SONY

4-587-873-11 (1)
GB

Solid-State Memory Camcorder

Operating Instructions

PXW-X400 / PXW-X400KC / PXW-X400KF

Ver. 1.0

XDCAM SxS MPEG HD422 MPEG IMX
HDMI XAVC DVCAM Exmor FULL HD 3CMOS

http://www.sony.net/

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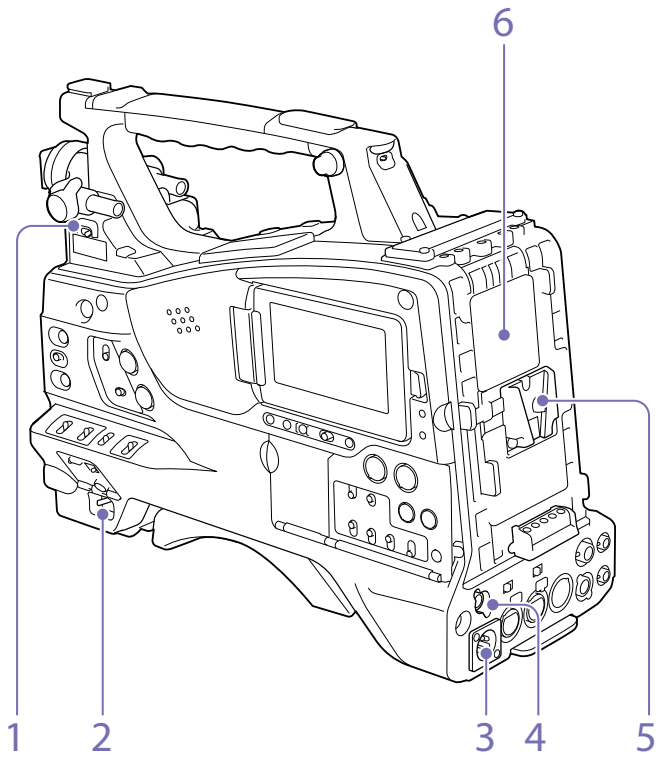
Name and Function of Parts

Power Supply



1. LIGHT (video light) switch

Determines how a video light connected to the LIGHT connector (page 4) is turned on and off.

AUTO: When the POWER switch of the video light is in the on position, the video light is turned on automatically while the camcorder is recording.

MANUAL: You can turn the video light on or off manually, using its own switch.

[Note]
When the camcorder is set for recording in Picture Cache mode, it is not possible to turn on the light before operation to start recording is carried out (or while data is being stored in memory).

2. POWER switch

Turns the main power supply on (**I**) and off (⏻).

3. DC IN (DC power input) connector (XLR type, 4-pin, male)

4. DC OUT 12V (DC power output) connector (4-pin, female)

Supplies power for an optional WRR-855S/860C/861/862 UHF Synthesizer Diversity Tuner or HDVF-L750 Viewfinder (maximum 1.8 A).

[Note]
Do not connect any equipment other than the UHF synthesized diversity tuner.

5. Battery attachment shoe

Attach a BP-L80S Battery Pack. Alternatively, you can attach an AC-DN2B/DN10 AC Adaptor to operate the camcorder from an AC power supply.

"Preparing a Power Supply" (page 21)

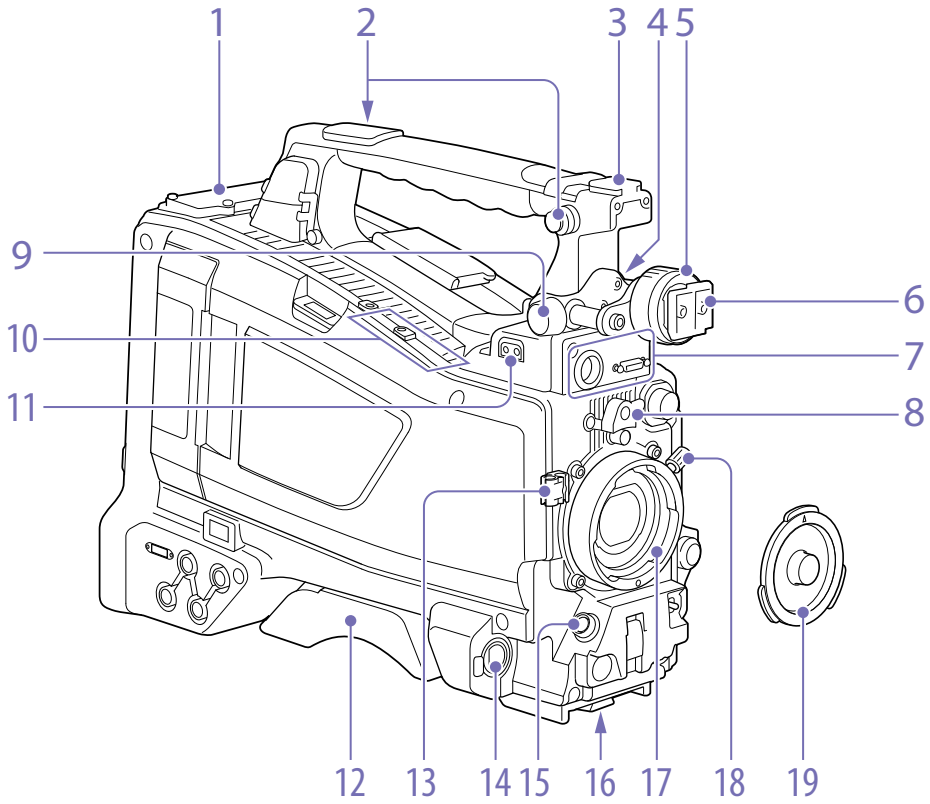
"Attaching a Digital Wireless Receiver" (page 26)

[Note]
For your safety, and to ensure proper operation of the camcorder, Sony recommends the use of the BP-L80S Battery Pack.

6. Camera adaptor connector

Enables connection of a CA-TX70/FB70 HD Camera Adaptor. To connect an adaptor, remove the cover.

Accessory Attachments



1. Wireless receiver insertion slot
2. Shoulder strap fitting (page 27)
3. Accessory shoe (page 27)
4. Viewfinder front-to-back positioning lever (page 23)
5. Viewfinder left-to-right positioning ring (page 22)
6. Viewfinder attachment shoe (page 22)
7. VF (viewfinder) connectors (26-pin, rectangular and 20-pin, round)

The analog interface connector (20-pin) is for connection of an HDVF series viewfinder, and the digital interface connector (26-pin) is for connection of a CBK-VF02 HD viewfinder.
Use a connection cable to connect your viewfinder to the corresponding connector.

[Note]
Do not connect viewfinders to both connectors at the same time.

8. Lens mount securing rubber

After locking the lens in position using the lens locking lever, fit this rubber over the lower of the two projections. This fixes the lens mount, preventing it from coming loose.

9. Viewfinder front-to-back positioning knob (page 22)
10. Attachment for optional microphone holder (page 26)
11. LIGHT (video light) connector (2-pin, female) (page 27)
12. Shoulder pad (page 27)
13. Lens cable clamp

Clamps the lens cable.

14. MIC IN (microphone input) (+48 V) connector (XLR type, 5-pin, female)

Connect a stereo microphone to this connector. The power (+48 V) is supplied via this connector.

15. LENS connector (12-pin) (page 25)

[Note]
When connecting or disconnecting the lens cable to this connector, power off the camcorder first.

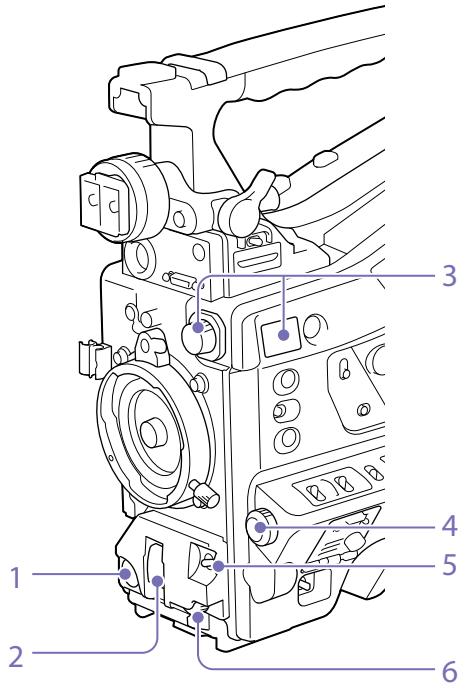
16. Tripod mount

When using the camcorder on a tripod, attach the tripod adaptor (optional).

17. Lens mount (special bayonet mount) (page 25)
18. Lens locking lever (page 25)
19. Lens mount cap

Remove by pushing the lens locking lever up. When no lens is mounted, keep this cap fitted for protection from dust.

Controls Near the Lens



1. REC START (recording start) button

Press to start recording. Press it again to stop recording. The operation is the same as that of the REC button on the lens.

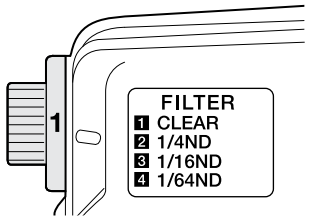
2. SHUTTER switch

Set to ON to use the electronic shutter. Push to SELECT to switch the shutter speed or shutter mode setting. When this switch is operated, the new setting appears on the viewfinder screen for about three seconds.

"Setting the Electronic Shutter" (page 37)

3. **FILTER knob**

Switches between four ND filters built into this camcorder.



When this selector is used, the new setting appears on the viewfinder screen for about three seconds.

FILTER knob setting	ND filter
1	CLEAR
2	1/4 ND (attenuates light to approximately 1/4)
3	1/16 ND (attenuates light to approximately 1/16)
4	1/64 ND (attenuates light to approximately 1/64)

You can change a Maintenance menu setting so that different white balance settings can be stored for different FILTER knob positions. This allows you to automatically obtain optimum white balance for the current shooting conditions in linkage with the filter selection.

"Adjusting the White Balance" (page 35)

4. **MENU knob (page 80)**

5. **AUTO W/B BAL (automatic white/black balance adjustment) switch**

Activates the automatic white/black balance adjustment functions.

WHITE: Adjust the white balance automatically.
If the WHITE BAL switch (page 6) is set to A or B, the white balance setting is stored in the corresponding memory. If the WHITE BAL switch is set to PRST, the automatic white balance adjustment function does not operate.

BLACK: Adjust the black set and black balance automatically.

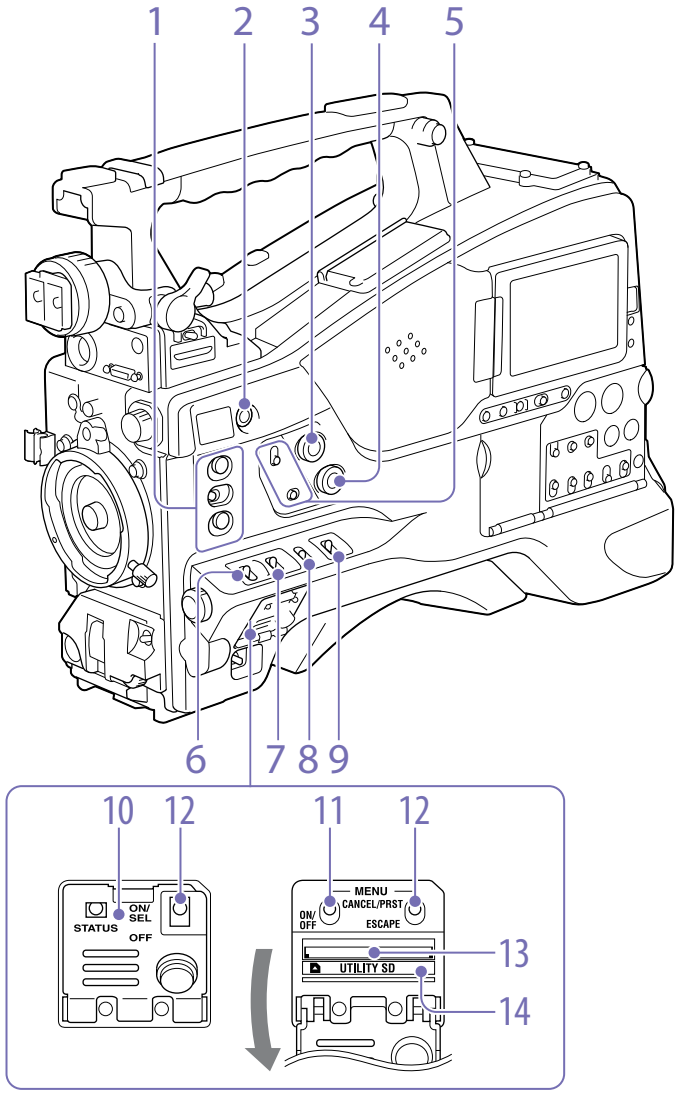
You can use the AUTO W/B BAL switch even when the ATW (Auto Tracing White Balance) function is operating.

If you push the switch to the WHITE side once more during the automatic white balance adjustment, the adjustment is canceled and the white balance setting returns to the original setting.

If you push the switch to the BLACK side once more during the automatic black balance adjustment, the adjustment is canceled and the black balance setting returns to the original setting.

6. **MIC (microphone) LEVEL knob (page 41)**

LCD Monitor Side (1)



1. ASSIGN. (assignable) 1/2/3 switches

You can assign a function using Operation >Assignable Switch in the setup menu (page 106).
The ASSIGN. 1/3 switches are provided with an indicator to show whether a function is assigned to the switch (ON) or not (OFF).

2. ONLINE button

When network client mode or the streaming function is assigned to this button, press and hold until the indicator is lit orange. Then, press the button again, turning the indicator blue, to enable network client mode or the streaming function.
To exit the enabled function, press and hold the button until the indicator turns off.
The button can also be used as an assignable switch when assigned with functions other than those above (page 107).

3. ALARM (alarm tone volume adjustment) knob

Controls the volume of the warning tone that is output via the built-in speaker or optional earphones. When the knob is turned to the minimum position, no sound can be heard. However, if Maintenance >Audio >Min Alarm Volume in the setup menu is set to [Set], the alarm tone is audible even when this volume control is at the minimum position.

4. MONITOR (monitor volume adjustment) knob

Controls the volume of the sound other than the warning tone that is output via the built-in speaker or earphones. When the knob is turned to the minimum position, no sound can be heard.

5. MONITOR (audio monitor selection) switches

By means of combinations of the two switches, you can select audio that you want to hear through the built-in speaker or earphones.

When the lower switch is set to CH-1/2

Upper switch	Audio output
CH-1/CH-3	Channel 1 audio
MIX	Channels 1 and 2 mixed audio (stereo) a)
CH-2/CH-4	Channel 2 audio

When the lower switch is set to CH-3/4

Upper switch	Audio output
CH-1/CH-3	Channel 3 audio
MIX	Channels 3 and 4 mixed audio (stereo) a)
CH-2/CH-4	Channel 4 audio

a) By connecting stereo headphones to the EARPHONE jack, you can hear the audio in stereo. (Maintenance >Audio >Headphone Out in the setup menu must be set to Stereo.)

6. ASSIGN. (assignable) 0 switch

You can assign a function using Operation >Assignable Switch in the setup menu (page 106).
Off is assigned to these switches when the camcorder is shipped from the factory.
This is a momentary type switch. Each press of the switch turns the function assigned to this switch on or off.

7. GAIN switch

Switches the gain of the video amplifier to match the lighting conditions during shooting. The gain values corresponding to the L, M, and H settings can be selected using Operation >Gain Switch in the setup menu (page 88) (factory settings are L=0 dB, M=6 dB, and H=12 dB).
When this switch is adjusted, the new setting appears on the viewfinder screen for about three seconds.

8. OUTPUT/DCC (output signal/dynamic contrast control) switch

Switches the video signal output from the camera module, between the following two.
BARS: Output the color bar signal.
CAM: Output the video signal being shot. When this is selected, you can switch DCC [1] on and off.

1) DCC (Dynamic Contrast Control): Against a very bright background with the iris opening adjusted to the subject, objects in the background will be lost in the glare. The DCC function will suppress the high intensity and restore much of the lost detail. It is particularly effective for shooting in the following cases.
- Shooting people in the shade on a sunny day
- Shooting a subject indoors, against a background through a window
- Any high contrast scene

9. WHITE BAL (white balance memory) switch

Controls adjustment of the white balance.
PRST: Adjust the color temperature to the preset value (the factory default setting: 3200K). Use this setting when you have no time to adjust the white balance.
A or B: Recall the white balance adjustment settings already stored in A or B. Push the AUTO W/B BAL switch (page 5) to the WHITE position to automatically adjust the white balance and save the adjustment settings in memory A or memory B.
B (ATW [1]):When this switch is set to B and Operation >White Setting >White Switch <B> is set to [ATW] in the setup menu, ATW is activated.
You can use the AUTO W/B BAL switch even when ATW is in use.
When this switch is adjusted, the new setting appears on the viewfinder screen for about three seconds.

1) ATW (Auto Tracing White balance): The white balance of the picture being shot is adjusted automatically for varying lighting conditions.

[Note]
It may not be possible to adjust to the appropriate colors using ATW, depending on the lighting and subject conditions.
Examples:
- When a single color dominates the subject, such as sky, sea, ground, or flowers.
- When the subject is under a light source of extremely high or extremely low color temperature.

If execution of automatic tracing by the ATW function takes an unacceptably long time or only results in an inadequate effect, then execute the AWB function.

10. Switch cover

Open this cover to use the MENU ON/OFF switch or the MENU CANCEL/PRST/ESCAPE switch.

11. MENU ON/OFF switch

To use the switch, open the cover.
This switch is used to display the menu on the viewfinder screen or the test signal screen. Each time the switch is pushed down, the menu screen is turned on and off.
The function of this switch is the same as that of the MENU button in the thumbnail screen operations section.

[Note]
It is not possible to turn off the menu screen by closing the cover.

12. MENU CANCEL/PRST (preset) /ESCAPE switch

To use the switch, open the cover.
This switch has different functions depending on whether or not a menu is displayed.

Use the switch in the following way when the menu is displayed.
CANCEL/PRST: Pushing this switch up to this position after a setting is changed in the setup menu displays the message to confirm whether the previous settings are canceled. Pushing this switch up to this position again cancels the previous settings.
Pushing this switch up to this position before a setting is changed in the setup menu or after a setting change is canceled in the setup menu displays the message to confirm whether the setting is reset to the initial value. Pushing this switch up to this position again resets the settings to the initial value.
ESCAPE: Use this switch when the menu page, which has a hierarchical structure, is opened.

Each time the switch is pushed to this position, the page returns to one stage higher in the hierarchy.

Use the switch in the following way when the menu is not displayed.

CANCEL/PRST: Each time this switch is pushed upward, a window to confirm the menu settings and status of the camcorder appears on the viewfinder screen (page 12). The window consists of several pages, which are switched each time the switch is pushed upward.

ESCAPE: To clear the page, push this switch down to the OFF position.

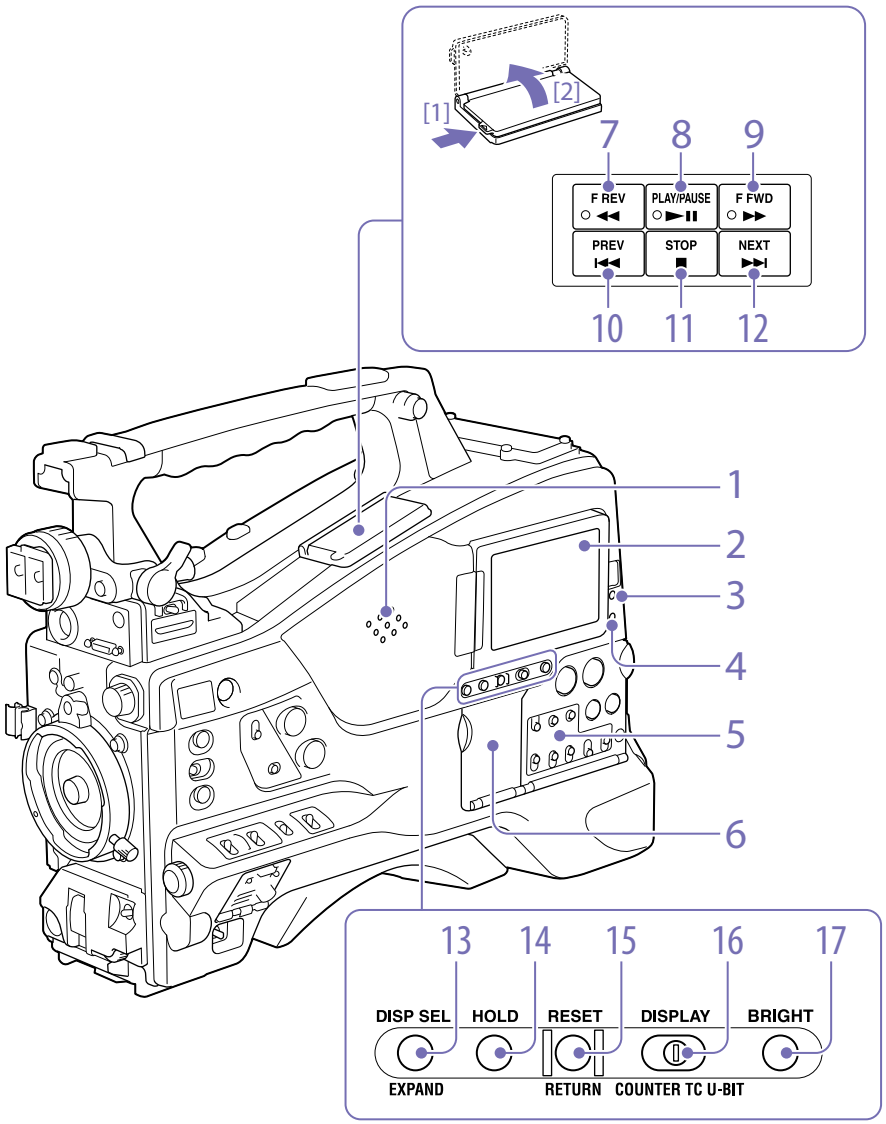
13. UTILITY SD card slot

Insert an SD card for saving camcorder settings.

14. ACCESS indicator

Lights up orange when the SD card is being accessed.

LCD Monitor Side (2)



1. Built-in speaker

The speaker can be used to monitor E-E [1] sound during recording, and playback sound during playback. The speaker also sounds alarms to reinforce visual warnings (page 124).

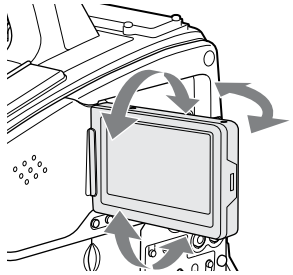
If you connect earphones to the EARPHONE jack, the speaker output is suppressed automatically.

1) E-E: Abbreviation of "Electric-to-Electric." In E-E mode, video and audio signals input to the camcorder are output after passing through internal electric circuits only. This can be used to check input signals.

2. LCD monitor

Displays remaining battery capacity, remaining media capacity, audio levels, time data, and so on. It also allows you to check camera and playback pictures (page 12).

You can adjust the position and angle of the LCD monitor.



3. WARNING indicator

Lights up or flashes when an abnormality occurs (page 124).

4. ACCESS indicator

Lights up in blue when data is written to or read from the recording media.

5. Audio control section (page 9)

6. Thumbnail screen operation section (page 9)

7. F REV (fast reverse) button and indicator

This plays back at high speed in the reverse direction. The playback speed changes in the order ×4 → ×15 → ×24 with each press of the button. The indicator lights during high-speed playback in

the reverse direction.

8. PLAY/PAUSE button and indicator

Press this button to view playback video images using the viewfinder screen or the LCD monitor. The indicator lights during playback.
Press this button again during playback to pause, outputting a still image. At this time the indicator flashes at a rate of once per second.
Pressing the F REV or F FWD button during playback or pause starts high speed playback in the forward or reverse direction.

9. F FWD (fast forward) button and indicator

This plays back at high speed in the forward direction. The playback speed changes in the order ×4 → ×15 → ×24 with each press of the button. The indicator lights during high-speed playback in the forward direction.

10. PREV (previous) button

This jumps to the first frame of the current clip.
If you press this together with the F REV button, the jump is to the first frame of the first recorded clip on the recording media.
If you press this button twice in rapid succession, the jump is to the first frame of the preceding clip (or the first frame of the current clip when no preceding clips exist).

11. STOP button

Press this button to stop playback.

12. NEXT button

This jumps to the first frame of the next clip.
If you press this together with the F FWD button, the jump is to the last frame of the last recorded clip on the recording media.

13. DISP SEL (display selection)/EXPAND (expand function) button

With each press of this button, the display in the LCD monitor changes as follows.

Display indication	Description
Video with superimposed information (CHAR)	The LCD monitor displays the same text information as the viewfinder.
Video without superimposed information (MONI)	Only the video appears.
Status display (STATUS)	Counter indications, warnings, audio levels, and similar information appear. No video image appears.

The EXPAND button function will be supported in a future upgrade.

14. HOLD (display hold) button

Pressing this button instantly freezes the time data displayed in the LCD monitor. (The timecode generator continues running.) Pressing this button again releases the hold.

For details about the time data display, see page 12.

15. RESET/RETURN button

Resets the value shown in the time data display in the LCD monitor. According to the settings of the PRESET/REGEN/CLOCK switch (page 9) and the F-RUN/SET/R-RUN switch (page 9), this button resets the display as follows.

Switch settings	RESET/RETURN button operation
DISPLAY switch: COUNTER	Reset counter to 00:00:00:00.
DISPLAY switch: TC PRESET/REGEN/CLOCK switch: PRESET F-RUN/SET/R-RUN switch: SET	Reset timecode to 00:00:00:00.
DISPLAY switch: U-BIT PRESET/REGEN/CLOCK switch: PRESET F-RUN/SET/R-RUN switch: SET	Reset user bits data [a] to 00:00:00:00.

a) Of the timecode bits for every frame recorded on the media, those bits which can be used to record useful information for the user such as scene number, shooting place, etc.

"Setting Time Data" (page 43)

This button returns to the previous screen when pressed during thumbnail screen display or essence mark thumbnail screen display.

16. DISPLAY switch

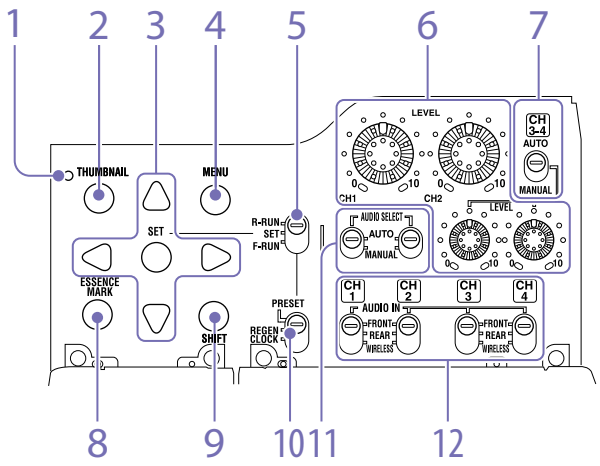
This cycles the data displayed in the time data display in the LCD monitor through the sequence COUNTER, TC, and U-BIT (page 12).
COUNTER: Display recording/playback duration counter.
TC: Display timecode.
U-BIT: Display user bits data.

17. BRIGHT (brightness) button

Switches the brightness of the LCD monitor backlight.
Each press of the button selects the next setting in the order shown in the following table. If you press the button with the LCD monitor off, the LCD backlight comes on in the H state.

Setting	LCD monitor backlight
H	High (select this to view the LCD monitor outdoors in the daytime)
M	Brightness between H and L
L	Low (select this to view the LCD monitor indoors or outdoors at night)
OFF	Off (the display is also off)

Thumbnail screen operations section and audio control section



1. Thumbnail indicator

This lights when the thumbnail screen is displayed.

2. THUMBNAIL button

Press this button to display the thumbnail screen (page 72) and to carry out a thumbnail operation.

Press once more to return to the original display.

3. SET button and arrow buttons

Use these buttons to make timecode and user bit settings, and for thumbnail screen operations.

When the menu is displayed, press this button to select an item or to confirm the setting change.

4. MENU button

Each press of this button turns the setup menu display on and off.

The function of this button is the same as that of the MENU ON/OFF switch.

5. F-RUN/SET/R-RUN (free run/set/recording run) switch

Selects the operating mode of the internal timecode generator. The operating mode is set as explained below, depending on the position of the switch.

F-RUN: Timecode keeps advancing, regardless of whether the camcorder is recording. Use this setting when synchronizing the timecode with external timecode.

SET: Sets the timecode or user bits.

R-RUN: Timecode advances only during recording. Use this setting to have a consecutive timecode on the recording media.

"Setting the Timecode" (page 43)

"Setting the User Bits" (page 43)

6. LEVEL CH1/CH2/CH3/CH4 (audio channel 1/2/3/4 recording level) knobs

Adjust the audio levels to be recorded on channels 1, 2, 3, and 4 when the AUDIO SELECT CH1/CH2 and AUDIO SELECT CH 3-4 switches are set to MANUAL.

7. AUDIO SELECT CH 3-4 (audio channel 3/4 adjustment method selection) switches

Select the audio level adjustment method for audio channels 3 and 4.

AUTO: Automatic adjustment

MANUAL: Manual adjustment

8. ESSENCE MARK button

By pressing this button when a thumbnail display is on the screen, you can view the following thumbnail displays of the essence-marked frames of the selected clip, depending on the item selected in a list displayed on the screen.

All: Thumbnail display of all frames marked with essence marks.

Rec Start: Thumbnail display of frames marked with Rec Start marks and of the first frames of clips (when the first frames are not marked with Rec Start marks).

Shot Mark1: Thumbnail display of the frames marked with Shot Mark 1.

Shot Mark2: Thumbnail display of the frames marked with Shot Mark 2.

You can also select Shot Mark 0 and Shot Mark 3 to Shot Mark 9.

If a clip is recorded using planning metadata that defines names for shot mark 0 to shot mark 9, the selection options in the list are displayed by the defined names.

9. SHIFT button

Use this in combination with other buttons.

10. PRESET/REGEN (regeneration)/CLOCK switch

Selects the type of timecode to record.

PRESET: Record new timecode on the media.

REGEN: Record timecode continuous with the existing timecode recorded on the media. Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in R-RUN mode.

CLOCK: Record timecode synchronized to the internal clock. Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in F-RUN mode.

11. AUDIO SELECT CH1/CH2 (audio channel 1/2 adjustment method selection) switches

Select the audio level adjustment method for audio channels 1 and 2.

AUTO: Automatic adjustment

MANUAL: Manual adjustment

12. AUDIO IN CH1/CH2/CH3/CH4 (audio channel 1/2/3/4 input selection) switches

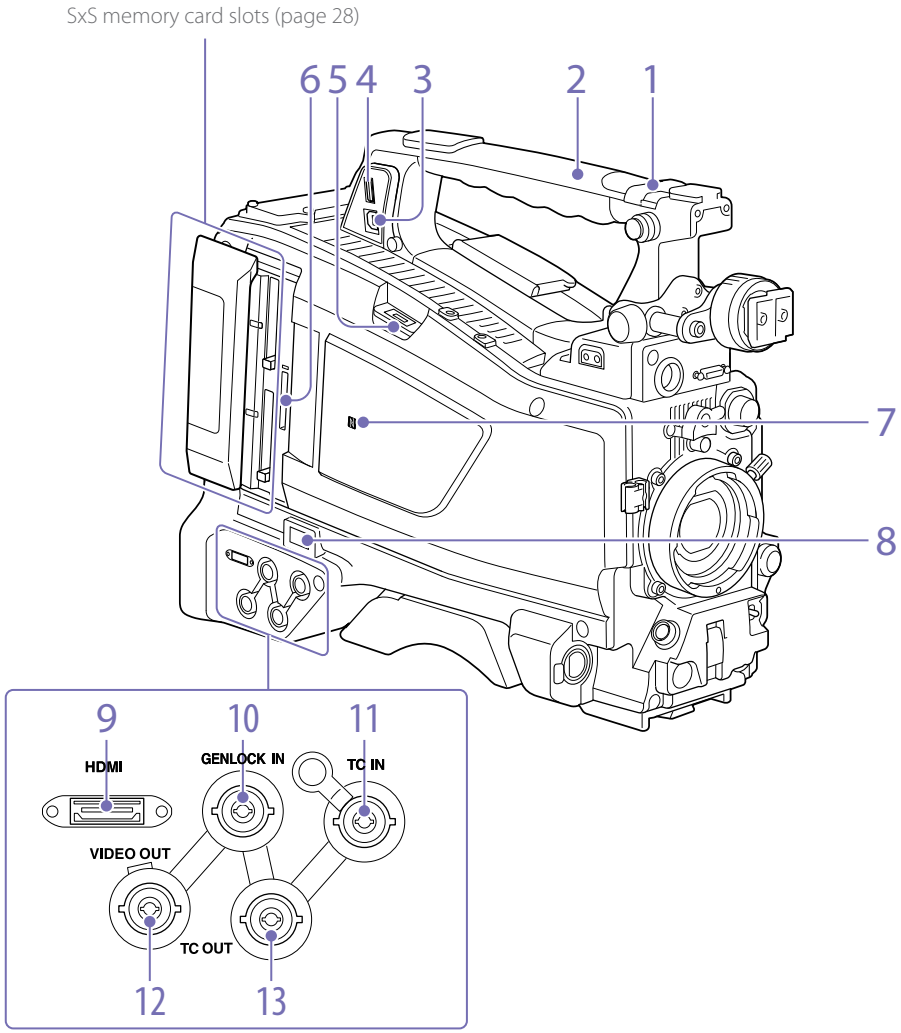
Select the audio input signals to be recorded on audio channels 1, 2, 3 and 4.

FRONT: Audio input signals from the microphone connected to the MIC IN connector

REAR: Audio input signals from an audio device connected to the AUDIO IN CH-1/CH-2 connectors

WIRELESS: Audio input signals from the UHF portable tuner if it is attached

Handle and Memory Card Slot Side



1. **ASSIGNABLE 4/5 switches**
You can assign a function using Operation >Assignable Switch in the setup menu (page 107).
Off is assigned to these switches when the camcorder is shipped from the factory.

2. **GPS module**
Contains a built-in GPS module.

[Note]
Do not grasp this part of the camcorder when the GPS function is in use.

3. **PC connector**
Used to put this camcorder into USB connection mode and use it as an external storage device for a computer. When a computer is connected to this connector, every memory card inserted in the camcorder is recognized as a drive on the computer.

4. **External device connector**
Reserved for use in a future upgrade.

5. **USB wireless LAN module connector**
Connect to an IFU-WLM3 USB Wireless LAN Module (supplied), CBK-WA02 Wireless LAN Adaptor (option), or combination of CBK-NA1 Network Adaptor Kit (option) and modem (option) to enable communications with wireless LAN devices and networks.

"Connecting Devices using Wireless LAN" (page 56)

"Connecting to the Internet" (page 59)

6. **PROXY SD card slot (page 51)**
Insert an SD card for recording proxy data.

7. **(NFC) mark**
A built-in NFC antenna is provided. Reserved for use in a future upgrade.

8. **Network connector**
Connects to a network via a wired LAN connection using a LAN cable (sold separately).

[CAUTION]
- For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to this port.
  Follow the instructions for this port.
- When you connect the LAN cable of the unit to peripheral device, use a shielded-type cable to prevent malfunction due to radiation noise.

"Connecting to the Internet" (page 59)

9. **HDMI connector**
Connect an HDMI device, such as a monitor or recording unit, to output HD or SD HDMI video and audio signals.

10. **GENLOCK IN (genlock signal input) connector (BNC type)**
This connector inputs a reference signal when the camcorder is to be genlocked or when timecode is to be synchronized with external equipment. The supported reference signals vary depending on the current system frequency as shown in the following table.

System frequency	Supported reference signals
59.94i	1080/59.94i, 480/59.94i
59.94P	1080/59.94i, 480/59.94i
50i	1080/50i, 576/50i
50P	1080/50i, 576/50i
29.97P	1080/59.94i, 480/59.94i
25P	1080/50i, 576/50i
23.98P	1080/23.98PsF

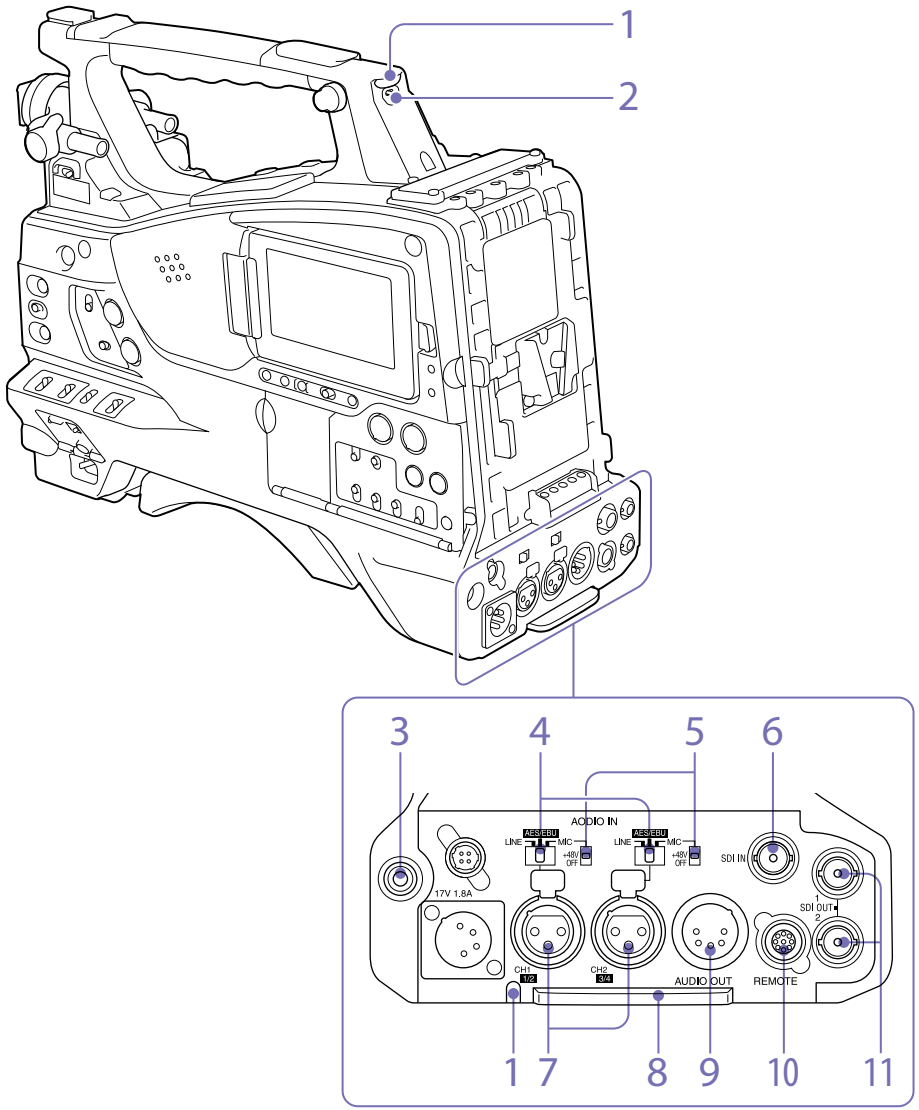
11. **TC IN (timecode input) connector (BNC type)**
To apply an external lock to the timecode of the camcorder, input the reference timecode.

"Setting the Timecode" (page 43)

12. **VIDEO OUT connector (BNC type)**
Outputs video signals for monitoring.

13. **TC OUT (timecode output) connector (BNC type)**
To lock the timecode of an external VTR to the timecode of this camcorder, connect this connector to the external VTR's timecode input connector.

Tally Indicator and Connector Section



1. **TALLY (back tally) indicator (red)**
Lights up during recording. It will not light if the TALLY switch is set to OFF. It also flashes when the WARNING indicator operates. The tally indicator on the front of the viewfinder and the REC indication on the viewfinder screen light or flash in the same manner.

"Error/Warning System" (page 124)

2. **TALLY switch**
Set to ON to activate the TALLY indicator function.

3. **EARPHONE jack (stereo, minijack)**
You can monitor the E-E sound during recording and playback sound during playback. When an alarm is indicated, you can hear the alarm sound through the earphone. Plugging an earphone into the jack automatically cuts off the built-in speaker. You can select monaural or stereo using Maintenance >Audio >Headphone Out in the setup menu.

4. **AUDIO IN selector switch**
Select the audio source you connect to the AUDIO IN CH1/CH2 connectors.
LINE: When connecting a stereo amplifier or other external audio signal source
AES/EBU: When connecting an external digital audio signal source
MIC: When connecting a microphone.

5. **+48V/OFF (+48V external power source on/off) switch**
Switch between the following settings, according to the microphone used for audio input.
+48V: Microphone requiring external power source (phantom power)
OFF: Microphone using internal power source or not requiring a power source

6. **SDI IN (SDI input) connector (BNC type)**
Connector used when connecting an external HD SDI signal source to the camcorder.

7. **AUDIO IN CH-1/CH-2 (audio channel 1 and channel 2 input) connectors (XLR type, 3-pin, female)**
Connect to audio equipment or a microphone.

8. **Bottom cover**
This is provided for protecting the cables connected to the connectors on the rear panel. By loosening the screws which retain the cover to the bottom of the camcorder, you can adjust the position of the cover depending on the size and shape of the microphone or audio cable plugs. After adjusting the position, tighten the screws to secure the cover.

9. **AUDIO OUT connector (XLR type, 5-pin, male)**
Outputs the audio signals recorded on audio channels 1 and 2 or audio channels 3 and 4. The audio signals are selected by the MONITOR switch.

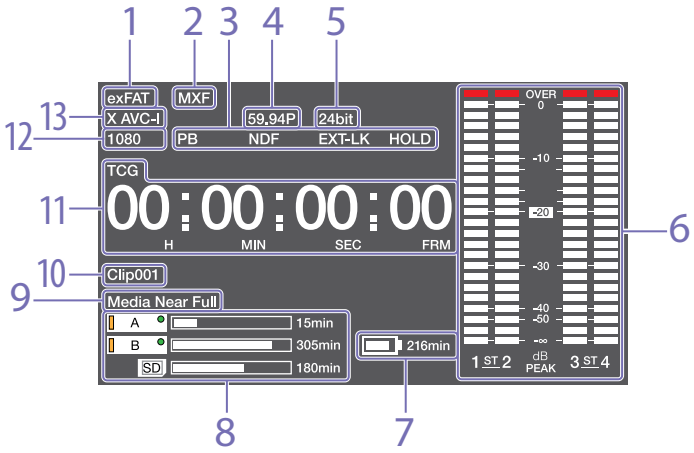
10. **REMOTE connector (8-pin)**
Connect a remote control unit to control the camcorder remotely.

[Note]
Before connecting/disconnecting the Remote Control Unit to/from the camcorder, be sure to turn off the camcorder POWER switch.

11. **SDI OUT 1/2 connectors (BNC type)**
Outputs an HDSDI or SDSDI signal (with embedded audio). The output from this connector can be turned on or off using Operation >Input/Output >SDI Out1 Output or SDI Out2 Output in the setup menu.

Screen Display

Information Screen



1. **Recording mode indicator**

2. **File format indicator**

3. **Status display**

PB: Appears during media playback.

NDF: Appears when non-drop-frame timecode is selected.

EXT-LK: Appears when the internal timecode generator is locked to an external signal input to the TC IN (timecode input) connector.

HOLD: Appears when the operation mode of the internal timecode generator is set to R-RUN and stopped.

4. **System frequency indicator**

Indicates the system frequency of video being currently played or recorded.

5. **Audio format indicator**

Indicates the audio recording format or the audio format of clip being currently played.

Indicator	Recording format
16bit	HD420 HQ DVCAM MPEG IMX 50
24bit	HD422 50 MPEG IMX 50 XAVC Intra XAVC Long

6. **Audio level meters**

Indicates the audio recording or playback levels of channels 1 to 4.

7. **Remaining battery capacity indicator**

Displays the battery remaining capacity icon and the remaining recording time.

8. **Remaining media capacity indicator**

Shows bar segments indicating the remaining capacity of recording media in the slots.

9. **Warning indicator area**

Displays warnings when trouble with recording or moisture condensation occurs.

For details, see "Error/Warning System" (page 124).

10. **Clip name display**

Displays the name of the clip currently recording when recording, or displays the name of the next clip to be recorded during recording standby.

11. **Time data display**

Switches displays of duration, timecode, and user bits data, depending on the position of the DISPLAY switch.

Displays the type of data currently shown in the time data display, as follows.

TCG: Recorded timecode

TCR: Playback timecode

UBG: Recorded user bits

UBR; Playback user bits

CNT: Counter

DUR: Duration

CLK: Time display (when the PRESET/REGEN/CLOCK switch is set to CLOCK)

When the HOLD button is pressed to hold the timecode value, the timecode is displayed in the format shown below. When the HOLD button is pressed again to release the hold, the timecode is displayed in the normal format.

The three dots indicate that the timecode and counter progress are displayed in hold mode.

12. **Resolution indicator**

Indicates the resolution of the output video.

13. **Recording format indicator**

Indicates the current recording format or the recording format of clip being currently played.

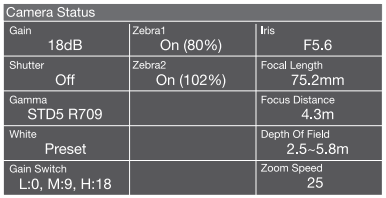
Status Screens

The status screens allow you to check camcorder settings and various types of status information. When no menu is displayed, push the MENU CANCEL/PRST/ESCAPE switch up to the CANCEL/PRST position to display the status screen. Each push selects the next status screen, in the order given in the table above.

The following status screens can be displayed.

Camera Status screen

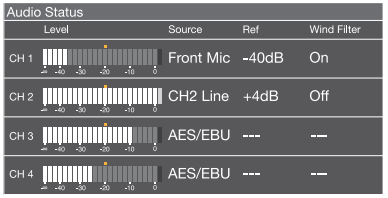
Displays settings and status information related to shooting.



Display item	Description
Gain	Gain level in dB units
Shutter	Electronic shutter status
Gamma	Gamma category and curve
White	White balance mode setting
Gain Switch	GAIN switch status
Zebra	Zebra pattern status
Iris	Iris f-stop value
Focal Length	Focal length
Focus Distance	Focus distance
Depth Of Field	Depth of field
Zoom Speed	Zoom speed configured for the lens ZOOM button

Audio Status screen

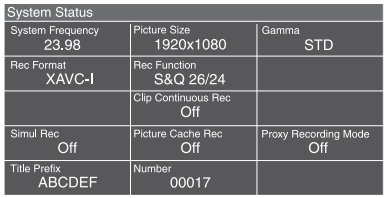
Displays settings and status information related to audio input and output.



Display item	Description
CH 1/CH 2/CH 3/CH 4	Audio level, input source, reference input level, and wind noise reduction filter settings for each channel

System Status screen

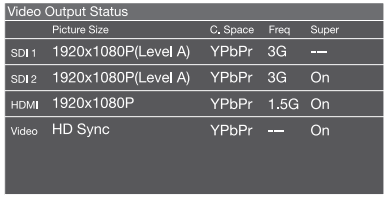
Displays settings and status information related to recording.



Display item	Description
System Frequency	System frequency
Rec Format	Recording format
Clip Continuous Rec	Clip Continuous Rec function on/off setting
Title Prefix	Clip name prefix
Picture Size	Picture size
Simul Rec	Simul Rec function on/off
Rec Function	Enabled special recording format and settings
Picture Cache Rec	Picture cache function on/off setting
Number	Clip name suffix
Gamma	Gamma category in use
Proxy Recording Mode	Proxy data recording function on/off setting

Video Output Status screen

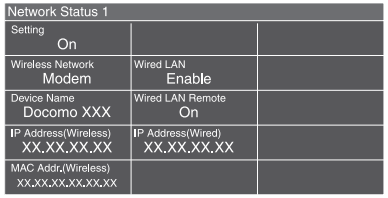
Displays settings and status information related to video output.



Display item	Description
SDI	SDI OUT connector output settings (output picture size, output form, output rate, superimposition)
HDMI	HDMI connector output settings (output picture size, output form, output rate, superimposition)
Video	VIDEO OUT connector output settings (output picture size, superimposition)

Network Status 1 screen

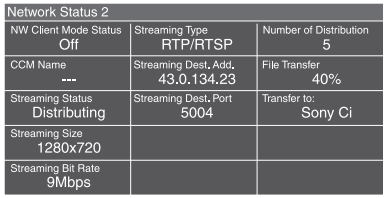
The Network Status 1 screen displays settings and status information related to the network.



Display item	Description
Setting	Network setting status
Wireless Network	Wireless network setting status
Device Name	Name of device attached to the USB wireless LAN module connector
IP Address (Wireless)	IP address of wireless LAN connection
MAC Add. (Wireless)	MAC address of device attached the USB wireless LAN module connector
Wired LAN	Wired LAN network connection status
Wired LAN Remote	Remote control enabled/disabled state when connected using a LAN cable
IP Address (Wired)	IP address of wired LAN connection

Network Status 2 screen

The Network Status 2 screen displays settings and status information related to streaming.



Display item	Description
NW Client Mode Status	Network client mode status For details about the status, see “Network client mode status” (page 13).
CCM Name	Name of the connected CCM when using network client mode
Streaming Status	Streaming distribution status
Streaming Size	Picture size of the currently selected streaming setting
Streaming Bit Rate	Bit rate of the currently selected streaming setting
Streaming Type	Type of the currently selected streaming setting
Streaming Dest. Add.	Streaming destination address
Streaming Dest. Port	Streaming destination port
Number of Distribution	Number of streaming distribution destinations
File Transfer	File transfer progress status
Transfer to:	Server name of file transfer destination

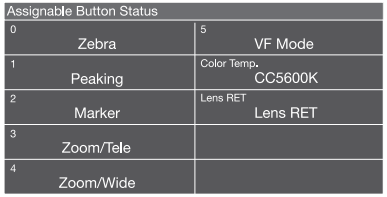
Network client mode status

Status display	State	Description
Off	CCM not connected	Network client mode is off.
Connected	CCM connected	Network client mode is on, CCM is connected, and CCM control is enabled.
Connecting	Connecting to CCM (disconnected)	Attempting to connect to CCM (or disconnecting). Wait until connection (disconnection) is successful. If the status does not change from “Connecting,” the CCM address setting may be incorrect. Check that the address is set correctly.
Awaiting	CCM connection standby	Network client mode is on, but the network setting is off. Enable the network setting to connect to the CCM.

Status display	State	Description
Address Error	CCM address error	The host name or IP address of the CCM to connect may be incorrect. Check that the setting is correct.
Auth. Failed	CCM user name/ password error	The user name or password used to connect to the CCM may be incorrect. Check that the setting is correct.
No Inet Access	Internet connection error	Cannot connect to the network. The network settings may be incorrect. Check the network settings.
Cert. not Valid	CCM certification not valid error	The CCM certificate is not valid. The date setting may be invalid. Check the date setting.

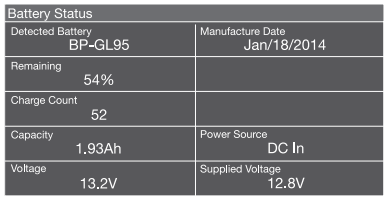
Assignable Button Status screen

Displays the names of functions assigned to assignable switches.



