SONY

4-477-605-**11** (1)

Solid-State Memory Camcorder

Operating Instructions

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

PMW-400K
PMW-400L

XDCAM SxS HDMI

MPEG HD422 Exmor FULL HD 3CMOS

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Foreword

Before Use

After purchasing the PMW-400 Solid-State Memory Camcorder, before operating, it is necessary to set the area of use.
(Unless this setting is made, the camcorder will not operate.)

For details of these settings, see "Setting the Area of Use" (page 35).

Note

Before attaching/removing optional components or accessories to/from the PMW-400 (referred to as "the camcorder"), be sure to turn the power of the camcorder off.

Chapter 1 Overview

Features

$^2/_3$-type full-HD (1920 × 1080) CMOS image sensors

The PMW-400 Solid-State Memory Camcorder is provided with three newly developed $^2/_3$-type "Exmor" CMOS image sensors with approximately 207 million effective pixels, for full HD resolution (1920 × 1080). The new image sensor technology enables the capture of very high-quality images, with a sensitivity of F12 (59.94i) / F13 (50i) and an S/N ratio of 60 dB by the 3DNR function.

SxS memory cards as recording media

A new generation HD recording system

HD recording using the "MPEG-2 Long GOP" codec and SD recording in DVCAM format

The PMW-400 records 1920 × 1080, 1440 × 1080, and 1280 × 720 HD images using "MPEG-2 Long GOP" codec compression. When recording with UDF, settings of 50 Mbps (in HD422 mode) or 35 Mbps (in HQ mode) are supported. With FAT, settings of 35 Mbps (in HQ mode) or 25 Mbps (in SP mode) are supported. When using UDF with a 64 GB SxS memory card, efficient compression methods allow for recording approximately 120 minutes of HD images at 50 Mbps (in HD422 mode), and approximately 180 minutes of HD images at 35 Mbps (in HQ mode). Furthermore, the PMW-400 supports recording and playback in DVCAM 25 Mbps format, as well as playback in MPEG IMX 50 Mbps format.

High-quality uncompressed audio recording

When in UDF HD422 mode, this camcorder can record 4-channel audio in 24-bit, 48 kHz linear PCM format. Recording of 4-channel audio in 16-bit, 48 kHz linear PCM format for FAT HD Mode is possible.

Support for a file-based workflow

File-based recording in MXF and MP4 formats allows material to be handled with great flexibility in computer work environments, enabling easy copying, transferring, sharing, and archiving.

Instant-access thumbnail display with "Expand" function

Each time a recording is started and stopped, the video and audio signals are recorded as one clip. Furthermore, thumbnails are automatically generated for each clip as a visual reference, allowing the operator to cue-up to a desired scene simply by guiding the cursor to a thumbnail. For further convenience, the 'Expand' function allows one selected clip in the Thumbnail display to be divided into 12 equal time intervals, each with its own thumbnail identifier. This is useful if you wish to quickly search for a particular scene within a lengthy clip.

Multi-format support

The camcorder supports interlace format recording (1080/59.94i or 1080/50i), progressive format recording (1080/29.97P, 1080/23.98P, 720/59.94P, 720/29.97P, 720/23.98P, or 1080/25P, 720/50P, 720/25P), thus offering the flexibility needed for worldwide HD recording. It also supports recording and playback of SD signals (both NTSC and PAL). The camcorder has an optional capability to record and play back SD signals in IMX/DVCAM format, and can output HD signals down-converted to SD.

A special auto focus lens

The camcorder is provided with the 2/3-type auto focus lens, which ensures high-quality shooting in all situations from wide angle to telephoto (PMW-400K only).

A variety of functions for improved performance under various shooting conditions

- Picture Cache function
- Optical ND filters and electrical CC filters
- Hyper gamma
- Slow shutter function
- Frame Recording function
- Time lapse function (interval recording)
- Slow & quick motion function
- Freeze mix function
- Focus magnification function
- Digital extender function [1)]
- Image inversion function
- Assignable switches
- 3.5-inch high-resolution color LCD viewfinder
- Remote control

1) When the optional CBK-CE01 50 Pin Interface and Digital Extender is installed

Wireless LAN support

You can connect this camcorder to a computer over a wireless LAN (Wi-Fi connection) by connecting the optional CBK-WA01 Wi-Fi Adapter to the external device connector.
A Wi-Fi connection allows you to transfer planning metadata and other files between a computer and this camcorder. You can also use the Live Logging function to add shot marks to the video currently being shot.

Camcorder system configuration

When you install the optional CBK-CE01 50 Pin Interface and Digital Extender, you can mount the CA-FB70/TX70 HD Camera Adaptor and connect the CCU to configure a system for shooting and recording.
When the CBK-CE01 is installed, you can also connect the HDCA-702 MPEG TS Adaptor instead of the camera adaptor. This allows you to convert this camcorder's HDSDI output to a MPEG HD transport stream.

Software Downloads

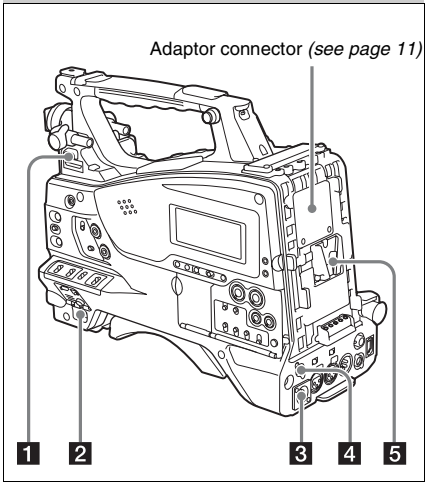
When the unit is used with a PC connection, download device drivers, plug-ins, and application software, where applicable, from the Sony Professional products web site.

Sony Professional products web site homepage:

U.S.A.	http://pro.sony.com
Canada	http://www.sonybiz.ca
Latin America	http://sonypro-latin.com
Europe, Middle East and Africa	http://www.pro.sony.eu
Japan	http://www.sonybsc.com
Asia Pacific	http://pro.sony-asia.com
Korea	http://bp.sony.co.kr
China	http://pro.sony.com.cn

Locations and Functions of Parts and Controls

Power Supply



1 LIGHT switch

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

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

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

Supplies power for an optional WRR-860C/861/862 UHF Synthesized Diversity Tuner (maximum 0.5 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 on AC power supply.

For details, see "Preparing a Power Supply" (page 29).

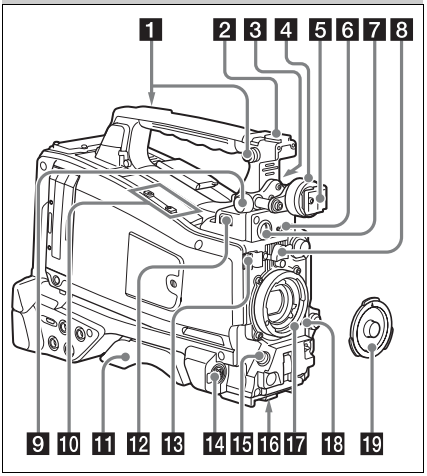
Note

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

Adaptor connector

Enables connection of a CA-FB70/TX70 HD Camera Adaptor or an HDCA-702 MPEG TS Adaptor. To connect an adaptor, remove the cover from the connector and install the optional CBK-CE01 50 Pin Interface and Digital Extender.

Accessory Attachments



1 Shoulder strap fitting *(see page 42)*.

2 Accessory fitting shoe *(see page 41)*.

3 Viewfinder front-to-back positioning lever

4 Viewfinder left-to-right positioning ring *(see page 30)*.

5 Viewfinder fitting shoe

6 VF (viewfinder) connector (26-pin, rectangular)

7 VF (viewfinder) connector (20-pin, round)

Connect the cable of the optional DXF-51 or DXF-20W viewfinder.

For connecting the DXF-51, optional parts are required. Consult a Sony service representative for information about connecting the DXF-51.

8 Lens mount securing rubber

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

9 Viewfinder front-to-back positioning knob (LOCK knob) *(see page 30)*.

10 Fitting for optional microphone holder *(see page 39)*.

11 Shoulder pad

Raise the shoulder pad fixing lever to adjust the position in the front-to-rear direction *(see page 42)*.

12 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)*.

13 Lens cable clamp

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

The power (+48 V) is supplied via this connector.

15 LENS connector (12-pin)

Note

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

16 Tripod mount

17 Lens mount (special bayonet mount)

Consult a Sony service representative for information about available lenses.

18 Lens locking lever

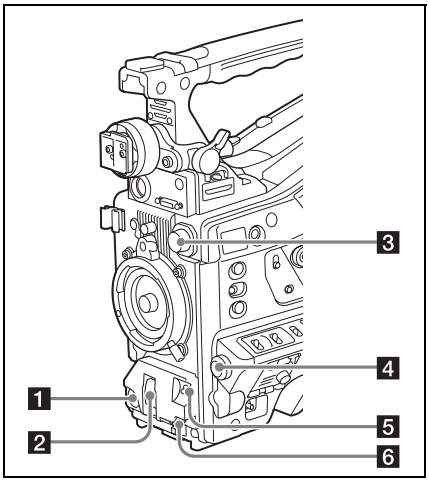
After inserting the lens in the lens mount, rotate the lens mount ring with this lever to lock the lens in position.
After locking the lens, be sure to use the lens mount securing rubber to prevent the lens from becoming detached.

19 Lens mount cap

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

Operating and Connectors Section

Front



1 REC START (recording start) button

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 48).

3 FILTER selector

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 the "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 46).

4 MENU knob

Changes the item selection or a setting within the menu *(see page 104)*.

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

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.

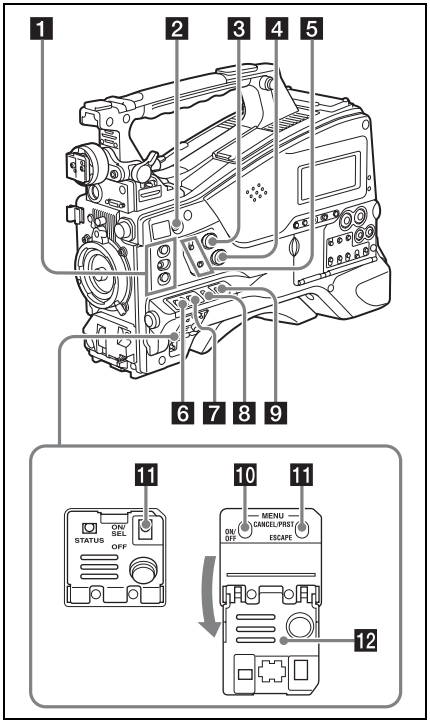
You can use the AUTO W/B BAL switch even when the ATW (Auto Tracing White Balance) function is operating.

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 *(see page 53)*.

Right side (near the front)



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

You can assign the desired functions to these switches on "OPERATION" > "Assignable SW" in the setup menu *(see page 148)*.

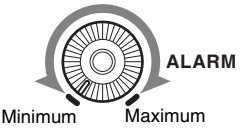
The ASSIGN.1/3 switches are provided with an indicator to show whether a function is assigned to the switch (ON) or not (OFF).

2 COLOR TEMP. (color temperature) button

You can also use this button as an assignable switch *(see page 148)*.

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 down-side switch: CH-1/2

Position of up-side 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 down-side switch: CH-3/4

Position of up-side 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 on "OPERATION" > "Assignable SW" in the setup menu *(see page 149)*.

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 gains corresponding to the L, M, and H settings can be selected on "OPERATION" > "Gain Switch" in the setup menu *(see page 115)*.
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

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

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)* on the WHITE side, 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.

10 MENU ON/OFF switch

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.

11 STATUS ON/SEL/OFF (menu display on/page selection/display off) switch

MENU CANCEL/PRST (preset) / ESCAPE switch

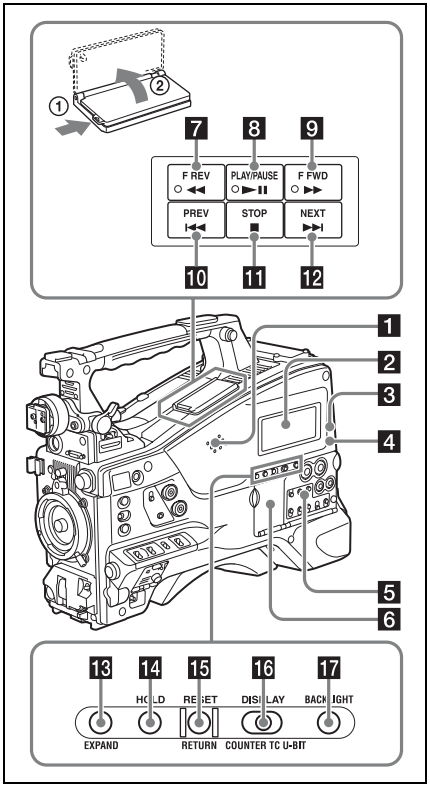
When the menu is not displayed, this switch functions as the STATUS ON/SEL/OFF switch. When the menu is displayed, the switch functions as the MENU CANCEL/PRST/ESCAPE switch. (To use the MENU CANCEL/PRST/ESCAPE switch, open the cover.)

