SONY

SOLID-STATE MEMORY CAMCORDER

PXW-X500

XDCAM Power HAD FX SxS

MPEG HD422 HDMI XAVC DVCAM

OPERATION MANUAL English

1st Edition

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Before Using This Unit

After purchasing the Sony PXW-X500 Solid-State Memory Camcorder, it is necessary to set the date and time of the internal clock and to set the user language.

For details about how to make settings, see "Using the Unit for the First Time" (page 33).

Note

Before attaching/removing optional components or accessories to/from the PXW-X500 (referred to as "the camcorder"), be sure to turn the power of the camcorder off.

Chapter 1 Overview

Features

$^{2}/_{3}$-inch type Power HAD FX CCD

Employs a $^{2}/_{3}$-inch type IT (Interline Transfer) progressive scan image sensor, with 2.20 megapixels for Full HD (1920 × 1080) resolution, and a newly developed signal processor LSI that achieves a high sensitivity of F11 (1080/59.94i) or F12 (1080/50i) for shooting high quality video.

Slow & Quick Motion function

Supports slow and quick motion shooting as a special recording function. This function allows you to obtain special video effects when shooting slow-moving or fast-moving subjects. You can shoot full HD 1920×1080 resolution video at frame rates of up to 1080/120P *(see page 69)*.

Multi-format support

Supports next generation XAVC (Intra/Long) and MPEG4 SStP formats, in addition to existing MPEG HD and DVCAM formats, allowing the camcorder to record material in a diverse range of applications *(see page 43)*.

* Support for ProRes, DNxHD, and MPEG IMX additional formats is planned.

* Installation of the PXWK-501 Codec Option and PXWK-502 Codec Option Key (available separately) is required for ProRes and DNxHD.

Simultaneous recording function

You can record the same video simultaneously onto two SxS memory cards using the simultaneous recording function. This is useful for making a video backup while shooting *(see page 71)*.

Wireless function

The wireless LAN connection function and the supplied IFU-WLM3 USB Wireless LAN Module enable you to configure and operate the camcorder from a smartphone or tablet *(see page 80)*.

Camcorder shooting/recording system configuration

A shooting/recording system can be configured using the pre-installed 50-pin interface, mounting a CA-FB70/TX70 HD Camera Adaptor on the camcorder, and connecting to a CCU *(see page 154)*.

GPS function

The camcorder can record location information and time information for recorded video using a built-in GPS module, enabling you to trace shooting locations in post-production *(see page 79)*.

Pool-feed function

The camcorder can record external input using the pre-installed pool-feed function *(see page 155)*.

Other functions

- The ALAC (automatic lens aberration correction) function greatly reduces specific patterns of chromatic aberration caused by the lens *(see page 133)*.
- The contrast of the video can be appropriately adjusted using the gamma correction function, which utilizes the dynamic range of the Power HAD CCD sensor *(see page 122)*. You can also create customized gamma curves using user gammas *(see page 150)*.
- The focus assist function provides for easier focusing in the viewfinder *(see page 25)*.

Software Downloads

When the unit is used with a PC connection, download any device drivers, plug-ins, and application software you require from the following websites.

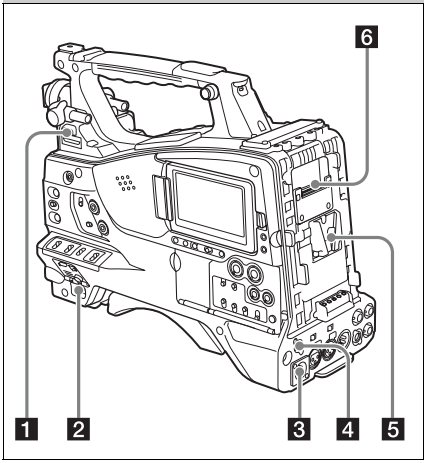
Sony Professional products website:

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

Locations and Functions of Parts and Controls

Power Supply



1 LIGHT switch

Determines how a video light connected to the LIGHT connector *(see page 12)* 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)

To operate the camcorder from an AC power supply, connect an optional DC power cord to this terminal and then connect the cord to the DC output terminal of the BC-L70, BC-L160, BC-L500, or another battery charger.

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

Supplies power for an optional WRR-855S/860C/861/862 UHF Synthesized Diversity Tuner or HDVF-L750/L770 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.

For details, see "Preparing a Power Supply" (page 28).

For details, see "Attaching a UHF Portable Tuner (for a UHF Wireless Microphone System)" (page 37).

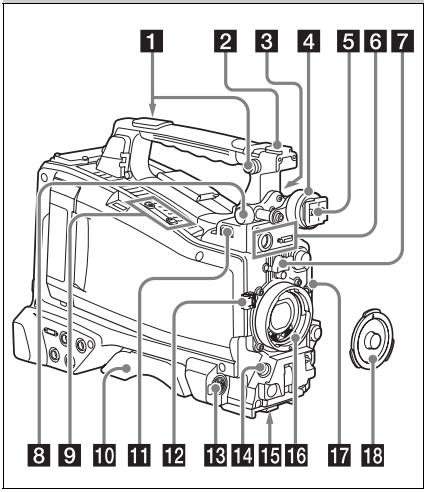
Note

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 Shoulder strap fitting

Attach the supplied shoulder strap *(see page 41)*.

2 Accessory fitting shoe

Attach an optional accessory, such as a video light *(see page 41)*.

3 Viewfinder front-to-back positioning lever

Adjust the viewfinder position in the front-to-back direction *(see page 30)*.

4 Viewfinder left-to-right positioning ring

Loosen this ring to adjust the left-to-right position of the viewfinder *(see page 30)*.

5 Viewfinder fitting shoe

Attach the viewfinder *(see page 29)*.

6 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.

7 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.

8 Viewfinder front-to-back positioning knob (LOCK knob)

Loosen this knob to adjust the front-to-back position of the viewfinder *(see page 30)*.

9 Fitting for optional microphone holder

Fit an optional CAC-12 Microphone Holder *(see page 36)*.

10 Shoulder pad

Raise the shoulder pad fixing lever to adjust the position in the front-to-rear direction. Adjust the position for maximum convenience when operating the camcorder on your shoulder *(see page 42)*.

11 LIGHT (video light) connector (2-pin, female)

A video light with a maximum power consumption of 50 W, such as the Anton Bauer Ultralight 2 or equivalent, can be connected *(see page 41)*.

12 Lens cable clamp

Clamp the lens cable.

13 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.

14 LENS connector (12-pin)

Connect the lens cable to this connector.

Note

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

15 Tripod mount

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

16 Lens mount (special bayonet mount)

Attach the lens.

Consult a Sony service representative for information about available lenses.

17 Lens locking lever

After inserting the lens in the lens mount, rotate the lens mount ring with this lever to lock the lens in position.

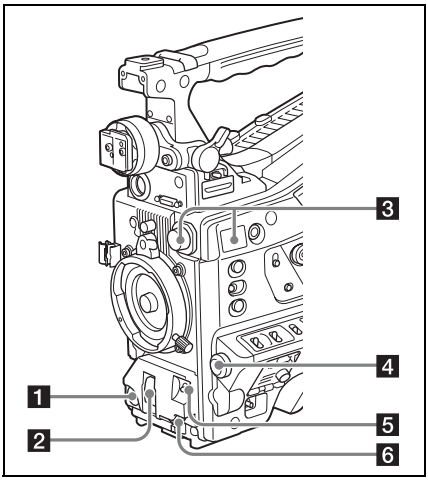
After locking the lens, be sure to use the lens mount securing rubber to prevent the lens from becoming detached.

18 Lens mount cap

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

Operating and Connectors Section

Front



1 REC START (recording start) button

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

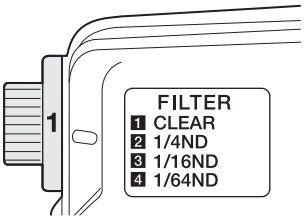
2 SHUTTER selector

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.

For details, see "Setting the Electronic Shutter" (page 47).

3 FILTER selector

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 selector 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 selector positions. This allows you to automatically obtain optimum white balance for the current shooting conditions in linkage with the filter selection.

For details, see "Adjusting the White Balance" (page 45).

4 MENU knob

Changes the item selection or a setting within the menu *(see page 103)*.

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 *(see page 15)* 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.

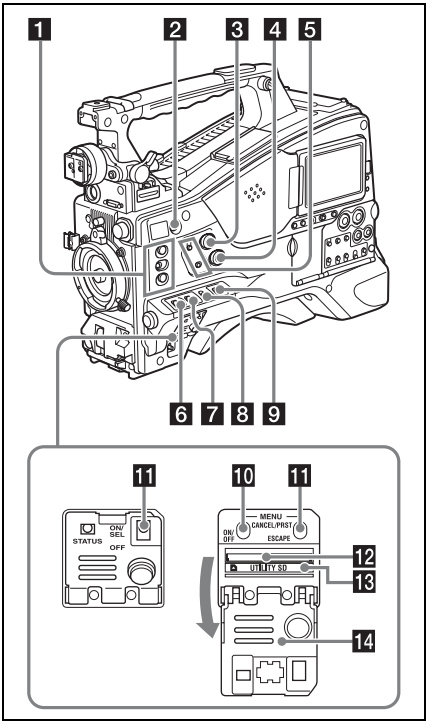
If you push the switch to the WHITE side once more during the automatic white balance adjustment, the adjustment is cancelled and the white balance setting returns to the original setting.

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

6 MIC (microphone) LEVEL control

Adjusts the input level of audio channels 1, 2, 3 and 4 *(see page 51)*.

Right side (near the front)



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

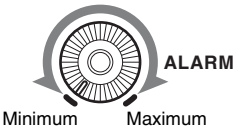
You can assign the desired functions to these switches using Operation >Assignable Switch in the setup menu *(see page 140)*.
Off is assigned to the ASSIGN. 1/2/3 switches as the factory default setting.
The ASSIGN. 1/3 switches are provided with an indicator to show whether a function is assigned to the switch (ON) or not (OFF).

2 COLOR TEMP. (color temperature) button

Can be used as an assignable switch.
This button is reserved for use in a future upgrade to change the color temperature when shooting.

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.

Position of lower switch: CH-1/2

Position of 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

Position of lower switch: CH-3/4

Position of 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. (Under Maintenance >Audio in the setup menu, Headphone Out must be set to STEREO.)

6 ASSIGN. (assignable) 0 switch

You can assign the desired function to this switch using Operation >Assignable Switch in the setup menu *(see page 140)*.
Off is assigned to this switch 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 selector

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 *(see page 114)*. (The 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 and is particularly effective 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 *(see page 13)* 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

Under some conditions of lighting or the shooting subject, adjustment by ATW may fail to provide proper colors.

Examples:

- When the subject of a substantially single color like sky, sea, ground, grass, or certain kinds of flowers occupies most of the frame area,
- 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 MENU ON/OFF switch

To use this 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.

11 MENU CANCEL/PRST (preset) / ESCAPE switch

To use the MENU CANCEL/PRST/ESCAPE 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 cancelled. 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 cancelled 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 *(see page 56)*. The window consists of five pages, which are switched each time the switch is pushed upward. Each page is displayed for about 10 seconds.

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

12 UTILITY SD card slot

Insert an SD card for saving camcorder settings.

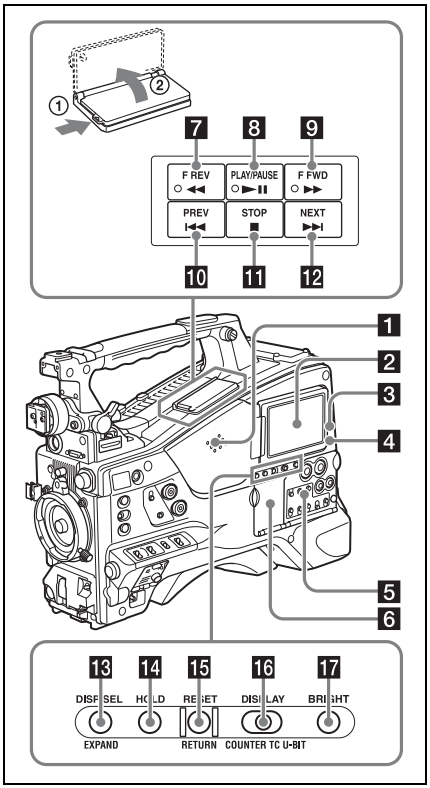
13 ACCESS indicator

Lights up orange when the SD card is being accessed.

14 Switch cover

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

Right side (near the rear)



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 *(see page 159)*.

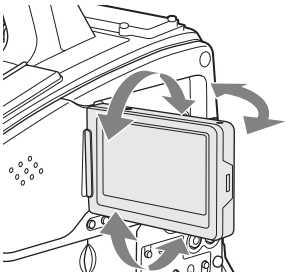
If you connect earphones to the EARPHONE jack, the speaker output is suppressed automatically.

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 *(see page 22)*.

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



3 WARNING indicator

Lights up or flashes when an abnormality occurs *(see page 159)*.

4 ACCESS indicator

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

5 Protection cover of the audio control section

Open to access the audio control section *(see page 18)*.

6 Protection cover of the thumbnail screen operations section

Open to access the thumbnail screen operations section *(see page 18)*.

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 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	Meaning
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 of the time data display, see page 23.

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 *(see page 19)* and the F-RUN/SET/R-RUN switch *(see page 18)*, this button resets the display as follows.

Settings of switches	To reset
DISPLAY switch: TC **PRESET/REGEN/CLOCK switch:** PRESET **F-RUN/SET/R-RUN switch:** SET	Timecode to 00:00:00:00
DISPLAY switch: U-BIT **PRESET/REGEN/CLOCK switch:** PRESET **F-RUN/SET/R-RUN switch:** SET	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.

For details, see "Setting Time Data" (page 54).

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 *(see page 23)*.
COUNTER: Display the duration.
TC: Display timecode.
U-BIT: Display user bits data.

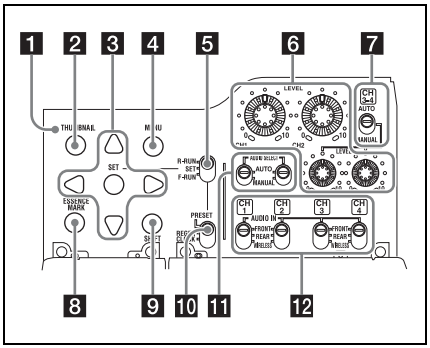
17 BRIGHT (brightness) button

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 *(see page 92)* 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 *(see page 94)*.

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.

For details, see "Setting the Timecode" (page 54) and "Setting the User Bits" (page 54).

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) switch

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 you have recorded clips by using planning metadata that defines names for Shot Mark 0 to Shot Mark 9, the defined names are displayed instead of the above item names in the list.

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

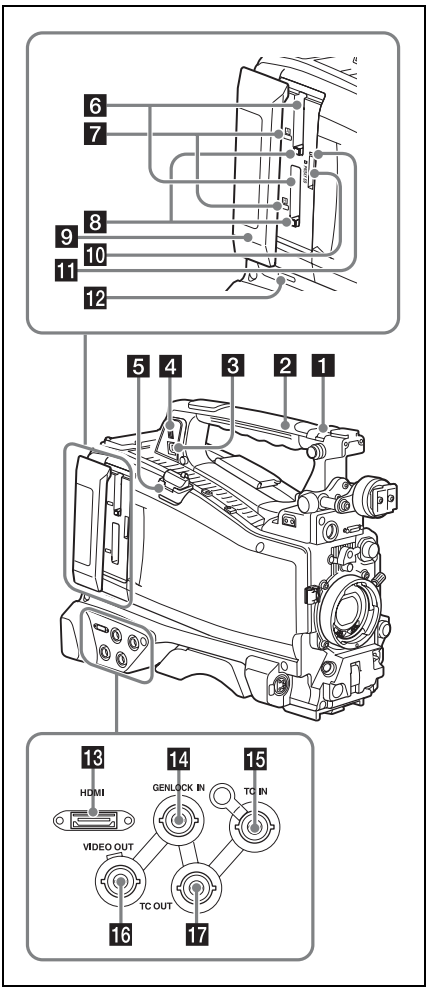
Select the audio input signals to be recorded on audio channels 1, 2, 3 and 4.

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

Left side and upper section



1 ASSIGNABLE 4/5 switches

You can assign the desired functions to these switches using Operation >Assignable Switch in the setup menu *(see page 141)*.

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 without ExpressCard slot 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 an optional IFU-WLM3 USB Wireless LAN module to connect the camcorder with smartphones, tablets, or other devices by Wi-Fi.

See "Attaching the IFU-WLM3" (page 80).

6 SxS memory card slots

These two slots (A and B) can receive SxS memory cards or other recording media *(see page 60)*.

7 ACCESS indicators

Indicates the state of slots A and B *(see page 60)*. You can check whether the indicators are lit even when the slot cover is closed.

8 EJECT (SxS memory card) button

To remove the recording media from the slot, press the EJECT button to release the lock, then press the button once more. This makes the media come out of the slot partially *(see page 61)*.

9 Slot cover

Slide to the left and right to open and close.

10 PROXY SD card slot

Insert an SD card for recording proxy data.

11 ACCESS indicator

Lights up orange when the SD card is being accessed.

12 SLOT SELECT (SxS memory card select) button

When SxS memory cards are loaded in both card slots A and B, press this button to select the card you want to use *(see page 61)*.

13 HDMI connector

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

14 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. Available reference signals vary depending on the current system frequency as shown in the following table.

System frequency	Available reference signals
1080/59.94i	1080/59.94i, 480/59.94i
1080/59.94P	1080/59.94i, 480/59.94i
1080/50P	1080/50i, 576/50i
1080/29.97P	1080/59.94i, 480/59.94i
1080/23.98P (PsF output)	1080/23.98PsF, 480/59.94i
1080/23.98P (Pulldown output)	1080/59.94i, 480/59.94i
720/59.94P	1080/59.94i, 480/59.94i
720/29.97P	1080/59.94i, 480/59.94i
720/23.98P	1080/59.94i, 480/59.94i
480/59.94i	1080/59.94i, 480/59.94i
1080/50i	1080/50i, 576/50i
1080/25P	1080/50i, 576/50i
720/50P	1080/50i, 576/50i
720/25P	1080/50i, 576/50i
576/50i	1080/50i, 576/50i

(Genlock for the camera module supports horizontal sync signals only.) Use Maintenance >Genlock in the setup menu to adjust the genlock H-phase (phase of horizontal sync signal).

15 TC IN (timecode input) connector (BNC type)

To apply an external lock to the timecode of the camcorder, input the reference timecode.

For details, see "Setting the Timecode" (page 54).

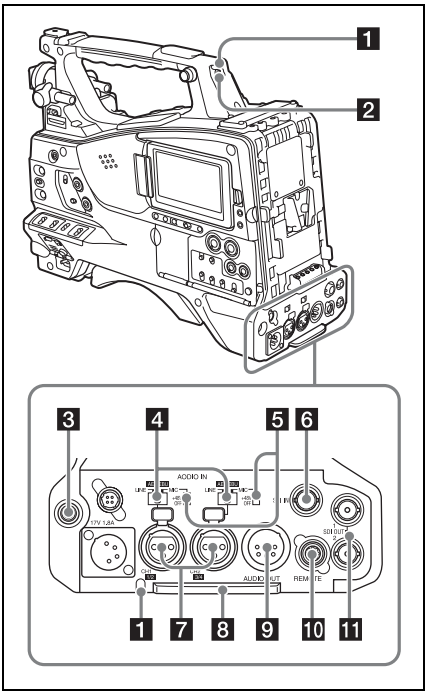
16 VIDEO OUT connector (BNC type)

Outputs video signals for monitoring.

17 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.

Rear



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 *(see page 16)* 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.

For details, see "Operation Warnings" (page 159).

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 selectors

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)

These are audio input connectors for channels 1 and 2 to which you can connect 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

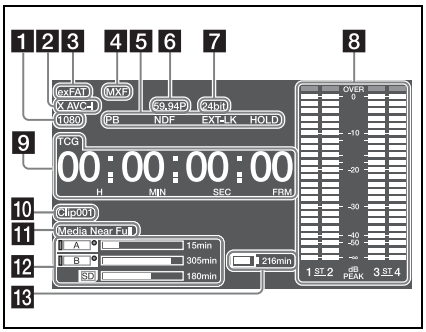
Before connecting/disconnecting the Remote Control Unit to/from the camcorder, be sure to turn off the camcorder POWER switch.