Battery Status screen

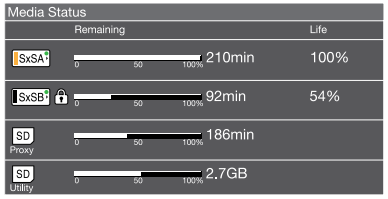
Displays the status of the battery attached to the camcorder.



Display item	Description
Detected Battery	Detected type of the battery
Remaining	Remaining capacity (%)
Charge Count	Number of recharges
Capacity	Remaining capacity (Ah)
Voltage	Voltage
Manufacture Date	Date of battery manufacture
Power Source	Power supply source
Supplied Voltage	Supplied power source voltage

Media Status screen

Displays the status of the recording media.

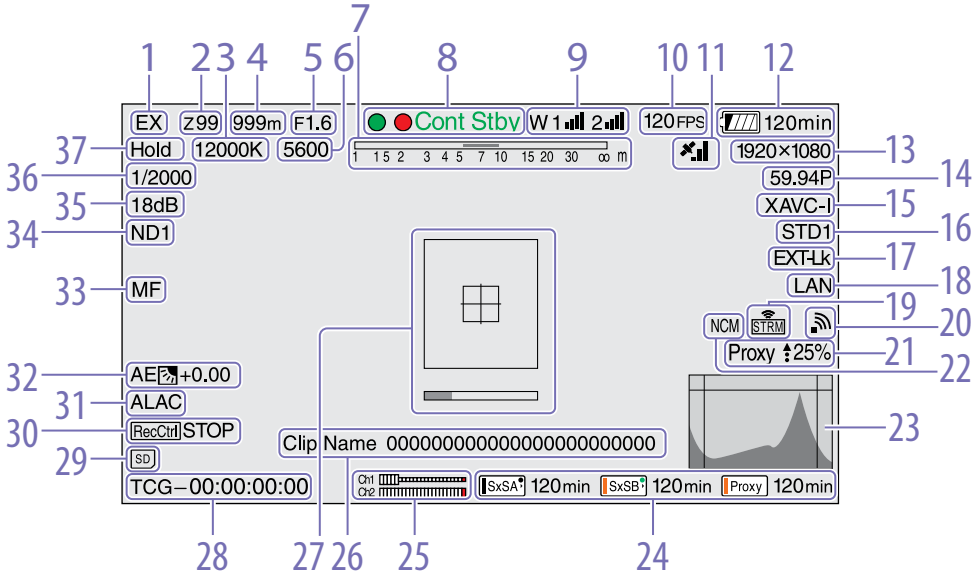


Display item	Description
SxSA	Remaining capacity (bar graph and remaining time display) and media life of media in slot A
SxSB	Remaining capacity (bar graph and remaining time display) and media life of media in slot B
SD Proxy	Remaining capacity (bar graph and remaining time display) and media life (displayed only if available) of media in PROXY SD card slot
SD Utility	Remaining capacity (bar graph and remaining capacity) and media life (displayed only if available) of media in UTILITY SD card slot

A mark is displayed if the media is protected.

Viewfinder Screen

The viewfinder screen displays images during shooting (recording or recording standby) and playback with camcorder information superimposed on the display.
You can toggle the display of information on/off using the DISPLAY switch.
The information to display is linked to the settings in Operation >Super Impose in the setup menu, and the settings of the corresponding switches.



1. Extender indicator

Displays the status of the digital extender function and lens extender function.

EX: Appears when the lens extender function is ON

X2D: Appears when the digital extender function (×2) is ON

X3D: Appears when the digital extender function (×3) is ON

X4D: Appears when the digital extender function (×4) is ON

EX2D: Appears when both the lens extender function and digital extender function (×2) are ON

EX3D: Appears when both the lens extender function and digital extender function (×3) are ON

EX4D: Appears when both the lens extender function and digital extender function (×4) are ON

Turn the digital extender on/off using an assignable switch assigned with the Digital Extender function.

[Note]

The digital extender cannot be turned on when Slow & Quick Motion is enabled.

2. Zoom position indicator (with lens mounted)

Displays the zoom position of the zoom lens in the range 0 to 99.

3. Color temperature indicator

Displays the color temperature of the white balance.

4. Focus position indicator (with lens mounted)

Displays the focus position as a distance to the subject (unit: meters).

5. Iris position indicator (with lens mounted)

Displays the iris position setting.

6. Electric color temperature filter indicator

Appears when the CC5600K function is on.

7. Depth of field indicator (serial lens mounted)

Displays the depth of field using a bar. The units for display are set using Operation >Display On/Off >Lens Info in the setup menu, and can be set to meters or feet.

8. Recording mode indicator

Displays the following recording operation states of the camcorder.

Indicator	Meaning
●Rec	During recording
Stby	Recording standby
●Cont Rec	Clip continuous recording in progress
Cont Stby	Recording standby in clip continuous recording mode
●S&Q Rec	Recording in progress in Slow & Quick Motion mode
S&Q Stby	Recording standby in Slow & Quick Motion mode
●Rec	Recording in picture cache mode
●Cache	Recording standby in picture cache mode
●Int Rec	Recording in progress in Interval Rec mode
Int Stby	Recording standby in Interval Rec mode
●Int Stby	Recording paused in Interval Rec mode (during pause intervals)
●Sml Rec	Recording in progress in Simul Rec mode
Sml Stby	Recording standby in Simul Rec mode
CALL	Call received from external connected device

Green tally is displayed when the camcorder is in the following states.

- Maintenance >Camera Config >HD-SDI Remote I/F is set to Green Tally in the setup menu and a recording control signal is output from the SDI OUT connector.
- Green tally signal received (when a camera adaptor is mounted on the camcorder and a camera extension unit is connected)

9. Wireless receiver function indicator

Displays "W" when a slot-in receiver is attached to the camcorder, and displays the reception level for each channel that can be used by the receiver (1ch, 2ch, or 4ch).

Normal: Displays the strength of the received signal level by the number of white segment indicators.

Analog receiver muting/Digital receiver error rate warning: Displays the strength of the received signal level by the number of gray segment indicators.

If the received level exceeds the peak: Displays "P" in place of the indicator. [1)]

Receiver battery is low: The corresponding channel number and indicators flash. [1)]

1) When using the DWR-S02D

10. S&Q Motion (Slow & Quick) frame rate indicator

Displays the shooting frame rate when the camcorder is set to Slow & Quick Motion recording mode.

11. GPS indicator (page 54)

12. Battery capacity/voltage display

Displays the following indicators according to the type of battery power source.

Battery type	Indicator
Info battery	Battery remaining capacity icon and remaining recording time
Anton/Bauer battery	Remaining battery capacity (% indicator)
Other batteries	Input voltage

13. Recording format (picture size) indicator

Displays the picture size of clips recorded onto SxS memory cards.

14. Recording format (system frequency and scan method) indicator

Displays the currently configured camcorder system frequency and the recording format scan method.

15. Recording format (codec) indicator

Displays the format name of clips recorded onto SxS memory cards.

16. Gamma indicator

Display the gamma setting.

Menu settings				Indicator
Operation >Display On/Off >Gamma	Paint >Gamma setting			
	Gamma	Gamma Category	Gamma Select	
Off	—	—	—	—
On	Off	—	—	Gamma Off
	On	STD	STD1 DVW	STD1
			STD2 x4.5	STD2
			STD3 x3.5	STD3
			STD4 240M	STD4
			STD5 R709	STD5
			STD6 x5.0	STD6
		HG	HG1 3250G36	HG1
			HG2 4600G30	HG2
			HG3 3259G40	HG3
			HG4 4609G33	HG4
On	On	User	User 1	User 1
			User 2	User 2
			User 3	User 3
			User 4	User 4
			User 5	User 5

17. Timecode external lock indicator

Displays timecode lock when the timecode is input from an external source.

18. Wired LAN connection status

Displays the wired LAN network setting and connection status using icons.

State			Icon
Operation >Display On/Off >Network Condition	Maintenance >Network >Wired LAN	Network connection status	
Off	—	—	—
On	Disable	—	—
	Enable	Connecting to LAN	LAN (flashing)
		Connected to LAN	LAN
		LAN connection error	LAN

19. Streaming indicator

Displays the status of streaming using icons.

State			Streaming state/Icon
Operation >Display On/Off >Streaming Status	Maintenance >Streaming >Setting	Maintenance >Network Client Mode >Setting	
Off	—	—	—
On	Off	Off	–
	On	Off	Not streaming
			Streaming
			Warning
			Error

The following icons are displayed when streaming from a CCM.

State			Streaming state/Icon
Operation >Display On/Off >Streaming Status	Maintenance >Streaming >Setting	Maintenance >Network Client Mode >Setting	
On	Off	On	Not streaming
			Streaming
			Warning
			Error

[Note]
Icons are not displayed before streaming starts.

20. Wireless network status indicator

Displays the network setting and connection status using icons.

State			Icon
Operation >Display On/Off >Network Condition	Maintenance >Network >Wireless Network	Network connection status	
Off	—	—	—
On	Off	—	—
	Wi-Fi Access Point	Connecting using Wi-Fi	AP (flashing)
		Wi-Fi standby (connected)	AP
	Wi-Fi Station	Connecting using Wi-Fi	(flashing)
		Access point search	
		Access point connection	Icon varies with signal strength.
		Access point connection error	
	Modem	Connecting using 3G/4G	3G/4G (flashing)
		Connected using 3G/4G	3G/4G
		3G/4G connection error	3G/4G

21. Proxy indicator

Displays “Proxy” when proxy recording is on (Operation >Proxy Recording Mode >Setting in the setup menu is set to On). During setup, “Proxy” blinks. “Proxy Rec” is displayed during proxy file recording. Displays and transfer rate (%) during proxy file transfer. When transfer finishes, disappears to indicate 100% transfer.

22. Network client mode indicator

Displays the status of the connection to the CCM (PWS-100RX1 Network RX Station configured as Connection Control Manager) using icons when network client mode is on.

State			Icon
Operation >Display On/Off >NW Client Mode Status	Maintenance >Network Client Mode >Setting	State	
Off	—	—	—
On	Off	—	—
	On	CCM connected	NCM
		Connecting to CCM (disconnected)	NCM (flashing)
		CCM connection standby	–
		CCM connection error	NCM For details about errors, see (page 13).

23. Video signal indicator

Displays the video signal in realtime as a waveform, vectorscope, or histogram.

24. Recording media state/remaining capacity indicator for each media slot

Displays the state and remaining capacity of the media in SxS slot A, SxS slot B, and the PROXY SD card slot.

SxS slot icon indicator

*SxS slot A (SxSA) example. The icons for SxS slot B are labeled SxSB.

Icon	Media state
–	Media not inserted or not mounted
SxSA	Media mounted
SxSA (flashing)	Media mounting
SxSA (orange bar)	Recording (active)
SxSA (green indicator)	Playback (active)
SxSA (orange bar + green indicator)	Recording/playback (active)

SD card (for proxy data recording) icon indicator

Icon	Media state
–	Media not inserted or not mounted
Proxy	Media mounted
Proxy (flashing)	Media mounting
Proxy (orange bar)	Recording (active)

The remaining recording time is displayed numerically.

25. Audio level meter indicators

Displays the levels of audio channels 1 and 2.

26. Clip name display

Displays the name of the clip currently recording when recording, or displays the name of the next clip to be recorded during recording standby.

27. Focus assist indicator

Displays a detection frame (focus area marker) indicating the area for detection of degree of focus, and a level bar (focus assist indicator) indicating the degree of focus within that area.

28. Time data display

Displays the remaining recording/playback time, timecode, user bits, etc., as selected by the DISPLAY switch (page 8).

29. SD card indicator for saving configuration data

Displays the state of the SD card (for saving configuration data) inserted in the UTILITY SD card slot.

Icon	Media state
—	SD card not inserted or not mounted
SD	SD card mounted
SD	Mounted SD card is protected
SD (flashing)	SD card mounting

30. SDI output REC trigger indicator

Displays the superimposition state of the recording command sent to the SDI connector output.
It is displayed when Maintenance >Camera Config >HD SDI Remote I/F is set to "Characters" in the setup menu.

31. ALAC indicator

Displays "ALAC" when the ALAC (Auto Lens Aberration Correction) function is set to be performed automatically.
ALAC will be performed automatically when an ALAC-compatible lens is attached, the ALAC function is enabled, and Maintenance >Camera Config >ALAC is set to "Auto" in the setup menu.

32. AE (auto iris) mode indicator

Displays the current operating mode of the auto iris function using an icon and auto iris override level.

Icon	Meaning
	Backlight mode
STD	Standard mode
	Spotlight mode

33. Auto focus mode indicator

Displayed when an auto focus lens is attached (not supported in this version).

34. ND filter indicator

Displays the position number of the currently selected ND filter (page 5).
When "Electrical CC" is assigned to an assignable switch, the position (A/B/C/D) of the electrical CC filter is displayed on the right of the ND filter indicator (1 to 4).

35. Gain indicator

Displays the gain setting (dB), set using the GAIN switch, of the video amplifier.

36. Shutter mode/shutter speed indicator

Displays the shutter mode or shutter speed.

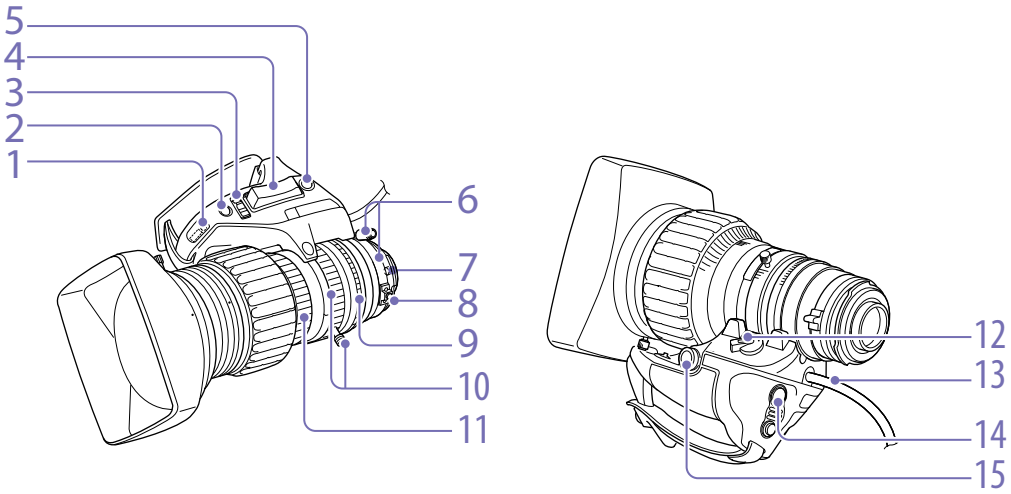
"Setting the Electronic Shutter" (page 37)

37. White balance mode indicator

Displays the currently selected white balance automatic adjustment memory.
ATW: ATW (Auto Tracing White Balance) mode
W:A: Memory A mode
W:B: Memory B mode
W:C: Memory C mode
W:P: Preset mode
3200K: Appears when an assignable switch assigned with Color Temp SW 3200K is on
4300K: Appears when an assignable switch assigned with Color Temp SW 4300K is on
5600K: Appears when an assignable switch assigned with Color Temp SW 5600K is on
6300K: Appears when an assignable switch assigned with Color Temp SW 6300K is on

Lens Supplied with the PXW-X400KC

The PXW-X400KC is supplied with a lens.



1. **Iris gain adjustment trimmer (page 39)**

2. **Iris push auto switch**
When the iris mode switch is in the M (manual) position, press this switch for instantaneous auto iris adjustment. The iris is automatically adjusted while the switch is held down.

3. **Iris mode switch**
A (auto): The iris is adjusted automatically.
M (manual): Adjust the iris with the iris ring.

4. **Zoom seesaw switch**
This is enabled when the zoom servo/manual knob is in the SERVO position. Set to the W (wide angle) position when you want wide-angle, and set to the T (telephoto) side when you want telephoto.
Press the switch harder for a faster zoom action, or softer for slower zoom action.

5. **RET switch**
While pressed, the last few seconds recorded appear on the viewfinder screen (Rec Review) (page 19).

6. **F.B. lock screw / F.B. adjustment ring (page 39)**

7. **Positioning pin**
When attaching the lens, align this pin with the recess in the top center of lens mount on the camcorder.

8. **Macro button / macro ring**
Press and hold the macro button and turn the macro ring to adjust the focus (minimum focus distance: 10 mm).

9. **Iris ring**
For manual iris adjustment, set the iris mode switch to the M (manual) position, then turn this ring.

[Note]
Always set the iris mode switch to the M (manual) position first and then adjust the iris.

10. **Zoom lever / zoom ring**
For manual zoom adjustment, set the zoom servo/manual switch to the MANU position, then operate the lever/ring.

11. **Focus ring**
Turn this ring to adjust the focus.

12. **Zoom servo / manual knob**
SERVO (servo): Selects power zoom. Operate the zoom with the zoom seesaw switch.
MANU (manual): Selects manual zoom. Operate the zoom with the zoom lever/zoom ring.

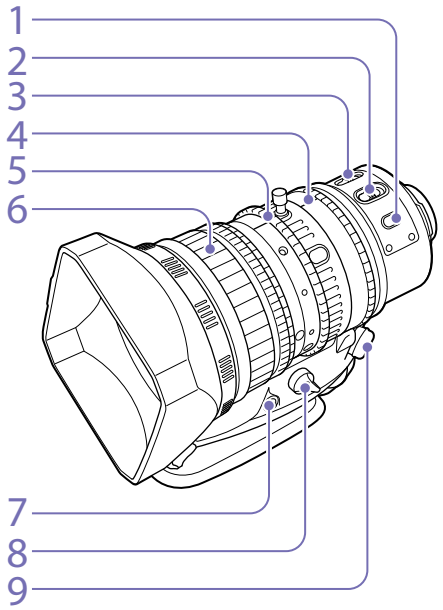
13. **Power/iris control cable**
Connect to the LENS connector on the camcorder.

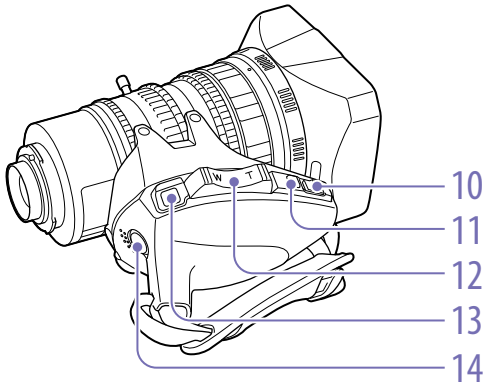
14. **VTR switch**
Use this to start and stop recording. Press once to start recording, then press once more to stop.

15. **Zoom remote control connector**
Connect to an optional zoom servo controller to enable remote control of zooming.

Lens Supplied with the PXW-X400KF

The PXW-X400KF is supplied with a lens.





1. PUSH AF (auto focus) button
Reserved for use in a future upgrade.

2. FOCUS (adjustment mode) switch
A (auto): Reserved for use in a future upgrade.
M (manual): Selects manual mode for focus adjustment with the focus ring.

3. MACRO switch
When this switch is in the ON position, macro mode is enabled, allowing focusing over the whole range (5 cm [1] to ∞) including the macro range (from 5 cm [1] to 90 cm from the front of the lens).
This operation is independent of whether the focus adjustment mode is auto or manual.
1) At the wide-angle setting

4. Iris ring
For manual iris adjustment, set the IRIS switch to the M (manual) position, then turn this ring.

5. Zoom ring
For manual zoom adjustment, set the ZOOM switch to the MANUAL position, then turn this ring.

6. Focus ring
Turn this ring to adjust the focus.
When the ring is set to AF/MF mode, the faster you turn ring the faster the focusing mechanism operates, minimizing the amount of turning required for focusing.
When you slide the focus ring back (toward the camcorder), the focus mode is set to Full MF mode, in which all focus adjustments are manual (page 40).

7. Flange focal length adjustment button
Press this to adjust the flange focal length (the distance from the lens mounting flange plane to the focusing plane) (page 25).

8. Zoom control connector (8-pin)
Connect to an optional zoom servo controller to enable remote control of zooming.

9. ZOOM switch
SERVO: Selects power zoom. Operate the zoom with the power zoom lever.
MANUAL (manual): Selects manual zoom. Operate the zoom with the zoom ring.

10. PUSH AUTO (instant auto iris) button
When the IRIS switch is in the M position for manual adjustment, press this button for instantaneous auto adjustment. The iris is automatically adjusted while the button is held down.

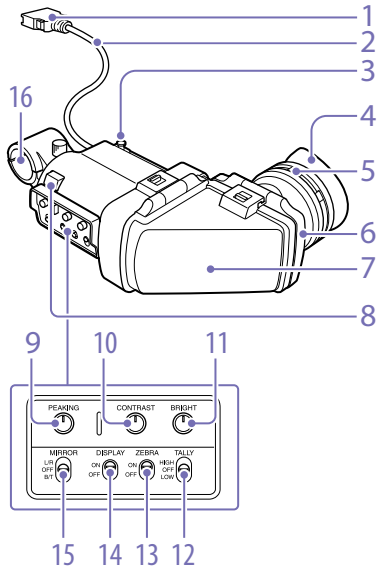
11. IRIS (adjustment mode) switch
A (auto): The iris is adjusted automatically.
M (manual): Adjust the iris with the iris ring.

12. Power zoom lever
This is enabled when the ZOOM switch is in the SERVO position. Set to the W (wide angle) position when you want wide-angle, and set to the T (telephoto) side when you want telephoto.
Press the lever harder for a faster zoom action, or softer for slower zoom action.

13. RET (return video) button
You can assign a function and use this as an assignable switch (page 106).
When "Lens RET" is assigned to this button (factory default setting), press this after recording stops to review the last few seconds recorded on the viewfinder screen (Rec Review) (page 45).
Press this button (single click) during recording or playback to record a Shot Mark 1 mark, or double-click to record a Shot Mark 2 mark (page 47).

14. VTR button
Use this to start and stop recording. Press once to start recording, then press once more to stop.

Viewfinder



1. Connector
Connect to the VF connector (26-pin) on the camcorder.

2. Viewfinder cable

3. Slide stopper
Prevents the viewfinder from coming off the camcorder when it is slid from side to side.

4. Eyecup

5. Diopter adjustment ring
Turn this ring to adjust the image until it is in sharpest focus.

6. Eyepiece
You can raise this up when required by the situation.

7. Viewfinder barrel
You can raise this up or rotate when required by the situation.

8. **Tally indicator**
Lights up when recording is started by a press of the REC START button on this camcorder, the VTR button on the lens, or the VTR button on the remote control unit.
When an abnormality occurs, the tally indicator flashes to indicate a warning.

9. **PEAKING knob**
Turning this knob clockwise adjusts the picture sharpness, and makes focusing easier. This control has no effect on the output signals of the camcorder.

10. **CONTRAST knob**
Adjusts the contrast of the screen. This control has no effect on the output signals of the camcorder.

11. **BRIGHT knob**
Adjusts the brightness of the screen. This control has no effect on the output signals of the camcorder.

12. **TALLY switch**
Controls the tally indicator located on the front of the viewfinder.
HIGH: The tally indicator brightness is set to high.
OFF: The tally indicator is disabled.
LOW: The tally indicator brightness is set to low.

13. **ZEBRA (zebra pattern) switch**
Controls the zebra pattern display.
ON: Display a zebra pattern.
OFF: Do not display a zebra pattern.

14. **DISPLAY switch**
ON: Display text information.
OFF: Do not display text information.

15. **MIRROR switch**
The image display on the monitor screen becomes reversed horizontally or vertically when the viewfinder barrel is raised up or rotated.
L/R: Reverse the image horizontally.
OFF: Do not reverse the image.
B/T: Reverse the image vertically.

16. **Microphone holder**

Preparing a Power Supply

For safety, use only the Sony battery packs and AC adaptors listed below.

- BP-L80S Lithium-ion Battery Pack

[CAUTION]
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
When you dispose of the battery, you must obey the law in the relative area or country.

Using a Battery Pack

Press the battery pack against the back of the camcorder, aligning the line on the side of the battery pack with the line on the camcorder. Then slide the battery pack down until its "LOCK" arrow aligns with the line on the camcorder.
To detach the battery pack, pull the battery pack up by holding the release button in.

[Notes]

- If the battery pack is not attached correctly, the terminals may become damaged.
- During recording and playback (while the ACCESS lamp on the right-side panel is lit in blue and the ACCESS lamp in the card slot section is lit in orange), be careful never to remove the battery pack.
  Doing so may corrupt the data recorded on the card.
- Make sure to power the camcorder off before replacing the battery pack.

When a BP-L80S Battery Pack is used, the camcorder will operate continuously for approximately 145 minutes.

[WARNING]
Batteries shall not be exposed to excessive heat such as sunshine, fire or the like.

[Note]
The battery pack operating time depends on the frequency of use of the battery pack, and the ambient temperature when used.

Before use, charge the battery pack with a charger suitable for each battery.

For details on the battery charging procedure, refer to the battery charger operation manual.

Note on using the battery pack

A warm battery pack may not be able to be fully recharged.

Using AC Power

Mount an AC-DN2B/DN10 on the camcorder in the same way as a battery pack, then connect to the AC power supply.

Attaching a Viewfinder

This section describes the viewfinder supplied with the PXW-X400KC/PXW-X400KF models.

[CAUTION]
When the viewfinder is attached, do not leave the camcorder with the eyepiece lens facing the sun.
Direct sunlight can enter through the lens, be focused in the viewfinder and cause fire.

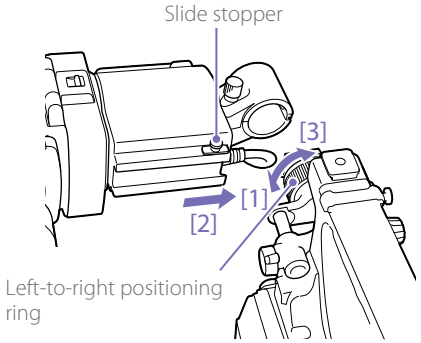
[Note]
A viewfinder is supplied with the PXW-X400KC/PXW-X400KF models. A viewfinder for the PXW-X400 is available separately.

Attaching the Supplied Viewfinder

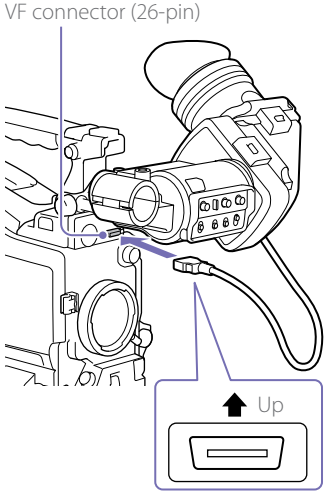
[Note]
When attaching the viewfinder, take note of the following points.

- Be sure to the power off the camcorder before coupling the viewfinder connector to the camcorder's VF connector (26-pin). If you make this connection when the camcorder power is on, the viewfinder may not function properly.
- Couple the viewfinder connector firmly to the camcorder's VF connector (26-pin). If the coupling is loose, noise may appear on the video or the tally light may not operate properly.

1 [1] Loosen the viewfinder left-to-right positioning ring, [2] attach the viewfinder to the viewfinder fitting shoe, and [3] tighten the viewfinder left-to-right positioning ring.



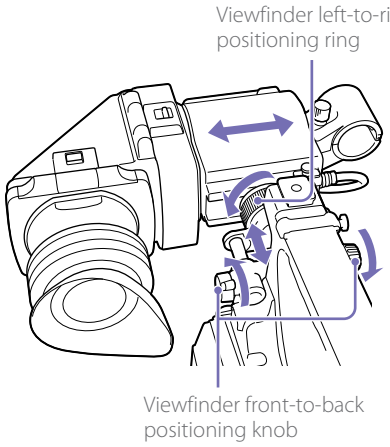
2 Couple the viewfinder connector to the VF connector (26-pin).



You can detach the viewfinder by following the attaching procedure in reverse order. But, when detaching the viewfinder from the attachment shoe, pull up the stopper.

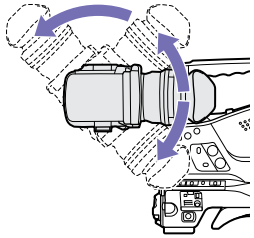
Adjusting the Viewfinder Position

To adjust the viewfinder left-right position, loosen the left-right positioning ring, and to adjust the front-back position, loosen the front-to-back positioning knob.



Adjusting the Viewfinder Angle

You can adjust the angle of the viewfinder.



Reversing the display (image/text indication) vertically

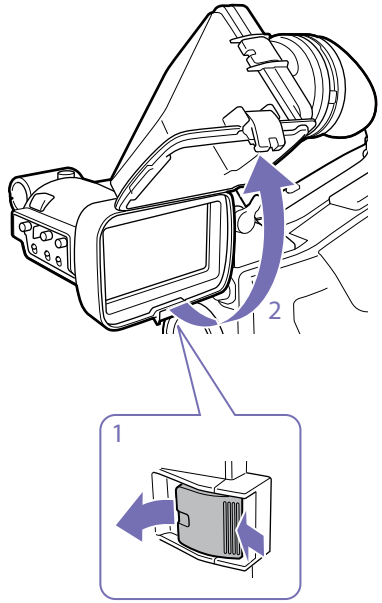
The viewfinder can be rotated as much as 180 degrees toward the direction facing the subject. When you do this, the picture and other information displayed in the viewfinder appear upside down.
To restore the normal display, set the MIRROR switch on the rear panel of the viewfinder to B/T.

Lifting Up the Viewfinder Barrel and Eyepiece

You can view the LCD screen inside the viewfinder or its mirrored image by lifting up the viewfinder barrel or the eyepiece.

1 Push the clip on the bottom to release and flip up the viewfinder barrel.

2 It locks at the 120-degree position.



Normally use it in the locked position.
Although you can open it farther from the lock position, you must return it to the closed position to lock it at the 120-degree position again.

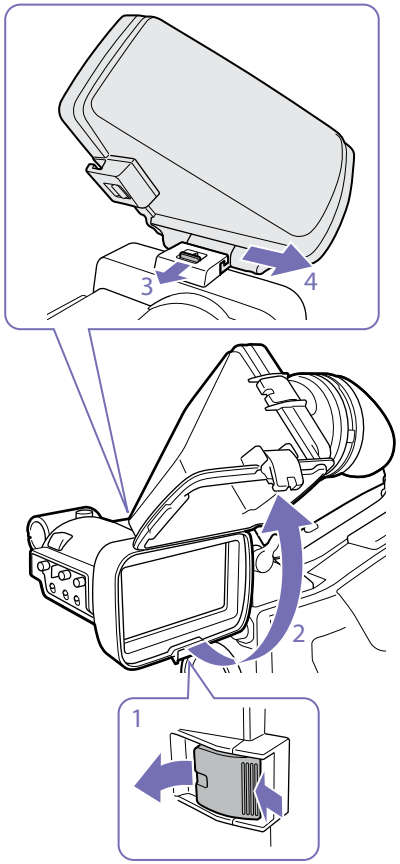
Detaching the Viewfinder Barrel/ Eyepiece

1 Push the clip on the bottom to release.

2 Flip up the viewfinder barrel.

3 Slide the knob on the top to the opposite side of the viewfinder barrel.

4 Detach the viewfinder barrel by horizontally sliding it.

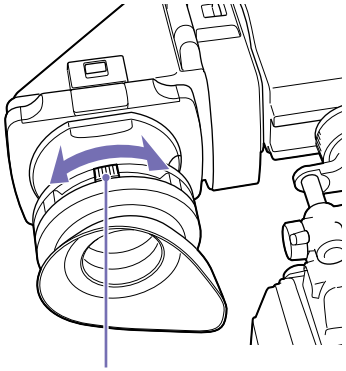


Reversing the display (image/text indication) horizontally

By setting the MIRROR switch on the rear panel of the viewfinder to L/R, you can reverse the picture and other information displayed in the viewfinder horizontally.

Adjust the Diopter

Turn the diopter adjustment ring until the viewfinder image is sharpest.

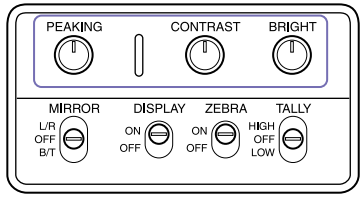


Diopter adjustment ring

You can also attach a commercially available protection filter, close-up lens, etc. that is 52 mm in diameter.

Adjusting the Screen

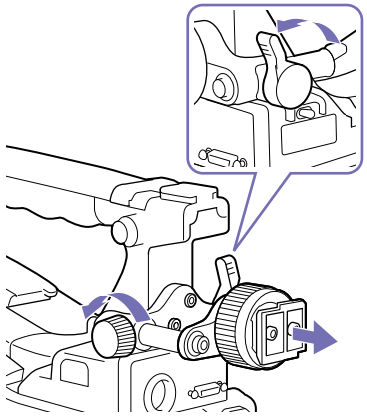
Adjust the brightness, contrast, and peaking of the viewfinder screen with the controls shown below.
Outlines: Adjust using the PEAKING knob.
Contrast: Adjust using the CONTRAST knob.
Brightness: Adjust using the BRIGHT knob.



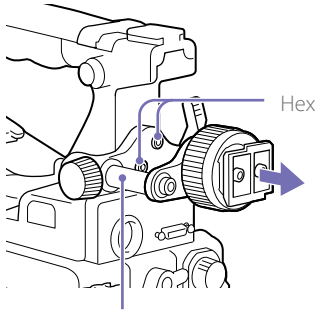
Attaching the BKW-401 Viewfinder Rotation Bracket

By fitting an optional BKW-401 Viewfinder Rotation Bracket, you can rotate the viewfinder out of the way so that your right leg does not hit the viewfinder while you are carrying the camcorder.

1 Loosen the front-to-back viewfinder positioning levers and the front-to-back viewfinder positioning knobs, and then pull the viewfinder slide assembly forward.

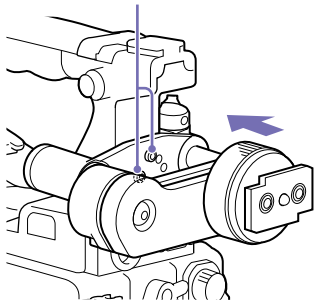


2 Using a 2.5 mm diameter hexagonal wrench, detach the viewfinder slide assembly.



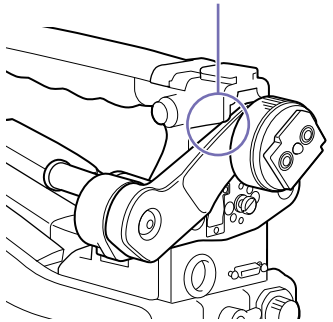
3 Attach the BKW-401 with the supplied bolts.

Bolts supplied with the BKW-401



4 Adjust the front-to-back position so that the arm of the BKW-401 does not touch the handle when it is raised.

Adjust position so that arm does not touch handle



Using the Camcorder for the First Time

When using the camcorder for the first time, configure the following settings in the menu.

For details about menu operations, see "Basic Setup Menu Operations" (page 80).

Setting the Time Zone

Set the time zone for the region of use. The default value is "UTC Greenwich."

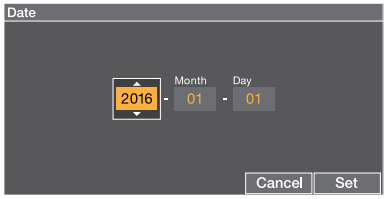
1 Select Operation >Time Zone >Time Zone in the setup menu.

2 Select the time zone to use.

Setting the Date and Time of the Internal Clock

Set the year, month, day, and day-of-week of the internal clock.

1 Select Maintenance >Clock Set >Date in the setup menu.
The Date screen appears.



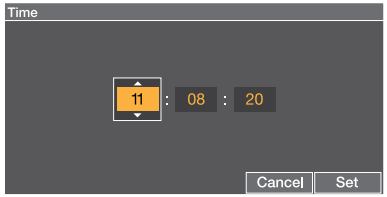
2 Turn the MENU knob to select the year, month, or day, and then press the knob.
The selected year, month, or day becomes editable.

3 Turn the MENU knob to set the year, month, or day, and then press the knob.

4 Repeat steps 2 and 3 to set the remaining digits.

5 Press the SET button.
The internal clock is set to the date set in steps 2 to 4.
Next, set the time.

6 Select Maintenance >Clock Set >Time in the setup menu.
The Time screen appears.



7 Set the time in the same way as when setting the date.

8 Press the SET button.
The time is registered in the internal clock.

To cancel the setting, press the Cancel button.

Mounting and Adjusting the Lens

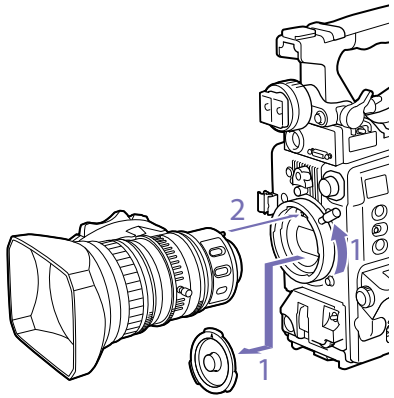
[Note]
When connecting or disconnecting the lens cable to this connector, power off the camcorder first.

Attaching the Lens

This section describes how to attach the lens supplied with the PXW-X400KF as an example.

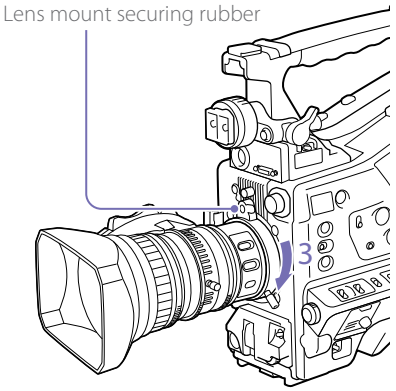
1 Push the lens locking lever up and remove the lens mount cap from the lens mount.

2 Align the center pin on the lens with the center slot in the lens mount, and insert the lens into the mount.



3 Holding the lens in place, push the lens locking lever down to lock the lens.

[Caution]
If the lens is not firmly locked, it may come off while the camcorder is being used. This could cause a serious accident. Make sure the lens is firmly locked. It is recommended that the lens mount securing rubber be put on the lens locking lever as illustrated below.



4 Connect the lens cable to the LENS connector.

5 Secure the lens cable with the cable clamp.

If an aberration correction lens is attached

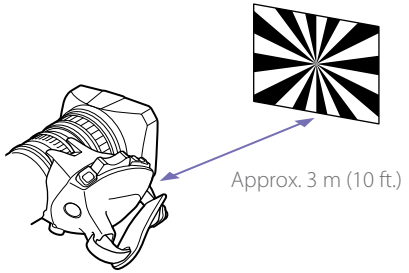
The aberration correction function is activated automatically. [1] Starting the camcorder with an aberration correction lens may require more time than normal because of data loading at start-up. The lens supplied with the PXW-X400 is an aberration correction lens. Contact a Sony sales or service representative for information about other aberration correction lenses.

1) The aberration correction function does not operate if Maintenance >Camera Config >ALAC in the setup menu is set to Off.

Adjusting the Flange Focal Length

If the lens does not stay in focus properly as you zoom from telephoto to wide angle, adjust the flange focal length (the distance from the plane of the lens mounting flange to the imaging plane, also called flange-back).
Make this adjustment just one time after mounting or changing the lens.

When carrying out the adjustment, use a flange focal length adjustment chart as the subject.



[Notes]
- If you use a subject with insufficient contrast, or move the camcorder or subject during adjustment, this will cause an adjustment error.
- Place the subject (the flange focal length adjustment chart) so that it appears at the center of the screen at the telephoto end. Arrange it so that no nearby object (no object closer to the camera than the chart) enters the screen at the wide-angle end.

Adjusting the flange focal length on the lens supplied with the PXW-X400KC

1 Place a subject (Siemens star chart, for example) 3 m (10 ft) in front of the camera.

2 Open the iris.
The depth-of-field is reduced when the iris is open, making adjustment easier.

3 Set the lens zoom to T (telephoto).

4 Adjust the focus on the subject.

5 Set the lens zoom to W (wide angle).

6 Loosen the F.B. lock screw on the lens, and turn the F.B. adjustment ring to adjust the focus.

7 Repeat steps 3 to 6 until the proper focus is achieved at both ends of the zoom ring.

8 When the optimum position of the F.B. adjustment ring is achieved, tighten the F.B. lock screw.

Adjusting the flange focal length on the lens supplied with the PXW-X400KF

1 Place a subject (Siemens star chart, for example) 3m (10 ft) in front of the camera.

2 Open the iris.
The depth-of-field is reduced when the iris is open, making adjustment easier.

3 Set the FOCUS switch to the M (manual) position, the focus ring to the AF/MF position, and the ZOOM switch to the SERVO position.

4 Press and hold the F.f. button.

5 When the zoom automatically moves to the T (telephoto) position, adjust the focus, and press the F.f. button.

6 When the zoom automatically moves to the W (wide angle) position, adjust the focus, and press the F.f. button.

If the flange focal length adjustment is not successful

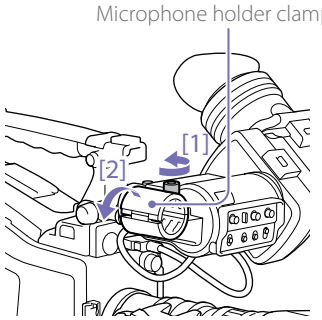
Check the subject and lighting conditions, and repeat the adjustment.

Preparing the Audio Input System

Connecting a Microphone to the MIC IN Connector

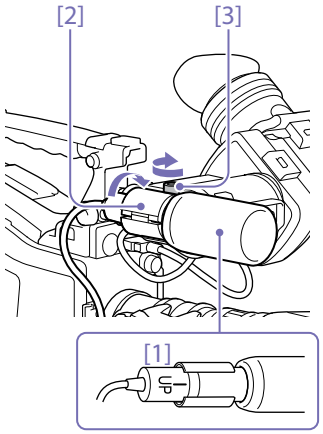
Attach the supplied microphone to the microphone holder of the supplied viewfinder.

1 Loosen the screw and open the microphone holder clamp.



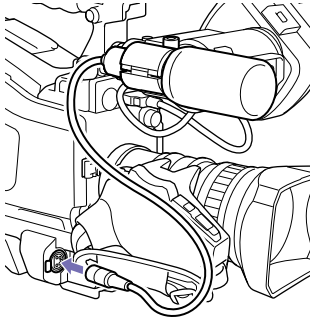
2 Place the microphone in the microphone holder.

[1] Place the microphone in the holder so that "UP" is at the top.
[2] Close the microphone holder.
[3] Tighten the screw.



On how to attach the microphone, refer to the operation manual for the microphone.

3 Plug the microphone cable into the MIC IN connector, then set the AUDIO IN switch for the channel on which you want to record the audio from this microphone to FRONT.



4 Secure the microphone cable with the cable clamp.

Connecting Microphones to the AUDIO IN Connectors

You can connect up to two monaural microphones to the AUDIO IN CH-1/CH-2 connectors, using an optional CAC-12 Microphone Holder.

Supported microphones: ECM-674/678 electret condenser microphone

For details about attaching the microphone holder and microphone, refer to the instruction manual of each product.

Attaching a Digital Wireless Receiver

To use a Sony digital wireless microphone system, power the camcorder off and then attach the digital wireless receiver.

- DWR-S02D Digital Wireless Receiver

For details about attaching a digital wireless receiver, refer to the instruction manual of each product.

Connecting Line Input Audio Equipment

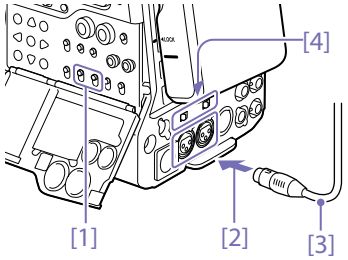
1 Connect the audio output connector of the audio equipment that supplies the line input signal to the AUDIO IN CH-1 or CH-2 connector.

2 Set the AUDIO IN selector for the channel to which the audio signal source is connected to LINE.

XLR connection automatic detect function

- With the XLR connection automatic detection function switched off (the factory default setting): Set the AUDIO IN CH1/CH2 switch to REAR for the channels to which the audio equipment is connected.
- With the XLR connection automatic detection function switched on: When a cable is connected to the AUDIO IN CH-1 or CH-2 connector, the input from that connector is automatically selected for audio recording, regardless of the setting of the AUDIO IN CH1/CH2 switch.

The XLR connection automatic detection function can be switched on/off using Maintenance >Audio >Rear XLR Auto in the setup menu.



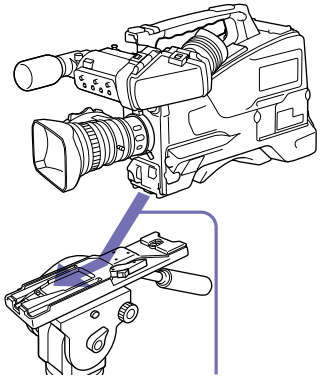
[1] Place the microphone in the holder so that "UP" is at the top.
[2] Close the microphone holder.
[3] Tighten the screw.

Attaching and Adjusting Peripheral Devices

Mounting on a Tripod

1 Attach the optional VCT-14/U14 Tripod Adaptor to the tripod.

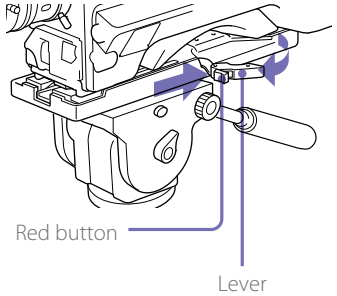
2 Mount the camcorder on the tripod adaptor.



Slide the camcorder forward along the groove in the adaptor until it clicks.

3 Make sure that the camcorder is securely attached by moving it back and forth.

To remove the camcorder from the tripod attachment, hold down the red button and pull the lever in the direction of the arrow.



Red button

Lever

[Note]
The tripod adaptor pin may remain in the engaged position even after the camcorder is removed. If this happens, press the red button and move the lever as shown above until the pin returns to the stowed position. If the pin remains in the engaged position, you will not be able to mount the camcorder on the tripod adaptor.

Connecting a Video Light

With this camcorder, you can use the Anton Bauer Ultralight 2 or equivalent video light (powered by 12 V with maximum power consumption of 50 W).

- If you connect the video light to the LIGHT connector on the camcorder and set the LIGHT switch to AUTO, you can turn the light on and off automatically as you start and stop recording on this camcorder.
- The output of the LIGHT connector on the camcorder is regulated to 12 V even when the camcorder is supplied with over 12 V power (through the DC IN connector or battery pack). The brightness or color temperature of the light will not change in response to voltage increase.

[Notes]

- Do not connect video lights with power consumption of 50 W or greater.
- The brightness or color temperature of the light will change when the voltage (supplied through the DC IN connector or from the battery pack) is less than 12 V.

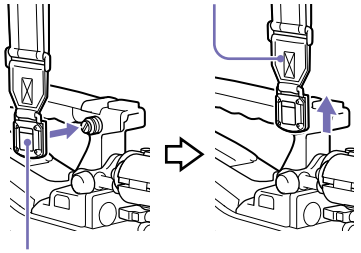
To attach a video light, fit the video light to the accessory shoe on the camcorder grip, and connect the video light cable to the LIGHT connector.

[Note]
The accessory shoe on the camcorder is of the 1/4-inch tapped hole type. If you want to replace this with a slide-type shoe, use the supplied cold shoe kit.

Attaching the Shoulder Strap

1 Fit one of the clips to a shoulder strap fitting.

Pull up the strap to lock the fitting.

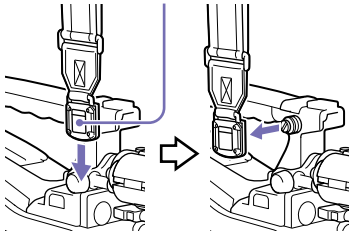


Clip

2 Fit the other clip to the shoulder strap fitting on the other side of the grip in the same way.

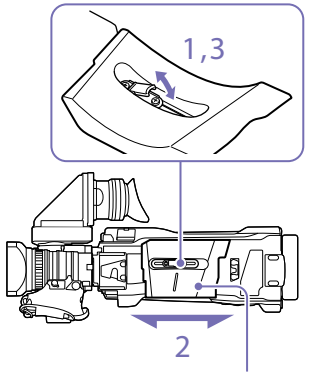
To remove the shoulder strap, refer to the following diagram.

Press here and pull in the direction shown by the arrow to release.



Adjusting the Shoulder Pad Position

You can slide the shoulder pad back and forth within a 40 mm range. This adjustment helps you get the best balance for shooting with the camcorder on your shoulder.



Shoulder pad

1 Raise the lever in the center of the shoulder pad to unlock the shoulder pad.

2 Slide the shoulder pad backward or forward until it is in the most convenient position.

3 Bring down the lever to lock the shoulder pad in the selected position.

Handling SxS Memory Cards

This camcorder records video and audio on SxS memory cards (not supplied) loaded into one or both of its memory card slots.
You can use the camcorder with the following devices to make recordings.

- MEAD-SD02 Media Adaptor (SDXC only supported) or QDA-EX1 XQD ExpressCard Adaptor

About SxS Memory Cards

SxS memory cards

Use Sony SxS memory cards (SxS PRO or SxS-1) with this camcorder.

SxS PRO+ series
SxS PRO series
SxS-1 series

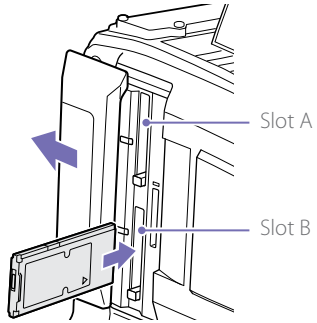
The memory cards listed above comply with the ExpressCard memory card standard.

- SxS, SxS PRO, and SxS-1 are trademarks of Sony Corporation.
- The ExpressCard label and logo are the property of the Personal Computer Memory Card International Association (PCMCIA) and are licensed to Sony Corporation. All other trademarks and trade names are the property of their respective owners.

Inserting SxS Memory Cards

1 Slide the cover to the left to open.

2 Insert an SxS memory card into a card slot.



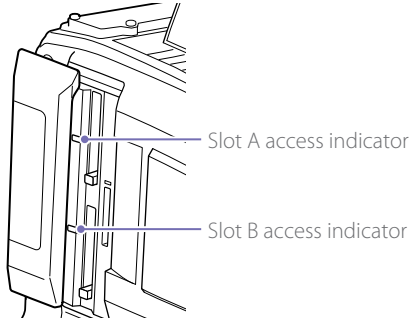
[Note]
Make sure to insert the SxS card in the correct orientation. Hold the card with the arrow on one side facing the direction shown in the diagram, and then insert the card.

The ACCESS indicator lights in orange, and then lights in green to indicate that the memory card is usable.

3 Close the cover.

ACCESS indicator status

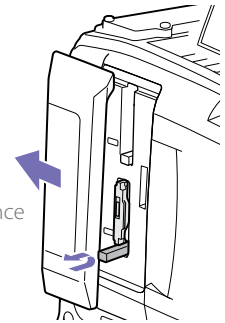
Card slots A and B each have an ACCESS indicator that indicate the slot status.



Indicator	Slot status
Lights in orange	Accessing the SxS memory card (lights during data reading and writing)
Lights in green	Standby (the loaded SxS memory card is ready for recording or playback)
Not lit	No SxS memory card is loaded. An unusable card is loaded. An SxS memory card is loaded, but the other slot is selected.