Use the STATUS ON/SEL/OFF switch in the following way.
ON/SEL: 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 57)*. Each page is displayed for about 10 seconds.
OFF: To clear the page immediately after display, push this switch down to the OFF position.

Use the MENU CANCEL/PRST/ESCAPE switch in the following way.
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.

12 Cover

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 166)*.
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 Monochrome LCD panel

Displays remaining battery capacity, remaining media capacity, audio levels, time data, and so on *(see page 21)*.

3 WARNING indicator *(see page 166)*.

4 ACCESS lamp

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

5 Protection cover of the audio control section *(see page 17)*.

6 Protection cover of the thumbnail screen operations section *(see page 17)*.

7 F REV (fast reverse) button and indicator

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 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

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 last preceding clip (or the first frame of the current clip when no preceding clips exist).

11 STOP button

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 first frame of the last recorded clip on the recording media.

13 EXPAND (expand function) button

If you press this button when the thumbnail screen is displayed, the duration of the selected clip is divided into fractions, and the first frame of each of the divisions is shown in a further thumbnail display (expand function). For an HD recorded MP4 clip, its duration is divided into 12. If an SD recorded AVI clip comprises multiple files, the divisions are displayed for the individual files.

For MP4 clips, each time you press this button the division is repeated. Hold down the SHIFT button and press this button to step back through the division process.

14 HOLD (display hold) button

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

For details of the counter display, see page 21.

15 RESET/RETURN button

Resets the value shown in the time counter display in the monochrome LCD panel. According to the settings of the PRESET/REGEN/CLOCK switch *(see page 18)* 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: COUNTER	Counter to 0:00:00:00
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 the Time Data" (page 54).

This button returns to the previous screen when pressed during thumbnail screen display, expand thumbnail screen display, or shot mark thumbnail screen display.

16 DISPLAY switch

This cycles the data displayed in the time counter display in the monochrome LCD panel through the sequence COUNTER, TC, and U-BIT *(see page 21)*.

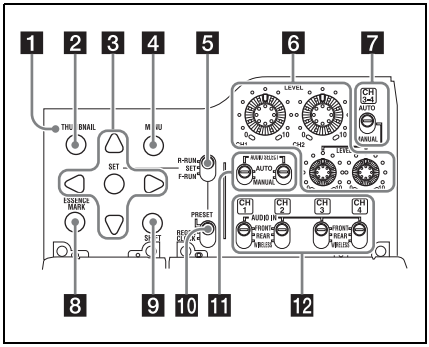
COUNTER: Display the elapsed recording/playback time (hours, minutes, seconds, frames).

TC: Display timecode.

U-BIT: Display user bits data.

17 BACKLIGHT button

Thumbnail screen operations section and audio control section



1 THUMBNAIL indicator

This lights when thumbnail screen is displayed.

2 THUMBNAIL button

Press this button to display the thumbnail screen *(see page 91)* and to carry out a thumbnail operation.

Press once more to return to the original display.

3 SET (set) button and arrow buttons

Use these buttons to make timecode and user bit settings, and for thumbnail screen operations *(see page 97)*.

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 55).

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 each of audio channels 3 and 4.

AUTO: Automatic adjustment

MANUAL: Manual adjustment

8 ESSENCE MARK button

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

All: Thumbnail display of all frames marked with essence 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 defined 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 each of 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

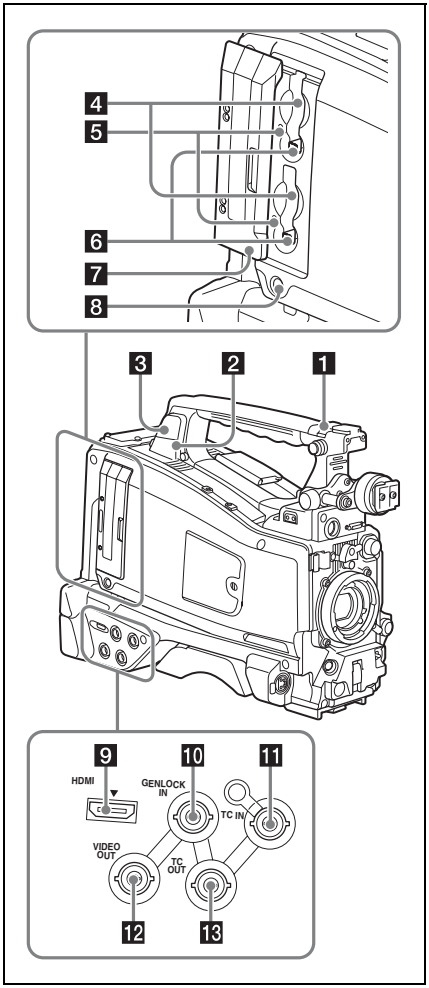
Select the audio input signals to be recorded on audio channels 1, 2, 3 and 4.

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 installed

Left side and upper section



1 ASSIGNABLE 4/5 switches

You can assign the desired functions to these switches on "OPERATION" > "Assignable SW" in the setup menu *(see page 149)*.
Off is assigned to these switches when the camcorder is shipped from the factory.

2 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 for that computer.

3 External device connector

Connect an optional CBK-WA01 Wi-Fi Adapter. Connecting a CBK-WA01 allows Wi-Fi connection (wireless LAN connection) between the camcorder and a computer.

Note

Use this connector only for connecting a CBK-WA01. Do not connect and use a USB hub or similar products.

For details on Wi-Fi connection, refer to "Using a Wi-Fi Adapter" (page 76).

4 SxS memory card slots

These two slots (A and B) can receive SxS memory cards or other recording media *(see page 58)*.

5 ACCESS lamps

Indicate the state of slots A and B *(see page 58)*. You can check whether the lamps are lit even when the slot cover is closed.

6 EJECT buttons *(see page 58)*

7 Slot cover

Slide to the left and right to open and close.

8 SLOT SELECT (SxS memory card select) button *(see page 59)*.

9 HDMI [1] output connector

When a video monitor provided with an HDMI signal input connector is connected to this connector, you can monitor picture being shot (camera picture) or playback picture.

1) The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

10 GENLOCK IN (genlock signal input) connector (BNC type)

This connector inputs a reference signal when the camcorder is to be genlocked or when timecode is to be synchronized with external equipment. 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
1080/29.97P	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, 720/59.94P, 480/59.94i
720/29.97P	1080/59.94i, 720/59.94P, 480/59.94i
720/23.98P	1080/59.94i, 720/59.94P, 480/59.94i
480/59.94i	1080/59.94i, 480/59.94i
480/29.97P	1080/59.94i, 480/59.94i
1080/50i	1080/50i, 576/50i
1080/25P	1080/50i, 576/50i
720/50P	1080/50i, 720/50P, 576/50i
720/25P	1080/50i, 720/50P, 576/50i
576/50i	1080/50i, 576/50i
576/25P	1080/50i, 576/50i

(Genlock for the camera module supports horizontal sync signals only.) Adjust the genlock H-phase (phase of horizontal sync signal) on "MAINTENANCE" > "Genlock" in the setup menu.

11 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).

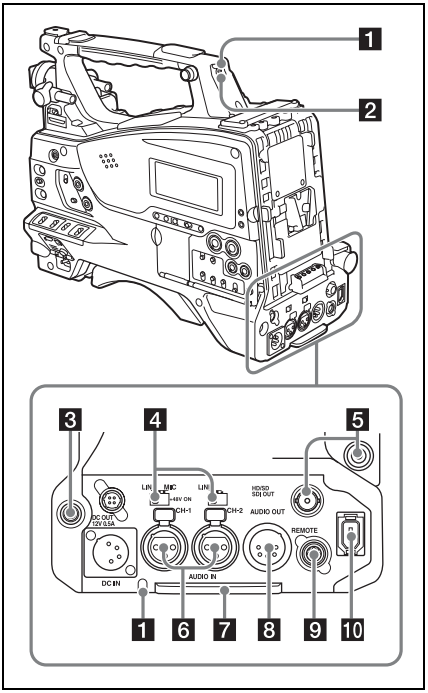
12 VIDEO OUT connector (BNC type)

The output signals can be selected either composite video or HD-Y depending on the setting of "OPERATION" > "Input/Output" > "Output&i.LINK" in the setup menu.

13 TC OUT (timecode output) connector (BNC type)

To lock the timecode of an external VTR to the timecode of this camcorder, connect this connector to the external VTR's timecode input connector.

Rear



1 TALLY (back tally) indicators (red)

Light up during recording. They will not light if the TALLY switch is set to OFF. These indicators also flash to indicate warnings *(see page 16)*. 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 166).

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 on "MAINTENANCE" > "Audio" in the setup menu.

4 AUDIO IN selectors

Select the audio source you connect to the AUDIO IN CH-1/CH-2 connectors.

LINE: When connecting a stereo amplifier or other external audio signal source

MIC: When connecting a microphone that does not require 48 V power supply

+48V: When connecting a microphone that requires 48 V power supply

5 HD/SD SDI OUT connectors (BNC type)

The PMW-400 has two HD/SD SDI OUT connectors. These connectors output an HDSDI or SDSDI signal (with embedded audio). The output from these connectors can be turned on or off, on "OPERATION" > "Input/Output" > "SDI Output" in the setup menu.

6 AUDIO IN CH-1/CH-2 (audio channel 1 and channel 2 input) connectors (XLR type, 3-pin, female)

You can connect audio equipment or a microphone.

7 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.

8 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.

9 REMOTE connector (8-pin)

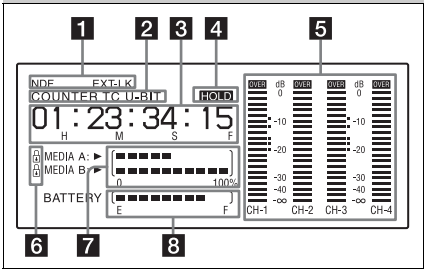
Note

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

10 i.LINK (HDV/DV) connector (6-pin, IEEE1394 compliant, S400)

To input and output HDV/DV streams, connect to an HDV/DV device.

Monochrome LCD Panel



1 Timecode status

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.

2 Counter display mode

Shows the type of information selected by the DISPLAY switch to be displayed in the time counter display.

COUNTER: Counter values

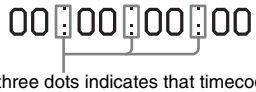
TC: Timecode

U-BIT: User bits data

3 Time counter display

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

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.

4 HOLD indication

Appears when the timecode generator output is displayed in the hold mode.

5 Audio level indicators

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

6 Lock icon

Appears when the recording media is write-protected.

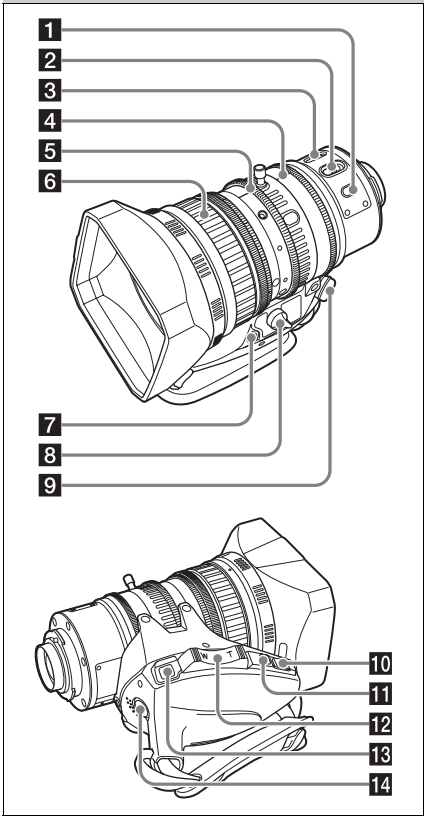
7 Remaining media capacity indicator

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

8 Remaining battery capacity indicator

Shows bar segments indicating the remaining battery capacity.

Auto Focus Lens (Supplied with the PMW-400K)



1 PUSH AF (auto focus) button

When the focus adjustment is in the manual mode, by pressing this button you can use the auto focus for an instantaneous adjustment to the subject. When the button is pressed, the auto focus operates until the image is in focus, then disengages.

Even when the FOCUS switch is set to A (auto), by pressing this button, you can restart the auto focus.

2 FOCUS switch

A (auto): The auto focus function is constantly active. Even with the switch in the A position, you can manually adjust the focus by operating the focus ring.

M (manual): The manual mode allows focusing adjustment with the focus ring.

In manual mode, auto focus adjustment is also possible, by pressing the PUSH AF button.

3 MACRO switch

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

1) At the wide-angle setting

4 Iris ring

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

5 Zoom ring

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

6 Focus ring

Turn this ring to adjust the focus.
This ring can be turned endlessly in both directions. The faster you turn, the faster the focusing mechanism operates, to minimize the amount of turning required for focusing.
When you slide the focus ring back (toward the camcorder), the focus mode becomes Full MF mode *(see page 52)*.