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 Resolution

Indicates the resolution of the output video.

2 Recording format

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

3 Recording mode

4 File format

5 Status display

PB: Appears during play.

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.

6 System frequency

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

7 Audio format

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

Indication	Recording format
16bit	• HD420 HQ • DVCAM
24bit	• HD422 50 • XAVC Intra • XAVC Long • SStP

8 Audio level indicators

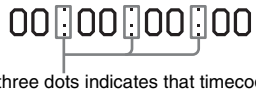
Indicates the audio recording or playback levels of channels 1 to 4.

9 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
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 indicates that timecode is displayed in the hold mode.

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 Warning indicator area

Displays warnings when trouble with recording or moisture condensation occurs.

For details, see "Operation Warnings" on page 159.

12 Remaining media capacity indicator

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

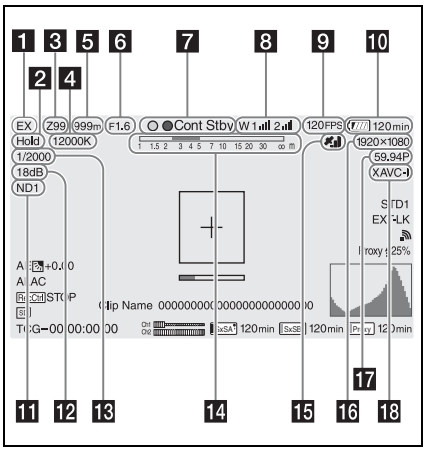
13 Remaining battery capacity indicator

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

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.

Display information (top of screen)



1 Extender indicator

Displays "EX" when the lens extender function is ON.

2 White balance mode indicator

Displays the currently selected white balance automatic adjustment memory.

ATW: ATW (Auto Tracing White Balance) operating mode
Hold: ATW (Auto Tracing White Balance) hold mode
W:A: Memory A mode
W:B: Memory B mode
W:C: Memory C mode

W:P: Preset mode

3 Zoom position indicator (with lens mounted)

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

4 Color temperature indicator

Displays the color temperature of the white balance.

5 Focus position indicator (with lens mounted)

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

6 Iris position indicator (with lens mounted)

Displays the iris position setting.

7 Recording mode indicator

Displays the following recording operation states of the camcorder.

Indicator	Meaning
●Rec	Recording in progress
Stby	Recording stopped in clip continuous recording mode, or recording standby in all other modes
●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
CALL (red)	Call received from external connected device

Green tally indicator

Indicates 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)

8 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.

9 S&Q Motion (Slow & Quick) frame rate indicator

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

10 Battery capacity/voltage display

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

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

11 ND filter indicator

Displays the position number of the currently selected ND filter *(see page 13)*.

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).

12 Gain indicator

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

13 Shutter mode/shutter speed indicator

Displays the shutter mode or shutter speed.

See “Setting the Electronic Shutter” (page 47).

14 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.

15 GPS indicator

Displays the GPS status.

See "Obtaining Location Information (GPS)" (page 79).

16 Recording format (picture size) indicator

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

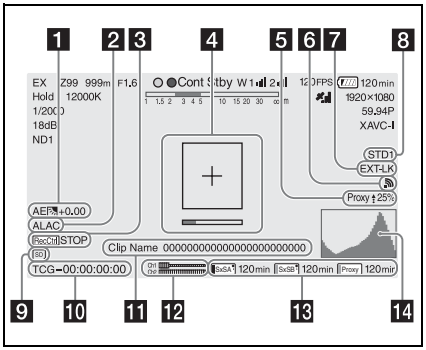
17 Recording format (system frequency and scan method) indicator

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

18 Recording format (codec) indicator

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

Display information (bottom of screen)



1 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
	Standard mode
	Spotlight mode

2 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.

3 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.

4 Focus assist indicator

Displays the detection frame (Focus Area Marker) indicating the region for detecting focus, and a bar graph (Focus Assist Indicator) indicating the level of focus within the detection frame.

5 Proxy indicator

Displays and transfer rate (%) during proxy file transfer. When transfer finishes, disappears to indicate 100% transfer.

6 Wi-Fi indicator

Displays the Wi-Fi setting and reception state using icons.

State			Icon
Operation >Display On/Off >Wi-Fi Condition	**Maintenance >Wi-Fi >Setting**	**Wi-Fi operating state**	
Off	–	–	–
On	Off	–	–
	Access Point	Initializing	AP (flashing)
		Waiting/ Connecting	AP
	Station	Initializing	 (flashing)
		Access point search	
		Access point connection	     Icon varies with signal strength.
		Access point authorization error	

7 Timecode external lock indicator

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

8 Gamma indicator

Display the gamma setting.

Menu settings				Indicator
Operation >Display On/Off >Gamma	**Paint >Gamma**			
	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
		User	User 1	User 1
			User 2	User 2
			User 3	User 3
			User 4	User 4
			User 5	User 5

9 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	State
SD	SD card mounted
SD	SD card protected
SD (flashing)	SD card mounting

10 Time data display

Displays the remaining recording/playback time, timecode, user bits, etc., as selected by the DISPLAY switch *(see page 17)*.

11 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.

12 Audio level meter indicators

Displays the levels of audio channels 1 and 2.

13 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

Example: SxS slot A ("SxSA"). The icons for SxS slot B are labeled "SxSB."

Icon	Media state
–	Media not inserted or not mounted
SxSA	Media mounted
SxSA (flashing)	Mounting media
SxSA (orange bar)	Recording (active)
SxSA (green lamp)	Playback (active)
SxSA (orange bar + green lamp)	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 in use
Proxy (orange bar)	Recording (active)

The remaining recording time is displayed numerically.

14 Video signal indicator

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

Chapter 2 Preparations

Preparing a Power Supply

For safety, use only the Sony battery packs and AC adaptors listed below.
- BP-L80S Lithium-ion Battery Pack
- AC-DN2B/DN10 AC Adaptor

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

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.

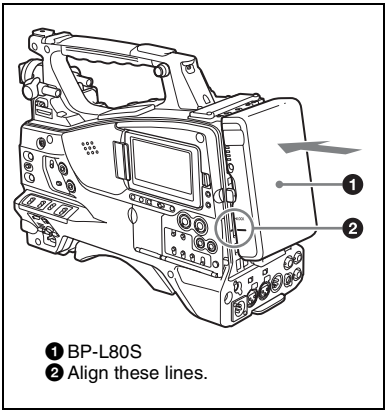
For details on the battery charging procedure, refer to the battery charger operation manual.

Note on using the battery pack

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

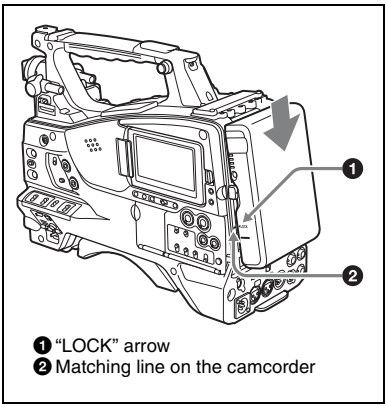
To attach the battery pack

1 Press the battery pack against the back of the camcorder, aligning the line on the side of the battery pack with the matching line on the camcorder.



❶ BP-L80S
❷ Align these lines.

2 Slide the battery pack down until its "LOCK" arrow points at the matching line on the camcorder.



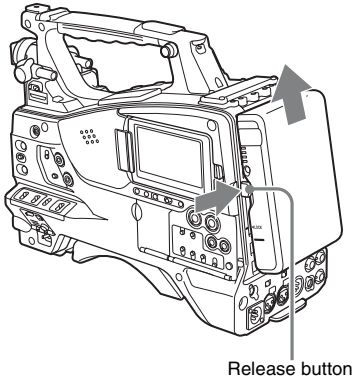
❶ "LOCK" arrow
❷ Matching line on the camcorder

Note

If the battery pack is not attached correctly, the terminals may become damaged.

To detach the battery pack

Holding the release button in, pull the battery pack up.

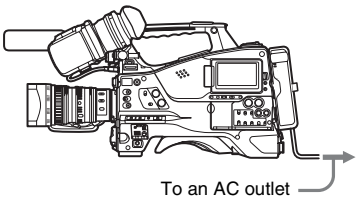


Notes

- During recording and playback (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), 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.

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 the Viewfinder

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

The viewfinder is supplied separately.

The following procedure is an example for attaching the HDVF-20A.

For procedures for attaching other viewfinders, refer to a manual supplied with each viewfinder.

Attaching the Viewfinder

Note

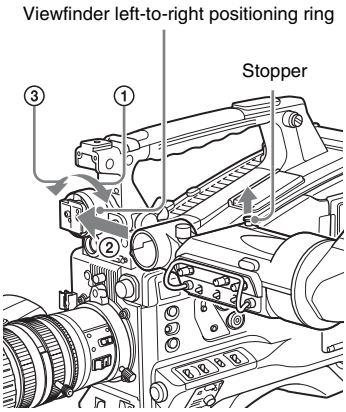
When attaching the viewfinder, take note of the following points.

- Be sure to the power off the camcorder before coupling the viewfinder connector to the camcorder's VF connector (20-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. If the coupling is loose, noise may appear on the video or the tally light may not operate properly.

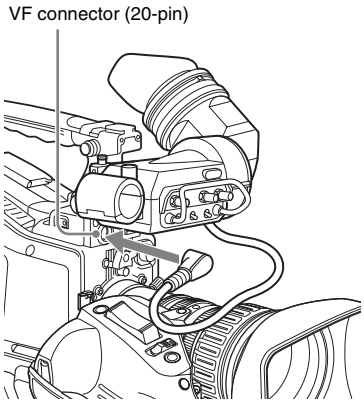
For more information about the connection of the viewfinder and camcorder, contact a Sony service representative.

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 (20-pin).

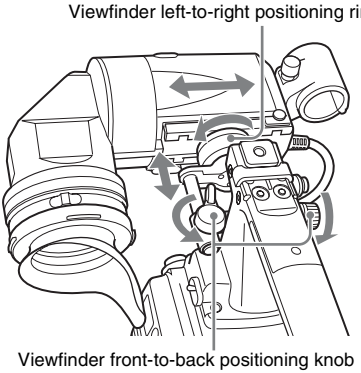


Detaching the viewfinder

You can carry out this by following the attaching procedure in reverse order, but there is an additional action to take: when detaching the viewfinder from the fitting shoe, pull up the stopper.

Adjusting the Viewfinder Position

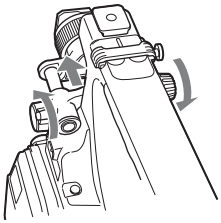
To adjust the viewfinder left-right position, loosen the left-right positioning ring, and to adjust the front-back position, loosen the front-to-back positioning knob.



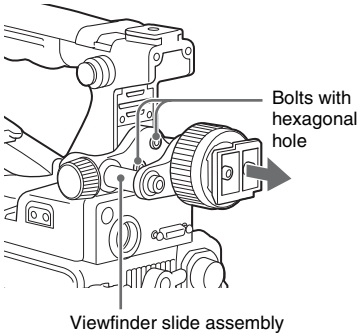
Using the BKW-401 Viewfinder Rotation Bracket

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.

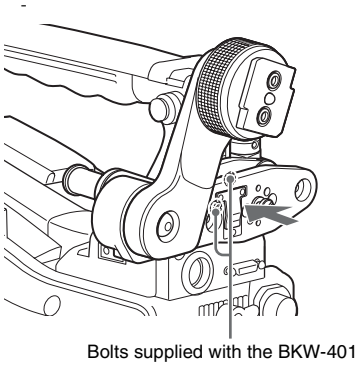
1 Loosen the front-to-back viewfinder positioning levers and the front-to-back viewfinder positioning knobs, and then pull the viewfinder slide assembly forward.



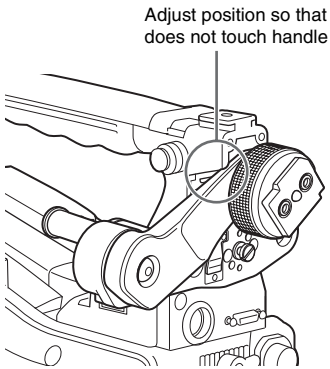
2 **Using a 2.5 mm diameter hexagonal wrench, detach the viewfinder slide assembly.**



3 **Attach the BKW-401 with the supplied bolts.**



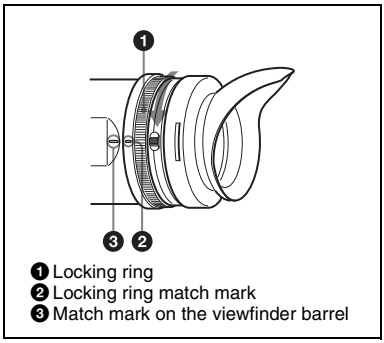
4 **Adjust the front-to-back position so that the arm of the BKW-401 does not touch the handle when it is raised.**



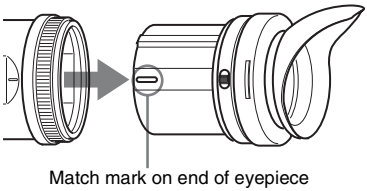
Detaching the Eyepiece

Removing the eyepiece gives a clearer view of the screen from further away. It is also easy to remove dust from the viewfinder screen and mirror when the eyepiece is detached.

1 **Turn the eyepiece locking ring fully counterclockwise, to align the red marks on the locking ring and the viewfinder barrel.**



2 **Detach the eyepiece.**



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

To reattach the eyepiece

1 **Align the red marks on the eyepiece locking ring and the viewfinder barrel.**

2 **Align the red mark on the end of the eyepiece end with the red marks on the eyepiece locking ring and the viewfinder barrel. Then insert the eyepiece into the viewfinder barrel.**

3 **Turn the eyepiece locking ring clockwise until its "LOCK" arrow points at the red mark on the viewfinder barrel.**

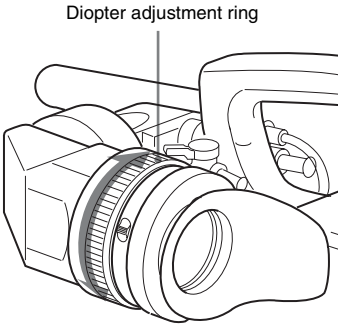
When the eyecup is worn out, replace it with a new one.

For details of a replacement eyecup, contact a Sony service representative.

Adjusting the Viewfinder Focus and Screen

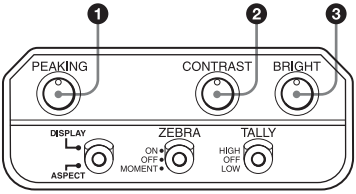
To adjust the viewfinder focus

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



To adjust the viewfinder screen

Adjust the brightness, contrast, and peaking of the viewfinder screen with the controls shown below.



❶ PEAKING control
❷ CONTRAST control
❸ BRIGHT control

Using the Unit 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 103).

Setting the time zone

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

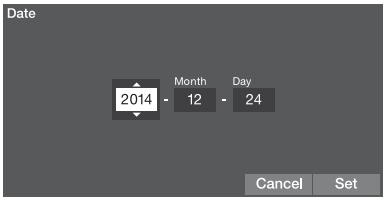
1 Select Operation >Time Zone >Time Zone in the setup menu.

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.



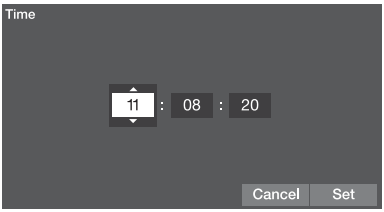
2 Turn the MENU knob to select the year, month, or day, and then press the knob.
The selected year, month, or day becomes editable.

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 with 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 for 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

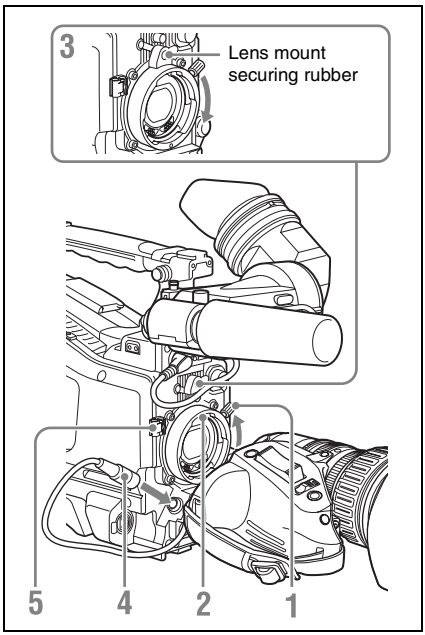
Note

Always power the camcorder off before mounting or removing a lens.

For information about using the lens, refer to the operation manual for the lens.

Note

The lens is supplied separately.



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 above.

4 Connect the lens cable to the LENS connector.

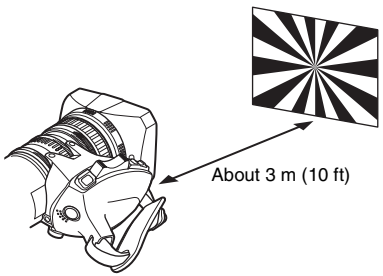
5 Secure the lens cable with the cable clamp.

If you have attached an aberration correction lens

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

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). 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.

Carrying out the adjustment

1 **Set the iris to manual.**

2 **Open the iris, position the supplied flange focal length adjustment chart approximately 3 meters (10 ft) away from the camcorder, and arrange the lighting to obtain a satisfactory video output.**

3 **Loosen the fixing screws on the F.f or F.B ring (flange focal length adjustment ring).**

4 **Use manual or power zoom to set the lens to telephoto.**

5 **Point the camcorder at the chart by turning the focus ring and focus on it.**

6 **Set the zoom ring to wide angle.**

7 **Turn the F.f or F.B ring until the chart is in focus, being careful not to disturb the focus ring.**

8 **Repeat steps 4 to 7 until the chart stays in focus all the way from wide angle to telephoto.**

9 **Tighten the F.f or F.B ring fixing screws.**

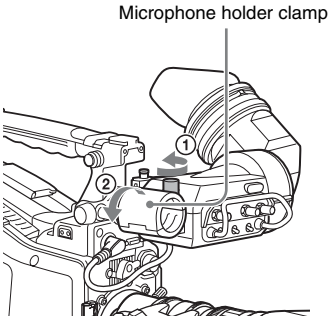
Preparing the Audio Input System

Connecting a Microphone to the MIC IN Connector

You can attach the optional ECM-680S stereo microphone to the microphone holder of the viewfinder (optional).
The following procedure is an example for attaching a microphone holder to the HDVF-20A.

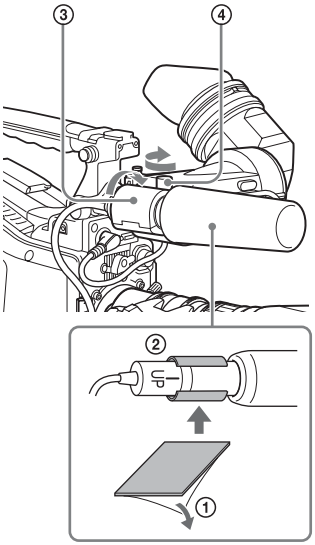
For procedures for attaching a microphone holder to other viewfinders, refer to the manual supplied with each viewfinder.

1 **Loosen the screw and open the microphone holder clamp.**



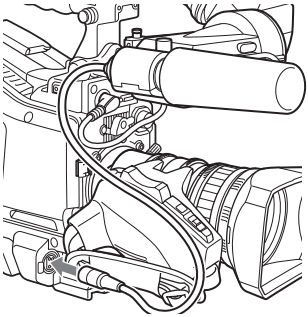
2 **Place the microphone in the microphone holder.**

① Wind the microphone spacer around the microphone, while peeling off the protective sheets on both sides of the microphone spacer.
② Place the microphone in the holder so that “UP” is at the top.
③ Close the microphone holder.
④ Tighten the screw.



On how to perform this operation, 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.