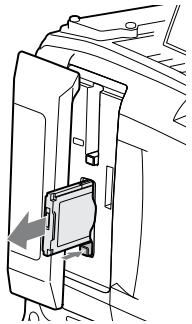
Ejecting SxS Memory Cards

1 Open the cover, and then press the EJECT button to release the lock and extract the button.



2 Press the EJECT button again to eject the card.

[Note]
When you press the EJECT button, take care not to impede the SxS memory card. If the movement of the SxS memory card is impeded, the lock may fail to release.



[Note]
Data integrity cannot be guaranteed if you power the camcorder off or remove a memory card while the card is being accessed. All data recorded on the card may be discarded. Always make sure that the ACCESS indicator is lit green or not lit before you power the camcorder off or remove a memory card.

Selecting the SxS Memory Card to Use

When SxS memory cards are loaded in both slot A and slot B, you can press the SLOT SELECT button to select the SxS memory card to use.
When the remaining recording time on the recording SxS memory card falls below 60 seconds, the remaining capacity indicator for the corresponding media slot flashes on the viewfinder screen to indicate that the camcorder will switch SxS memory cards soon.
Subsequently, the camcorder switches automatically to the other card when the selected card becomes full, and recording continues.

[Note]
The SLOT SELECT button is disabled during playback. The memory cards are not switched even if you press the button. Button operations are enabled when a thumbnail screen (page 72) is displayed.

Formatting (Initializing) SxS Memory Cards

When an unformatted SxS memory card or an SxS memory card formatted in another specification is inserted, a message notifying you that the media has a different file system appears. In this case, format the memory card in the following way.
SxS memory cards are formatted in exFAT mode or FAT mode by factory default.

[Note]
SxS memory cards must be formatted on an XDCAM device that supports the exFAT or UDF file system or on this camcorder. Cards in other formats cannot be used.

1 Select Operation >Format Media in the setup menu.

2 Select Media(A) (slot A) or Media(B) (slot B).

3 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen prompting whether to format the card appears.

4 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.
Formatting begins.
During formatting, a message is displayed, and the ACCESS indicator is lit orange.
When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

If formatting fails

A format operation may fail because the SxS memory card is write protected, or because it is not the type of card specified for use with this camcorder.
In this case, an error message appears. Follow the instructions in the error message and exchange the card for an SxS memory card that can be used with this camcorder.

[Notes]
- Formatting a memory card erases all data, including recorded video data and setup files.
- Use the format function of this camcorder to format SxS memory cards for use on this camcorder. The formats of cards formatted on other devices are not recognized as valid formats, making it necessary to format them again on this camcorder.

Checking the Remaining Recording Time

You can check the remaining capacity of the SxS memory cards loaded in the two slots by checking the recording media remaining capacity indicator in the viewfinder.
The remaining recording time is calculated from the remaining capacity of the media in each slot and the current video format (recording bit rate), and is displayed in units of minutes.
You can check the remaining capacity on a bar graph by displaying the Media Status screen (page 14).

[Note]
A mark appears when a memory card is write protected.

When to exchange SxS memory cards

- The warning message "Media Near Full" appears, the WARNING indicator and the REC indication on the viewfinder screen flash, and the buzzer sounds when the total remaining recording time of the two memory cards falls to five minutes during recording.
  Exchange one of the cards for media with available recording capacity.
- If you continue recording, the message "Media Full" appears and recording stops when the total remaining recording time falls to 0.

[Note]
About up to 600 clips can be recorded on one SxS memory card.
The display of remaining recording time changes to "0" and the message "Media Full" appears when the clip limit is reached.

Restoring SxS Memory Cards

If for any reason an error should occur in a memory card, the card must be restored before use.
When you load an SxS memory card that needs to be restored, a message appears in the viewfinder to ask whether you want to restore it.

To execute the restore, turn the MENU knob to select [Execute], and then press the knob.
The restoration starts.
During restoration, a message is displayed, and the ACCESS indicator is lit orange.
When restoration ends, a completion message appears. Press the MENU knob to dismiss the message.

If restoration fails

- Write protected SxS memory cards and cards on which memory errors have occurred cannot be restored. A warning message appears for such cards. Follow the instructions in the message and unprotect the card or replace it with another card.
- SxS memory cards on which memory errors have occurred may become usable if they are reformatted.
- In some cases, some clips can be restored while others cannot. The restored clips can be played normally.
- If the message "Could not Restore Some Clips" keeps appearing after repeated attempts at restoration, it may be possible to restore the SxS memory card with the following procedure.
  [1] Use the application software (page 132) to copy the required clips to another SxS memory card.
  [2] Format the unusable SxS memory card on the camcorder.
  [3] Copy the required clips back to the newly formatted SxS memory card.

Handling SD Cards for Saving Configuration Data

The following SD cards can be used for saving configuration data.

SDHC memory cards* (Speed Class: 4 to 10, non-UHS, Capacity: 2 to 32 GB)
SD memory cards* (Capacity: up to 2 GB)
* Referred to as "SD cards" in this manual.

Formatting (Initializing) SD Cards

SD cards must be formatted the first time they are used in the camcorder.
SD cards for use in the camcorder should be formatted using the format function of the camcorder. If a message appears when the SD card is inserted into the camcorder, format the SD card.

1 Select Operation >Format Media >SD Card (Utility) in the setup menu.
A confirmation screen prompting whether to format the card appears.

2 Turn the MENU knob to select [Execute], then press the knob.
Formatting begins.
During formatting, a message is displayed, and the ACCESS indicator is lit orange.
When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

[Note]
Formatting an SD card erases all data on the card. The card cannot be restored.

Checking the Remaining Capacity

You can check the remaining capacity on an SD card on the Media Status screen (page 14).
To use an SD card formatted on the camcorder in the slot of another device, make a backup of the card, then reformat the card in the device to be used.

Using a Media Adaptor

[Notes]
- For professional applications, the use of other media will not provide the same high reliability and durability that is obtained using SxS memory cards.
- Not all memory cards are guaranteed to work with this camcorder. For compatible memory cards, contact your Sony dealer.

XQD Memory Cards

By using an optional QDA-EX1 XQD ExpressCard Adaptor, you can insert an XQD memory card into the SxS memory card slot and use it instead of an SxS memory card.

For details about using a QDA-EX1 XQD ExpressCard Adaptor, refer to the instruction manual supplied with the adaptor.

[Notes]
- High-speed playback may not be properly achieved with an XQD memory card.
- Slow motion recording using the Slow & Quick Motion recording function cannot be used with an XQD memory card.

Formatting (initializing)

XQD memory cards must be formatted the first time they are used in the camcorder.
XQD memory cards for use in the camcorder should be formatted using the format function of the camcorder. If a message appears when the XQD memory card is inserted into the camcorder, format the XQD memory card.
If an unformatted XQD memory card or an XQD memory card that was formatted in a different specification is inserted, a message asking for confirmation to format media or a message notifying you that the media has a different file system appears.

1 Select Operation >Format Media in the setup menu.

2 Select Media(A) (slot A) or Media(B) (slot B).

3 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen prompting whether to format the card appears.

4 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.
Formatting begins.
During formatting, a message is displayed, and the ACCESS indicator is lit orange.
When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

[Note]
Formatting an XQD memory card erases all data on the card, including protected video. The data cannot be restored.

Connection between the camcorder and a computer

Insert the recorded XQD memory card into a slot in the camcorder, and connect the camcorder to a computer using a USB cable.

To use a memory card formatted on the camcorder in the slot of another device

First, make a backup of the card, then reformat the card in the device to be used.

SDXC Cards

By using an optional MEAD-SD02 Media Adaptor, you can insert an SDXC card into an SxS memory card slot and use it instead of an SxS memory card for recording and playback.

[Note]
Do not use SDXC cards at the same time as other memory cards. If a mix of cards are used at the same time, the camcorder cannot switch cards when the media becomes full.

The following SDXC cards are supported.
SDXC memory cards (SD speed class: Class 10)

For details about using an MEAD-SD02 Media Adaptor, refer to the instruction manual supplied with the adaptor.

[Notes]
- High-speed playback may not be properly achieved with an SDXC card.
- Slow motion recording using the Slow & Quick Motion recording function cannot be used with an SDXC card.

Formatting (initializing)

SDXC cards must be formatted the first time they are used in the camcorder.
SDXC cards for use in the camcorder should be formatted using the format function of the camcorder. If a message appears when the SDXC card is inserted into the camcorder, format the SDXC card.
If an unformatted SDXC card or an SDXC card that was formatted in a different specification is inserted, a message asking for confirmation to format media or a message notifying you that the media has a different file system appears.
Format the card using the following procedure.

1 Select Operation >Format Media in the setup menu.

2 Select Media(A) (slot A) or Media(B) (slot B).

3 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen prompting whether to format the card appears.

4 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.
Formatting begins.
During formatting, a message is displayed, and the ACCESS indicator is lit orange.
When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

[Note]
Formatting an SDXC card erases all data on the card, including protected video. The data cannot be restored.

Connection between the camcorder and a computer

Insert the recorded SDXC card into a slot in the camcorder, and connect the camcorder to a computer using a USB cable.

To use a memory card formatted on the camcorder in the slot of another device

First, make a backup of the card, then reformat the card in the device to be used.

Format Settings

You can set the recording mode, system frequency, and video format using Operation >Format in the setup menu.

For details about menu operations, see "Basic Setup Menu Operations" (page 80).

Selecting the Recording Mode

You can select exFAT or UDF recording mode.

[Note]
UDF support is planned for a future release.

1 Select Operation >Format >File System in the setup menu.

2 Turn the MENU knob to select exFAT or UDF, and press the knob.
A confirmation screen appears.

3 Select [Execute] to execute, or select [Cancel] to cancel, and then press the MENU knob.
The camcorder will reboot automatically after executing.

Switching the System Frequency

You can switch the system frequency as required. The camcorder will reboot automatically after switching.

[Notes]
- The system frequency cannot be changed during recording/playback or while the thumbnail screen is displayed.
- After switching between 29.97 and 59.94 or between 25 and 40, the camcorder does not reboot automatically.

1 Select Operation >Format >Frequency in the setup menu.

2 Turn the MENU knob to select the system frequency, and press the knob.
A confirmation screen appears.

3 Select [Execute] to execute, or select [Cancel] to cancel, and then press the MENU knob.

Switching the Video Format

Refer to "Video Formats" (page 32) as required when switching the video format.

1 Select Operation >Format >Rec Format in the setup menu.

2 Turn the MENU knob to change the video format, and press the knob.
A confirmation screen appears.

3 Select [Execute] to execute, or select [Cancel] to cancel, and then press the MENU knob.

Video Formats

The following recording formats can be selected for different combinations of video resolution and system frequency.

System frequency	Video format (Operation >Format >Rec Format in setup menu)	Picture size
59.94/50	XAVC-I 1080i	1920 × 1080
	XAVC-I 720P	1280 × 720
	XAVC-L 50 1080P	1920 × 1080
	XAVC-L 50 1080i	1920 × 1080
	XAVC-L 50 720P	1280 × 720
	XAVC-L 35 1080P	1920 × 1080
	XAVC-L 35 1080i	
	XAVC-L 25 1080i	
	HD422 50 1080i [a)]	
	HD422 50 720P [a)]	1280 × 720
	HQ 1920 × 1080i [a)]	1920 × 1080
	HQ 1440 × 1080i [a)]	1440 × 1080
	HQ 1280 × 720P [a)]	1280 × 720
	MPEG IMX 50 [a)]	720 × 486/720 × 576
	DVCAM [a)]	720 × 480/720 × 576

System frequency	Video format (Operation >Format >Rec Format in setup menu)	Picture size
29.97/25/23.98	XAVC-I 1080P	1920 × 1080
	XAVC-L 50 1080P	
	XAVC-L 35 1080P	
	HD422 50 1080P [a]	1920 × 1080
	HD422 50 720P [a]	1280 × 720
	HQ 1920 × 1080P [a]	1920 × 1080

a) exFAT and UDF files systems are supported. Only exFAT is supported for other options.

[Note]
UDF support is planned for a future release.

SDI OUT Connector and HDMI Output Connector Output Formats

The signals that can be output from the SDI OUT connector and HDMI output connector are shown in the following table according to the Operation >Format setting in the setup menu.

Operation menu			
Format		Input/Output	
Frequency	Rec Format (codec omitted)	Output Format	
		SDI	HDMI
59.94	1920 × 1080P	1920 × 1080P (Level A)	1920 × 1080P
		1920 × 1080P (Level B)	No signal
		1920 × 1080i	1920 × 1080i
		720 × 486i	720 × 480i
	1920 × 1080i	1920 × 1080i	1920 × 1080i
		720 × 486i	720 × 480i
	1440 × 1080i	1920 × 1080i	1920 × 1080i
		720 × 486i [a]	720 × 480i [a]
	1280 × 720P	1280 × 720P	1280 × 720P
		720 × 486i	720 × 480i
	720 × 480i	720 × 486i	720 × 480i
		No signal	720 × 480P
29.97	1920 × 1080P	1920 × 1080PsF	1920 × 1080i
		720 × 486i	720 × 480i
	1280 × 720P	1280 × 720P	1280 × 720P
		720 × 486i	720 × 480i
23.98	1920 × 1080P	1920 × 1080PsF	No signal
		1920 × 1080i (2-3PD)	1920 × 1080i (2-3PD)
		720 × 486i (2-3PD)	720 × 480i (2-3PD)
	1280 × 720P	1280 × 720P (2-3PD)	1280 × 720P (2-3PD)
		720 × 486i (2-3PD)	720 × 480i (2-3PD)
50	1920 × 1080P	1920 × 1080P (Level A)	1920 × 1080P
		1920 × 1080P (Level B)	No signal
		1920 × 1080i	1920 × 1080i
		720 × 576i	720 × 576i
	1920 × 1080i	1920 × 1080i	1920 × 1080i
		720 × 576i	720 × 576i
	1440 × 1080i	1920 × 1080i	1920 × 1080i
		720 × 576i [a]	720 × 576i [a]
	1280 × 720P	1280 × 720P	1280 × 720P
		720 × 576i	720 × 576i
	720 × 576i	720 × 576i	720 × 576i
		No signal	720 × 576P
25	1920 × 1080P	1920 × 1080PsF	1920 × 1080i
		720 × 576i	720 × 576i
	1280 × 720P	1280 × 720P	1280 × 720P
		720 × 576i	720 × 576i

a) Not supported when proxy recording and wireless LAN connection function is on.

VIDEO Connector Output Formats

The signals that can be output from the VIDEO connector are shown in the following table according to the Operation >Format setting in the setup menu.

Operation menu		VIDEO OUT signal format	
Format			
Frequency	Rec Format (codec omitted)	Proxy recording/Wireless LAN connection function	
		OFF	ON
59.94	1920 × 1080P	HD Y	
		HD Y	
		HD Y	
		Composite	HD Y
	1920 × 1080i	HD Y	
		Composite	HD Y
	1440 × 1080i	HD Y	
		Composite	—
	1280 × 720P	HD Sync [a]	
		Composite	HD Sync [a]
	720 × 480i	Composite	Composite [c]
		Composite	HD Y
29.97	1920 × 1080P	HD Y	
		Composite	HD Y
	1280 × 720P	HD Y [b]	
		Composite	HD Y [b]
23.98	1920 × 1080P	HD Y	
		HD Y/HD Sync	HD Y
		Composite	HD Y
	1280 × 720P	HD Y [b]	
		Composite	HD Y [b]
50	1920 × 1080P	HD Y	
		HD Y	
		HD Y	
		Composite	HD Y
	1920 × 1080i	HD Y	
		Composite	HD Y
	1440 × 1080i	HD Y	
		Composite	—
	1280 × 720P	HD Sync [a]	
		Composite	HD Sync [a]
	720 × 576i	Composite	Composite [c]
		Composite	HD Y
25	1920 × 1080P	HD Y	
		Composite	HD Y
	1280 × 720P	HD Y [b]	
		Composite	HD Y [b]

a) 1080i sync signal output.
b) 1080PsF sync signal output.
c) Character information (superimposed) turns on/off in conjunction with the SDI OUT2 connector output on/off setting.

Adjusting the Black Balance and White Balance

To ensure excellent image quality when using this camcorder, conditions may require that both the black balance and the white balance be adjusted. Black balance and white balance adjustment values that are automatically set by the camcorder and the various settings are stored in the camcorder memory and retained even when the power is turned off.

Adjusting the Black Balance

The black balance will require adjustment in the following cases.

- When the camcorder is used for the first time
- When the camcorder has not been used for a long time
- When the camcorder is used under conditions in which the surrounding temperature has changed greatly
- When the GAIN selector (L/M/H/Turbo) values have been changed with Operation >Gain Switch in the setup menu.

It is not usually necessary to adjust the black balance when using the camcorder after it has been off.

In automatic black balance mode, adjustments are performed in the following order: black set and black balance. Manual black balance adjustment can be selected from the setup menu.

Automatic black balance adjustment is disabled in the following cases.

- During recording
- During special recording modes
- When the shutter mode is SLS

1 Set the OUTPUT/DCC switch to CAM.

2 Push the AUTO W/B BAL switch to BLACK and release the switch.
The message "Executing…" appears during execution, and changes to "OK" when the adjustment finishes.
Adjustment values are saved to memory automatically.

[Notes]

- During the black balance adjustment, the iris is automatically closed.
- During the black balance adjustment, the gain selection circuit is automatically activated so you may see flickering on the viewfinder screen, but this is not a fault.

If automatic black balance adjustment cannot be made

If the black balance adjustment cannot be completed normally, an error message will appear for about three seconds on the viewfinder screen.

Error message	Meaning
NG: Iris not Closed	The lens iris did not close; adjustment was impossible.

If any of the above error messages is displayed, retry the black balance adjustment.
If the error message occurs again, an internal check is necessary.

For information about this internal check, refer to the Maintenance Manual.

[Note]
If the lens cable is not firmly connected to the LENS connector, it may not be possible to adjust the lens iris. If this happens, the black balance will be incorrect.

Adjusting the White Balance

Always readjust the white balance when the lighting conditions change.

1 Set the switches and selectors as shown below.

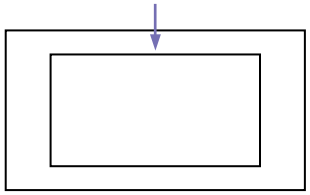
- GAIN switch: L (set to a gain value that is as small as possible)
- OUTPUT/DCC switch: CAM
- WHITE BAL switch: A or B [1)]

1) Adjustment values are saved to memory B only when Operation >White Setting >White Switch<B> in the setup menu is set to Memory.

2 Set the FILTER knob to suit the lighting conditions as follows.

3 Place a white test card under the same lighting conditions as the subject to be shot and zoom in on it.
Alternatively, any white object such as a cloth or a wall can be used.
The absolute minimum white area is as follows.

Rectangle centered on the screen
The lengths of the sides are 70% of the length and width of the screen. 10% or more of the surface area of the image within the rectangular area must be white.



[Note]
Make sure there are no bright spots in the rectangle.

4 Adjust the lens iris.
Manually adjusted lens: set the iris to an appropriate setting.
Lens with automatic iris: set the automatic/manual switch on the lens to automatic.

5 Push the AUTO W/B BAL switch to WHITE and then release the switch.
The message "Executing…" appears during execution, and changes to "OK: (color temperature of subject)" when the adjustment finishes.
The adjustment values are saved automatically in the memory selected in step 1 (A or B).

[Note]
If the camcorder has a zoom lens with an automatic iris, the iris may hunt [1)] during the adjustment. To prevent this, adjust the iris gain knob (indicated as IG, IS, or S) on the lens.

1) Hunting: Repeated brightening and darkening of the image, resulting from repeated response to automatic iris control.

For details, refer to the lens operation manual.

If the automatic white balance adjustment cannot be made

If the white balance adjustment cannot be completed normally, an error message will appear for about three seconds on the viewfinder screen.

Error message	Meaning
NG: Low Light	The white video level is too low. Either open the lens iris or increase the gain.
NG: Timeout	Adjustment could not be completed within the standard number of attempts.
NG: High Light	The white video level is too high. Either stop down the lens iris or change the ND filter.
NG: Color Temp. High	The color temperature of the subject lighting is too high, and could not be adjusted. Adjust the color temperature of the lighting, then update memory.
NG: Color Temp. Low	The color temperature of the subject lighting is too low, and could not be adjusted. Adjust the color temperature of the lighting, then update memory.
NG: Out of Range	Value could not be adjusted because the difference between the current value and reference value exceeds the adjustment range.

Error message	Meaning
NG: Poor White Area	The white surface of the subject is too narrow, and could not be adjusted.

If any of the above error messages is displayed, retry the white balance adjustment. If the error message occurs again, an internal check is necessary.

For information about this internal check, refer to the Maintenance Manual.

If you have no time to adjust the white balance

Set the WHITE BAL switch to PRST.

Changing the color temperature when the ND filter is switched

You can assign electrical CC (color correction) filters to ND filters (page 5) allowing you to change the color temperature automatically when the ND filter is switched.

1 Set Maintenance >White Filter >ND Filter C. Temp to On in the setup menu (page 100).

2 To assign an electrical CC filter to FILTER knob position number 1, select [ND FLT C. Temp<1>]. To assign it to positions 2 to 4, select [ND FLT C.Temp<2-4>].

3 Turn the MENU knob to select the desired color temperature.

4 Repeat steps 2 and 3 as required.

Switching electrical CC filters with an assignable switch

You can assign the function that switches between electrical CC filters to an assignable switch. This allows you to switch between color temperatures (3200K/4300K/5600K/6300K) that have been assigned using up to four positions (A to D) with each press of the assignable switch.
Regardless of assignments to assignable switches, you can also switch between the color temperatures assigned to each position from a RM-B150/B170/B750 Remote Control Unit.

1 Select Maintenance >White Filter in the setup menu.

2 Select the position to which to assign a CC filter by selecting one of [Electrical CC<A>] to [Electrical CC <D>], and then turn the MENU knob to select the desired color temperature. Select "-----" with Electrical CC <C> or <D> selected.
When the assignable switch is pressed, the setting for that position is not displayed. For example, if "-----" is set for one position, then switching between the remaining three positions is carried out.

3 Repeat step 2 as required.

4 Assign the electrical CC filter switching function (ELECTRICAL CC) to an assignable switch (page 107).

White balance memory

Values stored in memory are held until the white balance is next adjusted, even if the camcorder power is turned off.
The camcorder has two white balance memories, A and B. You can automatically save adjustment values for each ND filter in the memory that corresponds to the WHITE BAL switch setting (A or B). The camcorder has four built-in ND filters, allowing you to save a total of eight adjustment values (4×2). However, the contents of the memories are not linked to ND filter settings in the following cases.

- When the number of memories allocated to each of A and B is limited to one by setting Operation >White Setting >Filter White Memory in the setup menu to Off.
- When the electrical CC filter switching function has been assigned to an assignable switch, or when a remote control unit has been connected. (In these cases, the contents of white balance memory are linked to electrical CC filter positions (A to D).)

Also, when Operation >White Setting >White Switch<B> in the setup menu is set to [ATW (Auto Tracing White Balance)], and the WHITE BAL switch is set to B, the ATW function is activated to automatically adjust the white balance of the picture being shot for varying lighting conditions.

Setting the Electronic Shutter

Shutter Modes

The shutter modes that can be used with the electronic shutter and the shutter speeds that can be selected are listed below.

Standard mode

Select this mode for shooting fast-moving subjects with little blurring.
You can set the shutter speed in one of two shutter modes: Speed mode, in which the speed is set in seconds, and Angle mode, in which the speed is set in degrees.

Speed mode

System frequency	Shutter speed (unit: seconds)
59.94i 59.94P 50i 50P	1/60, 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000
29.97P	1/40 a), 1/50 a), 1/60, 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000
25P	1/33 a), 1/50 a), 1/60, 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000
23.98P	1/32 a), 1/48 a), 1/50 a), 1/60, 1/96, 1/100, 1/120, 1/125, 1/250, 1/500, 1/1000, 1/2000

a) This speed cannot be selected when the camcorder is in Slow & Quick Motion mode and Operation >Rec Function >Frame Rate in the setup menu is set to a value that is greater than the system frequency.

Angle mode
180°, 90°, 45°, 22.5°, 11.25°

ECS (Extended Clear Scan) mode

Select this mode for obtaining images with no horizontal bands of noise when shooting subjects such as monitor screens.
As shown in the following tables, the range of shutter speeds that can be set varies depending on whether the Slow & Quick Motion (S&Q) function is on or off.

System frequency	Shutter speed (unit: Hz)	
	S&Q: Off	S&Q: On
59.94i	60.00 to 7000	—
59.94P	60.00 to 8000	60.00 to 8000
29.97P	30.00 to 8000	30.00 to 8000
23.98P	23.99 to 6000	30.03 to 6000
50i	50.00 to 7000	—
50P	50.00 to 7000	50.00 to 7000
25P	25.02 to 7000	30.00 to 7000

SLS (slow speed shutter) mode

This mode is used to shoot subjects with low illumination. The number of accumulated frames shot when using the slow speed shutter function can be set to 2, 3, 4, 5, 6, 7, 8, 16 using Operation >Slow Shutter >Number of Frames in the setup menu.

[Notes]
- SLS mode cannot be used when the camcorder is in Slow & Quick Motion mode.
- It is not possible to turn the SLS mode on or off, or change the number of accumulated frames when recording.

Setting the Shutter Mode and Shutter Speed

[Notes]
- When the automatic iris is used, the iris opens wider as the shutter speed increases, thus reducing the depth of field.
- The selectable shutter speeds vary depending on the current system frequency.

Switching between Speed mode and Angle mode

1 Select Operation >Shutter >Mode in the setup menu.

2 Turn the MENU knob to select [Speed] or [Angle], and then press the knob.

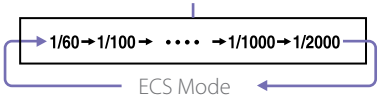
Setting the shutter mode and shutter speed (standard mode)

Once the shutter speed is selected, it is retained even when the camcorder power is turned off.

1 Push the SHUTTER switch from ON to SELECT. The current shutter setting indication appears in the viewfinder for about three seconds.

2 Before the shutter setting in step 1 disappears, push the SHUTTER switch down to SELECT again. Repeat this step until the desired mode or speed appears.
When all modes and speeds are displayed, the display changes in the following order.

Speed Mode (with system frequency 59.94i)



[Note]
Depending on the frame rate setting (page 48), some shutter speeds cannot be selected in Slow & Quick Motion mode. These speeds are replaced by the slowest selectable shutter speed.

Example: If you perform Slow & Quick Motion shooting with the frame rate set to 60 and the video format to HQ1280/29.97P:
The shutter speed is indicated as follows.
- Slow & Quick Motion mode: Off
  1/40⟶1/50⟶1/60⟶1/100⟶…
- Slow & Quick Motion mode: On
  1/60⟶1/60⟶1/60⟶1/100⟶…

Setting the shutter speed (ECS mode)

1 Set the shutter mode to ECS (see the previous item).

2 Turn the MENU knob to select the desired frequency or number of frames.

Setting the shutter speed (SLS mode)

1 Select Operation >Slow Shutter >Setting in the setup menu and set the shutter mode to On.

2 Select Operation >Slow Shutter >Number of Frames in the setup menu and select the desired number of frames.

Setting Auto Iris

The reference value for automatic iris adjustment can be changed to aid the shooting of clear pictures of back-lit subjects, or to prevent blown-out highlights.

Setting the Auto Iris Operating Mode

Set the operating mode used when adjusting levels using auto iris.

1 Select Operation >Auto Iris >Mode in the setup menu.

2 Turn the MENU knob to select the operating mode, then press the knob.

Operating mode	Description
Backlight	Mode for shooting in backlight conditions
Standard	Standard mode
Spotlight	Mode for reducing blown out highlights when there are spotlights centered on a subject.

Set the target convergence level for auto iris

1 Select Operation >Auto Iris >Level in the setup menu.

2 Turn the MENU knob to select the level in the range –99 to +99, then press the knob.

Convergence level	Description
–99	Sets the iris 2 f-stops or more darker
±0	Reference level
+99	Sets the iris 2 f-stops or more lighter

Setting the auto iris speed

Set the operating speed when adjusting levels using auto iris.

1 Select Operation >Auto Iris >Speed in the setup menu.

2 Turn the MENU knob to select the speed in the range –99 (slowest) to +99 (fastest), then press the knob.

Changing the Reference Value of the Lens Iris

The reference value for the lens iris can be set within the following range with respect to the standard value.

- +0.25 to +1 (increments of 0.25): About 0.25 to 1 stop further open
- –0.25 to –1 (increments of 0.25): About 0.25 to 1 stop further closed

Also you can set the area where light detection occurs.

1 Set Operation >Auto Iris >Iris Override in the setup menu to On.

2 Set the MENU ON/OFF switch to OFF.

3 Turn the MENU knob to change the reference value.

[Note]
Be sure to confirm that the current shutter mode is not ECS.

The current reference value is shown by the iris position indicator (page 15) on the viewfinder screen.

- To open the iris slightly, turn the MENU knob counterclockwise as seen from the front of the camcorder.
  Select one of +0.25, +0.5, +0.75, or +1.
- To close the iris slightly, turn the MENU knob clockwise as seen from the front of the camcorder.
  Select one of –0.25, –0.5, –0.75, or –1.

The changed reference value is retained until the power of the camcorder is turned off. Even if the reference value is changed, it reverts to the standard value every time the power is turned on.

Setting the Auto Iris Detection Window

1 Set Operation >Auto Iris >Detect Window Indication in the setup menu to On.
The current automatic iris window appears on the viewfinder screen.
If it is not necessary to display the auto iris window on the screen, set to Off.

2 Select Operation >Auto Iris >Detect Window in the setup menu.

3 Turn the MENU knob until the desired auto iris window appears, and then press the knob.

The shaded parts indicate the area of light detection.

If you select Var, the following items become effective and you can set the window of the desired size. Set Operation >Auto Iris >Iris Var Width, Iris Var Height, Iris Var, Iris Var H Position, and Iris Var V Position in the setup menu.

Item	setting
Iris Var Width	The width of the window
Iris Var Height	The height of the window
Iris Var H Position	The position of the window in the horizontal direction
Iris Var V Position	The position of the window in the vertical direction.

When you exit the menu, the auto iris window selected in step 3 appears.
Unless you need to keep this window displayed, set Operation >Auto Iris >Detect Window Indication in the setup menu to Off.

Reducing the Effect of Bright Highlights

If the subject is too bright, the iris may close too much, leaving the overall image dark, a condition known as clipped blacks. In such cases, switching the clip highlight function on will clip the signal above a certain level, reducing the effects of the auto iris.
Set Operation >Auto Iris >Clip High Light in the setup menu to On.

Adjusting the Iris Gain on the Lens Supplied with the PXW-X400KC

1 Set the iris mode switch to the A (auto) position.

2 Flip off the rubber cap of the iris gain adjustment trimmer.

3 Turn the iris gain adjustment trimmer using a screwdriver, or similar object, to adjust the gain.
Turn clockwise to increase the gain. Turn counterclockwise to decrease the gain.
Adjust while watching the iris ring on the lens body.

4 Reattach the rubber cap.

Adjusting the Focus

This section describes the focus adjustment when using the lens supplied with the PXW-X400KF.

[Notes]

- The lens is designed with an extra margin at the infinity position (∞), to compensate for focus drifting due to variations in temperature. When shooting a subject at infinity in MF or Full MF mode, check the picture in the viewfinder as you focus.
- Auto focus support is planned for a future upgrade.

Adjusting in Full MF Mode

When you slide the focus ring back (toward the camcorder), the focus mode is set to Full MF mode for full manual focus adjustment.

[Note]

When you slide the focus ring back, the focus instantly moves to the marker position.

Focus by turning the focus ring while viewing the viewfinder.
The distance indications on the ring are valid in Full MF mode. The distances where the picture is in focus correspond to absolute positions of the focus ring.

Peaking

You can turn the PEAKING knob on the viewfinder to use the peaking function. Edges are emphasized in the monitor picture, which facilitates manual focusing.
The recorded video signals are not affected.

Using the Focus Ring

Adjust the focus by turning the focus ring while viewing the viewfinder.
The distance indications on the ring are invalid in MF mode.

Using Macro Mode

When the focus mode is MF, set the MACRO switch to the ON position to enable macro mode. Macro mode allows you to adjust the focus over a range that includes the macro area.
Macro mode is disabled in Full MF mode.

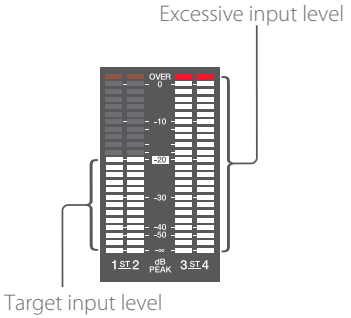
Adjusting the Audio Level

When you set the AUDIO SELECT switch to AUTO, the input levels of analog audio signals recorded on each channel are adjusted automatically. You can also make manual adjustments.

[Note]
Even if you set the AUDIO SELECT switch to AUTO, the input levels of digital audio signals are not adjusted automatically.

Target Audio Level for Manual Adjustment

Make adjustment using –20 dB as the target level. If the audio level meter shows a maximum level of 0 dB, then it indicates that the input audio level is excessive.



Manually Adjusting the Audio Levels of the Audio Inputs from the AUDIO IN CH-1/CH-2 Connectors

1 To adjust the signal input to the AUDIO IN CH-1 or CH-2 connector, set the AUDIO IN CH1 or CH2 switch to REAR.
To adjust both input signals, set both switches to REAR.

2 Set the AUDIO SELECT switch(es) corresponding to the channel(s) selected in step 1 to MANUAL.

3 With the LEVEL knob(s) for the channel(s) selected in step 1, adjust so that the audio level meter shows up to –20 dB for a normal input volume.

Selecting the knob used for adjusting the recording level

In Maintenance >Audio in the setup menu, you can select which audio level control controls the audio recording level of the input to each of the AUDIO IN CH-1/CH-2 connectors. The correspondences between the settings of the menu items and the controls are as follows.

[Note]
If an AES/EBU digital audio signal is input, the recording level cannot be adjusted using the camcorder.

Rear1/WRR Level: Channel 1 recording level

Setting	Knob
Side1	LEVEL (CH1) knob
Front	MIC LEVEL knob
Front+Side1	LEVEL (CH1) knob and MIC LEVEL knob (linked operation)

Rear2/WRR Level: Channel 2 recording level

Setting	Knob
Side2	LEVEL (CH2) knob
Front	MIC LEVEL knob
Front+Side2	LEVEL (CH2) knob and MIC LEVEL knob (linked operation)

[Note]
When you have operation of the LEVEL (CH1/CH2) knobs and MIC LEVEL knob linked together, if the MIC LEVEL knob is set to 0, the audio signals on channels 1 and 2 cannot be recorded. Check the position of the MIC LEVEL knob before adjusting the LEVEL (CH1/CH2) knobs.

Manually Adjusting the Audio Level of the MIC IN Connector

1 Set either or both of the AUDIO IN switch(es) to FRONT.

2 Set the AUDIO SELECT switch(es) for the desired channel(s) selected in step 1 to MANUAL.

3 Turn the MIC LEVEL knob, and adjust so that the audio level meter shows up to –20 dB for a normal input volume.

Selecting the knob used for adjusting the recording level

In Maintenance >Audio in the setup menu, you can select which audio level control controls the audio recording level of the front microphone input. The correspondences between the settings of the menu items and the controls are as follows.
MIC CH1 Level: Channel 1 recording level

Setting	Knob
Side1	LEVEL (CH1) knob
Front	MIC LEVEL knob
Front+Side1	LEVEL (CH1) knob and MIC LEVEL knob (linked operation)

MIC CH2 Level: Channel 2 recording level

Setting	Knob
Side2	LEVEL (CH2) knob
Front	MIC LEVEL knob
Front+Side2	LEVEL (CH2) knob and MIC LEVEL knob (linked operation)

[Note]
When you have operation of the MIC LEVEL knob and LEVEL (CH1/CH2) knobs linked together, if the LEVEL (CH1/CH2) knobs are set to 0, the audio signals on channels 1 and 2 cannot be recorded. Check the position of the LEVEL (CH1/CH2) knobs before adjusting the MIC LEVEL knob.

Recording Audio on Channels 3 and 4

1 Select the audio recorded on audio channels 3 and 4 with the AUDIO IN CH3/CH4 switches.

CH3 switch	Channel 3 recording target
FRONT	Front microphone audio
REAR	Audio signal input to AUDIO IN CH1 connector
WIRELESS	Wireless microphone audio

CH4 switch	Channel 4 recording target
FRONT	Front microphone audio
REAR	Audio signal input to AUDIO IN CH2 connector
WIRELESS	Wireless microphone audio

2 To adjust automatically, set the AUDIO SELECT CH 3-4 switch to AUTO.
To adjust manually, set the AUDIO SELECT CH 3-4 switch to MANUAL.

3 Select the knobs that adjust the audio levels with the Audio CH3 Level and Audio CH4 Level items under Maintenance >Audio in the setup menu.

Audio CH3 Level: Channel 3 recording level

Setting	Knob
Side3	LEVEL (CH3) knob
Front	MIC LEVEL knob

Setting	Knob
Front+Side3	LEVEL (CH3) knob and MIC LEVEL knob (linked operation)

Audio CH4 Level: Channel 4 recording level

Setting	Knob
Side4	LEVEL (CH4) knob
Front	MIC LEVEL knob
Front+Side4	LEVEL (CH4) knob and MIC LEVEL knob (linked operation)

You can now adjust the levels of audio channels 3 and 4 with the knobs selected here.

Setting Time Data

Setting the Timecode

The timecode setting range is from 00:00:00:00 to 23:59:59:29 (hours:minutes:seconds:frames).

1 Press the DISP SEL/EXPAND button to switch the display in the LCD monitor to status display.

2 Set the DISPLAY switch to TC.

3 Set the PRESET/REGEN/CLOCK switch to PRESET.

4 Set the F-RUN/SET/R-RUN switch to SET.
The first (leftmost) digit of the timecode flashes.

5 Use the up and down arrow buttons to change values, and use the left and right arrow buttons to move the flashing digit. Repeat until all digits are set.
To reset the value to 00:00:00:00, press the RESET/RETURN button.

6 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.
F-RUN: Free run (timecode generator keeps running)
R-RUN: Recording run (timecode generator runs only while recording)

[Note]
When picture cache mode is active, time data cannot be set by switching the F-RUN/SET/R-RUN switch to SET. To set time data, turn picture cache mode off.

Switching between DF and NDF

You can select the drop frame (DF) mode or non-drop frame (NDF) mode using Maintenance >Timecode >DF/NDF in the setup menu.

To make the timecode consecutive

When the F-RUN/SET/R-RUN switch is set to R-RUN, recording a number of scenes on the media normally produces consecutive timecode. However, once you remove the media and record on another media, the timecode will no longer be consecutive when you use the original media again for recording.
In this case, to make the timecode consecutive, set the PRESET/REGEN/CLOCK switch to REGEN.

Saving the real time in the timecode

Setting the PRESET/REGEN/CLOCK switch to CLOCK saves the real time in the timecode. The time of the camcorder internal clock is applied as the real time.

For details about adjusting the internal clock, see "Setting the Date and Time of the Internal Clock" (page 24).

Setting the User Bits

By setting the user bits (up to 8 hexadecimal digits), you can record user information such as the date, time, or scene number on the timecode track.

1 Press the DISP SEL/EXPAND button to switch the display in the LCD monitor to status display.

2 Set the DISPLAY switch to U-BIT.

3 Set the F-RUN/SET/R-RUN switch to SET.
The first (leftmost) digit flashes.

4 Use the up and down arrow buttons to change values, and use the left and right arrow buttons to move the flashing digit. Repeat until all digits are set.
To reset the value to 00 00 00 00, press the RESET/RETURN button.

5 Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN, corresponding to the desired operating mode for the timecode generator.

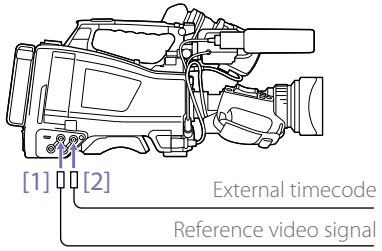
User bit memory function

The user bit setting (apart from the real time) is automatically retained in memory even when the power is turned off.

Synchronizing the Timecode to an External Source

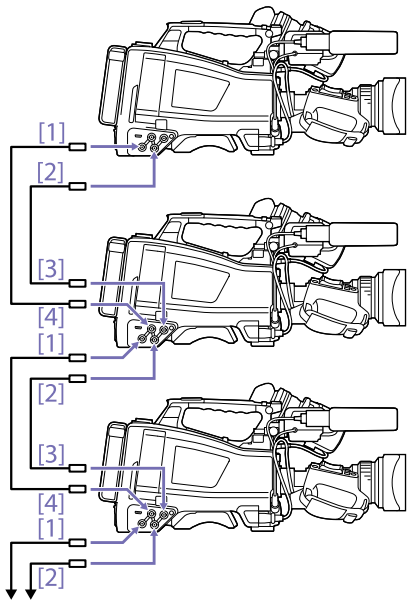
You can synchronize the internal timecode generator of this camcorder with an external generator. You can also synchronize the timecode generators of other camcorders/VTRs with the internal generator of this camcorder.

1 Connect both the reference video signal and the external timecode as illustrated below.
Example 1: Synchronizing with an external signal



[1] GENLOCK IN connector
[2] TC IN connector

Example 2: Interconnecting a number of camcorders with one camcorder as reference



To next camcorder

[1] VIDEO OUT connector
[2] TC OUT connector
[3] TC IN connector
[4] GENLOCK IN connector

2 Turn on the POWER switch.

3 Set the PRESET/REGEN/CLOCK switch to PRESET.

4 Set the F-RUN/SET/R-RUN switch to F-RUN.

5 Set the DISPLAY switch to TC.

6 Supply a timecode signal and a reference video signal, complying with the SMPTE standard and in proper phase relationship, to the TC IN connector and to the GENLOCK IN connector, respectively.
This operation synchronizes the internal

timecode generator with the external timecode. Once about ten seconds have elapsed after the timecode locks, the external lock state is maintained even if the external timecode source is disconnected.

To release the external synchronization, first stop the external timecode input, then set the F-RUN/SET/R-RUN switch to R-RUN.

[Notes]

- When you finish the above procedure, the internal timecode is immediately synchronized with the external timecode and the time data display will show the value of the external timecode. However, wait for a few seconds until the sync generator stabilizes before recording.
- If the frequency of the reference video signal is not the same as the system frequency of the camcorder, the camcorder cannot be correctly genlocked. If this occurs, the timecode will not acquire successful lock with the external timecode.

User bit settings during synchronization

When the timecode is synchronized to an external signal, only the time data is synchronized with the external timecode value.

Note on changing the power supply from the battery pack to an external power supply during external synchronization

To maintain a continuous power supply, connect the external power supply to the DC IN connector before removing the battery pack. You may lose timecode external synchronization if you remove the battery pack first.

Camcorder synchronization during external synchronization

During external synchronization, the camcorder is genlocked to the reference video signal input from the GENLOCK IN connector.

Basic Operations

This section explains the basic shooting and recording procedures.
Before starting to shoot, inspect the camera system to verify that it is operating properly.

1 Attach a fully charged battery pack (page 21).

2 Load one or two SxS memory cards (page 28).
If you load two cards, the camcorder switches automatically to the second card when the first card becomes full.

3 Set the camcorder's POWER switch (page 3) to ON.

4 Make the following settings.
Marker display: On (page 87)
Iris: Auto (page 38)
Zoom: Auto
Camera output: Select the picture currently being shot (camera picture), and turn the DCC function on (page 6)
Timecode advance mode: F-RUN (Free Run) or R-RUN (Rec Run) (page 43)
Audio input channel selection: Auto (page 9)

5 Push the AUTO W/B BAL switch to the BLACK position to adjust the black balance (page 35).

6 Select a filter according to the lighting conditions, and adjust the white balance (page 35).

7 Point the camcorder at the subject, and adjust the focus and zoom.

8 If you are using the electronic shutter, select an appropriate shutter mode and speed (page 37).

9 Do one of the following to start recording.
– Press the REC START button (page 4).
– Press the VTR button on the lens.
– Turn on the assignable switch to which the Rec function has been assigned (page 106).

During recording, the TALLY indicators, the tally indicator on the front panel of the viewfinder, and the REC indicator on the viewfinder screen light. Adjust the zoom and focus as required.

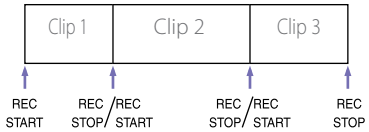
[Notes]
- Never remove the battery pack while the camcorder is recording (while the ACCESS indicator on the right-side panel is lit in blue and the ACCESS indicator in the card slot section is lit in orange). Doing so risks the loss of several seconds of data before the recording was interrupted, because internal processing will not end normally.
- The playback control buttons (EJECT, F REV, F FWD, NEXT, PREV, PLAY/PAUSE, STOP) do not function during recording.
- If XAVC, MPEG HD, MPEG IMX, or DVCAM is selected for the video format, you can start recording immediately when the camcorder is turned on. However, this is not supported when a special recording function (excluding Picture Cache mode) is running, when the timecode is set to REGEN, or when using planning metadata.

10 To stop recording, perform one of the operations listed in step 9.
The TALLY indicators, the tally indicator on the front panel of the viewfinder, and the REC indicator on the viewfinder screen go out, and camcorder enters recording standby (Stby) mode.
A clip is created from the video and audio data and the metadata recorded between steps 9 and 10.

To review the recording (rec review)

With the camcorder in recording standby mode, press an assignable switch assigned with the Rec Review function to play back the last two seconds of the clip at normal speed.
Press and hold an assignable switch assigned with the Rec Review function for one second or longer to start play back from the frame two seconds prior to the last frame at four times speed in the reverse direction. Then, release the button to play the clip from that point at normal speed. The clip is played to the end, then Rec Review ends and the camcorder returns to Stby mode.
When the Rec Review function is assigned to the RET button on the lens, you can also conduct a review by using the RET button.

11 Repeat steps 9 and 10 to continue recording.
With each repetition, another clip is created on the memory card.



[Notes]
- You cannot resume recording for about one second after stopping recording.
- The maximum number of clips that can be recorded on one memory card is 600. Even if the memory card has enough free capacity to record more clips, when 600 clips have been recorded, no further recording is possible.

Clip names

Eight-character clips names (consisting of a four-character prefix and a four-digit number) are generated automatically for clips recorded by this camcorder.
Example: ABCD0001
You can also use Operation >Clip >Title Prefix in the setup menu to set the clip name prefix to a user-specified string of characters (four to 46 characters in length). (A user-specified prefix cannot be changed after recording.)
The four-digit number at the end of clip names is generated automatically, incrementing as clips are recorded.

Playing Recorded Clips

When the camcorder is in standby (Stby) mode, you can play all or part of the most recently recorded clip (page 45).

1 Insert the SxS memory card to play (page 28).

2 Press the PREV button (page 8) or the F REV button (page 7) to cue up the clip to play.

3 Press the PLAY/PAUSE button.
The PLAY/PAUSE indicator lights, and the playback picture appears in the viewfinder.

Pausing playback

Press the PLAY/PAUSE button.
The PLAY/PAUSE indicator flashes while play is paused.
Press the button again to return to play mode.

High-speed playback

Press the F FWD button (page 8) or the F REV button (page 7).
To return to normal playback, press the PLAY/PAUSE button.

Stopping playback

Press the STOP button: Playback stops, and the camcorder enters E-E mode.
Press the THUMBNAIL button: Playback stops and the thumbnail screen (page 72) appears in the viewfinder.
Playback also stops and the timecode screen appears in the viewfinder when you start recording during playback, and when you eject an SxS memory card.

Switching between memory cards

When two memory cards are loaded, press the SLOT SELECT button (page 28) to select the active slot.
It is not possible to switch between memory cards during playback.

Advanced Operations

Recording Shot Marks

On this camcorder, two types of shot marks are available. You can record them at user-specified positions to make it easier for editors to cue up those positions.
The maximum number of shot marks per clip is 999.

You can also use the Thumbnail menu to add and delete shot marks in clips. For details, see "Adding/Deleting Essence Marks on Clips" (page 76).

To record shot marks, turn on an assignable switch assigned with the Shot Mark 1 or Shot Mark 2 function.
When a shot mark is recorded, a "Shot Mark 1" or "Shot Mark 2" indication appears in the viewfinder for about three seconds near the timecode indicator.

Setting Clip Flags

To make it easier for editors to select good clips, you can set clip flags in recorded clips.
Clip flags are set in the Thumbnail menu. For details, see "Adding Clip Flags to Clips" (page 75) and "Deleting a Clip Flag" (page 76).

Recording Retroactive Images (Picture Cache Rec Function)

The camcorder always maintains a cache of video and audio data for a set interval (maximum of 15 seconds) in internal storage memory when shooting, allowing you to record several seconds of footage before the start of recording.
This function is enabled when the camcorder is set to any of the following video formats (page 32).

XAVC-I
XAVC-L
MPEG HD 422
MPEG HD 420
MPEG IMX 50

To start recording in picture cache mode, picture cache mode and the storage time of images in memory (picture cache time) must be set beforehand in the Operation menu.
When recording is started, the duration of footage that can be recorded retroactively is determined by the picture cache time. The duration that can be recorded retroactively may be reduced in some circumstances, as described in [Notes] below.

[Notes]

- The storage of video in memory starts when picture cache mode is selected. However, if recording is started immediately after selecting this mode, a portion of the images shot immediately prior to selecting picture cache mode will not be recorded.
- Images are not stored in memory during playback, recording review, or thumbnail display, so picture cache recording of images during these periods is not supported.

Setting the picture cache time

1 Select Operation >Rec Function >Picture Cache Rec in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.

3 Select Operation >Rec Function > Cache Rec Time in the setup menu.

4 Turn the MENU knob to select the picture cache time setting, then press the knob.
0 to 2, 2 to 4, 4 to 6, 6 to 8, 8 to 10, 10 to 12, 12 to 14, or 13 to 15 seconds can be selected.

Once picture cache mode is selected, it is maintained until the settings are changed.

Alternatively, instead of performing steps 1 and 2, you can also select picture cache mode using an assignable switch (page 106) which has been assigned with the Picture Cache function.

[Notes]

- Only one special recording function, such as picture cache recording, can be used at any one time.
  If another special recording mode is enabled while picture cache recording is in use, picture cache recording is automatically released.
- Changing system settings, such as the video format, clears all images stored in memory. Consequently, images shot just before changing settings cannot be recorded, if recording is started immediately after changing settings. Picture cache mode is automatically released.
- The picture cache time cannot be set during recording.

Starting picture cache recording

Shoot as described in "Basic Operations" (page 45).

When recording starts, the "●Cache" indication in the viewfinder changes to the "●Rec" indication. The TALLY indicators and the tally indicator on the front panel of the viewfinder light as they do during normal recording.

To exit, stop the recording,

Canceling picture cache mode

In recording standby mode, set Operation >Rec Function >Picture Cache Rec in the setup menu to Off.

Device operation when recording in picture cache mode

The recording procedure is essentially the same, except for the following points where operation varies from normal.

