

Digital 4K Video Camera Recorder

Operating Guide



“Help Guide” (Web manual)

Refer to “Help Guide” for in-depth instructions on the many functions of the camera.

http://rd1.sony.net/help/cam/1710/h_zz/

Getting started

Recording/Playback

Saving images

Customizing your
camcorder

Others

HANDYCAM®

XAVC S **4K**

HDMI™ **InfoLITHIUM V SERIES**

MEMORY STICK **XC** **N**

Read this first

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

Owner's Record

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

Model No. FDR- _____

Serial No. _____

WARNING

To reduce the risk of fire or electric shock,

1) do not expose the unit to rain or moisture.

2) do not place objects filled with liquids, such as vases, on the apparatus.

Do not expose the batteries to excessive heat such as sunshine, fire or the like.

 Do not ingest battery, chemical burn hazard.

The remote control contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death. Keep new and used batteries away from children. If the battery compartment does not close securely, stop using the product and keep it away from children.

If you think batteries might have been swallowed or placed inside any

part of the body, seek immediate medical attention.

IMPORTANT SAFETY INSTRUCTIONS

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.

- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



CAUTION

Battery pack

If the battery pack is mishandled, the battery pack can burst, cause a fire or even chemical burns. Observe the following cautions.

- Do not disassemble.
- Do not crush and do not expose the battery pack to any shock or force such as hammering, dropping or stepping on it.
- Do not short circuit and do not allow metal objects to come into contact with the battery terminals.
- Do not expose to high temperature above 60°C (140°F) such as in direct sunlight or in a car parked in the sun.

- Do not incinerate or dispose of in fire.
- Do not handle damaged or leaking lithium ion batteries.
- Be sure to charge the battery pack using a genuine Sony battery charger or a device that can charge the battery pack.
- Keep the battery pack out of the reach of small children.
- Keep the battery pack dry.
- Replace only with the same or equivalent type recommended by Sony.
- Dispose of used battery packs promptly as described in the instructions.
- Do not expose to extremely low temperatures of -20°C (-4°F) or lower or extremely low pressures of 11.6 kPa or lower.
- Replace the battery with the specified type only. Otherwise, burst, fire or injury may result.
- Dispose of used batteries according to the instructions.

Use a nearby wall outlet (wall socket) when using the AC Adaptor/Battery Charger. If any malfunction occurs, disconnect the plug from the wall outlet (wall socket) immediately to disconnect from the power source. If you use the product with a charge lamp, note that the product is not disconnected from the power source even when the lamp turns off.

Do not use the AC Adaptor/Battery Charger placed in a narrow space, such as between a wall and furniture.

Notice

If static electricity or electromagnetic causes data transfer to discontinue midway (fail), restart the application or disconnect and connect the communication cable (USB, etc.) again.

This product has been tested and found compliant with the limits set out in the EMC regulation for using connection cables shorter than 3 meters (9.8 feet).

The electromagnetic fields at the specific frequencies may influence the picture and sound of this unit.

IEEE802.11b/g/n	2.4 GHz	<17.7 dBm e.i.r.p.
NFC	13.56 MHz	<60 dBuA/m (10 m)

For Customers in the U.S.A. and Canada

RECYCLING LITHIUM-ION BATTERIES

Lithium-Ion batteries are recyclable. You can help preserve our environment by returning your used rechargeable batteries to the collection and recycling location nearest you.



For more information regarding recycling of rechargeable batteries, call toll free 1-800-822-8837, or visit <http://www.call2recycle.org/>

Caution: Do not handle damaged or leaking Lithium-Ion batteries.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and

meets the FCC radio frequency (RF) Exposure Guidelines. This equipment has very low levels of RF energy that is deemed to comply without testing of specific absorption rate(SAR). The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power Wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure of low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research. This equipment has been tested and found to comply with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules.

For Customers in the U.S.A.

If you have any questions about this product, you may call:

Sony Customer Information Center
1-800-222-SONY (7669).

The number below is for the FCC related matters only.

I Regulatory Information

Declaration of Conformity

Trade Name: SONY

Model No.: FDR-AX700

Responsible Party: Sony

Electronics Inc.

Address: 16535 Via Esprillo,
San Diego, CA 92127
U.S.A.

Telephone No.: 858-942-2230

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment must not be co-located or operated in conjunction with any other antenna or transmitter.

I CAUTION

You are cautioned that any changes or modifications not expressly approved in this manual could void

your authority to operate this equipment.

I Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For the State of California, U.S.A. only

Perchlorate Material - special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate

For Customers in Canada

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

For Customers in Europe

This product has been manufactured by or on behalf of Sony Corporation. EU Importer: Sony Europe Limited. Inquiries to the EU Importer or related to product compliance in Europe should be sent to the manufacturer's authorized representative, Sony Belgium, *bijkantoor van Sony Europe Limited*, Da Vincilaan 7-D1, 1935 Zaventem, Belgium.

Hereby, Sony Corporation, declares that this equipment is in compliance Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:
<http://www.compliance.sony.de/>

Disposal of waste batteries and electrical and electronic equipment (applicable in the European Union and other European countries with separate collection systems)



This symbol on the product, the battery or on the packaging indicates that the product and the battery shall not be

treated as household waste. On certain batteries this symbol might be used in combination with a chemical symbol. The chemical symbols for mercury (Hg) or lead (Pb) are added if the battery contains more than 0.0005% mercury or 0.004% lead. By ensuring these products and batteries are disposed of correctly, you will help prevent potentially negative consequences for the environment and human health which could otherwise be caused by inappropriate waste handling. The recycling of the materials will help to conserve natural resources. In case of products that for safety, performance or data integrity reasons require a permanent connection with an incorporated battery, this battery should be replaced by qualified service staff only. To ensure that the battery and the electrical and electronic equipment will be treated properly, hand over these products at end-of-life to the applicable collection point for the recycling of electrical and electronic equipment. For all other batteries, please view the section on how to remove the battery from the product safely. Hand the battery over to the applicable collection point for the recycling of waste batteries.

For more detailed information about recycling of this product or battery, please contact your local Civic Office, your household waste disposal service or the shop where you purchased the product or battery.

For Customers in Singapore

Complies with
IMDA Standards
DB00353

For Customers in U.A.E.

TRA
REGISTERED No:

ER42682/15

DEALER No:

DA0073692/11

For Customers in Malaysia



Utilizing the Help Guide

The Help Guide is an online manual which you can see on your computer or smartphone. Refer to it for the detailed menu and how to use it, or the latest information.



http://rd1.sony.net/help/cam/1710/h_zz/

FDR-AX700 Help Guide

You will find further information such as the following functions in Help Guide.

- FOCUS AREA
- LOCK-ON AF
- AF DRIVE SPEED
- AF SUBJ. SWITCH. SENS.
- S&Q MOTION
- SUPER SLOW MOTION
- CTRL W/SMARTPHONE
- PICTURE PROFILE (HDR)
- PROXY recording (XAVC S)
- DIRECT menu
- ASSIGN button

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Selecting recording format/image quality

- 1** Press the MENU button → select  (REC/OUT SET) → [REC SET] → [FILE FORMAT] → desired setting value.

FILE FORMAT	Features	
XAVC S 4K	Allows recording with 4K resolution (3,840 × 2,160)	Data can be saved in the computer using the PlayMemories Home™ software.
XAVC S HD	Information volume is greater compared to AVCHD, enabling recording of clearer images. For supporting memory cards with this format, see page 19.	Data can be saved in the computer using the PlayMemories Home software.
AVCHD	Compatibility with recording devices other than computers is good.	Data can be saved in the computer or can be created into supporting media using the PlayMemories Home software.

- 2** Press the MENU button → select  (REC/OUT SET) → [REC SET] → [REC FORMAT] → desired setting value.

- Setting with a higher bit-rate makes image quality higher.
- Selectable setting value depends on the setting you have made by pressing the MENU button → select  (OTHERS) → [60i/50i SEL].
- Refer to the Help Guide for details of the following:
 - S&Q MOTION recording
 - SUPER SLOW MOTION recording
 - Estimated maximum recording time of each recording format

[REC FORMAT] is [XAVC S 4K]

60i/50i SEL	REC FORMAT	Bit-rate*	Actual movie format
60i	2160/30p 100Mbps	100 Mbps	3,840 × 2,160 (30p)
	2160/30p 60Mbps	60 Mbps	3,840 × 2,160 (30p)
	2160/24p 100Mbps	100 Mbps	3,840 × 2,160 (24p)
	2160/24p 60Mbps	60 Mbps	3,840 × 2,160 (24p)
50i	2160/25p 100Mbps	100 Mbps	3,840 × 2,160 (25p)
	2160/25p 60Mbps	60 Mbps	3,840 × 2,160 (25p)

* Approximate value.

[REC FORMAT] is [XAVC S HD]

60i/50i SEL	REC FORMAT	Bit-rate*	Actual movie format
60i	1080/120p 100Mbps	100 Mbps	1,920 × 1,080 (120p)
	1080/120p 60Mbps	60 Mbps	1,920 × 1,080 (120p)
	1080/60p 50Mbps	50 Mbps	1,920 × 1,080 (60p)
	1080/60p 25Mbps	25 Mbps	1,920 × 1,080 (60p)
	1080/30p 50Mbps	50 Mbps	1,920 × 1,080 (30p)
	1080/30p 16Mbps	16 Mbps	1,920 × 1,080 (30p)
	1080/24p 50Mbps	50 Mbps	1,920 × 1,080 (24p)
50i	1080/100p 100Mbps	100 Mbps	1,920 × 1,080 (100p)
	1080/100p 60Mbps	60 Mbps	1,920 × 1,080 (100p)
	1080/50p 50Mbps	50 Mbps	1,920 × 1,080 (50p)
	1080/50p 25Mbps	25 Mbps	1,920 × 1,080 (50p)
	1080/25p 50Mbps	50 Mbps	1,920 × 1,080 (25p)
	1080/25p 16Mbps	16 Mbps	1,920 × 1,080 (25p)

* Approximate value.