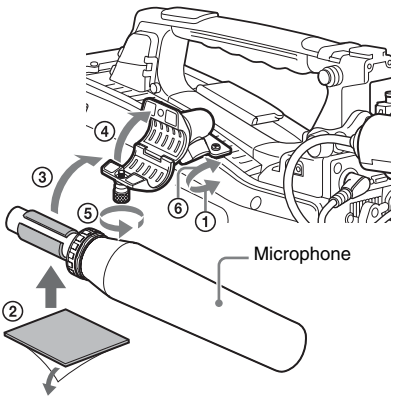
Connecting Microphones to the AUDIO IN Connectors

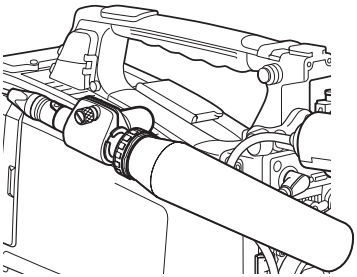
You can connect up to two monaural microphones to the AUDIO IN CH-1/CH-2 connectors, using an optional CAC-12 Microphone Holder.
The following is the procedure for attaching an electret condenser microphone such as the ECM-674/678.

On how to attach the CAC-12, refer to the operation manual for the CAC-12.

1 Attach the electret condenser microphone.

① Loosen the ball joint lock lever.
② Wind the microphone spacer (sheet type, supplied with the microphone) around the microphone, while peeling off the protective sheets on both sides of the microphone spacer.
③ Place the microphone in the holder so that “UP” is at the top.
④ Close the microphone holder.
⑤ Tighten the screw.
⑥ Position so that the microphone does not interfere with the viewfinder and tighten the ball joint lock lever.

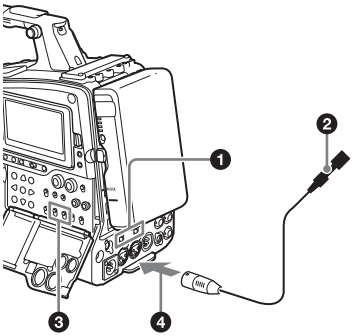




2 Connect the microphone cable to the AUDIO IN CH-1 or CH-2 connector.

3 Set the switches as follows.

- Set the AUDIO IN switch to the MIC position.
- Set the +48V/OFF switch as follows, according to the type of microphone used.
  Internal power supply: OFF
  External power supply: +48V
- Set the AUDIO IN CH1/CH2 switch for the channel to which the microphone is connected to REAR.



❶ AUDIO IN selectors
❷ Monaural microphone
❸ AUDIO IN CH1/CH2 switches
❹ To AUDIO IN CH-1 or CH-2 connector

4 Switch the input level to match the sensitivity of the microphone used.

Switch the input level by changing the setting of Maintenance >Audio >Rear MIC CH1/CH2 Ref in the setup menu (factory default setting is –60 dB). *For details, see page 129.*

Notes

- If the input level on the camcorder is not at an appropriate setting for the microphone sensitivity, loud sounds may be distorted, and the signal-to-noise ratio may be affected.
- In order for the AUDIO IN CH-1 and CH-2 connectors on the camcorder to be able to provide a phantom 48 V power supply, female XLR connectors (3-pin) are fitted. If the microphone cable has a female connector, use an adaptor.
- When you detach a CAC-12 Microphone Holder once you have attached it to the camcorder, be careful not to lose the two screws fixing the CAC-12 (in step 1). After detaching the CAC-12, be sure to put the two screws back into their original places.

Attaching a UHF Portable Tuner (for a UHF Wireless Microphone System)

To use a Sony UHF wireless microphone system, power the camcorder off and then fit one of the following UHF portable tuners.

- DWR-S01D Digital Wireless Receiver
- WRR-855S UHF Synthesized Tuner Unit
- WRR-860A/861/862 UHF Synthesized Diversity Tuner

For details of these units, refer to the operation manuals for them.

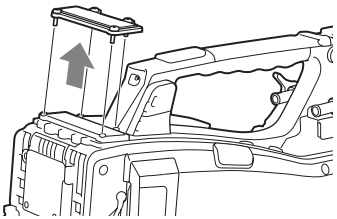
Note

The optional WRR Mount Bracket (service part number: A-8278-057-B) is required to fit the WRR-862.

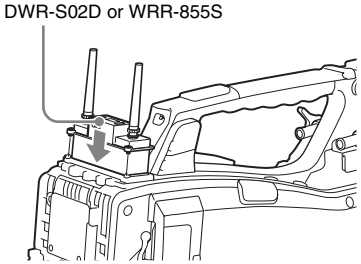
For details, contact your vendor or a Sony service representative.

To fit the DWR-S02D or WRR-855S

1 Remove the four fixing screws holding the cover of the portable tuner/receiver housing slot located in the rear of the camcorder to remove the cover.



2 Insert the DWR-S02D or WRR-855S into the housing slot, and fasten the four fixing screws.



3 Set the AUDIO IN selector for the channel to which you want to input audio signal to WIRELESS *(see page 19)*.

To fit the WRR-862 (when using a BP-L80S Battery Pack)

1 Attach the WRR tuner fitting (not supplied; service part number: A-8278-057-B) to the back of the camcorder.

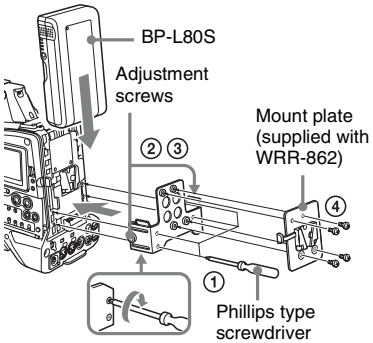
① Use a Phillips type screwdriver to tighten the four screws placed in the tuner fitting. For three of these screws, insert the screwdriver through the corresponding hole and tighten the screw.

Note

Make sure that all four screws are fully tightened.

② Loosen the adjustment screws on the tuner fitting.
③ Adjust the tuner fitting position for a BP-L80S Battery Pack to be attached, and tighten the adjustment screws to fix its position.
④ Attach the mount plate supplied with the WRR-862.

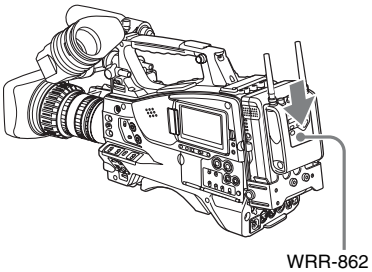
About the WRR tuner fitting (service part number: A-8278-057-B), contact a Sony service or sales representative.



2 Attach the battery pack.

On how to attach the battery pack, see "To attach the battery pack" on page 28.

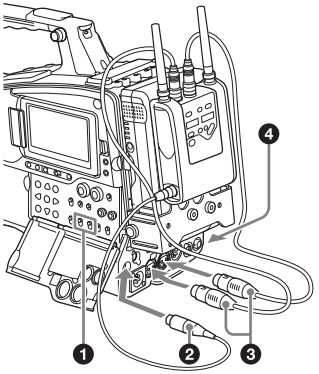
3 Mount the tuner on the WRR tuner fitting.



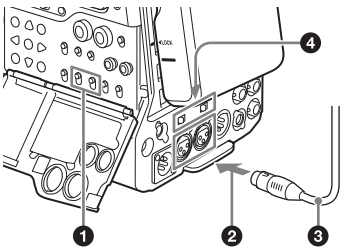
4 Connect the tuner power cord to the DC OUT connector of the camcorder, and the audio output cable to the AUDIO IN CH-1 or CH-2 connector.

5 Set the switches as follows.

- Set the AUDIO IN selector for the channel to which the audio output cable is attached to MIC.
- Set the AUDIO IN CH1/CH2/CH3/CH4 switch for the channel to which the audio output cable is connected to REAR.
  If the XLR connection automatic detection function is on, the input signal for audio recording is selected automatically, and therefore this setting is not required.



❶ AUDIO IN CH1/CH2 switches
❷ To DC OUT connector
❸ To AUDIO IN CH-1 or CH-2 connector
❹ AUDIO IN selectors



❶ AUDIO IN CH1/CH2 switches
❷ To AUDIO IN CH-1 or CH-2 connector
❸ Audio equipment
❹ AUDIO IN selectors

Connecting Line Input Audio Equipment

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.

Switch settings

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

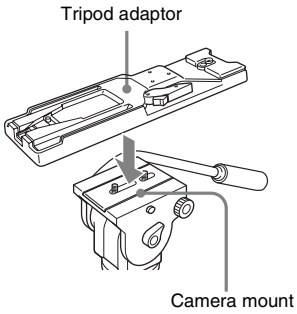
Selecting the audio inputs to be recorded

- With the XLR connection automatic detection function switched off (the factory default setting): A signal must be selected for audio recording by setting the AUDIO IN CH1 or CH2 switch to REAR depending on which of the AUDIO IN CH-1 and CH-2 connectors is used for connecting the external audio equipment.
- 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 or CH2 switch.

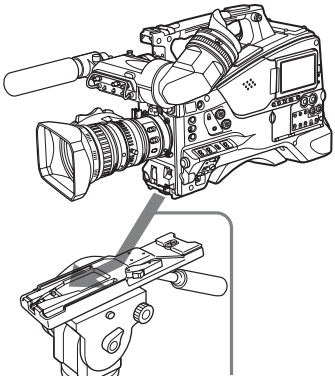
The XLR connection automatic detection function can be switched on or off by Maintenance >Audio >Rear XLR Auto in the setup menu.

Tripod Mounting

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



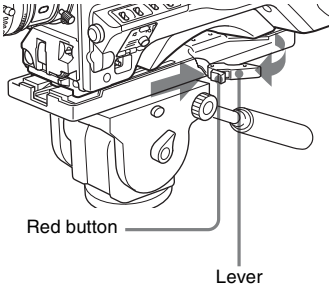
2 Mount the camcorder on the tripod adaptor.



3 Move the camcorder forward and backward, and make sure it does not detach.

To remove the camcorder from the tripod adaptor

Hold down the red button and pull the lever in the direction of the arrow.



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 use a video light with power consumption of over 50 W.
- 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 the video light

Fit the video light to the accessory fitting shoe on the camcorder grip, and connect the video light cable to the LIGHT connector.

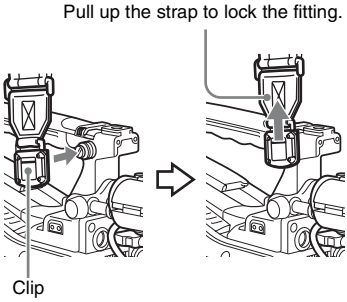
Note

The accessory fitting 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.

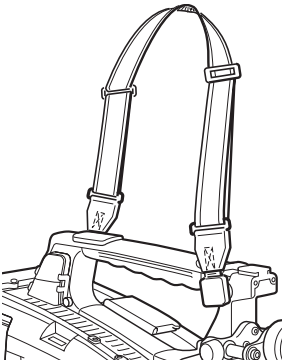
Using the Shoulder Strap

To attach the shoulder strap

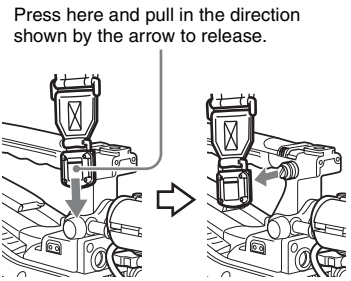
1 Fit one of the clips to a shoulder strap fitting.



2 Fit the other clip to the shoulder strap fitting on the other side of the grip in the same way as in step 1.

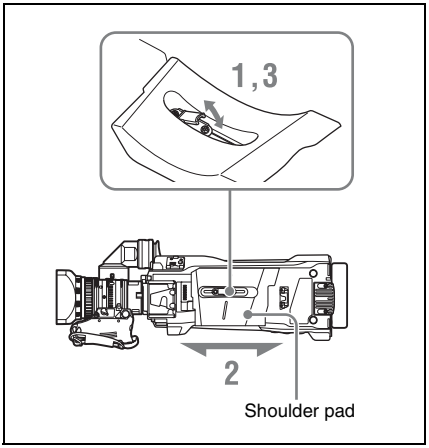


To remove the shoulder strap



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.



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.**

Chapter 3 Adjustments and Settings

For menu operations, see "Basic Setup Menu Operations" (page 103).

Setting the Video Format

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	
	HD422 50 720P	1280×720
	HQ 1920x1080i	1920×1080
	HQ 1440x1080i	1440×1080
	HQ 1280x720P	1280×720
	SStP SR-Lite 422	1920×1080
	DVCAM	720×480
29.97/25/23.98	XAVC-I 1080P	1920×1080
	XAVC-L 50 1080P	
	XAVC-L 35 1080P	
	HD422 50 1080P	1920×1080
	HD422 50 720P	1280×720
	HQ 1920x1080P	1920×1080
	SStP SR-Lite 422	

Switching the System Frequency

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

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.**

Note

The system frequency cannot be changed during recording/playback or while the thumbnail screen is displayed.

Switching the Video Format

You can switch the video format as required.

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.**

Adjusting the Black Balance and the 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 using 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
- In special recording mode (Slow & Quick Motion)
- 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. Possible messages are listed below.

Error message	Meaning
NG: Iris not Closed	The lens iris did not close; adjustment was impossible.
NG: Timeout	Adjustment could not be completed within the standard number of attempts.
NG: Out of Range	The difference between the reference value and the current value is so great that it exceeds the range. 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.

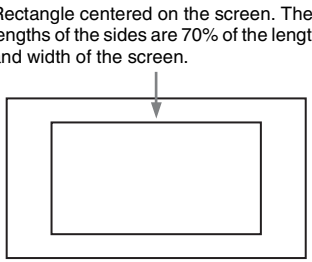
- GAIN switch: L (set to a gain value that is as small as possible)
- OUTPUT/DCC switch: CAM
- WHITE BAL switch: A or B [1)]

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 selector 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.



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.

For details, refer to the lens operation manual.

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

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. Possible messages are listed below.

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.
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.

To change the color temperature when the ND filter is switched

You can assign electrical CC (color correction) filters to ND filters *(see page 13)*. This allows you to change the color temperature automatically when the ND filter is switched.

1. **Set Maintenance >White Filter >ND Filter C.Temp in the setup menu *(see page 134)* to On.**
2. **To assign an electrical CC filter to FILTER selector 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.**

To switch between 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.**

To set no 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 *(see page 140)*.

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°, and 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.

Selecting 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.

To switch between Speed mode and Angle mode

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

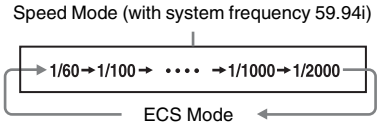
2 Turn the MENU knob to select [Speed] or [Angle], and then press the knob.

To set the shutter mode and standard-mode shutter speed

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

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

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



Note

Depending on the frame rate setting *(see page 69)*, 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 when setting the frame rate to 60 and the video format to HQ1280/29.97P, the shutter speed is indicated as follows.

When Slow & Quick Motion mode is off
1/40→1/50→1/60→1/100→...

When Slow & Quick Motion mode is on
1/60→1/60→1/60→1/100→...

To set the shutter speed in 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.

To set the shutter speed in 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.

To set 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.

To change 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 (increasing by increments of 0.25): About 0.25 to 1 stop further open
- –0.25 to –1 (decreasing by 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 *(see page 23)* on the viewfinder screen.

To make the iris more open
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 stop down the iris
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.

To set the automatic iris 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 where 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.

To counter problems with very 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 Audio Level

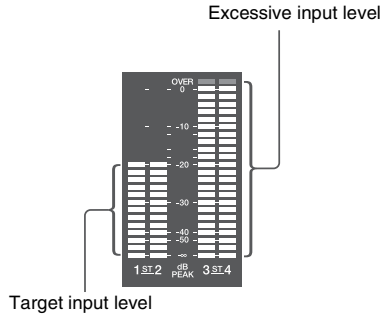
When you set the AUDIO SELECT switch to AUTO, the input levels of analog audio signals recorded on each channel are adjusted automatically. You can also make manual adjustments.

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 audio level 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.

Correspondence between recording level adjustments and audio level controls

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

Rear2/WRR Level: Channel 2 recording level

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

Note

When you have operation of the LEVEL (CH1/CH2) knobs and MIC LEVEL control linked together, if the MIC LEVEL control is set to 0, the audio signals on channels 1 and 2 cannot be recorded. Check the position of the MIC LEVEL control 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 control, and adjust so that the audio level meter shows up to –20 dB for a normal input volume.

Correspondence between recording level adjustments and audio level controls

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

MIC CH2 Level: Channel 2 recording level

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

Note

When you have operation of the MIC LEVEL control 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 control.

Recording Audio on Channels 3 and 4

Selecting the recorded audio

You can 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

Adjusting the audio recording levels

To adjust automatically

Set the AUDIO SELECT CH 3-4 switch to AUTO.

To adjust manually

1 Set the AUDIO SELECT CH 3-4 switch to MANUAL.

2 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 control
Front+Side3	LEVEL (CH3) knob and MIC LEVEL control (linked operation)

Audio CH4 Level: Channel 4 recording level

Setting	Knob
Side4	LEVEL (CH4) knob
Front	MIC LEVEL control
Front+Side4	LEVEL (CH4) knob and MIC LEVEL control (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 timecode 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. The timecode generator keeps running.
R-RUN: Recording run. The timecode generator runs only while recording.

To set the drop frame mode/non-drop frame mode

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 33).

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 user bit data 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.**

To store the user bit setting in memory

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

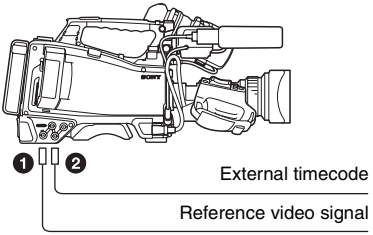
Synchronizing the Timecode

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.

Connections for timecode synchronization

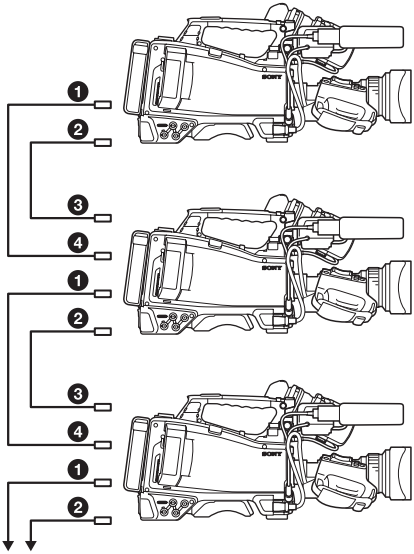
Connect both the reference video signal and the external timecode as illustrated below.

Example 1: Synchronizing with an external timecode



1 GENLOCK IN connector
2 TC IN connector

Example 2: Interconnecting a number of camcorders (including one reference camcorder)



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

To lock the timecode to an external source

1 **Turn on the POWER switch.**

2 **Set the PRESET/REGEN/CLOCK switch to PRESET.**

3 **Set the F-RUN/SET/R-RUN switch to F-RUN.**

4 **Set the DISPLAY switch to TC.**

5 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. After about 10 seconds, you can disconnect the external timecode without losing the synchronization.

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. In such a case, the internal timecode is not correctly synchronized with the external timecode.

User bit settings during timecode synchronization

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

To release the timecode synchronization

First disconnect the external timecode, then set the F-RUN/SET/R-RUN switch to R-RUN.

To change the power supply from the battery pack to an external power supply during timecode 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 synchronization if you remove the battery pack first.

Camcorder synchronization during timecode synchronization

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

Checking Camcorder Settings and Status Information (Status Screens)

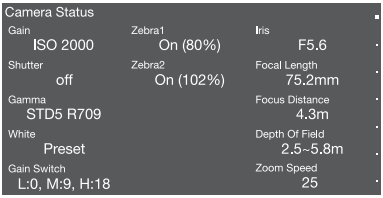
The status screens allow you to check camcorder settings and various types of status information. There are seven status screens, listed below.

Status screen	Information displayed
Camera Status	Settings and status information related to shooting
Audio Status	Settings and status information related to audio input and output
System Status	Settings and status information related to recording
Video Output Status	Settings and status information related to video output
Assignable Button Status	Names of functions assigned to assignable switches
Battery Status	Status of the battery mounted on the camcorder
Media Status	Status information about recording media

To display status screens

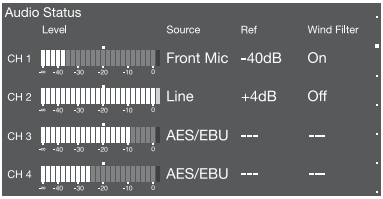
When no menu is displayed, push the MENU CANCEL/PRST/ESCAPE switch up to the CANCEL/PRST position. Each push selects the next status screen, in the order given in the table above.