7 Flange focal length adjustment button

Press this to adjust the flange focal length (the distance from the lens mounting flange plane to the focusing plane) *(see page 36)*.

8 Zoom control connector (8-pin)

Connecting an optional zoom servo controller allows remote control of zooming.

9 ZOOM switch

SERVO: Motorized zoom. Operate the zoom with the power zoom lever.
MANUAL (manual): Manual zoom. Operate the zoom with the zoom ring.

10 PUSH AUTO button

When the IRIS switch is in the M position for manual adjustment, press this button for an instantaneous auto adjustment. The iris is automatically adjusted while the button is held down.

11 IRIS switch

A (auto): The iris is adjusted automatically.
M (manual): Adjust the iris with the iris ring.

12 Power zoom lever

This is enabled when the ZOOM switch is in the SERVO position. Press the W end for wide-angle and the T end for telephoto.
Press the lever harder for a faster zoom action.

Notes on auto focus

- In the following cases, it may be difficult to focus on the subject. If this does happen, use manual focusing.
  - If the subject has no contrast
  - If the subject is moving rapidly
  - When shooting point light sources, under street lighting or at night
  - When there are very bright objects close to the subject
  - When shooting through a glass window
- If there are a number of objects within the screen at close and far range, the focus may not be on the intended subject. In this case, with the subject on which you want to focus in the center of the screen, press the PUSH AF button.
- After focusing with the PUSH AF button, if you operate the zoom or adjust the iris, the depth of field may become shallower, losing crisp focus. In such cases, press the PUSH AF button once more.
- If you focus at wide-angle then zoom to telephoto, the subject may no longer be in focus.
- It may take time until the image is in focus while using the slow shutter mode.

Note on zoom speed

Depending on the shooting distance, the zoom speed may fall as the lens approaches the telephoto end.

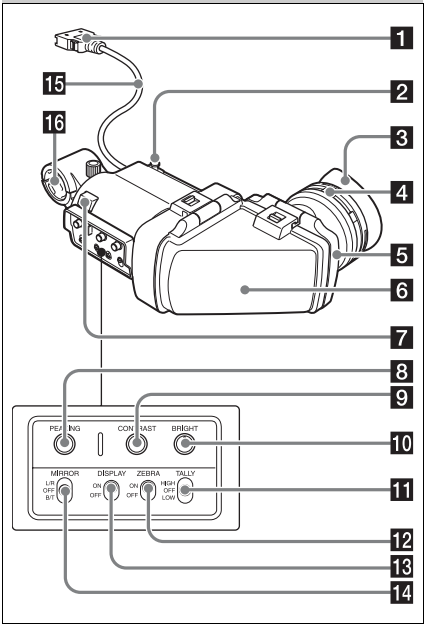
13 RET (return video) button

You can use this as an assignable switch *(see page 152)*.
Use this to check the video when Lens RET is assigned to this button (factory default setting). If you press this after recording stops, the last few seconds recorded appear on the viewfinder screen (recording review) *(see page 81)*.
Pressing this button (single click) during recording or playback records a Shot Mark 1 mark, and double-clicking records a Shot Mark 2 mark *(see page 83)*.

14 VTR button

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

Viewfinder



1 Plug

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

2 Stopper

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

3 Eyecup

4 Diopter adjustment ring

Allows for optimal focus adjustment.

5 Eyepiece

You can raise this up when required by the situation.

6 Viewfinder barrel

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

7 Tally indicator

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

8 PEAKING control

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

9 CONTRAST control

Adjusts the contrast of the screen. This control has no effect on the output signals of the camcorder.

10 BRIGHT control

Adjusts the brightness of the screen. This control has no effect on the output signals of the camcorder.

11 TALLY switch

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

12 ZEBRA (zebra pattern) switch

Controls the zebra pattern display on the viewfinder screen as follows.
ON: Display a zebra pattern.
OFF: Do not display a zebra pattern.

13 DISPLAY switch

ON: Display text information.
OFF: Do not display text information.

14 MIRROR switch

The image display on the monitor screen becomes reversed horizontally or vertically when the viewfinder barrel is raised up or rotated. Use this switch to control the image display in such situation.
L/R: Reverse the image horizontally.
OFF: Do not reverse the image.
B/T: Reverse the image vertically.

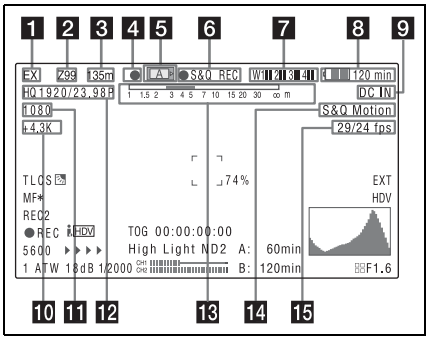
15 Viewfinder cable

16 Microphone holder

Viewfinder Screen Display

The viewfinder screen displays not only the video picture but also characters and messages indicating the camcorder settings and operating status, a center marker, a safety zone marker, etc. When the menu screen is not displayed and the DISPLAY switch is set to ON, the items for which an ON setting was made with "OPERATION" > "Super Impose" in the setup menu or with related switches are displayed at the top and bottom of the screen.
Not only these indications are displayed on the viewfinder screen, but a menu setting enables them to be output as video signals.

Top of viewfinder screen



1 Extender settings

Indicates the setting of the digital extender function (when optional CBK-CE01 is installed) of this camcorder and the setting of the lens extender.

EX: The lens extender is on.

08: The lens shrinker is on.

x2D: The digital extender function of this camcorder is on.

Ex2D: The lens extender and the digital extender function of this camcorder are both on.

Digital extender function can be turned on or off by an assignable switch to which Digital Extender is assigned.

2 Zoom position (when the lens is mounted)

Indicates the zoom position of the zoom lens in the range from 0 to 99.

3 Focus position (when the serial lens is mounted)

Indicates the focus position as distance to the subject (in units of m).

4 Green tally

Lights when the camcorder is the following states.

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

5 Media status

Displays the name of the currently active media slot (A or B).

6 Recording mode/operation status

Indication	Meaning
●REC	Recording in progress
STBY	Standby for recording
●CACHE	Standby in Picture Cache mode
●INT REC	Recording in progress in Interval Recording mode
●INT STBY	Standby for next recording in Interval Recording mode
INT STBY	Standby in Interval Recording mode
●FRM REC	Recording in progress in Frame Recording mode
●FRM STBY	Standby for next recording in Frame Recording mode
FRM STBY	Standby in Frame Recording mode
●S&Q REC	Recording in progress in Slow & Quick Motion mode
S&Q STBY	Standby in Slow & Quick Motion mode
●CALL	Being called from a connected device
►REVIEW	During recording review

7 Wireless receiver reception level

When a wireless receiver is installed in the camcorder, "W" appears together with four segment reception level indicators for each of the channels (1 to 4) that can be used by the receiver. The indications are as follows.

In normal situation: The number of white segments indicates the strength of the signal level.

Muting (for an analog receiver) or error rate aggravation (for a digital receiver): The number of gray segments indicates the strength of the signal level.

Reception level over peak: "P" is displayed instead of the indicators. 1)

Tuner battery is low: The channel number and indicator of the corresponding channel flash. 1)

1) When an optional DWR-S01D is used

8 Battery remaining/voltage capacity

Type of power source	What is displayed
InfoLithium battery	Remaining battery capacity icon and remaining recording time
Anton Bauer battery	Remaining battery capacity (% indication)
Other type than above	Input voltage

9 External power input

Appears when power is supplied from an external power source connected to the DC IN connector.

10 Color temperature

Displays a color temperature calculated from the gain of R and B, in the range 1.5 K to 50.0 K (in steps of 0.1 K). The +/– signs may be displayed depending on the "Offset White" setting *(see page 119)*.

No display: "Offset White" is "Off."

+: The value of "Offset White" is greater than 3200K.

–: The value of "Offset White" is less than 3200K.

11 Number of system lines

Indicates the number of system lines (1080/720/576/480) of video currently being recorded or played back.

12 Video format

Indicates the video format *(see page 43)*.
The video aspect ratio (16:9 or 4:3) can also be displayed when the recording format is set to DVCAM.

13 Depth of field indication (when the serial lens is mounted) Error/warning indication

A bar indicates the depth of field. The display unit is meters or feet, as selected on "OPERATION" > "Display On/Off" > "Lens Info" in the setup menu.
An error or warning message is displayed here depending on the situation.

Under this area, you can also display the name of the next clip to be recorded *(see page 122)*.

14 Special recording mode indication

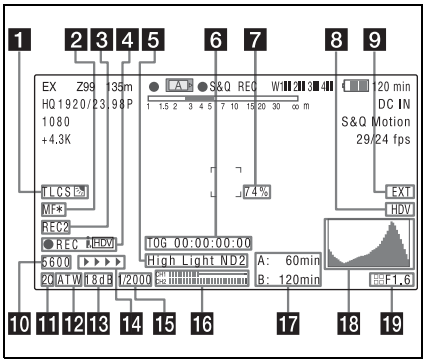
The following is displayed when the camcorder is in a special recording mode.

- Frame Rec (Frame Recording mode)
- Interval Rec (Interval Recording mode)
- S&Q Motion (Slow & Quick Motion mode)

15 Special recording mode settings indication

Appears when the camcorder is in a special recording mode.

Bottom of viewfinder screen



1 TLCS iris control mode

Icon	TLCS control mode
	Backlight mode
STD	Standard mode
	Spotlight mode

2 Focus adjustment mode (when the auto focus lens is mounted)

Indicates the current focus adjustment mode of the camcorder.

- AF (Auto Focus mode)
- MF (Manual Focus mode)
- MF* (Manual Focus mode when the MF Assist function is on)
- Full MF (Full Manual Focus mode)

3 External device control

"REC2" is displayed when "MAINTENANCE" > "Camera Config" > "HD-SDI Remote I/F" is set to "Chara" in the setup menu and a recording control signal is output from the HD/SD SDI OUT connector.

4 Operation status of connected i.LINK device

Indication	Meaning
●REC HDV	HDV recording in progress
STBY HDV	Standby for HDV recording
●REC DV	DV recording in progress
STBY DV	Standby for DV recording

5 Video level indication

An indication is displayed together with an appropriate ND filter position number when the light level of the subject is too high or too low.

6 Timecode Caution message

Indicates the elapsed recording/playback time, timecode, user bits data or other information selected by the DISPLAY switch *(see page 17)*. Also indicates a caution message when caution is required such as when you try to change settings.

7 Brightness level

Indicates the average brightness level (%) of the detection area.

8 External input source

Indicates the type of external input signal (HDV) to be recorded.

9 Recording of external input

Indicates "EXT" when an external input is recorded.

10 Electric color temperature filter

Appears when the CC 5600K function is set to on.

11 Filter position

Indicates the currently selected ND filter position number. *(see page 13)*.
When Electrical CC is assigned to an assignable switch, the electrical filter position (A/B/C/D) appears to the right of the ND filter position (1 to 4).

12 White balance memory

Indicates the currently selected white balance automatic adjustment memory.
ATW: ATW (Auto Tracing White Balance) mode
W:A: Memory A mode
W:B: Memory B mode
W:P: Preset mode
3200: When the assignable switch to which Color Temp SW 3200K has been assigned is on
4300: When the assignable switch to which Color Temp SW 4300K has been assigned is on
5600: When the assignable switch to which Color Temp SW 5600K has been assigned is on
6300: When the assignable switch to which Color Temp SW 6300K has been assigned is on

13 Gain value

Indicates the gain value (in dB) of the video amplifier, as set by the GAIN selector.

14 Recording status indication

When "OPERATION" > "Super Impose" > "Super (Rec Status Indicator)" is set to "On" in the setup menu, ▶ marks are displayed as the recording proceeds.

15 Shutter

Indicates the shutter speed or the shutter mode.

For details, see "Setting the Electronic Shutter" (page 48).

16 Audio level meters

Indicate the audio levels of channel 1 and channel 2.

17 Remaining media capacity

Indicates the recording time remaining for each of the media loaded in the slots. The available time for recording with the current video format (recording bit rate) is calculated according to the remaining space of each media and indicated in time units of minutes. A lock icon appears if the media is write-protected.

18 Histogram

Shows a pixel distribution of video luminance (HD mode only).

19 Iris position (when the lens is mounted)

Indicates the iris position and the setting for iris override (reference value for the lens iris) *(see page 50)*.

The iris override setting is indicated by four segments indicator as follows.

Reference value	Indicator	
+0.25	■ □□	Lower left segment is lit in grey.
+0.5	■■ □□	Left two segments are lit in grey.
+0.75	■■ ■□	Left two segments and lower right segment are lit in grey.
+1	■■ ■■	All segments are lit in grey.
–0.25	□ □□	Lower left segment is lit in white.
–0.5	□□ □□	Left two segments are lit in white.
–0.75	□ □□	Left two segments and lower right segment are lit in white.
–1	□□ □□	All segments are lit in white.