[REC FORMAT] is [AVCHD]

60i/50i SEL	REC FORMAT ^{*1}	Bit-rate	Actual movie format
60i	1080/60i FX	Max. 24 Mbps	1,920 × 1,080 (60i)
	1080/60i FH	Avg. 17 Mbps ^{*2}	1,920 × 1,080 (60i)
	1080/60i LP	Avg. 5 Mbps ^{*2}	1,920 × 1,080 (60i)
50i	1080/50i FX	Max. 24 Mbps	1,920 × 1,080 (50i)
	1080/50i FH	Avg. 17 Mbps ^{*2}	1,920 × 1,080 (50i)
	1080/50i LP	Avg. 5 Mbps ^{*2}	1,920 × 1,080 (50i)

^{*1} When you create an AVCHD disc from movies recorded with the [REC FORMAT] setting of [1080/60i FX] or [1080/50i FX], it takes long time to change the image quality.

^{*2} Approximate value.

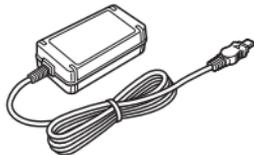
Notes

- To view the movies recorded with your camcorder on a TV, set [60i/50i SEL] in advance to the appropriate TV system for the country/region in which you intend to watch the movies. For the country/region where you can watch TV in each setting, refer to the Help Guide.

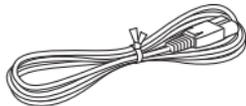
Supplied items

The numbers in () indicate the supplied quantity.

- Camcorder (1)
- AC Adaptor (1)



- Power cord (mains lead) (1)



- Wireless remote commander (1)

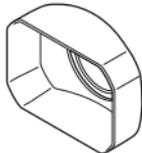


A button-type lithium battery is already installed.

- Large eyecup (1)



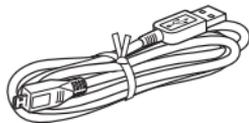
- Lens hood (1)



- Lens cap (attached to the lens) (1)



- USB cable (1)

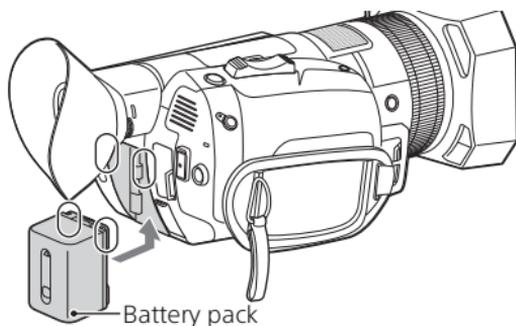


- "Operating Guide" (This manual) (1)
- Rechargeable battery pack NP-FV70A (1)

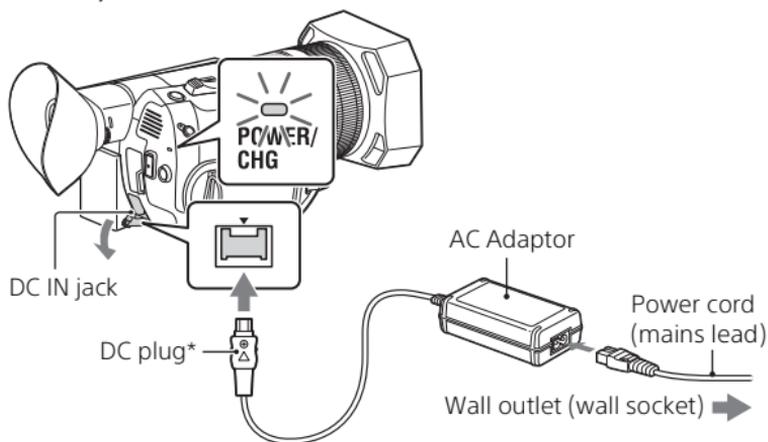


Charging the battery pack

- 1 Turn off your camcorder by closing the LCD monitor, retract the viewfinder, and attach the battery pack.



- 2 Connect the AC Adaptor and the power cord (mains lead) to your camcorder and the wall outlet (wall socket).



- * Align the ▲ mark on the DC plug with that on the DC IN jack.
- The POWER/CHG (charge) lamp turns orange.
- The POWER/CHG (charge) lamp turns off when the battery pack is fully charged. Disconnect the AC Adaptor from the DC IN jack of the camcorder.

Estimated time of charging the supplied battery pack (minutes)

Battery pack	AC Adaptor (supplied)
NP-FV70A	170

- The charging times are measured when charging an empty battery pack to its full capacity at a room temperature of 25°C (77°F).

Estimated time of recording and playback using the supplied battery pack (minutes)

Battery pack	Recording time		Playback time
	Continuous	Typical	
NP-FV70A	190	95	275

- The recording and playback times are measured when using the camcorder at 25°C (77°F).
- The recording times are measured when recording movies with the default settings ([FILE FORMAT]: [XAVC S 4K], [REC FORMAT]: [2160/30p 60Mbps] (60i) or [2160/25p 60Mbps] (50i), [PROXY REC MODE]: [OFF]).
- Typical recording time shows the time when you repeat starting/stopping recording, switching the SHOOTING MODE, zooming, etc.
- The recording time shows the time when recording with the LCD monitor open.

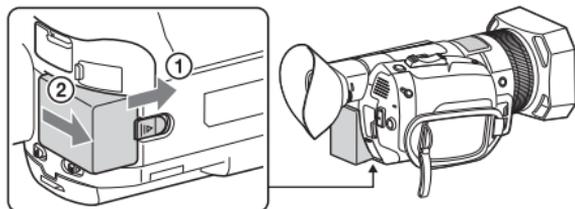
To use your camcorder connected to the wall outlet (wall socket)

Connect the camcorder to the wall outlet (wall socket) in the same way as "Charging the battery pack."

You can use the AC Adaptor to obtain the AC power. If you attach the battery pack to the camcorder while the AC adaptor is connected to the camcorder, the battery is not charged, but also not consumed.

| To remove the battery pack

Turn off your camcorder. Slide the BATT (battery) release lever (①) and remove the battery pack (②).



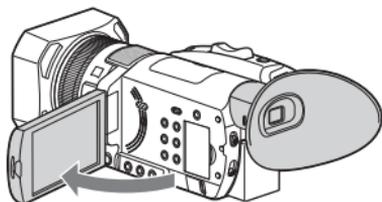
| To charge the battery pack abroad

You can charge the battery pack in any countries/regions using the AC Adaptor supplied with your camcorder within the AC 100 V - 240 V, 50 Hz/60 Hz range.

- Do not use an electronic voltage transformer.

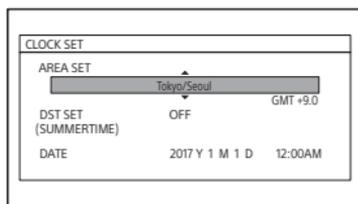
Turning the power on

- 1 Open the LCD monitor of your camcorder and turn the power on.



- You can also turn on the power by extending the viewfinder or by pressing the \odot (On/Standby) button. To extend the viewfinder, grip both side of the viewfinder and pull it out horizontally.
- When you use your camcorder for the first time, the [CLOCK SET] screen appears.

- 2 Follow the instructions on the LCD monitor and select AREA SET, DST SET (SUMMERTIME), and DATE with the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button.

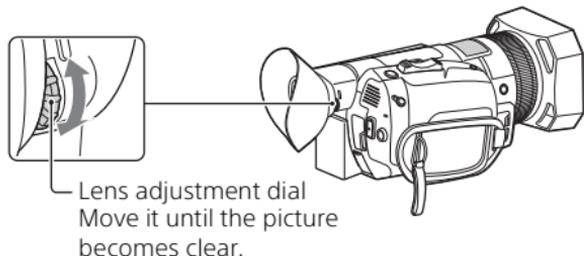


- For detail how to use the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button, see page 46.
- To change the screen language, press the MENU button and select \equiv (OTHERS) - [LANGUAGE] with the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button.
- To turn off the power, close the LCD monitor or press the \odot (On/Standby) button. If the viewfinder is extended, retract it.
- To set the date and time again, press the MENU button \rightarrow select \equiv (OTHERS) \rightarrow [CLOCK SET] with the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button. (In case you haven't used your camcorder for several months)
- To turn off the operating sound, press the MENU button \rightarrow select \equiv (OTHERS) \rightarrow [BEEP] \rightarrow [OFF] with the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button.

Adjusting the viewfinder

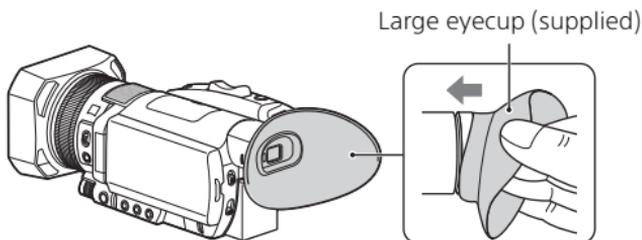
When using the viewfinder, extend it and position your eye near it. If you extend the viewfinder while the LCD monitor is open, the display switches from the LCD monitor to the viewfinder when you position your eye near the viewfinder.

If the viewfinder image appears blurred, turn the lens adjustment dial next to the viewfinder until the image is sharp.



When the picture in the viewfinder is hard to see

If you cannot see the picture in the viewfinder clearly under bright circumstances, use the supplied large eyecup. To attach the large eyecup, stretch it slightly and fit it over the groove on the camcorder. You can attach the large eyecup facing either the right or left side.

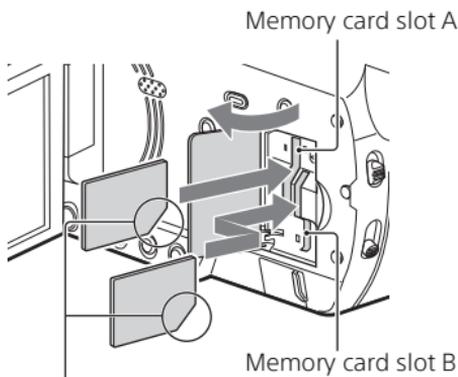


Notes

- If the viewfinder is extended while the battery pack NP-FV100A (sold separately) is attached, the large eyecup and battery pack may interfere with each other slightly. However, this does not affect the functionality of the camcorder.