Camera Status screen



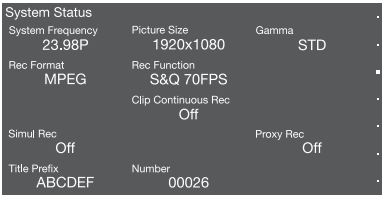
Display item	Description
Gain	Gain level in dB units
Shutter	Electronic shutter status
Gamma	Gamma category and curve
White	White balance mode setting
Gain Switch	GAIN switch status
Zebra	Zebra pattern status
Iris	Iris f-stop value
Focal Length	Focal length
Focus Distance	Focus distance
Depth Of Field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

Audio Status screen



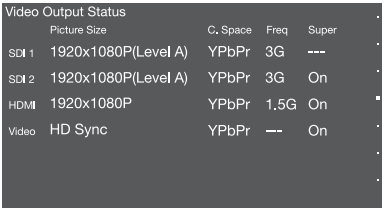
Display item	Description
CH 1/CH 2/CH 3/ CH 4	Audio level, input source, reference input level, and wind noise reduction filter settings for each channel

System Status screen



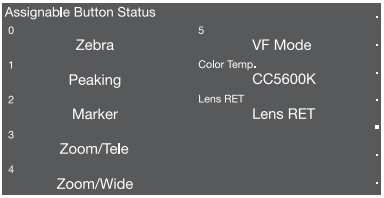
Display item	Description
System Frequency	System frequency
Rec Format	Recording format
Simul Rec	Simultaneous recording function on/off
Title Prefix	Clip name prefix
Picture Size	Picture size
Rec Function	Enabled special recording format and settings
Clip Continuous Rec	Clip continuous recording function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

Video Output Status screen

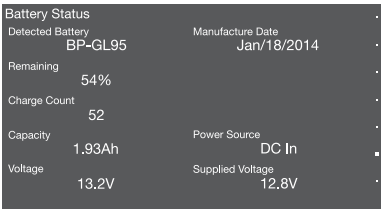


Display item	Description
SDI	SDI OUT connector output settings (output picture size, output form, output rate, superimposition)
HDMI	HDMI connector output settings (output picture size, output form, output rate, superimposition)
Video	VIDEO OUT connector output settings (output picture size, superimposition)

Assignable Button Status screen

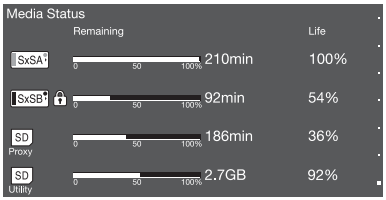


Battery Status screen



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 supply voltage

Media Status screen



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.

Chapter 4 Shooting

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 that can be used with this camcorder

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

SxS PRO+ series
SxS PRO series
SxS-1 series

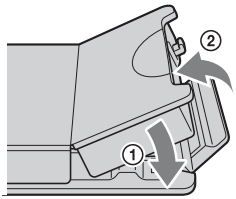
Proper operation cannot be guaranteed when memory cards other than SxS PRO and SxS-1 are used.

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

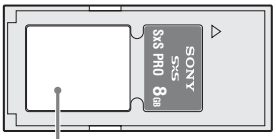
- SxS, SxS PRO, and SxS-1 are trademarks of Sony Corporation.
- The ExpressCard label and logo are the property of the Personal Computer Memory Card International Association (PCMCIA) and are licensed to Sony Corporation. Other trademarks and trade names are the property of their respective owners.

Notes on the use of SxS memory cards

- Recorded data may be lost or corrupted in the following cases.
  - When the camcorder is subjected to shock or vibrations during reading, writing, or formatting of an SxS memory card, and when the camcorder is powered off or an SxS memory card is removed during reading, writing, or formatting
  - When the camcorder is used in an environment subject to static electricity or electromagnetic noise
- Do not use or store SxS memory cards in locations that are:
  - Outside the specified environmental ranges
  - Very hot, such in as vehicles parked in the sun during summer, or exposed to direct sunlight, or near heaters
  - Subject to high humidity and corrosion
- When inserting a memory card, insert with the label side facing the correct direction.
- Carry and store SxS memory cards in their cases, and lock the cases securely.

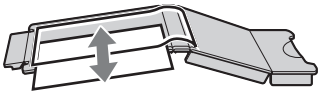


- Guard against accidents and inadvertent data loss by backing up the data stored on SxS memory cards. Sony cannot be responsible for any consequences of damage to or loss of data stored on SxS memory cards.
- Do not attach anything other than the supplied labels in the designated label space. When attaching a label, make sure it does not protrude beyond the label space.



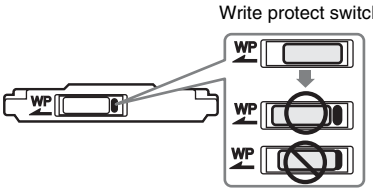
Label space

- Use this camcorder to format SxS memory cards that will be used with this camcorder. When memory cards are formatted on another device, the format may be regarded as an invalid format, making it necessary to format the memory cards again.
  However, note that the format and delete functions of this camcorder do not completely remove data from memory cards. Before discarding or disposing of a memory card, erase it using commercial data erasure software, or physically destroy it. Sony cannot be responsible for any failure to erase data completely.
- Clip operations may not be possible when the remaining capacity of the media is low. In this case, use a computer to delete unneeded files and try again.
- Open the memory card case completely before storing a card in the case or removing a card from the case.



Preventing accidental erasure

You can prevent accidental recording, editing, and deletion of data on an SxS memory card by setting the write protect switch to the WP position.



Note

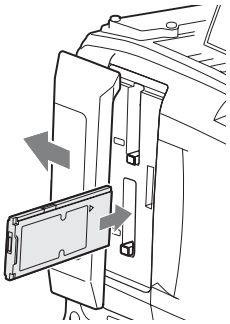
Do not touch the write protect switch while an SxS memory card is loaded in a card slot. Eject the card before setting the write protect switch.

Loading and Ejecting SxS Memory Cards

To load SxS memory cards

1 Slide the cover to the left to open.

2 Insert an SxS memory card into a card slot.



Insert with the label side facing right.

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

3 Close the cover.

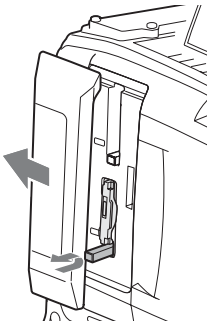
ACCESS indicator status

Card slots A and B each have an ACCESS indicator to 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.

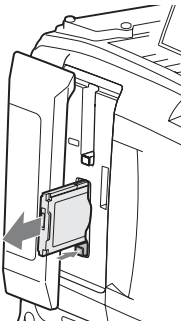
To eject SxS memory cards

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



Press the button once to release the lock.

2 Press the EJECT button again to eject the card.



Note

Data integrity cannot be guaranteed if you power the camcorder off or remove a memory card while the card is being accessed. Doing so may corrupt all data recorded on the card. 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.

The camcorder switches automatically to the other card if the selected card becomes full during recording.

Note

The SLOT SELECT button is disabled during playback. Even when pressed, it does not change the selected slot. Button operations are enabled when a thumbnail screen *(see page 92)* 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 asking for confirmation to format media or 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 FAT mode by factory default.

Note

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

To format (initialize) a memory card

If the message for formatting is displayed, turn the MENU knob to select [Execute], and then press the knob.
Formatting starts.

During formatting, a progress indication appears (%), and the ACCESS indicator lights in orange. When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

To format (initialize) by menu operation

When no format confirmation message is displayed, you can execute formatting by menu operation.

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], and then press the knob.
A confirmation screen prompting whether to format the card appears.

4 Turn the MENU knob to select [Execute], and press the knob.
Formatting starts.

During formatting, a progress indication appears (%), and the ACCESS indicator lights in orange. When formatting ends, a completion message appears. Press the MENU knob to dismiss the message.

Recording and playback during formatting

Even during formatting, recording and playback are possible using an SxS memory card loaded in the other card slot.

If the format operation 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

- All data is erased when you format a memory card, including setup files and all of the recorded video data.
- 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 camcorder calculates the remaining recording time for the media in each slot on the basis of the current video format (recording bit rate), and displays it in units of minutes.
You can check the remaining capacity on a bar graph by displaying the Media Status screen *(see page 58)*.

Note

The 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 indicator 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 restore a card

Turn the MENU knob to select [Execute], and then press the knob.
The restoration starts.
During the restoration, an execution message appears, the progress is displayed (%), and the ACCESS indicator lights in 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 *(see page 154)* 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.

Recording and playback during restoration

Even while restoration is in progress, you can record and play an SxS memory card in the other card slot.

Note

For restoration of media recorded with this camcorder, be sure to use this camcorder. Media recorded with a device other than this camcorder or with another camcorder of different version (even of the same model) may not be restored using this camcorder.

Handling SD Cards for Saving Configuration Data

SD cards supported 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 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.

Inserting/Ejecting SD Cards for Saving Configuration Data

To insert 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.**

To eject 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 card 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.

Checking the Remaining Capacity

You can check the remaining capacity on an SD card on the Media Status screen *(see page 58)*. 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

Note

For professional applications, the use of other media will not provide the same high reliability and durability that is obtained using SxS memory cards.

XQD Memory Cards

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

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.
- Not all XQD memory cards are guaranteed to work with this camcorder. For compatible memory cards, contact your Sony dealer.

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) or Media(B).**

3 Turn the MENU knob to select [Execute], then press the knob.
A confirmation message appears asking you whether to start formatting.

4 Turn the MENU knob to select [Execute] on the confirmation message screen, 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 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.

Compatible SDXC cards

SDXC 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.

1 Select Operation >Format Media in the setup menu.

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

3 Turn the MENU knob to select [Execute], then press the knob.
A confirmation message appears asking you whether to start formatting.

4 Turn the MENU knob to select [Execute] on the confirmation message screen, 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 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.

XQD is a registered trademark of Sony Corporation.

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** ***(see page 28)*****.**

2 **Load one or two SxS memory cards** ***(see page 60)*****.**
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** ***(see page 10)*** **to ON.**

4 **Make the following settings.**
Marker display: On *(see page 113)*
Iris: Auto *(see page 49)*
Zoom: Auto
Camera output: Select the picture currently being shot (camera picture), and turn the DCC function on *(see page 14)*.
Timecode advance mode: F-RUN (Free Run) or R-RUN (Rec Run) *(see page 54)*
Audio input channel selection: Auto *(see page 19)*

5 **Push the AUTO W/B BAL switch to the BLACK position to adjust the black balance** ***(see page 44)*****.**

6 **Select a filter according to the lighting conditions, and adjust the white balance** ***(see page 45)*****.**

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** ***(see page 47)*****.**

9 Do one of the following to start recording.

- Press the REC START button *(see page 12)*.
- Press the VTR button on the lens.
- Turn on the assignable switch to which the Rec function has been assigned *(see page 141)*.

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.

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.

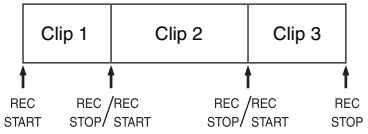
To check the recording (recording review)

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 *(see page 67)*.

1 Insert the SxS memory card to play *(see page 60)*.

2 Press the PREV button *(see page 17)* or the F REV button *(see page 16)* 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.

To pause the playback

Press the PLAY/PAUSE button.
The PLAY/PAUSE indicator flashes during pause.
Press the button again to return to playback mode.

To play at high speed

Press the F FWD button *(see page 17)* or the F REV button *(see page 16)*.
To return to normal playback, press the PLAY/PAUSE button.

To switch between memory cards

When two memory cards are loaded, press the SLOT SELECT button *(see page 20)* to select the active slot.
It is not possible to switch between memory cards during playback.

To end playback

Press the STOP button: Playback stops, and the camcorder enters E-E mode.
Press the THUMBNAIL button: Playback stops, and a thumbnail screen *(see page 92)* 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.

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 98).

To record shot marks

The following two methods are supported.
- Turn on an assignable switch assigned with the Shot Mark 1 or Shot Mark 2 function.
- Turn on an assignable switch assigned with the Lens RET function and press the RET button on the lens to record Shot Mark 1.

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.

To add/delete clip flags

You can use the Thumbnail menu to add and delete clip flags in previously recorded clips. For details, see *"Adding/Deleting Clip Flags on Clips" (page 97)*.

Shooting with Slow & Quick Motion

When the video format *(see page 43)* 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 Slow & Quick Motion using a recording format of XAVC-I or XAVC-L 50 (system frequency of 25P or 23.98P) and S&Q frame rate of 72 fps or higher, the use of SxS Pro+ (SBP-64B/SBP-128B) SxS memory cards is recommended.

Recording format	System frequency	S&Q frame rate
XAVC- I 1080P	29.97P/ 23.98P/25P	1 FPS to 60 FPS (1 FPS units), 72, 75, 80, 90, 96, 100, 110, 120 FPS
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)

The PXWK-503 Slow&Quick Option (available separately) is required for use with the XAVC video format.

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.

Slow & Quick Motion settings and shooting

To make Slow & Quick Motion settings

Notes

- Slow & Quick Motion cannot be used if the video format is set to XAVC and the PXWK-503 Slow&Quick Option (available separately) is not installed.
- 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.

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

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

To shoot in Slow & Quick Motion mode

Shoot as described in *"Basic Operations" (page 66)*.

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 stop shooting

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).

To exit 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.

Clip Continuous Rec settings and shooting

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.

To make Clip Continuous Rec settings

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

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

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 COLOR TEMP button.

For details, see "Assigning Functions to Assignable Switches" (page 140).

To shoot in Clip Continuous Rec mode

Shoot as described in *"Basic Operations" (page 66)*.
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 lit), 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 *(see page 70)* and then remove the media.
When "Cont Stby" indication is flashing (once per second), you can remove the media.

To stop shooting

Stop the recording.

Note

Stop the recording after recording for two or more seconds.

To exit 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
- Play back a clip

• Switch to the thumbnail screen

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

When the video format *(see page 43)* 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.

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 50 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 1920x1080P	29.97/25/23.98
HQ 1920x1080i	59.94/50
HQ 144x1080i	59.94/50
HQ 1280x720P	59.94/50
HQ 1920x1080i	59.94/50
DVCAM 720x480	59.94
DVCAM 720x576	50

To set Simul Rec

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 canceled.
- Simul Rec cannot be set during recording, playback, or while the thumbnail screen is displayed.

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

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

To shoot using Simul Rec

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.

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 *(see page 27)*.

2 Shoot as described in *"Basic Operations" (page 66)*.

To stop shooting

Stop the recording.

To exit Simul Rec

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

Recording 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.

Note

Always remove the SD card from the camcorder while the camcorder is turned off. Before turning the camcorder off, check that the ACCESS indicator is not lit.

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 Capacity

You can check the remaining capacity on an SD card on the Media Status screen *(see page 58)*.

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.

About the recorded files

The file system is FAT32, and the file name extension is “.mp4”. The timecode is also recorded simultaneously.

To stop recording of proxy data

Stop recording and set Operation >Proxy Recording Mode >Setting in the setup menu to [Off].

If recording fails

“Media(Proxy) Error” or “Write Error” appears. If recording fails due to insufficient free remaining capacity on the SD card, “NG: Not Enough Capacity” appears.

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 Operations

Planning metadata is information about shooting and recording plans, recorded in an XML file.

```
<?xmlspversion="1.0"spencoding="UTF-8"?>

<PlanningMetadata
xmlns="http://xmlns.sony.net/pro/metadata/planningmetadata"
assignId="P0001" creationDate="2011-08-20T17:00:00+09:00"
lastUpdate="2011-09-28T10:30:00+09:00" load="false" version="1.00">

<PropertiesspropertyId="assignment" update="2011-08-20T09:00:00+09:00"
modifiedBy="Chris">

<TitlespusAscii="Typhoon" xml:lang="en">Typhoon_Strikes_Tokyo</Title>

</Properties>

</PlanningMetadata>
```

Example of a planning metadata 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’s Internal Memory when Recording a Clip

Note

Data cannot be loaded from SDXC cards.

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 the 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 [Execute], and then press the knob.**

To display 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 clips in material group [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.

To clear the planning metadata loaded

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 of the file 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="
2014-09-30T17:00:00+09:00" sp
lastUpdate="
2014-10-06T17:00:00+09:00" sp
version="1.00">↵
  <Properties sp propertyId="
  assignment" sp update="
  2014-10-06T17:00:00+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.

To set clip names

1 Load a planning metadata file that contains clip names into the camcorder memory ***(see page 73)*****.**

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, ...

Note

When you load another planning metadata file, the serial number returns to 00001 with the next recording operation.

To select 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 version="1.0" encoding="
UTF-8"?>↵
<PlanningMetadata xmlns="http://
xmlns.sony.net/pro/metadata/
planningmetadata" assignId="
H00123" creationDate="
2014-09-30T08:00:00Z" lastUpdate="
2014-09-30T15:00:00Z" version=
"1.00">↵
<Properties propertyId=
"assignment" class="original" 
update="2014-09-30T15:00:00Z" 
modifiedBy="Chris">↵
  <Title usAscii="Football
  Game" xml:lang="en">
  Football Game 30/09/2014</
  Title>↵
    <Meta name="_ShotMark1" 
    content="Goal "/>↵
    <Meta name="_ShotMark2" 
    content="Shoot "/>↵
    <Meta name="_ShotMark3" 
    content="Corner Kick "/>↵
    <Meta name="_ShotMark4" 
    content="Free Kick "/>↵
    <Meta name="_ShotMark5" 
    content="Goal Kick "/>↵
    <Meta name="_ShotMark6" 
    content="Foul "/>↵
    <Meta name="_ShotMark7" 
    content="PK "/>↵
    <Meta name="_ShotMark8" 
    content="1st Half "/>↵
    <Meta name="_ShotMark9" 
    content="2nd Half "/>↵
    <Meta name="_ShotMark0" 
    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.

Operating via the REMOTE Connector

When an RM-B170/B750 Remote Control Unit, RCP-1001/1501 Remote Control Panel, or other control unit is connected, some camcorder functions can be controlled from these units. You can use the display on the RM-B750 or a video monitor connected to the MONITOR connector of the remote control unit to perform camcorder menu operations and monitor the camcorder picture.

To connect

Using the remote cable (10 m (33 ft)) supplied with the remote control unit, 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.

Adjusting the Camcorder from the Remote Control Unit

You can control menu and recording operations from the remote control unit.

Notes

- Remote control operation is not supported if USB connection to the camcorder is enabled.
- Do not connect or disconnect the remote control unit when the camcorder is on.

The following switches of the camcorder are disabled when a remote control unit is connected.

- GAIN selector
- WHITE BAL switch
- AUTO W/B BAL switch
- SHUTTER switch
- OUTPUT/DCC switch
- ASSIGN. 1/3 switches, ASSIGNABLE 4/5 switches, and the COLOR TEMP. button to which the Turbo Gain function has been assigned.

To release remote control mode

Turn off the camcorder and disconnect the remote control unit.
The switch settings on the camcorder become enabled.

To connect a monitor to the RM-B170/B750

The MONITOR connector (BNC type) of the RM-B170/B750 outputs the same signal as the output from the VIDEO OUT connector.
To connect a monitor to the MONITOR connector on the RM-B170/B750, use the black cable supplied with the RM-B170/B750.

Image quality adjustments when the RM-B170/B750 is connected

When the RM-B170/B750 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/B750 was connected.

Function of the recording start/stop buttons when the RM-B170/B750 is connected

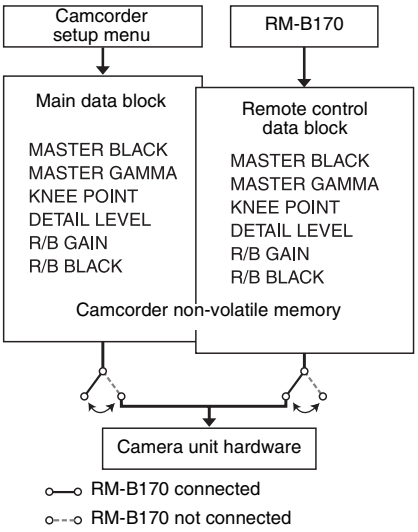
Set the function of the buttons using Maintenance >Camera Config >RM Rec Start in the setup menu.

RM Rec Start settings and button functions

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 COLOR TEMP. button	Disabled	Enabled	Enabled
RM-B170/B750 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 two regions as 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 recalled. 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 you connect the remote control unit. 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 RM-B170 operation, refer to the operation manual of the RM-B170.

Operating the Menu from the RM-B750

1 Press the MONITOR button, turning it on, then press the VF MENU button.

The menu is displayed on the RM-B750 display or the monitor connected to the MONITOR connector of the RM-B750.