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
  When a BP-L80S Battery Pack is used, the camcorder can be operated continuously for approximately 270 minutes.
- AC power using the AC-DN2B/DN10 AC Adaptor
- The fan is consumable parts that will need periodic replacement.
  When operating at room temperature, a normal replacement cycle will be about 5 to 7 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 adapter 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.

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.

Using a Battery Pack

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

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.

Notes

- If the battery pack is not attached correctly, the terminal may be damaged.
- During recording and playback (while the ACCESS lamp on the right-side panel is lit in blue and the ACCESS lamp in the card slot section is lit in orange), be careful never to remove the battery pack.
- 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.
The AC-DN2B/DN10 can supply up to 100 W of power.

Attaching the Viewfinder

CAUTION

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

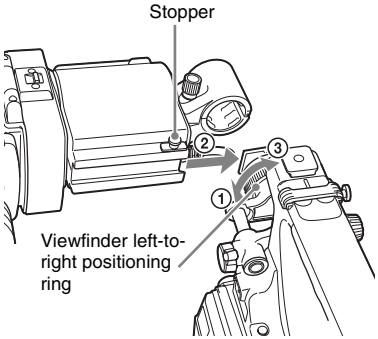
Attaching the Supplied Viewfinder

Note

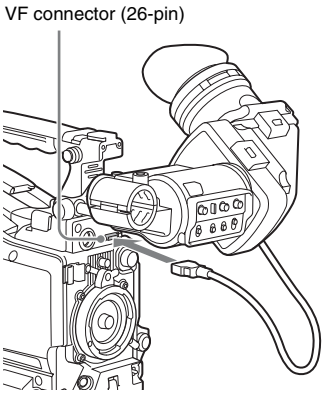
When attaching the viewfinder, make notes of the following points.

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

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



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

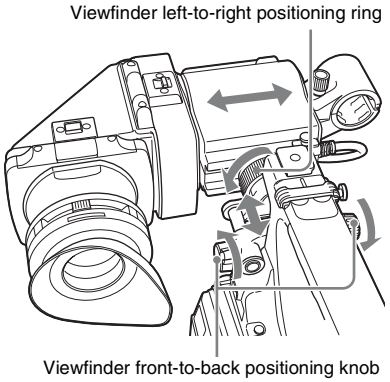


Detaching the viewfinder

You can detach the viewfinder 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 *(see page 30)*.

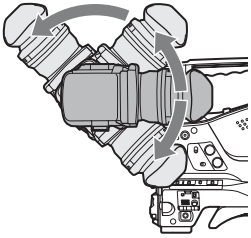
Adjusting the Viewfinder Position

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



Adjusting the Viewfinder Angle

You can adjust the angle of the viewfinder.

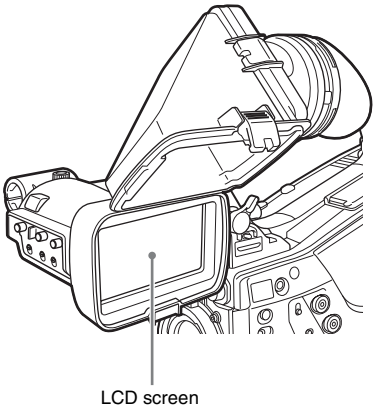


To reverse the display (image/text indication) vertically

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

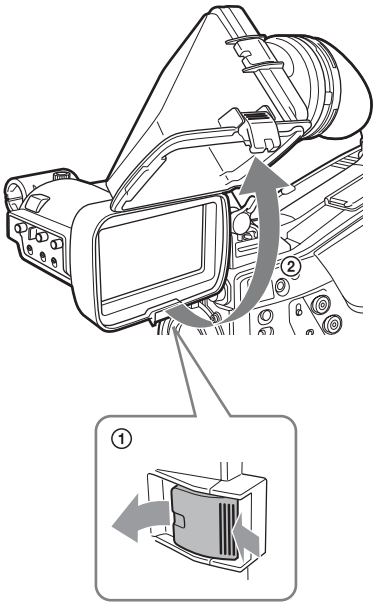
Lifting Up the Viewfinder Barrel and Eyepiece

You can view the LCD screen inside the viewfinder or its mirrored image by lifting up the viewfinder barrel or the eyepiece.
This section describes how to lift up the viewfinder barrel and detach it. The eyepiece can also be lifted up and detached in the same way.



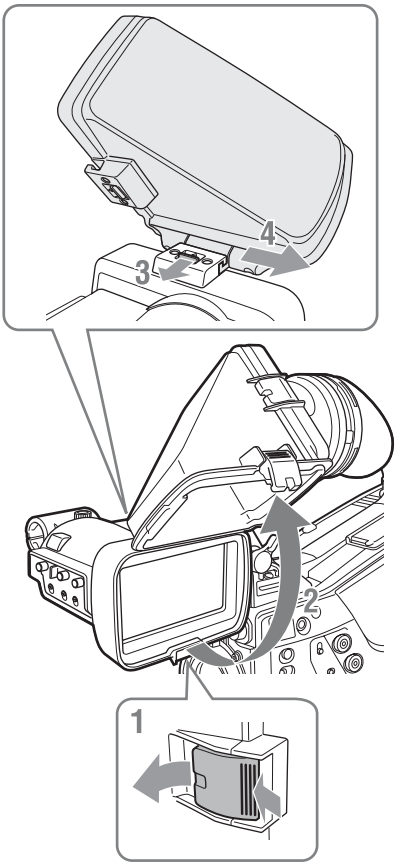
To raise up the viewfinder barrel

Push the clip on the bottom to release and flip up the viewfinder barrel.
It locks at the 120-degree position.



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

To detach the viewfinder barrel



1 **Push the clip on the bottom to release.**

2 **Flip up the viewfinder barrel.**

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

4 **Detach the viewfinder barrel by horizontally sliding it.**

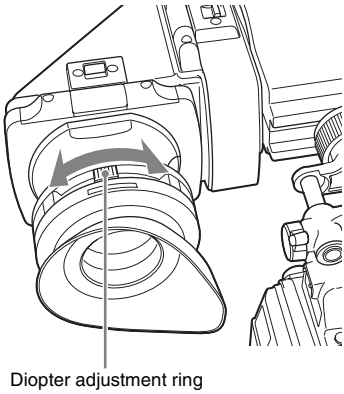
To reverse the display (image/text indication) horizontally

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

Adjusting the Viewfinder Focus and Screen

To adjust the viewfinder focus

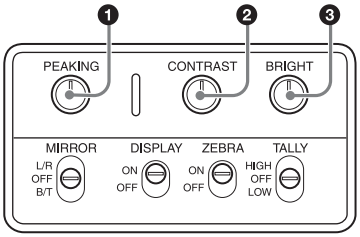
Turn the diopter adjustment ring until the viewfinder image is sharpest.



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

To adjust the viewfinder screen

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

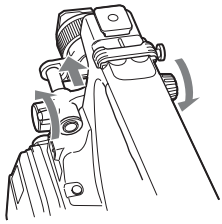


❶ PEAKING control
❷ CONTRAST control
❸ BRIGHT control

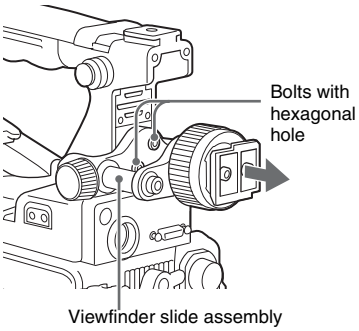
Using the BKW-401 Viewfinder Rotation Bracket

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.

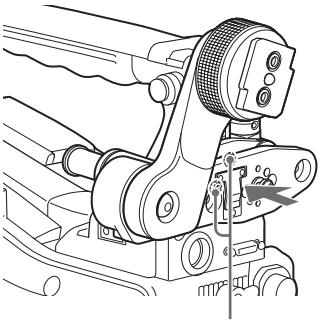
1 Loosen the front-to-back viewfinder positioning levers and the front-to-back viewfinder positioning knobs, and then pull the viewfinder slide assembly forward.



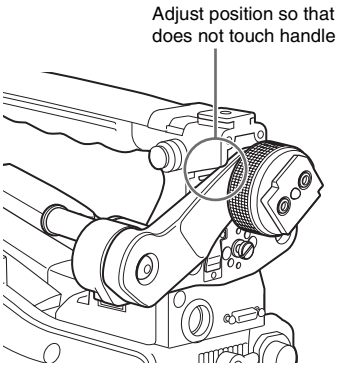
2 Using a 2.5 mm diameter hexagonal wrench, detach the viewfinder slide assembly.



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.



Attaching a 5-inch Electronic Viewfinder

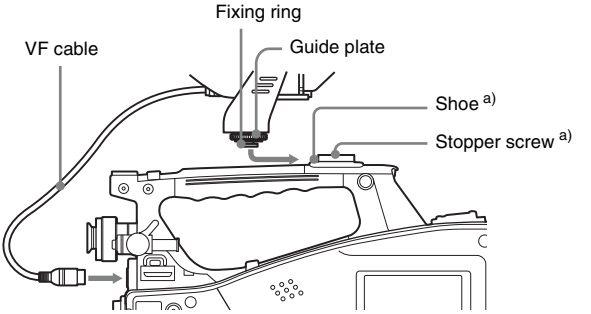
You can attach an optional DXF-51/DXF-C50WA (5-inch) Electronic Viewfinder. To attach it, an Accessory Shoe Kit (service part number: A-8274-968-B) is required.

For details, consult a Sony service representative.

Note

It is not possible to use the supplied viewfinder and a 5-inch viewfinder at the same time.

Remove the cover of the grip, and attach the shoe and stopper screw of the Accessory Shoe Kit.



a) Supplied with the Accessory Shoe Kit

Setting the Area of Use

When using the camcorder for the first time

You cannot use the camcorder without setting the area of use.

To set the area of use

1 Set the POWER switch to the ON position.
The screen for setting the area of use appears in the viewfinder.

2 Press the MENU knob.
The settings for selectable areas of use are displayed.

3 Turn the MENU knob to select the desired area of use.

Setting	Area of use
NTSC Area	NTSC area (for areas other than Japan) a)
NTSC(J) Area	NTSC area (Japan) b)
PAL Area	PAL area c)

a) The composite signal output from this camcorder is an NTSC signal with a black setup (7.5 IRE). The system frequency is 59.94i.
b) The composite signal output from this camcorder is an NTSC signal with no black setup. The system frequency is 59.94i.
c) The composite signal output from this camcorder is a PAL signal. The system frequency is 50i.

4 Set the following items.
- Time Zone
- Date/Time

See "Basic Setup Menu Operations" (page 104).

5 Turn the MENU knob to select "Finish", then press the MENU knob.
The camcorder is now ready for use.

Setting the Date/Time of the Internal Clock

You can set or change the date and time of the internal clock. The date and time set are reflected in the timecode.

For menu operations, see "Basic Setup Menu Operations" (page 104).

1 Select "MAINTENANCE" > "Clock Set" > "Date/Time" in the setup menu.

2 Press the MENU knob.
The Date/Time setting window appears.

3 Turn the MENU knob to display the desired value, and press the knob.
The selection shifts to the next item on the right.

4 To continue the remaining settings, repeat step 3.

5 Making sure that "SET" is selected, press the MENU knob.
The internal clock is set with the date and time set in steps 3 and 4.

To cancel the setting

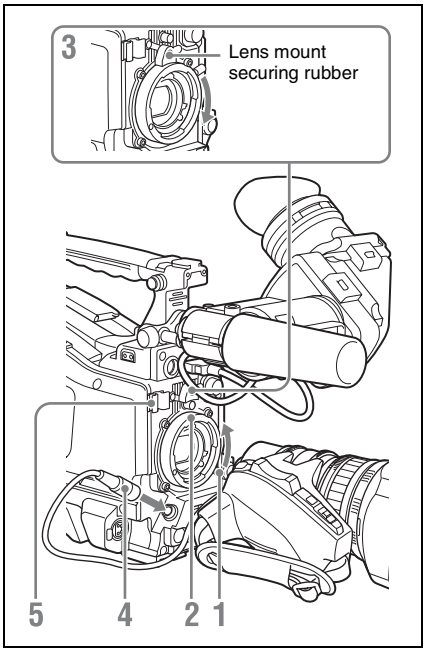
Before executing step 5, push the MENU CANCEL/PRST/ESCAPE switch up to the CANCEL/PRST side.

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.



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.

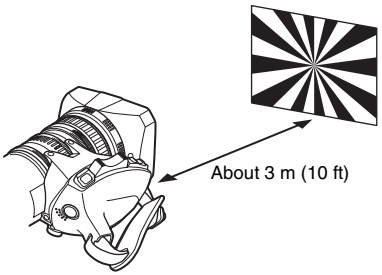
5 Secure the lens cable with the cable clamps.