Inserting a memory card

- 1 Open the cover, and insert the memory card until it clicks.



Insert the card with the notched corner in the direction as illustrated.

- The [Preparing image database file. Please wait.] screen appears if you insert a new memory card. Wait until the screen disappears.
 - Memory card slot A accepts either Memory Stick media or an SD card. Memory card slot B accepts an SD card only.
-
- To eject the memory card, open the cover and lightly push the memory card in once.

Types of memory card you can use with your camcorder

Select the type of memory card to use with the camcorder referring to the following table.

SD cards

Recording formats		Supporting memory cards
Photos		SD/SDHC/SDXC memory card
AVCHD		SD/SDHC/SDXC memory card (Class 4 or faster, or U1 or faster.)
XAVC S	4K 60 Mbps* HD 60 Mbps* HD 50 Mbps or less*	SDHC/SDXC memory card (Class 10 or faster, or U1 or faster.)
	4K 100 Mbps* HD 100 Mbps	SDHC/SDXC memory card (U3)
	S&Q MOTION	
	SUPER SLOW MOTION	SDHC/SDXC memory card (Class 10 or faster, or U1 or faster.)

* Including in the proxy recording mode.

Memory Stick media

Recording formats		Supporting memory cards
Photos		Memory Stick PRO Duo™ media, Memory Stick PRO-HG Duo™ media
AVCHD		Memory Stick PRO Duo media (Mark 2), Memory Stick PRO-HG Duo media
XAVC S		—

Notes

- The movies recorded will be divided into files of 4 GB when a SDHC memory card is used to record XAVC S movies over extended periods of time.

The divided files will be played back continuously when played back on the camcorder.

The divided files can be integrated into the single file by using PlayMemories Home.

- Proper operation with all memory cards is not guaranteed. Contact the manufacturer of each memory card for the compatibility of memory cards other than Sony.
 - When you use the camcorder with the Memory Stick Micro media or microSD memory card, insert into a dedicated card adaptor and connect it to the camcorder.
 - To repair the image database file, charge the battery pack fully in advance.
 - Movies saved on SDXC memory cards cannot be imported to or played back on computers or AV devices not supporting the exFAT(*) file system by connecting this product to these devices with the USB cable. Confirm in advance that the connecting equipment is supporting the exFAT system. If you connect equipment not supporting the exFAT system and a message that prompts you to perform formatting appears, do not perform the formatting. All the data saved will be lost.
- * The exFAT is a file system that is used for SDXC memory cards.

| Selecting the memory card slot to be used

Press the SLOT SELECT button to change which slot is selected for recording. You can confirm the selected slot on the screen.

When only one slot has a memory card inserted or in movie shooting, the slot that has the memory card is selected automatically. When the shooting mode is PHOTO, change the slot to which the memory card is currently inserted by pressing the SLOT SELECT button.

Notes

- You can only select a slot that already has a memory card inserted.
- While movies are being recorded on the memory card, you cannot switch the slot even if you press the SLOT SELECT button.

| To format the memory card

- To ensure stable operation of the memory card, it is recommended to format the memory card with your camcorder before the first use.
- To format the memory card, press the MENU button → select  (OTHERS) → [MEDIA FORMAT] → the slot which the medium you want to format is inserted →  with the ▲/▼/◀/▶/SET button.
- Formatting the memory card will erase all the data stored on it and the data will be irrecoverable. Save your important data on your PC, etc.

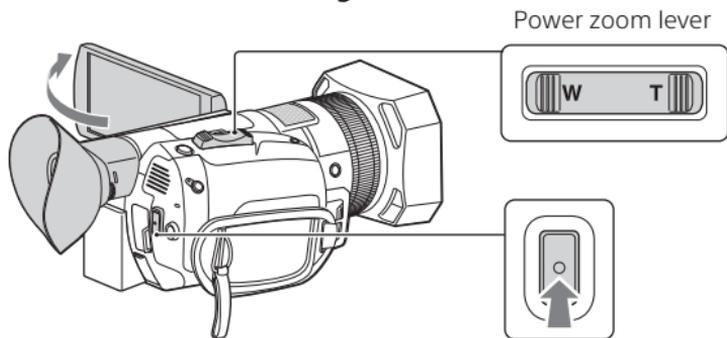
Recording

Recording movies

Your camcorder records movies on a memory card. The factory setting of recording movies is XAVC S 4K. Perform the following steps to record movies.

See page 9 for details of the recording format and image quality of movies.

- 1 Open the LCD monitor, and press the START/STOP button to start recording.



- To stop recording, press the START/STOP button again.

Notes

- When movie recording and outputting images to an external device (HDMI output) are performed simultaneously, [NIGHTSHOT LIGHT] is fixed to [OFF]. Also, when recording a movie with the [XAVC S 4K] 100Mbps or [XAVC S 4K] 60Mbps setting and outputting images to an external device (HDMI output) are performed simultaneously, [LCD BRIGHT] is fixed to [NORMAL].
- When the memory card access lamp is lit or flashing in red, your camcorder is reading or writing data on memory card. Do not shake or apply strong force to your camcorder, do not turn the power off, and do not remove the memory card, battery pack or the AC Adaptor. The image data may be destroyed.
- If a movie file size exceeds 2 GB while recording in AVCHD format, the camcorder automatically divides the file and creates a new one.
- The menu settings, picture profile settings, and settings made using the AUTO/MANUAL switch are saved when you close the LCD monitor and

turn the power off. The POWER/CHG (charge) lamp flashes while the settings are being stored.

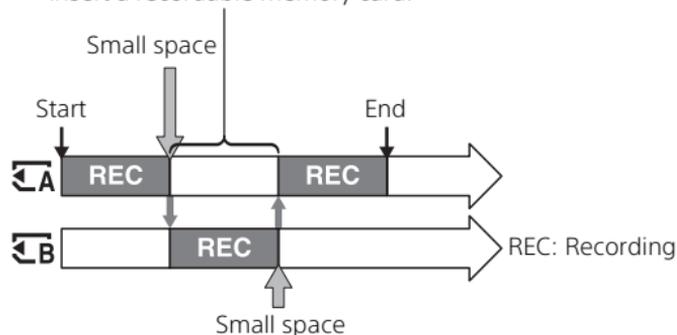
▶ To continue recording on the memory cards, one after another (Relay recording)

Insert memory cards each in both slots A and B, so the camcorder switches memory card A (or B) just before space on the other one runs out, and continues recording on the next memory card automatically.

Do the following setting before recording.

Press the MENU button → select $\left[\rightleftharpoons \right]$ (REC/OUT SET) → [REC SET] → [SIMUL/RELAY REC] → [RELAY REC] with the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button.

Insert a recordable memory card.



Notes

- Do not eject the memory card that is currently being used for recording. When replacing a memory card while recording, replace only the one in the slot whose access lamp is off.
- Even if you press the SLOT SELECT button, while recording movies, you cannot switch the slot currently being used.
- When the remaining recording time of the memory card being used is less than 1 minute and the other slot has recordable memory card inserted, [$\left[\rightleftharpoons \right]$ A → $\left[\rightleftharpoons \right]$ B] or [$\left[\rightleftharpoons \right]$ B → $\left[\rightleftharpoons \right]$ A] appears on the camcorder screen. The indicator turns off when the memory card is switched.
- If you start recording on a memory card with the remaining recording time of less than 1 minute, the camcorder may not be able to relay-record. To perform relay recording without fail, make sure that the capacity of the memory card is more than 1 minute when you start recording.
- Seamless playback of relay-recorded movies with this camcorder is not possible.

- You can re-combine relay-recorded movies using the application software "PlayMemories Home."
- The maximum continuous recording time for a movie is approximately 13 hours.

| To record movies using both the memory card A and B (Simultaneous recording)

You can record movies on both of these memory cards simultaneously.

Press the MENU button → select  (REC/OUT SET) → [REC SET] → [SIMUL/RELAY REC] → [SIMULTANEOUS REC] with the ▲/▼/◀/▶/SET button.

Notes

- Simultaneous recording is not available when type of memory cards inserted in memory card slots A and B is different.

| Approximate recording time available

FILE FORMAT	Memory card*1	
	64 GB	256 GB
XAVC S 4K*2	2 h 5 min.	8 h 35 min.
XAVC S HD*3	2 h 30 min.	10 h 25 min.
AVCHD*4	8 h 15 min.	33 h 15 min.

*1 When using a Sony memory card.

*2 When recording with the default setting:

[REC FORMAT]: [2160/30p 60Mbps] (60i) or [2160/25p 60Mbps] (50i),
[PROXY REC MODE]: [OFF].

*3 Approximate recording time when recording with the following setting:

[REC FORMAT]: [1080/60p 50Mbps] (60i) or [1080/50p 50Mbps] (50i),
[PROXY REC MODE]: [OFF].

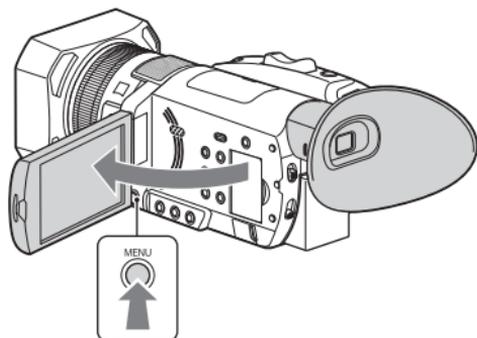
*4 Approximate recording time when recording with the following setting:

[REC FORMAT]: [1080/60i FH] (60i) or [1080/50i FH] (50i).

- The actual recording time or number of recordable photos is displayed on the LCD monitor during recording.