2 Select and set menu items using the MENU SELECT knob, and ENTER and CANCEL buttons.

3 When finished, press the VF MENU button to exit the menu.

For details about RM-B750 operation, refer to the operation manual of the RM-B750.

Obtaining Location Information (GPS)

Location and time information of video shot when GPS 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.

GPS reception state

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.

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.
The following operations can be performed between the camcorder and devices connected using a wireless LAN.

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 created (H.264/AAC-LC compression) and then streamed from a connected 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.

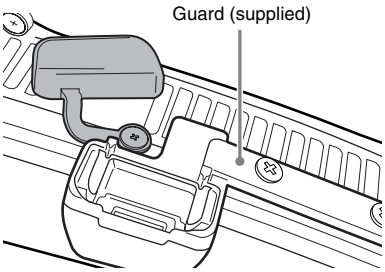
Compatible devices

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.

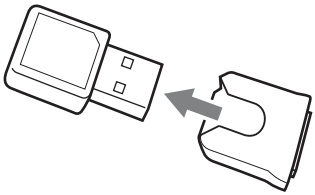
Device	OS	Browser
Smartphone	Android 4.4	Chrome
	iOS7	Safari
Tablet	Android 4.4	Chrome
	iOS7	
Computer	Microsoft Windows 7/ Microsoft Windows 8.1	Chrome
	Mac OS 10.8/10.9	Safari

Attaching the IFU-WLM3

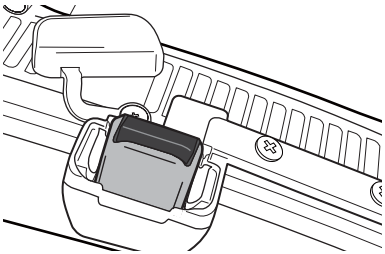
1 Remove the cover of the USB wireless LAN module connector.



2 Attach the protective cap to the IFU-WLM3.



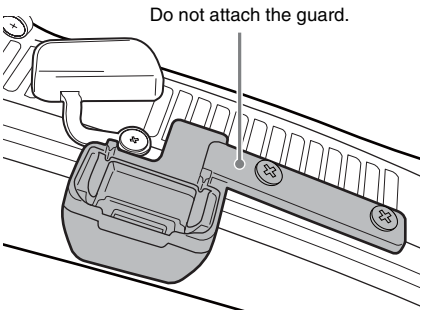
3 Plug the IFU-WLM3 into the connector.



Notes

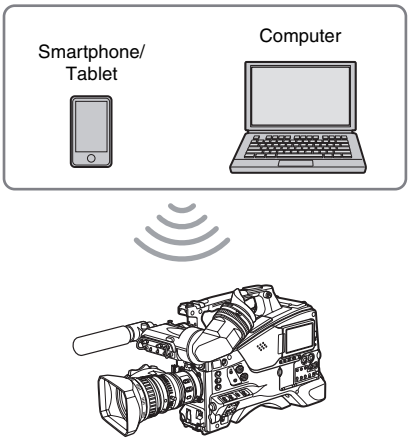
- Always turn the camcorder off before connecting or removing the IFU-WLM3.
- For attachment of the guard, contact a Sony service representative.

If not using the IFU-WLM3



Connecting using Wireless LAN Access Point Mode

The camcorder can connect to devices that are set up as an access point.



To connect using WPS-equipped devices

Devices that support WPS can be connected using WPS.

1 Select Maintenance >Wi-Fi >Setting in the setup menu.

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

Note

It may take some time (30 seconds to 1 minute) to enable access point mode. Wait until the Wi-Fi "AP" (access point) indicator *(see page 26)* stops flashing on the LCD monitor or in the viewfinder.

3 Select Maintenance >Wi-Fi >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.

7 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.

8 Enter a user name and password, then select [OK].
For the user name and password for access authentication, see Maintenance >Basic Authentication *(see page 135)* in the setup menu.

To connect using SSID and password on the device

Connect by entering the SSID and password on the device.

1 Select Maintenance >Wi-Fi >Setting in the setup menu.

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

Note

It may take some time (30 seconds to 1 minute) to enable access point mode. Wait until the Wi-Fi "AP" (access point) indicator *(see page 26)* 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 >Wi-Fi >SSID & Password *(see page 136)* in the setup menu.

Note

The steps will vary depending on the device used.

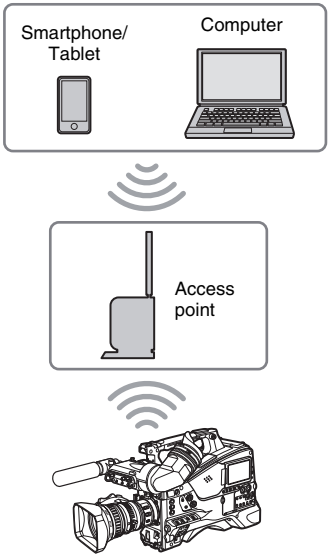
5 Launch a browser on the device and enter "http://192.168.1.1:8080/index.html" in the URL bar.
The user name and password entry screen appears.

6 Enter a user name and password, then select [OK].
For the user name and password for access authentication, see Maintenance >Basic Authentication *(see page 135)* in the setup menu.

Connecting using Wireless LAN Station Mode

The camcorder can connect to existing wireless LAN access points as a client.

The device connects via the access point.



To connect 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 *"To connect to an access point in station mode without using WPS" (page 89)*.

1 Turn the access point on.

2 Turn the camcorder on.

3 Select Maintenance >Wi-Fi >Setting in the setup menu.

4 Turn the MENU knob to select [Station], then press the knob.

Note

It may take some time (30 seconds to 1 minute) to enable station mode. Wait until the Wi-Fi level indicator *(see page 26)* stops flashing on the LCD monitor or in the viewfinder.

5 Select Maintenance >Wi-Fi >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 Wi-Fi level indicator *(see page 26)* 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.

9 **Launch a browser on the device and enter "http://<IP_address>:8080/index.html" in the URL bar, where "<IP_address>" is the IP address assigned by the access point to the camcorder.**

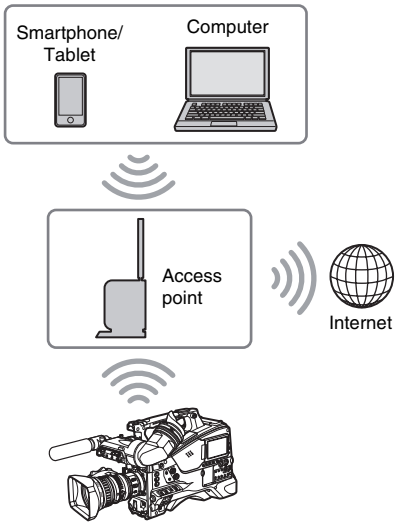
For the IP address of the camcorder, see Maintenance >Wi-Fi >IP Address in the setup menu. The user name and password entry screen appears.

10 **Enter a user name and password, then select [OK].**

The web menu of the camcorder appears. For details about the web menu, see *"Web Menu" (page 88)*.
For the user name and password for access authentication, see Maintenance >Basic Authentication *(see page 135)* in the setup menu.

Connecting to the Internet

You can connect to the Internet via an access point that supports 3G/4G/LTE (optional) or by using tethering.
You connect to the Internet using station mode by using a 3G/4G/LTE-compatible access point (optional) that supports wireless LAN station mode connection or by using device tethering.



Connection method

If the access point and device supports WPS, connect using the procedure in *"To connect to an access point using WPS" (page 82)*. If WPS is not supported, connect using the procedure in *"To connect to an access point in station mode without using WPS" (page 89)*.
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 an access point.

Preparation

Connecting to the Internet

Connect to the Internet using the procedure in *"Connecting to the Internet" (page 83)*.

Registering a file transfer destination

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 91)*.

Selecting and Transferring Files

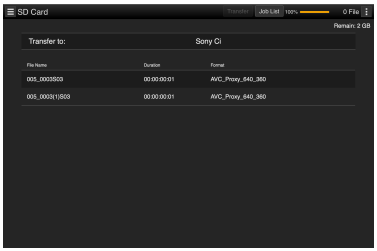
You can select proxy files on an SD card or original files on SxS memory cards for transfer to a server.

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 connect to the camcorder *(see page 80)*.

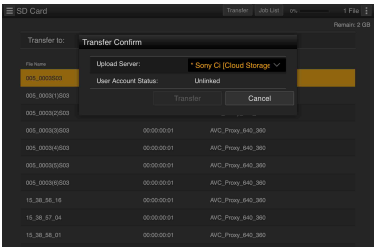
2 Display a file list screen to select files.

3 Tap ☰ and select [Media Info], then tap [SD Card].
The SD Card screen appears.



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 to:].
The default destination server specified in [Default Setting] (*"To register a new destination server" (page 91)*) appears.
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].

To transfer original files on SxS memory cards

Note

Files cannot be transferred under the following conditions.

- During recording, playback, or when displaying the thumbnail screen
- When the wireless LAN access point is set to Access Point mode

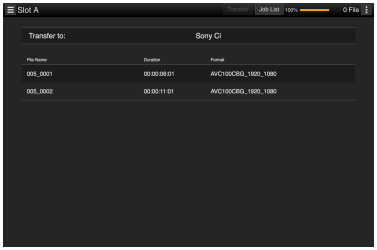
1 Select Maintenance >File Transfer >File Transfer in the setup menu.

2 Turn the MENU knob to select [Execute], then press the knob.
File transfer mode is initiated.

3 Connect the camcorder and device using a LAN connection, then launch a browser on the device to connect to the camcorder *(see page 80)*.

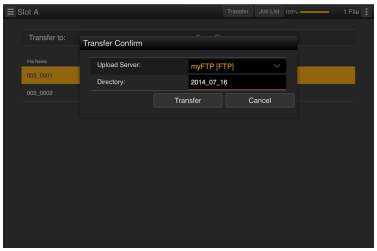
4 Display a file list screen to select files.

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 to:].**
The default destination server specified in [Default Setting] appears (see *"To register a new destination server" (page 91)*).
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].

To monitor 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 *(see page 91)*.

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 and device using a Wireless LAN connection *(see page 80)*.**

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 >Wi-Fi >IP Address 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 >Wi-Fi >SSID & Password *(see page 136)* in the setup menu).**
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] *(see page 88)* from the web menu.

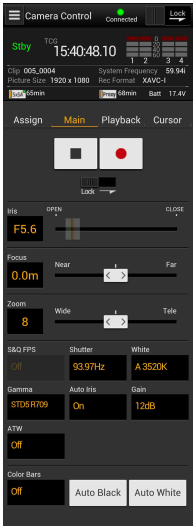
Notes

- 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

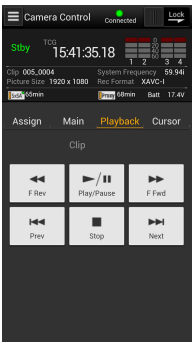
Smartphone display

Main screen



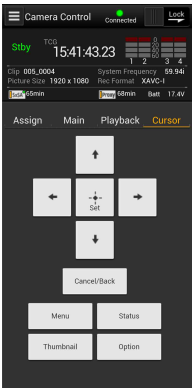
- Status
- Settings
  Iris, Focus, Zoom, S&Q FPS, Shutter, White, Gamma, Auto Iris, Gain, ATW, Color Bars, Auto Black, Auto White

Playback screen



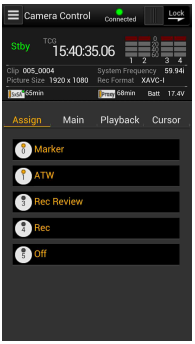
- Status
- Playback control buttons
  F Rev, Play/Pause, F Fwd, Prev, Stop, Next

Cursor screen



- Status
- Cursor control buttons, menu/status
  Up, Left, Set, Right, Down, Cancel/Back, Menu, Status, Thumbnail, Option (SHIFT + SET)

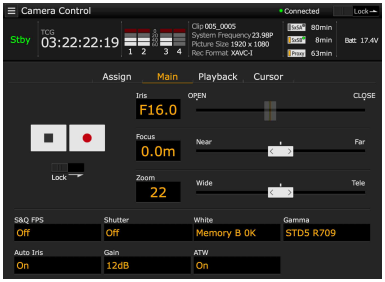
Assign screen



- Status
- Assignable buttons
  Assignable buttons 0, 1, 3, 4, 5

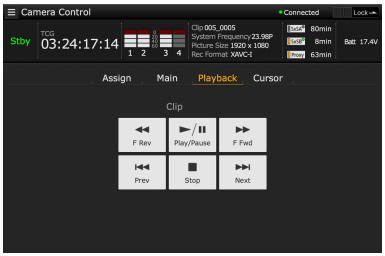
Tablet display

Main screen



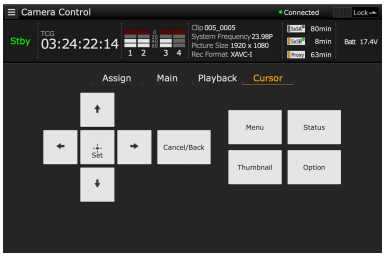
- Status
- Assignable buttons
  Assignable buttons 0, 1, 3, 4, 5
- Settings
  S&Q FPS, Shutter, White, Gamma, Auto Iris, Gain, ATW, Color Bars, Auto Black, Auto White

Playback screen



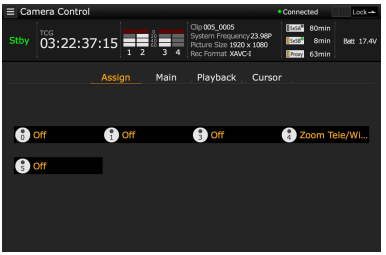
- Status
- Playback control buttons
  F Rev, Play/Pause, F Fwd, Prev, Stop, Next

Cursor screen



- Status
- Cursor control buttons, menu/status
  Up, Left, Set, Right, Down, Cancel/Back, Menu, Status, Thumbnail, Option (SHIFT + SET)

Assign screen



- Assignable buttons
  Assignable buttons 0, 1, 3, 4, 5

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.

Configuration menu

When the camcorder is accessed from a browser on a connected device, the SD Card screen for Media Info on the camcorder appears.
Tapping ☰ in the top left of the web menu screen will display the configuration menu. 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	Refer to
Wireless Module >Format	Format settings	*"Format Settings" (page 88)*
Wireless LAN >Station Settings	Wireless LAN settings	*"Wireless LAN Station Settings" (page 89)*
Wireless LAN >Status	Wireless LAN settings status	*"To monitor wireless LAN status" (page 90)*
Wireless LAN >Upload Settings	Transfer settings	*"Transfer (Upload) Settings" (page 90)*

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
- 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 *(see page 91)*.

Cam Remote Control

Displays the Wi-Fi remote control screen *(see page 85)*.

Format Settings

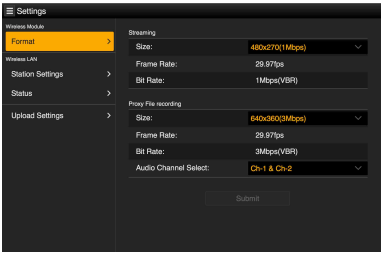
Use the Format tab of the Settings screen to make settings for recording of proxy files on an SD card in the camcorder, and for setting the format of streams when streaming using the device.

Video

- XAVC Proxy (AVC/H.264 Main Profile, 4:2:0 Long GOP)
- Select from sizes in the following table.

Audio

- AAC-LC compression
- Sampling frequency: 48 kHz
- Bit rate: 128 kbps for stereo



Item	Description	Setting
Streaming Size	Sets the video size and bit rate for streaming.	640x360(3Mbps)/ 480x270(1Mbps)/ 480x270(0.5Mbps)
Streaming Frame Rate	Displays the video frame rate for streaming.	23.98fps/25fps/ 29.97fps/50fps/ 59.94fps
Streaming Bit Rate	Displays the video bit rate for streaming.	3Mbps/1Mbps/ 0.5Mbps
Proxy File recording Size	Sets the video size and bit rate for proxy files.	1280x720(9Mbps)/ 640x360(3Mbps)/ 480x270(1Mbps)/ 480x270(0.5Mbps)
Proxy File recording Frame Rate	Displays the video frame rate for proxy files.	23.98fps/25fps/ 29.97fps/50fps/ 59.94fps

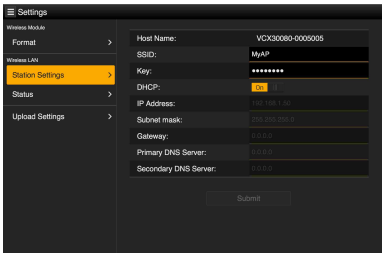
Item	Description	Setting
Proxy File recording Bit Rate	Displays the video bit rate for proxy files.	9Mbps/3Mbps/ 1Mbps/0.5Mbps
Proxy File recording Audio Channel Select	Sets the audio channel to record to proxy data.	Ch-1 & Ch-2

Notes

- The bit rate for proxy files is an average value, so this value may be exceeded at times.
- A video frame rate of 24 fps is not supported.

Wireless LAN Station Settings

Use the Station Settings tab of the Settings 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].
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.

To connect to an access point in station mode without using WPS

1 Connect the camcorder and device using access point mode *(see page 81)*.

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 >Wi-Fi >Setting in the setup menu.

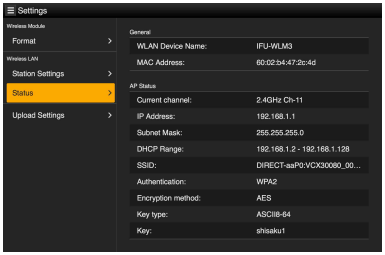
5 Turn the MENU knob to select [Station], then press the knob.

This step connects the camcorder to the access point in station mode. Proceed to step 9 in *"To connect to an access point using WPS" (page 82)* to access the camcorder from the device.

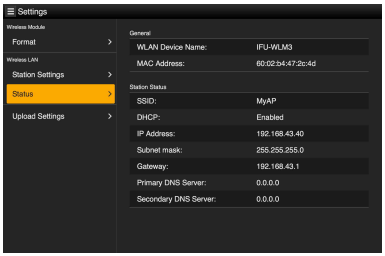
To monitor wireless LAN status

Use the Status tab of the Settings screen to monitor the wireless LAN status.
The displayed settings will vary depending on the wireless LAN mode of the camcorder.

Access point mode

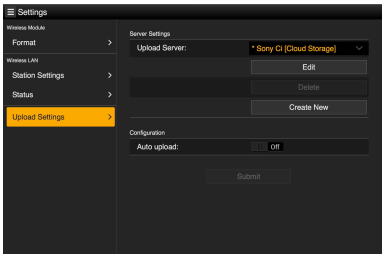


Station mode



Transfer (Upload) Settings

Use the Upload Settings tab of the Settings screen to register and set servers for transferring proxy files or original files recorded on the camcorder.



Auto Transfer

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.

Note

A subscription is required in order to use the “Sony Ci” cloud service. For details, visit www.SonyMCS.com/wireless.

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.

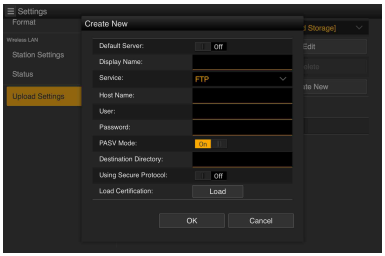
2 **Enter a user name and password.**
For details, visit www.SonyMCS.com/wireless.

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 a destination directory.
Using Secure Protocol	Set whether to use secure FTP.
Load Certification	Loads a CA certificate. The certificate to be loaded must be in PEM format, and should be written to the root directory of the SD card with “certification.pem” file name.
Clear Certification	Clears the CA certificate.

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.

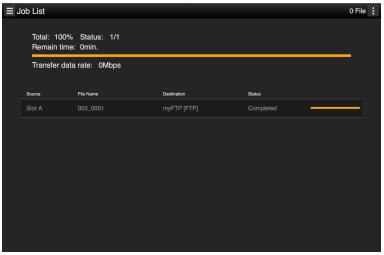
For details about items, see “To register a new destination server” (page 91).

To delete 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 left 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.