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 normally because of data loading at start-up. The lens supplied with the PMW-400 is an aberration correction lens. Contact a Sony service representative for information about other 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 the supplied 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 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

When using the auto focus lens

With the lens supplied with the PMW-400, zoom and focus operations automatically adjust the flange focal length.

1 **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.**

2 **Set the ZOOM switch to SERVO (power zoom mode).**

3 **Hold down the flange focal length adjustment button for 3 seconds.**

The flange focal length adjustment starts.

During adjustment
The message "AUTO FB Adjust EXECUTING" appears on the viewfinder screen.

If the adjustment completes correctly
The message on the viewfinder screen changes to "Auto FB Adjust: OK."

If the flange focal length adjustment does not complete correctly
Check the subject and lighting conditions, and repeat the adjustment.

When using a non-auto focus lens

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.**

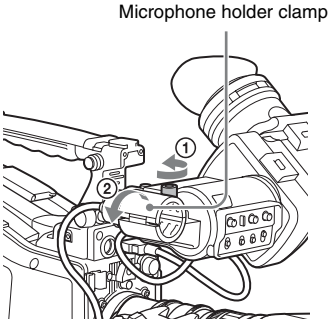
9 **Tighten the F.f or F.B ring fixing screws.**

Preparing the Audio Input System

Connecting a Microphone to the MIC IN Connector

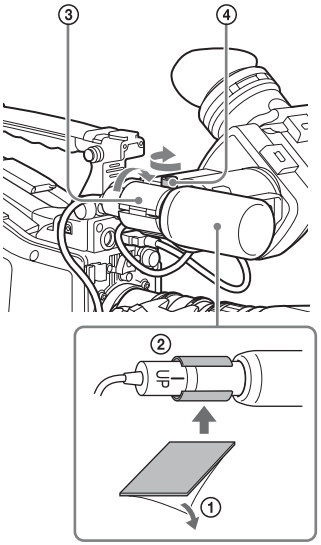
Attach the supplied microphone to the microphone holder of the supplied viewfinder.

1 Loosen the screw and open the microphone holder clamp.



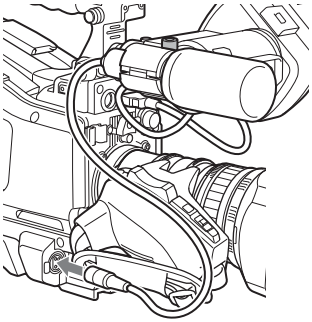
2 Place the microphone in the microphone holder.

① 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.

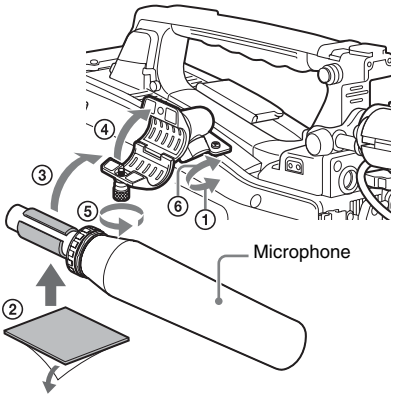
Connecting Microphones to the AUDIO IN Connectors

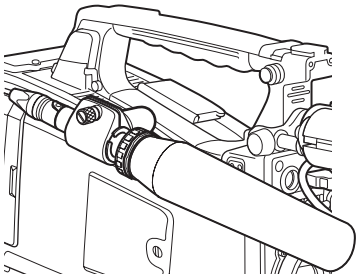
You can connect up to two monaural microphones to the AUDIO IN CH-1/CH-2 connectors, using an optional CAC-12 Microphone Holder.
The following is the procedure for attaching an electret condenser microphone such as the ECM-674/678.

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.

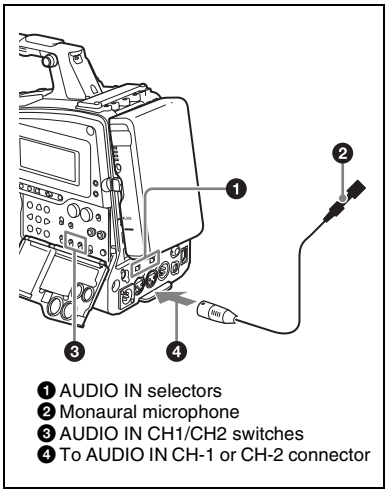




2 Connect the microphone cable to the AUDIO IN CH-1 or CH-2 connector.

3 Set the switches as follows.

- Set the AUDIO IN selectors indicated below, depending on the power supply type of the microphone.
  Internal power supply: MIC
  External power supply: +48V
- Set the AUDIO IN CH1/CH2 switch for the channel to which the microphone is connected to REAR.



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 131.*

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 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-860C/861/862 UHF Synthesized Diversity Tuner

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

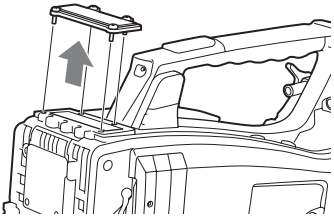
Note

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

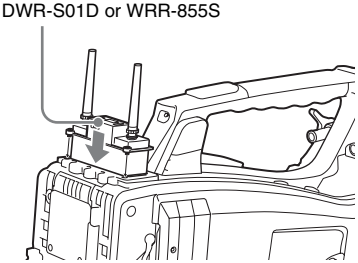
For details, contact your vendor or a Sony service representative

To fit the DWR-S01D 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-S01D or WRR-855S into the housing slot, and fasten the four fixing screws.

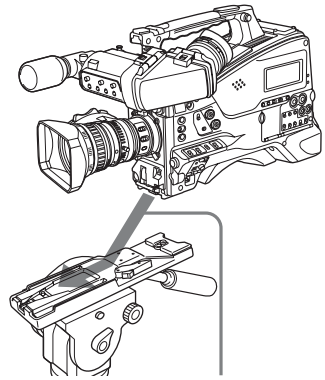


3 Set the AUDIO IN selector for the channel to which you want to input audio signal to WIRELESS *(see page 18)*.

Tripod Mounting

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

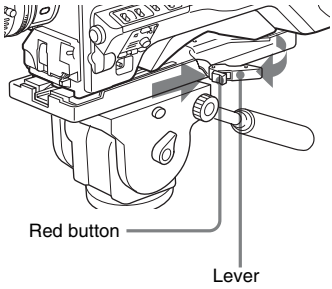
2 Mount the camcorder on the tripod adaptor.



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

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 controlled 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 according 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 under 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.

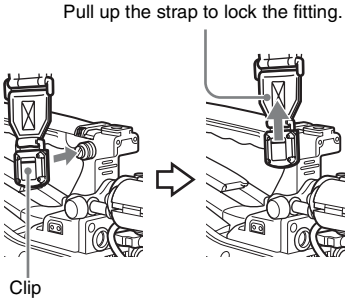
Note

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

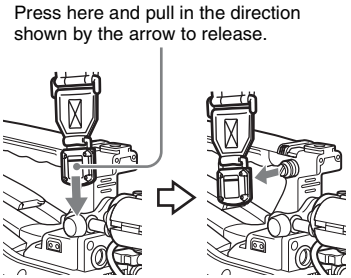
To attach the shoulder strap

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



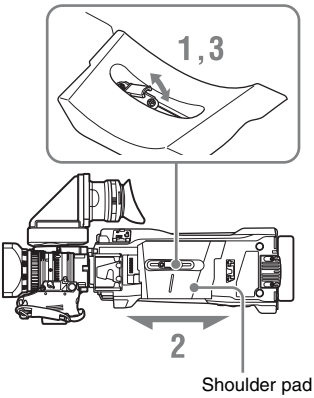
2 Fit the other clip to the shoulder strap fitting on the other side of the grip in the same way as in step 1.

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 104).

Setting the Video Format

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

In UDF mode

Setting items of "OPERATION" > "Format"				Video format (recording format/system frequency)	Frame size
HD/SD	**HD System Line**	**Rec Format**	**System Frequency** [a]		
HD	1080	HD422 50	59.94i	HD422 1920/59.94i	1920×1080
			50i	HD422 1920/50i	
			29.97P	HD422 1920/29.97P	
			25P	HD422 1920/25P	
			23.98P	HD422 1920/23.98P	
		HD420 HQ1440	59.94i	HQ 1440/59.94i	1440×1080
			50i	HQ 1440/50i	
			29.97P	HQ 1440/29.97P	
			25P	HQ 1440/25P	
			23.98P	HQ 1440/23.98P	
	720	HD422 50	59.94P	HD422 1280/59.94P	1280×720
			50P	HD422 1280/50P	
			29.97P	HD422 1280/29.97P	
			25P	HD422 1280/25P	
			23.98P	HD422 1280/23.98P	
		HD420 HQ1280	59.94P	HQ 1280/59.94P	
			50P	HQ 1280/50P	
			23.98P [b]	HQ 1280/23.98P	
SD	—	IMX50	59.94i	IMX50/59.94i	720×486
			50i	IMX50/50i	720×576
			29.97P [c]	IMX50/29.97P	720×486
			25P [c]	IMX50/25P	720×576
		DVCAM	59.94i	DVCAM/59.94i	720×480
			50i	DVCAM/50i	720×576
			29.97P [c]	DVCAM/29.97P	720×480
			25P [c]	DVCAM/25P	720×576

a) **59.94i/29.97P/59.94P/23.98P:** When "OPERATION" > "Format" > "Country" in the setup menu is set to "NTSC Area" or "NTSC(J) Area"

50i/25P/50P: When "OPERATION" > "Format" > "Country" in the setup menu is set to "PAL Area"

b) Converted to 59.94i by 2-3 pulldown processing and recorded

c) Converted to PsF and recorded

In FAT mode

Setting items of "OPERATION" > "Format"				Video format (recording format/system frequency)	Frame size
HD/SD	HD System Line	Rec Format	System Frequency [a]		
HD	1080	HQ 1920	59.94i	HQ 1920/59.94i	1920×1080
			50i	HQ 1920/50i	
			29.97P	HQ 1920/29.97P	
			25P	HQ 1920/25P	
			23.98P	HQ 1920/23.98P	
		HQ 1440	59.94i	HQ 1440/59.94i	1440×1080
			50i	HQ 1440/50i	
			29.97P	HQ 1440/29.97P	
			25P	HQ 1440/25P	
			23.98P	HQ 1440/23.98P	
		SP 1440	59.94i	SP 1440/59.94i	
			50i	SP 1440/50i	
			23.98P [b]	SP 1440/23.98P	
	720	HQ 1280	59.94P	HQ 1280/59.94P	1280×720
			50P	HQ 1280/50P	
			29.97P	HQ 1280/29.97P	
			25P	HQ 1280/25P	
			23.98P	HQ 1280/23.98P	
SD	—	DVCAM	59.94i	DVCAM/59.94i	720×480
			50i	DVCAM/50i	720×576
			29.97P [c]	DVCAM/29.97P	720×480
			25P [c]	DVCAM/25P	720×576

a) **59.94i/29.97P/59.94P/23.98P:** When "OPERATION" > "Format" > "Country" in the setup menu is set to "NTSC Area" or "NTSC(J) Area"

50i/25P/50P: When "OPERATION" > "Format" > "Country" in the setup menu is set to "PAL Area"

b) Converted to 59.94i by 2-3 pulldown processing and recorded

c) Converted to PsF and recorded

Selecting the Recording Mode

Select the recording mode between UDF and FAT.

1 **Select "OPERATION" > "Format" > "File System" in the setup menu *(see page 107)*.**

2 **Turn the MENU knob to select "UDF" or "FAT," and press the knob.**
A confirmation message appears.

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

4 **Power the camcorder off and on again.**

Changing the Video Format

1 **Select "OPERATION" > "Format" in the setup menu *(see page 107)*.**

2 **Turn the MENU knob to select the item to change, and press the knob.**

3 **Turn the MENU knob to change the setting, and press the knob.**
A confirmation message appears.

4 **Select "Execute" to execute, or select "Cancel" to cancel, and then press the MENU knob.**

5 **When the setting of HD/SD or Country was changed, power the camcorder off and on again.**

Adjusting the Black Balance and the White Balance

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.

Black balance adjustment

The black balance will require adjustment in the following cases.

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

White balance adjustment

Always readjust the white balance when the lighting conditions change.

Adjusting the Black Balance

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.

Note

Automatic black balance adjustment is disabled in the following case.

- During recording
- In a special recording modes (Picture Cache Rec, Interval Rec, Frame Rec, Slow & Quick)
- 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 "Done" 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.
- Output from the i.LINK connector stops temporarily if you execute black balance adjustment during i.LINK output. Output from the connector resumes when black balance adjustment finishes.

If automatic black balance adjustment cannot be made

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, contact your vendor or a Sony service representative.

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

1 Set the switches and selectors as shown below.

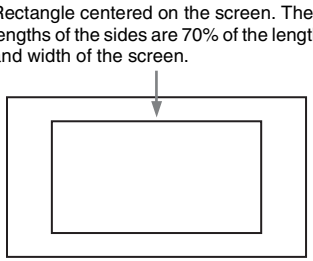
- GAIN switch: L (set to a gain value that is as small as possible)
- OUTPUT/DCC switch: CAM
- WHITE BAL switch: A or B [1)]

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 for the subject to be shot and zoom up to 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 not 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

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.