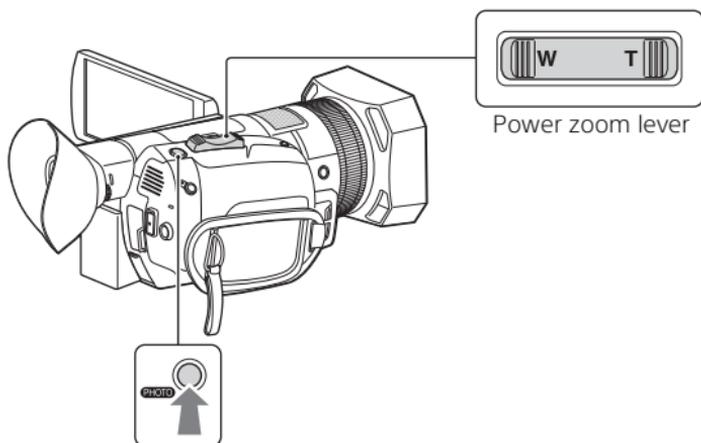
Shooting photos

- 1 Open the LCD monitor and switch the shooting mode to photo mode by selecting →  (REC/OUT SET) → [/SHOOTING MODE] → [PHOTO] with the ▲/▼/◀/▶/SET button.



- You cannot take photos when the camcorder is in movie mode.

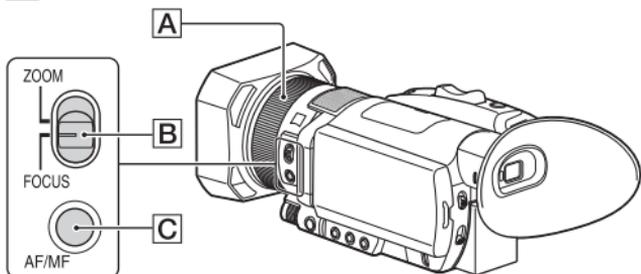
- 2 Press the PHOTO button lightly to adjust the focus, then press it fully.



Using the manual adjustment features

Adjusting the focus

- 1 During recording or standby, press the AF/MF button **C** to set the focus to manual.



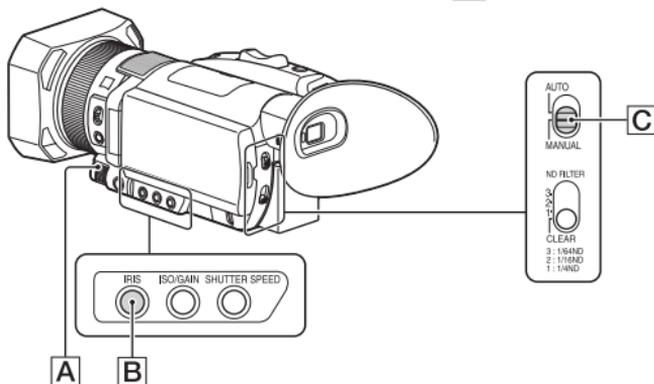
-  appears.

- 2 Move the ZOOM/FOCUS switch **B**, and turn the manual lens ring **A**.

- FOCUS: You can manually adjust the focus by turning the manual lens ring.
- ZOOM: You can manually adjust the zoom by turning the manual lens ring.
 -  changes to  when the focus cannot be adjusted any farther, or changes to  when the focus cannot be adjusted any closer.

Adjusting the iris

- 1 Set the AUTO/MANUAL switch **C** to "MANUAL."

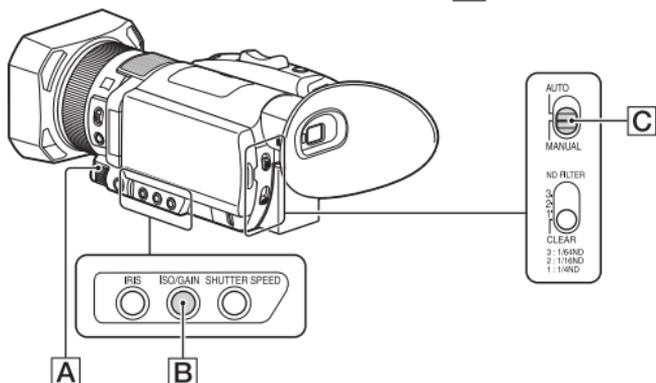


- 2 Press the IRIS button **B**.
 - The **A** or **E** next to the iris value disappears, and the iris value is highlighted.
- 3 Turn the manual dial **A** to adjust the value and press the **▲/▼/◀/▶/SET** button to enter.
 - The volume of the light increases the more that you open the aperture (decreasing F value). The volume of the light decreases the more that you close the aperture (increasing F value).

Adjusting the gain

You can use this if you do not want to increase the gain value by AGC (automatic gain control).

- 1 Set the AUTO/MANUAL switch **C** to “MANUAL.”

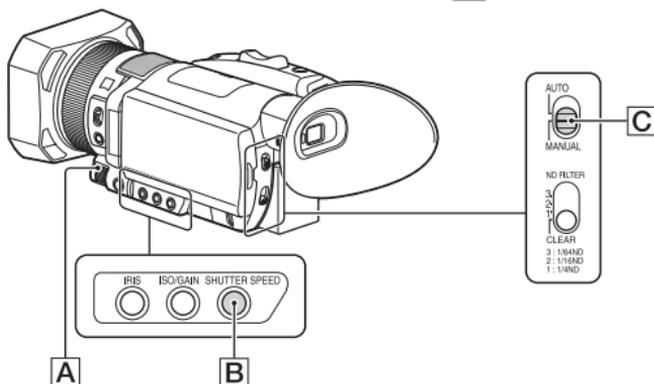


- 2 Press the ISO/GAIN button **B**.
 - The **A** or **E** next to the gain value disappears, and the gain value is highlighted.
- 3 Turn the manual dial **A** to adjust the value and press the **▲/▼/◀/▶/SET** button to enter.

Adjusting the shutter speed

You can adjust and fix the shutter speed manually.

- 1 Set the AUTO/MANUAL switch **C** to "MANUAL."



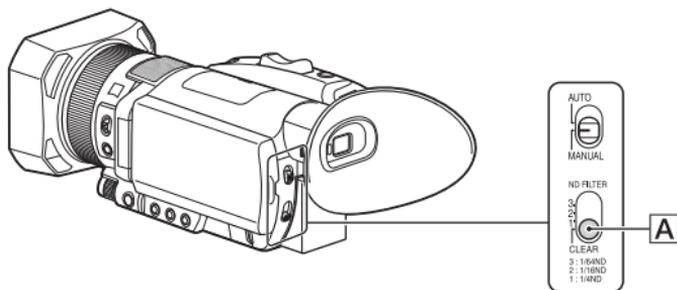
- 2 Press the SHUTTER SPEED button **B**.

- The **A** or **E** next to the shutter speed value disappears, and the shutter speed value is highlighted.

- 3 Turn the manual dial **A** to adjust the value and press the **▲/▼/◀/▶/SET** button to enter.

- When [60i] is selected: You can select from 1/8 to 1/10000 (1/6 - 1/10000 when shooting with 24p).
- When [50i] is selected: You can select from 1/6 to 1/10000.
- The denominator of the set shutter speed appears on the LCD monitor. For example, [100] appears on the LCD monitor when you set the shutter speed to 1/100 second. The larger the value on the LCD monitor is, the faster the shutter speed is.

Adjusting the volume of light (ND filter)



You can record the subject clearly by using the ND FILTER switch **A** when the recording environment is too bright.

The ND filters 1, 2 and 3 reduce the volume of light to about 1/4, 1/16 and 1/64, respectively.

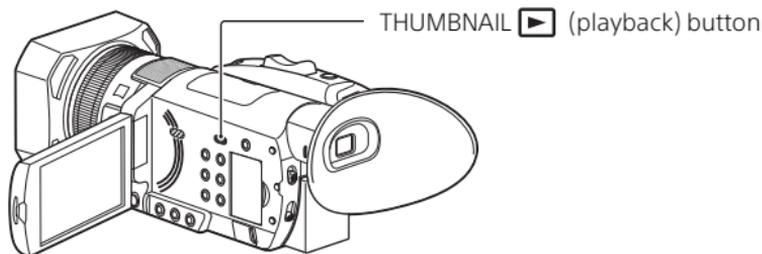
If **ND1** flashes during the iris automatic adjustment, set the ND filter to 1. If **ND2** flashes during the iris automatic adjustment, set the ND filter to 2. If **ND3** flashes during the iris automatic adjustment, set the ND filter to 3.

When an appropriate brightness is achieved, the ND filter indicator stops flashing and remains lit on the screen.

If **NDOFF** flashes, set the ND FILTER switch **A** to "CLEAR." The ND filter icon will disappear from the screen.

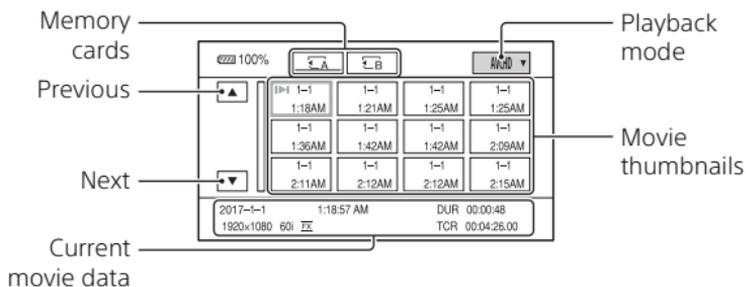
Playback

- 1 Open the LCD monitor and press the THUMBNAIL  (playback) button on the camcorder to enter the playback mode.



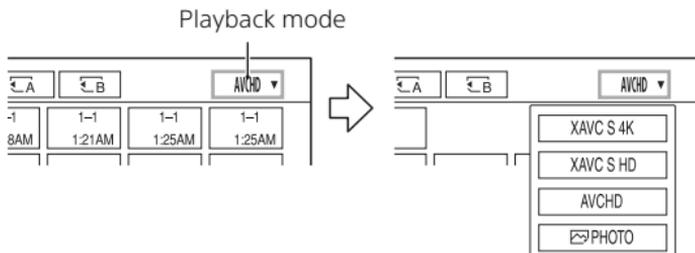
- The thumbnail screen appears.
- You can turn on or off the date and time display on the thumbnails by pressing the DISPLAY button.