- If recording is started while accessing media, the actual start point of recording may be delayed even longer than the set picture cache time. The delay increases with the number of recorded clips, so stopping recording and quickly restarting recording should be avoided in picture cache mode.
- Regardless of the setting of the F-RUN/SET/R-RUN switch, the camcorder operates in F-RUN mode.
- In picture cache mode, time data cannot be set by switching the F-RUN/SET/R-RUN switch to SET.
  To set time data, first stop picture cache mode.
- If the remaining recording time of the media in the currently selected slot is shorter than the picture cache time, images are recorded to the media (if there is sufficient remaining recording time) in the non-selected slot.
  However, images are not recorded if there is no media in the non-selected slot or if the media in the slot has insufficient remaining recording time. (A message notifying you that there is insufficient remaining recording time will appear on the viewfinder screen.)
- Shot marks are not recorded, even if the shot marks are set before the recording start operation.

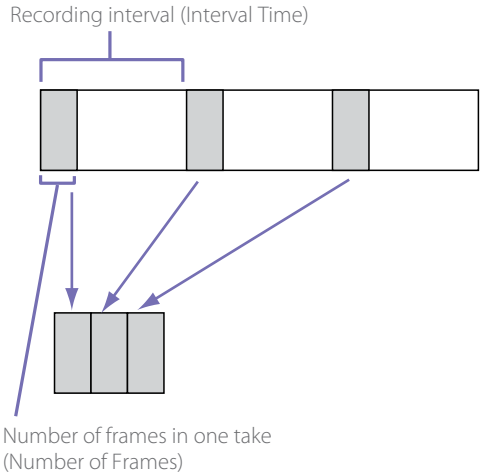
If the camcorder is turned off during recording

- If the POWER switch on the camcorder is set to the OFF position, the media is accessed for several seconds to record the images stored in memory up till that moment, and then the power turns off automatically.
- If the battery is removed, the DC cable disconnected, or the AC adaptor turned off during recording, the video and audio data stored in memory is erased, and images up till that point are not recorded. Care should be exercised when exchanging the battery.

Recording Time-lapse Video (Interval Rec Function)

The camcorder's Interval Rec function allows you to capture time-lapse video to the camcorder's internal memory. This function is an effective way to shoot slow-moving subjects.
When you start recording, the camcorder automatically records a specified number of frames at a specified interval time.
This function is enabled when the camcorder is set to any of the following video formats (page 32).

XAVC-I
XAVC-L
MPEG HD 422



A pre-lighting function is available when Interval Rec is enabled. This function automatically turns on the video light before recording starts, which allows you to record pictures under stable light and color temperature conditions.

[Notes]

- Only one special recording function, such as Interval Rec recording, can be used at any one time.
  If another special recording mode is enabled while Interval Rec is in use, for example, Interval Rec is automatically released.
- Interval Rec settings cannot be changed during recording.

Setting Interval Rec

1 Select Operation >Rec Function >Interval Rec in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.
The camcorder enters Interval Rec mode, and "Int Stby" appears at the REC indicator position on the viewfinder screen. (The green tally indicator in the HDVF series viewfinder also flashes.)

3 Select [Number of Frames], turn the MENU knob to select the number of frames to record in one take, and then press the knob.
You can select 2, 6, or 12 when the format is 50P or 59.9P.
You can select 1, 3, 6, or 9 when the format is 23.98P, 25P, 29.97P, 50i, or 59.94i.

4 Select [Interval Time], turn the MENU knob to select the desired interval, and then press the knob.
You can select 1 to 10/15/20/30/40/50 sec, 1 to 10/15/20/30/40/50 min, or 1 to 4/6/12/24 hour.

5 As required, select [Pre-Lighting], turn the MENU knob to select the length of lighting time before recording starts, and then press the knob.
You can select 2, 5, 10 seconds. or Off.

[Notes]

- If you want to turn the video light on before the start of recording, set the camcorder's LIGHT switch to AUTO. The video light switch must also be turned on. When this is done, the video light turns on and off automatically. However, the video light remains lit if the time that it would be off is five seconds or less.
- If you set the LIGHT switch to MANUAL and turn the video light switch on, the video light is always lit. (The video light does not turn on and off automatically.)

The camcorder exits Interval Rec mode when it is powered off, but the number of frames, interval time, and pre-lighting settings are maintained. You do not need to set them again the next time you shoot in Interval Rec mode.

Starting Interval Rec recording

Make the settings and preparations described in "Basic Operations" (page 45), secure the camcorder so that it does not move, and begin shooting.

When Interval Rec mode is set to On, "Int Stby" appears at the REC position on the viewfinder screen. When you start recording, "●Int Rec" and "●Int Stby" are displayed alternately. The TALLY indicators and the tally indicator on the front panel of the viewfinder light as they do during normal recording. (The green tally indicator in the HDVF series viewfinder also flashes at high speed.)
If you are using the pre-lighting function, the video light comes on before recording starts.

To exit, stop the recording,
When shooting ends, the video data stored in memory up to that point is written to the media.

Canceling Interval Rec mode

Do one of the following.

- Set the POWER switch to OFF.
- In recording standby mode, set Operation >Rec Function >Interval Rec in the setup menu to Off.

[Note]
Restarting the camcorder automatically releases Interval Rec mode.

Limitations during recording

- Regardless of the setting of the F-RUN/SET/R-RUN switch, the advance mode of the internal timecode generator is always R-RUN.
- Audio is not recorded.
- Reviewing the recording (Rec Review) is not possible.
- Genlock is not possible.

If the camcorder is turned off during recording

- If the POWER switch on the camcorder is set to the OFF position, the media is accessed for several seconds to record the images stored in memory up till that moment, and then the power turns off automatically.
- If power is lost because the battery was removed, the DC power cord was disconnected, or the power was turned off on the AC adaptor side, then the video and audio data shot up to that point may be lost (maximum 10 seconds). Care should be exercised when exchanging the battery.

Shooting with Slow & Quick Motion

When the video format (page 32) is set to one of the formats listed below, you can specify a recording frame rate that is different from the playback frame rate.

[Note]
If shooting in XAVC recording format, the use of SxS Pro+ memory cards is recommended. The use of other SxS memory cards may be subject to limitations, so you should contact your dealer.

Recording format	System frequency	S&Q frame rate
XAVC-I 1080P	29.97P/23.98P/25P	1 FPS to 60 FPS (1 FPS units)
XAVC-L 50 1080P	59.94P/50P/29.97P/23.98P/25P	
XAVC-L 35 1080P	59.94P/50P/29.97P/23.98P/25P	
HD422 50 1080P	29.97P	1 FPS to 30 FPS (1 FPS units)
	23.98P	
	25P	1 FPS to 25 FPS (1 FPS units)

By shooting with a frame rate that differs from the playback frame rate, you can obtain slow and quick motion effects that are smoother than low-speed or high-speed playback of content recorded at the normal frame rate.

Setting Slow & Quick Motion

1 Select Operation >Rec Function >Slow & Quick Motion in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.
Slow & Quick Motion starts, and "S&Q Stby" appears in the recording status indicator area in the viewfinder.
Next, set the frame rate.

3 Select Operation >Rec Function >Slow & Quick Motion >Frame Rate in the setup menu.

4 Turn the MENU knob to select the frame rate, then press the knob.

When you finish making these settings, the system frequency and the frame rate appear at the top of the viewfinder screen. You can change the frame rate while viewing the display in the viewfinder by turning the MENU knob.
The Slow & Quick Motion mode setting and the frame rate are retained even after the camcorder is powered off.

[Notes]
- Only one special recording function, such as Slow & Quick Motion, can be used at any one time.
- If another special recording function is enabled while using Slow & Quick Motion, Slow & Quick Motion is automatically canceled.
- Slow & Quick Motion cannot be set during recording, playback, or while the thumbnail screen is displayed.
- Slow & Quick Motion cannot be set if the slow shutter function is set.

Starting Slow & Quick Motion recording

Shoot as described in "Basic Operations" (page 45).

When recording starts, the "S&Q Stby" indication in the viewfinder changes to the "●S&Q Rec" indication. The TALLY indicators and the tally indicator on the front panel of the viewfinder light as they do during normal recording.

To exit, stop the recording,

[Note]
It takes longer than normal for recording to stop when the frame rate is set to a low value (for a slow frame rate).

Canceling Slow & Quick Motion mode

With the camcorder in recording standby mode, set Operation >Rec Function >Slow & Quick in the setup menu to Off.

Limitations during recording

- Regardless of the setting of the F-RUN/SET/R-RUN switch, the advance mode of the internal timecode generator is always R-RUN.
- Audio cannot be recorded when the recording and playback frame rates differ.
- Reviewing the recording (Rec Review) is not possible.
- If you change the recording frame rate to a value faster than the current shutter speed, the shutter speed is changed to the slowest value for which shooting is possible.
  Example: If the frame rate is 32 and the shutter speed is 1/40, and you change the frame rate to 55, then the shutter speed is changed to 1/60.
  It is not possible to select a shutter speed that is slower than the recording frame rate.
- Genlock is not possible.

Recording with the Clip Continuous Rec Function

Normally, a clip is created as an independent file each time that you start and stop recording. But this function allows you to start and stop recording while continuously recording to the same clip, for as long as the function remains enabled. This is convenient when you do not want to generate a large number of short clips, and when you want to record without worrying about exceeding the clip limit.
It is still easy to find recording start points, because a Rec Start essence mark is recorded at the recording start point each time you start recording.
This function is enabled when the camcorder is set to any of the following video formats (page 32).

XAVC-I
XAVC-L
MPEG HD 422

Setting Clip Continuous Rec

1 Select Operation >Rec Function >Clip Continuous Rec in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.
"Cont Stby" appears in the viewfinder, and the function is enabled.

[Notes]
- Only one special recording function, such as Clip Continuous Rec, can be used at any one time.
- If another special recording mode is enabled while Clip Continuous Rec is in use, for example, the currently selected mode is automatically released.

You can assign the Clip Continuous Rec on/off function to one of the ASSIGN. 1/2/3 switches, ASSIGNABLE 4/5 switches, or the ONLINE button.

For details, see "Assigning Functions to Assignable Switches" (page 106).

Starting Clip Continuous Rec recording

Shoot as described in "Basic Operations" (page 45).
When recording starts, the "Cont Stby" indication in the viewfinder changes to "●Cont Rec" indication.
The TALLY indicators and the tally indicator on the front panel of the viewfinder light as they do during normal recording.

[Note]
During recording or in recording standby mode (when "Cont Stby" indication is displayed), if you remove the media, the battery, or the power source, the media needs to be restored. It is not possible to restore media on a device other than this camcorder.
Exit Clip Continuous Rec mode (page 50) and then remove the media.
When "Cont Stby" indication is flashing (once per second), you can remove the media.

To exit, stop the recording,

[Note]
Stop the recording after recording for two or more seconds.

Canceling Clip Continuous Rec mode

With the camcorder in recording standby mode, set Operation >Rec Function >Clip Continuous Rec in the setup menu to Off.

Limitations during recording

A single continuous clip cannot be created if you perform one of the following operations while the camcorder is in recording or recording standby mode. (A new clip will be created when you next start recording.)

- Operate on a clip (lock, delete, or rename a clip)
- Switch slots
- Change the recording format
- Turn off the POWER switch
- Playback
- Switch to the thumbnail screen

Recording Video Simultaneously to Two SxS Memory Cards (Simul Rec)

When the video format (page 32) is set to one of the options in the following table, you can record the same video to two SxS memory cards. This function is useful for making a video backup while shooting.

[Note]
It is recommended that both SxS memory cards be formatted (initialized) using the camcorder before use.

Operation >Format >Rec Format in the setup menu	Operation >Format >Frequency in the setup menu
XAVC-I 1080P	29.97/25/23.98
XAVC-I 1080i	59.94/50
XAVC-I 720P	59.94/50
XAVC-L 50 1080P	59.94/50/29.97/25/23.98
XAVC-L 50 1080i	59.94/50
XAVC-L 35 720P	59.94/50
XAVC-L 35 1080P	59.94/50/29.97/25/23.98
XAVC-L 35 1080i	59.94/50
XAVC-L 25 1080i	59.94/50
HD 422 50 1080P	29.97/25/23.98
HD 422 50 1080i	59.94/50
HD 422 50 720P	59.94/50/29.97/25/23.98
HQ 1920×1080P	29.97/25/23.98
HQ 1920×1080i	59.94/50
HQ 1440×1080i	59.94/50
HQ 1280×720P	59.94/50
HQ 1920×1080i	59.94/50

Setting Simul Rec

1 Select Operation >Rec Function >Simul Rec in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.

[Notes]

- Only one special recording function, such as Simul Rec, can be used at any one time.
- If another special recording mode is enabled while using Simul Rec, Simul Rec is automatically released.
- Simul Rec cannot be set during recording, playback, or while the thumbnail screen is displayed.

Starting Simul Rec recording

1 Insert SxS memory cards in both memory slots A and B.
The ACCESS indicators for SxS slots A and B are lit. Also, icons for SxS slots A and B appear in the viewfinder (page 17).

2 Shoot as described in “Basic Operations” (page 45).

[Notes]

- Simultaneous recording is not possible if either of the media is defective or if the media is write protected.
- During simultaneous recording, if either of the media becomes full or an error occurs and recording cannot continue, recording to that media stops but recording to the other media continues.

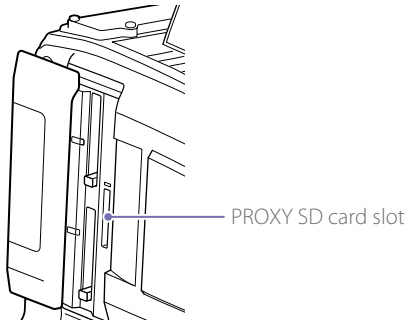
To exit, stop the recording,

Canceling Simul Rec mode

In recording standby mode, set Operation >Rec Function >Simul Rec in the setup menu to Off.

Proxy Data

Proxy data is made up of low-resolution video data (H.264) and audio data (AAC-LC). This lightweight proxy data can be used in the same way as the original data, but it can be transferred more quickly, for more efficient viewing and editing. During clip recording, proxy data is recorded onto the SD card inserted into the PROXY SD card slot.



By importing proxy data recorded on the SD card into a computer, you can quickly check the recorded content or perform rapid offline editing.

Proxy Recording using the Camcorder

- Proxy recording will not start unless an SxS memory card is inserted.
- When the camcorder has been turned on for about 45 seconds, the Proxy icon (media status indicator for Proxy SD slot) turns on in the LCD monitor and viewfinder screen to indicate that proxy recording is enabled.
  If you start shooting while the Proxy icon is flashing or is not lit, proxy files are not recorded.
- Before removing an SD card from the camcorder, always check that the ACCESS indicator for the PROXY SD card slot is not lit, then turn off the camcorder or turn off the proxy recording/wireless LAN connection function.
  To turn off the proxy recording/wireless LAN connection function, make the following settings in the setup menu.
  – Set Operation >Proxy Recording Mode >Setting to Off.
  – Set Maintenance >Network >Setting to Off.
- Attempting to remove the SD card while either the proxy recording or wireless LAN connection function is enabled may display a warning (E91-1C0) in some cases. If the warning appears while recording, data is still recorded correctly to the SxS memory cards, but proxy files are not recorded. The warning message can be cleared by turning the camcorder off and then on again.
- Proxy recording will not start if Picture Cache Rec, Interval Rec, Slow & Quick Motion, streaming, or network client mode is enabled.

SD Cards

SD cards supported for recording proxy data

SDHC memory cards* (Speed Class: 4 or higher, Capacity: up to 32 GB)
* Referred to as "SD cards" in this manual.

Formatting (initializing) SD cards

SD cards must be formatted the first time they are used in the camcorder.
SD cards for use in the camcorder should be formatted using the format function of the camcorder. If a message appears when the SD card is inserted into the camcorder, format the SD card.

1 Select Operation >Proxy Recording Mode >Setting in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.

3 Select Operation >Format Media >SD Card(Proxy) in the setup menu.

4 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen prompting whether to format the card appears.

5 Turn the MENU knob to select [Execute], then press the knob.
Formatting begins.
During formatting, a message and progress state (%) is displayed and the ACCESS indicator is lit orange.
When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

[Note]
Formatting an SD card erases all data on the card. The card cannot be restored.

Checking the remaining recording capacity

You can check the remaining capacity on an SD card on the Media Status screen (page 14).

To use an SD card formatted on the camcorder in the slot of another device

First, make a backup of the card, then reformat the card in the device to be used.

Recording Proxy Data

1 Select Operation >Proxy Recording Mode >Setting in the setup menu.

2 Turn the MENU knob to select [On], then press the knob.

3 Insert an SD card for recording proxy data into the PROXY SD card slot.

4 Start recording.
The proxy data file is saved in the "/PRIVATE/PXROOT/Clip" directory of the SD card at the same time as the original data is being recorded onto an SxS memory card.
Proxy data recording automatically stops when you stop recording.

About the recorded files

- The file system is FAT32, and the file name extension is ".mp4".
- The timecode is also recorded simultaneously.
- A still image of the first frame is also recorded simultaneously.
- Location information and a Log file are recorded simultaneously if the GPS function is enabled.
  The Log file is saved in "Root/PRIVATE/SONY/GPS."

Canceling proxy data recording

Set Operation >Proxy Recording Mode >Setting in the setup menu to Off.

When there is insufficient remaining capacity on an SD card

A warning is displayed to indicate that there is insufficient free space.

Changing proxy recording settings

Select Operation >Proxy Recording Mode >Size and Audio Channel in the setup menu to change the settings for the size of the proxy recording format and the audio channel for proxy recording, respectively.

Checking proxy recording settings

Select Operation >Proxy Recording Mode >Frame Rate and Bit Rate in the setup menu to view the settings for the video frame rate and video bit rate, respectively.

Planning Metadata

Planning metadata is information about shooting and recording plans, recorded in an XML file. You can shoot using clip names and shot mark names defined in advance in a planning metadata file.

[Note]
Use a font set that is compatible with the language set using Maintenance >Language in the setup menu when defining clip names and shot mark names. Using fonts for a language that is different from the language setting on the camcorder may cause characters to be displayed abnormally.

Loading a Planning Metadata File into Camcorder Memory when Recording a Clip

1 Save the planning metadata file on an SxS memory card beforehand.
Planning metadata files are stored in the "General/Sony/Planning" directory.

2 Insert an SxS memory card in slot A or B.

3 Select Operation >Planning Metadata >Load Media(A) or Load Media(B) in the setup menu.
A file list screen appears.
Up to 64 planning metadata files are displayed in the list.

4 Turn the MENU knob to select a file to load and press the knob.

5 Turn the MENU knob to select [Load] and press the knob, then select [Execute] and press the knob again.

[Note]
Data cannot be loaded from SDXC cards.

Displaying Detailed Information in Planning Metadata

After loading planning metadata into the camcorder, you can check the detailed information that it contains, such as file names, date and time of creation, and titles.

1 Select Operation >Planning Metadata >Properties in the setup menu.

2 Turn the MENU knob to select [Execute], and then press the knob.
The planning metadata information is displayed.

Item	Information
File Name	File name
Assign ID	Assign ID
Created	Date and time of creation
Modified	Date and time of most recent modification
Modified by	Name of person who modified the file
Title	Title1 specified in file (ASCII format clip name)
Title2	Title2 specified in file (UTF-8 format clip name)
Material Group	Number of material groups [a)]
Shot Mark0 to Shot Mark9	Names defined in file for Shot Mark 0 to Shot Mark 9

a) Material group: A group of clips recorded with the same planning metadata.

You can turn the MENU knob to scroll the list.

Clearing the Loaded Planning Metadata

1 Select Operation >Planning Metadata >Clear Memory in the setup menu.

2 Turn the MENU knob to select [Execute], and then press the knob.
Deletion starts.
The message "Clear Planning Metadata File OK" appears when the deletion finishes.

Defining Clip Names in Planning Metadata

The following two types of clip name strings can be written in a planning metadata file.

- An ASCII format name that appears in the viewfinder
- A UTF-8 format name that is actually registered as the clip name

You can select which type of clip name is displayed with Operation >Planning Metadata >Clip Name Disp in the setup menu.
When a clip name is set with planning metadata, the clip name is displayed.

[Note]
When you define both an ASCII format name and a UTF-8 format name with planning metadata, the UTF-8 format string is used as the clip name string. If you define either an ASCII format name or a UTF-8 format name with planning metadata, the defined format name is displayed though it is not selected by menu setting.

Clip name string example

Use a text editor to modify the two fields in the <Title> tag that contain the clip name strings. The shaded fields in the example are clip name strings. "Typhoon" is described in ASCII format (up to 44 characters). "Typhoon_Strikes_Tokyo" is described in UTF-8 format (up to 44 bytes).
"sp" indicates a space and ↵ indicates a carriage return.

```
<?xml sp version="1.0" sp encoding="
UTF-8"?>↵
<PlanningMetadata sp xmlns="http://
xmlns.sony.net/pro/metadata/
planningmetadata" sp assignId="
P0001" sp creationDate="
2015-09-30T17:00:00+09:00" sp
lastUpdate="
2015-10-06T17:00:00+09:00" sp
version="1.00">↵
    <Properties sp propertyId="
    assignment" sp update="
    2015-10-06T17:00:00+09:00" sp
    modifiedBy="Chris">↵
        <Title sp usAscii="Typhoon" sp
        xml:lang="en">Typhoon_Strikes_Tokyo
        </Title>↵
        </Properties>↵
</PlanningMetadata>↵
```

[Notes]

- When you create a file, enter each statement as a single line with a CRLF only after the last character in the statement line, and do not enter spaces except where specified.
- Up to 44 bytes (or characters) can be entered for the clip name.
  If the UTF-8 format string exceeds 44 bytes, the first 44 bytes are used as the clip name.
  If only an ASCII format name is specified, a 44-character string is used as the clip name.
  When neither an ASCII format name string nor UTF-8 format name string can be used, the standard format clip name is used.

Setting clip names

1 Load a planning metadata file that contains clip names into camcorder memory (page 91).

2 Set Operation >Clip >Clip Naming in the setup menu to Plan.
Each time that you record a clip, the camcorder automatically generates a name consisting of the clip name defined in the planning metadata file, with the addition of an underbar (_) and a five-digit serial number (00001 to 99999).
Examples:Typhoon_Strikes_Tokyo_00001, Typhoon_Strikes_Tokyo_00002,… After the number reaches 99999, the next increment returns the number to 00001.

[Note]
When you load another planning metadata file, the serial number continues incrementing. You can change the numbering using Operation >Clip >Number Set in the setup menu.

Selecting the clip name display format

When names are defined in both ASCII format and UTF-8 format, you can use Operation >Planning Metadata >Clip Name Disp in the setup menu to select which of the names to display on the LCD monitor and on the viewfinder screen.
To display ASCII format names:
Select Title1(ASCII).
The clip name becomes "Typhoon_Strikes_Tokyo_SerialNumber", but "Typhoon_SerialNumber" is displayed on the screen.
To display UTF-8 format names:
Select Title2(UTF-8).
The clip name becomes "Typhoon_Strikes_Tokyo_SerialNumber", and the same name is displayed on the screen.

Defining Shot Mark Names in Planning Metadata

When you use planning metadata to set shot marks, you can define names for Shot Mark 0 to Shot Mark 9.
When you record shot marks, you can add the shot mark name strings defined in the planning metadata.

[Note]
Only Shot Mark 1 and Shot Mark 2 can be recorded on the camcorder.

Shot mark name string example

Use a text editor to modify the fields in the <Meta name> tag.
The shaded fields in the example are essence mark name strings. Names can be either in ASCII format (up to 32 characters) or UTF-8 format (up to 16 characters).
"sp" indicates a space and ↵ indicates a carriage return.

[Note]
If a name string contains even one non-ASCII character, the maximum length of that string is 16 characters.

```
<?xml sp version="1.0" sp encoding="
UTF-8"?>↵
<PlanningMetadata xmlns="http://
xmlns.sony.net/pro/metadata/
planningmetadata" sp assignId="
H00123" sp creationDate="
2015-09-30T08:00:00Z" sp lastUpdate="
2015-09-30T15:00:00Z" sp version=
"1.00">↵
<Properties sp propertyId=
"assignment" sp class="original" sp
update="2015-09-30T15:00:00Z" sp
modifiedBy="Chris">↵
    <Title sp usAscii="Football
    Game" sp xml:lang="en">
    Football Game 30/09/2015</
    Title>↵
        <Meta sp name="_ShotMark1" sp
        content="Goal"/>↵
        <Meta sp name="_ShotMark2" sp
        content="Shoot"/>↵
        <Meta sp name="_ShotMark3" sp
        content="Corner Kick"/>↵
        <Meta sp name="_ShotMark4" sp
        content="Free Kick"/>↵
        <Meta sp name="_ShotMark5" sp
        content="Goal Kick"/>↵
        <Meta sp name="_ShotMark6" sp
        content="Foul"/>↵
        <Meta sp name="_ShotMark7" sp
        content="PK"/>↵
        <Meta sp name="_ShotMark8" sp
        content="1st Half"/>↵
        <Meta sp name="_ShotMark9" sp
        content="2nd Half"/>↵
        <Meta sp name="_ShotMark0" sp
        content="Kick Off"/>↵
    </Properties>↵
</PlanningMetadata>↵
```

[Note]
When you create a definition file, enter each statement as a single line with a CRLF only after the last character in the statement line, and do not enter spaces except where specified, except within essence mark name strings.

Obtaining Location Information (GPS)

Location and time information of video shot when positioning is enabled is recorded by the camcorder.
The GPS function is set to Off by factory default.

1 Check that the camcorder is in standby state.

2 Set Operation GPS to On in the setup menu. is displayed in the viewfinder when the camcorder is seeking GPS satellites. When positioning is established, location information is recorded when shooting video.

The icon displayed in the viewfinder varies, depending on the signal reception from the GPS satellites.

Positioning status	Display	GPS reception state
Off	No display	GPS is set to Off or an error occurred.
Positioning not available	NO GPS SIGNAL	Location information could not be obtained because GPS signal could not be received. Move to a location with a clear view of the sky.
Searching for satellites		Searching for GPS satellites. Several minutes may be required to acquire satellites.
Positioning		A weak GPS signal is being received.
		A GPS signal is being received. Location information can be acquired.
		A strong GPS signal is being received. Location information can be acquired.

- It may take some time to start acquiring location information after turning on the camcorder.
- If a positioning icon is not displayed after several minutes, there may be a problem with signal reception. Start shooting without location information, or move to an area with a clear view of the sky. Shooting when a positioning icon is not displayed means that location information will not be recorded.
- The GPS signal may not be received when indoors or near tall structures. Move to a location with a clear view of the sky.
- The recording of location information may be interrupted, depending on the strength of the received signal, even if a positioning icon is displayed.

Network Functions Supported by the Camcorder

The camcorder supports various network functions. This section provides an overview and detailed description of the network connections and functions.

Network Connection Overview

Connecting devices using wireless LAN

The camcorder can connect to smartphones, tablets, and other devices using wireless LAN connection using the IFU-WLM3 USB Wireless LAN Module (supplied) or CBK-WA02 Wireless LAN Adaptor (option).

1 Select the wireless connection device.
IFU-WLM3 USB Wireless LAN Module (supplied) ⇨ (page 56)
CBK-WA02 Wireless LAN Adaptor (option) ⇨ (page 56)

2 Select the wireless LAN access mode.
Wi-Fi Access Point mode ⇨ (page 57)
Wi-Fi Station mode ⇨ (page 58)

Connecting to the Internet using a LAN cable

Connect the camcorder to the Internet via a router using the network connector.

1 Connect the camcorder and router using a LAN cable.
⇨ (page 59)

Connecting to the Internet using wireless LAN

Connect the camcorder to the Internet using the IFU-WLM3 USB Wireless LAN Module (supplied), CBK-WA02 Wireless LAN Adaptor (option), or modem (option).

[Note]
The CBK-NA1 Network Adaptor Kit (option) is required if connecting using a CBK-WA02 Wireless LAN Adaptor (option) or modem (option).

When using the IFU-WLM3 (supplied)

1 Attach the IFU-WLM3 to the camcorder.
⇨ (page 56)

2 Set the wireless LAN access mode to Wi-Fi Station mode and connect to the Internet.
⇨ (page 60)

When using the CBK-WA02 (option)

1 Attach the CBK-WA02 to the camcorder.
⇨ (page 56)

2 Set the wireless LAN access mode to Wi-Fi Station mode and connect to the Internet.
⇨ (page 60)

Using a modem

1 Attach the USB extension adaptor of the CBK-NA1 (option).
⇨ (page 59)

2 Connect the modem.
⇨ (page 60)

Network Function Overview

Transferring files recorded on the camcorder to a server on the Internet

You can transfer proxy files recorded on an SD card and original files recorded on SxS memory cards to a server on the Internet when connected via a 3G/4G/LTE network, access point, wired LAN router.
⇨ (page 62)

Transmitting streaming video and audio

You can transmit the video and audio captured/played back with the camcorder via the Internet or local network.

Streaming using the streaming settings on the camcorder

⇨ (page 63)

High-quality streaming using a Sony PWS-100RX1 Network RX Station (option) as a Connection Control Manager

⇨ (page 64)

Common Information

Using Wi-Fi remote control

You can access the Wi-Fi remote control built into the camcorder from a smartphone, tablet, or other device over a wireless LAN connection.
⇨ (page 65)

Configuring from the web menu

The web menu of the camcorder appears when the camcorder is accessed from a browser on a device connected using a wireless LAN connection.
⇨ (page 67)

Supported network functions and operating limitations

⇨ (page 71)

Connecting Devices using Wireless LAN

The camcorder can connect to smartphones, tablets, and other devices using wireless LAN connection by attaching the IFU-WLM3 USB Wireless LAN Module (supplied) or CBK-WA02 Wireless LAN Adaptor (option).
The following operations can be performed between the camcorder and devices connected using a wireless LAN.

[Note]
USB wireless LAN modules/adaptors other than the IFU-WLM3 or CBK-WA02 cannot be used.

Remote operation via wireless LAN

The camcorder can be operated remotely from a smartphone, tablet, or computer that is connected using a wireless LAN.

File transfer via wireless LAN

Proxy files (low-resolution files) stored on the camcorder SD card and original files (high-resolution files) recorded on the camcorder can be transferred to a server via a wireless LAN.

Video/audio streaming via wireless LAN

A camcorder camera video feed or playback video feed can be streamed (H.264/AAC-LC compression) from a device using the "Content Browser Mobile" application via a wireless LAN.

"Content Browser Mobile" is an application that can operate the camcorder remotely on the device screen, while streaming content, and can be used to configure the camcorder.

For details about the "Content Browser Mobile" application, contact your Sony sales or service representative.

[Notes]
- Proxy files (low-resolution files) recorded on the SD card in the camcorder can be streamed via a wireless LAN.
- Streaming is not supported when the video format is set to MPEG-IMX or DVCAM.
- Obstructions and electromagnetic interference between the camcorder and wireless LAN access point or terminal device, or the ambient environment (such as wall materials) could shorten the communication range or prevent connections altogether. If you experience these problems, check the connection/communication status after moving the camcorder to a new location, or bringing the camcorder and access point/terminal device closer together.

Compatible Devices

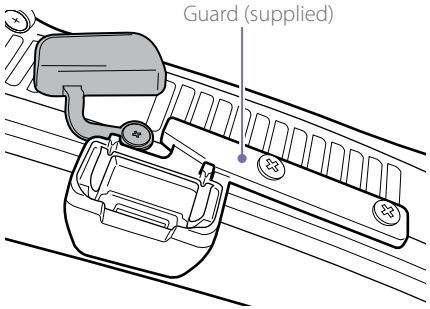
You can use a smartphone, tablet, or computer to configure and operate the camcorder. The supported devices, OS, and browsers are shown in the following table.

Device	OS	Browser
Smartphone	Android 4.4/5.0/5.1/6.0	Chrome
	iOS 8.0/8.1/8.2/8.3/8.4/9.0	Safari
Tablet	Android 4.4/5.0/5.1/6.0	Chrome
	iOS 8.0/8.1/8.2/8.3/8.4/9.0	
Computer	Microsoft Windows 7/ Microsoft Windows 8/ Microsoft Windows 10	Chrome
	Mac OS 10.9/10.10	Safari

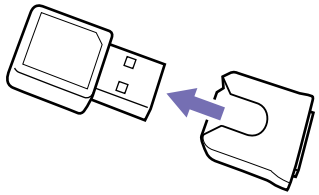
[Note]
Playback may not be supported, depending on the operating system of the terminal device used and the browser version. If this occurs, use "Content Browser Mobile."

Attaching the IFU-WLM3

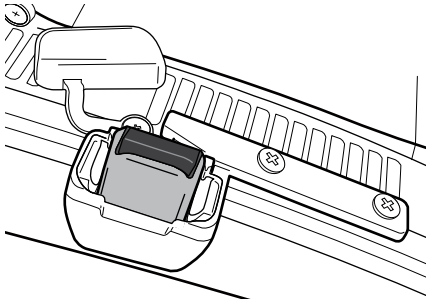
1 Open the cover of the USB wireless LAN module connector.



2 Attach the protective cap to the IFU-WLM3.



3 Plug the IFU-WLM3 into the connector.



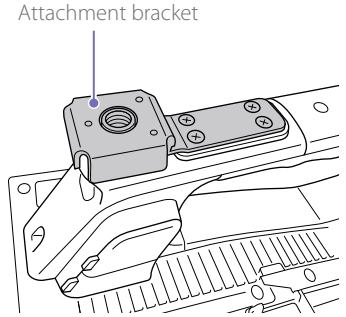
[Notes]
- Always turn the camcorder off before connecting or removing the IFU-WLM3.
- For attachment of the guard, contact a Sony service representative.

If not using the IFU-WLM3

Unscrew the two screws, remove the guard, and close the connector cover.

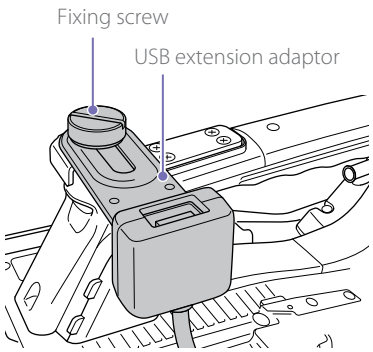
Attaching the CBK-WA02

1 Attach the attachment bracket to the handle in the position shown in the following diagram.
For attachment of the attachment bracket (Service Part No. A-2092-367-), contact a Sony service representative.

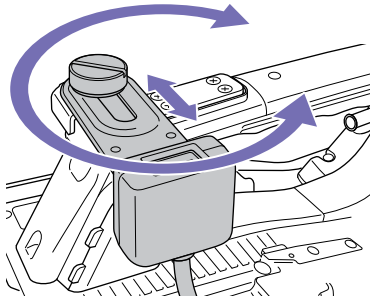


2 Attach the USB extension adaptor, supplied with the CBK-WA02 (option), to the attachment bracket.

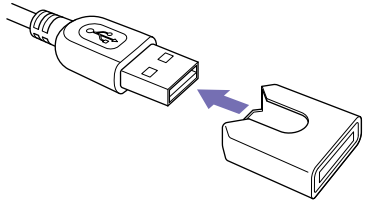
3 Turn the fixing screw clockwise to secure the USB extension adaptor.



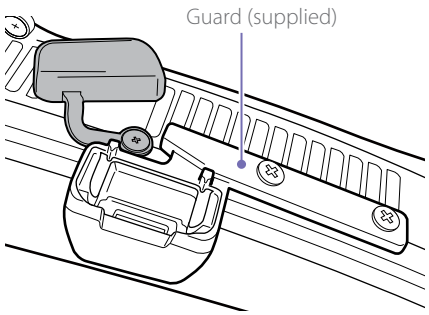
You can adjust the position of the USB extension adaptor over the range shown in the following diagram.



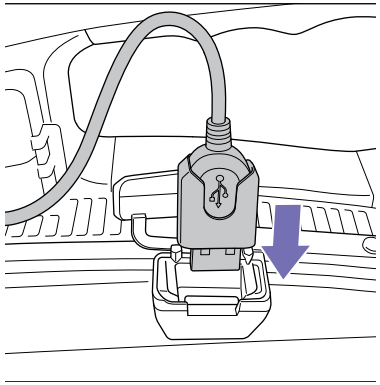
4 Attach the protective cap (supplied) to the USB connector of the USB extension adaptor.



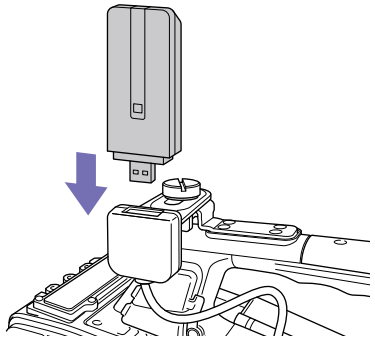
5 Open the cover of the USB wireless LAN module connector.
For attachment of the guard, contact a Sony service representative.



6 Plug the USB connector of the USB extension adaptor into the USB wireless LAN module connector.



7 Plug the CBK-WA02 into the USB connector of the USB extension adaptor.



8 Set the wireless LAN channel in Maintenance >Network >Channel in the setup menu (page 101).

For details about using the CBK-WA02, refer to the instruction manual supplied with the CBK-WA02.

[Notes]

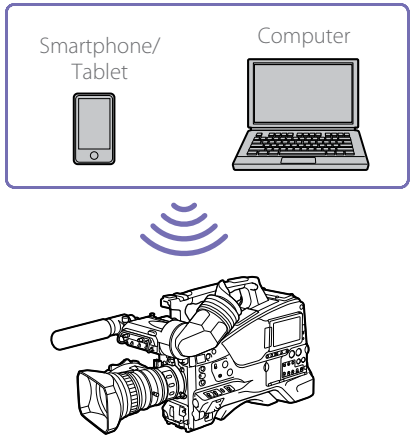
- Always turn the camcorder off before connecting or removing the CBK-WA02.
- Attaching the CBK-WA02 and selecting Wi-Fi Station in Maintenance >Network >Setting in the setup menu enables connection to a 5 GHz access point.
- The Ch setting "Auto(5GHz)" in Wi-Fi Access Point mode may not be displayed, depending on the CBK-WA02 used.
- "Auto(5GHz)" is not displayed in the menu if use of the CBK-WA02 in the 5 GHz band is prohibited for outdoor use in your country or region. Check that the use of the CBK-WA02 is permitted in your country or region. For details, refer to the CBK-WA02 operation manual.

If not using the CBK-WA02

Unscrew the two screws, remove the guard, and close the connector cover.

Connecting using Wireless LAN Access Point (Wi-Fi Access Point Mode)

The camcorder can connect to devices that are set up as an access point.



Connecting using WPS-equipped devices

Devices that support WPS can be connected using WPS.

1 Set Maintenance >Network >Wireless Network to Wi-Fi Access Point.

2 Set Maintenance >Network >Setting to On.

[Note]
It may take some time (30 seconds to 90 seconds) to enable access point mode. Wait until the network "AP" (access point) indicator (page 16) stops flashing on the LCD monitor or in the viewfinder.

3 Select Maintenance >Network >WPS in the setup menu.

4 Turn the MENU knob to select [Execute], then press the knob.

5 Open the device Network Settings or Wi-Fi Settings, and turn Wi-Fi on.

6 Select the camcorder SSID from the Wi-Fi network SSID list, display Option, and select WPS Push Button.

[Note]
The steps will vary depending on the device used.

Connecting using SSID and password on the device

Connect by entering the SSID and password on the device.

1 Set Maintenance >Network >Wireless Network to Wi-Fi Access Point.

2 Set Maintenance >Network >Setting to On.

[Note]
It may take some time (30 seconds to 90 seconds) to enable access point mode. Wait until the net work "AP" (access point) indicator (page 16) stops flashing on the LCD monitor or in the viewfinder.

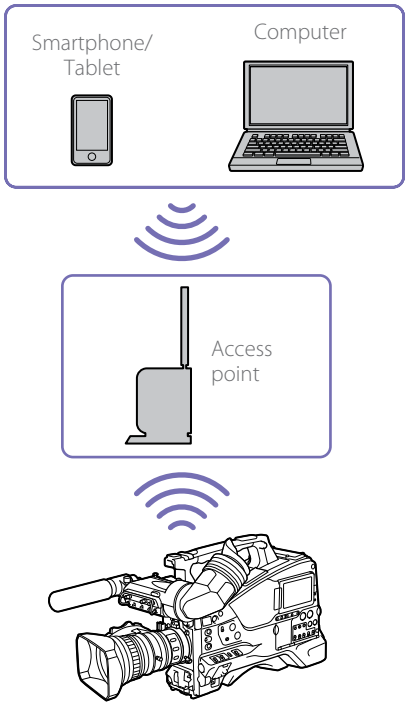
3 Open the device Network Settings or Wi-Fi Settings, and turn Wi-Fi on.

4 Select the camcorder SSID from the Wi-Fi network SSID list, then enter a password to connect.
For the camcorder SSID and password, see Maintenance >Network >SSID & Password (page 101) in the setup menu.

[Note]
The steps will vary depending on the device used.

Connecting Using Wireless LAN Station Mode (Wi-Fi Station Mode)

The camcorder can connect to an existing wireless LAN access point as a client.
The device connects via the access point.



Connecting to an access point using WPS

If an access point supports the WPS function, you can connect using a basic setting. If an access point does not support the WPS function, see "Connecting to an access point in station mode without using WPS" (page 69).

1 Turn the access point on.

2 Turn the camcorder on.

3 Set Maintenance >Network >Wireless Network to Wi-Fi Station.

4 Set Maintenance >Network >Setting to On.

[Note]
It may take some time (30 seconds to 1 minute) to enable station mode. Wait until the network indicator (page 16) signal strength icon stops flashing on the LCD monitor or in the viewfinder.

5 Select Maintenance >Network >WPS in the setup menu.

6 Turn the MENU knob to select [Execute], then press the knob.

7 Press the access point WPS button.
For details about WPS button operation, refer to the instruction manual for the access point.
When the connection is successful, the network indicator (page 16) signal strength icon will show a strength of 1 or higher on the LCD monitor or in the viewfinder.

[Note]
If the connection fails, perform the procedure again from step 1.

8 Connect the device to the access point.
For details about how to connect, refer to the instruction manual for each device.

Connecting to the Internet

You can connect to the Internet using a wired LAN or wireless LAN.
For wired LAN, connect a LAN cable (not supplied) to the network connector on the camcorder, and connect to the Internet via a router.
For wireless LAN, connect to the Internet using the IFU-WLM3 USB Wireless LAN Module (supplied), CBK-WA02 Wireless LAN Adaptor (option), or modem (option).

Required device for network connection

Wireless LAN connection

One of the following devices is required.

- IFU-WLM3 USB Wireless LAN Module (supplied)
- CBK-WA02 Wireless LAN Adaptor (option) + CBK-NA1E USB Extension Adaptor supplied with the CBK-NA1 Network Adaptor Kit (option)
- Modem (option) + CBK-NA1E USB Extension Adaptor supplied with the CBK-NA1 Network Adaptor Kit (option)

Wired LAN connection

- LAN cable (not supplied)

[Notes]

- The wireless LAN module may not be available in some countries/regions.
- The frequency band for the wireless LAN module is shared by various devices. Depending on the use environment, transmission speed and distance may be decreased, or communication may be disconnected, by using other devices.
- To use the 3G/4G/LTE services, you need to contract with a cell phone company.
- For details about the required compatible device for the network connection, contact your Sony dealer or a Sony service representative.

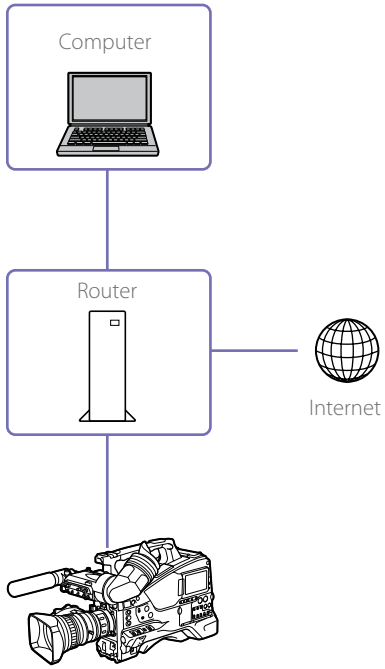
Limitations on simultaneous use of network connection function

The camcorder can connect to a network using wireless LAN or wired LAN methods.
However, there are limits on the simultaneous use of these connection functions.

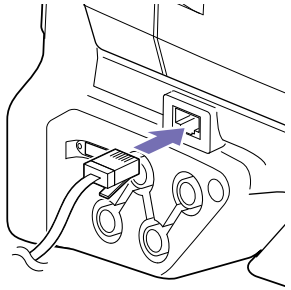
For details, see “Limitations on Simultaneous Use of Network Functions” (page 71).

Connecting Using a LAN Cable (Wired LAN Connection)

You can connect to the Internet using a wired LAN connection via a router connected to the network connector on the camcorder.



1 Connect the network connector of the camcorder and a router using a LAN cable.



2 Set Maintenance >Network >Wired LAN to Enable.

3 Set Maintenance >Network >Setting to On.
An IP address is automatically assigned to the camcorder.

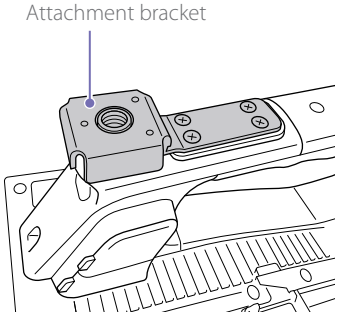
[Notes]

- It may take some time (30 seconds to 1 minute) for the wired LAN connection to become enabled. Wait until the network status indicator (page 16) LAN icon stops flashing on the LCD screen or in the viewfinder.
- To transfer original files/proxy files recorded on the camcorder, use Wi-Fi remote control, operate the web menu, or monitor output using the “Content Browser Mobile” application, set Maintenance >Network >Wired LAN Remote in the setup menu to On (page 102).
- When connected to a network, using a LAN cable, that will not be used to connect to the Internet, it is recommended that Wired LAN Remote be set to On to prevent unauthorized access from the Internet. When connecting to the Internet, check that the network connection is to a secure network before use.
- A wired LAN connection is not possible if a modem (option) is attached to the USB wireless LAN module connector. For wired LAN connection, first remove the modem (option).
- When connected to the Internet using Wi-Fi Station mode and the wired LAN is not connected to the Internet, a network error may occur and Internet-related functions may not operate. In this case, set Wired LAN to Disable, and connect to the Internet using Wi-Fi- Station mode only.

Preparation for Connection to the Internet Using a Modem

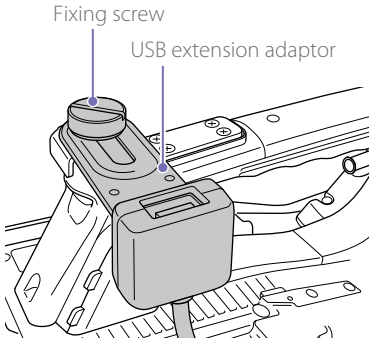
Attach the CBK-NA1E USB extension adaptor, supplied with the CBK-NA1 Network Adaptor Kit (option), to the USB wireless LAN module connector on the camcorder when planning to connect to the Internet via a 3G/4G network using the USB wireless LAN module connector.

1 Attach the attachment bracket to the handle in the position shown in the following diagram.
For attachment of the attachment bracket (Service Part No. A-2092-367-), contact a Sony service representative.

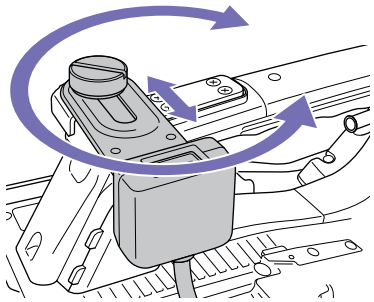


2 Attach the USB extension adaptor to the attachment bracket.

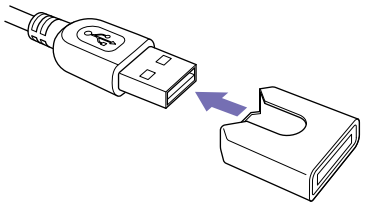
3 Turn the fixing screw clockwise to secure the USB extension adaptor.



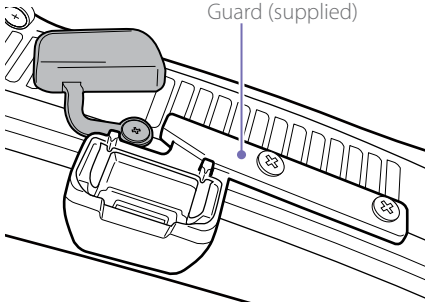
You can adjust the position of the USB extension adaptor over the range shown in the following diagram.



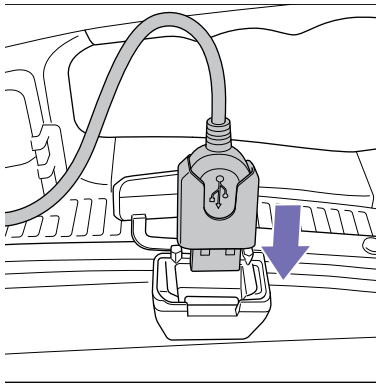
4 Attach the protective cap (supplied) to the USB connector of the USB extension adaptor.



5 Open the cover of the USB wireless LAN module connector.
For attachment of the guard, contact a Sony service representative.

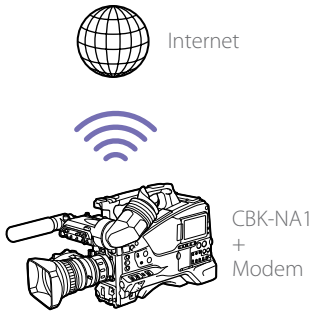


6 Plug the USB connector of the USB extension adaptor into the USB wireless LAN module connector.



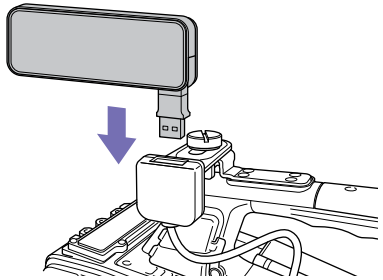
Connecting Using a Modem

You can connect the camcorder to the Internet via a 3G/4G network by attaching a modem (option) to the camcorder using a CBK-NA1 Network Adaptor Kit (option).



Connecting

1 Connect the modem (option) to the USB connector of the CBK-NA1E USB extension adaptor.



For details about connecting a modem, refer to the instruction manual supplied with the modem.

2 Set Maintenance >Network >Wireless Network to Modem.

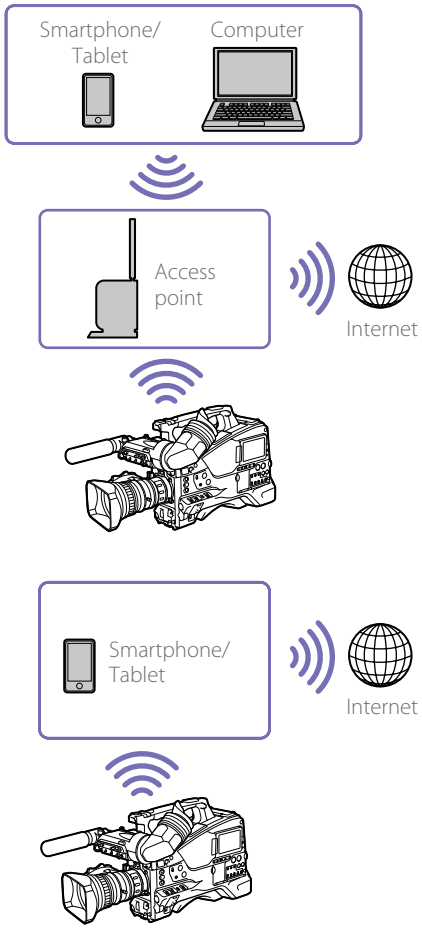
3 Set Maintenance >Network >Setting to On.