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, contact your vendor or a Sony service representative.

If you have no time to adjust the white balance

Set the WHITE BAL switch to PRST.
This makes it possible to automatically set the white balance to 5600K (factory default value) by pressing the COLOR TEMP. button.
The color temperature to which the white balance is set when the COLOR TEMP. button is pressed can be selected from among 3200K, 4300K, 5600K, and 6300K on OPERATION >Assignable SW in the setup menu. You can also assign color temperatures to the ASSIGN. 1/3 switches or ASSIGNABLE 4/5 switches.

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 137)* 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.**
As you turn the MENU knob, the color temperature changes as follows: 3200K ⟷ 4300K ⟷ 5600K ⟷ 6300K.

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 to 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-B170/B750 Remote Control Unit.

1 **Select "MAINTENANCE" > "White Filter" in the setup menu *(see page 137)*.**

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.**
As you turn the MENU knob, the color temperature changes as follows: 3200K ⟷ 4300K ⟷ 5600K ⟷ 6300K.

To set no color temperature
Select "-----" with "Electrical CC<C>" or "Electrical CC<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 151)*.

White balance memory

Values stored in memory are held until the white balance is next adjusted even when 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.

Note

While the ATW function is activated, the color temperature of the subject may differ from the color temperature that is displayed on the viewfinder screen.

Setting the Electronic Shutter

Shutter Modes

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 lines: 1080

System frequency	Shutter speed (unit: Hz)	
	S&Q: Off	S&Q: On
59.94i	60.00 to 3800	—
50i	50.00 to 3500	—
29.97P	29.99 to 4100	32.01 to 4100
23.98P	23.99 to 3700	32.02 to 3700
25P	25.00 to 3900	32.03 to 3900

System lines: 720

System frequency	Shutter speed (unit: Hz)	
	S&Q: Off	S&Q: On
59.94P	60.07 to 4100	32.01 to 4100
50P	50.03 to 3900	32.03 to 3900
29.97P	29.99 to 4100	32.01 to 4100
23.98P	23.99 to 3700	32.02 to 3700
25P	25.00 to 3900	32.03 to 3900

SLS (slow speed shutter) mode

Select this mode for shooting subjects in low level lighting conditions.

Number of accumulated frames
2, 3, 4, 5, 6, 7, 8, 16, 32, 64

Notes

- SLS mode cannot be used when the video format is SP 1440/23.98P or when the camcorder is in Slow & Quick Motion mode.
- It is not possible to output the color bar signal, turn the SLS mode on or off, or change the number of accumulated frames when the number of accumulated frames is set to 16, 32 or 64.

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 "OPEARTION" > "Shutter" > "Shutter Select" in the setup menu *(see page 120)*.

2 Turn the MENU knob to select "Second" or "Degree," 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 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 111)*, 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 Set "OPERATION" > "Shutter" > "Slow Shutter" in the setup menu to "On" *(see page 120)*.

2 Select the desired number of accumulated frames with "OPERATION" > "Shutter" > "SLS Frames" in the setup menu.

Changing the Reference Value for Automatic Iris Adjustment

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. 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 close

Also you can set the area where light detection occurs.

To change the reference value

1 Set "OPERATION" > "Auto Iris" > "Iris Override" in the setup menu to "On" ***(see page 117)*****.**

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.

An indicator of the current reference value is shown at the iris position indication *(see page 28)* 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.

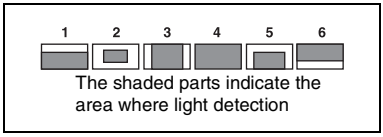
To set the automatic iris window

1 Set "OPERATION" > "Auto Iris" > "Iris 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 Turn the MENU knob to select "Iris Window," and then press the knob.

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



If you select "Var," the following items become effective and you can set the window of the desired size. Set the following items with "MAINTENANCE" > "Auto Iris2."

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" > "Iris 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, or the highlights may be blown out. In such cases, setting the highlight clip function on reduces the luminance range, avoiding problems from the automatic iris correction.
Set "OPERATION" > "Auto Iris" > "Clip High Light" in the setup menu to "On."

Zooming

Switching between Zoom Modes

Set the ZOOM switch to SERVO (servo zoom) or MANU (manual zoom).

Using Manual Zoom

Turn the zoom ring.

Using Servo Zoom

Operate the power zoom lever.
The current lens zoom position appears in the viewfinder, over the range 0 (wide-angle) to 99 (telephoto) *(see page 25)*.
Push to the W (wide) side when you want wide-angle, and push to the T (telephoto) side when you want telephoto. The zoom speed increases when you push the lever deeply, and decreases when you push less deeply.

Adjusting the Focus

Note

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

Adjusting in Full MF Mode

When you slide the focus ring back (toward the camcorder), the focus mode becomes Full MF mode, in which all focus adjustments are manual.

Note

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

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

Peaking

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

Adjusting in MF Mode

When you slide the focus ring forward (toward the lens hood), and set the FOCUS switch to M (manual), the focus mode becomes MF mode, in which focus adjustments are manual but auto focus is available only when necessary.

Using the focus ring

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

One-push auto focus

Press the PUSH AF button. Auto focus is enabled temporarily.
One-push auto focus ends when the subject is brought into focus.

MF assist function

When the MF assist function is on *(see page 150)*, auto focus starts when you stop adjusting with the focus ring, enabling fine adjustments with the subject at the center of the screen.
Auto focusing by the MF assist function ends when the fine adjustments end.

Adjusting in AF Mode

When you slide the focus ring forward, and set the FOCUS switch to A (auto), the focus mode becomes AF mode, in which auto focus is always active.
The distance indications on the ring are invalid in AF mode.

Using Macro Mode

When the focus mode is MF or AF, you can set the MACRO switch to the ON side to enable macro mode. Macro mode allows you to focus over the range that includes the macro area.
Macro mode is disabled in Full MF mode.

Adjusting the Audio Level

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

Note

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

Target audio level for manual 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 CH-1 or CH-2 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 control(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

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 on "MAINTENANCE" > "Audio" in the setup menu,

Rear1/WRR Level: Channel 1 recording level *(see page 133)*
Rear2/WRR Level: Channel 2 recording level *(see page 133)*

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

You can select which audio level control controls the audio recording level of the front microphone input on "MAINTENANCE" > "Audio" in the setup menu.

MIC CH1 Level: Channel 1 recording level *(see page 132)*
MIC CH2 Level: Channel 2 recording level *(see page 132)*

Note

When you have operation of the MIC LEVEL control and LEVEL (CH1/CH2) knobs linked together, if the LEVEL (CH1/CH2) controls 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 CH-1 connector
WIRELESS	Wireless microphone audio

CH4 switch	Channel 4 recording target
FRONT	Front microphone audio
REAR	Audio signal input to AUDIO IN CH-2 connector
WIRELESS	Wireless microphone audio

You can have the selection made automatically, as follows.

To automatically select the same audio as on channels 1 and 2

Set “MAINTENANCE” > “Audio” > “Audio CH3/4 Mode” of the setup menu to “Ch 1/2.”

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 *(see page 133)*

   Audio CH4 Level: Channel 4 recording level *(see page 133)*

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

Setting the Time Data

Note

When picture cache mode is enabled, it is not possible to set time data, even if you set the F-RUN/SET/R-RUN switch to SET. If you want to set time data, first exit picture cache mode.

Setting the Timecode

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

1. **Set the DISPLAY switch to TC.**
2. **Set the PRESET/REGEN/CLOCK switch to PRESET.**
3. **Set the F-RUN/SET/R-RUN switch to SET.**

   The first (leftmost) digit of timecode 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 timecode value to 00:00:00:00

   Press the RESET/RETURN button.
5. **Set the F-RUN/SET/R-RUN switch to F-RUN or R-RUN.**

   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 on MAINTENANCE >Timecode 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. When it is necessary to set the actual time, use MAINTENANCE >Clock Set >Date/Time in the setup menu.

For details, see "Setting the Date/Time of the Internal Clock" (page 35).

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 **Set the DISPLAY switch to U-BIT.**

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

3 **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.

4 **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

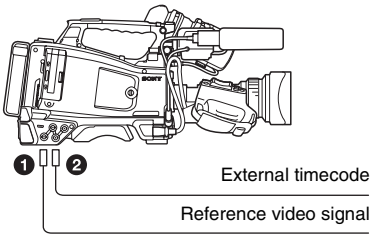
The user bit setting (apart from the real time) is automatically retained in memory even when the power is turned off.

Synchronizing the Timecode

Connections for timecode synchronization

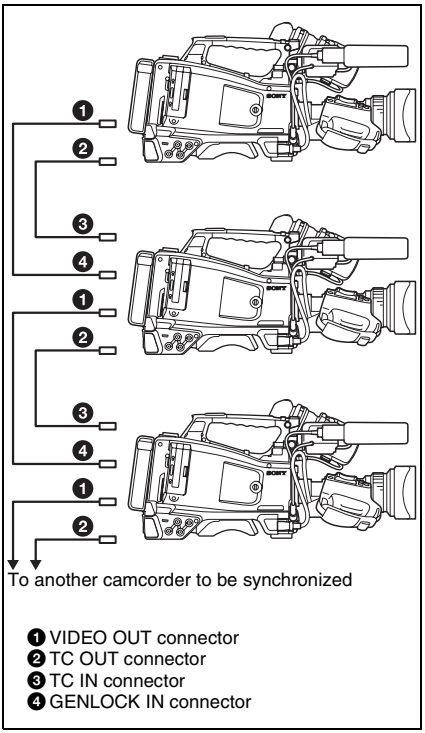
Connect both the reference video signal and the external timecode as illustrated below.

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)



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 counter 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.

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)

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
VIDEO status	Settings and status information related to recording and playback
ASSIGN SWITCH status	Names of functions assigned to assignable switches
BATTERY/ MEDIA status	Status of the battery mounted on the camcorder and the media status

To display status screens

With no menu is displayed, push the STATUS ON/SEL/OFF switch up to the ON/SEL side. Each push selects the next status screen, in the order given in the table above.

CAMERA status screen

White Bal: White balance status
Gain: GAIN switch status
Zoom Speed: Zoom speed set with the lens ZOOM button
Zebra: Zebra status
Skin Detail: Skin details status

AUDIO status screen

CH-1/CH-2/CH-3/CH-4: Audio level meters and input sources
Wind Filter: Wind filter settings

VIDEO status screen

Video Format: Video format
Rec Mode: Recording bit rate (HD mode only)
Output&i.LINK: Output&i.LINK setting and i.LINK usage status
SDI Output: HD/SD SDI OUT connector output setting
HDMI Output: HDMI connector output setting
Down Converter: SD output down converter setting (HD mode only)

ASSIGN SWITCH status screen

This screen displays the names of the functions assigned to assignable switches

BATTERY/MEDIA status screen

Battery: The remaining battery capacity
Charge Count: The number of times the battery has been charged
Media A/Media B:

- Remaining capacity of media
- Recordable time
- Approximate writable lifetime (Life) “Life 100%” is shown for unused media.

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 recording.

- MEAD-MS01/SD01 Media Adaptor (when the recording mode is FAT), or QDA-EX1 XQD ExpressCard Adapter (when the recording mode is FAT/UDF)

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-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 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.

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.**

3 **Close the cover.**

ACCESS lamp status indications

Card slots A and B each have an ACCESS lamp to indicate the slot status.

Lamp	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 pull the button out.**

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 lamp 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 91)* is displayed.

Formatting (Initializing) SxS Memory Cards

When you load an unformatted SxS memory card, or load an SxS memory card that has been formatted to other specifications, a message "Cannot Use Media(A)/Unsupported File System" appears in the viewfinder. In this case, format the memory card in the following way.

Note

SxS memory cards must be formatted on an XDCAM EX device. Cards in other formats cannot be used.

To format (initialize) a memory card

1. **Select "OPERATION" > "Format Media" in the setup menu *(see page 108)*.**
2. **Select "Media(A)" (slot A) or "Media(B)" (slot B).**
3. **Turn the MENU knob to select "Execute," and then press the knob.**
   The confirmation message for formatting is displayed on the viewfinder screen.
4. **Turn the MENU knob to select "Execute," and press the knob.**

Execution of the format starts.
During execution of the format, a progress indication appears (%), and the ACCESS lamp lights in orange.

Recording and playback during format execution

Even during execution of a format, recording and playback are possible using an SxS memory card loaded into 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. Following 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 display 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 also check the remaining time in the BATTERY/MEDIA status screen *(see page 57)*.

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 indication on the viewfinder screen flash, and the buzzer sounds when the total remaining recording time of the two memory cards falls to five minutes during recording.
  Exchange one of the cards for media with available recording capacity.

• If you continue recording, the message “Media Full” appears and recording stops when the total remaining recording time falls to 0.

