit.

Also, keep the unit away from sea water.

- Sand or dust may damage the unit. (Care should be taken when inserting and removing a card.)
- If sea water splashes onto the unit, wipe off the water with a well wrung cloth. Then wipe the unit again with a dry cloth.

When carrying the unit, do not drop or bump it.

- A strong impact can break the unit's casing, causing it to malfunction.
- When carrying this unit, please hold the hand strap or shoulder strap firmly and treat it with care.

Cleaning

- Before cleaning, detach the battery or pull the AC cable from the AC outlet, and then wipe the unit with a soft, dry cloth.
- If the unit is very dirty, dip a cloth in water and squeeze firmly, and then wipe the unit with the damp cloth. Next, dry the unit with a dry cloth.
- Use of benzene, paint thinner, alcohol, or dishwashing liquid may alter the camera body or peel the surface finish. Do not use these solvents.
- When using a chemical dust cloth, follow the instructions that came with the cloth.

Do not use the unit for surveillance purposes or other business uses.

- This unit was designed for consumer intermittent use. It was not intended for continuous use, or for any industrial or commercial application resulting in prolonged use.
- In certain situations, continuous use could cause the unit to overheat and cause a malfunction. Such use is strongly discouraged.

When you are not going to use the unit for an extended time

- When storing the unit in a cupboard or cabinet, it is recommended that you place a desiccant (silica gel) in with it.

Do not lift up this unit by the handle with the tripod still attached

- When the tripod is attached, its weight will also affect the unit's handle, possibly causing the handle to break and hurting the user.
- To carry the unit while the tripod is attached, take hold of the tripod.

Do not swing the unit around, shake it by, or allow it hang from the handle

- Do not jar, swing, or shake the unit by its handle. Any strong jolt to the handle may damage the unit or result in personal injury.

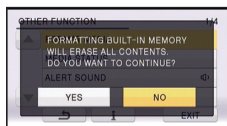
Do not allow the cord to drag on the ground or pull a connected cord along the passage

- The cord will be damaged, causing fire or electrical shock, when the cord gets caught by the feet, excite will also cause personal injury.

HC-MDH2M

When disposing of or giving away this unit, note that:

- Formatting and deletion simply change the file management information and cannot be used to completely erase the data in built-in memory of this unit. The data can be recovered using commercially available software or the like.
- We recommend that you physically format the built-in memory before disposing of or giving away this unit.
To physically format the built-in memory, connect the unit via the AC adaptor, select [OTHER FUNCTION] → [FORMAT MEDIA] → [Built-inMemory] from the menu, and then press and hold the recording start/stop button on the screen below for about 3 seconds. When the built-in memory data deletion screen appears, select [YES], and then follow the on-screen instructions.



- Please look after the data in your built-in memory carefully. Panasonic will not be held responsible in the unlikely case that private data is divulged.

About the battery

The battery used in this unit is a rechargeable lithium-ion battery. It is susceptible to humidity and temperature and the effect increases the more the temperature rises or falls. In cold areas, the full charge indication may not appear or the low battery indication may appear about 5 minutes after starting use. At high temperatures, the protection function may be triggered, making it impossible to use the unit.

Be sure to detach the battery after use.

- If the battery is left attached, a minute amount of current continues to flow even if the unit is off. Keeping the unit in this state may result in over discharge of the battery. This may result in you not being able to use the battery even after it is charged.
- The battery should be stored in the vinyl bag so metal does not come into contact with the terminals.
- The battery should be stored in a cool place free from humidity, with as constant temperature as possible. (Recommended temperature: 15 °C to 25 °C, Recommended humidity: 40%RH to 60%RH)
- Extremely high temperatures or low temperatures will shorten the life of the battery.
- If the battery is kept in high-temperature, high-humidity, or oily-smoky places, the terminals may rust and cause malfunctions.
- To store the battery for a long period of time, we recommend you charge it once every year and store it again after you have completely used up the charged capacity.
- Dust and other matter attached to the battery terminals should be removed.

Prepare spare batteries when going out for recording.

- Prepare batteries enough to last for 3 to 4 times the period you are planning to record for. Cold places such as a ski resort can shorten recording time.

If you drop the battery accidentally, check to see if the terminals are damaged.

- Inserting a battery with damaged terminals can damage the unit.

Do not throw an old battery into fire.

- Heating a battery or throwing it into a fire may result in an explosion.