[Notes]

- Always turn the camcorder off before connecting or removing the CBK-NA1 and modem.
- It may take some time (30 seconds to 1 minute) to enable modem mode. Wait until the "3G/4G" network status indicator (page 16) stops flashing on the LCD screen or in the viewfinder.

Connecting Using Wireless LAN Station Mode (Wi-Fi Station Mode)

You can connect to the Internet using Wi-Fi station mode by attaching the IFU-WLM3 USB Wireless LAN Module (supplied) or CBK-WA02 Wireless LAN Adaptor (option) to the camcorder, and using a 3G/4G/LTE-compatible access point (option) or using device tethering.
For details about attaching devices, see "Attaching the IFU-WLM3" (page 56) and "Attaching the CBK-WA02" (page 56).



If the access point and device supports WPS, connect using the procedure in “Connecting to an access point using WPS” (page 58). If WPS is not supported, connect using the procedure in “Connecting to an access point in station mode without using WPS” (page 69).
First, turn the access point and device on, and configure the device tethering function if planning to use tethering.

Transferring Files

You can transfer proxy files recorded on an SD card and original files recorded on SxS memory cards to a server on the Internet when connected to the Internet via a 3G/4G/LTE network, access point, or wired LAN router.

Preparation for Transfer

1 Connect the camcorder to the Internet using the procedures in "Connecting Devices using Wireless LAN" (page 56) and "Connecting to the Internet" (page 59).

2 You must first register a server to which you want to transfer files.
For details about registering a server, see "To register a new destination server" (page 70).

Transferring

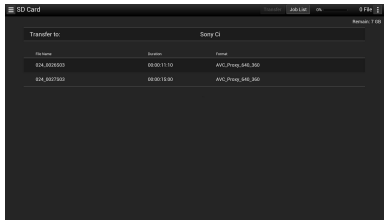
You can select proxy files on an SD card or original files on SxS memory cards for transfer to a server.

Transferring proxy files on an SD card

1 Connect the camcorder and device using a LAN connection, then launch a browser on the device to access the camcorder.

2 Display a file list screen to select files.

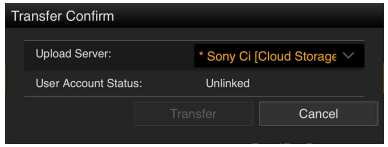
3 Tap ☰ and select [Media Info], then tap [SD Card].
The SD Card screen appears.



Using "Content Browser Mobile" application version 2.0 or later, you can quickly display a thumbnail for a proxy file on an SD card by using the still image of the first frame.

4 Select the files you want to transfer.
Tap a file to select it. Tap a file a second time to de-select it. You can double-tap a file to play the file to check its content.

5 Tap [Transfer].
The default destination server specified in [Default Setting] appears (see "To register a new destination server" (page 70)).
To change the destination server, tap the destination server to display a list and then select a different server. Enter the directory on the destination server, as required.



6 Tap [Transfer].
Transfer of the selected files begins. To cancel file transfer, tap [Cancel].

Transferring parts of proxy files

Using "Content Browser Mobile" application version 2.0 or later, you can specify In/Out points from proxy files to cut out and transfer the cutout parts.

[Notes]
- Margins of up to 15 frames are added before and after the cutout region in the created file.
- Files created from cutouts from proxy files recorded using network function software (V1.25 or earlier) may not be imported into non-linear editors.

Transferring original files on SxS memory cards

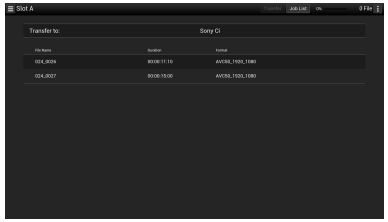
1 Connect the camcorder and device using a LAN connection, then launch a browser on the device to connect to the camcorder "Connecting Devices using Wireless LAN" (page 56).

2 Select Maintenance >File Transfer >File Transfer in the setup menu.

3 Turn the MENU knob to select [Execute], then press the knob.
File transfer mode is initiated.

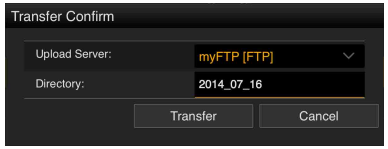
4 Display a file list screen to select files in the browser on the device.

5 Tap ☰ and select [Media Info], then tap Slot A (for files recorded on media in slot A) or Slot B (for files recorded on media in slot B).
The Slot A or Slot B screen appears.
Example: Slot A screen



6 Select the files you want to transfer.
Tap a file to select it. Tap a file a second time to de-select it.

7 Tap [Transfer].
The default destination server specified in [Default Setting] appears (see "To register a new destination server" (page 70)).
To change the destination server, tap the destination server to display a list and then select a different server.
Enter the directory on the destination server in [Directory].



8 Tap [Transfer].
Transfer of the selected files begins. To cancel file transfer, tap [Cancel].

[Note]
Files cannot be transferred under the following conditions.
- During recording, playback, or when displaying the thumbnail screen
- When Maintenance >Network >Wireless Network >Wi-Fi Access Point and Wired LAN >Disable in the setup menu are set to Disable
- When the streaming function is enabled (Maintenance >Streaming >Setting is set to On)
- When network client mode is enabled (Maintenance >Network Client Mode >Setting is set to On)

Monitoring the File Transfer

Tap [Job List] on the SD Card, Slot A, or Slot B screen to display the Job List screen to check the status of the file transfer (page 70).

Transmitting Streaming Video and Audio

You can transmit the video and audio captured/played back with the camcorder via the Internet or local network.

Preparation for Streaming Transmission

1 Connect the camcorder to the Internet using the procedures in "Connecting Devices using Wireless LAN" (page 56) and "Connecting to the Internet" (page 59).

2 Select Preset1 (or Preset2, Preset3) in Maintenance >Streaming in the setup menu. The streaming connection destination setup screen appears.

3 Set Size, Bit Rate, Type, and items according to Type on the screen.

4 Select Preset1 (or Preset2, Preset3), set in steps 1 and 2, in Maintenance >Streaming >Preset Select in the setup menu.

Starting Streaming

1 Set Maintenance >Streaming >Setting in the setup menu to On.
Streaming starts according to the settings.
You can assign Streaming to an assignable button. For details about assignment, see "Assigning Functions to Assignable Switches" (page 106).

[Notes]

- Streaming cannot be started under the following menu settings.
  - Maintenance >Network >Setting in the setup menu is set to Off
  - Maintenance >Network Client Mode >Setting in the setup menu is set to On
- It may take several tens of seconds to stream actual video or audio after starting streaming.
- You cannot start streaming when playing back an SD format clip.
- If you set the streaming transmission destination is set incorrectly or the camcorder does not connect to the network, "×" appears on the screen as the streaming status indicator.
- Streaming in network client mode (page 64), monitoring, proxy recording, and file transfer are not available after switching to streaming mode.
- Starting streaming while monitoring, proxy recording, or transferring files will stop the corresponding function.

Stopping Streaming

Set Maintenance >Streaming >Setting to Off to stop streaming.
When Streaming is On, streaming can also be stopped by pressing the assignable button to which Streaming has been assigned.

When the camcorder is connected to a device via Wireless LAN (page 56) or is connected to the Internet using wireless LAN station mode (page 58), you can also set the streaming transmission destination and start/stop streaming from the web menu (page 67).

Streaming High Quality Video

High-quality streaming is supported by enabling network client mode and connecting and using a PWS-100RX1 Network RX Station (option) as a Connection Control Manager (CCM).

1 Connect the camcorder to the network.
For details, see "Connecting Devices using Wireless LAN" (page 56) and "Connecting to the Internet" (page 59).

2 Set each item in Maintenance >Network Client Mode >Detail Settings in the setup menu.

Item	Description
CCM Address	Enter the IP address of the CCM to connect. (Host name or IP address)
CCM Port	Enter the port number of the CCM to connect.
User Name	Enter the user name.
Password	Enter the password.

[Note]
Network client mode cannot be set if values are not entered for all items.

3 Set Maintenance >Network Client Mode >Setting in the setup menu to On.
Network client mode is enabled, and the camcorder connects to the PWS-100RX1 Network RX Station.
Live streaming starts in response to PWS-100RX1 Network RX Station operation.
For details about operation, refer to the instruction manual for the PWS-100RX1 Network RX Station.
You can assign Setting (On/Off) for Network Client Mode to an assignable button. For details about assignment, see "Assigning Functions to Assignable Switches" (page 106).

[Notes]
- Changing to network client mode during normal streaming (page 63) is not possible.
- Normal streaming (page 63), monitoring, proxy recording, and file transfer are not available after switching to network client mode.
- Switching to network client mode while monitoring, proxy recording, or transferring files will stop the corresponding operation.

Using Wi-Fi Remote Control

You can access the Wi-Fi remote control built into the camcorder from a smartphone, tablet, or other device over a wireless LAN connection.
Using the Wi-Fi remote control allows you to operate the camcorder remotely. This allows you to start/stop recording or configure settings remotely, and is useful in applications where the camcorder is fixed in a remote location or mounted on a crane, for example.

Displaying the Wi-Fi Remote Control

The Wi-Fi Remote screen is automatically resized to match the screen size of the connected device.

1 Connect the camcorder to the Internet using the procedures in "Connecting Devices using Wireless LAN" (page 56) and "Connecting to the Internet" (page 59).

2 Launch a browser on the device and enter "http://<IP_address>/rm.html" in the URL bar, where "<IP_address>" is the IP address (Maintenance >Network >IP Address (Wireless) in the setup menu) of the camcorder.
For example, if the IP address is 192.168.1.1, enter "http://192.168.1.1/rm.html" in the URL bar.

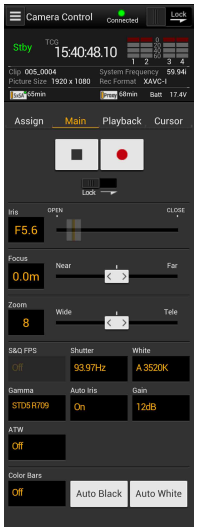
3 Enter the user name and password (Maintenance >Basic Authentication (page 101) in the setup menu) on the browser screen.
When connection is successful, the Wi-Fi Remote screen appears on the device.
You use the Wi-Fi Remote screen to operate the camcorder.
You can disable the REC button operation by sliding the Lock knob to the right on the screen.
You can also display the Wi-Fi remote control using [Cam Remote Control] (page 67) from the web menu.

[Notes]

- To display the page for a smartphone, change "rm.html" to "rms.html" in the URL. To display the page for a tablet, change "rm.html" to "rmt.html" in the URL. When "rm.html" is entered, the page automatically switches for display on the corresponding device. However, the appropriate page may not be displayed, depending on the device.
- The Wi-Fi Remote screen may not match the camcorder settings under the following circumstances. If this occurs, reload the browser window.
  - If the camcorder is restarted while connected
  - If the camcorder is operated directly while connected
  - If the device has been reconnected
  - If the browser Forward/Back buttons have been used
- The Wi-Fi remote control may not function if the wireless signal strength becomes weak.

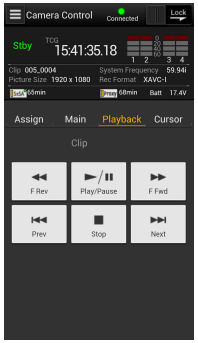
Wi-Fi Remote Screen (Smartphones)

Main screen



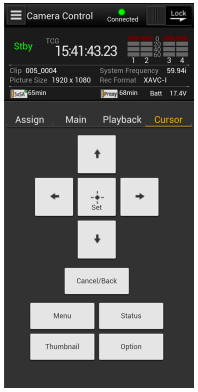
- Status display
- Shooting settings
  Iris, Focus, Zoom, S&Q FPS, Shutter, White, Gamma, Auto Iris, Gain, ATW, Color Bars, Auto Black, Auto White

Playback screen



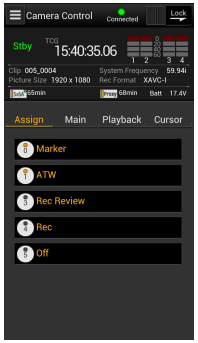
- Status display
- Playback control buttons
  F Rev, Play/Pause, F Fwd, Prev, Stop, Next

Cursor screen



- Status indicators
- Cursor control buttons, menu/status display
  Up, Left, Set, Right, Down, Cancel/Back, Menu, Status, Thumbnail, Option (SHIFT + SET)

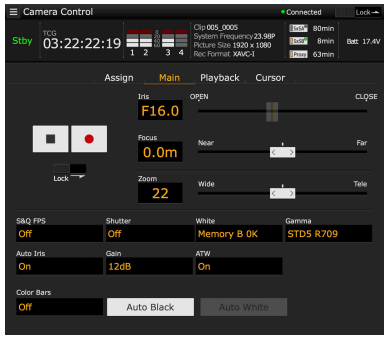
Assign screen



- Status display
- Assignable buttons
  Assignable buttons 0, 1, 3, 4, 5

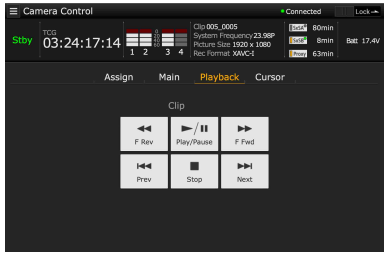
Wi-Fi Remote Screen (Tablets)

Main screen



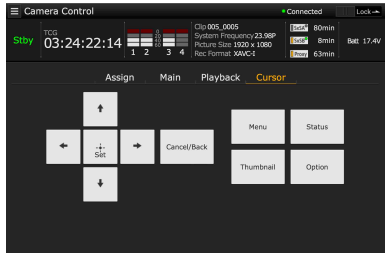
- Status display
- Assignable buttons
  Assignable buttons 0, 1, 3, 4, 5
- Shooting settings
  S&Q FPS, Shutter, White, Gamma, Auto Iris, Gain, ATW, Color Bars, Auto Black, Auto White

Playback screen



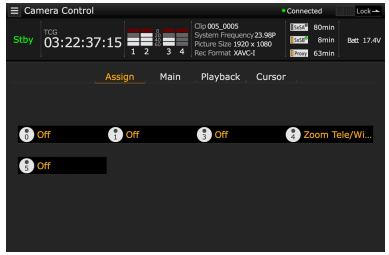
- Status display
- Playback control buttons
  F Rev, Play/Pause, F Fwd, Prev, Stop, Next

Cursor screen



- Status display
- Cursor control buttons, menu/status display
  Up, Left, Set, Right, Down, Cancel/Back, Menu, Status, Thumbnail, Option (SHIFT + SET)

Assign screen



- Assignable buttons
  Assignable buttons 0, 1, 3, 4, 5

Configuring from the Web Menu

The web menu of the camcorder appears when the camcorder is accessed from a browser on a device connected using a wireless LAN connection. Using the web menu, you can configure settings related to wireless functions, transfer files, and perform other actions.

Displaying the Web Menu

1 Connect the camcorder to the Internet using the procedures in "Connecting Devices using Wireless LAN" (page 56) and "Connecting to the Internet" (page 59).

2 Launch a browser on the device and enter "http://192.168.1.1:8080/index.html" in the URL bar.
The user name and password entry screen appears.

3 Enter a user name and password, then select [OK].
For the user name and password for access authentication, see Maintenance >Basic Authentication (page 101) in the setup menu.

Setup Menu

Launch a browser on the device and enter "http://<IP_address>/rm.html" in the URL bar, where "<IP_address>" is the IP address (Maintenance >Network >IP Address in the setup menu) of the camcorder, to display the Media Info >SD Card screen of the camcorder
Tapping ☰ in the top left of the web menu screen will display the configuration menus. Tap the item you want to configure.
The menu has the following items: Settings, Media Info, Job List, and Cam Remote Control.

Settings

Used to configure the camcorder. This screen has the following items.

Item	Description	See
Wireless Module >Streaming Format	Streaming format settings	Streaming Format Settings(page 67)
Wireless Module >Proxy Format	Proxy format settings	Proxy Format Settings(page 68)
Wireless LAN >Station Settings	Wireless LAN settings	Wireless LAN Station Settings(page 68)
Wireless LAN >Status	Wireless LAN settings status	Checking wireless LAN settings(page 69)
Wired LAN >Wired LAN Settings	Wired LAN settings	Wired LAN Settings(page 69)
Wired LAN >Status	Wired LAN settings status	Checking wired LAN settings(page 69)
Upload Settings	Transfer settings	Transfer (Upload) Settings(page 69)

Media Info

Displays media information and is used to select files to transfer from media.

- SD Card: Media inserted into the PROXY SD card slot of the camcorder
  Double-clicking a file will start playback of the selected file.

[Note]
Playback may not be supported, depending on the operating system of the terminal device used and the browser version. If this occurs, use "Content Browser Mobile."

- Slot A: Media inserted into card slot A of the camcorder
- Slot B: Media inserted into card slot B of the camcorder

Job List

Displays the Job List screen for managing file transfers (page 70).

Cam Remote Control

Displays the Wi-Fi remote control screen (page 65).

Streaming Format Settings

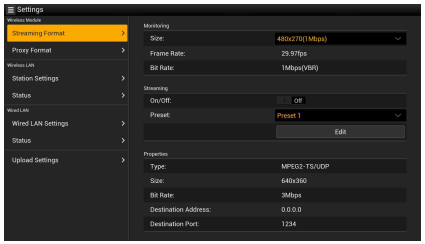
You can configure the stream for monitoring by devices, and set the format and transmission destination of the stream for streaming via the Internet or local network.

Video

- AVC/H.264 Main Profile, 4:2:0 Long GOP
- Size is selected in the following settings.

Audio

- AAC-LC compression
- Sampling frequency: 48 kHz
- Bit rate: 128 kbps for stereo



Monitoring Settings

You can set the format for monitoring by devices.

Item	Description	Setting
Monitoring Size	Sets the video size and bit rate for monitoring.	480×270(1Mbps)/ 480×270(0.5Mbps)
Monitoring Frame Rate	Displays the video frame rate for monitoring.	23.98fps/25fps/ 29.97fps/50fps/ 59.94fps
Monitoring Bit Rate	Displays the video bit rate for monitoring.	1Mbps(VBR)/ 0.5Mbps(VBR)

[Notes]

- The bit rate is an average value, so this value may be exceeded at times.
- A video frame rate of 24 fps is not supported.
- 640×360 (3Mbps (VBR)) is not supported for Monitoring Size.

Streaming settings

You can set the format and transmission destination for streaming. Up to three settings can be preset.

Item	Description	Setting
On/Off	Switches streaming transmission on/off.	On/Off
Preset	Selects the preset from Preset 1 to Preset 3. You can edit Preset by tapping Edit.	Preset1/Preset2/ Preset3
Type	Selects the type of video for streaming.	MPEG-2 TS/UDP/ MPEG-2 TS/ RTP
Size	Sets the size of video for streaming. When HD Auto is selected, the size is set to 1920×1080 or 1280×720, according to the setting of the recording format recorded on the SxS memory card or the format of the clip to be played back.	HD Auto/ 1280×720/ 640×360/ 480×270
Bit Rate	Sets the bit rate of video for streaming. The selectable bit rate varies depending on the Size setting.	9Mbps/ 6Mbps/ 3Mbps/ 2Mbps/ 1Mbps/ 0.5Mbps
Destination Address	Enter the address of the transmission destination server for streaming data.	Host name or IP address
Destination Port	Enter the port number of the transmission destination server used for streaming.	1 to 65535
Audio Channel Select	Selects the audio channels for the streaming output.	Ch-1 & Ch-2/ Ch-3 & Ch-4

[Notes]

- When Streaming is set to On, the monitoring function cannot be used.
- Audio/video data is transmitted as-is via the Internet. Accordingly, the data may potentially be exposed to other parties.
  Always check that the transmission destination can receive the streaming data.
  The data may be sent to an unintended party if the address or other settings are configured incorrectly.
- Not all frames may be played, depending on the status of the network.
- The picture quality may deteriorate in scenes with excessive motion.
- Not all frames may be played when the stream is set to a large size with a small bit rate.
  To reduce this, select a smaller size for the Size setting.

Proxy Format Settings

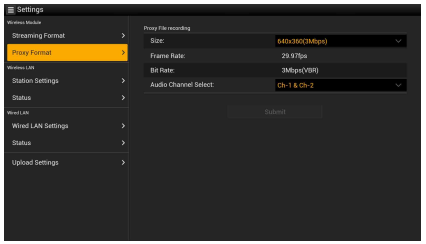
You can set the format of the proxy file that is recorded on the SD card of the camcorder.

Video

- XAVC Proxy (AVC/H.264 Main Profile, 4:2:0 Long GOP)
- Size is selected in the following settings.

Audio

- AAC-LC compression
- Sampling frequency: 48 kHz
- Bit rate: 128 kbps for stereo



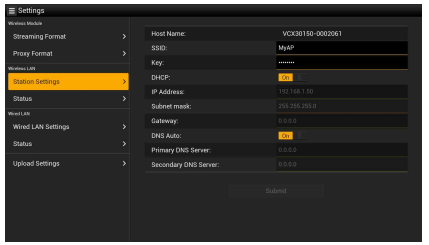
Item	Description	Setting
Proxy File recording >Size	Sets the video size and bit rate for proxy files.	1280×720(9Mbps)/ 1280×720(6Mbps)/ 640×360(3Mbps)/ 480×270(1Mbps)/ 480×270(0.5Mbps)
Proxy File recording >Frame Rate	Displays the video frame rate for proxy files.	23.98fps/ 25fps/ 29.97fps/ 50fps/ 59.94fps
Proxy File recording >Bit Rate	Displays the video bit rate for proxy files.	9Mbps(VBR)/ 6Mbps(VBR)/ 3Mbps(VBR)/ 1Mbps(VBR)/ 0.5Mbps(VBR)
Proxy File recording >Audio Channel Select	Sets the audio channel to record to proxy data.	Ch-1 & Ch-2/ Ch-3 & Ch-4

[Notes]

- The bit rate is an average value, so this value may be exceeded at times.
- 24 fps is not supported.

Wireless LAN Station Settings

Use this screen to make settings for connecting the camcorder to a wireless LAN.



Item	Description
Host Name	Name of the camcorder (can be modified)
SSID	Displays the SSID selected in [Access Point].
Key	Enter the password for the access point.
DHCP	Enables/disables DHCP. When set to [On], an IP address is automatically assigned to the camcorder. To enter the camcorder IP address manually, set to [Off].
IP Address	Enter the IP address of the camcorder. Enabled only when DHCP is [Off].
Subnet mask	Enter the subnet mask of the camcorder. Enabled only when DHCP is [Off].
Gateway	Enter the gateway for the access point. Enabled only when DHCP is [Off].
DNS Auto	Obtains DNS address automatically. When set to On, the address of the DNS server is obtained automatically.

Item	Description
Primary DNS Server	Enter the primary DNS server for the access point. Enabled only when DHCP is [Off].
Secondary DNS Server	Enter the secondary DNS server for the access point. Enabled only when DHCP is [Off].
Submit	Applies the wireless LAN settings.

Connecting to an access point in station mode without using WPS

1 Connect the camcorder and device using access point mode (page 57).

2 Configure settings on the Station Settings screen.
Configure settings to match the settings of the access point connection.

For details about access point settings, refer to the instruction manual for the access point.

3 Tap [Submit].
The specified settings are applied.

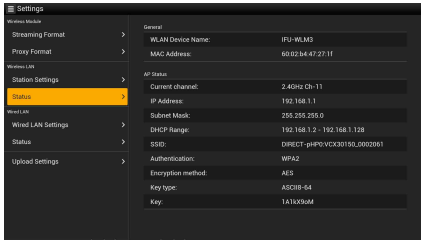
4 Select Maintenance >Network >Wireless Network in the setup menu.

5 Turn the MENU knob to select [Wi-Fi Station], then press the knob.
This step connects the camcorder to the access point in station mode. Proceed to step 9 in "Connecting to an access point using WPS" (page 58) to access the camcorder from the device.

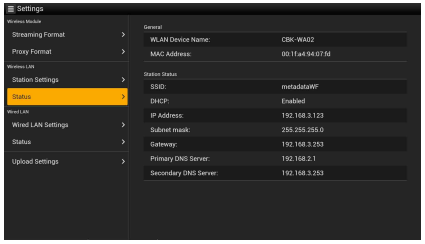
Checking wireless LAN settings

Use the Wireless LAN >Status tab to monitor the wireless LAN status.
The displayed settings will vary depending on the wireless LAN mode of the camcorder.

Access point mode

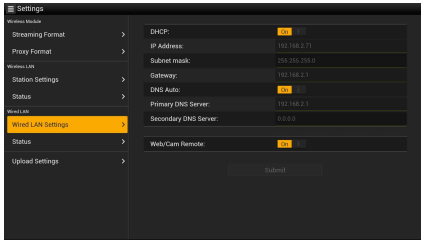


Station mode



Wired LAN Settings

Use this screen to make settings for connecting the camcorder to a wired LAN.

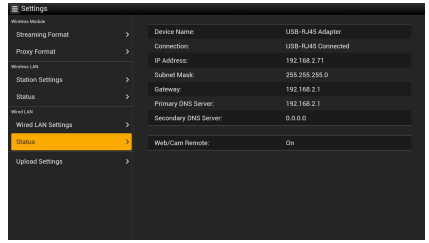


Item	Description
DHCP	Enables/disables DHCP. When set to [On], an IP address is automatically assigned to the camcorder. To enter the camcorder IP address manually, set to [Off].
IP Address	Enter the IP address of the camcorder. Enabled when DHCP is [Off].
Subnet mask	Enter the subnet mask of the camcorder. Enabled when DHCP is [Off].
Gateway	Enter the gateway for the access point. Enabled when DHCP is [Off].
DNS Auto	Obtains DNS address automatically. When set to On, the address of the DNS server is obtained automatically.
Primary DNS Server	Enter the primary DNS server of the router. Enabled when DNS Auto is [Off].
Secondary DNS Server	Enter the secondary DNS server of the router. Enabled when DHCP is [Off].
Web/Cam Remote	Enables/disables access to the camcorder web menu and Wi-Fi remote control. When set to On, access is permitted.
Submit	Sets the wired LAN settings.

[Note]
To prevent unauthorized access from the Internet, it is recommended that Web/Cam Remote be set to On only when the wired LAN network is not connected to the Internet. When connecting to the Internet, check that the network connection is a secure network before use.

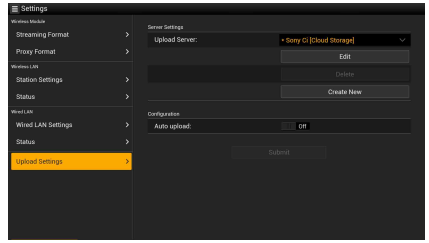
Checking wired LAN settings

Use the Wired LAN >Status tab to monitor the wired LAN status.



Transfer (Upload) Settings

You can register and set servers for transferring proxy files or original files recorded on the camcorder.



Auto transfer ON/OFF

If [Auto upload] is [On] and an Internet connection exists, proxy files are automatically transferred to the default server specified on the Upload Settings tab when recording ends.
The default server is set to "Sony Ci" by factory default.
"Sony Ci" is the Media Cloud Services provided by Sony. You can transfer files to the "Sony Ci" cloud service.

[Notes]
- A subscription is required in order to use the "Sony Ci" cloud service. For details, visit www.SonyMCS.com/wireless.
- The name of the transfer destination folder is specified in [Destination Directory]. If not specified, a folder name with the current date is used. To change the setting, see "To change registered server settings" (page 70).

Use the following procedure to register with "Sony Ci."

1 Check that "Sony Ci" is displayed on the [Upload Settings] tab, then click [Edit].
The "Sony Ci" setup screen appears.

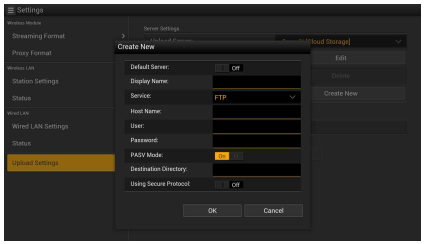
2 Enter a user name and password.
For details, visit www.SonyMCS.com/wireless.

3 Tap [Link].
A completion message appears after a short while.
[Link] associates the user with the camcorder. An Internet connection is required to execute [Link].

4 Tap [OK].
After registering with "Sony Ci," [Unlink] appears on the Settings screen. Tapping [Unlink] releases the user account to enable other user accounts to link with the camcorder.

To register a new destination server

Tap [Create New] to display a configuration screen.



After specifying settings, tap [OK] to apply the settings. Tapping [Cancel] discards the settings.

Item	Description
Default Server	Set to [On] to set the default file destination server. (Displayed at the top of the server list for file transfers.)
Display Name	Enter the name of the server to display in the list.
Service	Displays the type of server. FTP: FTP server
Host Name	Enter the address of the server.
User	Enter the user name.
Password	Enter the password.
PASV Mode	Enable/disable PASV mode.
Destination Directory	Specify the destination directory. [Note] If an invalid character is entered in the directory name, the directory is not created and files are transferred to the top level of the default transfer destination directory.
Using Secure Protocol	Set whether to use secure FTP.

[Note]
Communication using FTP is not encrypted. The use of FTPS is recommended.

To change registered server settings

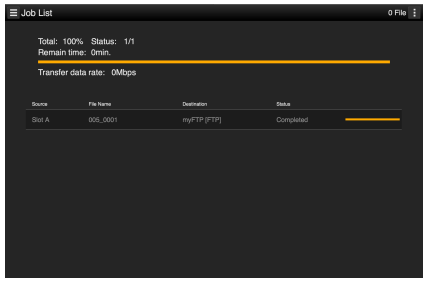
Select the server whose settings you want to change on the Upload Settings screen, then tap [Edit]. Change the setting on the displayed configuration screen.
For details about items, see To register a new destination server.

Deleting a registered server

Select the server you want to delete on the Upload Settings screen, then tap [Delete]. A confirmation message appears. Tap [OK] to delete the server and return to the previous screen.

Monitoring File Transfers (Job List)

You can monitor file transfer status, manage files in the transfer file list, and start/stop file transfers.
The camcorder supports the FTP resume function (for continuing file transfer if transfer stops).



Item	Description
Total	Progress status of the transfer of all files
Status	Progress status of the file being transferred
Remain time	Predicted remaining transfer time
Transfer data rate	Transfer rate

To stop/restart file transfer or delete a file from the transfer list

1 Select a file.

2 Tap ☰ on the top right of the screen.
Select a menu item.
- Abort selected: Stop file transfer.
- Delete from list: Delete the file from the transfer list.
- Start selected: Start file transfer.
- Select All: Select all files in the list.
- Clear completed: Delete all files that have been transferred from the list.

Supported Network Functions and Operating Limitations

Network Functions and Network Connection Settings

The supported network functions and corresponding network connection settings (Maintenance >Network >Wireless Network and Wired LAN settings) are shown below.
To enable the network functions, set Maintenance >Network >Setting in the setup menu to On.

Network function	Maintenance >Network>Wireless Network in the setup menu				Maintenance >Network >Wired LAN in the setup menu	
	Wi-Fi Access Point	Wi-Fi Station	Modem	Off	Enable	Disable
Proxy recording [1] (page 51)	Yes	Yes	Yes	Yes	Yes	Yes
Proxy playback (page 67)	Yes[2]	Yes[2]	No	No	Yes[2]	No
File transfer (page 62)	No	Yes[2]	Yes[2]	No	Yes[2]	No
Streaming transmission (page 63)	No	Yes	Yes	No	Yes	No
Monitoring (page 67)	Yes[2]	Yes[2]	No	No	Yes[2]	No
Network client mode (page 64)	No	Yes	Yes	No	Yes	No
Camcorder remote control (page 65)	Yes[2]	Yes[2]	No	No	Yes[2]	No

1) Proxy recording is enabled when Operation >Proxy Recording Mode> Setting in the setup menu is set to On.
2) Supports camcorder and network-connected device functions.

Limitations on Simultaneous Use of Network Functions

The following limitations apply to the simultaneous use of network functions.

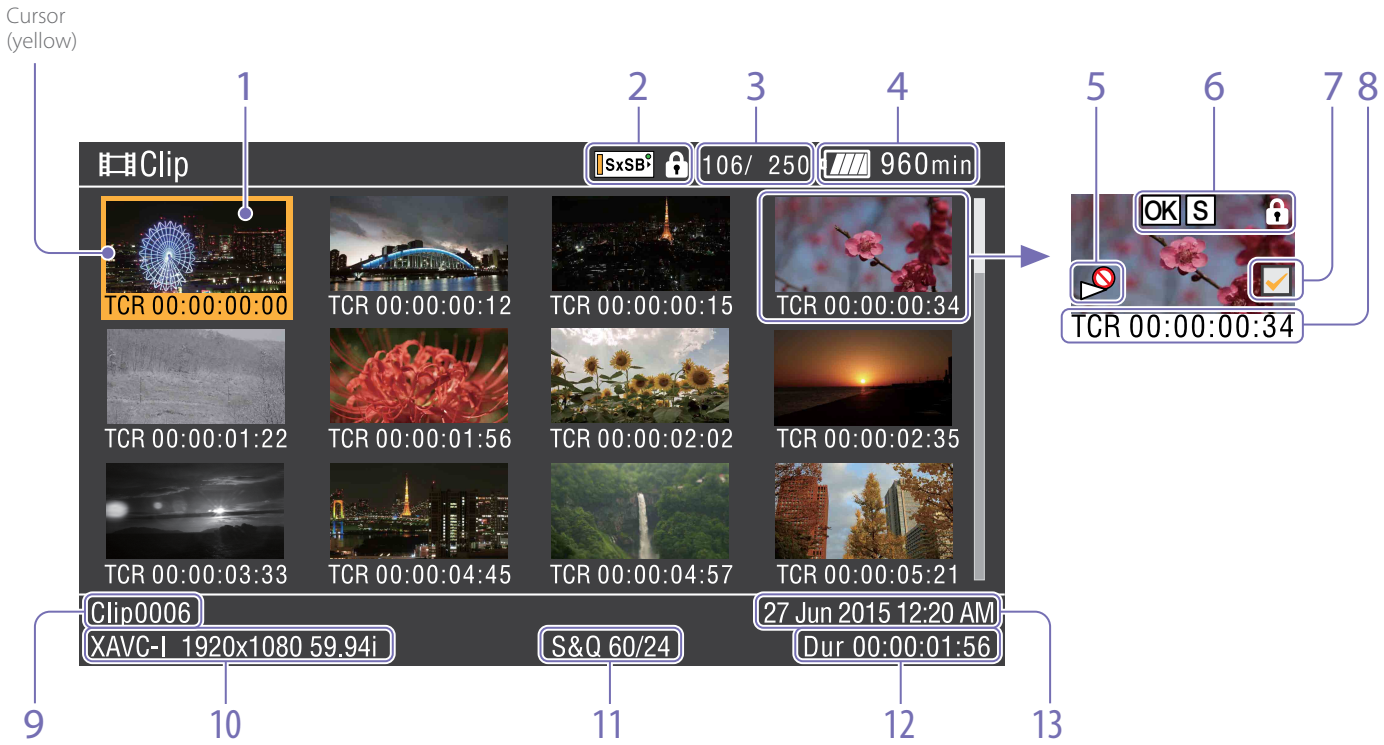
Wireless LAN connection	Wired LAN connection	Operation
None	Disabled	Network function stopped
USB wireless LAN module	Disabled	USB wireless LAN module operating
3G/4G/LTE USB modem	Disabled	3G/4G/LTE USB modem operating
None	Enabled	Wired LAN operating
USB wireless LAN module	Enabled	USB wireless LAN module and wired LAN operating [1]

1) Streaming and file transfer operate using wired LAN. The USB wireless LAN module is reserved for Wi-Fi remote control operation.

[Note]
Wired LAN connection is not possible when the USB extension adaptor of the CBK-NA1R Ethernet Adaptor, supplied with the CBK-NA1 (option), is attached to the USB wireless LAN module on the camcorder.

Clip Operations on the Thumbnail Screen

Thumbnail Screen



The thumbnail screen appears if you press the THUMBNAIL button in E-E or playback mode. Thumbnail screens display lists of the index pictures of clips stored on SxS memory cards as thumbnails. (A message appears if you insert a memory card that contains no clips.)
You can select any clip (page 73) on the thumbnail screen and start playback of that clip (page 73).
You can also add a clip flag to any clip on the thumbnail screen to filter clips according to the flags. You can also switch to the Essence Mark thumbnail screen from the thumbnail screen and add essence marks (for example, shot marks) to any frame in the clip.

To hide the thumbnail screen, press the THUMBNAIL button.

1. **Thumbnail (index picture)**
When a clip is recorded, its first frame is automatically displayed as the index picture. You can change the index picture to any frame (page 76).

2. **Selected media icon/media status**
A 🔒 mark is displayed if the media is protected. If two SxS memory cards are inserted in the camcorder, you can switch between them using the SLOT SELECT button.

[Note]
You cannot switch between SxS memory cards while the Essence Mark thumbnail screen is displayed.

3. **Clip number / total number of clips**

4. **Battery / Voltage status**

5. **Playback disabled indicator**

6. **Clip status**
Displays the clips status using an icon.

Icon	Meaning
S, OK, NG, KP icons	Essence mark or clip flag attached to a clip
Lock icon	Clip is locked (protected)

7. **Clip select checkbox**
Place a check mark in the checkbox to select a clip (thumbnail).

8. **Thumbnail information**
Displays thumbnail information. The displayed information varies according to the Customize View setting (page 77).

9. **Clip name / title**
Displays the name or title of the selected clip.

10. **Recording video format**

11. **Special recording information**
Displays the recording mode if the clip was recorded using a special recording mode (Slow &

Quick Motion).
For Slow & Quick Motion clips, the [Recording frame rate/Playback frame rate] are displayed on the right.

12. **Clip duration**
13. **Creation date**

Selecting Clips

To select a clip thumbnail, do one of the following to move the yellow cursor to the thumbnail that you want to select.

- Press the ⇧, ⇩, ⇦, ⇨ buttons.
- Turn the MENU knob.
- Press the PREV or NEXT button.

Selecting the First Thumbnail

Press and hold the F REV button, and press the PREV button.

Selecting the Last Thumbnail

Press and hold the F FWD button, and press the NEXT button.

Playing Clips Sequentially Starting from the Selected Clip

1 Select the thumbnail of the clip that you want to play first.

2 Press the PLAY/PAUSE button.
Playback begins from the start of the selected clip.

It plays all clips sequentially starting from the selected clip.
After the last clip has been played, the camcorder enters pause (still image) mode at the last frame of the last clip.
Press the THUMBNAIL button to return to the thumbnail screen.

[Notes]

- Not all clips may be played back sequentially if the clips on the SxS memory cards were recorded with a mixture of different recording formats.
- Clips with an playback disabled icon (page 72) displayed on the thumbnail screen are not played. The corresponding clips are skipped and sequential playback continues.
- There may be momentary picture breakup or still image display at the boundary between clips. During this time, the play controls and the THUMBNAIL button cannot be operated.
- When you select a clip in the thumbnail screen and begin playback, there may be momentary picture breakup at the start of the clip. To view the start of the clip without breakup, put the camcorder into playback mode, pause, use the PREV button to return to the start of the clip, and start play again.

Pausing Playback

Press the PLAY/PAUSE button.
The PLAY/PAUSE indicator flashes while play is paused.
Press the button again to return to play mode.

Playing at High Speed

Press the F FWD button (page 8) or the F REV button (page 7).
To return to normal playback, press the PLAY/PAUSE button.

Returning to the Start of the Current Clip

Press the PREV button.

- During playback or F FWD, this jumps to the start of the current clip and starts playback.
- During F REV or pause, this jumps to the start of the current clip and displays a still image.
- Each subsequent press of the button moves to the previous clip.

Playing from the Start of the First Clip

Simultaneously press the PREV and F REV buttons. This jumps to the start of the first clip on the SxS memory card.

Jumping to the Start of the Next Clip

Press the NEXT button.

- During playback or F FWD, this jumps to the start of the next clip and starts playback.
- During F REV or pause, this jumps to the start of the next clip and displays a still image.
- Each subsequent press of the button moves to the next clip.

Jumping to the Last Clip

Simultaneously press the F FWD and NEXT buttons. This jumps to the last frame of the last clip recorded on the SxS memory card.

Adding a Shot Mark during Playback

You can add shot marks to clips during playback by using the same method used during recording (page 47).

[Notes]

- Shot marks cannot be recorded when the SxS memory card is write protected.
- Shot marks cannot be added to the first frame of each clip or the last frame of the last clip.

Stopping Playback

Press the STOP button: Playback stops, and the camcorder enters E-E mode.
Press the THUMBNAIL button: Playback stops and the thumbnail screen (page 72) appears in the viewfinder.

Play also stops if you eject the memory card. In this case, the camera picture appears in the viewfinder.

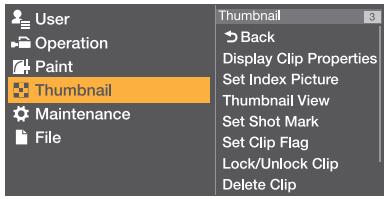
Basic Thumbnail Menu Operations

The Thumbnail menu is used to protect/delete clips, check properties, add/delete clip flags and essence marks to frames in a clip, and other tasks.

1 Press the THUMBNAIL button.
The thumbnail screen appears.

2 Set the MENU ON/OFF switch to ON, or press the MENU button.
The menu screen appears.

3 Turn the MENU knob to select [Thumbnail], then press the knob.
You can also press the ⇧ or ⇩ button to select [Thumbnail], and press the SET button.



To hide the Thumbnail menu, press the MENU button again.

To select a menu item/sub-item, do one of the following.
- Turn the MENU knob to select an item or sub-item, then press the knob.
- Press the arrow buttons (⇧, ⇩, ⇦, ⇨) to select an item or sub-item, then press the SET button.

A selection list or a clip properties screen appears (page 75) according to the selected item or sub-item.
To return to the previous screen, push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE position.

[Notes]
- When an SxS memory card is write protected, it is not possible to copy, delete, change index pictures, or add and delete clip flags marks and shot marks.
- Some items cannot be selected, depending on the state when the menu was displayed.

For details about the thumbnail screen structure, see "Thumbnail Menu" (page 77).

Protecting Clips

You can protect a specified clip or all clips to protect the clips from being deleted.
🔒 is added to the thumbnails of protected clips.
Clips can be protected on the thumbnail screen or the filtered clip thumbnail screen (page 76).

Protecting a specific clip

1 Select Thumbnail >Lock/Unlock Clip >Select Clip in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
The clip selection screen appears.

3 Turn the MENU knob to select a clip to protect, then press the knob.
A check mark is attached to the selected clip.

4 Simultaneously press the SET button and SHIFT button.
A confirmation screen appears.

5 Turn the MENU knob to select [Execute], then press the knob.
The clip is protected, and a completion message appears.

6 Press the MENU knob to dismiss the message.

Protecting all clips

1 Select Thumbnail >Lock/Unlock Clip >Lock All Clips in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.
All clips are protected, and a completion message appears.

4 Press the MENU knob to dismiss the message.

Unlocking all clips

1 Select Thumbnail >Lock/Unlock Clip >Unlock All Clips in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.
All clips are unlocked, and a completion message appears.

4 Press the MENU knob to dismiss the message.

Copying Clips

You can copy clips to another SxS memory card.
Clips are copied to destination SxS memory cards using the same names as the original clips.

[Notes]
- If a clip with the same name already exists at the copy destination SxS memory card, a one-digit number in parentheses is added to the original name.
  The number in parentheses is the smallest number that does not exist at the copy destination.
  Example:
  ABCD0002→ABCD0002(1)
  ABCD0002(1)→ABCD0002(2)
  ABCD0005(3)→ABCD0005(4)
- If the parenthetical numbers (1) to (999) already exist at the copy destination, because a clip has been copied more than 1000 times, it is not possible to copy any more clips under that name.
- A message appears if there is not enough free space on the copy destination SxS memory card. Exchange the card for one with more free space.
- When multiple clips are recorded on the source SxS memory card, it may not be possible to copy all clips even when the source and destination memory cards have the same capacity, depending on the memory characteristics and usage of the memory cards.

Copying a specific clip

1 Select Thumbnail >Copy Clip >Select Clip in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
The clip selection screen appears.

3 Turn the MENU knob to select a clip to copy, then press the knob.
A check mark is attached to the selected clip.

4 Simultaneously press the SET button and SHIFT button.
A confirmation screen appears.

5 Turn the MENU knob to select [Execute], then press the knob.
The clip is copied, and a completion message appears.

6 Press the MENU knob to dismiss the message.

Copying all clips

You can copy all clips stored on the same SxS memory card at the same time to another SxS memory card.

1 Select Thumbnail >Copy Clip >All Clips in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.
All clips are copied, and a completion message appears.

4 Press the MENU knob to dismiss the message.

Deleting Clips

You can delete clips from SxS memory cards. Clips can be deleted on the thumbnail screen or the filtered clip thumbnail screen (page 76).

1 Select Thumbnail >Delete Clip >Select Clip in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
The clip selection screen appears.

3 Turn the MENU knob to select a clip to delete, then press the knob.
A check mark is attached to the selected clip.

4 Simultaneously press the SET button and SHIFT button.
A confirmation screen appears.

5 Turn the MENU knob to select [Execute], then press the knob.
The clip is deleted, and a completion message appears.

6 Press the MENU knob to dismiss the message.

The clips below the deleted clip on the thumbnail screen move up one position.

Deleting all clips

You can delete all clips stored on the same SxS memory card at the same time.

[Notes]
- Deleted clips cannot be restored.
- If the media or clip is protected, this function is disabled.

1 Select Thumbnail >Delete Clip >All Clips in the setup menu.

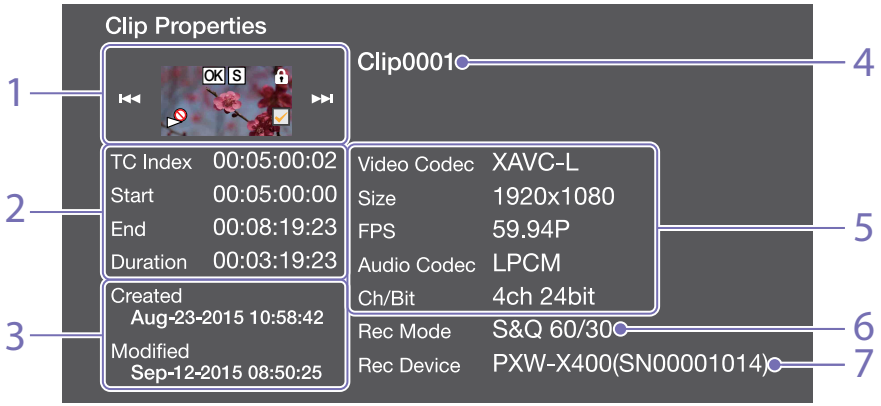
2 Turn the MENU knob to select [Execute], then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.
All clips are deleted, and a completion message appears.

4 Press the MENU knob to dismiss the message.

Displaying Clip Properties

The clip properties screen for the selected clip appears when you select Thumbnail >Display Clip Properties in the setup menu.



1. **Current clip image**
Displays the index picture and status of the selected clip.

2. **Timecode display**
TC Index: Timecode of the displayed image
Start: Timecode of the recording start point
End: Timecode of the recording end point
Duration: Duration between start and end points

3. **Creation date and modified date**

4. **Clip name**

5. **Recording format**
Video Codec: Video codec
Size: Picture size
FPS: Frame rate
Audio Codec: Audio codec
Ch/Bit: Audio recording channel/Number of bits for audio recording

6. **Special recording information**

7. **Recording device name**

To hide the clip properties screen, do one of the following.
Press the RESET/RETURN button: Returns to the Thumbnail menu screen.
Press the THUMBNAIL button: Sets the camcorder to E-E mode and displays the camera picture.
Press the PLAY/PAUSE button: Starts playback of the selected clip.

Adding Clip Flags to Clips

You can add clip flags (OK, NG or KP marks) to clips to filter the display of clips based on the clip flags. You can perform this operation on the thumbnail screen or the filtered clip thumbnail screen (page 76).

1 Select the thumbnail for the clip to which you want to add the clip flag, then select Thumbnail >Set Clip Flag in the setup menu.

2 Turn the MENU knob to select a clip flag, then press the knob.

Setting	Added clip flag
Add OK	OK
Add NG	NG
Add KEEP	KP

The clip flag is added to the thumbnail of the selected clip.

You can also use an assignable switch assigned with the clip flag function to add clip flags (page 106).

Deleting a Clip Flag

1 Select the thumbnail for the clip from which you want to delete a clip flag, then select Thumbnail >Set Clip Flag >Delete Clip Flag in the setup menu.
The clip flag is deleted.

Filtering the Clips Displayed using the Filtered Clip Screen

1 Select Thumbnail >Filter Clips in the setup menu.

2 Turn the MENU knob to select a clip flag used to filter clips, then press the knob.

Setting	Filter clip flag
OK	OK
NG	NG
KEEP	KP
None	(Clips are not filtered)

The clip screen appears showing the clips filtered by the selected clip flag. This screen is referred to as the filtered clip screen.

Adding/Deleting Essence Marks on Clips

You can add (and delete) essence marks (shot marks, recording start marks) to any frame in a clip. You add/delete essence marks on the essence mark thumbnail screen.

Adding a shot mark

1 Select Thumbnail > Thumbnail View > Essence Mark Thumbnail in the setup menu.

2 Turn the MENU knob to select [All], and then press the knob.

3 Select the thumbnail for the frame to which you want to add the essence mark on the essence mark thumbnail screen, then select Thumbnail >Set Shot Mark in the setup menu.

4 Turn the MENU knob to select one of the following, then press the knob.

Setting	Operation
Add Shot Mark1	Adds Shot Mark 1
Add Shot Mark2	Adds Shot Mark 2

The shot mark is added to the selected frame.

Deleting a shot mark

1 Select Thumbnail > Thumbnail View > Essence Mark Thumbnail in the setup menu.

2 Select the type of shot mark to delete.

3 Select the thumbnail for the frame from which you want to delete a shot mark on the essence mark thumbnail screen, then select Thumbnail >Set Shot Mark in the setup menu.

4 Turn the MENU knob to select one of the following, then press the knob.

Setting	Operation
Delete Shot Mark1	Deletes Shot Mark 1
Delete Shot Mark2	Deletes Shot Mark 2

The shot mark is deleted from the selected frame.

Filtering Clips (Frames) using the Essence Mark Thumbnail Screen

The essence mark thumbnail screen displays only those frames in a clip where an essence mark has been recorded in thumbnail view. Display the thumbnail screen, then either press the ESSENCE MARK button (page 9) or use the following procedure to display the essence mark thumbnail screen.