- 2 Touch the memory card you want to play back.



- You can also select the desired memory card  (memory card A) or  (memory card B) with the ////SET button. Press the SET button to display the thumbnails in that media.

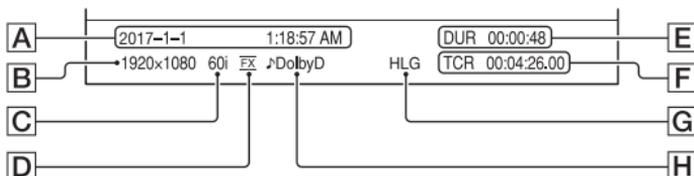
3 Touch the playback mode, and select the desired image quality of movies.



4 Touch twice the thumbnail of the movie you want to play back.

- You can also select the movie or photo to be played back by pressing the ▲/▼/◀/▶/SET button followed by pressing the SET button.
- The first touch of the thumbnail will show the information on the movie or photo at the lower part of the screen.

Movies



A Date and time of recording started

B Resolution

C Frame rate

D Recording mode

E Duration

F Time code of recording started

Time code will not be displayed correctly when you play back memory card with no time code, or memory card with time code that your camcorder does not support.

G HLG (Hybrid Log-Gamma) recording

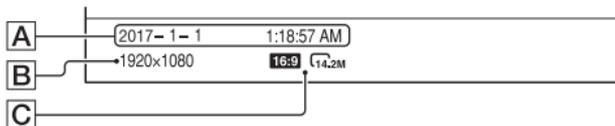
Displayed when movies are recorded with Hybrid Log-Gamma (HLG).

H DOLBY DIGITAL recording

Displayed when audio is recorded in Dolby Digital format.

- **▶|▶** appears with the movie that has been most recently played back or recorded. If you touch the movie with **▶|▶**, you can continue playback from the previous time.

Photos

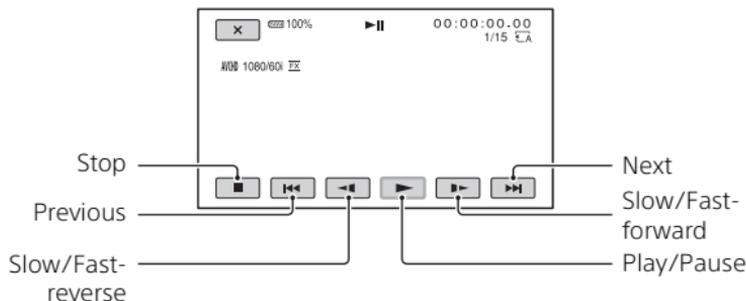


- A** Date and time of shooting
- B** Number of pixels
- C** Image size

Notes

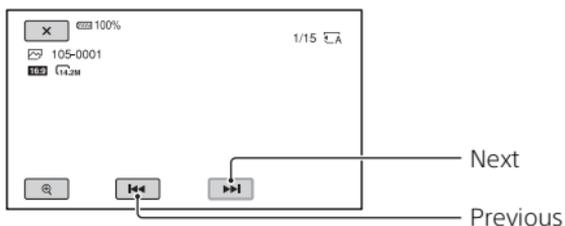
- You may not be able to play back images that were recorded on your camcorder with other devices normally. Also, you may not be able to play back images recorded on other devices with your camcorder.

Operations of playing back movies



- When playback from the selected movie reaches the last movie, the screen returns to the thumbnail screen.
- Touch **◀|▶** during pause to play back movies slowly.
- The playback speed increases based on the number of times that you touch **◀▶**.

| Operations of playing back photos



- Touch (playback zoom) when playing back a photo.
- You can adjust the zoom with / , or with the power zoom lever.
- When you touch the enlarged image, the touched point will be displayed at the center of the screen.

| To adjust the volume

Press the MENU button and select (AUDIO SET) → [VOLUME] with the ////SET button.

| To return to the recording mode

Press the THUMBNAIL (playback) button.

| To delete the images



- ① Select the playback mode of the image to delete on the thumbnail screen.
- ② Press the MENU button.
- ③ Select  (EDIT) → [DELETE] with the ▲/▼/◀/▶/SET button.
- ④ Touch the thumbnail you want to delete.
 -  is displayed on the selected thumbnail.
 - Press and hold the thumbnail down to preview the image. Touch  to return to the previous screen.
 - You can select up to 100 images at one time.
- ⑤ Touch  →  → .

Notes

- Do not remove the battery pack, the AC Adaptor or the memory card that contains the movies or photos from your camcorder during the deletion. It may damage the memory card.

| How to set the playback images

FILE FORMAT	TV	[HDMI] in [VIDEO OUT]*	Playback image quality
XAVC S 4K	4K TV	AUTO 2160p/1080p/480i(576i) 2160p/720p/480i(576i) 2160p/1080i/480i(576i)	4K image quality
		1080p/480i(576i) 720p/480i(576i) 1080i/480i(576i)	High definition image quality (HD)
		480p(576p) 480i(576i)	Standard image quality
	High definition TV	AUTO 2160p/1080p/480i(576i) 2160p/720p/480i(576i) 2160p/1080i/480i(576i) 1080p/480i(576i) 720p/480i(576i) 1080i/480i(576i)	High definition image quality (HD)
		480p(576p) 480i(576i)	Standard image quality
XAVC S HD AVCHD	4K TV or High definition TV	AUTO 2160p/1080p/480i(576i) 2160p/720p/480i(576i) 2160p/1080i/480i(576i) 1080p/480i(576i) 720p/480i(576i) 1080i/480i(576i)	High definition image quality (HD)
		480p(576p) 480i(576i)	Standard image quality

* () is the value when [60i/50i SEL] is set to 50i.

- Playback image quality of photos is high definition image quality (HD).
- To change the setting, change [HDMI] setting.

Press the MENU button → select  (REC/OUT SET) → [VIDEO OUT] → [HDMI] with the ▲/▼/◀/▶/SET button.

- If your TV does not have an HDMI jack, connect the Multi/Micro USB Terminal of the camcorder to the video/audio input jacks of the TV using an AV cable (sold separately).
- The camcorder does not support BRAVIA Sync.

Importing images to your computer

What you can do with PlayMemories Home

PlayMemories Home allows you to import movies and photos to your computer to use them in a variety of ways.

- Update PlayMemories Home to the latest version before using.



Import images from the camcorder.

For Windows, the following functions are also available.



Viewing images on Calendar



Creating movie discs



Uploading images to network services

Playing back imported images



Sharing images on PlayMemories Online™



How to download PlayMemories Home

PlayMemories Home can be downloaded from the following URL.

<http://www.sony.net/pm/>

How to check the computer system

You can check the computer requirements for the software at the following URL.

<http://www.sony.net/pcenv/>



Saving images on an external media device

How to store movies and photos to an external media device is explained here. Also refer to the instruction manual supplied with the external media device.

Store movies to a computer using PlayMemories Home software (page 39).

How to store movies

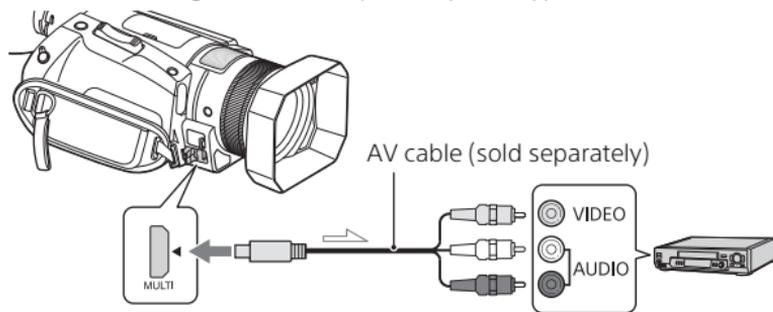
Device	Cable	Image quality/ Recording format	Media
Recorder without a USB jack	AV cable (sold separately)	Standard definition image quality	DVD
Computer	USB cable (supplied)	4K/High definition image quality (HD) <ul style="list-style-type: none">• XAVC S• AVCHD	Computer and connected external media

- See the following website for the latest storage environment.
<http://www.sony.net/>
- You can store images by connecting to a recorder with an analog AV cable (sold separately). Movies are copied with standard definition image quality (page 41).

How to connect a device

| Recorder without a USB jack

Connect a recorder to the Multi/Micro USB Terminal of your camcorder using an AV cable (sold separately).



➤ Signal flow

- For how to save images, also refer to the instruction manual of your recording device.
- Movies are copied with standard definition image quality.

Using the Wi-Fi function

Installing PlayMemories Mobile™ on your smartphone

For the latest information and more detailed information on the functions of PlayMemories Mobile, visit the following URL.



<http://www.sony.net/pmm/>

| Android OS

Install PlayMemories Mobile from Google Play.



- Android 4.0 or higher is required to use One-touch functions (NFC).

| iOS

Install PlayMemories Mobile from App Store.



- One-touch functions (NFC) are not available with iOS.

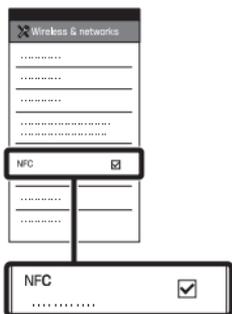
Notes

- You may not be able to download PlayMemories Mobile from Google Play or App Store depending on the country or the region. In that case, search for "PlayMemories Mobile".
- If PlayMemories Mobile is already installed in your smartphone, update the software to the latest version.
- The Wi-Fi function described here is not guaranteed to work on all smartphones and tablets.
- The Wi-Fi function of the camcorder cannot be used connected to a public wireless LAN.
- To use the One-touch functions (NFC) of the camcorder, a smartphone or tablet supporting the NFC function is required.
- The operation methods and display screens for the application are subject to change without notice by future upgrades.