Note

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

Restoring SxS Memory Cards

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, a execution message appears, the progress is displayed (%), and the ACCESS lamp lights in orange.
When the restoration finishes, a completion message is displayed for three seconds.

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 camcorder’s copy function *(see page 99)* or the supplied application software *(see page 161)* 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.

Using a Media Adaptor

XQD Memory Cards

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

For details on using a QDA-EX1 XQD ExpressCard Adapter, refer to the instruction manual supplied with it.

Notes

- High-speed playback may not be properly achieved with an XQD memory card.
- Slow Motion recording by the Slow & Quick Motion recording function cannot be made 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

When you use an XQD memory card with this camcorder, formatting is required.
An XQD memory card to be used with this camcorder must be formatted using the format function of this camcorder.
It is also necessary to format an XQD memory card for use if a caution message is displayed when you mount the XQD memory card.
For an XQD memory card that was formatted with another system unsupported by this camcorder, the message "Unsupported File System" is displayed on the LCD monitor/ viewfinder screen.
Format the XQD memory card as instructed below.

To execute formatting

Specify the slot on "OPERATION" > "Format Media" in the setup menu, then select "Execute." On a confirmation message, select "Execute" again.

An in-progress message and status bar (%) are displayed, and the access lamp lights in orange.

When formatting is completed, a completion message is displayed for three seconds.

Note

When formatting, all data in an XQD memory card-including protected images-are erased and cannot be restored.

Connection between the camcorder and a computer

To use an XQD memory card in which data have been recorded with an XDCAM EX-series product, insert it into the slot of the camcorder and connect between the computer and this camcorder using a USB cable.

To use media formatted with this camcorder in the slots of other devices

Make a backup of the media, then format it using the other device.

"Memory Stick" media/SDHC Cards (FAT Mode only)

When FAT mode is selected, use of the optional MEAD-MS01 or MEAD-SD01 Media Adaptor permits you to insert a "Memory Stick" (with MEAD-MS01) or an SDHC card (with MEAD-SD01) to the SxS memory card slot of the camcorder and use it for recording and playback in the same way as with an SxS memory card.

Usable "Memory Stick"

"Memory Stick PRO-HG Duo" HXA series

Usable SDHC card

Class 10 SDHC card

For details on use of the MEAD-MS01/SD01 Media Adaptor, refer to the Operating Instructions of the adaptor.

Notes

- In UDF mode, no Media Adaptor can be used.
- High-speed playback may not be properly achieved with a "Memory Stick" or an SDHC card.
- When using the Slow & Quick Motion function with the "Memory Stick" or an SDHC card, you cannot perform slow motion shooting.

Formatting

When you use a "Memory Stick" or an SDHC card with this camcorder, formatting is required.

A “Memory Stick” or an SDHC card to be used with this camcorder must be formatted using the format function of this camcorder.
It is also necessary to format a “Memory Stick” or an SDHC card for use if a caution message is displayed when you mount the “Memory Stick” or SDHC card.
For a “Memory Stick” or an SDHC card that was formatted with another system unsupported by this camcorder, the message “Unsupported File System” is displayed on the LCD monitor/EVF screen.
Format the “Memory Stick” or SDHC card as instructed below.

To execute formatting

Select “Media(A)” (slot A) or “Media(B)” (slot B) on “OPERATION” > “Format Media” in the setup menu, and select “Execute.”
An in-progress message and status bar (%) are displayed, and the ACCESS lamp lights in orange. When formatting is completed, a completion message is displayed for three seconds.

Note

In formatting, all data in a “Memory Stick” or MEAD-SD01, including protected images, are erased and cannot be restored.

Connection between the camcorder and a computer

To use a “Memory Stick” or MEAD-SD01 in which data have been recorded with an XDCAM EX-series product, establish USB connection between the computer and this camcorder and insert it into the slot of the camcorder, or use a specified USB card reader SBAC-US10.

To use a media formatted with this camcorder in the slots of other devices

Make a backup of the media, then format it using the other device.

Operating via the REMOTE Connector

When the RM-B170/B750 Remote Control Unit, the 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 RM-B750’s display or a video monitor connected to the MONITOR connector of the remote control unit to control the camcorder by 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 the connection, the camcorder enters Remote Control mode.

Adjusting the Camcorder from the Remote Control Unit

You can control menu and recording operations.

For the functions that can be controlled from the remote control unit, see “Functions That Can Be Controlled from the RM-B170/B750” on page 65, or “Functions That Can Be Controlled from the RCP-1001/1501” on page 74.

Notes

- Remote Control operations cannot be made if USB connection to the camcorder is enabled.
- Do not connect or disconnect the remote control unit when the camcorder is on.

The following controls of the camcorder becomes inoperative when the remote control unit is connected.

- GAIN selector
- WHITE BAL switch
- AUTO W/B BAL switch
- SHUTTER selector
- OUTPUT/DCC switch
- Buttons and switches to which the Turbo Gain function has been assigned, including the

ASSIGN. 1/3 switches, the ASSIGNABLE 4 switch, the COLOR TEMP. button, and the ASSIGNABLE 5 switch.

- REC START button: the VTR button on the lens, and buttons and switches to which the function has been assigned using "OPERATION" > "Assignable SW" in the setup menu, including the ASSIGN. 1/3 switches, the ASSIGNABLE 4 switch, the COLOR TEMP. button, and the ASSIGNABLE 5 switch (when "MAINTENANCE" > "Camera Config" > "RM Rec Start" in the setup menu is set to "RM").

To release Remote Control mode

Turn off the camcorder and disconnect the remote control unit.
The settings on the controls on the camcorder become valid.

To connect the monitor to the RM-B170/B750

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

Camera image quality adjustment items 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 reset to the parameters that were specified the last time that RM-B170/B750 was connected.

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

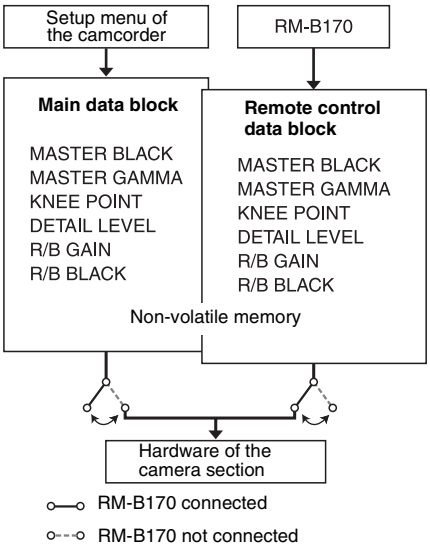
This setting is made using "MAINTENANCE" > "Camera Config" > "RM Rec Start" in the setup menu.

Relationship between the setting of the RM Rec Start item and the function of recording start/stop buttons

Recording start/stop button	Settings of RM Rec Start		
	RM	CAM	PARA
Camcorder's REC START button	Disabled	Enabled	Enabled
Lens' VTR button	Disabled	Enabled	Enabled
Buttons and switches to which the recording start/stop function has been assigned (ASSIGN. 1/3 switches, ASSIGNABLE 4 switch, COLOR TEMP. button, and ASSIGNABLE 5 switch)	Disabled	Enabled	Enabled
Remote control unit's VTR button	Enabled	Disabled	Enabled

Structure of the paint adjustment data

The non-volatile memory of the camcorder used for storing paint adjustment data consists of two regions as shown below: one is the "main data block" that is used when a remote control unit is not connected, and the other is the "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 to the camcorder, 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.

The settings of the absolute value rotational controls [1)] and absolute value switches [2)] are overwritten by those on the remote control unit after the remote control unit is connected.

When the remote control unit is disconnected from the camcorder, the "main data block" becomes effective. Thus the camcorder will return to the settings that were in effect before the remote control unit was connected.

1) **Absolute value rotational controls:** The data corresponding to the angular position of controls is output. Rotational controls for which the data corresponding to the amount of their rotation is output are called relative value controls.

2) **Absolute value switches:** Like toggle switches or slide switches (except most momentary switches), the switches (or knobs) whose positions must coincide with their functions are called absolute value switches.

When "MAINTENANCE" > "Camera Config" > "RM Common Memory" is set to "On" in the setup menu, 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 renewed when you change the settings on the remote control unit. Thus, the settings of the paint data made with the remote control unit can be retained even if 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 over that on the remote control unit.

Also, it is possible to keep the settings that are in effect before you connect the remote control unit. In this case, you should set the control knob to the 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 MENU.

The camcorder menus can be displayed on a video monitor connected to the MONITOR connector of the RM-B170.

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

3 When the settings are completed, set the DISPLAY switch to ON or OFF to exit the menu.

For details on operations of the RM-B170, refer to the Operation Manual of the RM-B170.

Operating the Menu from the RM-B750

1 Press and light the MONITOR button then press the VF MENU button.

The camcorder menus can be displayed on the RM-B750's display or a video monitor connected to the MONITOR connector of the RM-B750.

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

3 When the settings are completed, press the VF MENU button to exit the menu.

For details on operations of the RM-B750, refer to the Operation Manual of the RM-B750.

Functions That Can Be Controlled from the RM-B170/B750

You can adjust the functions in the following table by using menu operations, adjustment knobs, switches, and the touch panel (RM-B750 only) on the RM-B170/B750.

For details on operations, refer to the operation manual of the RM-B170/B750.

How to Read the Table

In the RM-B170 and RM-B750 columns of the table below, "Yes" and "No" mean the following.
Yes: The operation can be performed from the unit.
No: The operation cannot be performed from the unit.

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Gain	Step Gain	–	Sets the master gain.	No	No
	L/M/H	Low/Mid/High	Switches between three gain levels, when the master gain has been set from a menu.	No	No
	Step	–3/0/3/6/9/12/18/24/30/36/42dB	Sets the master gain.	Yes	Yes
Bars	Bars	On/Off	Turns color bar output on or off.	Yes	Yes
Shutter	Step Shutter Setting	On/Off	Turns the step shutter function on or off.	Yes	Yes
	Step Shutter Speed	–	Sets the step shutter speed.	Yes	Yes
	ECS Setting	On/Off	Turns ECS on or off.	Yes	Yes
	ECS Frequency	–	Selects the ECS frequency.	Yes	Yes
	SLS Setting	On/Off	Turns SLS on or off.	Yes	Yes/No [a]
	SLS Speed	–	Sets the SLS speed (number of frames).	Yes	Yes [a]
DCC	DCC	On/Off	Turns DCC on or off.	Yes	Yes
	DCC Point	–99 to ±**0** to +99	Adjusts the DCC minimum knee point.	Yes [b]	Yes [a] [b]
White Balance	AWB	Start/Stop	Starts execution of auto white balance adjustment, or stops execution.	Yes	Yes
	White Memory	A/B/C/Preset	Switches the auto white balance memory.	Yes	Yes
	ATW	On/Off	Turns ATW on or off.	Yes	Yes
	5600K	On/Off	Turns color temperature conversion on or off.	Yes	Yes
Black	ABB	Start/Stop	Starts execution of auto black balance adjustment, or stops execution.	Yes	Yes

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Iris	Iris Mode	Auto/Manual	Selects the iris mode.	Yes	Yes
	Iris Speed	–99 to **±0** to +99	Specifies the control speed (speed of reaction to changes in the video). (Larger values specify quicker reaction times.)	Yes [b]	Yes [b]
	Iris Level	–99 to **±0** to +99	Adjusts the level of the auto iris target value.	Yes [b]	Yes [b]
	Iris APL Ratio	–99 to **±0** to +99	Adjusts the mix ratio of auto iris detection peak value and average value.	Yes [b]	Yes [b]
	Iris Window Ind	On/**Off**	Turns on or off the function that displays a frame marker for the auto iris detection window.	Yes [b]	Yes [b]
	Close	On/Off	Turns forcible iris closing on or off.	No	Yes
Rec Function	Slow & Quick	On/**Off**	Turns the Slow & Quick Motion function on or off.	Yes	Yes [a] [b]
	Frame Rate	The available settings vary depending on the Format >HD System Line setting.	When the Slow & Quick setting is On, sets the frame rate for Slow & Quick Motion shooting.	Yes	Yes [a] [b]
Camcorder Menu	Menu	On/Off	Operates the camcorder menu.	Yes	Yes
	Cancel/Preset	Cancel/Preset		Yes	Yes
	Select/Set	Select (Up/Down)/Set		Yes	Yes
Panel Active	Panel Active	On/Off	Enables (On) or disables (Off) panel operations.	Yes	Yes
Standard	Standard	On/Off	Selects standard mode.	Yes	Yes
ND Filter	ND Filter	Display only	Turns the display of ND filter settings on or off. (The settings cannot be changed, only displayed.)	No	No
CC Filter	CC Filter	A/B/C/D	Selects a CC filter.	Yes	Yes
Extender IND	Extender	**On**/Off	Turns the lens extender indication on or off. (The settings cannot be changed, only displayed.)	No	No
Call	Call	On/Off	Enables (On) or disables (Off) calls from externally connected equipment.	Yes	No