1 Select Thumbnail >Thumbnail View >Essence Mark Thumbnail in the setup menu.

2 Turn the MENU knob to select an essence mark used to filter frames, then press the knob.

Setting	Description
All	All frames with added essence marks
Rec Start	Frames with a recording start mark and the first frame of clips that do not have a recording start mark
Shot Mark0 to Shot Mark9	Frames with each shot mark

The essence mark thumbnail screen appears filtered by the selected essence mark.

If a clip is recorded using planning metadata that defines names for shot mark 0 to shot mark 9, the selection options in the list are displayed by the defined names.

Changing the Index Picture of a Clip

You can set the frame selected on the essence mark thumbnail screen as the index picture for the clip.
Select the thumbnail of the frame you want to set as the index picture for the clip, then select Thumbnail >Set Index Picture in the setup menu.

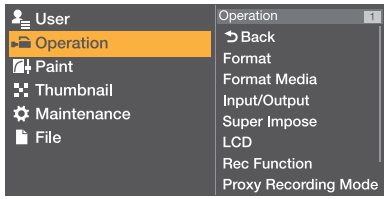
Thumbnail Menu

Default values are shown in **bold.**

Item	Sub-item setting	Description
Display Clip Properties	–	Displays clip properties (page 75).
Set Index Picture	–	Sets/changes the index picture of a clip (page 76).
Thumbnail View Changes the thumbnail screen displayed.	Essence Mark Thumbnail All/Rec Start/Shot Mark1/Shot Mark2/Shot Mark3/Shot Mark4/ Shot Mark5/Shot Mark6/Shot Mark7/Shot Mark8/Shot Mark9/ Shot Mark0	Displays the essence mark thumbnail screen with clips filtered by essence mark (page 76).
	Clip Thumbnail	Displays the thumbnail screen (clip thumbnail screen) (page 72).
Set Shot Mark Adds/deletes shot marks.	Add Shot Mark1	Adds Shot Mark 1 to a frame (page 76).
	Delete Shot Mark1	Deletes Shot Mark 1 (page 76).
	Add Shot Mark2	Adds Shot Mark 2 to a frame (page 76).
	Delete Shot Mark2	Deletes Shot Mark 2 (page 76).
Set Clip Flag Adds/deletes clip flags.	Add OK	Adds an OK flag to a clip (page 75).
	Add NG	Adds an NG flag to a clip (page 75).
	Add KEEP	Adds a KP (Keep) flag to a clip (page 75).
	Delete Clip Flag	Deletes a clip flag (page 76).
Lock/Unlock Clip Protects/unlocks a clip.	Select Clip	Selects the clip to protect (page 74).
	Lock All Clips	Protects all clips on the media (page 74).
	Unlock All Clips	Unlocks all clips on the media (page 74).
Copy Clip Copies clips.	Select Clip	Selects the clip to copy (page 74).
	All Clips	Copies all clips on the media (page 75).
Delete Clip Deletes clips.	Select Clip	Selects the clip to delete (page 75).
	All Clips	Deletes all clips on the media (page 75).
Filter Clips Filters the display of clips by clip flag.	OK	Filters the display of clips by OK flags (page 76).
	NG	Filters the display of clips by NG flags (page 76).
	KEEP	Filters the display of clips by KP (Keep) flags (page 76).
	None	Clips are not filtered (page 76).
Customize View	Thumbnail Caption Date Time/Time Code/ Duration/Sequential Number	Selects the information displayed beneath clip thumbnails. Date Time: Displays the date and time. Time Code: Displays the timecode. Duration: Displays the duration of the clip. Sequential Number: Displays a sequential number for each clip.

Setup Menu Organization

On this camcorder, settings for shooting and playback are made in the setup menu, which appears in the viewfinder.
The setup menu can also be displayed on an external video monitor (page 118).



Menu Structure

User menu
: Menu used to arrange items from the setup menu in any chosen order (page 82).

Operation menu
: Menu used to make settings related to shooting (excluding settings related to picture quality).

Paint menu
: Menu used to make settings related to picture quality.

Thumbnail menu
: Menu used to make settings related to clip thumbnails (page 77).

[Note]
The Thumbnail menu can be used only when a thumbnail screen (page 72) is displayed. It is disabled when the thumbnail screen is not displayed.

Maintenance Menu
: Menu used to make settings related to camcorder maintenance and system management.

File menu
: Menu used to make perform operations on files.

Menu Items

Operation menu

Item	Description	Page
Format	System settings	84
Format Media	Media format settings	84
Input/Output	Input/output signal settings	85
Super Impose	Superimposition settings	85
LCD	LCD monitor settings	85
Rec Function	Special recording mode settings	85
Proxy Recording Mode	Proxy data settings	86
Assignable Switch	Assign functions to assignable switches	87
VF Setting	Viewfinder settings	87
Marker	Marker settings	87
Gain Switch	Gain value settings	88
Auto Iris	Auto iris settings	88
Zebra	Zebra pattern settings	88
Display On/Off	Viewfinder display item settings	88
"!" LED	Viewfinder "!" settings	89
White Setting	White balance settings	90
Offset White	Offset white settings	90
Shutter	Shutter settings	90
Slow Shutter	Slow shutter settings	90
Time Zone	Time settings	90
Clip	Clip settings	91
Update Media	Update media management information	91
GPS	Location information (GPS) settings	91
Planning Metadata	Planning metadata settings	91

Paint menu

Item	Description	Page
Switch Status	Correction functions and test signal on/off settings	92
White	Color temperature settings	92
Black	Black level settings	92
Flare	Flare correction settings	92
Gamma	Gamma correction settings	92
Black Gamma	Black gamma correction settings	93
Knee	Knee correction settings	93
White Clip	White clip settings	93
Detail(HD)	Detail settings	94
Detail(SD)	Detail settings	94
Aperture	Aperture correction settings	94
Skin Detail	Skin detail correction settings	94
Matrix	Matrix correction settings	94
Multi Matrix	Multi matrix correction settings	95
V Modulation	V modulation shading correction settings	95
Low Key Saturation	Low key saturation correction settings	95
Saturation Mode	Saturation correction settings	95
Noise Suppression	Noise suppression settings	96

Maintenance menu

Item	Description	Page
White Shading	White shading correction settings	96
Black Shading	Black shading correction settings	96
Battery	Battery settings	97
DC Voltage Alarm	External DC source voltage alarm settings	97
Audio	Audio settings	97
WRR Setting	Wireless tuner settings	98
Timecode	Timecode settings	99
Essence Mark	Essence mark settings	99
Camera Config	Camcorder operation settings	99
Preset White	Preset white settings	100
White Filter	Filter settings	100
DCC Adjust	DCC settings	100
Flicker Reduce	Flicker correction settings	101
Genlock	Genlock settings	101
Auto Shading	Auto black shading correction settings	101
APR	APR settings	101
Basic Authentication	Basic authentication settings	101
Network	Network connection settings	101
Network Client Mode	Network client mode settings	102
File Transfer	Wi-Fi transfer settings	102
Streaming	Streaming settings	102
Clock Set	Internal clock settings	103
Language	Display language settings	103
Hours Meter	Digital time counter settings	103
Network Reset	Network reset	103
Fan Control	Fan control settings	103
VF Display Setting	Viewfinder display settings	103
Version	Version settings	103

File menu

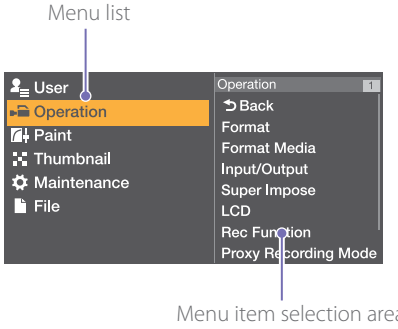
Item	Description	Page
User File	User file settings	104
All File	ALL file settings	104
Scene File	Scene file settings	104
Reference File	Reference file settings	104
Lens File	Lens file settings	105
User Gamma	Gamma file settings	105

Basic Setup Menu Operations

Displaying the Setup Menu

Set the MENU ON/OFF switch to ON, or press the MENU button.
The camcorder enters menu mode and the menu list appears on the screen.

The following example shows the cursor positioned at the Operation menu



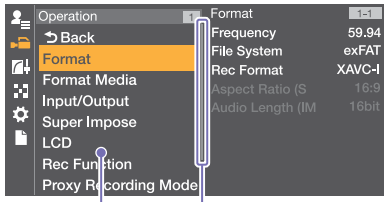
[Note]
The setup menu cannot be used when the camcorder is in focus magnification mode. Exit focus magnification mode by pressing the assignable switch to which the Focus Mag function has been assigned.

Making Menu Settings

1 Turn the MENU knob, or press the ⇧ or ⇩ button, to move the cursor to the desired menu.
A list of selectable menu items appears in the menu item selection area to the right of the menu list.

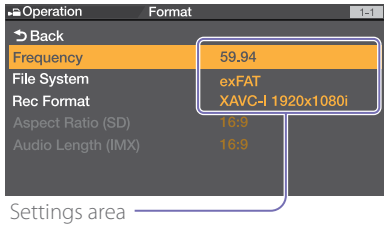
2 Press the MENU knob or the SET button.
The menu item selection screen appears.
You can also display the menu item selection screen by pressing the ⇨ button.

- The menu item selection area displays a maximum of seven lines. You can scroll through menus with more than seven lines by moving the cursor up and down.



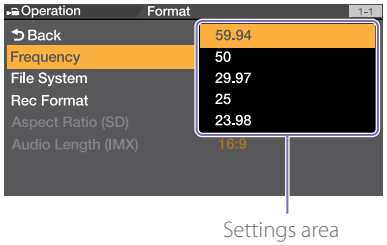
- If the selected item has sub-items, they appear on the right.
- If there are no sub-items, the current setting appears on the right.
- Select [Back] to return to the previous level.

3 Turn the MENU knob, or press the ⇧ or ⇩ button, to move the cursor to the menu item that you want to set, and then confirm by pressing the MENU knob or the SET button.
The sub-items area appears to the right of the menu item selection area, and the cursor moves to the first sub-item.



- Displays sub-items and their current settings
- To return to the previous level, select [Back], press the ⇦ button, or push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE position.

4 Turn the MENU knob, or press the ⇧ or ⇩ button, to move the cursor to the sub-item that you want to set, and then confirm by pressing the MENU knob or the SET button.
The settings of the selected sub-item appear, and the cursor moves to the currently selected value.



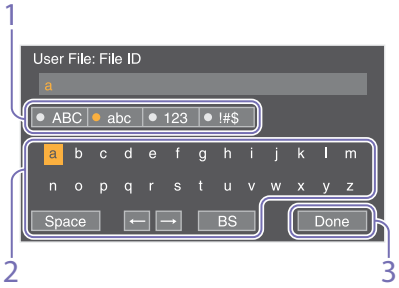
- The settings area displays a maximum of nine lines. You can scroll through menus with more than nine sub-items by moving the cursor up and down.
- For sub-items with a large settings range (for example, –99 to +99), the settings area is not displayed. The current setting is highlighted to indicate that the value can be changed.

5 Turn the MENU knob, or press the ⇧ or ⇩ button, to select the value to set, and then confirm by pressing the MENU knob or the SET button.
The setting is changed, and the display is updated to show the new setting.
If you select [Execute] for an executable item, the corresponding function is executed.

If an item requires confirmation before execution, selecting the item in step 3 hides the menu and a confirmation message appears. Follow the instructions in the message to execute or cancel the operation.

Entering Text

When you select an item, such as a file name, which requires character entry, the character entry screen appears.



1 Press the MENU knob to select the type of character to enter, then press the MENU knob or SET button.
ABC: Uppercase alphabetic characters
abc: Lowercase alphabetic characters
123: Numeric characters
!#$: Special characters

2 Select a character from the selected character type, then press the knob.
The cursor moves to the next field.
Space: Enters a space character at the cursor position.
←/→: Moves the position of the cursor.
BS: Deletes the character on the left of the cursor (backspace).

3 When finished, select [Done] and press the dial.
The character string is confirmed and the character entry screen disappears.

Canceling Changes to Settings

1 Push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE position.

Exiting the Menu

1 Set the MENU ON/OFF switch to OFF or press the MENU button.
The normal camera picture reappears.

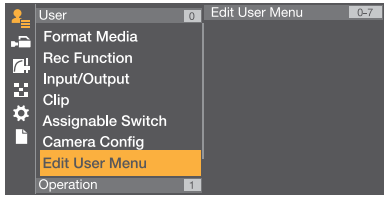
Editing the User Menu

You can edit the User menu, such as adding items, deleting items, and rearranging items, to make the User menu more useful using Edit User Menu.
You can select any item in the Operation menu, Paint menu, or Maintenance menu and add it to the User menu.
Up to 20 items can be registered in the User menu. There are six items registered in the User menu by factory default, one of which must always be present, allowing you to add up to 19 new items.

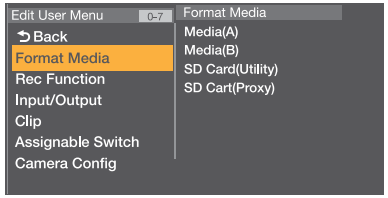
Displaying the Edit User Menu Screen

You edit the User menu on the Edit User Menu screen.

1 Turn the MENU knob to select User >Edit User Menu, then press the knob.



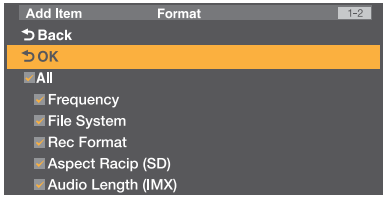
The Edit User Menu screen appears.



Adding Items and Sub-Items

1 Turn the MENU knob to select Edit User Menu >Add Item, then press the knob.
The items that can be added are displayed.

2 Turn the MENU knob to select an item, then press the knob.
A screen for selecting sub-items to add appears.



3 Turn the MENU knob to select a sub-item, then press the knob.
Place a check mark in the All checkbox to add all sub-items.
Place a check mark in the individual checkboxes to specify which sub-items to add.

4 Turn the MENU knob to select [OK], then press the knob.
The item/sub-item(s) are added.

[Note]
The same item or sub-item cannot be registered twice. Also, the name of the item or sub-item cannot be changed.

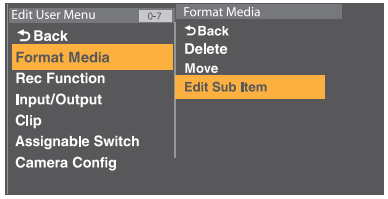
Editing Sub-Items

You can specify the sub-items to display.

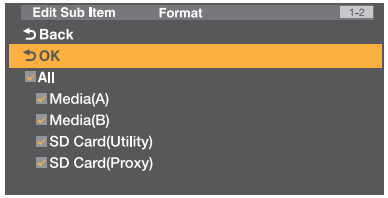
1 Display the Edit User Menu screen.

2 Turn the MENU knob to select an item to edit, then press the knob.
The edit function list appears.

3 Turn the MENU knob to select Edit Sub Item in the edit function list, then press the knob.



The Edit Sub Item screen appears.



All sub-items are checked when the screen is first opened (function to display all sub-items). Remove the check marks for the sub-items you do not want to display in the User menu.

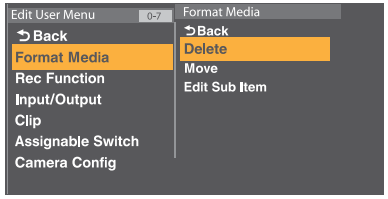
4 Turn the MENU knob to select [OK], then press the knob.
Editing is completed.

Deleting Items

1 Display the Edit User Menu screen.

2 Turn the MENU knob to select an item to edit, then press the knob.
The edit function list appears.

3 Turn the MENU knob to select Delete in the edit function list, then press the knob.



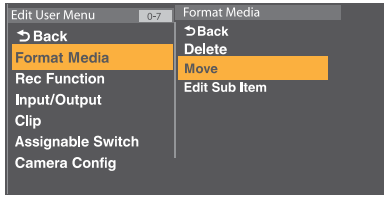
The item is deleted.

Moving Items

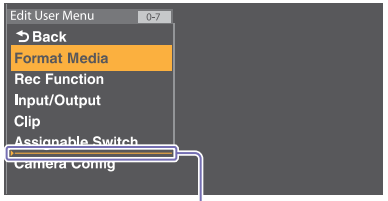
1 Display the Edit User Menu screen.

2 Turn the MENU knob to select an item to move, then press the knob.
The edit function list appears.

3 Turn the MENU knob to select Move in the edit function list, then press the knob.

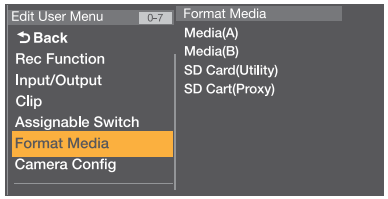


The item to move is highlighted, and a triangle mark and line indicate the destination position.



Triangle mark and line indicating move destination

4 Turn the MENU knob to move the triangle and line to the desired destination, then press the knob.
The item is moved.



Restoring the User Menu to Factory Default State

1 Turn the MENU knob to select Edit User Menu >Customize Reset, then press the knob.
The Customize Reset screen appears.

2 Turn the MENU knob to select [Reset], then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.
The User menu is restored to the factory default state.

Menu List

User Menu (Factory Default Configuration)

The User menu consists of the following items when it is in the factory default state.

- Format Media (page 84)
- Rec Function (page 85)
- Input/Output (page 85)
- Clip (page 91)
- Assignable Switch [1] (page 87)
- Camera Config [2] (page 99)

1) Excluding sub-item 0
2) Contains only User Menu Only as sub-item

For details about editing the User menu, see "Editing the User Menu" (page 82).

Operation Menu

Default values are shown in **bold**.

Operation >Format
Sets the system frequency, recording mode, recording format, and recording aspect ratio.

Item	Setting	Description
Frequency	**59.94**/50/29.97/25/23.98	Selects the system frequency (execute by selecting Execute).
File System	**exFAT**/UDF	Switches the recording mode between exFAT and UDF (execute by selecting Execute) [Note] UDF support is planned for a future release.

Operation >Format
Sets the system frequency, recording mode, recording format, and recording aspect ratio.

Item	Setting	Description
Rec Format	Settings vary according to the system frequency setting.	Selects the recording format (execute by selecting Execute).
	XAVC-I 1080i XAVC-I 720P XAVC-L 50 1080P XAVC-L 50 1080i XAVC-L 50 720P XAVC-L 35 1080P XAVC-L 35 1080i XAVC-L 25 1080i HD422 50 1080i HD422 50 720P HQ 1920×1080i HQ 1440×1080i HQ 1280×720P MPEG IMX 50 DVCAM	When the system frequency is 59.94 or 50.
	XAVC-I 1080P XAVC-L 50 1080P XAVC-L 35 1080P HD422 50 1080P HD422 50 720P HQ 1920×1080P	When the system frequency is 29.97, 25, or 23.98
Aspect Ratio (SD)	**16:9**/4:3	Selects the SD mode aspect ratio.
Audio Length	24bit/**16bit**	Selects the audio bit rate for recording in IMX format.

Operation >Format Media
Formats the media.

Item	Setting	Description
Media (A)	Execute/Cancel	Initializes the SxS memory card in slot A (execute by selecting Execute).
Media (B)	Execute/Cancel	Initializes the SxS memory card in slot B (execute by selecting Execute).
SD Card(Utility)	Execute/Cancel	Initializes the SD card in the UTILITY SD card slot (execute by selecting Execute).
SD Card(Proxy)	Execute/Cancel	Initializes the SD card in the PROXY SD card slot (execute by selecting Execute).

Operation >Input/Output
Sets input/output signals.

Item	Setting	Description
Output Format	Settings vary according to the system frequency setting.	Selects the input format (execute by selecting Execute). Settings vary according to the recording format setting (page 84).
Source Select	Camera/External	Selects the camera picture (Camera) or SDI IN connector input signal for the video input source.
SDI Out1 Output	On/Off	Turns the output signal from the SDI OUT1 connector on/off.
SDI Out2 Output	On/Off	Turns the output signal from the SDI OUT2 connector on/off.
HDMI Output	On/Off	Turns the output signal from the HDMI connector on/off.
SDI Out2/HDMI Super	Off/On	Turns character information (superimposed) from the SDI OUT2 connector on/off.
Video Out Super	Off/On	Turns character information (superimposed) from the VIDEO OUT connector on/off.
Down Converter	Edge Crop/Letter Box/Squeeze	Selects the signal conversion mode for output of SD signals. Edge Crop: Crops the edges of the 16:9 picture for output as a 4:3 picture. Letter Box: Masks the top and bottom of the 4:3 picture and displays a 16:9 picture in the center of the screen. Squeeze: Squeezes the 16:9 picture horizontally for output as a 4:3 picture.
Wide ID	Through/Auto	Selects whether to add a wide ID signal to the SD output signal. Through: Outputs without adding a wide ID signal. Auto: Adds and outputs a wide ID signal to the video signal when the wide ID signal is set to Squeeze.
Wide Mode(Ext)	Auto/16:9	When the input signal is SD, sets the method that determines wide screen information. Auto: Records with 16:9 aspect ratio when the wide screen information of the input signal is Squeeze. Otherwise, records with 4:3 aspect ratio. 16:9: Records with 16:9 aspect ratio.

Operation >Super Impose
Sets character information/markers to be superimposed.

Item	Setting	Description
Super(VF Display)	On/Off	When Input/Output >SDI Out2/HDMI Super or Input/Output >Video Out Super is set to On, this turns superimposition of character information on the output from the SDI OUT connector or VIDEO OUT connector, respectively.
Super(Menu)	On/Off	
Super(Marker)	On/Off	When Input/Output >SDI Out2/HDMI Super or Input/Output >Video Out Super is set to On, this turns superimposition of markers on the output from the SDI OUT connector or VIDEO OUT connector on/off, respectively.

Operation >LCD
Sets the LCD monitor.

Item	Setting	Description
LCD Color	–99 to ±0 to +99	Adjusts the color depth of the LCD monitor.
LCD Marker&Zebra	On/Off	Turns the marker and zebra pattern display on the LCD monitor on/off.

Operation >Rec Function
Sets the special recording mode.

Item	Setting	Description
Slow & Quick Motion	On/Off	Turns Slow & Quick Motion on/off. (When set to On, the settings for other special recording modes are set to Off.)

Operation >Rec Function
Sets the special recording mode.

Item	Setting	Description
Frame Rate	Settings vary according to the recording format setting.	When Slow & Quick Motion is On, selects the frame rate for Slow & Quick Motion shooting.
	1 to 60	When the recording mode is exFAT, and the recording format is XAVC Intra or XAVC Long.
	1 to 50	When the recording mode is UDF, and the recording format is MPEG2 HD 422 50M (1280×720), 50P/25P. [Note] UDF support is planned for a future release.
	1 to 30	When the recording mode is exFAT or UDF, and the recording format is MPEG2 HD 422 50M (1920×1080), 29.97P/23.98P. [Note] UDF support is planned for a future release.
	1 to 25	When the recording mode is exFAT or UDF, and the recording format is MPEG2 HD 422 50M (1920×1080), 25P. [Note] UDF support is planned for a future release.
Clip Continuous Rec	On/Off	Turns Clip Continuous Rec mode on/off. (When set to On, the settings for other special recording modes are set to Off.)
Picture Cache Rec	On/Off	Turns picture cache recording mode on/off. (When set to On, the settings for other special recording modes are set to Off.)
Cache Rec Time	Settings vary according to the recording format setting.	Sets the picture cache recording time, when Picture Cache Rec is set to On.
	0 to 2/2 to 4/4 to 6/6 to 8sec	When the recording format is AVC-I.
	0 to 2/2 to 4/4 to 6/6 to 8/ 8 to 10/10 to 12/12 to 14/ 13 to 15sec	When the recording format is XAVC-L, MPEG2 HD 422, MPEG2 HD 420, or MPEG IMX 50.
Interval Rec	On/Off	Turns Interval Rec mode on/off. (When set to On, the settings for other special recording modes are set to Off.)

Operation >Rec Function
Sets the special recording mode.

Item	Setting	Description
Number of Frames	The available settings vary depending on the Format >Frequency setting.	When Interval Rec is set to On, this sets the number of frames to shoot in one Interval Rec take.
	2frames/6frames/12frames	When the recording format frame rate is 50P or 59.94P.
	1frame/3frames/6frames/ 9frames	When the recording format frame rate is 23.98P, 25P, 29.97P, 50i, or 59.94i.
Interval Time	1/2/3/4/5/6/7/8/9/10/15/20/30/ 40/50 (sec) 1/2/3/4/5/6/7/8/9/10/15/20/30/ 40/50/ (min) 1/2/3/4/6/12/24 (hour)	When Interval Rec is set to On, this sets the interval for Interval Rec shooting.
Pre-Lighting	Off/2sec/5sec/10sec	Sets the number of seconds that the video light is turned on prior to the start of Interval Rec shooting. To not turn the video light on, select Off.
Simul Rec	On/Off	Turns simultaneous recording to slots A and B on/ off.

Operation >Proxy Recording Mode
Sets proxy recording.

Item	Setting	Description
Setting	On/Off	Turns proxy recording on/off.
Size	1280×720(9Mbps)/ 1280×720(6Mbps)/ 640×360(3Mbps)/ 480×270(1Mbps)/ 480×270(0.5Mbps)	Selects the size of the proxy recording format.
Frame Rate	23.98fps/25fps/29.97fps/50fps/ 59.94fps	Selects the frame rate of the proxy recording format.
Bit Rate	9Mbps/6Mbps/3Mbps/1Mbps/ 0.5Mbps	Selects the bit rate of the proxy recording format.
Audio Channel	CH1/CH2/CH3/CH4	Selects the audio channel to record to proxy data.

Operation >Assignable Switch

Assigns functions to assignable switches.

For details about assigning functions, see "Assigning Functions to Assignable Switches" (page 106).

Item	Setting	Description
<0>	106	Assigns a function to the ASSIGN. 0 switch.
<1>	107	Assigns a function to the ASSIGN. 1 switch.
<2>	106	Assigns a function to the ASSIGN. 2 switch.
<3>	107	Assigns a function to the ASSIGN. 3 switch.
<4>	107	Assigns a function to the ASSIGNABLE 4 switch.
<5>	107	Assigns a function to the ASSIGNABLE 5 switch.
Lens RET	108	Assigns a function to RET button on the lens.
On Line	107	Assigns a function to the ONLINE button.
Zoom Speed	0 to 20 to 99	When Zoom has been assigned to the ASSIGNABLE 4 or 5 switch, this sets the zoom speed.

Operation >VF Setting

Sets the viewfinder screen.

Item	Setting	Description
Color	–99 to ±0 to +99	Adjusts the color depth of the viewfinder image.
Color Mode	Color/B&W	Selects the viewfinder display mode (when using CBK-VF02). Color: Color B&W: Black & white
Peaking Type	Normal/Color	Selects the type of peaking (when using CBK-VF02). Normal: Normal peaking Color: Color peaking
Peaking Frequency	Normal/High	When Peaking Type is set to Normal, this selects Normal or High peaking frequency (when using CBK-VF02).
Peaking Color	B&W/Red/Yellow/Blue	Selects the peaking color when Peaking Type is set to Color (when using CBK-VF02). B&W: Black & white Red: Red Yellow: Yellow Blue: Blue
VF Detail Level	–99 to ±0 to +99	Sets the detail level (set on the camcorder) of the viewfinder (when using HDVF-20A).

Operation >Marker

Sets the marker display in the viewfinder.

Item	Setting	Description
Setting	On/Off	Turns the display of all markers on/off. [Note] When Marker is assigned to the ASSIGN. 2 switch, this setting is disabled.
Color	White/Yellow/Cyan/Green/Magenta/Red/Blue	Selects the marker display color.
Center Marker	1/2/3/4/Off	When the center marker is displayed, selects the type. Select Off if you do not want to display the marker.
Safety Zone	On/Off	Turns the safety zone indicator on/off.
Safety Area	80%/90%/92.5%/95%	Selects the safety zone range.
Aspect Marker	Line/Mask/Off	When an aspect marker is to be displayed, selects the display method. Select Off if you do not want to display the marker. Line: Show as white lines. Mask: Displays a lower video signal level for areas outside the marker area.
Aspect Select	15:9/14:9/13:9/4:3/1.66:1/1.85:1/2.35:1/2.4:1	Selects the aspect ratio of the marker.
Aspect Mask	0% to 12% to 15%	When the Aspect Marker setting is Mask, this sets the video signal level of areas outside the marker area as a percentage value relative to the video signal level of areas inside the marker area.
Aspect Safety Zone	On/Off	Turns the aspect safety zone marker on/off.
Aspect Safety Area	80%/90%/92.5%/95%	Selects the size of the aspect safety zone marker (as a percentage of total screen size).
100% Marker	On/Off	Turns the 100% safety zone marker indicator on/off.
User Box	On/Off	Turns the box cursor display on/off.
User Box Width	40 to 500 to 999	Sets the box cursor width (distance from the center to the left and right edges).
User Box Height	70 to 500 to 999	Sets the box cursor height (distance from the center to the top and bottom edges).
User Box H Position	–479 to 0 to 479	Sets the horizontal position of the box cursor center.
User Box V Position	–464 to 0 to 464	Sets the vertical position of the box cursor center.

Operation >Gain Switch
Sets the gain value switch settings.

Item	Setting	Description
Gain<L>	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Selects the gain value for the L position of the GAIN switch.
Gain<M>	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Selects the gain value for the M position of the GAIN switch.
Gain<H>	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Selects the gain value for the H position of the GAIN switch.
Gain <Turbo>	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Selects the gain value when the Turbo Gain function is assigned to an assignable switch.
Shockless Gain	On/Off	Turns shockless gain (function that switches the gain smoothly when the gain is switched) on/off.

Operation >Auto Iris
Sets the auto iris.

Item	Setting	Description
Iris Override	On/Off	Turns iris override (setting opens or closes the iris more than normal) on/off.
Mode	Backlight/Standard/Spotlight	Selects the control mode of the auto iris. Backlight: Backlight mode (mode for reduced darkening of a subject when the subject is backlit) Standard: Standard mode (cannot be selected when using optional remote control connection) Spotlight: Spotlight mode (mode for reduced blown out highlights when subject is lit by spotlighting)
Level	–99 to ±0 to +99	Sets the convergence target level (larger values increase brightness.)
Speed	–99 to ±0 to +99	Sets the control speed (speed of response to changes in the video). (Larger values specify quicker reaction times.)
Clip High light	On/Off	Turns the function that ignores brightest areas to provide a flatter reaction to high luminance on/off.
Detect Window	1/2/3/4/5/6/Var	Selects the type of auto iris detection window. Var: Variable
Detect Window Indication	On/Off	Turns the function that displays the auto iris detection window frame using a marker on/off.

Operation >Auto Iris
Sets the auto iris.

Item	Setting	Description
Iris APL Ratio	–99 to ±0 to +99	If the Mode setting for Auto Iris is set to Standard, sets the mix ratio of peak to mean auto iris detection value.
Iris Var Width	40 to 500 to 999	Sets the width of the window when Iris Window is set to Var.
Iris Var Height	70 to 500 to 999	Sets the height of the window when Iris Window is set to Var.
Iris Var H Position	–479 to 0 to 479	Sets the horizontal position of the window when Iris Window is set to Var.
Iris Var V Position	–464 to 0 to 464	Sets the vertical position of the window when Iris Window is set to Var.

Operation >Zebra
Sets the display of zebra patterns.

Item	Setting	Description
Zebra Select	1/2/Both	Selects the zebra pattern type (Zebra 1, Zebra 2, Both).
Zebra1 Level	50% to 70% to 107%	Sets the Zebra 1 display level.
Zebra1 Aperture Level	1 to 10% to 20%	Sets the Zebra 1 aperture level.
Zebra2 Level	52% to 100% to 109%	Sets the Zebra 2 display level.

Operation >Display On/Off
Selects the items to display in the viewfinder.

Item	Setting	Description
Video Level Warning	On/Off	Turns the warnings that appear when the video level is too bright or too dark on/off.
Shutter Setting	On/Off	Turns the shutter mode and shutter speed indicators on/off.
ND Filter Position	On/Off	Turns the ND filter setting indicator on/off.
Gain Setting	On/Off	Turns the gain setting indicator on/off.
Rec/Play Status	On/Off	Turns the recording and playback indicators on/off.
Color Temp.	On/Off	Turns the color temperature indicator on/off.
Frame Rate/Interval	On/Off	Turns the special recording mode indicator on/off.

Operation >Display On/Off
Selects the items to display in the viewfinder.

Item	Setting	Description
Battery Remain	Auto/Voltage/Off	Sets the mode of the remaining battery capacity and input voltage indicators. Auto: Displays the remaining capacity, according to the battery type. Voltage: Displays the input voltage, regardless of the battery type. Off: No display.
Timecode	On/Off	Turns the display of time data (timecode, user bits, counter, duration) on/off.
Audio Level Meter	On/Off	Turns the display of the audio level meter on/off.
Media Status	On/Off	Turns the media status indicator on/off.
SD Card(Utility)	On/Off	Turns the SD card (Utility) indicator on/off.
Focus Position	Meter/Feet/Off	Turns the lens focus position indicator on/off and selects the display units.
Iris Position	On/Off	Turns the lens iris position indicator on/off.
Zoom Position	On/Off	Turns the lens zoom position indicator on/off.
Extender	On/Off	Turns the lens and digital extender indicator on/off.
ALAC	On/Off	Turns the lens aberration correction indicator on/off.
AE Mode	On/Off	Turns AE mode and the AE level setting indicator on/off.
White Balance Mode	On/Off	Turns the white balance mode indicator on/off.
CC5600K	On/Off	Turns the CC5600K indicator on/off.
Rec Format	On/Off	Turns the recording format indicator on/off.
Gamma	On/Off	Turns the selected gamma type indicator on/off.
Timecode Lock	On/Off	Turns the timecode indicator on/off.
Network Condition	On/Off	Turns the network connection status indicator on/off.
Proxy Status	On/Off	Turns the proxy status indicator on/off.
NW Client Mode Status	On/Off	Turns the network client mode indicator on/off.
Streaming Status	On/Off	Turns streaming transmission on/off.
GPS	On/Off	Turns the GPS reception status indicator on/off.

Operation >Display On/Off
Selects the items to display in the viewfinder.

Item	Setting	Description
Video Signal Monitor	Off/Waveform/Vector/Histogram	Selects whether to display the video signal, and the type of video signal to display. [Note] Not displayed in the following circumstances. When Operation >Input/Output >SDI Out1 Select and SDI Out2 Select in the setup menu are both set to Off. When Operation >Input/Output >Output Format in the setup menu is set to 720×480P or 720×576P.
Clip Name	On/Off	Turns the clip name display on/off.
Focus Assist Indicator	On/Off	Turns the focus assist indicator on/off.
Focus Area Marker	On/Off	Turns the focus area marker indicator on/off.
Lens Info	Meter/Feet/Off	Selects whether to display depth of field and the units to display.
WRR RF Level	On/Off	Turns the wireless tuner reception status indicator on/off.
Clip Number	On/Off	Turns the clip information display on/off.

Operation >"!"LED
Sets the "!" indicator in the viewfinder. (Enabled when using HDVF-20A).

Item	Setting	Description
Gain <!>	On/Off	Turns the function to light the ! indicator, when the gain is set to other than 0 dB, on/off.
Shutter <!>	On/Off	Turns the function to light the ! indicator, when the SHUTTER switch is set to ON, on/off.
White Preset <!>	On/Off	Turns the function to light the ! indicator, when the WHITE BAL switch is set to PRST, on/off.
ATW Run <!>	On/Off	Turns the function to light the ! indicator, when ATW is used, on/off.
Extender <!>	On/Off	Turns the function to light the ! indicator on/off, when the digital extender function or lens extender, is used.
Filter <!>	On/Off	Turns the function to light the ! indicator, when the ND filter is set to other than 1, on/off.
Iris Override <!>	On/Off	Turns the function to light the ! indicator, when the auto iris override is not set to Standard, on/off.

Operation >White Setting
Makes settings related to white balance adjustment.

Item	Setting	Description
White Switch<B>	Memory/ATW	Sets the operating mode selected by the B position of the WHITE BAL switch. Memory: Auto white balance ATW: Auto tracing white balance
Shockless White	Off/1/2/3	Selects the transition time when the WHITE BAL switch setting is changed (1 is fastest).
ATW Speed	1/2/3/4/5	Selects the ATW (auto tracing white) transition speed (1 is fastest).
AWB Fixed Area	On/Off	Runs AWB (auto white balance) for the center of the screen.
Filter White Memory	On/Off	Sets the white balance memory area for each FILTER knob position number when White Balance is set to Preset or ATW. • When Electrical CC is assigned to an assignable switch, this sets independent white balance memory areas for Electrical CC A, B, C, and D settings. • When Electrical CC is not assigned to an assignable switch, this sets white balance memory areas for each FILTER knob position number.

Operation >Offset White
Makes settings related to white balance offset values.

Item	Setting	Description
Offset White<A>	On/Off	Selects whether to add (On) or not to add (Off) an offset value to the white balance in memory A.
Warm Cool <A>	Approximate color temperature display (Approx. 1600K to 3200K to 16000K)	When Offset White<A> is set to On, this specifies the offset (as a color temperature) to add to the white balance in memory A. (Note that the error increases for higher offset color temperatures. Adjust while viewing the actual image.)
Warm Cool Balance<A>	–99 to ±0 to +99	Specifies a more precise color temperature, for use when a satisfactory image cannot be obtained with the Warm Cool <A> setting.
Offset White <B>	On/Off	When this is set to On, the offset adjusted here is added to the white balance of channel B.

Operation >Offset White
Makes settings related to white balance offset values.

Item	Setting	Description
Warm Cool <B>	Approximate color temperature display (Approx. 1600K to 3200K to 16000K)	When Offset White<B> is set to On, this specifies the offset (as a color temperature) to add to the white balance in memory A. (Note that the error increases for higher offset color temperatures. Adjust while viewing the actual image.)
Warm Cool Balance<B>	–99 to ±0 to +99	Specifies a more precise color temperature, for use when a satisfactory image cannot be obtained with the Warm Cool <B> setting.

Operation >Shutter
Sets the shutter operating mode.

Item	Setting	Description
Mode	Speed/Angle	Selects the operating mode of the electronic shutter. Speed: Sets the shutter speed as a time (units: seconds). Angle: Sets the shutter speed as an angle (units: degrees).

Operation >Slow Shutter
Sets the slow shutter.

Item	Setting	Description
Setting	On/Off	Turns the slow shutter function on/off.
Number of Frames	2/3/4/5/6/7/8/16	Sets the number of accumulated frames for the slow shutter function.

Operation >Time Zone
Sets the time zone.

Item	Setting	Description
Time Zone	UTC +14:00 to UTC Greenwich to UTC –12:00 Kwajalein	Selects the difference in time from UTC (Greenwich Mean Time) in units of 30 minutes.

Operation >Clip

Makes settings relating to clip names and management.

[Note]
Do not assign clip names that begin with the "." (period) symbol. Clips with names in which the first character is "." cannot be viewed in the application software on a computer.

Item	Setting	Description
Clip Naming	Title/Plan	Selects the clip naming format. Title: Name specified by Title Prefix. Plan: Name specified in planning metadata (if no name is specified in planning metadata, the name specified by Title Prefix is used.)
Title Prefix	Text input	Sets the title part (4 to 46 alphanumeric characters) of clip titles using a character string entry screen (page 80).
Number Set	Settings vary according to the Clip Naming setting.	Sets the numeric portion of the clip name. When Clip Naming is set to Title: 0001 to 9999 When Clip Naming is set to Plan and a planning metadata file is loaded: 00001 to 99999

Operation >Update Media

Updates the media's management file.

Item	Setting	Description
Media (A)	Execute/Cancel	Updates the management information of the SxS memory card in slot A (execute by selecting Execute).
Media (B)	Execute/Cancel	Updates the management information of the SxS memory card in slot B (execute by selecting Execute).

Operation >GPS

Turns location information (GPS) on/off.

Item	Setting	Description
GPS	On/Off	Turns the GPS function on/off.

Operation >Planning Metadata

Makes settings relating to planning metadata operations.

Item	Setting	Description
Load Media (A)	Execute/Cancel	Loads planning metadata from the SxS memory card in slot A. Execute to display a list of planning metadata files stored on the SxS memory card in slot A. Select a file to display the properties screen.

Operation >Planning Metadata

Makes settings relating to planning metadata operations.

Item	Setting	Description
Load Media (B)	Execute/Cancel	Loads planning metadata from the SxS memory card in slot B. Execute to display a list of planning metadata files stored on the SxS memory card in slot B. Select a file to display the properties screen.
Properties	Execute/Cancel	Displays the planning metadata content loaded in the camcorder (execute by selecting Execute).
Clear Memory	Execute/Cancel	Clears the planning metadata loaded in the camcorder (execute by selecting Execute).
Clip Name Disp	Title1(ASCII)/Title2(UTF-8)	Selects the display format if the clip name is specified in planning metadata (page 52).

Paint Menu

Default values are shown in **bold**.

Paint >Switch Status
Turns various correction functions and the test signal on/off.

Item	Setting	Description
Gamma	**On**/Off	Turns the gamma function on/off.
Black Gamma	On/**Off**	Turns the black gamma function on/off.
Matrix	On/**Off**	Turns the matrix function on/off.
Knee	**On**/Off	Turns the knee function on/off.
White Clip	**On**/Off	Turns the white clip function on/off. [Note] If set to Off, it is reset to On when power is next turned on.
Detail	**On**/Off	Turns the detail function on/off.
Aperture	**On**/Off	Turns the aperture function on/off.
Flare	**On**/Off	Turns the flare correction function on/off.
Test Saw	On/**Off**	Turns the test signal on/off.

Paint >White
Sets the color temperature, and adjusts white balance manually.

Item	Setting	Description
Color Temp <A>	1500K to **3200K** to 50000K	Displays the white balance color temperature saved in memory A.
Color Temp Balance <A>	–99 to **±0** to +99	Sets the white balance gain value saved in memory A (linked to R gain and B gain).
R Gain<A>	–99 to **±0** to +99	Sets the white balance R gain value saved in memory A.
B Gain<A>	–99 to **±0** to +99	Sets the white balance B gain value saved in memory A.
Color Temp <B>	1500K to **3200K** to 50000K	Displays the white balance color temperature saved in memory B.
Color Temp Balance <B>	–99 to **±0** to +99	Sets the white balance gain values saved in memory B (linked R gain and B gain).
R Gain <B>	–99 to **±0** to +99	Sets the white balance R gain value saved in memory B.
B Gain <B>	–99 to **±0** to +99	Sets the white balance B gain value saved in memory B.

Paint >Black
Sets the black level (image level without lighting).
You can achieve a desired look by adjusting the black level for deeper or shallower blacks.

Item	Setting	Description
Master Black	–99 to **±0** to +99	Sets the master black level.
R Black	–99 to **±0** to +99	Sets the R black level.
B Black	–99 to **±0** to +99	Sets the B black level.

Paint >Flare
Makes settings related to flare correction.
Flare is a phenomenon where the video level increases across the entire image due to the effects of bright regions in the image, increasing the brightness of darker regions and reducing contrast. It is caused by reflected light inside the lens.

Item	Setting	Description
Setting	**On**/Off	Turns the flare correction function on/off.
Master Flare	–99 to **±0** to +99	Sets the master flare correction level.
R Flare	–99 to **±0** to +99	Sets the R flare correction level.
G Flare	–99 to **±0** to +99	Sets the G flare correction level.
B Flare	–99 to **±0** to +99	Sets the B flare correction level.

Paint >Gamma
Makes settings related to gamma correction.
Gamma correction allows you to adjust the contrast of the image to significantly alter the impression of an image.

Item	Setting	Description
Setting	**On**/Off	Turns the gamma correction function on/off.
Step Gamma	0.35 to **0.45** to 0.90 (0.05 steps)	Sets a gamma correction value in 0.05 steps.
Master Gamma	–99 to **±0** to +99	Sets the master gamma level.
R Gamma	–99 to **±0** to +99	Sets the R gamma level.
G Gamma	–99 to **±0** to +99	Sets the G gamma level.
B Gamma	–99 to **±0** to +99	Sets the B gamma level.
Gamma Category	**STD**/HG/User	Selects the gamma category. STD: Standard gamma curve for video signals HG: Gamma curve that imitates gradation and color reproduction of shooting with film User: User-defined gamma curve created using CvpFileEditorTM V4.2

Paint >Gamma

Makes settings related to gamma correction.
Gamma correction allows you to adjust the contrast of the image to significantly alter the impression of an image.

Item	Setting	Description
Gamma Select	Settings vary according to the Gamma Category setting.	Selects the gamma table used for gamma correction. When Gamma Category is STD STD1 DVW: DVW camcorder equivalent STD2 x4.5: ×4.5 gain STD3 x3.5: ×3.5 gain STD4 240M: SMPTE-240M equivalent STD5 R709: ITU-R709 equivalent (default setting) STD6 x5.0: ×5.0 gain When Gamma Category is HG HG1 3250G36: Compresses 325% video input to 100% video output. HG2 4600G30: Compresses 460% video input to 100% video output. HG3 3259G40: Compresses 325% video input to 109% video output. HG4 4609G33: Compresses 460% video input to 109% video output (default setting). When Gamma Category is User User 1: Gamma table registered in User1 (default setting) User 2: Gamma table registered in User2 User 3: Gamma table registered in User3 User 4: Gamma table registered in User4 User 5: Gamma table registered in User5

Paint >Black Gamma

Makes settings related to black gamma correction.
Black gamma correction allows you to reproduce gradations and colors in black or near-black (dark) parts of the picture.

Item	Setting	Description
Setting	On/Off	Turns the black gamma correction function on/off. [Note] To enable the black gamma function, set Saturation Mode to Low Key.

Paint >Black Gamma

Makes settings related to black gamma correction.
Black gamma correction allows you to reproduce gradations and colors in black or near-black (dark) parts of the picture.

Item	Setting	Description
Range	Low/L.Mid/H.Mid	Selects the effective range of the black gamma correction. Low: 0 to 3.6% L.Mid: 0 to 7.2% H.Mid: 0 to 14.4%
Master Black Gamma	–99 to ±0 to +99	Sets the master black gamma level.

Paint >Knee

Makes settings related to knee correction.
Knee correction is processing that prevents blown out highlights by compressing the bright parts of the image in response to the upper limit for the dynamic range of the recorded/output image. The signal level where knee processing begins is called the "knee point," and the slope of knee compression is called the "knee slope."

Item	Setting	Description
Setting	On/Off	Turns the knee correction function on/off.
Point	75% to 95% to 109%	Sets the knee point when the DCC function is off.
Slope	–99 to ±0 to +99	Sets the knee slope when the DCC function is off.
Knee Saturation	On/Off	Turns the knee saturation function on/off. [Note] To enable the knee saturation function, set Saturation Mode to Knee.
Knee Saturation Level	–99 to ±0 to +99	Sets the knee saturation level.

Paint >White Clip

Makes settings related to white clip adjustment.
White clip processing limits the maximum level of video output signals. The maximum video output signal value is called the "white clip level."

Item	Setting	Description
Setting	On/Off	Turns the white clip adjustment function on/off.
Level	90.0% to 109.0% The default setting varies according to the system frequency setting.	Sets the white clip level. The default setting is 108.0% when the system frequency is 59.94, 29.97, 24, or 23.98. The setting is 105.0% when the system frequency is 50.25.

Paint >Detail(HD)/Detail(SD)

Makes settings related to detail adjustments in HD mode and SD mode.
Detail adjustment processing improves the clarity of images by adding a detail signal to the outline of the subject.

Item	Setting	Description
Setting	On/Off	Turns the detail adjustment function on/off.
Level	–99 to ±0 to +99	Sets the detail level.
H/V Ratio	–99 to ±0 to +99	Sets the mix ratio between the H detail level and the V detail level.
Crispening	–99 to ±0 to +99	Sets the crispening level.
Level Depend	On/Off	Turns the level dependence adjustment function on/off.
Level Depend Level	–99 to ±0 to +99	Sets the level dependence level.
Frequency	–99 to ±0 to +99	Sets the center frequency of the H detail signal (larger values give finer detail).
Knee Aperture	On/Off	Turns the knee aperture correction function on/off.
Knee Aperture Level	–99 to ±0 to +99	Sets the knee aperture level.
Limit	–99 to ±0 to +99	Sets the detail limiter for both the white-side and black-side directions.
White Limit	–99 to ±0 to +99	Sets the white-side detail limiter.
Black Limit	–99 to ±0 to +99	Sets the black-side detail limiter.
V Black Limit	–99 to ±0 to +99	Sets the black-side V detail limiter.
V Detail Creation	NAM/Y/G/G+R	Selects the source signal used to generate the V detail signal. NAM: V detail signal created from the R signal, V detail signal created from the G signal, or V detail signal created from the B signal, whichever signal has the highest level Y: Y signal G: G signal G+R: Mixed signal comprising the G signal and R signal in a 1:1 ratio
Cross Color Suppress (SD mode)	–99 to ±0 to +99	Sets the cross color suppression level of the detail. [Note] This setting is disabled if the detail adjustment function is Off, and when Operation Format Frequency in the setup menu is set to 50 or 25.

Paint >Aperture

Makes settings related to aperture correction.
Aperture correction processing improves resolution by adding high-frequency aperture signals to the video signal, which corrects deterioration due to high-frequency characteristics.

Item	Setting	Description
Setting	On/Off	Turns the aperture correction function on/off.
Level	–99 to ±0 to +99	Sets the aperture level.

Paint >Skin Detail

Makes settings related to skin detail correction.
Skin detail correction processing increases or decreases the detail level of a specified color range, for the purpose of obtaining attractive reproduction of skin tones.

Item	Setting	Description
Setting	On/Off	Turns the skin detail correction function on/off.
Area Detection	Execute/Cancel	Displays a color detection screen for detecting colors for skin detail correction (execute by selecting Execute).
Area Indication	On/Off	Turns the display of a zebra pattern in areas targeted for skin detail correction on/off.
Level	–99 to ±0 to +99	Sets the skin detail level.
Saturation	–99 to ±0 to +99	Sets the saturation of the color targeted for skin detail correction.
Hue	0 to 359	Sets the hue of the color targeted for skin detail correction.
Width	0 to 40 to 90	Sets the range for the hue of the color targeted for skin detail correction.

Paint >Matrix

Makes settings related to matrix correction.
Adjusts the hue and vividness of the image using matrix correction.
You can select a matrix to achieve a specific purpose using “Adaptive Matrix” to control the effect of a linear matrix or “Preset Matrix” for a predefined parameter set. You can also set user-defined parameters as a “User Matrix.”

Item	Setting	Description
Setting	On/Off	Turns the matrix correction function on/off.
Adaptive Matrix	On/Off	Turns the adaptive matrix function on/off.
Preset Matrix	On/Off	Turns the preset matrix function on/off.

Paint >Matrix

Makes settings related to matrix correction.
Adjusts the hue and vividness of the image using matrix correction.
You can select a matrix to achieve a specific purpose using "Adaptive Matrix" to control the effect of a linear matrix or "Preset Matrix" for a predefined parameter set. You can also set user-defined parameters as a "User Matrix."