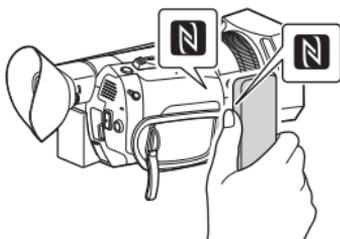
Using your smartphone as a wireless remote commander

1 One-touch connection with an Android supporting NFC

- 1 On the smartphone, select [Settings], then, select [More] to check that [NFC] is enabled.



- 2 Touch the smartphone on the camcorder.



- 3 Operate the connected smartphone.

Notes

- Cancel the sleep mode or unlock the screen on the smartphone beforehand.

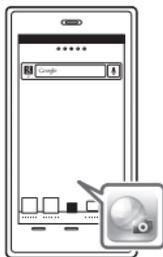
- Make sure that **N** is displayed on the LCD monitor of the camcorder and the smartphone.
- Continue touching the smartphone to the camcorder without moving until PlayMemories Mobile starts (1 to 2 seconds).
- If the camcorder cannot be connected with the smartphone by NFC, see "Connecting to a Wi-Fi network using the QR Code" (page 43).

2 Connecting to a Wi-Fi network using the QR Code

- 1 Press the MENU button → select (NETWORK SET) → [CTRL W/SMARTPHONE].
 - The QR Code, SSID, and Password are displayed.



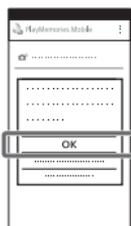
- 2 Start up PlayMemories Mobile.



- 3** Select [Scan QR Code of the Camera] from the screen of PlayMemories Mobile.



- 4** Select [OK]. (If a message appears, select [OK] again.)



- 5** With your smartphone, read the QR Code displayed on the LCD monitor of the camcorder.

Android

Perform the following operations.

- ① When [Connect with the camera?] is displayed, select [Connect].

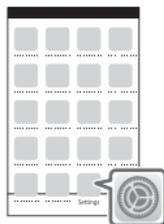
iPhone/iPad

Perform the following operations.

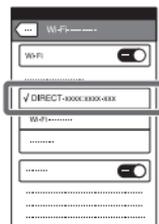
- ① Follow the on-screen instruction and install the profile (setting information).
- If you are required to enter the pass code during installation, enter it set to the iPhone.



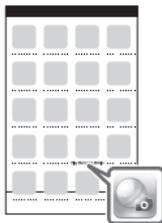
- ② On Home, select [Settings] → [Wi-Fi].



- ③ Select the SSID of the camcorder.



- ④ Go back to Home and start up PlayMemories Mobile.



6 Operate the connected smartphone.

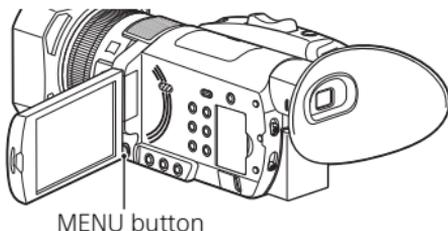
- Once the QR Code has been read and the connection has been successfully established, the SSID (DIRECT-xxxx) and the password of the camcorder will be registered onto your smartphone. The subsequent Wi-Fi connection between the camcorder and your smartphone will only require selecting the SSID of the camcorder registered on your smartphone.
- If the camcorder cannot be connected with the smartphone by NFC and by reading the QR Code, connect by using the SSID and the password. For more details, refer to "Help Guide".

Notes

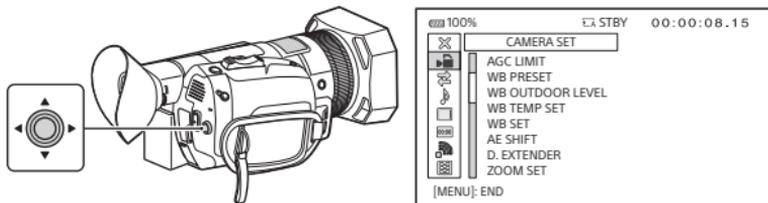
- Depending on local electrical interference or the smartphone's capabilities, the live view images may not be displayed smoothly.
- Images recorded with the camcorder cannot be saved in the smartphone.

Using the menus

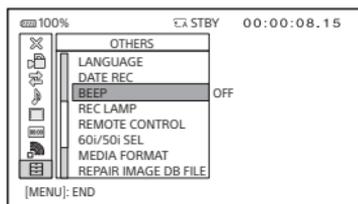
- 1 Press the MENU button.



- 2 Select a menu icon with the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button and press the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button to enter.



- 3 Press the $\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$ /SET button to select a desired menu item.



- To finish the MENU, press the MENU button.
- Select [\blacktriangleleft RETURN] to return to the previous menu screen.

Menu lists

CAMERA SET

ISO/GAIN SEL ^{*1}
AUTO ISO LIMIT
AGC LIMIT ^{*1}
WB PRESET
WB OUTDOOR LEVEL
WB TEMP SET
WB SET
AE SHIFT
D. EXTENDER ^{*1}
ZOOM SET
 STEADYSHOT ^{*1}
 STEADYSHOT ^{*2}
FOCUS AREA ^{*1}
AF DRIVE SPEED ^{*1}
AF SUBJ. TRACK SET ^{*1}
LOCK-ON AF
FACE DETECTION
SLOW & QUICK ^{*1}
AUTO MODE SET ^{*1, *3}
SCENE SELECTION SET ^{*1}
SPOT METER/FOCUS
SPOT METER
SPOT FOCUS
LOW LUX ^{*1}
AUTO BACK LIGHT ^{*1}
NIGHTSHOT ^{*1}
NIGHTSHOT LIGHT ^{*1}
COLOR BAR ^{*1}
PICTURE PROFILE ^{*1}

REC/OUT SET

 /  SHOOTING MODE
REC SET ^{*1}

IMAGE SIZE^{*2}

FILE NUMBER^{*2}

VIDEO OUT

AUDIO SET

VOLUME
AVCHD AUDIO FORMAT ^{*1}
AUDIO REC LEVEL ^{*1}
INT MIC WIND ^{*1}
MIC SELECT ^{*1}
AUDIO OUTPUT TIMING ^{*1}

DISPLAY SET

HISTOGRAM
ZEBRA
PEAKING
PHASE AF FRAMES ^{*1}
PHASE DETECT. AF AREA ^{*1}
MARKER
FOCUS MAG RATIO
CAMERA DATA DISPLAY
AUDIO LEVEL DISPLAY ^{*1}
ZOOM DISPLAY
FOCUS DISPLAY
SHUTTER DISPLAY ^{*1}
DATA CODE ^{*4}
GAMMA DISP ASSIST ^{*1}
LCD BRIGHT
VF COLOR TEMP.
DISPLAY OUTPUT

TC/UB SET^{*1}

TC/UB DISPLAY
TC PRESET
UB PRESET
TC FORMAT
TC RUN
TC MAKE

UB TIME REC



NETWORK SET

CTRL W/SMARTPHONE

Wi-Fi SET

AIRPLANE MODE

NETWORK RESET



OTHERS

STATUS CHECK

CAMERA PROFILE

S&Q BUTTON SETTING^{*1}

ASSIGN BUTTON

CLOCK SET

AREA SET

DST SET (SUMMERTIME)

LANGUAGE

DATE REC^{*1, *5}

BEEP

REC LAMP

REMOTE CONTROL

60i/50i SEL

MEDIA FORMAT

REPAIR IMAGE DB FILE

USB CONNECT

USB LUN SET

OPERATION TIME

VERSION DISPLAY

CALIBRATION

INITIALIZE



EDIT^{*6}

PROTECT

DELETE

DIVIDE^{*7}

^{*2} Displayed when the camcorder is in photo mode.

^{*3} When recording in XAVC S 4K, this setting is fixed to [AUTO].

^{*4} Displayed during playback.

^{*5} Displayed when [AVCHD] is selected for [FILE FORMAT].

^{*6} You can display the [ EDIT] menu by pressing the MENU button while the thumbnail or playback screen is displayed.

^{*7} Displayed when you press the MENU button while playing back AVCHD movie.

^{*1} Displayed when the camcorder is in movie mode.

Precautions

AC Adaptor

Do not short-circuit the battery terminal with any metallic objects. This may cause a malfunction.

Playing back images with other devices

You may not be able to play back images that were recorded on your camcorder with other devices normally. Also, you may not be able to play back images recorded on other devices with your camcorder.

Recording and playback

- Avoid rough handling, disassembling, modifying, physical shock, or impact such as hammering, dropping or stepping on the product. Be particularly careful with the lens.
- To ensure stable operation of the memory card, it is recommended to format the memory card with your camcorder before the first use. Formatting the memory card will erase all the data stored on it and the data will be irrecoverable. Save your important data on your PC, etc.
- Confirm the direction of the memory card. If you forcibly insert the memory card in the wrong direction, the memory card, memory card slot, or image data may be damaged.
- Before starting to record, test the recording function to make sure the image and sound are recorded without any problems.

- Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be a violation of the copyright laws.
- Compensation for the content of recordings cannot be provided, even if recording or playback is not possible due to a malfunction of the camcorder, memory card, etc.
- The camcorder is not dustproofed, dripproofed or waterproofed.
- Do not let your camcorder get wet, for example, from rain or sea water. If your camcorder gets wet, it may malfunction. Sometimes this malfunction cannot be repaired.
- Do not aim the camcorder at the sun or strong light. Doing so may cause your camcorder to malfunction.
- Do not use the camcorder near strong radio waves or radiation. The camcorder may not be able to record or play back images properly.
- Do not use the camcorder on a sandy beach or anywhere dusty. Doing so may cause your camcorder to malfunction.
- If moisture condensation occurs, stop using the camcorder until moisture evaporates.
- Do not subject the camcorder to mechanical shock or vibration. If you do so, the camcorder may operate incorrectly or may not record images. In addition, the recording medium or recorded data may be damaged.