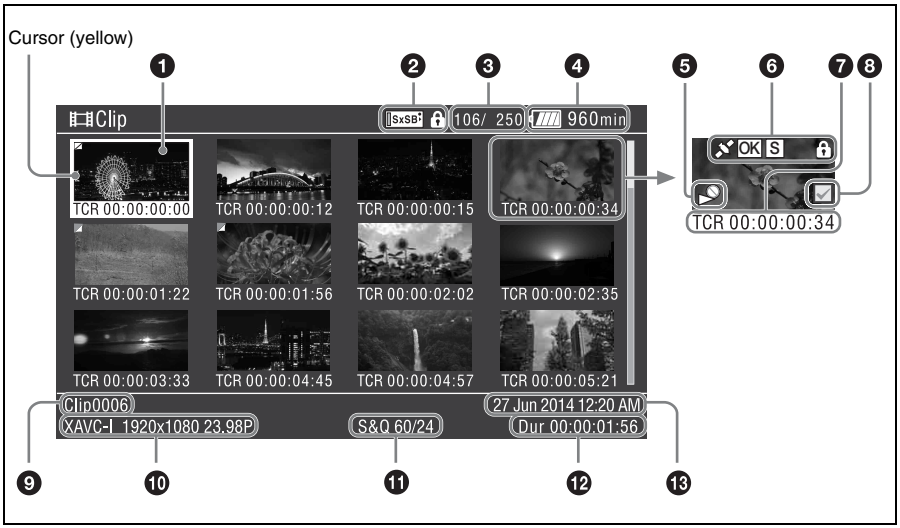
Chapter 5 Clip Operations

Clip Operations on the 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 *(see page 93)* on the thumbnail screen and start playback of that clip *(see page 93)*.

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.

Thumbnail Screen



❶ 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 *(see page 99)*.

❷ 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.

❸ Clip number / total number of clips

❹ Battery / voltage status

❺ Playback disabled indicator

❻ Clip status

Displays the clips status using an icon.

Icon	Meaning
GPS icon	GPS reception status
S, OK, NG, KP icons	Essence mark or clip flag attached to a clip
Lock icon	Clip is locked (protected)

❼ Thumbnail information

Displays thumbnail information. The displayed information varies according to the Customize View setting *(see page 100)*.

❽ Clip select checkbox

Place a check mark in the checkbox to select a clip (thumbnail).

❾ Clip name / title

Displays the name or title of the selected clip.

❿ Recording video format

⓫ 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.

⓬ Clip duration

⓭ Creation date

To hide the thumbnail screen

Press the THUMBNAIL button.

Playing Clips

To select clip thumbnails

Do one of the following to move the yellow cursor to the thumbnail that you want to select.
- Press the ⇧, ⇩, ⇦, ⇨ button.
- Turn the MENU knob.
- Press the PREV or NEXT button.

To select the first thumbnail

Press and hold the F REV button, and press the PREV button.

To select the last thumbnail

Press and hold the F FWD button, and press the NEXT button.

To play 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.
Play continues through all clips after the selected clip.

Sequential playback starts 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 unplayable icon *(see page 93)* 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 transition from one clip to another. During this time, the play controls and the THUMBNAIL button cannot be operated.
- When you select a clip on 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.

To pause play

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

To play at high speed

Press the F FWD button *(see page 17)* or the F REV button *(see page 16)*.
To return to normal playback, press the PLAY/PAUSE button.

To stop play

Press the STOP button: Play stops and the camcorder enters E-E mode.
Press the THUMBNAIL button: Play stops and the thumbnail screen *(see page 92)* appears in the viewfinder.

Play also stops if you eject the memory card. In this case, the camera picture appears in the viewfinder.

To cue up clips

To return 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 play.
- 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.

To play from the start of the first clip

Simultaneously press the PREV and F REV buttons. This jumps to the start of the first clip recorded on the SxS memory card.

To jump 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 play.
- 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.

To jump 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.

To add a shot mark during playback

You can add shot marks to clips during playback by using the same method used during recording *(see page 68)*.

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.

Basic Thumbnail Menu Operations

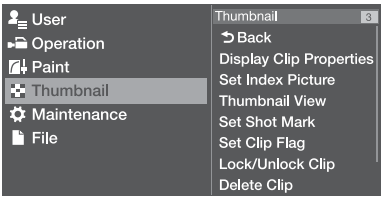
The Thumbnail menu is used to protect/delete clips, check properties, add/delete clip flags and essence marks to frames in a clip, and other tasks.

To display the Thumbnail menu

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 THUMBNAIL button again.

To select menu items and sub-items

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 *(see page 97)* 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 of the thumbnail screen, see "Thumbnail Menu" (page 100).

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 *(see page 98)*.

To protect a 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.**

To protect 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.**

To unlock 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.**

Deleting Clips

You can delete clips from SxS memory cards. Clips can be deleted on the thumbnail screen or the filtered clip thumbnail screen *(see page 98)*.

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.

To delete all clips simultaneously

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.**

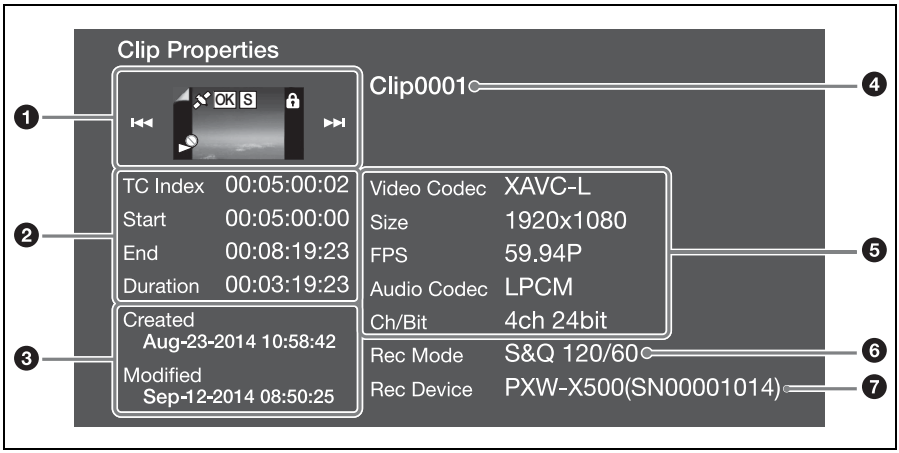
2 **Turn the MENU knob to select [Execute], then press the knob.**
A confirmation screen appears.

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.**
The progress during deletion is displayed.

Displaying Clip Properties

The clip properties screen for the selected clip appears when you select Thumbnail >Display Clip Properties in the setup menu.



❶ Current clip image

Displays the index picture and status of the selected clip.

❷ 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

❸ Creation date and modified date

❹ Clip name

❺ 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

❻ Special recording mode information

❼ 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/Deleting Clip Flags on 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 perform this operation on the thumbnail screen or the filtered clip thumbnail screen *(see page 98)*.

To add a clip flag

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 *(see page 140)*.

To delete 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 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.

To add 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.

To delete 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 *(see page 18)* 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

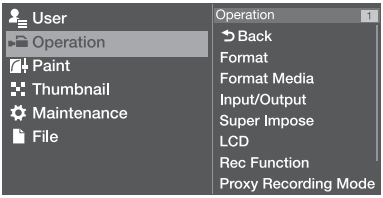
Default values are shown in bold.

Thumbnail		
Item	**Sub-item setting**	**Description**
Display Clip Properties	–	Displays clip properties *(see page 97)*.
Set Index Picture	–	Sets/changes the index picture of a clip *(see page 99)*.
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 *(see page 99)*.
	Clip Thumbnail	Displays the thumbnail screen (clip thumbnail screen) *(see page 92)*.
Set Shot Mark Adds/deletes shot marks.	Add Shot Mark1	Adds Shot Mark 1 to a frame *(see page 98)*.
	Delete Shot Mark1	Deletes Shot Mark 1 *(see page 98)*.
	Add Shot Mark2	Adds Shot Mark 2 to a frame *(see page 98)*.
	Delete Shot Mark2	Deletes Shot Mark 2 *(see page 98)*.
Set Clip Flag Adds/deletes clip flags.	Add OK	Adds an OK flag to a clip *(see page 97)*.
	Add NG	Adds an NG flag to a clip *(see page 97)*.
	Add KEEP	Adds a KP (Keep) flag to a clip *(see page 97)*.
	Delete Clip Flag	Deletes a clip flag *(see page 98)*.
Lock/Unlock Clip Protects/unlocks a clip.	Select Clip	Selects the clip to protect *(see page 95)*.
	Lock All Clips	Protects all clips on the media *(see page 95)*.
	Unlock All Clips	Unlocks all clips on the media *(see page 95)*.
Delete Clip Deletes clips.	Select Clip	Selects the clip to delete *(see page 96)*.
	All Clips	Deletes all clips on the media *(see page 96)*.
Filter Clips Filters the display of clips by clip flag.	OK	Filters the display of clips by OK flags *(see page 98)*.
	NG	Filters the display of clips by NG flags *(see page 98)*.
	KEEP	Filters the display of clips by KP (Keep) flags *(see page 98)*.
	None	Clips are not filtered *(see page 98)*.
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.

Chapter 6 Menu and Detailed Settings

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 *(see page 151)*.



User Menu

Menu used to arrange items from the setup menu in any chosen order *(see page 105)*.

Operation Menu

Menu used to make settings related to shooting (excluding settings related to picture quality).

Item	Description	Page
Format	System settings	*109*
Format Media	Media format settings	*109*
Input/Output	Input/output signal settings	*110*
Super Impose	Superimposition settings	*110*
LCD	LCD monitor settings	*110*
Rec Function	Special recording mode settings	*111*
Proxy Recording Mode	Proxy data settings	*111*
Assignable Switch	Assign functions to assignable switches	*112*
VF Setting	Viewfinder settings	*112*
Marker	Marker settings	*113*
Gain Switch	Gain value settings	*114*
Auto Iris	Auto iris settings	*115*
Zebra	Zebra pattern settings	*115*
Display On/Off	Viewfinder display item settings	*116*
“!” LED	Viewfinder “!” settings	*117*
White Setting	White balance settings	*118*
Offset White	Offset white settings	*118*
Shutter	Shutter settings	*118*
Slow Shutter	Slow shutter settings	*119*
Time Zone	Time settings	*119*
Clip	Clip settings	*119*
Update Media	Update media management information	*119*
GPS	GPS settings	*119*
Planning Metadata	Planning metadata settings	*119*

Paint Menu

Item	Description	Page
Switch Status	Correction functions and test signal on/off settings	*120*
White	Color temperature settings	*120*
Black	Black level settings	*120*
Flare	Flare correction settings	*121*
Gamma	Gamma correction settings	*122*
Black Gamma	Black gamma correction settings	*123*
Knee	Knee correction settings	*123*
White Clip	White clip settings	*123*
Detail(HD)	Detail settings	*124*
Detail(SD)	Detail settings	*124*

Item	Description	Page
Aperture	Aperture correction settings	*125*
Skin Detail	Skin detail correction settings	*125*
Matrix	Matrix correction settings	*126*
Multi Matrix	Multi matrix correction settings	*126*
V Modulation	V modulation shading correction settings	*127*
Low Key Saturation	Low key saturation correction settings	*127*
Saturation Mode	Saturation correction settings	*127*
Noise Suppression	Noise suppression settings	*127*

Thumbnail Menu

Menu used to make settings related to clip thumbnails. *(see page 100)*

Note

The Thumbnail menu can be used only when a thumbnail screen *(see page 92)* 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.

Item	Description	Page
White Shading	White shading correction settings	*128*
Black Shading	Black shading correction settings	*128*
Battery	Battery settings	*129*
DC Voltage Alarm	External DC source voltage alarm settings	*129*
Audio	Audio settings	*129*
WRR Setting	Wireless tuner settings	*132*
Timecode	Timecode settings	*132*
Essence Mark	Essence mark settings	*133*
Camera Config	Camcorder operation settings	*133*
Preset White	Preset white settings	*134*
White Filter	Filter settings	*134*
DCC Adjust	DCC settings	*135*
Genlock	Genlock settings	*135*
Auto Shading	Auto black shading correction settings	*135*
APR	APR settings	*135*
Basic Authentication	Basic authentication settings	*135*
Wi-Fi	Wi-Fi settings	*136*
File Transfer	Wi-Fi transfer settings	*136*
Clock Set	Internal clock settings	*136*
Language	Display language settings	*136*
Hours Meter	Digital time counter settings	*136*
Network Reset	Network reset	*136*
Fan Control	Fan control settings	*136*
Option	Software option settings	*137*
Version	Version settings	*137*

File Menu

Menu used to perform operations on files.

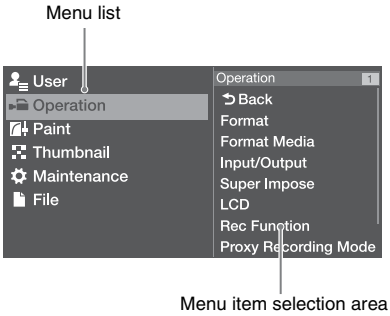
Item	Description	Page
User Menu Item	User file settings	*138*
All File	ALL file settings	*138*
Scene File	Scene file settings	*138*
Lens File	Lens file settings	*138*
User Gamma	Gamma file settings	*139*

Basic Setup Menu Operations

To display 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.

Example: When the cursor is positioned at the Operation menu



Note

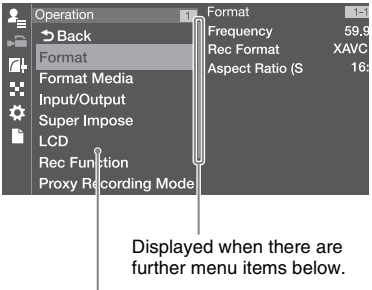
The setup menu cannot be used when the camcorder is in focus magnification mode. Exit focus magnification mode by pressing the assignable switch to which the Focus Mag function has been assigned.

To make menu settings

1 **Turn the MENU knob, or press the ⇧ or ⇩ button, to move the cursor to the item that you want to set.**
A list of selectable menu items appears in the menu item selection area to the right of the menu list.

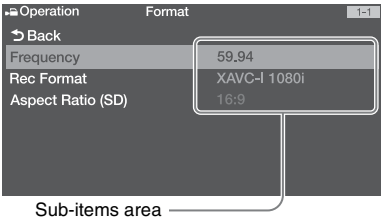
2 **Press the MENU knob or the SET button.**
The menu item selection screen appears.
You can also display the menu item selection screen by pressing the ⇨ button.

- 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.

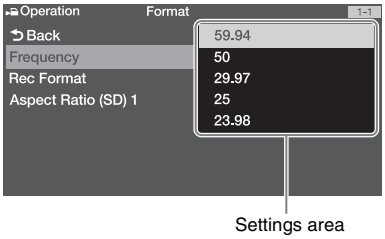
3 **Turn the MENU knob, or press the ⇧ or ⇩ button, to move the cursor to the item that you want to set, and then confirm by pressing the MENU knob or the SET button.**
The sub-items area appears to the right of the menu item selection area, and the cursor moves to the first sub-item.



- 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 the selection 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. Instead, the sub-item name is highlighted to indicate that the sub-item can be set.

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.

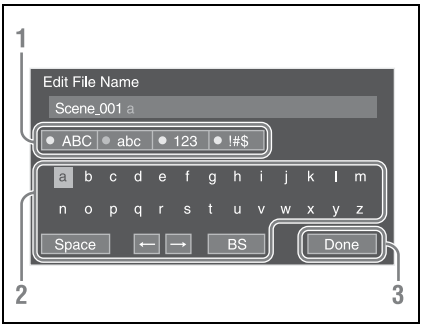
If you select [Execute] for an executable item, the corresponding function is executed.

Items that require confirmation before execution

In step 3, the menu disappears and a confirmation message appears if you select an item that requires confirmation before execution. Follow the instructions in the message to execute or cancel the operation.

To enter 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 knob.

The character string is confirmed and the character entry screen disappears.

To cancel the setting change

1 Push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE position.

To exit the menu

1 Set the MENU ON/OFF switch to OFF or press the MENU button.

The normal camera picture reappears.

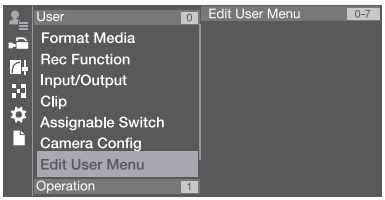
Editing the User Menu

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.

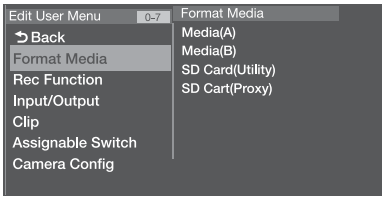
Displaying the Edit User Menu Screen

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.



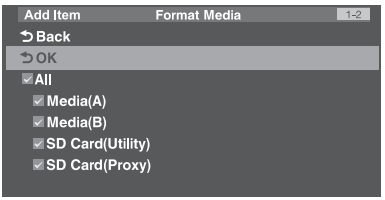
Adding Items and Sub-Items

Note

The same item or sub-item cannot be registered twice. Also, the name of the item or sub-item cannot be changed.

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.

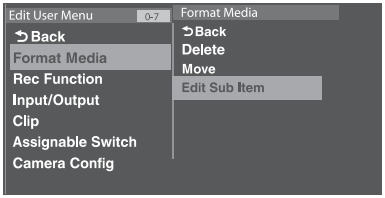
Editing Sub-Items

You can specify the sub-items to display.

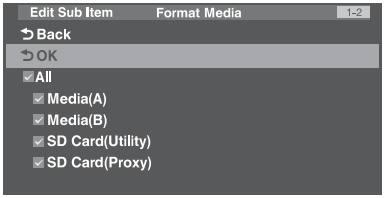
1 Display the Edit User Menu screen.

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.

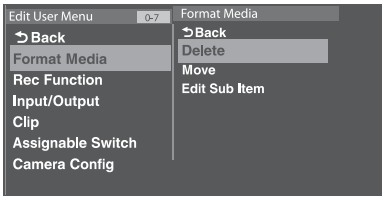
4 Turn the MENU knob to select [OK], then press the knob.
Editing is completed.

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.



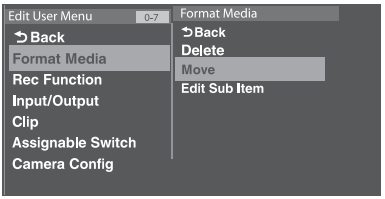
The item is deleted.

Moving Items

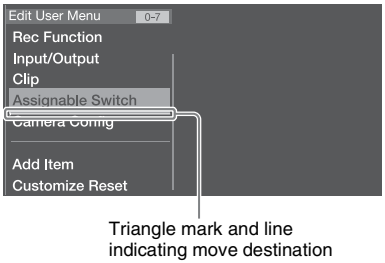
1 Display the Edit User Menu screen.

2 Turn the MENU knob to select an item to move, then press the knob.
The edit function list appears.

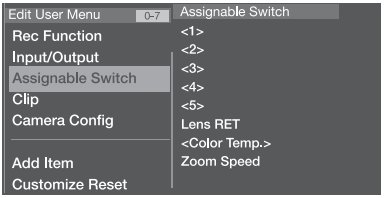
3 Turn the MENU knob to select Move in the edit function list, then press the knob.



The item to move is highlighted, and a triangle mark and line indicate the destination position.



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 *(see page 109)*
- Rec Function *(see page 111)*
- Input/Output *(see page 110)*
- Clip *(see page 119)*
- Assignable Switch[1] *(see page 112)*
- Camera Config[2] *(see page 133)*

1) Excluding sub-item <0>

2) Contains only User Menu Only as sub-item

You can change the configuration of the User menu by adding desired menu items and arranging them in a desired order.

For details, see "Editing the User Menu" (page 105).

Operation Menu

Default values are shown in bold.