Item	Setting	Description
Preset Select	1: SMPTE240M 2: ITU-709 3: SMPTE Wide 4: NTSC 5: EBU 6: PAL	Selects a preset matrix. 1: SMPTE240M: SMPTE-240M equivalent 2: ITU-709: ITU-709 equivalent 3: SMPTE Wide: SMPTE WIDE equivalent 4: NTSC: NTSC equivalent 5: EBU: EBU equivalent 6: PAL: PAL equivalent
User Matrix	On/Off	Turns the user matrix correction function on/off.
Level	–99 to ±0 to +99	Sets the saturation of the color of the entire image.
Phase	–99 to ±0 to +99	Sets the color tone (phase) of the entire image.
User Matrix R-G	–99 to ±0 to +99	Sets a user-defined R-G user matrix.
User Matrix R-B	–99 to ±0 to +99	Sets a user-defined R-B user matrix.
User Matrix G-R	–99 to ±0 to +99	Sets a user-defined G-R user matrix.
User Matrix G-B	–99 to ±0 to +99	Sets a user-defined G-B user matrix.
User Matrix B-R	–99 to ±0 to +99	Sets a user-defined B-R user matrix.
User Matrix B-G	–99 to ±0 to +99	Sets a user-defined B-G user matrix.

Paint >Multi Matrix

Makes settings related to multi matrix correction.
Multi-matrix correction sets the saturation using a 16-axis hue space.

Item	Setting	Description
Setting	On/Off	Turns the multi matrix correction function on/off.
Area Indication	On/Off	Turns the display of a zebra pattern in the color area targeted for multi matrix correction on/off.
Color Detection	Execute/Cancel	Displays a color detection screen for detecting colors for multi matrix correction (execute by selecting Execute).
Reset	Execute/Cancel	Sets all hue and saturation on each axis to default values (execute by selecting Execute).
Axis	B/B+/MG–/MG/MG+/R/R+/YL–/YL/YL+/G–/G/G+/CY/CY+/B–	Sets the color targeted for multi matrix correction (16-axis mode)
Hue	–99 to ±0 to +99	Sets the hue of the color targeted for multi matrix correction for each 16-axis mode.

Paint >Multi Matrix

Makes settings related to multi matrix correction.
Multi-matrix correction sets the saturation using a 16-axis hue space.

Item	Setting	Description
Saturation	–99 to ±0 to +99	Sets the saturation of the color targeted for multi matrix correction for each 16-axis mode.

Paint >V Modulation

Makes settings related to V modulation shading correction.
V modulation shading corrects the vertical slope of the sensitivity arising from the relationship between the lens and prism.

Item	Setting	Description
Setting	On/Off	Turns the V modulation shading correction function on/off.
Master V Modulation	–99 to ±0 to +99	Sets the master V modulation level.
R V Modulation	–99 to ±0 to +99	Sets the V modulation level of the R signal.
G V Modulation	–99 to ±0 to +99	Sets the V modulation level of the G signal.
B V Modulation	–99 to ±0 to +99	Sets the V modulation level of the B signal.

Paint >Low Key Saturation

Makes settings related to low key saturation correction.
Corrects the saturation of colors in dark parts of the image.

Item	Setting	Description
Setting	On/Off	Turns the low key saturation correction function on/off. [Note] To enable the low key saturation function, set Saturation Mode to Low Key.
Level	–99 to ±0 to +99	Sets the saturation of colors in low luminance areas.
Range	Low/L.Mid/H.Mid	Selects the luminance level for which low key saturation is enabled.

Paint >Saturation Mode

Makes settings related to saturation correction.

Item	Setting	Description
Saturation Mode	Knee/Low Key	Selects whether the saturation function operates at high levels (Knee) or low levels (Low Key).
Knee Saturation	On/Off	Turns the knee saturation function on/off.
Black Gamma	On/Off	Turns the black gamma correction function on/off.
Low Key Saturation	On/Off	Turns the low knee saturation function on/off.

Paint >Noise Suppression

Makes settings related to noise suppression (noise compression).
This allows you to effectively suppress noise components while preserving fine edge components of the subject.

Item	Setting	Description
Setting	On/Off	Turns the noise suppression function on/off.
Level	Low/Mid/High	Selects the noise suppression level.

Maintenance Menu

Default values are shown in **bold**.

Maintenance >White Shading

Makes settings related to white shading correction.
White shading is required for each different lens to correct luminance and color irregularities in bright areas arising from lens characteristics.

Item	Setting	Description
Channel Select	Red/Green/Blue	Selects the target for white shading correction.
White H Saw	–99 to ±0 to +99	Sets the SAW white shading correction value for the horizontal direction.
White H Para	–99 to ±0 to +99	Sets the parabola white shading correction value for the horizontal direction.
White V Saw	–99 to ±0 to +99	Sets the SAW white shading correction value for the vertical direction.
White V Para	–99 to ±0 to +99	Sets the parabola white shading correction value for the vertical direction.
White Saw/Para	On/Off	Turns the white shading SAW/parabola correction function on/off.

Maintenance >Black Shading

Makes settings related to black shading correction.

Item	Setting	Description
Channel Select	Red/Green/Blue	Selects the target for black shading correction.
Black H Saw	–99 to ±0 to +99	Sets the SAW black shading correction value for the horizontal direction.
Black H Para	–99 to ±0 to +99	Sets the parabola black shading correction value for the horizontal direction.
Black V Saw	–99 to ±0 to +99	Sets the SAW black shading correction value for the vertical direction.
Black V Para	–99 to ±0 to +99	Sets the parabola black shading correction value for the vertical direction.
Black Saw/Para	On/Off	Turns the black shading SAW/parabola correction function on/off.
Master Black	–99 to ±0 to +99	Sets the master black level.
Master Gain (TMP)	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Sets a temporary master gain value.

Maintenance >Battery
Makes settings related to batteries.

Item	Setting	Description
Near End: Info Battery	5%/10%/15%...95%/100%	Sets the threshold value for displaying the "Battery Near End" warning when using a BP-GL65/GL95 battery pack.
End: Info Battery	0%/1%/2%/3%/4%/5%	Sets the threshold value for displaying the "Battery End" warning when using a BP-GL65/GL95 battery pack.
Near End: Sony Battery	11.5V to 17V (0.1V steps)	Sets the threshold value for displaying the "Battery Near End" warning when using a BP-L60S/L80S battery pack.
End: Sony Battery	11.0V to 11.5V (0.1V steps)	Sets the threshold value for displaying the "Battery End" warning when using a BP-L60S/L80S battery pack.
Near End: Other Battery	11.5V to 11.8V to 17.0V (0.1V steps)	Sets the threshold value for displaying the "Battery Near End" warning when using a non-Sony battery pack.
End: Other Battery	11.0V to 14.0V (0.1V steps)	Sets the threshold value for displaying the "Battery End" warning when using a non-Sony battery pack.
Detected Battery	Sony Info Battery/Sony Battery/ Other Battery/DC IN	Displays the result of automatic battery pack type detection.

Maintenance >DC Voltage Alarm
Sets alarms relating to external DC supply voltage.

Item	Setting	Description
DC Low Voltage1	11.5V to 17V (0.1V steps)	Sets the threshold value for displaying the "Battery Near End" warning when using an external power source connected to the DC IN connector.
DC Low Voltage2	11.0V to 14.0V (0.1V steps)	Sets the threshold value for displaying the "Battery End" warning when using an external power source connected to the DC IN connector.

Maintenance >Audio
Makes settings related to audio.

Item	Setting	Description
Front MIC Select	Mono/Stereo	Selects whether the front microphone is monaural (Mono) or stereo (Stereo).
Rear XLR Auto	On/Off	Turns the automatic detection function on/off for detecting cable connections on the AUDIO IN CH-1/CH-2 connectors on the rear panel.

Maintenance >Audio
Makes settings related to audio.

Item	Setting	Description
Front MIC CH1 Ref	–70dB/–60dB/–50dB/–40dB/ –30dB	Selects the reference level of the front microphone for channel 1.
Front MIC CH2 Ref	–70dB/–60dB/–50dB/–40dB/ –30dB	Selects the reference level of the front microphone for channel 2.
Rear MIC CH1 Ref	–70dB/–60dB/–50dB/–40dB/ –30dB	Selects the reference input level when the AUDIO IN CH1 switch is set to MIC.
Rear MIC CH2 Ref	–70dB/–60dB/–50dB/–40dB/ –30dB	Selects the reference input level when the AUDIO IN CH2 switch is set to MIC.
Line Input Ref	+4dB/0dB/–3dB/EBUL	Selects the reference input level when the AUDIO IN CH1 and AUDIO IN CH2 switches are set to LINE.
Min Alarm Volume	Off/Set	Selects the volume when the ALARM knob is turned all the way down. Off: Inaudible Set: Audible
Speaker Attenuate	Off/3dB/6dB/9dB/12dB	Selects the volume from the monitor speakers (does not affect earphone volume).
Headphone Out	Mono/Stereo	Selects whether the earphones are monaural (Mono) or stereo (Stereo).
Reference Level	–20dB/–18dB/–16dB/–12dB/ EBUL	Sets the output level of the 1 kHz test signal.
Reference Out	+4dB/0dB/–3dB/EBUL	Sets the output level relative to the reference input level.
CH1&2 AGC Mode	Mono/Stereo	Automatically adjusts the input level of analog audio signals recorded on channels 1 and 2, and selects whether to make the adjustments separately for each channel (Mono) or in stereo mode (Stereo).
CH3&4 AGC Mode	Mono/Stereo	Automatically adjusts the input level of analog audio signals recorded on channels 3 and 4, and selects whether to make the adjustments separately for each channel (Mono) or in stereo mode (Stereo).
AGC Spec	–6dB/–9dB/–12dB/–15dB/–17dB	Selects the AGC characteristic (saturation level).
Limiter Mode	Off/–6dB/–9dB/–12dB/–15dB/ –17dB	Selects the limiter characteristic (saturation level) for large input signals when adjusting the audio input level manually. Select Off if not using the limiter.
Output Limiter	On/Off	Turns the audio output limiter on/off.

Maintenance >Audio
Makes settings related to audio.

Item	Setting	Description
CH1 Wind Filter	On/Off	Turns the channel 1 wind noise reduction filter on/off.
CH2 Wind Filter	On/Off	Turns the channel 2 wind noise reduction filter on/off.
CH2 Wind Filter	On/Off	Turns the channel 3 wind noise reduction filter on/off.
CH4 Wind Filter	On/Off	Turns the channel 4 wind noise reduction filter on/off.
1kHz Tone on Color Bars	On/Off/Auto	Sets whether to output (On) or not output (Off) a 1 kHz test signal in color bar mode. Auto: Outputs a test signal only when the AUDIO SELECT CH1 switch is set to AUTO.
MIC CH1 Level	Side1/Front/Front+Side1	Selects the knob for adjusting the audio level when recording input audio from the front microphone on channel 1. Side1: LEVEL knob (left) on the side panel Front: MIC LEVEL knob on the front panel Front+Side1: LEVEL knob (left) and MIC LEVEL knob (linked control)
MIC CH2 Level	Side2/Front/Front+Side2	Selects the knob for adjusting the audio level when recording input audio from the front microphone on channel 2. Side2: LEVEL knob (right) on the side panel Front: MIC LEVEL knob on the front panel Front+Side2: LEVEL knob (right) and MIC LEVEL knob (linked control)
Rear1/WRR Level	Side1/Front/Front+Side1	Selects the knob for adjusting the audio level of a wireless microphone or a device connected to the AUDIO IN CH-1 connector on the rear panel. Side1: LEVEL knob (left) on the side panel Front: MIC LEVEL knob on the front panel Front+Side1: LEVEL knob (left) and MIC LEVEL knob (linked control)
Rear2/WRR Level	Side2/Front/Front+Side2	Selects the knob for adjusting the audio level of a wireless microphone or a device connected to the AUDIO IN CH-2 connector on the rear panel. Side2: LEVEL knob (right) on the side panel Front: MIC LEVEL knob on the front panel Front+Side2: LEVEL knob (right) and MIC LEVEL knob (linked control)

Maintenance >Audio
Makes settings related to audio.

Item	Setting	Description
Audio CH3 Level	Side3/Front/Front+Side3	Selects the knob for adjusting the audio level recorded on channel 3. Side3: LEVEL knob on the side panel Front: MIC LEVEL knob on the front panel Front+Side3: LEVEL knob and MIC LEVEL knob (linked control)
Audio CH4 Level	Side4/Front/Front+Side4	Selects the knob for adjusting the audio level recorded on channel 4. Side4: LEVEL knob on the side panel Front: MIC LEVEL knob on the front panel Front+Side4: LEVEL knob and MIC LEVEL knob (linked control)

Maintenance >WRR Setting
Makes settings related to the wireless tuner.

Item	Setting	Description
WRR Valid CH Sel	All/CH1	Selects whether to enable channels 1 and 2 of the wireless tuner (All) or channel 1 only (CH1).
WRR CH Select	TX1/TX2	Selects the reception channel for display in the menu. TX1: Displays channel 1. TX2: Displays channel 2.
WRR Delay Comp	On/Off	Selects whether to enable (On) or disable (Off) the delay compensation function for wireless input audio. (When On is selected, all E-E output audio is delayed by about 8 ms.)
TX	---	Displays the name of the transmitter whose signals are being received on the channel selected by WRR CH Select.
TX Audio Peak	---/Peak	Displays whether the AF level of the transmitter whose signals are being received on the channel selected by WRR CH Select are over peak.
TX Input Level	---/Mic/Line	Displays whether the input level of the transmitter whose signals are being received on the channel selected by WRR CH Select is set to microphone (Mic) or line (Line).
TX ATT Level	---	Sets the ATT level of the transmitter whose signals are being received on the channel selected by WRR CH Select. (The setting range varies depending on the transmitter.)

Maintenance >WRR Setting
Makes settings related to the wireless tuner.

Item	Setting	Description
TX LCF Frequency	---	Sets the low cut filter frequency of the transmitter whose signals are being received on the channel selected by WRR CH Select. (The setting range varies depending on the transmitter.)
TX System Delay	Auto/0.0ms to 8.0ms	Sets the amount of audio delay. Auto: Automatically corrects for the amount of delay so that the delay in the audio from the wireless tuner is zero. 0.0ms to 8.0ms: Sets the amount of estimated wireless system delay, for cases in which several wireless systems are being used via a device such as an audio mixer.

Maintenance >Time Code
Makes settings related to timecode.

Item	Setting	Description
TC Out	Auto/Generator	Selects the timecode output. Auto: Outputs the timecode generator value during recording, and the timecode reader value during playback. Generator: Outputs the timecode generator value during recording and playback.
DF/NDF	DF/NDF	Selects drop-frame mode (DF) or non-drop-frame mode (NDF).
LTC UBIT	Fix/Time	Sets the data recorded in LTC user bits. Fix: Records user-specified data. Time: Records the current time.
Counter Display	Counter/Duration	Select the method used to reset the counter value displayed on the viewfinder screen. Counter: Continue to increment until the RESET button is pressed. Duration: Reset each time that recording is started.

Maintenance >Essence Mark
Makes settings related to essence marks.

Item	Setting	Description
Find Mode	Clip/Rec Start	Sets the operation when the NEXT/PREV button is pressed. Rec Start: Moves to the next or the previous recording start mark, respectively. Clip: Moves to the start of the next clip when the NEXT button is pressed. Moves to the start of the current clip when the PREV button is pressed (or moves to the start of the previous clip if the PREV button is pressed at the start of the clip).

Maintenance >Camera Config
Makes settings related to various camcorder operations.

Item	Setting	Description
HD SDI Remote I/F	Off/Characters/ Green Tally/Red Tally	Sets whether to enable the recording control function for an external device connected to the SDI OUT 1/2 connector (HD SDI output) of the camcorder. If enabled, it selects the indicator used to display the recording state of the external device. Off: Recording control function is disabled. Chara: Displayed using the external device control indicator on the status display in the viewfinder. G-Tally: Displayed using the TALLY indicator (green tally) in the viewfinder. R-Tally: Displayed using the REC indicator (recording red tally) in the viewfinder.
Color Bars Select	ARIB/100%/75%/SMPTE	Selects the color bar type.
User Menu Only	On/Off	Selects whether to display the User menu only (On) or display the menu list (Off) when the camcorder is displaying the menu.
RM Common Memory	On/Off	Selects whether to share (On) or not share (Off) settings between when using a remote control unit connection and when the camcorder is operated locally.

Maintenance >Camera Config
Makes settings related to various camcorder operations.

Item	Setting	Description
RM Rec Start	RM/Camera/PARA	Selects which of the recording start/stop buttons are enabled when a remote control unit is connected, RM: Remote control unit Camera: Camcorder PARA: Both
SET Key on Thumbnail	Pause/Play	Selects the operation when the MENU knob is pressed with only one thumbnail selected.
ALAC	Auto/Off	Sets whether to execute ALAC (Auto Lens Aberration Correction) automatically. Auto: Execute ALAC automatically when an ALAC-compatible lens is attached and ALAC is enabled. Off: Do not execute. [Note] Depending on the aberration correction lens, the aberration correction function may not be activated immediately ("ALAC" does not appear on the viewfinder screen) after turning the power on, even when this setting is set to Auto. If this occurs, turn the lens zoom ring and focus ring to the end stop and back, and check whether the "ALAC" indicator appears on the viewfinder screen. *Contact a Sony service representative for information about aberration correction lenses.*

Maintenance >Preset White
Makes settings related to white balance preset values.

Item	Setting	Description
Color Temp <P>	1500K to 3200K to 50000K	Sets the white balance preset value.
C.Temp BAL <P>	–99 to ±0 to +99	Sets the fine color temperature settings, for use when a satisfactory image cannot be obtained using Color Temp<P>.
R Gain <P>	–99 to ±0 to +99	Sets the R gain preset value.
B Gain <P>	–99 to ±0 to +99	Sets the B gain preset value.
AWB Enable <P>	On/Off	Turns execution of the AWB (auto white balance) function on/off when the WHITE BAL switch is set to PRST.
Color Temp <P>	1500K to 3200K to 50000K	Sets the white balance preset value.

Maintenance >Preset White
Makes settings related to white balance preset values.

Item	Setting	Description
C.Temp BAL <P>	–99 to ±0 to +99	Sets the fine color temperature settings, for use when a satisfactory image cannot be obtained using Color Temp<P>.
R Gain <P>	–99 to ±0 to +99	Sets the R gain preset value.
BGain <P>	–99 to ±0 to +99	Sets the B gain preset value.
AWB Enable <P>	On/Off	Turns execution of the AWB (auto white balance) function on/off when the WHITE BAL switch is set to PRST.

Maintenance >White Filter
Makes settings related to filters.

Item	Setting	Description
ND Filter C.Temp	On/Off	Turns the function that assigns electrical CC filters to ND filters on/off.
ND FLT C.Temp<1>	3200K/4300K/5600K/6300K	Selects the color temperature when electrical CC filters are assigned to ND filters (filter 1).
ND FLT C.Temp<2-4>	3200K/4300K/5600K/6300K	Selects the color temperature when electrical CC filters are assigned to ND filters (filters 2 to 4).
Electrical CC<A>	3200K/4300K/5600K/6300K	Selects the color temperature when the electrical CC filter switching function is assigned to an assignable switch.
Electrical CC<B>	3200K/4300K/5600K/6300K	Selects the color temperature when the electrical CC filter switching function is assigned to an assignable switch.
Electrical CC<C>	3200K/4300K/5600K/6300K/ ---	Selects the color temperature when the electrical CC filter switching function is assigned to an assignable switch. Select "----" if not using C.
Electrical CC<D>	3200K/4300K/5600K/6300K/ ---	Selects the color temperature when the electrical CC filter switching function is assigned to an assignable switch. Select "----" if not using D.

Maintenance >DCC Adjust
Makes settings related to DCC (dynamic contrast control).

Item	Setting	Description
DCC Function Select	DCC/Fix	Selects the setting method for the knee point when the OUTPUT/DCC switch is set to CAM with DCC on. DCC: Automatically adjusts the knee point to match the luminance of the subject. Fix: Sets the knee point to a fixed value.

Maintenance >DCC Adjust
Makes settings related to DCC (dynamic contrast control).

Item	Setting	Description
DCC D Range	400%/450%/500%/550%/600%	Sets the dynamic range when the OUTPUT/DCC switch is set to CAM with DCC on.
DCC Point	–99 to ±0 to +99	Sets the DCC minimum knee point.
DCC Gain	–99 to ±0 to +99	Sets the gain relative to the DCC detected value.
DCC Delay Time	–99 to ±0 to +99	Sets the DCC control speed (speed of response to changes in the video).
DCC Peak Filter	–99 to ±0 to +99	Adjusts the response sensitivity relative to the peaks in DCC detected values.

Maintenance >Flicker Reduce
Makes settings related to the flicker correction function.
You can correct the flicker created when shooting a subject under lighting where the brightness varies periodically, such as fluorescent lighting, due to the relationship between the frequency and the recording frame rate.

Item	Setting	Description
Mode	Auto/On/Off	Sets the operation of the flicker correction function. On: Always operating. Auto: Operates when flicker is detected. Off: Does not operate.
Frequency	60Hz/50Hz	The factory setting is 60Hz when System Frequency is set to 59.94, 29.97, or 23.98. The factory setting is 50Hz when System Frequency is set to 50 or 25.

Maintenance >Genlock
Makes settings related to genlock.

Item	Setting	Description
Genlock	On/Off	Turns the genlock function on/off.
Reference	Internal/External(HD)/ External(SD)/SDI IN/CA	Displays the type of reference signal used by the camcorder.

Maintenance >Auto Shading
Executes auto black shading correction.

Item	Setting	Description
Auto Black Shading	Execute/Cancel	Executes auto black shading correction (execute by selecting Execute).
Reset Black Shading	Execute/Cancel	Clears the black shading correction value (execute by selecting Execute).

Maintenance >Auto Shading
Executes auto black shading correction.

Item	Setting	Description
Master Gain (TMP)	–3dB/0dB/3dB/6dB/9dB/12dB/ 18dB/24dB/30dB/36dB/42dB	Sets a temporary master gain value. (The value is the same as the value selected with the GAIN switch.)

Maintenance >APR
Makes settings related to automatic pixel noise reduction.

Item	Setting	Description
APR	Execute/Cancel	Executes the automatic pixel noise reduction function to suppress white flecks in SLS mode (execute by selecting Execute).
Reset	Execute/Cancel	Deletes white flecks data that were added by execution of the APR and automatic black balance adjustment functions (execute by selecting Execute).

Maintenance >Basic Authentication
Makes settings related to basic authentication.

Item	Setting	Description
User Name	(Displays the current user name.)	Sets the user name (arbitrary name for basic authentication). Set to “admin” by factory default.
Password	*******	Sets the password (for basic authentication). Set to “pxw-x400” by factory default.

Maintenance >Network
Makes settings related to network connections.

Item	Setting	Description
Setting	On/Off	Turns the network function on/off.
Wireless Network	Wi-Fi Access Point/Wi-Fi Station/ Modem/Off	Sets the operating mode for wireless LAN connections.
WPS	Execute/Cancel	Starts Wi-Fi Protected Setup (WPS) (execute by selecting Execute).
Channel	Auto(5GHz)/Auto/CH1/CH2/ CH3/CH4/CH5/CH6/CH7/CH8/ CH9/CH10/CH11	Sets the wireless LAN channel. [Note] “Auto(5GHz)” may not be displayed, depending on the wireless LAN module used.
SSID & Password	(SSID display) (Password display)	Displays the SSID and password.
Device Name (Wireless)		Displays the name of network device attached to the USB wireless LAN module connector

Maintenance >Network
Makes settings related to network connections.

Item	Setting	Description
IP Address (Wireless)		Displays the IP address when connected to a wireless LAN.
Subnet Mask (Wireless)		Displays the subnet mask when connected to a wireless LAN.
MAC Address (Wireless)		Displays the MAC address of the USB Wireless LAN Module attached to the camcorder.
Regenerate Password	Execute/Cancel	Regenerates a password (execute by selecting Execute).
Wired LAN	Enable/Disable	Enables/disables wired LAN connection.
Wired LAN Remote	On/Off	If connected to a network using a LAN cable, operation from a Wi-Fi remote control, web menu, and "Content Browser Mobile" is enabled.

Maintenance >Network Client Mode
Makes settings related to network client mode.

[Note]
Network client mode cannot be set if values are not entered for all items.

Item	Setting	Description
Setting	On/Off	Turns network client mode on/off.
Detail Settings	CCM Address	Sets the address of the CCM to connect. Host name or IP address
	CCM Port (1 to 65535 (8443))	Sets the port number of the CCM to connect
	User Name	Sets the user name for authentication of the CCM to connect.
	Password	Sets the password of the CCM to connect.

Maintenance >File Transfer
Makes settings related to network transfer of data on SxS memory cards in the camcorder.

Item	Setting	Description
File Transfer	Execute/Cancel	Switches to transfer mode (execute by selecting Execute).
Auto Upload (Proxy)	Off/On	Turns proxy clip auto transfer on/off.

Maintenance >Streaming
Makes settings related to streaming.

Item	Setting	Description
Setting	On/Off	Turns streaming transmission on/off. [Notes] • This setting is set to Off when you turn the power on again. • When set to On, the monitoring function is not available.
Preset Select	Preset 1/Preset 2/Preset 3	Selects a streaming preset. The settings are common to Preset 1/Preset 2/Preset 3. See below for descriptions for the settings in a preset.
Size	HD Auto/1280×720/640×360/480×270	Sets the size of video for streaming. When "HD Auto" is selected, the size is set to 1920×1080 or 1280×720, according to the setting of the recording format recorded on the SxS memory card or the format of the clip to be played back.
Bit Rate	9Mbps/6Mbps/3Mbps/2Mbps/1Mbps/0.5Mbps	Sets the bit rate of video for streaming. The selectable bit rate varies depending on the Size setting. [Notes] • Audio/video data is transmitted as-is via the Internet. Accordingly, the data may potentially be exposed to other parties. Always check that the transmission destination can receive the streaming data. • The data may be sent to an unintended party if the address or other settings are configured incorrectly. • Not all frames may be played, depending on the status of the network. • The picture quality may deteriorate in scenes with excessive motion. • Not all frames may be played when the stream is set to a large size with a small bit rate. To reduce this, select a smaller size for the Size setting.
Type	MPEG-2 TS/UDP/MPEG-2 TS/RTP	Selects the type of video for streaming.
Destination Address	Character string (0.0.0.0)	Enter the address of the transmission destination server for streaming data.
Destination Port	1 to 65545 (1234)	Enter the port number of the transmission destination server used for streaming.
Audio Channel	CH1/CH2/CH3/CH4	Selects the audio channel for the streaming output.

Maintenance >Clock Set
Sets the internal clock.

Item	Setting	Description
Date Mode	YYMMDD/MMDDYY/DDMMYY	Selects the display format for dates.
12H/24H	12H/24H	Selects the clock display format.
Date		Displays the date setting screen.
Time		Displays the time setting screen.

Maintenance >Language
Selects the display language for messages.

Item	Setting	Description
Select	English/ 中文(简)/日本語 / Espanol/ Русский	Selects the display language for messages.

Maintenance >Hours Meter
Makes settings related to the digital hours meter.

Item	Setting	Description
Hours (System)	xxxxH (xxxx hours)	Displays the cumulative hours of use (cannot be reset).
Hours (Reset)	xxxxH (xxxx hours)	Displays the cumulative hours of use (can be reset).
Reset	Execute/Cancel	Resets the Hours (Reset) display to 0 (execute by selecting Execute).

Maintenance >Network Reset
Returns network-related settings to their factory default state.

Item	Setting	Description
Reset	Execute/Cancel	Resets network settings (execute by selecting Execute).

Maintenance >Fan Control
Sets the fan control mode.

Item	Setting	Description
Setting	Auto/Minimum/Off in Rec	Selects the fan control mode.

Maintenance >VF Display Setting
Makes settings related to the viewfinder display.

Item	Setting	Description
Chara/Marker Brightness	5/4/3/2/1	Sets the brightness of character strings, icons, and markers superimposed in the viewfinder image.

Maintenance >Version
Displays the version of the camcorder, and updates the camcorder.

Item	Setting	Description
Number	Version Up Execute/Cancel	Displays the software version of the camcorder (Vx.xx). Updates the camcorder (execute by selecting Execute). [Note] Cannot be selected when the version updater SD card is not inserted.
Net-Func Version Number		Displays the firmware version of the wireless LAN connection function of the camcorder (Vx.xx)
Net-Func Ver.Up	Execute/Cancel	Updates the firmware of the wireless LAN connection function (execute by selecting Execute).

File Menu

Default values are shown in **bold**.

File >User File
Makes settings relating to user file operations.

Item	Setting	Description
Load SD Card		Displays a screen for loading user file settings from an SD card.
Save SD Card		Displays a screen for saving user file settings onto an SD card.
File ID		Displays a screen for displaying/editing the file ID of user files.
Recall User Preset	Execute/Cancel	Returns the value of menu items registered in the User menu to the preset values (execute by selecting [Execute]).
Store User Preset	Execute/Cancel	Stores the value of menu items registered in the User menu items as the preset values (execute by selecting [Execute]).
Clear User Preset	Execute/Cancel	Returns the current settings and preset values of menu items registered in the User menu to the factory default values (execute by selecting [Execute]).
Load Customize Data	On/**Off**	Sets whether to load User menu customized information when [Load SD Card] is executed.
Load White Data	On/**Off**	Sets whether to load white balance information when [Load SD Card] is executed.

File >All File
Makes settings related to ALL file operations.

Item	Setting	Description
Load SD Card		Displays a screen for loading All File settings from an SD card.
Save SD Card		Displays a screen for saving All File settings onto an SD card.
File ID		Displays a screen for displaying/editing the file ID of All Files.
All Preset	Execute/Cancel	Returns all items to their preset values (execute by selecting Execute).
Store All Preset	Execute/Cancel	Stores the current settings of all items as the preset values (execute by selecting [Execute]).

File >All File
Makes settings related to ALL file operations.

Item	Setting	Description
Clear All Preset	Execute/Cancel	Returns the current settings and presets of All File menu items to their factory default values (execute by selecting Execute).
3Sec Clear Preset	On/**Off**	Turns the function that clears the currents settings and presets of each item on/off, when the MENU CANCEL/PRST/ESCAPE switch is pushed up and held for three seconds in the CANCEL/PRST position.

File >Scene File
Makes settings related to scene file operations.

Item	Setting	Description
Recall Internal Memory		Displays a screen for recalling scene files from internal memory.
Store Internal Memory		Displays a screen for storing scene files in internal memory.
Load SD Card		Displays a screen for loading scene files from an SD card.
Save SD Card		Displays a screen for saving scene files onto an SD card.
File ID		Displays a screen for displaying/editing the file ID of scene files.
Scene White Data	On/**Off**	Sets whether to reflect the while balance data of scene files when recalling scene files.

File >Reference File
Makes settings related to reference file operations.

Item	Setting	Description
Store Reference	Execute/Cancel	Stores the current settings of reference file target menu items as the preset values (execute by selecting [Execute]).
Clear Reference	Execute/Cancel	Returns the current settings and preset values of reference file target menu items to the factory default values (execute by selecting [Execute]).
Load Reference(SD Card)	Execute/Cancel	Loads reference file settings from and SD card and sets the preset values (execute by selecting [Execute]).
Save Reference(SD Card)	Execute/Cancel	Stores the preset values of reference file target menu items to an SD card (execute by selecting [Execute]).

File >Reference File
Makes settings related to reference file operations.

Item	Setting	Description
File ID		Displays a screen for displaying/editing the file ID of reference files.

File >Lens File
Makes settings related to lens file operations.

Item	Setting	Description
Display Mode	Model Name/Lens ID	Selects the items to display in the list box that appears when saving or loading a file.
Recall Internal Memory		Displays a screen for recalling lens files from internal memory.
Store Internal Memory		Displays a screen for storing lens files in internal memory.
Load SD Card		Displays a screen for loading lens files from an SD card.
Save SD Card		Displays a screen for saving lens files onto an SD card.
File ID		Displays a screen for displaying/editing the file ID of lens files.
File Source		Displays the number of the selected file.
Clear Lens Offset	Execute/Cancel	Clears the lens file (execute by selecting Execute).
Lens Auto Recall	Off/On(Lens Name)/ On(Serial Number)	Sets whether to automatically recall a lens file when a lens that supports serial communication is attached.
Lens Serial Number		Displays the serial number of the attached lens (lenses that support serial communication only).
Lens Name		Displays the model name of the attached lens (lenses that support serial communication only).
Lens Manufacturer		Displays the name of the manufacturer of the attached lens (lenses that support serial communication only).
Master V Modulation	–99 to ±0 to +99	Sets the SAW shading correction value in the vertical direction in the lens file.
Lens Center H	–40 to ±0 to +40	Sets the horizontal position of the center marker in the lens file.
Lens Center V	–40 to ±0 to +40	Sets the vertical position of the center marker in the lens file.
R Flare	–99 to ±0 to +99	Sets the R flare level in the lens file.
G Flare	–99 to ±0 to +99	Sets the G flare level in the lens file.

File >Lens File
Makes settings related to lens file operations.

Item	Setting	Description
B Flare	–99 to ±0 to +99	Sets the B flare level in the lens file.
White Offset R	–99 to ±0 to +99	Sets the white balance offset R channel correction value for the lens in the lens file.
White Offset B	–99 to ±0 to +99	Sets the white balance offset B channel correction value for the lens in the lens file.
Shading Ch Select	Red/Green/Blue	Selects the target for white shading correction.
Shading H SAW	–99 to ±0 to +99	Sets the SAW white shading correction value in the horizontal direction in the lens file.
Shading H PARA	–99 to ±0 to +99	Sets the parabola white shading correction value in the horizontal direction in the lens file.
Shading V SAW	–99 to ±0 to +99	Sets the SAW white shading correction value in the vertical direction in the lens file.
Shading V PARA	–99 to ±0 to +99	Sets the parabola white shading correction value in the vertical direction in the lens file.

File >User Gamma
Makes settings related to user gamma.

Item	Setting	Description
Current Settings		Displays a list screen of the current user gamma file settings (file names).
Load SD Card		Displays a screen for loading User Gamma settings from an SD card.
Reset	1/2/3/4/5/All	Resets the settings in the selected user gamma file (execute by selecting Execute). Select All to reset all user gamma files.

Assigning Functions to Assignable Switches

Using the Assignable Switch item of the Operation menu, you can assign user-specified functions to the ASSIGN. 0 to 3 switches, the ASSIGNABLE 4 and 5 switches, the ONLINE button, and the RET button on the lens.
The following tables lists the functions that are assigned when the camcorder is shipped from the factory.

Switch or button	Function	Assignable Switch setting
ASSIGN. 0 switch	No assignment	Off
ASSIGN. 1 switch	No assignment	Off
ASSIGN. 2 switch	No assignment	Off
ASSIGN. 3 switch	No assignment	Off
ASSIGNABLE 4 switch	No assignment	Off
ASSIGNABLE 5 switch	No assignment	Off
RET button	Rec Review (if playback is allowed)	Lens RET
ONLINE button	Auto transfer proxy clip	Auto Upload(Proxy)

Functions That Can Be Assigned to the ASSIGN. 0 Switch

Assignable Switch setting	Function	State when camcorder is next powered on
Off	No assignment	—
Marker	Turns the display of all markers on/off.	Setting retained
ATW Hold	Holds the white balance setting in the ATW (auto-tracking white balance) mode	—
Picture Cache	Turns picture cache recording mode on/off.	Setting retained
Focus Magnifier	Turns the focus magnification function on/off.	Setting not retained
Zebra	Turns zebra display on/off.	Setting not retained
Shot Mark1	Writes Shot Mark1.	—
Shot Mark2	Writes Shot Mark2.	—
OK Mark	Adds or deletes an OK mark.	—
Clip Flag OK	Adds/Clears an OK mark to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Adds/Clears an NG mark to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Adds/Clears a KP (Keep) mark to/from the clip being recorded or played.	Setting not retained

Functions That Can Be Assigned to the ASSIGN. 2 Switch

[Note]
Immediately after you assign a function to the ASSIGN. 2 switch or you switch the recording format, the setting of the switch at that point may not match the camcorder's internal state. After assigning a function, switch the ASSIGN. 2 switch or power the camcorder off and on again.

Assignable Switch setting	Function
Off	No assignment
Front Mic	Switches between stereo and monaural when a stereo microphone is connected.
Marker	Turns the display of all markers on/off.
Picture Cache [1)]	Turns picture cache recording mode on/off.
Zebra	Turns zebra display on/off.
Clip Continuous Rec	Turns Clip Continuous Rec mode on/off.
Digital Extender ×2	Turns the screen magnification (×2) function on/off.
Digital Extender ×3	Turns the screen magnification (×3) function on/off.
Digital Extender ×4	Turns the screen magnification (×4) function on/off.
Rec Source	Switches the signals to be recorded between the camera picture and external input. (If the camcorder is currently recording or playing, the switch takes effect after recording or playback ends.)

1) When Picture Cache is assigned, Operation >Rec Function is disabled (grayed out) and cannot be set.

Functions That Can Be Assigned to the ASSIGN. 1 and 3 Switches, the ASSIGNABLE 4 and 5 Switches, and the ONLINE Button

Assignable Switch setting	Function	State when camcorder is next powered on
Off	No assignment	—
Front Mic	Switches between stereo (On) and monaural (Off) when a stereo microphone is connected.	Setting retained
Marker	Turns the display of all markers on/off.	Setting retained
ATW	Turns ATW (auto tracing white balance) mode on/off.	Setting not retained
ATW Hold	Hold the white balance setting in the ATW mode.	—
Turbo Gain	Executes Turbo Gain according to the setting of Operation >Gain Switch >Gain Turbo.	Setting not retained
Rec Review	Executes recording review.	—
Rec	Starts or stops recording.	—
Network Client Mode	Turns network client mode on/off.	Setting retained
Streaming	Turns streaming transmission on/off.	Setting not retained
Auto Upload(Proxy)	Turns proxy clip auto transfer on/off.	Setting retained
Picture Cache	Turns picture cache recording mode on/off.	Setting retained
Spotlight	Turns the spotlight function in auto iris mode on/off.	Setting retained
Backlight	Turns the backlight function in auto iris mode on/off.	Setting retained
VF Mode	Switches the viewfinder screen between B&W (On) and color (Off).	Setting retained
Video Signal Monitor	Switches the video signal monitor display function.	Setting retained
Lens Info	Switches the depth of field indication between off, displayed in meters, and displayed in feet.	Setting retained
Zoom Tele/Wide	When a lens that supports serial communication is installed, assigns the Zoom Tele function to ASSIGNABLE 4, and assigns the Zoom Wide function to ASSIGNABLE 5 (displayed only when <4> and <5> are set).	—
Zoom Wide/Tele	When a lens that supports serial communication is installed, assigns the Zoom Wide function to ASSIGNABLE 4, and assigns the Zoom Tele function to ASSIGNABLE 5 (displayed only when <4> and <5> are set).	—
Focus Magnifier	Turns the focus magnification function on/off.	Setting not retained
Zebra	Turns zebra display on/off.	Setting not retained
Lens RET	Displays return video signal. When a camera extension unit is not connected: Rec Review (if playback is allowed)	—
Return Video	Displays the return 1 video signal.	—
Return Video2	Displays the return 2 video signal.	—
Return Video3	Displays the return 3 video signal.	—
Return Video4	Displays the return 4 video signal.	—
Shot Mark1	Writes Shot Mark1.	—
Shot Mark2	Writes Shot Mark2.	—
OK Mark	Adds or deletes an OK mark.	—
Clip Flag OK	Adds/Clears an OK mark to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Adds/Clears an NG mark to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Adds/Clears a KP (Keep) mark to/from the clip being recorded or played.	Setting not retained
Color Temp SW 3200K	Adjusts white balance using 3200K preset value.	Setting retained
Color Temp SW 4300K	Adjusts white balance using 4300K preset value.	Setting retained
Color Temp SW 5600K	Adjusts white balance using 5600K preset value.	Setting retained
Color Temp SW 6300K	Adjusts white balance using 6300K preset value.	Setting retained
Electrical CC	Function that switches the electrical CC filter (3200K/4300K/5600K/6300K) applied to white balance adjustment values. Sequence with each press of the switch/button: 3200K → 4300K → 5600K → 6300K Can be changed using menu settings (Electrical CC <A> <B> <C> <D>). [Note] This function is not available when Maintenance >White Filter >ND Filter C.Temp in the setup menu is set to On. If you set ND Filter C.Temp to On after assigning the function, the assignable switch ceases to function.	Setting retained

Assignable Switch setting	Function	State when camcorder is next powered on
CC5600K	Applies a 5600K electrical CC filter to white balance adjustment values.	Setting retained
Clip Continuous Rec	Turns Clip Continuous Rec mode on/off.	Setting not retained
Slot Select	When recording media is loaded in both card slots A and B, selects the card you want to use.	—
Digital Extender ×2	Turns the screen magnification (×2) function on/off.	Setting not retained
Digital Extender ×3	Turns the screen magnification (×3) function on/off.	Setting not retained
Digital Extender ×4	Turns the screen magnification (×4) function on/off.	Setting not retained
Digital Extender ×2×3×4	Switches the magnification of the screen magnification function. Each press of the switch or button switches in the order Off → ×2 → ×3 → ×4 → Off.	Setting not retained

Functions That Can Be Assigned to the RET Button on the Lens

Assignable Switch setting	Function	State when camcorder is next powered on
Off	No assignment	—
Lens RET	Displays return video signal. When a camera extension unit is not connected: Rec Review (if playback is allowed)	—
Return Video	Displays return video signal.	—
Rec Review	Executes recording review.	—
Shot Mark1	Writes Shot Mark1.	—
Shot Mark2	Writes Shot Mark2.	—
Clip Flag OK	Adds/Clears an OK mark to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Adds/Clears an NG mark to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Adds/Clears a KP (Keep) mark to/from the clip being recorded or played.	Setting not retained
OK Mark	Adds or deletes an OK mark.	—
Focus Magnifier	Turns the focus magnification function on/off.	Setting not retained
Digital Extender ×2	Turns the screen magnification (×2) function on/off.	Setting not retained
Digital Extender ×3	Turns the screen magnification (×3) function on/off.	Setting not retained
Digital Extender ×4	Turns the screen magnification (×4) function on/off.	Setting not retained
Digital Extender ×2×3×4	Switches the magnification of the screen magnification function. Each press of the switch or button switches in the order Off → ×2 → ×3 → ×4 → Off.	Setting not retained

User Configuration Data

You can save setup menu settings in the camcorder's internal memory and on SD cards. This allows you to quickly recall an appropriate set of menu settings for the current situation.
To save setup data on an SD card, insert a writable SD card (page 30) into the UTILITY SD card slot before proceeding.

Inserting an SD card (for saving configuration data)

1 Open the switch cover.

2 Insert the SD card (for saving configuration data) in the UTILITY SD card slot.

3 Close the switch cover.

Ejecting an SD card (for saving configuration data)

1 Open the switch cover.

2 Press the SD card in slightly, then remove the card.

[Notes]
- If the camcorder is turned off or the SD card is removed while the SD is being accessed, the integrity of data on the card cannot be guaranteed. All data recorded on the card may be discarded. Always make sure the ACCESS indicator is off before turning off the camcorder or removing the SD card.
- Take caution to prevent the SD card from flying out when inserting/ejecting the card.

The following user data is supported.

User Files

User files save the setting items and data of the customizable User menu. You can save up to 64 files on an SD card. By loading this file into the camcorder memory, you can customize the setup of the User menu.

ALL Files

ALL files save the configuration data of all menus. You can save up to 64 files on an SD card.

[Note]
Device specific data (shading, output levels, and other data that requires adjustment for the specific device) is not saved.

Scene Files

Scene files save adjustments to Paint menu items for the purpose of shooting a particular scene. You can save up to five files in the camcorder's internal memory and up to 64 files on an SD card.
Scene files allow you to save the following types of data.
- Values set in the Paint menu
- Shutter speeds set in standard mode or ECS mode
- White balance data
  The data that is saved and loaded depends on the setting of File >Scene File >Scene White Data in the setup menu.

Scene files can be stored in internal memory on the camcorder or on an SD card.
Scene files can also be loaded into the camcorder.

Reference Files

Reference files save the scene file standard settings (when File ID is Standard). You can save one file in the camcorder's internal memory and one file on an SD card.

Lens Files

You can set the following data for correcting for the lens characteristics, and save the data as a lens file. You can save up to 32 lens files in the camcorder's internal memory and up to 64 lens files on an SD card.

Configuration data	Sub-items
V modulation shading correction values	M V Modulation
Center marker position	Lens Center H Lens Center V
Flare level	R Flare G Flare B Flare
White balance correction value	White Offset R White Offset B
White shading correction value	Shading Ch Select Shading H SAW Shading H PARA Shading V SAW Shading V PARA

Gamma Files

You can save up to five user-defined gamma table data files (User Gamma Data File) in internal memory.

User Files

Saving a User File

1 Select File > User File >Save SD Card in the setup menu.
A screen for selecting a user file save destination appears.

2 Turn the MENU knob to select a destination, then press the knob.
You can save files in rows with a File ID of "No File." Selecting a row with a specified File ID name will overwrite the selected file.
The File ID is generated automatically, but you can modify it.

3 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.

Changing the File ID

1 Select File >User File >File ID in the setup menu.
A screen for editing the File ID appears.

2 Select characters and enter the File ID.

3 Turn the MENU knob to select [Done], then press the knob.
The File ID is updated.

Loading a User File

1 Select File >User File >Load SD Card in the setup menu.
A user file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

[Note]
The camcorder will reboot automatically after loading configuration data.

ALL Files

Saving Configuration Data as an ALL File

1 Select File >All File >Save SD Card in the setup menu.
A screen for selecting an ALL file save destination appears.

2 Turn the MENU knob to select a destination, then press the knob.
You can save files in rows with a File ID of "No File." Selecting a row with a specified File ID name will overwrite the selected file.
The File ID is generated automatically, but you can modify it.

3 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.

If an error message appears

One of the following error messages may appear during execution of the save, or as soon as you select [Execute]. In this case, the file is not saved.

Error message	Problem	Solution
File Access NG	No recordable media is inserted.	Insert recordable media.

Changing the File ID

1 Select File >All File >File ID in the setup menu.
A screen for editing the File ID appears.

2 Select characters and enter the File ID.

3 Turn the MENU knob to select [Done], then press the knob.
The File ID is updated.

Loading Configuration Data

1 Select File >All File >Load SD Card in the setup menu.
An ALL file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

[Notes]
- When you load a file from an SD card, the data saved in the camcorder's internal memory is overwritten.
- When loading files from one device to another, if the firmware versions on the two devices do not match, the setting values for functions that are not supported on the destination device are not loaded.
- The camcorder will reboot automatically after loading configuration data.

If an error message appears

One of the following error messages may appear during execution of the load, or as soon as you select [Execute]. In this case, the file is not loaded.

Error message	Problem	Solution
File Access NG	There is no readable media The specified file does not exist on the media	Insert the media that contains the file you want.

Restoring All Current Settings to Preset Values

In this document, initial setup menu settings configured/saved by the user are referred to as "preset values."
Even after loading files to set up the camcorder, and overwriting original files with new settings, you can reset the contents of the files by recovering the preset values.

1 Select File >All File >All Preset in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

Saving All Current Settings as Preset Values

1 Select File >All File >Store All Preset in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

[Note]
The camcorder will reboot automatically after executing.

Resetting Current Settings and Preset Values to Factory Default Settings

1 Select File >All File >Clear All Preset in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

[Note]
The camcorder will reboot automatically after executing.

Scene Files

Saving a Scene File in Internal Memory

1 Select File >Scene File >Store Internal Memory in the setup menu.
A scene file list screen appears.
If the File ID is set to "Standard" destination, preconfigured standard settings are saved.

2 Turn the MENU knob to select a destination, then press the knob.
The scene file is saved, overwriting any existing file, in the selected destination.

3 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.

Saving a Scene File on an SD Card

1 Select File >Scene File >Save SD Card in the setup menu.
A scene file save destination screen appears.

2 Turn the MENU knob to select a destination, then press the knob.
You can save files in rows with a File ID of "No File." Selecting a row with a specified File ID name will overwrite the selected file.
The File ID is generated automatically, but you can modify it.

3 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.

Changing the File ID

1 Select File >Scene File >File ID in the setup menu.
A screen for editing the File ID appears.

2 Select characters and enter the File ID.

3 Turn the MENU knob to select [Done], then press the knob.
The File ID is updated.

Loading a Scene File from Internal Memory

1 Select File >Scene File >Recall Internal Memory in the setup menu.
A scene file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

Load a Scene File from an SD Card

1 Select File >Scene File >Load SD Card in the setup menu.
A scene file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

Reference Files

Saving Current Settings as Preset Values

1 Select File >Reference File >Store Reference in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

Saving Current Settings as Preset Values on an SD Card

1 Select File >Reference File >Save Reference(SD Card) in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

Changing the File ID

1 Select File >Reference File >File ID in the setup menu.
A screen for editing the File ID appears.

2 Select characters and enter the File ID.

3 Turn the MENU knob to select [Done], then press the knob.
The File ID is updated.

Loading a Reference File from an SD Card

1 Select File >Reference File >Load Reference(SD Card) in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

Resetting Current Settings and Preset Values to Factory Default Settings

1 Select File >Reference File >Clear Reference in the setup menu.
A confirmation screen appears.

2 Turn the MENU knob to select [Execute], then press the knob.

Lens Files

Saving a Lens File in Internal Memory

1 Select File >Lens File >Store Internal Memory in the setup menu.
A lens file list screen appears.

2 Turn the MENU knob to select a destination, then press the knob.
You can save files in rows with File ID of "No offset." Selecting a row with a specified File ID name will overwrite the selected file.
The File ID is generated automatically, but you can modify it.

3 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.

Saving a Lens File on an SD Card

1 Select File >Lens File >Save SD Card in the setup menu.
A lens file save destination screen appears.

2 Turn the MENU knob to select a destination, then press the knob.
You can save files in rows with a File ID of "No File." Selecting a row with a specified File ID name will overwrite the selected file.
The File ID is generated automatically, but you can modify it.

3 Turn the MENU knob to select [Execute] on the confirmation message screen, then press the knob.

Changing the File ID

1 Select File >Lens File >File ID in the setup menu.
A screen for editing the File ID appears.

2 Select characters and enter the File ID.

3 Turn the MENU knob to select [Done], then press the knob.
The File ID is updated.

Loading a Lens File from Internal Memory

1 Select File >Lens File >Recall Internal Memory in the setup menu.
A lens file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

Loading a Lens File from an SD Card

1 Select File >Lens File >Load SD Card in the setup menu.
A lens file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

Loading a Lens File Automatically

When you are using a lens that supports serial communication, you can set up the camcorder by automatically loading the lens file that corresponds to the lens settings (Lens Auto Recall function).
To use the Lens Auto Recall function, set File >Lens File Lens >Auto Recall in the setup menu to one of the following.
Off: Do not use the Lens Auto Recall function.
On (Lens Name): Load the lens file that corresponds to the lens model name.
On (Serial Number): Load the lens file that corresponds to the lens model name and serial number (when the lens supports communication of the serial number).
If the lens does not support communication of the serial number, even when set to On (Serial Number), load the lens file that corresponds to the lens model name.

Gamma Files

Checking the Current Gamma File Settings (File Names)

Select File >User Gamma >Current Settings in the setup menu to display a list of the currently configured user gamma files.

Using User Gamma Files Created Using CvpFileEditorTM V4.3

Save created user gamma files to be loaded in the "PRIVATE/SONY/PRO/CAMERA/HD_CAM" directory of the SD card.