If the operating time is very short even after the battery has been recharged, the battery has worn out. Please purchase a new battery.

About the AC adaptor

- If the temperature of the battery is extremely high or extremely low, charging may take time or the battery may not be charged.
- If you use the AC adaptor near a radio, radio reception may be disturbed. Keep the AC adaptor 1 m or more away from the radio.
- When using the AC adaptor, it may generate whirring sounds. However, this is normal.
- After use, be sure to disconnect the AC adaptor. (If it is left connected, a minute amount of current is consumed.)
- Always keep the electrodes of the AC adaptor and battery clean.

About charging lamp during charging

When the charging lamp is flashing, the following should be considered.

Flashing with approx. 4 second period (off for approx. 2 seconds, on for approx. 2 seconds):

- When the battery is over discharged or the temperature of the battery is too high or low. It can be charged, but it may take a few hours to complete the charging normally.
- Once normal charging starts, the charging lamp lights up green. However, depending on the conditions of use, even when normal charging is taking place, the charging lamp may keep flashing in approx. 4 second intervals until charging is completed.

Flashing with approx. 0.5 second period (off for approx. 0.25 second, on for approx. 0.25 second):

- The battery is not charged. Remove the battery from the unit, and try charging again.
- Check that the terminals of the unit or battery are not dirty or covered with a foreign object, and connect the battery correctly once again. If a foreign object or dirt is present, turn off the unit before removing.
- The battery or environment is at an extremely high or low temperature. Wait until the temperature has returned to an appropriate level and try charging again. If you are still unable to charge, there may be a fault in the unit, battery or AC adaptor.

Off:

- Charging has finished.
- If the status indicator stays off despite the charging being unfinished, there may be a fault in the unit, battery or AC adaptor. Refer to page 129 for details on the battery.

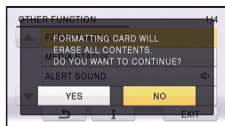
About the SD card

When disposing of or giving away the SD card, note that:

- Formatting and deletion of data on this unit or computer only changes the file management information and does not completely delete the data in the SD card.
- It is recommended that the SD card is physically destroyed or the SD card is physically formatted using this unit when disposing of or giving away the SD card.

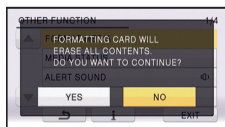
HC-MDH2

To physically format the SD card, connect the unit via the AC adaptor, select [OTHER FUNCTION] → [FORMAT MEDIA] → [SD CARD 1] or [SD CARD 2] from the menu, and then press and hold the recording start/stop button or sub recording start/stop button on the screen below for about 3 seconds. When the SD card data deletion screen appears, select [YES], and then follow the on-screen instructions.



HC-MDH2M

To physically format the SD card, connect the unit via the AC adaptor, select [OTHER FUNCTION] → [FORMAT MEDIA] → [SD CARD] from the menu, and then press and hold the recording start/stop button on the screen below for about 3 seconds. When the SD card data deletion screen appears, select [YES], and then follow the on-screen instructions.



- The customer is responsible for the management of the data in the SD card.

LCD monitor/viewfinder

- When the LCD screen is dirty or condensation has occurred, please wipe it using a soft cloth such as eyeglass cleaner.
- Do not touch the LCD monitor with your fingernails, or rub or press with strong force.
- It may become hard to see or hard to recognise the touch when the LCD protection sheet is affixed.
- When the unit has become very cold, for example due to storage in a cold area, its LCD monitor will be slightly darker than usual immediately after the unit is turned on. The normal brightness will be restored when the unit's internal temperature rises.

Extremely high precision technology is employed to produce the LCD Monitor screen. The result is more than 99.99% effective dots with a mere 0.01% of the dots inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

Extremely high precision technology is employed to produce the viewfinder screen. The result is more than 99.99% effective dots with a mere 0.01% of the dots inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

About copyright

■ Carefully observe copyright laws

Recording of pre-recorded tapes or discs or other published or broadcast material for purposes other than your own private use may infringe copyright laws. Even for the purpose of private use, recording of certain material may be restricted.

■ Licenses

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- "Eye-Fi" is a trademark of Eye-Fi, Inc.

- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

This product is licensed under the AVC patent portfolio license for the personal and non-commercial use of a consumer to (i) encode video in compliance with the AVC Standard ("AVC Video") and/or (ii) decode AVC Video that was encoded by a consumer engaged in a personal and non-commercial activity and/or was obtained from a video provider licensed to provide AVC Video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA, LLC. See <http://www.mpegla.com>.