Operation Item	Sub-item setting	Description
Format Sets the system frequency, recording format, and recording aspect ratio.	Frequency **59.94**/50/29.97/25/23.98	Selects the system frequency (execute by selecting Execute).
	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 1920x1080i HQ 1440x1080i HQ 1280x720P SStP SR-Lite 422 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 1920x1080P SStP SR-Lite 422	When the system frequency is 29.97, 25, or 23.98
	Aspect Ratio (SD) **16:9**/4:3	Selects the SD mode aspect ratio.
Format Media Formats the media.	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		
Item	**Sub-item setting**	**Description**
Input/Output Sets input/output signals.	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 *(see page 109)*.
	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 when the Down Converter is set to Squeeze.
Super Impose Sets character information/ markers to be superimposed.	Super(VF Display) **On**/Off	When Input/Output >SDI2 Out2/HDMI Super or 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 >SDI2 Out2/HDMI Super or 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.
LCD Sets the LCD monitor.	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		
Item	**Sub-item setting**	**Description**
Rec Function Sets the special recording mode.	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.)
	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**/72/75/80/90/96/100/110/120	When the recording format is XAVC Intra or XAVC Long.
	1 to **30**	When the recording format is MPEG2 HD 422 50M (1920×1080) or 29.97P/23.98P.
	1 to **25**	When the recording format is MPEG2 HD 422 50M (1920×1080) or 25P.
	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.)
	Simul Rec On/**Off**	Turns simultaneous recording to slots A and B on/off.
Proxy Recording Mode Sets proxy recording.	Setting On/**Off**	Turns proxy recording on/off.
	Size 1280x720(9Mbps)/ **640x360(3Mbps)**/ 480x270(1Mbps)/ 480x270(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/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		
Item	**Sub-item setting**	**Description**
Assignable Switch Assigns functions to assignable switches. *For details about assigning functions, see "Assigning Functions to Assignable Switches" (page 140).*	<0> *See page 140*	Assigns a function to the ASSIGN. 0 switch.
	<1> *See page 141*	Assigns a function to the ASSIGN. 1 switch.
	<2> *See page 141*	Assigns a function to the ASSIGN. 2 switch.
	<3> *See page 141*	Assigns a function to the ASSIGN. 3 switch.
	<4> *See page 141*	Assigns a function to the ASSIGNABLE 4 switch.
	<5> *See page 141*	Assigns a function to the ASSIGNABLE 5 switch.
	Lens RET *See page 143*	Assigns a function to RET button on the lens.
	Color Temp. *See page 141*	Assigns a function to COLOR TEMP. 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.
VF Setting Sets the viewfinder screen.	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	Selects the type of peaking (when using CBK-VF02). **Normal:** Normal peaking **Color:** Color peaking
	Peaking Frequency **Normal**/High	Selects Normal or High as the 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 Item	Sub-item setting	Description
Marker Sets the marker display in the viewfinder.	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 sizes 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		
Item	**Sub-item setting**	**Description**
Gain Switch Sets the gain value switch settings.	Gain<L> –6dB/–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> **–6dB**/–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> –6dB/–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> –6dB/–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 Item	Sub-item setting	Description
Auto Iris Sets the auto iris.	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.
	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.
Zebra Sets the display of zebra patterns.	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		
Item	**Sub-item setting**	**Description**
Display On/Off Selects the items to display in the viewfinder.	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 **On**/Off	Turns the S&Q frame rate indicator on/off when in Slow & Quick Motion recording mode.
	Battery Remain **On**/Off	Turns the remaining battery capacity and input voltage indicators on/off.
	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.
	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.
	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.
	Wi-Fi Condition **On**/Off	Turns the Wi-Fi signal strength indicator on/off.
	Proxy Status **On**/Off	Turns the proxy status indicator on/off.
	GPS **On**/Off	Turns the GPS reception status indicator on/off.

Operation		
Item	**Sub-item setting**	**Description**
Display On/Off Selects the items to display in the viewfinder.	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.
"!" LED Sets the "!" indicator in the viewfinder. (Valid setting when using HDVF-20A).	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 when the lens extender is used on/off.
	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 Item	Sub-item setting	Description
White Setting Makes settings related to white balance adjustment.	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.
Offset White Makes settings related to white balance offset values.	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> Displays the approximate color temperature. (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.
	Warm Cool <B> Displays the approximate color temperature. (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.
Shutter Sets the shutter operating mode.	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 Item	Sub-item setting	Description
Slow Shutter Sets the slow shutter.	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.
Time Zone Sets the time zone.	Time Zone UTC + 13:30 to **UTC Greenwich** to UTC - 12:00 Kwajalein	Selects the difference in time from UTC (Greenwich Mean Time) in units of 30 minutes.
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.	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 *(see page 104)*.
	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
Update Media Updates the media's management file.	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).
GPS Turns location information (GPS) on/off.	GPS On/**Off**	Turns the GPS function on/off.
Planning Metadata Makes settings relating to planning metadata operations.	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.
	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 *(see page 74)*.

Paint Menu

Default values are shown in bold.

Paint		
Item	**Sub-item setting**	**Description**
Switch Status Turns various correction functions and the test signal on/off.	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.
White Sets the color temperature, and adjusts white balance manually.	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.
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.	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		
Item	**Sub-item setting**	**Description**
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.	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		
Item	**Sub-item setting**	**Description**
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.	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
	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		
Item	**Sub-item setting**	**Description**
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.	Setting On/**Off**	Turns the black gamma correction function on/off.
	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.
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.”	Setting **On**/Off	Turns the knee correction function on/off.
	Point 75% to **90%** 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.
	Knee Saturation Level –99 to **±0** to +99	Sets the knee saturation level.
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.”	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		
Item	**Sub-item setting**	**Description**
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.	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		
Item	**Sub-item setting**	**Description**
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.	Setting **On**/Off	Turns the aperture correction function on/off.
	Level –99 to **±0** to +99	Sets the aperture level.
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.	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		
Item	**Sub-item setting**	**Description**
Matrix Makes settings related to matrix correction for adjusting the hue and vividness of the image. 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."	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.
	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.
Multi Matrix Makes settings related to multi matrix correction. Multi-matrix correction sets the saturation using a 16-axis hue space.	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.
	Saturation –99 to **±0** to +99	Sets the saturation of the color targeted for multi matrix correction for each 16-axis mode.

Paint		
Item	**Sub-item setting**	**Description**
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.	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.
Low Key Saturation Makes settings related to low key saturation correction. Corrects the saturation of colors in dark parts of the image.	Setting On/**Off**	Turns the low key saturation correction function on/off.
	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.
Saturation Mode Makes settings related to saturation correction.	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.
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.	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		
Item	**Sub-item setting**	**Description**
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.	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.
Black Shading Makes settings related to black shading correction.	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) –6dB/–3dB/0dB/3dB/6dB/ 9dB/12dB/18dB/24dB/ 30dB/36dB/42dB	Sets a temporary master gain value.

Maintenance Item	Sub-item setting	Description
Battery Makes settings related to batteries.	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.
DC Voltage Alarm Sets alarms relating to external DC supply voltage.	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.
Audio Makes settings related to audio.	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.
	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.

Maintenance Item	Sub-item setting	Description
Audio Makes settings related to audio.	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 **0dB**/+4dB/–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.
	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.
	CH3 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.

Maintenance		
Item	**Sub-item setting**	**Description**
Audio Makes settings related to audio.	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)
	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 Item	Sub-item setting	Description
WRR Setting Makes settings related to the wireless tuner.	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.)
	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.
Time Code Makes settings related to timecode.	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.

Maintenance Item	Sub-item setting	Description
Essence Mark Makes settings related to essence marks.	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).
Camera Config Makes settings related to various camcorder operations.	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.
	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.

Maintenance Item	Sub-item setting	Description
Preset White Makes settings related to white balance preset values.	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.
	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.
White Filter Makes settings related to filters.	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 Item	Sub-item setting	Description
DCC Adjust Makes settings related to DCC (dynamic contrast control).	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.
	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.
Genlock Makes settings related to genlock.	Genlock **On**/Off	Turns the genlock function on/off.
	Reference Internal/External(HD)/ External(SD)	Displays the type of reference signal used by the camcorder.
Auto Shading Executes auto black shading correction.	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).
	Master Gain (TMP) –6dB/–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.)
APR Makes settings related to automatic pixel noise reduction.	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).
Basic Authentication Makes settings related to basic authentication.	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-x500” by factory default.

Maintenance		
Item	**Sub-item setting**	**Description**
Wi-Fi Makes settings related to Wi-Fi connections.	Setting Access Point/Station/**Off**	Sets the operating mode for wireless LAN connections.
	Channel **Auto**/CH1/CH2/CH3/CH4/CH5/CH6/CH7/CH8/CH9/CH10/CH11/CH12/CH13	Sets the wireless LAN channel.
	SSID & Password SSID display Password display	Displays the SSID and password.
	WPS Execute/Cancel	Starts Wi-Fi Protected Setup (WPS) (execute by selecting Execute).
	IP Address	Displays the IP address of the camcorder.
	Subnet Mask	Displays the subnet mask.
	MAC Address	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).
File Transfer Makes settings related to Wi-Fi transfer of data on SxS memory cards in the camcorder.	File Transfer Execute/Cancel	Switches to transfer mode (execute by selecting Execute).
Clock Set Sets the internal clock.	Date Mode **YYMMDD**/MMDDYY/DDMMYY	Selects the display format for dates.
	12H/24H 12H/**24H**	Selects the display format for time.
	Date	Displays the date setting screen.
	Time	Displays the time setting screen.
Language Selects the display language for messages.	Select **English**/中文(簡)/日本語/Español/Русский	Selects the display language for messages.
Hours Meter Makes settings related to the digital hours meter.	Hours (System) xxxxH (where “xxxx” is the number of hours)	Displays the cumulative hours of use (cannot be reset).
	Hours (Reset) xxxxH (where “xxxx” is the number of hours)	Displays the cumulative hours of use (can be reset).
	Reset Execute/Cancel	Resets the Hours (Reset) display to 0 (execute by selecting Execute).
Network Reset Returns network-related settings to their factory default state.	Reset Execute/Cancel	Resets network settings (execute by selecting Execute).
Fan Control Sets the fan control mode.	Setting **Auto**/Minimum/Off in Rec	Selects the fan control mode.

Maintenance		
Item	**Sub-item setting**	**Description**
Option Performs checks and actions on software options.	Type Option model name	Displays the model name (PXWK-501, PXWK-502, PXWK-503) of the installed options, one name per line.
	Install Option Execute/Cancel	Displays the screen for installing options (execute by selecting Execute).
	Remove Option	Displays the screen for removing options.
Version Displays the version of the camcorder, and updates the camcorder.	Number	Displays the software version of the camcorder (Vx.xx).
	Version Up Execute/Cancel	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 Item	Sub-item setting	Description
User Menu Item Makes settings relating to user file operations.	Load SD Card	Displays a screen for reading User menu item settings from an SD card.
	Save SD Card	Displays a screen for saving User menu item settings onto an SD card.
	File ID	Displays a screen for displaying/editing the file ID of User menu items.
All File Makes settings related to ALL file operations.	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.
	Clear All Preset Execute/Cancel	Returns the current settings of All File menu items and standard settings to their factory default values (execute by selecting Execute).
Scene File Makes settings related to scene file operations.	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.
Lens File Makes settings related to lens file operations.	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).

File Item	Sub-item setting	Description
Lens File Makes settings related to lens file operations.	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.
	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.
User Gamma Makes settings related to user gamma.	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 COLOR TEMP. 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 Rreview (if playback is allowed)	Lens RET
COLOR TEMP. button	No assignment	Off

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	Turn the display of all markers on/off.	Setting retained
ATW Hold	Hold the white balance setting in the ATW (auto-tracking white balance) mode	—
Focus Magnifier	Turn the focus magnification function on/off.	Setting not retained
Zebra	Turn zebra display on/off.	Setting not retained
Shot Mark1	Write Shot Mark1.	—
Shot Mark2	Write Shot Mark2.	—
OK Mark	Add or delete an OK mark.	—
Clip Flag OK	Add/clear an OK mark to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Add/clear an NG mark to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Add/clear 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	Switch between stereo and monaural when a stereo microphone is connected.
Marker	Turn the display of all markers on/off.
Zebra	Turn zebra display on/off.
Clip Continuous Rec	Turn the Clip Continuous Rec mode on/off.
Digital Extender	Turn the screen magnification function on/off when the optional CBK-HD02 SDI/ COMPOSITE Input and 50 Pin Interface is installed.
Rec Source	Switch 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.)

Functions That Can Be Assigned to the ASSIGN. 1 and 3 Switches, the ASSIGNABLE 4 and 5 Switches, and the COLOR TEMP. Button

Assignable Switch setting	Function	State when camcorder is next powered on
Off	No assignment	—
Front Mic	Switch between stereo (On) and monaural (Off) when a stereo microphone is connected.	Setting retained
Marker	Turn the display of all markers on/off.	Setting retained
ATW	Turn ATW (auto tracing white balance) mode on/off.	Setting not retained
ATW Hold	Hold the white balance setting in the ATW mode.	—
Turbo Gain	Execute Turbo Gain according to the setting of Operation >Gain Switch >Gain Turbo.	Setting not retained
Rec Review	Conduct a recording review.	—
Rec	Start or stop recording.	—
Spotlight	Turn the spotlight function in auto iris mode on/off.	Setting retained
Backlight	Turn the backlight function in auto iris mode on/off.	Setting retained
VF Mode	Switch the viewfinder screen between B&W (On) and color (Off).	Setting retained
Video Signal Monitor	Switch the video signal monitor display function.	Setting retained
Lens Info	Switch 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, assign the Zoom Tele function to ASSIGNABLE 4, and assign the Zoom Wide function to ASSIGNABLE 5 (displayed only when <4> and <5> are set).	—

Assignable Switch setting	Function	State when camcorder is next powered on
Zoom Wide/Tele	When a lens that supports serial communication is installed, assign the Zoom Wide function to ASSIGNABLE 4, and assign the Zoom Tele function to ASSIGNABLE 5 (displayed only when <4> and <5> are set).	—
Focus Magnifier	Turn the focus magnification function on/off.	Setting not retained
Zebra	Turn zebra display on/off.	Setting not retained
Lens RET	Display the return video signal. When a camera extension unit is not connected, function as follows. Rec Review (if playback is allowed)	—
Return Video	Display the return 1 video signal.	—
Return Video2	Display the return 2 video signal.	—
Return Video3	Display the return 3 video signal.	—
Return Video4	Display the return 4 video signal.	—
Shot Mark1	Write Shot Mark1.	—
Shot Mark2	Write Shot Mark2.	—
OK Mark	Add or delete an OK mark.	—
Clip Flag OK	Add/Clear an OK mark to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Add/Clear an NG mark to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Add/Clear a KP (Keep) mark to/from the clip being recorded or played.	Setting not retained
Electrical CC	Function that switches the electrical CC filter (3200K/4300K/5600K/6300K) applied to white balance adjustment values. Each press of the switch or button switches in the order 3200K→4300K→5600K→6300K. These can also be applied from a menu (apply with 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
CC5600K	Apply a 5600K electrical CC filter to white balance adjustment values.	Setting retained
Clip Continuous Rec	Turn the Clip Continuous Rec mode on/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	Display return video signal. When a camera extension unit is not connected, function as follows. Rec Review (if playback is allowed)	—
Return Video	Display return video signal.	—
Rec Review	Execute recording review.	—
Shot Mark1	Write Shot Mark1.	—
Shot Mark2	Write Shot Mark2.	—
Clip Flag OK	Add/Clear an OK mark to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Add/Clear an NG mark to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Add/Clear a KP (Keep) mark to/from the clip being recorded or played.	Setting not retained
OK Mark	Add or delete an OK mark.	—
Focus Magnifier	Turn the focus magnification function on/off.	Setting not retained

Chapter 7 Saving and Loading User Setting Data

Saving and Loading Settings

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. Setting data is saved in the following categories.

User Menu Item files: User menu item files save the items in the User menu. You can save up to 64 user menu item files on an SD card.

ALL files: ALL files save the setting data of all menus. You can save up to 64 ALL 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 scene files in the camcorder's internal memory and up to 64 scene files on an SD card.

Lens files: Lens files save the setting data used to compensate for lens characteristics, such as flare, white shading, white balance and center markers. You can save up to 32 lens files in the camcorder's internal memory and up to 64 lens files on an SD card.

Gamma files: You can save up to five user-defined gamma table data files in internal memory.

The first settings stored in a file are called "preset values."
Even after loading files to set up the camcorder, and overwriting original files with new settings, you can still recover preset values and reset files to their initial states *(see page 146)*.

Saving and Loading User Menu Item Files

Insert a writable SD card *(see page 63)* into the UTILITY SD card slot.

Saving User Menu Item Files

1 **Select File >User Menu Item >Save SD Card in the setup menu.**
A screen for selecting a User Menu Item 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 blank File ID. 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.**

To change the File ID

1 **Select File >User Menu Item >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 User Menu Item Files

1 **Select File > User Menu Item >Load SD Card in the setup menu.**
A User Menu Item 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.**

Saving and Loading ALL Files

Insert a writable SD card *(see page 63)* into the UTILITY SD card slot before proceeding.

Saving Setting 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 save destination, then press the knob.**
You can save files in rows with 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 *(see page 146)*.

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	What to do
NG:Cannot Save	No recordable media is inserted.	Insert recordable media.
NG:Media Full	The media is full.	Use media with free capacity remaining.

To change 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 Setting Data

Note

When you load a file from an SD card, the data saved in the camcorder's internal memory is overwritten.

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.

Note

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 will be set to preset values.

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	What to do
NG:No Data	• There is no readable media • The specified file does not exist on the media	Insert the media that contains the file you want.

Resetting a File after Changing Its Contents

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.
All the settings in the ALL file are reset to the preset values.

Saving and Loading Scene Files

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. To use an SD card, insert an SD card into the UTILITY SD card slot (for saving configuration data) before proceeding.

Saving Scene Files

To save a scene file in internal memory

1 **Select File >Scene File >Store Internal Memory in the setup menu.**
A scene file list screen appears.

2 **Turn the MENU knob to select a destination, then press the knob.**
If the File ID is set to “Standard” destination, preconfigured standard settings are saved. To save a new scene file, set “Standard” as the save destination. Selecting a save destination displaying a File ID name other than “Standard” will overwrite the selected file.

3 **Turn the MENU knob to select [Execute] on the confirmation screen, then press the knob.**

To save 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 blank File ID. 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 screen, then press the knob.**

To change 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 Scene Files

To load 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.**

To 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.**

Saving and Loading Lens Files

Setting Lens File Data

Use File >Lens File *(see page 138)* in the setup menu to set the data in lens files.
You can set the following data and save it as a lens file.

Setting 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

Saving Lens Files

To save 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.**

To save 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 blank File ID. 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.**

To change 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 Lens Files

To load 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.**

To load 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 Lens Files 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.

On (Lens Name): Load the lens file that corresponds to the model name.
Off: Do not use the Lens Auto Recall function.
On (Serial Number): Load the lens file that corresponds to the 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, both settings load the lens file that corresponds to the model name.

Saving and Loading Gamma Files

Checking the Current Gamma File Settings (File Names)

1 **Select File >User Gamma >Current Settings in the setup menu.**
A list of the currently configured user gamma files appears.

Loading User Gamma Files 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.**

To use user gamma files created using CvpFileEditorTM V4.2

Save created user gamma files in the “PRIVATE/SONY/PRO/CAMERA/HD_CAM” directory of the SD card.

Resetting User Gamma Files to Initial State

1 **Select File >User Gamma >Reset in the setup menu.**
A gamma file number 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.

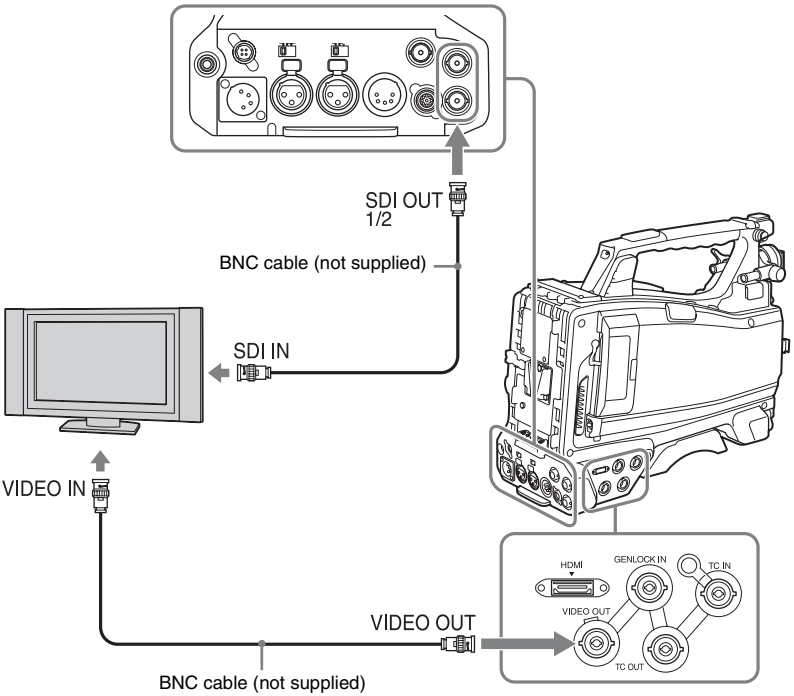
3 **Turn the MENU knob to select [Execute], then press the knob.**

Chapter 8 Connecting External Devices

You can connect a control device such as an RM-B150/B170/B750 Remote Control Unit or RCP-1001/1501 Remote Control Panel and operate this camcorder. For details about connection and operation of a remote control unit, see *"Operating via the REMOTE Connector" (page 76)*.