LCD monitor

The LCD monitor is manufactured using extremely high-precision technology, so over 99.99% of the pixels are operational for effective use. However, there may be some tiny black points and/or bright points (white, red, blue, or green in color) that appear constantly on the LCD monitor. These points are normal results of the manufacturing process and do not affect the recording in any way.

OLED panel display

The OLED panel may experience issues such as screen burn-in or loss of brightness with normal use over time. This is not a malfunction.

Camcorder temperature

The camcorder and battery pack become warm during operation. This is normal.

Overheat protection

Depending on the camcorder and battery temperature, you may be unable to record movies or the power may turn off automatically to protect the camcorder. A message will be displayed on the LCD monitor before the power turns off or you can no longer record movies. In this case, leave the power off and wait until the camcorder and battery temperature goes down. If you turn on the power without letting the camcorder and battery cool enough, the power may turn off again or you may be unable to record movies.

Deactivating wireless LAN (Wi-Fi, NFC, etc.) temporarily

When you board an airplane, you can deactivate the Wi-Fi function temporarily. Press the MENU button → select  (NETWORK SET) → [AIRPLANE MODE] → [ON].

Wireless LAN

We assume no responsibility whatsoever for any damage caused by unauthorized access to, or unauthorized use of, destinations loaded on the camcorder, resulting from loss or theft.

About the security on using Wireless LAN products

- Please ensure that you always use a secured wireless network with your devices to avoid hacking, unapproved third party access and other vulnerabilities.
- It is important to set security when using the wireless network function.
- Sony makes no guarantees and is not responsible for any damage resulting from having inadequate security or using the wireless network function.

Troubleshooting

If you run into any problems using your camcorder:

- Check your camcorder referring to Help Guide (page 8).
- Disconnect the power source, attach the power source again after about 1 minute, and turn the camcorder on.

- Initialize your camcorder (page 48)
All settings, including the clock setting, are reset.
- Contact your Sony dealer or local authorized Sony service facility.

Specifications

System

Signal format:

When [60i] is selected:

UHDTV

HDTV

NTSC color, EIA standards

When [50i] is selected:

UHDTV

HDTV

PAL color, CCIR standards

Movie recording format:

XAVC S (XAVC S format)

Video: MPEG-4 AVC/H.264

Audio: Linear PCM 2ch

(48 kHz/16 bit)

AVCHD (AVCHD format Ver. 2.0 compatible)

Video: MPEG-4 AVC/H.264

Audio: Linear PCM 2 ch

(48 kHz/16 bit) / Dolby Digital 2 ch

XAVC Proxy (XAVC S format)

Video: MPEG-4 AVC/H.264

Audio: MPEG-4 AAC-LC 2ch

Photo file format:

DCF Ver.2.0 Compatible

Exif Ver.2.3 Compatible

MPF Baseline Compatible

Recording media (Movie/Photo)

XAVC S 4K (100 Mbps) Movie:

SDHC memory card (UHS speed class 3 or faster)^{*1}

SDXC memory card (UHS speed class 3 or faster)^{*1}

XAVC S HD, XAVC S 4K

(60 Mbps) Movie:

SDHC memory card (Class 10, or UHS speed class 1 or faster)^{*1}

SDXC memory card (Class 10, or UHS speed class 1 or faster)^{*1}

AVCHD, Photo:

Memory Stick PRO-HG Duo
SD card (Class 4 or faster, or UHS speed class 1 or faster)

^{*1} Capacity of 4 GB or more is required.

Image device:

1.0 type Exmor RS™ CMOS sensor

Recording pixels (photo, 16:9):

Max 14.20 mega pixels (5 024 × 2 824)

Gross: Approx. 21.00 mega pixels

Effective (movie, 16:9):

Approx. 14.20 mega pixels

Effective (photo, 16:9):

Approx. 14.20 mega pixels

Effective (photo, 3:2):

Approx. 12.00 mega pixels

Lens:

ZEISS Vario-Sonnar T* Lens
12× (optical zoom), 24× (while HD movie recording with Clear image zoom), 18× (while 4K movie recording with Clear image zoom), 192× (digital zoom)

Focal Length (movie)^{*2}:

f=9.3 mm - 111.6 mm

35mm equivalent (16:9)^{*2}

f=29.0 mm - 348.0 mm

Focal Length (photo):

f=9.3 mm - 111.6 mm

35mm equivalent (16:9) f=

29.0 mm - 348.0 mm

Iris: F2.8 - F4.5 auto/manual selectable

Focus: AF/MF selectable,

10 mm to ∞ (Wide), 1,000 mm

to ∞ (Tele)

Filter diameter: M62 mm

^{*2} [ STEADYSHOT] is set to [STANDARD] or [OFF].

Color temperature:

Preset (indoor: 3200K, outdoor: 5600K \pm 7 steps, color temperature set range: 2300K – 15000K), Onepush A, B, Auto selectable

Minimum illumination:

When [60i] is selected:
1.7 lux ([LOW LUX] is set to [ON] and shutter speed is 1/30 sec., Gain is 33 dB.)

When [50i] is selected:
1.7 lux ([LOW LUX] is set to [ON] and shutter speed is 1/25 sec., Gain is 33 dB.)

Input/Output connectors

VIDEO OUT jack: Integrated into Multi/Micro USB Terminal (\times 1), Composite 1.0 Vp-p, 75 Ω

AUDIO OUT jacks: Integrated into Multi/Micro USB Terminal

HDMI OUT jack: Type A (\times 1)

USB jack: Multi/Micro USB Terminal (\times 1)
Supports Micro USB compatible devices.

🎧 (headphones) jack: Stereo mini jack (ϕ 3.5 mm) (\times 1)

MIC jack (PLUG IN POWER): Stereo mini jack (ϕ 3.5 mm) (\times 1)

Multi interface shoe: (\times 1)

REMOTE jack: Stereo mini-mini jack (ϕ 2.5 mm) (\times 1)

Screen

LCD monitor: 8.8 cm (3.5 type), 1,555,200 dots.

Viewfinder: 1.0 cm (0.39 type) OLED, 2,359,296 dots

Wireless LAN

Supported standard:

IEEE 802.11 b/g/n

Frequency: 2.4 GHz

Supported security protocols:

WEP/WPA-PSK/WPA2-PSK

Configuration method: WEP/WPA-PSK/WPA2-PSK

Access method: Infrastructure Mode

NFC: NFC Forum Type 3 Tag compliant

General

Power requirements:

DC 7.4 V (battery pack),
DC 8.4 V (AC Adaptor)

Average power consumption:

During camera recording using the viewfinder with normal brightness: Approx. 4.8 W

During camera recording using the LCD monitor with normal brightness: Approx. 5.1 W

Operating temperature: 0°C to 40°C (32°F to 104°F)

Storage temperature: -20°C to 55°C (-4°F to 131°F)

Dimensions (approx.):

116.0 mm \times 89.5 mm \times 196.5 mm (4 5/8 in. \times 3 5/8 in. \times 7 3/4 in.) (w/h/d) (including the projecting parts)

121.0 mm \times 104.0 mm \times 274.5 mm (4 7/8 in. \times 4 1/8 in. \times 10 7/8 in.) (w/h/d) (including projecting parts, lens hood, large eyecup, and battery pack NP-FV70A, excluding the grip belt)

Mass (approx.):

- 935 g (2 lb 1.0 oz) (with lens hood and large eyecup)
- 1,030 g (2 lb 4.3 oz) (with lens hood, large eyecup, and battery pack NP-FV70A)

AC Adaptor AC-L200 D

Power requirements: AC 100 V - 240 V, 50 Hz/60 Hz

Power consumption: 18 W

Output voltage: DC 8.4 V*

* See the label on the AC Adaptor for other specifications.

Rechargeable battery pack NP-FV70A

Output voltage: DC 7.3 V

Maximum charge voltage: DC 8.4 V

Maximum charge current: 2.3 A

Design and specifications are subject to change without notice.

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Use the following URL to download it.

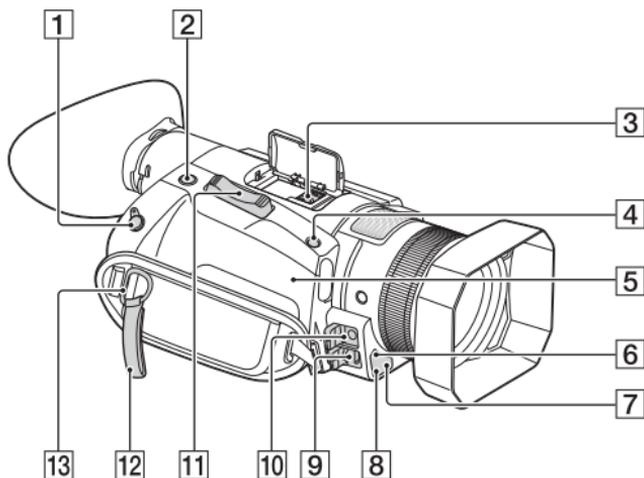
<http://oss.sony.net/Products/Linux>

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Parts and controls

Figures in () are reference pages.



1 REMOTE jack
For connecting the camcorder and a peripheral. You can control the camcorder, such as recording movies, with that device.

2 ASSIGN4/FOCUS
MAGNIFIER/PHOTO button
(25)

3 Multi interface shoe
 Multi Interface Shoe
For details on compatible accessories of the Multi interface shoe, visit the Sony web site in your area, or consult your Sony dealer or local authorized Sony service facility.
Operations with other manufacture's accessories are not guaranteed.
If you use a shoe adaptor (sold separately), you can also use accessories compatible with an Active Interface Shoe.

To prevent failure, do not use a commercially available flash with high-voltage synchro terminals or with reverse polarity.

4 ASSIGN5/IRIS PUSH AUTO button

5  (N mark) (43)
Touch an NFC-enabled smartphone to the mark to establish a connection with the camcorder.