Recording formats/approximate recordable time

- SD cards are only mentioned with their main memory size. The stated times are the approximate recordable times for continuous recording.

Recording format		[1080/50p]	[PH 1080/50i]	[HA 1080/50i]	[HG 1080/50i]	[HE 1080/50i]
Picture size/ Frame rate		1920×1080/ 50p	1920×1080/ 50i	1920×1080/ 50i	1920×1080/ 50i	1920×1080/ 50i
SD card	4 GB	19 min	21 min	30 min	40 min	1 h 30 min
	16 GB	1 h 20 min	1 h 30 min	2 h	2 h 40 min	6 h 40 min
	64 GB	5 h 20 min	6 h	8 h 30 min	11 h	27 h 30 min
HC-MDH2M Built-in memory	32 GB	2 h 40 min	3 h	4 h 10 min	5 h 30 min	13 h 40 min

- A** Favours image quality
B Favours Recording time

Recording format		[SA 576/50i]	[SX 576/50i]
Picture size/ Frame rate		720×576/ 50i	720×576/ 50i
SD card	4 GB	1 h	2 h
	16 GB	4 h	8 h
	64 GB	16 h 30 min	33 h
HC-MDH2M Built-in memory	32 GB	8 h	16 h

- "h" is an abbreviation for hour and "min" for minute.
- If recording for long periods, prepare batteries for 3 or 4 times the period you wish to record for. (→ 14)
- The default setting is [HG 1080/50i].
- Maximum continuously recordable time for one scene: 6 hours
- The recording is paused once when the recording time for one scene exceeds 6 hours, and the recording will automatically resume after a few seconds.
- The recordable time may be reduced if recording with a lot of action is recorded or recording of short scene is repeated.
- Use time in the row of 4 GB in above table as a guideline for the time that can be copied onto one DVD disc (4.7 GB).

Approximate number of recordable pictures

- SD cards are only mentioned with their main memory size. The stated number is the approximate number of recordable pictures.

Picture size		20.4M 6016×3384	9.4M 4096×2304	2.1M 1920×1080
Aspect ratio		16:9		
SD card	4 GB	300	650	3200
	16 GB	1300	2700	12500
	64 GB	5000	10500	52000
HC-MDH2M Built-in memory		32 GB	2700	5000
			5000	25000

Picture size		15.1M 4480×3360	5.8M 2784×2088	0.3M 640×480
Aspect ratio		4:3		
SD card	4 GB	400	1000	28000
	16 GB	1700	4100	117000
	64 GB	7000	16500	475000
HC-MDH2M Built-in memory		32 GB	3600	8000
			8000	235000

Picture size		15.1M 4752×3168	8M 3456×2304	2M 1728×1152
Aspect ratio		3:2		
SD card	4 GB	400	750	2200
	16 GB	1700	3100	8500
	64 GB	7000	12500	36000
HC-MDH2M Built-in memory		32 GB	3600	6000
			6000	18000

- The number of recordable pictures depends on the subject being recorded.
- Maximum number of recordable pictures that can be displayed is 9999. If the number of recordable pictures exceeds 9999, R 9999+ is displayed. The number will not change when the picture is taken until the number of recordable pictures is 9999 or less.
- The memory capacity indicated on the label of an SD card is the total of the capacity for copyright protection and management and the capacity which can be used on the unit, a PC etc.

Optional accessories

Attaching the Wide Conversion Lens/Filter Kit

Attach the Wide Conversion Lens (VW-W4907H: optional) ND filter or MC protector of the Filter Kit (VW-LF49N: optional) in front of the lens.

- It is not possible to attach it to the front of the lens hood.

Be careful about the following.

When 2 lens accessories, such as the ND filter and Wide Conversion Lens, are fitted and the zoom lever is pressed toward the W side, the 4 corners of an image will be darkened. (Vignetting)

Attaching the lens cap of the Filter Kit (VW-LF49N: optional)

- When the Filter Kit (VW-LF49N: optional) is used, protect the lens surface while the unit is not used with the lens cap supplied with the Filter Kit.

Attaching the optional accessories on the accessory shoe

You can attach a variety of optional accessories to the accessory shoe. For information on how to attach and use those accessories, refer to their manuals.