Connecting External Monitors

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 720x486i or 720x576i.

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 from this connector can be turned on and off using Operation >Input/Output >SDI Out1 Output/SDI Out2 Output in the setup menu *(see page 110)*.
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 is linked to 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. For these purposes, the clips on an SxS memory card can be operated by directly loading the card in a computer or by connecting the optional SBAC-US20 SxS Memory Card USB Reader/Writer to the computer, using an USB cable.

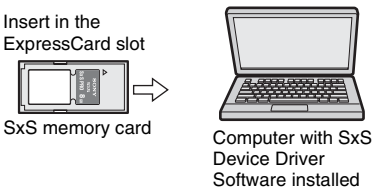
Using the ExpressCard Slot of a Computer

If the computer is equipped with an ExpressCard/34 or ExpressCard/54 slot, you can directly insert the SxS memory card containing clips recorded with this camcorder and access the files.

Notes

- The SxS Device Driver Software must be downloaded and installed on your computer. For details, see *"Software Downloads" (page 10)*.
- Operation is not guaranteed with all computers.

For support information for the driver software, visit the following URL:
http://www.sony.net/SxS-Support/



With a Windows computer
Check that a Removable Disk appears in My Computer. This indicates normal status.

With a Macintosh computer
An icon is displayed on the menu bar.

To remove an SxS memory card

Windows

1. Click on the icon of “Safely Remove Hardware” 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.

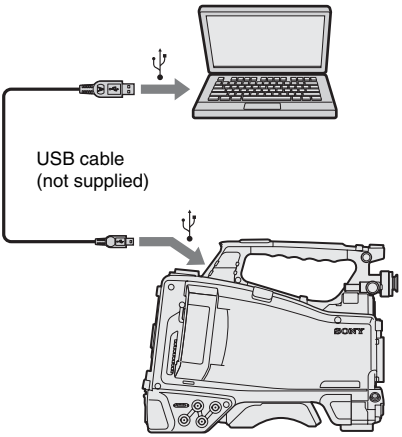
Macintosh

Drag the SxS memory card icon on the desktop to the Trash.
If the SxS memory card icon is located in the Finder, click on the eject icon.

USB Connection with a Computer

Preparations

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

Disabling the USB connection

To disable 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

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.

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, see *“Software Downloads” (page 10)* .
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 operate, e.g. copy the clips on the SxS memory card by using Explorer (Windows) or Finder (Macintosh), the subsidiary data contained by the clips may not be maintained.

To use a nonlinear editing system

For a nonlinear editing system, optional editing software that corresponds to the recording formats used with this 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.

Note

When using the camcorder in this system, do not connect a video light to the camcorder.

Recording External Input

You can output and 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].

For the recording formats supported for input SDI signals, see “Supported external input formats and camcorder recording formats” (page 156).

When you input SDI signals, you can change the setting of Wide ID to select the method used to handle wide picture information.

Notes

- External input signals cannot be recorded in Slow & Quick Motion mode. When Slow & Quick Motion mode is selected, the recording mode is cancelled 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, ends when set Operation >Input/Output >Source Select in the setup menu 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.

Supported external input formats and camcorder recording formats

Operation >Format >Rec Format in the setup menu	Operation >Format >Frequency in the setup menu	Supported external input signal formats
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
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 1920x1080i	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 1440x1080i	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 1280x720P	59.94	HD 1920×1080 29.97PsF/59.94i HD 1280×720 59.94P
	50	HD 1920×1080 25PsF/50i HD 1280×720 50P

Chapter 9 Maintenance

Testing the Camcorder

Check the functions of the camcorder before setting out for a shooting session, preferably by recording and playing back video and audio signals.

Maintenance

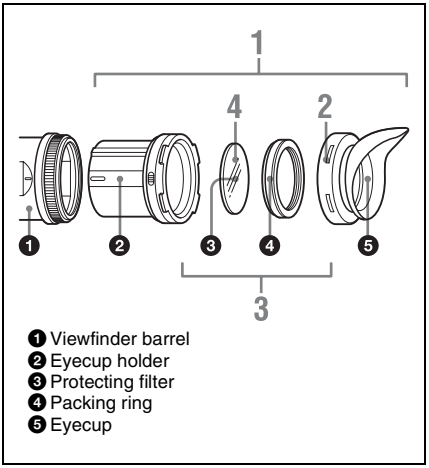
Cleaning the Viewfinder

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.

Caution

Never use organic solvents such as thinners.

Disassembling the eyepiece for cleaning (example: HDVF-20A)



1 Detach the eyepiece from the viewfinder barrel.

For the detaching procedure, see "Detaching the Eyepiece" on page 31.

2 Remove the eyecup from the eyecup holder.

3 Remove the protecting filter, together with the packing ring, from inside the eyecup holder.

4 Detach the protecting filter from the packing ring.

Fog-proof filter

Depending on the temperature and humidity, the protecting filter may mist because of vapor or your breath. To ensure that the viewfinder is always clear, replace the protecting filter with a fog-proof filter (service part number: 1-547-341-11).

Fitting the fog-proof filter

Replace the protecting filter on the packing ring with the fog-proof filter.
Be sure to correctly assemble the fog-proof filter, the packing ring, and the eyecup so that the reassembled eyepiece is waterproof.

Note

When cleaning the fog-proof filter, wipe it very gently with a soft cloth to avoid damaging the anti-fogging coating.

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.

Operation Warnings

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 Messages

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 Messages

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.)

Warning message	Warning sound	WARNING indicator	Tally/REC indicator	Cause and Solution
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.)

Caution and Operation Messages

The following caution and operation messages may appear in the center of the screen. Follow the instructions provided to resolve the issue.

Message	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.
Will Switch Slots Soon	The camcorder will switch memory card slots shortly. Check that there is a memory card in both slots.
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 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.

Message	Cause and Solution
Media(A) [1] Error	Recording stopped because an error occurred on the memory card. If the problem persists, replace the memory card.
Media Reached Rewriting Limit Change Media(A) [1]	The memory card has reached the end of its life. Make a backup, and replace the card immediately. If you continue using the card, the card may not be able to record or play. *For details, refer to the operating instructions for the memory card.*
Copy Error! (CANCEL:Abort) No Media!	There are no memory cards inserted in the slots. Insert cards.
Copy Error! (CANCEL:Abort) Cannot Use Media(A) [1]	An unusable memory card was inserted. Replace the card in the corresponding slot.
Cannot Use Media(A) [1] Unsupported File System	A memory card with a different file system was inserted. Replace the card or format the card using the camcorder.

1) “(B)” is displayed for cards in slot B.

Appendix

Important Notes on Operation

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 34).*

Viewfinder

Do not leave the camcorder with the eyepiece 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 Image Sensors

Note

The following phenomena that may occur in images are specific to image sensors. They do not indicate a malfunction.

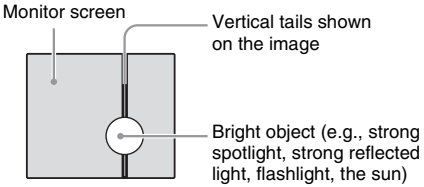
White flecks

Although the 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 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 temperatures
- when you have raised the gain (sensitivity)
- when using the slow shutter

Vertical smear

When an extremely bright object, such as a strong spotlight or flashlight, is being shot, vertical tails may be produced on the screen, or the image may be distorted.



Aliasing

When fine patterns, stripes, or lines are shot, they may appear jagged or flicker.

Fragmentation

If pictures cannot be recorded/reproduced properly, try formatting the recording medium. While repeating picture recording/playback with a certain recording medium for an extended period, files in the medium may be fragmented, disabling proper recording/storage. In such a case, make a backup of clips in the medium then perform formatting of the medium using Operation >Format Media *(see page 109)* in the setup menu.

Exchanging the Battery of the Internal Clock

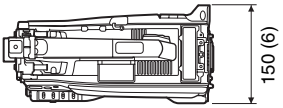
The camcorder's internal clock is powered by a lithium battery. If the message "BackUp Battery End" appears in the viewfinder, this battery must be exchanged. Contact a Sony service representative.

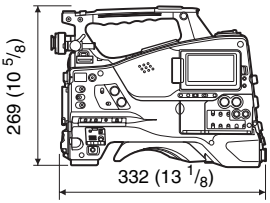
Specifications

General

Mass Approx. 3.8 kg (8 lb 6.0 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. 35 W (body only, 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
–5 °C to +40 °C (23 °F to 104 °F)
Storage temperature
–20 °C to +60 °C (–4 °F to +140 °F)
File system exFAT
Continuous operating time
Approx. 130 minutes (using BP-L80S)
Recording format (video)
SR SStP
MPEG-4 Simple Studio Profile, SR-Lite 422
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
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)
SR SStP
LPCM 24-bit, 48 kHz, 4-channel
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
DVCAM
LPCM 16-bit, 48 kHz, 2-channel
Proxy
AAC-LC, 128 kbps, 2-channel
Recording/playback time
SR SStP
59.94i/29.97P
Approx. 65 minutes: Using SBP-128B (128 GB)
Approx. 30 minutes: Using SBP-64B (64 GB)
Approx. 14 minutes: Using SBP-32 (32 GB)
50i/25P
Approx. 79 minutes: Using SBP-128B (128 GB)
Approx. 36 minutes: Using SBP-64B (64 GB)
Approx. 17 minutes: Using SBP-32 (32 GB)
23.98P
Approx. 82 minutes: Using SBP-128B (128 GB)
Approx. 38 minutes: Using SBP-64B (64 GB)
Approx. 18 minutes: Using SBP-32 (32 GB)

XAVC Intra
XAVC-I mode
Approx. 120 minutes: Using SBP-128B (128 GB)
Approx. 60 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 30 minutes: Using SBP-32/SBS-32G1A (32 GB)
XAVC Long
XAVC-L 50 mode
Approx. 240 minutes: Using SBP-128B (128 GB)
Approx. 120 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 60 minutes: Using SBP-32/SBS-32G1A (32 GB)
XAVC-L 35 mode
Approx. 340 minutes: Using SBP-128B (128 GB)
Approx. 170 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 85 minutes: Using SBP-32/SBS-32G1A (32 GB)
XAVC-L 25 mode
Approx. 440 minutes: Using SBP-128B (128 GB)
Approx. 220 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 110 minutes: Using SBP-32/SBS-32G1A (32 GB)
MPEG-2 Long GOP
MPEG HD422 mode
Approx. 240 minutes: Using SBP-128B (128 GB)
Approx. 120 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 60 minutes: Using SBP-32/SBS-32G1A (32 GB)
MPEG HD420 HQ mode
Approx. 360 minutes: Using SBP-128B (128 GB)
Approx. 180 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 90 minutes: Using SBP-32/SBS-32G1A (32 GB)
DVCAM
Approx. 440 minutes: Using SBP-128B (128 GB)
Approx. 220 minutes: Using SBP-64B/SBS-64G1A (64 GB)
Approx. 110 minutes: Using SBP-32/SBS-32G1A (32 GB)

Note

The recording/playback time may vary due to usage conditions and memory characteristics.

Recording frame rate
SR SStP
1920 × 1080/59.94i, 50i, 29.97P, 23.98P, 25P
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
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 Ω, unbalanced
TC IN: BNC type, 0.5 V to 18 Vp-p, 10 kΩ
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 to –30 dBu
MIC IN: XLR type, 5-pin, female, –70 to –30 dBu
WRR: D-sub 15-pin
Analog CH1: –40 dBu
Digital CH1/CH2: –40 dBFS
SDI IN: SMPTE 292M/259M 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, 292M/259M 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 Ω
EARPHONE (stereo mini jack): –11 dBu (reference level output, maximum monitor volume, 16 Ω 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), 4-pin (type B) (2)
VF: Rectangular type 26-pin, round type 20-pin

Camera Section

Image sensor: 2/3-inch type, CCD, Effective pixels: 1920 (H) × 1080 (V)
Type: 3-chip RGB
Optical system: F1.4 prism system
ND filters: 1: Clear
2: $^{1}/_{4}$ND
3: $^{1}/_{16}$ND
4: $^{1}/_{64}$ND
Sensitivity: F11 (system frequency: 59.94i)
F12 (system frequency: 50i)
(2000 lx, 89.9% reflectance, 3200K)
Minimum illumination: 0.016 lx (F1.4, +42 dB, 16-frame accumulation)
Image S/N ratio: 60 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)
Gain –6, –3, 0, 3, 6, 9, 12, 18, 24, 30, 36, 42 dB, AGC
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%
460% (1080/29.97P, 1080/25P, 1080/23.98P)
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
Mono, 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)

Supplied Accessories

Shoulder belt (1)
Cold shoe kit (1)
Lens mount cap
USB wireless LAN module (IFU-WLM3)
Protective cap (2)
Guard (1)
Operation Guide (1)
Operation Manual (CD-ROM) (1)

Related Equipment

Option key

PXWK-503 (XAVC S&Q key)

Power supply and related equipment

AC adaptor AC-DN10/DN2B
Battery pack BP-L80S
Battery charger
BC-L160/L500/L70

Lens, viewfinder and related equipment

Lens 2/3-inch type bayonet mount lens only
Viewfinder HDVF-20A/200/C30WR/C35W/EL75/L750/L770
CBK-VF02
Viewfinder rotation bracket
BKW-401

Equipment for remote control

Remote control unit

RM-B170/B750
RCP-1000/1500/1530
RCP-751/921
RCP-1001/1501

Note

Command network unit (CNU) is not supported.

HD camera adaptor

CA-FB70/TX70

Note

If SDIOUT2 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

Wireless microphone

DWR-S02D
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

Products for maintenance, ease of use/ handling

Hard carrying case

LC-H300

Soft carrying case

LC-DS300SFT

Maintenance manual

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Notes

- Always make a test recording, and verify that it was recorded successfully.
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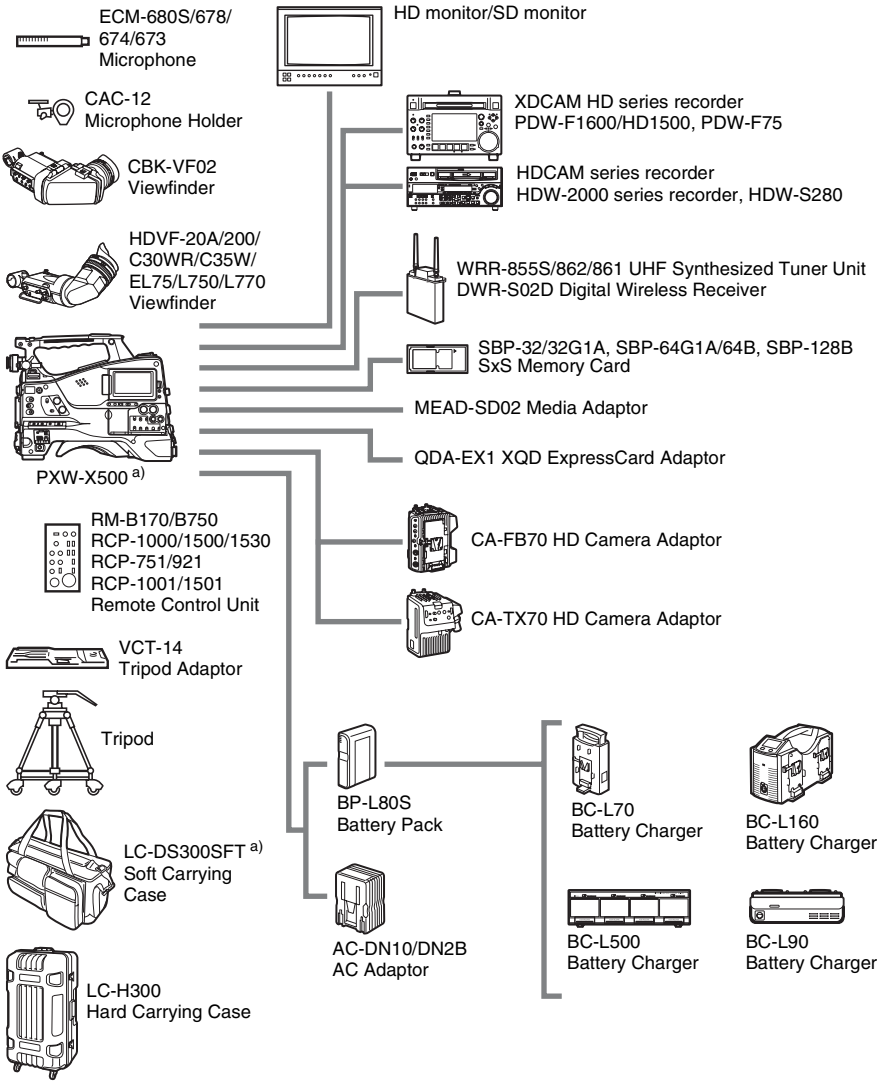
Chart of Optional Components and Accessories



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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AUTOMATIC UPDATE FEATURE

From time to time, SONY or the THIRD-PARTY SUPPLIERS may automatically update or otherwise modify the SOFTWARE, including, but not limited to, for purposes of enhancement of security functions, error correction and improvement of functions, at such time as you interact with SONY's or third parties' servers, or otherwise. Such updates or modifications may delete or change the nature of features or other aspects of the SOFTWARE, including, but not limited to, functions you may rely upon. You acknowledge and agree that such activities may occur at SONY's sole discretion and that SONY may condition continued use of the SOFTWARE upon your complete installation or acceptance of such update or modifications. Any updates/ modifications shall be deemed to be, and shall constitute part of, the SOFTWARE for purposes of this EULA. By acceptance of this EULA, you consent to such update/ modification.

ENTIRE AGREEMENT, WAIVER, SEVERABILITY

This EULA and SONY's privacy policy, each as amended and modified from time to time, together constitute the entire agreement between you and SONY with respect to the SOFTWARE. The failure of SONY to exercise or enforce any right or provision of this EULA shall not constitute a waiver of such right or provision. If any part of this EULA is held invalid, illegal, or unenforceable, that provision shall be enforced to the maximum extent permissible so as to maintain the intent of this EULA, and the other parts will remain in full force and effect.

GOVERNING LAW AND JURISDICTION

The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this EULA. This EULA shall be governed by the laws of Japan, without regards to conflict of laws provisions. Any dispute arising out of this EULA shall be subject to the exclusive venue of the Tokyo District Court in Japan, and the parties hereby consent to the venue and jurisdiction of such courts.

EQUITABLE REMEDIES

Notwithstanding anything contained in this EULA to the contrary, you acknowledge and agree that any violation of or non-compliance with this EULA by you will cause irreparable harm to SONY, for which monetary damages would be inadequate, and you consent to SONY obtaining any injunctive or equitable relief that SONY deems necessary or appropriate in such circumstances. SONY may also take any legal and technical remedies to prevent violation of and/or to enforce this EULA, including, but not limited to, immediate termination of your use of the SOFTWARE, if SONY believes in its sole discretion that you are violating or intend to violate this EULA. These remedies are in addition to any other remedies SONY may have at law, in equity or under contract.

TERMINATION

Without prejudice to any of its other rights, SONY may terminate this EULA if you fail to comply with any of its terms. In case of such termination, you must: (i) cease all use, and destroy any copies, of the SOFTWARE; (ii) comply with the requirements in the section below entitled "Your Account Responsibilities".

AMENDMENT

SONY RESERVES THE RIGHT TO AMEND ANY OF THE TERMS OF THIS EULA AT ITS SOLE DISCRETION BY POSTING NOTICE ON A SONY DESIGNATED WEB SITE, BY EMAIL NOTIFICATION TO AN EMAIL ADDRESS PROVIDED BY YOU, BY PROVIDING NOTICE AS PART OF THE

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THIRD-PARTY BENEFICIARIES
Each THIRD-PARTY SUPPLIER is an express intended third-party beneficiary of, and shall have the right to enforce, each provision of this EULA with respect to the SOFTWARE of such party.

Should you have any questions concerning this EULA, you may contact SONY by writing to SONY at applicable contact address of each area or country.

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