Loading a User Gamma File from an SD Card

1 Select File >User Gamma >Load SD Card in the setup menu.
A user gamma file list screen appears.

2 Turn the MENU knob to select a file to load, then press the knob.
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

Resetting a User Gamma File to Initial State

1 Select File >User Gamma >Reset in the setup menu.
A gamma file number reset screen appears.

2 Turn the MENU knob to select the number of the gamma file to reset (1 to 5).
To reset all gamma files, select [All].
A confirmation screen appears.

3 Turn the MENU knob to select [Execute], then press the knob.

Connecting a Remote Control Unit

When an RM-B170 Remote Control Unit, RCP1001/1501 Remote Control Panel, or other control unit is connected, some camcorder functions can be controlled from that unit.
You can use the display on the RM-B170 or a video monitor connected to the MONITOR connector of the remote control unit to perform camcorder menu operations and monitor the camcorder picture.

Connecting a Remote Control Unit

Using the remote control cable, connect between the REMOTE connector (8-pin) of the camcorder and the camera connector of the remote control unit.
When you turn on the camcorder after making the connection, the camcorder enters remote control mode, enabling menu operations and shooting operations.

[Notes]
- Remote control operation is not supported if USB connection to the camcorder is enabled.
- If a USB connection to the camcorder is enabled during remote control, remote control mode is released.
- Do not connect or disconnect the remote control unit when the camcorder is on.
- A remote control cable is not supplied with the RCP-1001/1501 Remote Control Unit.

The following switches of the camcorder are disabled when a remote control unit is connected.
- GAIN switch
- WHITE BAL switch
- AUTO W/B BAL switch
- SHUTTER switch
- OUTPUT/DCC switch
- ASSIGN. 1/3 switches, ASSIGNABLE 4/5 switches, and the ONLINE button to which the Turbo Gain or ATW function has been assigned

Releasing Remote Control Mode

Turn off the camcorder and disconnect the remote control unit.
The switch settings on the camcorder become enabled.

Connecting a Monitor to an RM-B170

The MONITOR connector (BNC type) of the RM-B170 outputs the same signal as the output from the VIDEO OUT connector.
To connect a monitor to the MONITOR connector on the RM-B170, use the black cable supplied with the RM-B170.

Image Quality Adjustment when an RM-B170 is Connected

When the RM-B170 is connected, the parameters for camera image quality adjustment items (paint data) are set to the parameters that were specified the last time that the RM-B170 was connected.

Function of Recording Start/Stop Buttons when an RM-B170 is Connected

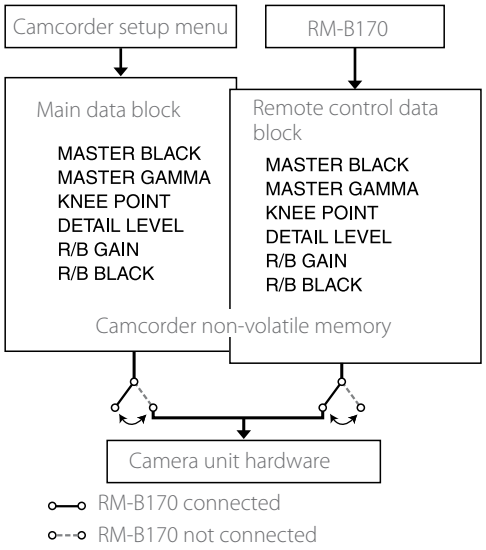
Set the function of the buttons using Maintenance >Camera Config >RM Rec Start in the setup menu.

The functions of the buttons for the RM Rec Start settings are given below.

Button	RM Rec Start setting		
	RM	Camera	PARA
Camcorder REC START button	Disabled	Enabled	Enabled
Lens VTR button	Disabled	Enabled	Enabled
ASSIGN. 1/3 switches, ASSIGNABLE 4/5 switches, and ONLINE button assigned with recording start/stop function	Disabled	Enabled	Enabled
RM-B170 VTR button	Enabled	Disabled	Enabled

Data Structure of Image Quality Adjustment Data

The non-volatile memory of the camcorder used for storing camera image quality adjustment data (paint data) consists of the two regions shown below: a "main data block" that is used when a remote control unit is not connected, and a "remote control data block" that is used when a remote control unit is connected. Paint adjustment data is automatically selected and output to the camera section depending on whether or not a remote control unit, such as the RM-B170, is connected.



When a remote control unit is connected, the "remote control data block" is selected as the current paint data block, and the paint adjustment parameters that were in effect the last time the remote control unit was used are loaded.
However, when the settings of absolute value controls [1] and absolute value switches [2] are set on the remote control unit, the settings on the remote control unit override the settings on the camcorder.
When the remote control unit is disconnected from the camcorder, the "main data block" is re-enabled, and the camcorder returns to the settings that were in effect before the remote control unit was connected.

1) Absolute value controls: Data corresponding to the angular position of the control is output. Controls for which data corresponding to the amount of rotation is output are called relative value controls.
2) Absolute value switches: Switches (or knobs), such as toggle switches or slide switches (except most momentary switches) whose positions must coincide with their functions are called absolute value switches.

When Maintenance >Camera Config >RM Common Memory in the setup menu is set to [On], you can use settings of the paint adjustment

data stored in the main data block even if a remote control unit is connected. In this case, the settings stored in the main data block will be updated when you change the settings on the remote control unit. Thus, the settings of the paint data made with the remote control unit will be retained even after the remote control unit is removed. However, if the switch position on the remote control unit differs from the one on the camcorder, the switch position on the camcorder takes precedence.
Also, it is possible to keep the settings that are in effect before you connect the remote control unit. In this case, you must set the control knobs to relative value mode on the remote control unit.

For details, refer to the operation manual supplied with the remote control unit.

Operating the Menu from the RM-B170

1 Set the DISPLAY switch to the MENU position. The menu is displayed on the monitor connected to the MONITOR connector of the RM-B170.

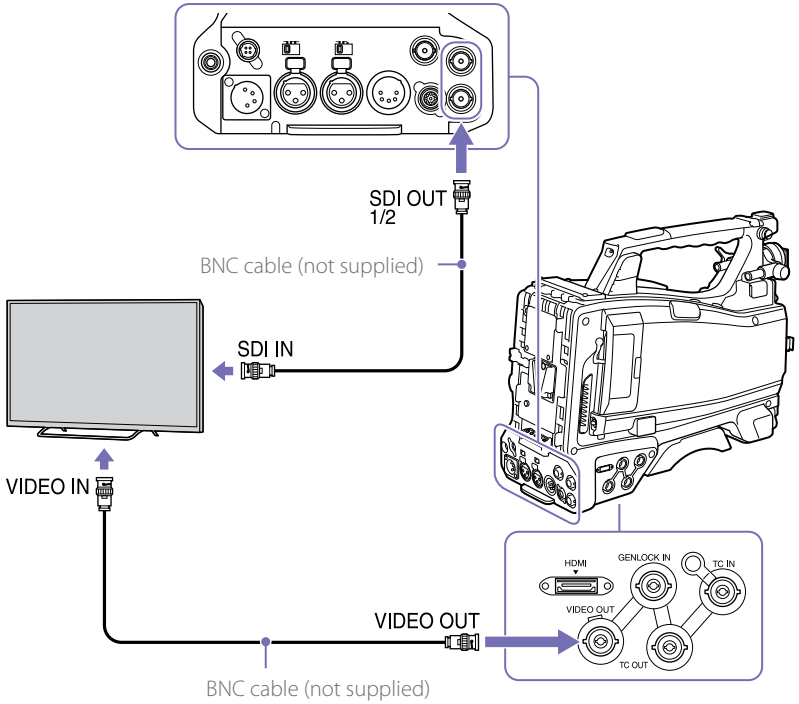
2 Select and set menu items using the MENU SELECT knob and CANCEL/ENTER switch.

3 When finished, set the DISPLAY switch to the ON or OFF position to exit the menu.

For details about RMB170 operation, refer to the operation manual of the RM-B170.

Connecting an External Monitor

Select the output signal and use an appropriate cable for the monitor to be connected.



Regardless of whether the signal is HD or SD, the same status information and menus can be displayed on the external monitor as those on the viewfinder screen.

[Note]
The SD signal down-converted output is enabled when Operation >Input/Output >Output Format in the setup menu is set to 720×486i or 720×576i.

SDI OUT Connector (BNC)

The SDI OUT connector can be used to connect a device that supports SDI. The device type can be a monitor, switcher, VTR, or other recording device.
The output signal from this connector can be turned on and off using Operation >Input/Output >SDI Out1 Output/SDI Out2 Output in the setup menu (page 85).
For connection, use a BNC cable (not supplied).

VIDEO OUT Connector

The VIDEO OUT connector can be used to connect a device that supports analog composite signals. The device type can be a monitor, VTR, or other recording device.
The output signal changes in conjunction with the setting of Operation >Input/Output >Output Format in the setup menu.
To input the VIDEO OUT connector output signal to an external analog composite device, it may be necessary to change the input signal setting of that external device to match the analog composite signal setting for the VIDEO OUT connector.
To input camcorder output audio to an external device such as a monitor, VTR, or other recording device, connect the audio output of the AUDIO OUT connector to the audio input of that external device.
For connection, use a BNC cable (not supplied).

HDMI OUT Connector (Type A Connector)

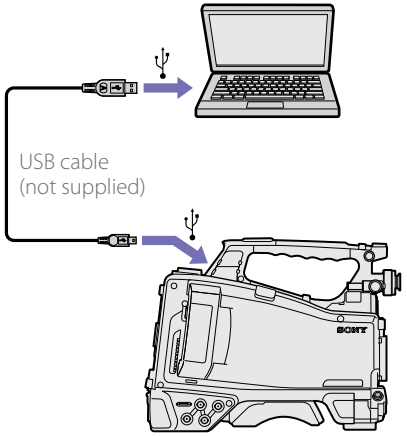
You can turn the output signal from the camcorder on/off using Operation >Input/Output >HDMI Output in the setup menu.
The output signal format is set using Operation >Input/Output >Output Format in the setup menu.
Use a commercially available HDMI cable for connection.

Managing/Editing Clips with a Computer

The clips recorded on SxS memory cards with this camcorder can be controlled on a computer or edited using optional nonlinear editing software.

USB Connection with a Computer

When you connect the camcorder to a computer using a USB cable (not supplied), the memory card in the slot is recognized as an extended drive by the computer.
When two memory cards are mounted in the camcorder, they are recognized as two independent extended drives by the computer.



[Notes]

- Turn the camcorder on and wait until the image and information are displayed on the screen, then connect the USB cable to the camcorder.
- When connecting the USB cable to the computer, be careful to check the form and direction of the USB connector.
- The camcorder does not work on the bus power from the computer.

To start USB connection

When you connect a computer to the PC connector with a USB cable (not supplied), the message "Connect USB Now?" is displayed to prompt you to confirm that you wish to enable the USB connection.
If you select "Cancel" or push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE position, or if you disconnect the USB cable, the message "Connect USB Now?" disappears.
If you select "Execute" and press the MENU knob, the USB connection is enabled and the camcorder is recognized as an extension drive.
If the USB connection is enabled during recording/playback operation, the operation is stopped and the message "USB Connecting" appears on the viewfinder screen.
At this time, the output signal from the VIDEO OUT connector and SDI OUT 1/2 connectors changes to a black signal.

[Notes]

- The camcorder cannot be operated for recording, playback, and so on while the message "USB Connecting" is displayed.
- When the computer accesses the media loaded in the camcorder, do not try to carry out the following operations.
  - Operating the camcorder (turning the power on/off, switching the operating mode, etc.)
  - Removing or loading a media from an active slot (being accessed from the computer)
  - Removing or connecting the USB cable

Releasing the USB connection

To release the USB connection, follow the same procedure as that for removing a device from the computer.
To enable the USB connection again, first disconnect the USB cable and then reconnect it.
The message "Connect USB Now?" appears again.

To remove an SxS memory card

On Windows

1 Click on the "Safely Remove Hardware" icon on the task bar of the computer.

2 Select "Safely remove SxS Memory Card - Drive(X:)" from the displayed menu.

3 Check that the "Safe To Remove Hardware" message appears, then remove the card.

On Macintosh

Drag the SxS memory card icon on the desktop to the Trash.
If the SxS memory card icon is displayed in the Finder, click on the eject icon.

To use the application software

To copy clips to the local disk of your computer, the dedicated application software must be downloaded and installed on your computer. For details about downloading software, see "Software Downloads" (page 132).
Although the data regarding recorded materials are stored over multiple files and folders, you can easily handle the clips without considering such data and directory structure by using the dedicated application software.

[Note]

If you perform operations on clips, such as copying the clips on the SxS memory card using Explorer (Windows) or Finder (Macintosh), the subsidiary data contained by the clips may not be maintained.

To use a nonlinear editing system

In a nonlinear editing system, editing software (option) that supports the formats recorded by the camcorder is required.
Store the clips to be edited on the HDD of your computer in advance, using the supplied application software.
Some editing software may not operate properly. Be sure to confirm before use that it conforms to the recording formats used with this camcorder.

Configuring a Shooting and Recording System

You can mount a CA-FB70/TX70 HD Camera Adaptor to the camcorder and connect a Camera Control Unit (CCU).
This allows you to configure a shooting and recording system consisting of multiple camcorders with camera extension units connected to a remote control unit.

For more information about the CA-FB70 and CA-TX70, refer to their respective operation manuals.

[Notes]
- When using the camcorder in this system, do not connect a video light to the camcorder.
- Supported only for XAVC and MPEG HD recording.
- Not supported for proxy recording and wireless LAN connection function.

Tally and Call Indicators

The tally and call indicators for a system are as follows.

Data received from system				HDVF LED indicators		Text display on viewfinder screen		
Tally	Green Tally	CA call	Non-CA call	REC/ TALLY LED	GREEN TALLY LED	●	●	CALL
OFF	OFF	OFF	OFF	Not lit	Not lit	No display	No display	No display
OFF	OFF	OFF	ON	Lit	Not lit	●	No display	CALL
OFF	OFF	ON	OFF	Not lit	Not lit	No display	No display	CALL
OFF	OFF	ON	ON	Lit	Not lit	●	No display	CALL
OFF	ON	OFF	OFF	Not lit	Lit	No display	●	No display
OFF	ON	OFF	ON	Lit	Lit	●	●	CALL
OFF	ON	ON	OFF	Not lit	Lit	No display	●	CALL
OFF	ON	ON	ON	Lit	Lit	●	●	CALL
ON	OFF	OFF	OFF	Lit	Not lit	●	No display	No display
ON	OFF	OFF	ON	Not lit	Not lit	No display	No display	CALL
ON	OFF	ON	OFF	Lit	Not lit	●	No display	CALL
ON	OFF	ON	ON	Not lit	Not lit	No display	No display	CALL
ON	ON	OFF	OFF	Lit	Lit	●	●	No display
ON	ON	OFF	ON	Not lit	Lit	No display	●	CALL
ON	ON	ON	OFF	Lit	Lit	●	●	CALL
ON	ON	ON	ON	Not lit	Lit	No display	●	CALL

[Note]
Alarm indications using the tally indicator in the warning display are not displayed while a CA-FB70/TX70 Camera Adaptor is connected.

Supported Formats and Limitations of Shooting/Recording Systems

The supported formats and operation limitations of a shooting/recording system comprising the camcorder, camera adaptor, and camera control unit are shown in the following table.

Operation menu			System format of camera adaptor / camera control unit	Camcorder limitation
Format		Input/Output		Return video display
Frequency	Rec Format	Output Format		
		SDI		
59.94	XAVC-L 50 1080P	1920×1080i	1920×1080 59.94i	No
	XAVC-L 35 1080P			
	XAVC-I 1080i	1920×1080i	1920×1080 59.94i	Yes
	XAVC-L 50 1080i			
	XAVC-L 35 1080i			
	XAVC-L 25 1080i			
	HD422 50 1080i			
	HQ 1920×1080i			
	HQ 1440×1080i			
	XAVC-I 720P	1280×720P	1280×720 59.94P	Yes
	XAVC-L 50 720P			
	HD422 50 720P			
	HQ 1280×720P			
29.97	XAVC-I 1080P	1920×1080PsF	1920×1080 29.97PsF [a)] 1920×1080 59.94i	Yes
	XAVC-L 50 1080P			
	XAVC-L 35 1080P			
	HD422 50 1080P			
	HQ 1920×1080P			
	HD422 50 720P	1280×720P	1280×720 59.94P	No
23.98	XAVC-I 1080P	1920×1080i (2-3PD)	1920×1080 59.94i	No
	XAVC-L 50 1080P			
	XAVC-L 35 1080P			
	HD422 50 1080P			
	HQ 1920×1080P			
	HD422 50 720P	1280×720P (2-3PD)	1280×720 59.94P	No
50	XAVC-L 50 1080P	1920×1080i	1920×1080 50i	No
	XAVC-L 35 1080P			
	XAVC-I 1080i	1920×1080i	1920×1080 50i	Yes
	XAVC-L 50 1080i			
	XAVC-L 35 1080i			
	XAVC-L 25 1080i			
	HD422 50 1080i			
	HQ 1920×1080i			
	HQ 1440×1080i			
	XAVC-I 720P	1280×720P	1280×720 50P	Yes
	XAVC-L 50 720P			
	HD422 50 720P			
	HQ 1280×720P			
25	XAVC-I 1080P	1920×1080PsF	1920×1080 25PsF [a)] 1920×1080 50i	Yes
	XAVC-L 50 1080P			
	XAVC-L 35 1080P			
	HD422 50 1080P			
	HQ 1920×1080P			
	HD422 50 720P	1280×720P	1280×720 50P	No

a) A PsF setting is recommended when a CA-TX70 Camera Adaptor is connected.

[Note]
In a shooting/recording system, special recording functions, such as wireless LAN connection function or Slow & Quick Motion, cannot be used simultaneously.

Recording External Input Signals

You can record SDI signals from devices connected to the SDI IN connector of the camcorder.

To output and record input signals instead of the camera picture, set Operation >Input/Output >Source Select in the setup menu to [External].

[Notes]

- External input signals cannot be recorded in Slow & Quick Motion mode. When a special recording mode, such as Slow & Quick Motion mode, is selected, the recording mode is canceled when you set Operation >Input/Output >Source Select in the setup menu to [External].
- Execution of automatic adjustment functions, such as automatic black balance, and operations, such as playback, Rec Review, and thumbnail display, will end when Operation >Input/Output >Source Select in the setup menu is set to [External]. The camcorder enters stop mode and then the camera picture switches to external input.
- Recording may stop if the input signal is disturbed while recording external input. Recording automatically resumes when the input signal returns to normal.
- Not supported for proxy recording and wireless LAN connection function.

Supported External Input Signal Formats and Camcorder Recording Formats

HD/SD	Operation >Format >Rec Format in the setup menu	Operation >Format >Frequency in the setup menu	Supported external input signal formats
HD	XAVC-I 1080i	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	XAVC-I 720P	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	XAVC-L 50 1080i	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
HD	XAVC-L 50 720P	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	HD422 50 1080i	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	HD422 50 720P	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	HQ 1920×1080i	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	HQ 1440×1080i	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
	HQ 1280×720P	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
		50	HD 1920×1080 25PsF/50i HD 1280×720 50P
SD	MPEG IMX 50	59.94	SD 486 59.94i
		50	SD 576 50i
	DVCAM	59.94	SD 486 59.94i
		50	SD 576 50i

Maintenance

Cleaning the Viewfinder

Use a dust blower to clean the CRT screen and mirror inside the viewfinder barrel.
Clean the lens and protecting filter with a commercially available lens cleaner.

[Note]
Never use organic solvents such as thinners.

Note about the Battery Terminals

The battery terminal of this unit (the connector for battery packs and AC adaptors) is a consumable part.
Power may not be supplied to the unit properly if the pins of the battery terminal are bent or deformed by shock or vibrations, or if they become corroded due to prolonged outdoor use.
Periodic inspections are recommended to keep the unit working properly and to prolong its usable lifetime.
Contact a Sony service or sales representative for more information about inspections.

Exchanging the Battery of the Internal Clock

The camcorder's internal clock is powered by a lithium battery. If the message "BackUp Battery End" appears in the viewfinder, this battery must be exchanged. Contact a Sony service representative.

Error/Warning System

If a warning, caution, or operating condition that requires confirmation occurs on the camcorder, a message is displayed in the viewfinder, the corresponding indicators start flashing, and a warning sound is emitted. You can adjust the volume of the warning sound using the ALARM knob. If the ALARM knob is set to minimum, the warning sound will not be audible.

Error Display

The camcorder will stop operation when the following kind of display occurs.

Error message	Warning sound	WARNING indicator	Tally/REC indicator	Cause and Solution
E + error code	Continuous	—	High-speed flashing	Indicates an abnormality in the camcorder. Turn off the camcorder, and check for any problem with connected devices, cables, or media. (If the camcorder does not turn off when the POWER switch is set to OFF, remove the battery or disconnect the AC supply.) If the error persists when the camcorder is turned on again, contact your Sony service representative.

Warning Display

Follow the instructions provided if the following display occurs.

Warning message	Warning sound	WARNING indicator	Tally/REC indicator	Cause and Solution
Media Near Full	Intermittent	Flashing	Flashing	The remaining capacity on the SxS memory card is getting low. Replace at the earliest convenience.
Media Full	Continuous	On	High-speed flashing	Clips could not be recorded, copied, or split because there is no remaining capacity on the SxS memory card. Replace immediately.
Battery Near End	Intermittent	Flashing	Flashing	The remaining capacity of the battery pack is getting low. Recharge at the earliest convenience. (The battery indicator flashes in the viewfinder.)
Battery End	Continuous	On	High-speed flashing	The battery pack is dead. Recording is disabled. Connect a power source to DC IN and allow the battery pack to recharge without attempting to operate the camcorder. (The battery indicator flashes in the viewfinder.)
Temperature High	Intermittent	Flashing	Flashing	The internal temperature is high. Turn off the camcorder and allow it to cool down before operating it again.
Voltage Low	Intermittent	Flashing	Flashing	The DC IN voltage is low (level 1). Check the power source.
Insufficient Voltage	Continuous	On	High-speed flashing	The DC IN voltage is too low (level 2). Recording is disabled. Connect a different power source. (The battery indicator flashes in the viewfinder.)

Warning message	Warning sound	WARNING indicator	Tally/REC indicator	Cause and Solution
Clips Full	Continuous	On	High-speed flashing	The maximum number of clips that can be recorded on an SxS memory card has been reached. Recording or copying more clips is not possible. Replace immediately.
Last Clip Recording	Intermittent	Flashing	Flashing	The clip currently recording is the last clip that can be recorded, as the maximum number of clips has been reached. Prepare a new SxS memory card.
Clips Near Full	Intermittent	Flashing	Flashing	The number of additional clips that can be recorded on the SxS memory card is getting low. Replace at the earliest convenience.
Media(Proxy) Full	Continuous	On	High-speed flashing	Proxy data cannot be recorded because there is no remaining free space on the proxy data SD card. Replace immediately.
Clips(Proxy) Full	Continuous	On	High-speed flashing	The maximum number of clips that can be recorded on the proxy data SD card has been reached. Recording more clips is not possible. Replace immediately.
Media(Proxy) Near Full	Intermittent	Flashing	Flashing	The remaining free space on the proxy data SD card is getting low. Replace at the earliest convenience.
Last Clip(Proxy) Rec	Intermittent	Flashing	Flashing	The proxy data currently recording is the last clip that can be recorded, as the maximum number of clips has been reached. Prepare a new proxy data SD card.
Clips(Proxy) Near Full	Intermittent	Flashing	Flashing	The number of additional clips that can be recorded on the proxy data SD card is getting low. Replace at the earliest convenience.
Media(A) [1] Full	Continuous	On	High-speed flashing	When using the simultaneous recording function
Media(A) [1] Clips Full	Continuous	On	High-speed flashing	When using the simultaneous recording function
Media(A) [1] Near Full	Intermittent	Flashing	Flashing	When using the simultaneous recording function
Media(A) [1] Last Clip Rec	Intermittent	Flashing	Flashing	When using the simultaneous recording function

1) "(B)" is displayed for cards in slot B.

Caution and Operation Confirmation Display

The following caution and operation messages may appear in the center of the screen. Follow the instructions provided to resolve the issue.

Display indication	Cause and Solution
Battery Error Please Change Battery	An error was detected in the battery pack. Replace with a normal battery pack.
Backup Battery End Please Change	The remaining capacity of the backup battery is insufficient. Replace the backup battery.
Unknown Media(A) [1] Please Change	A memory card that has been partitioned or a memory card containing more clips that can be handled by the camcorder was inserted. The card cannot be used in the camcorder, and must be replaced.
Media Error Media(A) [1] Needs to be Restored	An error occurred on the memory card, and the card must be restored. Eject and then re-insert the card, then repair the card.
Media Error Cannot Record to Media(A) [1]	The memory card may be damaged, and can no longer be used for recording. Playback may be possible, so making a copy and replacing the memory card is recommended.
Media Error Cannot Use Media(A) [1]	The memory card may be damaged, and can no longer be used for recording or playback. The card cannot be used in the camcorder, and must be replaced.
Cannot Use Media(A) [1] Unsupported File System	A card using a different file system or an unformatted card was inserted. The card cannot be used in the camcorder, and must be replaced or formatted using the camcorder.
Media(A) [1] Error Playback Halted	Cannot continue playback because an error occurred while reading from the memory card. If the problem persists, make a copy and replace the memory card.
Media(A) [1] Error	Recording is stopped because an error occurred on the memory card. If the problem persists, replace the memory card.
Different Media is Inserted Cannot Use Media(A) [1]	Different media was inserted. Eject the inserted card, and insert a card of the same type as the previously inserted card.

1) "(B)" is displayed for cards in slot B.

Usage Precautions

The fan and battery are consumable parts that will need periodic replacement.
When operating at room temperature, a normal replacement cycle will be about 5 years.
However, this replacement cycle represents only a general guideline and does not imply that the life expectancy of these parts is guaranteed. For details on parts replacement, contact your dealer.

The life expectancy of the AC adaptor and the electrolytic capacitor is about 5 years under normal operating temperatures and normal usage (8 hours per day; 25 days per month). If usage exceeds the above normal usage frequency, the life expectancy may be reduced correspondingly.

Use and storage

Do not subject the camcorder to severe shocks

- The internal mechanism may be damaged or the body warped.
- If an accessory mounted on the accessory shoe is subjected to severe shock, the accessory shoe may be damaged. In such a case, stop using it and contact your dealer or a Sony service representative.

Do not cover the camcorder while operating

Putting a cloth, for example, over the camcorder can cause excessive internal heat build-up.

After use

Always turn off the POWER switch.

Before storing the camcorder for a long period

Remove the battery pack.

Shipping

- Remove the media before transporting the camcorder.
- If sending the camcorder by truck, ship, air, or other transportation service, pack it in the shipping carton of the camcorder.

Care of the camcorder

Remove dust and dirt from the surfaces of the lenses or optical filters using a blower.
If the body of the camcorder is dirty, clean it with a soft, dry cloth. In extreme cases, use a cloth moistened in a little neutral detergent, then wipe dry. Do not use organic solvents such as alcohol or thinners, as these may cause discoloration or other damage to the finish of the camcorder.

In the event of operating problems

If you should experience problems with the camcorder, contact a Sony service representative.

Use and storage locations

Store in a level, ventilated place.
Avoid using or storing the camcorder in the following places.

- In excessive heat or cold (operating temperature range: –5 °C to +40 °C (23 °F to 104 °F))
  Remember that in summer in warm climates the temperature inside a car with the windows closed can easily exceed 50 °C (122 °F).
- In damp or dusty locations
- Locations where the camcorder may be exposed to rain
- Locations subject to violent vibration
- Near strong magnetic fields
- Close to radio or TV transmitters producing strong electromagnetic fields.
- In direct sunlight or close to heaters for extended periods

To prevent electromagnetic interference from portable communications devices

The use of portable telephones and other communications devices near this camcorder can result in malfunction and interference with audio and video signals.
It is recommended that the portable communications devices near this camcorder be powered off.

Condensation

If the unit is suddenly taken from a cold to a warm location, or if ambient temperature suddenly rises, moisture may form on the outer surface of the unit and/or inside of the unit. This is known as condensation. If condensation occurs, turn off the unit and wait until the condensation clears before operating the unit. Operating the unit while condensation is present may damage the unit.

Fitting the zoom lens

It is important to fit the lens correctly, as otherwise damage may result. Be sure to refer to the section “Mounting and Adjusting the Lens” (page 25).

Viewfinder

Do not leave the camcorder with the eyepiece lens pointing directly at the sun.
The eyepiece lens can concentrate the sun’s rays and melt the interior of the viewfinder.

About the LCD panels

The LCD panel fitted to this unit is manufactured with high precision technology, giving a functioning pixel ratio of at least 99.99%. Thus a very small proportion of pixels may be “stuck”, either always off (black), always on (red, green, or blue), or flashing. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such “stuck” pixels may appear spontaneously. These problems are not a malfunction. Note that any such problems have no effect on recorded data.

Phenomena specific to CMOS image sensors

The following phenomena that may appear in images are specific to CMOS (Complementary Metal Oxide Semiconductor) image sensors. They do not indicate malfunctions.

White flecks

Although the CMOS image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases, caused by cosmic rays, etc. This is related to the principle of CMOS image sensors and is not a malfunction.
The white flecks especially tend to be seen in the following cases:

- when operating at a high environmental temperature
- when you have raised the master gain (sensitivity)
- when operating in Slow-Shutter mode

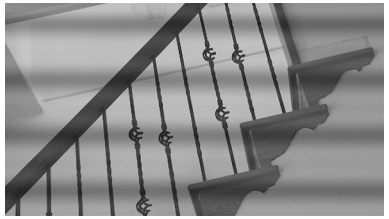
The problem may be alleviated by executing automatic black balance adjustment.

Aliasing

When fine patterns, stripes, or lines are shot, they may appear jagged or flicker.

Flicker

If recording is made under lighting produced by discharge tubes, such as fluorescent, sodium, or mercury-vapor lamps, the screen may flicker, colors may vary, or horizontal stripes may appear distorted.



In such cases, set the flicker-reduction function to auto mode (page 101).
If the frame rate selected for recording is close to the power-supply frequency, flicker may not be reduced sufficiently even if you activate the Flicker-Reduction function. In such cases, use the electronic shutter.

Focal plane

Owing to the characteristics of the pickup elements (CMOS image sensors) for reading video signals, subjects that quickly move across the screen may appear slightly skewed.

Flashband

The luminance at the top and bottom of the screen may change when shooting a flashlight beam or a light source that quickly flashes.You can use the supplied application software to correct clips that contain frames with flash bands.

Fragmentation

If pictures cannot be recorded/reproduced properly, try formatting the recording media. While repeating picture recording/playback with a certain recording media for an extended period, files in the media may be fragmented, disabling proper recording/storage. In such a case, make a backup of clips in the media then perform formatting of the media using Operation >Format Media (page 84) in the setup menu.

Notes on security

- SONY WILL NOT BE LIABLE FOR DAMAGES OF ANY KIND RESULTING FROM A FAILURE TO IMPLEMENT PROPER SECURITY MEASURES ON TRANSMISSION DEVICES, UNAVOIDABLE DATA LEAKS RESULTING FROM TRANSMISSION SPECIFICATIONS, OR SECURITY PROBLEMS OF ANY KIND.
- Depending on the operating environment, unauthorized third parties on the network may be able to access the unit. When connecting the unit to the network, be sure to confirm that the network is protected securely.
- Communication content may be unknowingly intercepted by unauthorized third parties in the vicinity of the signals. When using wireless LAN communication, implement security measures properly to protect the communication content.
- From a safety standpoint, when using the unit connected with the network, it is strongly recommended to access the Control window via a Web browser and change the access limitation settings from the factory preset values (page 67).
  Changing the password regularly is also recommended.
- Do not browse any other website in the Web browser while making settings or after making settings. Since the login status remains in the Web browser, close the Web browser when you complete the settings to prevent unauthorized third parties from using the unit or harmful programs from running.

About GPS

The GPS (Global Positioning System) is a system that calculates geographical location from highly accurate US space satellites. This system allows you to pinpoint your exact location on the earth. The GPS satellites are located in 6 orbits, 20,000 km above the earth. The GPS system consists of 24 or more GPS satellites.
A GPS receiver receives radio signals from the satellites, and calculates the current location of the receiver based on the orbital information (almanac data) and travel time of the signals, etc.
Determining a location is called "triangulating." A GPS receiver can determine the location's latitude and longitude by receiving signals from 3 or more satellites.

- As the positions of GPS satellites vary constantly, it may take longer to determine the location or the receiver may not be able to determine the location at all, depending on the location and time you use the camcorder.
- "GPS" is a system for determining geographic location by triangulating radio signals from GPS satellites. Avoid using the camcorder in places where radio signals are blocked or reflected, such as a shadowy place surrounded by buildings or trees, etc. Use the camcorder in open sky environments.
- You may not be able to record location information at locations or in situations where radio signals from the GPS satellites do not reach the camcorder as follows.
  - In tunnels, indoors or under the shade of buildings.
  - Between tall buildings or at narrow streets surrounded by buildings.
  - In underground locations, locations surrounded by dense trees, under an elevated bridge, or in locations where magnetic fields are generated, such as near high voltage cables.
  - Near devices that generate radio signals of the same frequency band as the camcorder: near 1.5 GHz band mobile telephones, etc.
- If you upload and share the images which are recorded when the setting "GPS" is "On," the record location may be exposed on the internet even if you do not intend to do so. If you do not want to record location information, select "Off" for "GPS" (page 91).

On triangulating errors

- If you move to another location right after setting "GPS" to "On" in the menu, it may take a longer time for the camcorder to start triangulating, compared to when you stay in the same place.
- Error caused by the position of GPS satellites
  The camcorder automatically triangulates your current location when the camcorder receives radio signals from 3 or more GPS satellites. The triangulating error allowed by the GPS satellites is about 10 m (33 feet). Depending on the environment of the location, the triangulating error can be greater. In this case, your actual location may not match the location on the map based on the GPS information. Meanwhile, the GPS satellites are controlled by the United States Department of Defense, and the degree of accuracy may be changed intentionally.
- Error during the triangulating process
  The camcorder acquires location information periodically during triangulating.

On the restriction of use of GPS

Use GPS in accordance with the regulations of the situation, the countries/regions of use.

On the geographic coordinate system

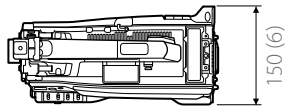
The "WGS-84" geographic coordinate system is used.

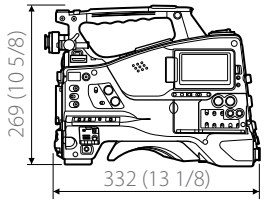
Specifications

General

Mass Approx. 3.6 kg (7 lb 15 oz) (body only)

Dimensions (Unit: mm (inch), excluding protrusions, body only) [1)]





1) The values for dimensions are approximate.

Power requirements
12 V (11 V to 17.0 V) DC

Power consumption
Approx. 22 W (body only, when recording in XAVC, with LCD monitor on)
Approx. 24 W (CBK-VF02 viewfinder, manual lens, microphone, when recording in XAVC, with LCD monitor on)

[Notes]
- Do not connect video lights with power consumption of 50 W or greater.
- When using a battery, do not allow the total power consumption of connected peripherals to exceed 40 W.
- When using the AC-DN10, do not allow the total power consumption of connected peripherals to exceed 50 W.
- When using the AC-DN2B, do not allow the total power consumption of connected peripherals to exceed 85 W.
- Connect only devices with current consumption of 1.8 A or lower to the DC OUT connector.

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

Storage temperature
–20 °C to +60 °C (–4 °F to +140 °F)

File system
exFAT, UDF

[Note]
UDF support is planned for a future upgrade.

Continuous operating time
Approx. 200 minutes (using BP-L80S)

Recording format (video)
- XAVC Intra
  - XAVC-I mode: CBG, 112 Mbps (max), MPEG-4 AVC/H.264
- XAVC Long
  - XAVC-L 50 mode: VBR, 50 Mbps (max), MPEG-4 AVC/H.264
  - XAVC-L 35 mode: VBR, 35 Mbps (max), MPEG-4 AVC/H.264
  - XAVC-L 25 mode: VBR, 25 Mbps (max), MPEG-4 AVC/H.264
- MPEG-2 Long GOP
  - MPEG HD422 mode: CBR, 50 Mbps, MPEG-2 422P@HL
  - MPEG HD420 HQ mode: VBR, 35 Mbps (max), MPEG-2 MP@HL
- MPEG IMX
  - CBR, 50 Mbps
- DVCAM
  - CBR, 25 Mbps
- Proxy
  - AVC/H.264 Main Profile 4:2:0 Long GOP
  - 1280×720/9 Mbps,
  - 640×360/3 Mbps,
  - 480×270/1 Mbps, 500 Kbps (VBR)

Recording format (audio)
- XAVC Intra
  - LPCM 24-bit, 48 kHz, 4-channel
- XAVC Long
  - LPCM 24-bit, 48 kHz, 4-channel
- MPEG-2 Long GOP
  - MPEG HD422 mode: LPCM 24-bit, 48 kHz, 4-channel
  - MPEG HD420 HQ mode: LPCM 16-bit, 48 kHz, 4-channel
- MPEG IMX
  - LPCM 16/24-bit, 48 kHz, 4-channel
- DVCAM
  - LPCM 16-bit, 48 kHz, 2-channel
- Proxy
  - AAC-LC, 128 Kbps, 2-channel

Recording/playback time
- XAVC Intra
  - XAVC-I mode
    - Approx. 60 minutes: Using SBP-64C/SBS-64G1B (64 GB)
- XAVC Long
  - XAVC-L 50 mode
    - Approx. 120 minutes: Using SBP-64C/SBS-64G1B (64 GB)
  - XAVC-L 35 mode
    - Approx. 170 minutes: Using SBP-64C/SBS-64G1B (64 GB)
  - XAVC-L 25 mode
    - Approx. 220 minutes: Using SBP-64C/SBS-64G1B (64 GB)
- MPEG-2 Long GOP
  - MPEG HD422 mode
    - Approx. 120 minutes: Using SBP-64C/SBS-64G1B (64 GB)
  - MPEG HD420 HQ mode
    - Approx. 180 minutes: Using SBP-64C/SBS-64G1B (64 GB)
- MPEG IMX
  - Approx. 120 minutes: Using SBP-64C/SBS-64G1B (64 GB)
- DVCAM
  - Approx. 220 minutes: Using SBP-64C/SBS-64G1B (64 GB)

[Note]
The recording and playback times are for a continuous recording as a single clip. The actual times may be shorter, depending on the number of clips recorded.

Recording frame rate
- XAVC Intra
  - XAVC-I mode
    - 1920×1080/59.94i, 50i, 29.97P, 23.98P, 25P
    - 1280×720/59.94P, 50P
- XAVC Long
  - XAVC-L 50 mode
    - 1920×1080/59.94P, 50P, 59.94i, 50i, 29.97P, 23.98P, 25P
    - 1280×720/59.94P, 50P
  - XAVC-L 35 mode
    - 1920×1080/59.94P, 50P, 59.94i, 50i, 29.97P, 23.98P, 25P
  - XAVC-L 25 mode
    - 1920×1080/59.94i, 50i
- MPEG-2 Long GOP
  - MPEG HD422 mode
    - 1920×1080/59.94i, 50i, 29.97P, 23.98P, 25P
    - 1280×720/59.94P, 50P, 29.97P, 23.98P, 25P
  - MPEG HD420 HQ mode
    - 1920×1080/59.94i, 50i, 29.97P, 23.98P, 25P
    - 1440×1080/59.94i, 50i
    - 1280×720/59.94P, 50P
- MPEG IMX
  - 720×486/59.94i
  - 720×576/50i
- DVCAM
  - 720×480/59.94i
  - 720×576/50i
- Proxy
  - Main line 1920×1080: 29.97P, 25P, 23.98P
  - Main line 1280×720: 59.94P, 50P, 29.97P, 25P, 23.98P

Input/Output Section

Inputs

GENLOCK IN: BNC type, 1.0 Vp-p, 75 ohms, unbalanced

TC IN: BNC type, 0.5 V to 18 Vp-p, 10 kilohms

AUDIO IN CH1/CH2:
XLR type, 3-pin, female
LINE / AES/EBU / MIC / MIC+48V switchable
LINE: +4, 0, –3 dBu
AES/EBU: AES3 compliant
MIC: –70 dBu to –30 dBu
MIC IN: XLR type, 5-pin, female, –70 dBu to –30 dBu
WRR: D-sub 15-pin
Analog CH1: –40 dBu
Digital CH1/CH2: –40 dBFS
SDI IN: SMPTE ST292-1/259 standard compliant
4-channel audio

Outputs

VIDEO OUT:
BNC type, SD analog composite/HD-Y switchable
SDI OUT 1/2:
BNC type, 0.8 Vp-p, unbalanced (3G HD/1.5G HD/SD switchable)
SMPTE ST424/425 Level-A/B, ST292-1/259 standard compliant
4-channel audio
AUDIO OUT:
XLR type, 5-pin, male, +4/0/–3 dBu (balanced)
TC OUT: BNC type, 1.0 Vp-p, 75 ohms
EARPHONE (stereo, minijack):
–11 dBu (reference level output, maximum monitor volume, 16-ohm load)
HDMI: Type A, 19-pin

Other

DC IN: XLR type, 4-pin, male, 11 V to 17 V DC
DC OUT: Round type 4-pin, 11 V to 17 V DC, 1.8 A maximum rated current
LENS: 12-pin, lens power source (11 V to 17 V DC, 1.0 A maximum rated current)
REMOTE: 8-pin
LIGHT: 2-pin
USB: 4-pin (type A) (2), 4-pin (type B)
VF: Rectangular type 26-pin, round type 20-pin
Network connector:
RJ45 type, 100BASE-TX (IEEE 802.3u), 10BASE-T (IEEE 802.3)

Camera Section

Imaging element
2/3-inch type, "Exmor" Full HD CMOS image sensor
1920 (H) × 1080 (V)
Type 3-chip RGB
Optical system
F1.4 prism system
ND filters
1: Clear
2: 1/4ND
3: 1/16ND
4: 1/64ND
Sensitivity F12 (system frequency: 59.94i)
(2000 lx, 89.9% reflectance, 3200K)
Minimum illumination
0.013 lx (F1.4, +42 dB, 16-frame accumulation)
Image S/N ratio
62 dB (Noise Suppression On)
Horizontal resolution
1000 TVL (TV lines) or higher
Modulation depth
45% or higher (27.5 MHz, screen center)
Black level 3 ±1% (Black set to [±0] in the setup menu)
Shutter speed
59.94i/P, 50i/P: 1/60 to 1/2000 sec.
29.97P: 1/40 to 1/2000 sec.
25P: 1/33 to 1/2000 sec.
23.94P: 1/32 to 1/2000 sec.
Slow shutter
2 to 8, 16 frames
Dynamic range
600%
Smear –135 dB

Audio Section

Sampling frequency
48 kHz
Quantization
16/24-bit
Headroom
20 dB (factory default) (20, 18, 16, 12 dB), EBUL
Frequency response
20 Hz to 20 kHz (±3 dB or less)
Dynamic range
90 dB (typical)
Distortion 0.08% or lower (–40 dBu input level)
Built-in speaker
Monaural, 300 mW output

Display Section

LCD monitor
Screen size
8.8 cm (3.5 inch) diagonal
Aspect ratio
16:9
Number of pixels
960 (H) × 540 (V)

Media Section

SxS card slots
Form factor: Express Card/34
Number of slots: 2
Connector: PCMCIA Express Card compliant
Write rate: 50 Mbps or higher
Read rate: 50 Mbps or higher
SD card slots
Proxy (1), Utility (1)

Lens Section (PXW-X400KC)

Lens mount
Sony 2/3-inch bayonet mount
Focal length
8.2 mm to 164 mm
Zoom Manual
Zoom factor
20
Maximum aperture ratio
1:1.9
Iris Auto/Manual switchable
F1.9 to F16 and C (Close)
Focus range
Auto/Manual switchable
Range
900 mm to ∞ (macro OFF)
10 mm to ∞ (macro ON, wide angle)
Filter diameter
M82 mm, 0.75 mm pitch
Macro ON/OFF selectable

Lens Section (PXW-X400KF)

Lens mount
Sony 2/3-inch bayonet mount
Focal length
8 mm to 128 mm
(35 mm equivalent: 31.5 mm to 503 mm)
Zoom Power/Manual switchable

Zoom factor
16
Maximum aperture ratio
1:1.9
Iris Auto/Manual switchable
F1.9 to F16 and C (Close)
Focus range
Auto/Manual switchable
Range
800 mm to ∞ (macro OFF)
50 mm to ∞ (macro ON, wide angle)
732 mm to ∞ (macro ON, telephoto)
Filter diameter
M82 mm, 0.75 mm pitch
Macro ON/OFF selectable

Supplied Accessories

Shoulder belt (1)
Cold shoe kit (1)
Lens mount cap
USB wireless LAN module (IFU-WLM3)
Protective cap (1)
Guard (1)
Before Using This Unit (1)
Operating Instructions (CD-ROM) (1)
Lens (supplied with PXW-X400KC) (1)
Autofocus lens (supplied with PXW-X400KF) (1)
Flange focal length (flange back) adjustment chart (1)
Stereo microphone (supplied with PXW-X400KC/PXW-X400KF) (1)
Viewfinder (supplied with PXW-X400KC/PXW-X400KF) (1)
Stereo microphone windscreen (supplied with PXW-X400KC/PXW-X400KF) (1)

Related Equipment

Power supply and related equipment

AC adaptor
AC-DN10/DN2B
Battery pack
BP-L80S
Battery charger
BC-L70/L90

Lens, viewfinder and related equipment

Lens 2/3-inch bayonet mount lens only
Viewfinder
HDVF-20A/200/L750/EL20/EL30
Viewfinder rotation bracket
BKW-401

Equipment for remote control

Remote control unit
RM-B170
RCP-1000/1500/1530
RCP-1001/1501

[Note]
Command network unit (CNU) is not supported.

HD camera adaptor

CA-FB70/TX70

[Note]
If SDI OUT2 is used when the CA-FB70 is attached, use an L-shaped adaptor.

Media adaptor

MEAD-SD02 (for SDXC cards)

XQD ExpressCard adaptor

QDA-EX1 (for XQD memory cards)

Recording media

SxS memory cards
SxS PRO+ series
SxS PRO series
SxS-1 series

Audio equipment

Microphone
ECM-678/674/673/680S
Microphone holder
CAC-12
Digital wireless receiver
DWR-S02D
UHF synthesizer tuner unit
WRR-855S/860C/861/862

Other peripheral devices

Tripod attachment
VCT-14/U14
Video light
UC-D200A (Nippon Video System - NIPROS)
Ultralight (Anton Bauer)
Pad CBK-SP01 soft-type shoulder pad
Wireless LAN adaptor
CBK-WA02
Network adaptor kit
CBK-NA1

Products for maintenance, ease of use/handling

Attachment bracket
A-2092-367-

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Notes

- Always make a test recording, and verify that it was recorded successfully.
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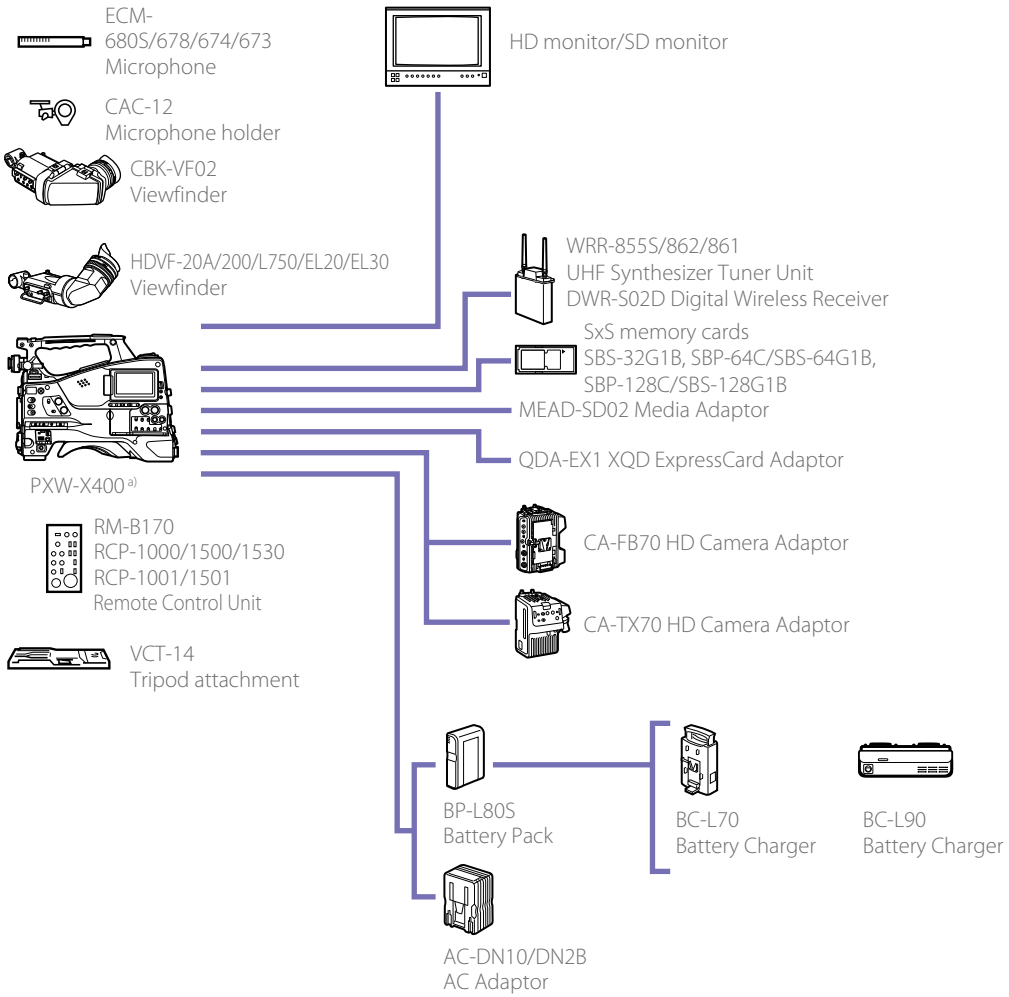
When the unit is used with a PC connection, download any device drivers, plug-ins, and application software you require from the following websites.

Sony Professional products website:

U.S.A.	http://pro.sony.com
Canada	http://www.sonybiz.ca
Latin America	http://sonypro-latin.com
Europe	http://www.pro.sony.eu/pro
Middle East, Africa	http://sony-psmea.com
Russia	http://sony.ru/pro/
Brazil	http://sonypro.com.br
Australia	http://pro.sony.com.au
New Zealand	http://pro.sony.co.nz
Japan	http://www.sonybsc.com
Asia Pacific	http://pro.sony-asia.com
Korea	http://bp.sony.co.kr
China	http://pro.sony.com.cn
India	http://pro.sony.co.in

Sony Creative Software, software download page:
http://www.sonycreativesoftware.com/download/software_for_sony_equipment

Chart of Peripheral Devices and Accessories



a) The carrying case is large enough to hold the camcorder with lens and microphone mounted. However, remove them if they protrude more than 25 cm (9 7/8 inches) from the front of the main unit.

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