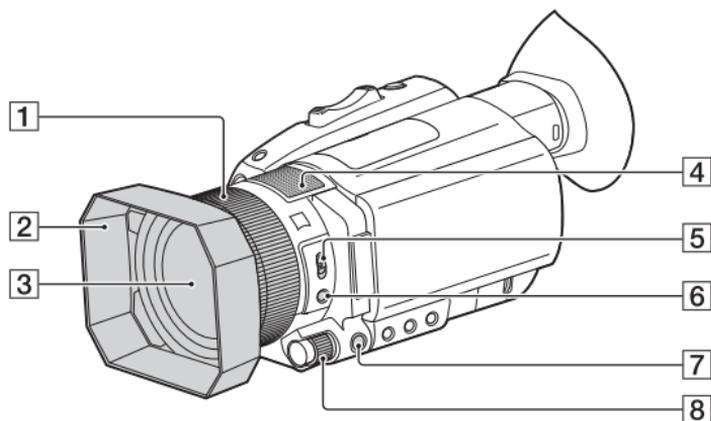
Near Field Communication (NFC) is an international standard for short-range wireless communication technology.

6 Remote sensor (63)

7 Recording lamp
Flashes when the remaining battery level is low or free space of the memory card is low.

8 NIGHTSHOT light emitter

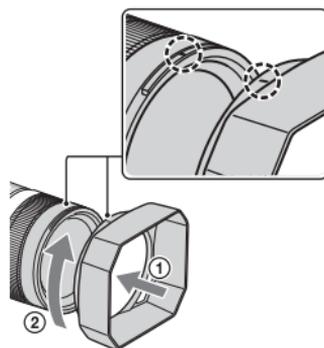
- 9** Multi/Micro USB Terminal/
VIDEO OUT jack (41)
- 10** MIC jack (PLUG IN POWER)
- 11** Power zoom lever (22, 25, 34)
- 12** Cable clamber
Dedicated to fix the HDMI cable
only. Do not attach other
objects such as the shoulder
strap to here.
- 13** Hook for shoulder strap



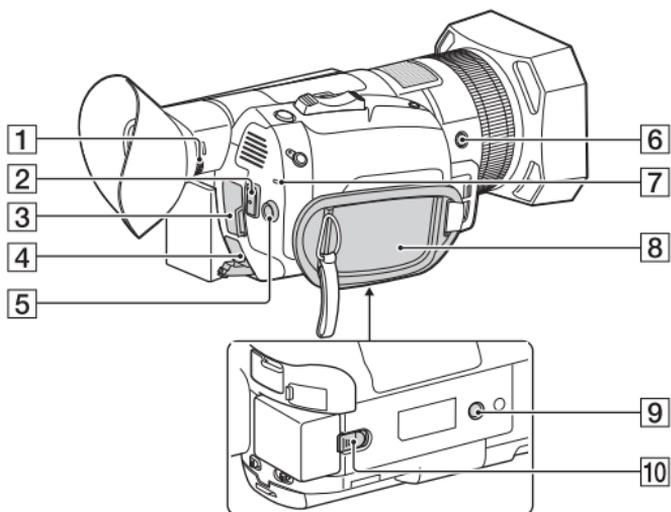
- 1** Manual lens ring (26)
- 2** Lens hood
- 3** Lens (ZEISS lens)
- 4** Internal microphone
- 5** ZOOM/FOCUS switch (26)
- 6** AF/MF button (26)
- 7** MENU button (46)
- 8** Manual dial (27, 28, 29)

Attaching the lens hood

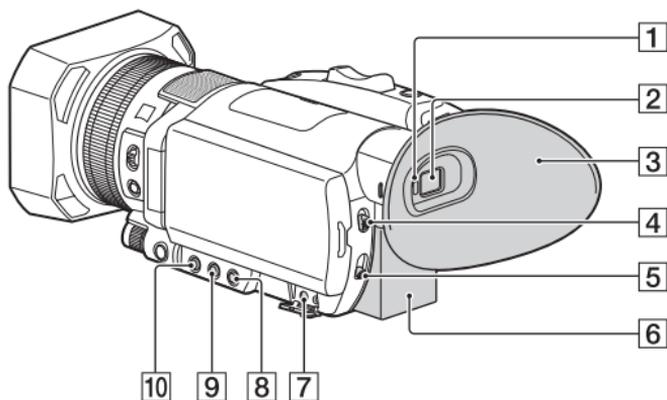
Align the marks on the lens hood to those on the camcorder, and turn the lens hood in the direction of the arrow **2** until it is locked.



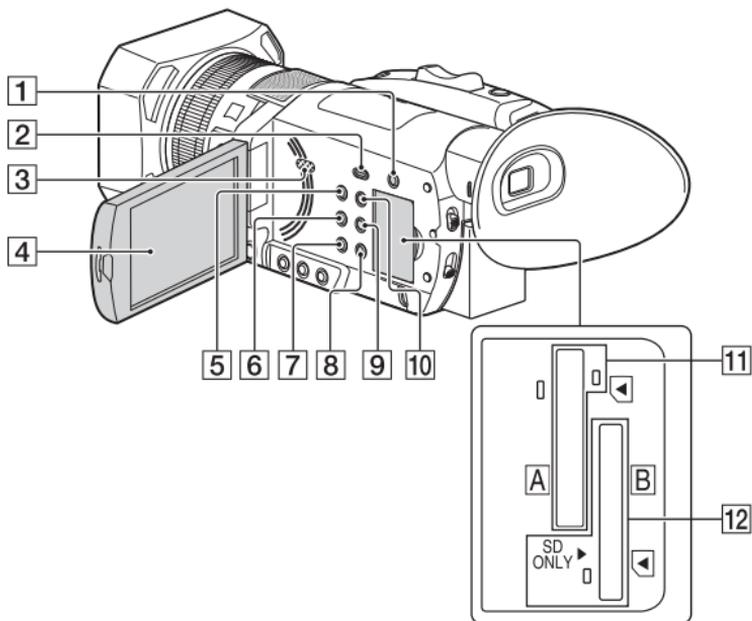
- If you attach or remove a 62 mm (2 1/2 in.) PL filter or MC protector, remove the lens hood.



- | | |
|---|---|
| <p>1 Lens adjustment dial (17)</p> <p>2 START/STOP button (22)</p> <p>3 HDMI OUT terminal (36)</p> <p>4 DC IN jack (13)</p> <p>5 ▲/▼/◀/▶/SET button (46)</p> <p>6 ASSIGN6 button</p> <p>7 POWER/CHG (charge) lamp (13)</p> <p>8 Grip belt</p> | <p>9 Tripod receptacles (1/4 inch)
For 1/4-20 UNC screws
For attaching a tripod with a
screw shorter than 5.5 mm
(sold separately).
Some tripods may not be
designed to attach in the
proper direction.</p> <p>10 BATT (battery) release lever (15)</p> |
|---|---|



- | | |
|--|------------------------------------|
| 1 Eye sensor | 6 Battery pack (13) |
| 2 Viewfinder (17) | 7 ⏪ (headphones) jack |
| 3 Large eyecup (17) | 8 SHUTTER SPEED button (29) |
| 4 AUTO/MANUAL switch (27, 28, 29) | 9 ISO/GAIN button (28) |
| 5 ND FILTER switch (30) | 10 IRIS button (27) |



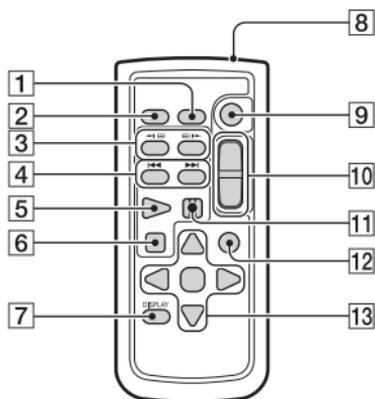
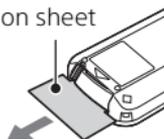
- 1** SLOT SELECT button (21)
- 2** THUMBNAIL  (playback) button (31)
- 3** Speaker
- 4** LCD monitor/touch panel
- 5**  (On/Standby) button (16)
- 6** WHITE BALANCE button
- 7** ASSIGN1/S&Q button

- 8** ASSIGN2/STATUS CHECK button
- 9** ASSIGN3/PICTURE PROFILE button
- 10** DISPLAY button (31)
- 11** Memory card slot A/Memory card access lamp (18)
- 12** Memory card slot B/Memory card access lamp (18)

Wireless Remote Commander

Remove the insulation sheet before using the Wireless Remote Commander.

Insulation sheet



- 1 DATA CODE button
- 2 PHOTO button
- 3 SCAN/SLOW button
- 4 ◀▶▶▶ (PREV/NEXT) button
- 5 PLAY button
- 6 STOP button
- 7 DISPLAY button
- 8 Transmitter
- 9 START/STOP button
- 10 Power zoom lever
- 11 PAUSE button
- 12 VISUAL INDEX button
- 13 ▲/▼/◀/▶/ENTER button

Notes

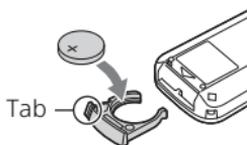
- Aim the Wireless Remote Commander towards the remote

sensor to operate your camcorder.

- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Wireless Remote Commander may not function properly.
- When you are operating the camcorder with the supplied Wireless Remote Commander, your video device may also operate. In that case, select a commander mode other than DVD2 for your video device, or cover the sensor of your video device with black paper.

To change the battery of the Wireless Remote Commander

- 1 While pressing on the tab, inset your fingernail into the slit to pull out the battery case.
- 2 Place a new battery with the + side facing up.
- 3 Insert the battery case until it clicks into place.



- When the lithium battery becomes weak, the operating distance of the Wireless Remote Commander may shorten, or the Wireless Remote Commander may not function properly. In this case, replace the battery with a Sony CR2025 lithium battery. Use of another battery may present a risk of fire or explosion.

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

<http://www.sony.net/>