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Media	Rec	Start/Stop	Starts or stops recording.	Yes	Yes
	Play	Play/Pause	Starts playback.	Yes	Yes
	FREV	–	Starts high-speed reverse playback.	Yes	Yes
	FFWD	–	Starts high-speed playback.	Yes	Yes
	Stop	–	Stops playback.	Yes	Yes
	Rec Review	–	Starts a recording review.	Yes	Yes
	PREV	–	Jumps to the first frame of the current clip.	Yes	Yes
	NEXT	–	Jumps to the first frame of the next clip.	Yes	Yes
	Freeze Mix	–	Execute the freeze mix function.	Yes	Yes
Switch Status	Gamma	**On**/Off	Turns gamma correction on or off.	Yes [b)]	Yes [b)]
	Black Gamma	On/**Off**	Turns black gamma correction on or off.	Yes	Yes [b)]
	Matrix	On/**Off**	Turns linear matrix correction and user matrix correction on or off.	Yes [b)]	Yes [b)]
	Knee	**On**/Off	Turns knee correction on or off.	Yes	Yes [b)]
	White Clip	**On**/Off	Turns white clip correction on or off.	Yes [b)]	Yes [b)]
	Detail	**On**/Off	Turns detail correction on or off.	Yes	Yes [b)]
	Flare	**On**/Off	Turns flare correction on or off.	Yes	Yes [b)]
	Test Saw	On/**Off**	Turns the test saw signal on or off.	Yes	Yes
White	R Gain<A>	–99 to ±**0** to +99	Specifies the white balance R gain value saved in memory A.	Yes	Yes
	B Gain<A>	–99 to ±**0** to +99	Specifies the white balance B gain value saved in memory A.	Yes	Yes
	R Gain<B>	–99 to ±**0** to +99	Specifies the white balance R gain value saved in memory B.	Yes	Yes
	B Gain<B>	–99 to ±**0** to +99	Specifies the white balance B gain value saved in memory B.	Yes	Yes

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Black	Master Black	–99 to **±0** to +99	Specifies the master black level.	Yes	Yes
	R Black	–99 to **±0** to +99	Specifies the R black level.	Yes	Yes
	B Black	–99 to **±0** to +99	Specifies the B black level.	Yes	Yes
Flare	Flare	**On**/Off	Turns flare correction on or off.	Yes	Yes [b]
	R Flare	–99 to **±0** to +99	Sets the R flare correction level.	Yes	Yes
	G Flare	–99 to **±0** to +99	Sets the G flare correction level.	Yes [b]	Yes [b]
	B Flare	–99 to **±0** to +99	Sets the B flare correction level.	Yes	Yes
Gamma	Gamma	**On**/Off	Turns gamma correction on or off.	Yes	Yes [b]
	Step Gamma	0.35 to **0.45** to 0.90 (in steps of 0.05)	Specifies a gamma correction value in steps of 0.05.	Yes [b]	Yes [b]
	Master Gamma	–99 to **±0** to +99	Specifies the master gamma level.	Yes	Yes
	R Gamma	–99 to **±0** to +99	Specifies the R gamma level.	Yes [b]	Yes
	G Gamma	–99 to **±0** to +99	Specifies the G gamma level.	Yes [b]	Yes [b]
	B Gamma	–99 to **±0** to +99	Specifies the B gamma level.	Yes [b]	Yes
	Gamma Select	When Gamma Category is STD: 1 DVW 2 ×4.5 3 ×3.5 4 240M 5 R709 6 ×5.0	Select the gamma table to use in gamma correction.	Yes [b]	Yes [b]
		When Gamma Category is HG: 1 3250 2 4600 3 3259 4 4609		Yes [b]	Yes [a] [b]
	Gamma Category	**STD**/HG	Selects use of standard gamma (STD) or HyperGamma (HG).	Yes [b]	Yes [a] [b]
Black Gamma	Black Gamma	On/**Off**	Turns black gamma correction on or off.	Yes	Yes
	Gamma Level	–99 to **±0** to +99	Specifies the master black gamma level.	Yes [b]	Yes
	Range	Low/L.Mid/ H.Mid/**High**	Selects the black gamma correction effective range.	Yes [b]	Yes [b]

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Knee	Knee	**On**/Off	Turns knee correction on or off.	Yes	Yes [b]
	Knee Point	50% to **95.0%** to 109% (in steps of 1%)	Specifies the knee point.	Yes	Yes [b]
	Knee Slope	–99 to **±0** to +99	Specifies the knee slope.	Yes [b]	Yes [b]
	Knee Saturation	**On**/Off	Turns the knee saturation function on or off.	Yes [b]	Yes [b]
	Knee Saturation Level	–99 to **±0** to +99	Specifies the knee saturation level.	Yes [b]	Yes [b]
White Clip	White Clip	**On**/Off	Turns white clipping adjustment on or off (Off = fixed as 109%).	Yes [b]	Yes [b]
	White Clip Level	[NTSC Area] or [NTSC(J) Area] is selected for Country 90.0% to **108.0%** to 109.0%	Specifies the white clip level.	Yes [b]	Yes [b]
		[PAL Area] is selected for Country 90.0% to **105.0%** to 109.0%			

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Detail(HD mode)/ Detail(SD mode)	Detail	**On**/Off	Turns detail adjustment on or off.	Yes	Yes [b]
	Level	–99 to **±0** to +99	Specifies the detail level.	Yes	Yes
	H/V Ratio	–99 to **±0** to +99	Specifies the mix ratio between the H detail level and the V detail level.	Yes [b]	Yes [b]
	Crispening	–99 to **±0** to +99	Specifies the crispening level.	Yes [b]	Yes [b]
	Level Depend	**On**/Off	Turns the level depend function on or off.	Yes [b]	Yes [b]
	Level Depend Level	–99 to **±0** to +99	Specifies the level depend level.	Yes [b]	Yes [b]
	Frequency	–99 to **±0** to +99	Specifies the central frequency for H detail signal. Larger values give finer details.	Yes [b]	Yes [b]
	Knee Aperture	On/**Off**	Turns the linear knee aperture function on or off.	Yes [b]	Yes [b]
	Knee Aperture Level	–99 to **±0** to +99	Specifies the knee aperture level.	Yes [b]	Yes [b]
	Limit	–99 to **±0** to +99	Specifies the detail limiter values for both the white-side and black-side direction.	Yes [b]	Yes [b]
	White Limit	–99 to **±0** to +99	Specifies the white-side detail limiter value.	Yes [b]	Yes [b]
	Black Limit	–99 to **±0** to +99	Specifies the black-side detail limiter value.	Yes [b]	Yes [b]
Skin Detail	Skin Detail	On/**Off**	Turns skin detail correction on or off.	Yes [b]	Yes
	Area Detection	Color detection screen	Detects the color to be targeted by skin detail correction.	Yes [b]	Yes [b]
	Area Indication	On/**Off**	Turns on or off the function that displays a zebra pattern in the area targeted by skin detail correction.	Yes [b]	Yes [b]
	Level	–99 to **±0** to +99	Specifies the skin detail level.	Yes [b]	Yes
	Saturation	–99 to **±0** to +99	Specifies the saturation of the color targeted by skin detail correction.	Yes [b]	Yes [b]
	Hue	**0** to 359	Specifies the hue of the color targeted by skin detail correction.	Yes [b]	Yes [b]
	Width	0 to **40** to 90	Specifies a range for the hue of the color targeted by skin detail correction.	Yes [b]	Yes [b]

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Matrix	Matrix	**On**/Off	Turns the matrix correction function on or off.	Yes [b]	Yes [b]
	Preset Matrix	**On**/Off	Turns the preset matrix function on or off.	Yes [b]	Yes [b]
	Preset Select	1/**2**/3/4/5/6	Selects a preset matrix. 1: SMPTE-240M equivalent 2: ITU-709 equivalent 3: SMPTE WIDE equivalent 4: NTSC equivalent 5: EBU equivalent 6: ITU-601 equivalent	Yes [b]	Yes [b]
	User Matrix	On/**Off**	Turns the user matrix function on or off.	Yes [b]	Yes [b]
	User Matrix R-G	–99 to **±0** to +99	Specifies a freely defined R-G user matrix.	Yes [b]	Yes [b]
	User Matrix R-B	–99 to **±0** to +99	Specifies a freely defined R-B user matrix.	Yes [b]	Yes [b]
	User Matrix G-R	–99 to **±0** to +99	Specifies a freely defined G-R user matrix.	Yes [b]	Yes [b]
	User Matrix G-B	–99 to **±0** to +99	Specifies a freely defined G-B user matrix.	Yes [b]	Yes [b]
	User Matrix B-R	–99 to **±0** to +99	Specifies a freely defined B-R user matrix.	Yes [b]	Yes [b]
	User Matrix B-G	–99 to **±0** to +99	Specifies a freely defined B-G user matrix.	Yes [b]	Yes [b]
Multi Matrix	Multi Matrix	On/**Off**	Turns the multi matrix correction function on or off.	Yes [b]	Yes [b]
	Area Indication	On/**Off**	Turns on or off the function that displays a zebra pattern in the color area targeted by multi matrix correction.	Yes [b]	Yes [b]
	Axis	**B**/B+/MG–/MG/MG+/R/R+/YL–/YL/YL+/G–/G/G+/CY/CY+/B–	Specifies a color targeted by multi matrix correction (16-axis mode).	Yes [b]	Yes [b]
	Hue	–99 to **±0** to +99	Specifies the hue of the color targeted by multi matrix correction for each 16-axis mode.	Yes [b]	Yes [b]
	Saturation	–99 to **±0** to +99	Specifies the saturation of the color targeted by multi matrix correction for each 16-axis mode.	Yes [b]	Yes [b]

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
V Modulation	V Modulation	**On**/Off	Turns V modulation shading on or off.	Yes [b]	Yes [b]
	Master V Modulation	–99 to **±0** to +99	Specifies the master V modulation.	Yes [b]	Yes
	R V Modulation	–99 to **±0** to +99	Specifies the V modulation level of R signal.	Yes [b]	Yes [b]
	G V Modulation	–99 to **±0** to +99	Specifies the V modulation level of G signal.	Yes [b]	Yes [b]
	B V Modulation	–99 to **±0** to +99	Specifies the V modulation level of B signal.	Yes [b]	Yes [b]
Low Key Saturation	Low Key Saturation	On/**Off**	Turns low key saturation correction on or off.	Yes [b]	Yes [b]
	Level	–99 to **±0** to +99	Specifies the saturation of colors in low luminance areas.	Yes [b]	Yes [b]
Noise Suppress	Noise Suppress	**On**/Off	Turns noise suppression on or off.	Yes [b]	Yes [a] [b]
White Shading	R/G/B White H Saw	–99 to **±0** to +99	Specifies a SAW white shading correction value for the horizontal direction.	Yes [b]	Yes [b]
	R/G/B White H Para	–99 to **±0** to +99	Specifies a parabola white shading correction value for the horizontal direction.	Yes [b]	Yes [b]
	R/G/B White V Saw	–99 to **±0** to +99	Specifies a SAW white shading correction value for the vertical direction.	Yes [b]	Yes [b]
	R/G/B White V Para	–99 to **±0** to +99	Specifies a parabola white shading correction value for the vertical direction.	Yes [b]	Yes [b]

Menu items	Sub-item	Setting	Description	RM-B170	RM-B750
Black Shading	R/G/B Black H Saw	–99 to **±0** to +99	Specifies a SAW black shading correction value for the horizontal direction.	Yes [b]	Yes [b]
	R/G/B Black H Para	–99 to **±0** to +99	Specifies a parabola black shading correction value for the horizontal direction.	Yes [b]	Yes [b]
	R/G/B Black V Saw	–99 to **±0** to +99	Specifies SAW black shading correction value for the vertical direction.	Yes [b]	Yes [b]
	R/G/B Black V Para	–99 to **±0** to +99	Specifies a parabola black shading correction value for the vertical direction.	Yes [b]	Yes [b]
	Auto Black Shading	Start/Cancel	Executes auto black shading compensation.	Yes [b]	Yes [b]
Scene	☐1	Standard	File number and file ID	Yes [b]	Yes [b]
	☐2	Standard	File number and file ID	Yes [b]	Yes [b]
	☐3	Standard	File number and file ID	Yes [b]	Yes [b]
	☐4	Standard	File number and file ID	Yes [b]	Yes [b]
	☐5	Standard	File number and file ID	Yes [b]	Yes [b]
	Scene Recall	Execute/Cancel	Loads a scene file (execute by selecting [Execute]).	Yes [b]	Yes [b]
	Scene Store	Execute/Cancel	Saves a scene file (execute by selecting [Execute]).	Yes [b]	Yes [b]
Reference	Reference Store	Execute/Cancel	Stores the current setting of reference file items in the reference file that is maintained in internal memory (execute by selecting [Execute]).	Yes [b]	Yes [b]
Shot Mark	Shot Mark1	–	Set a Shot Mark1.	Yes	No
	Shot Mark2	–	Set a Shot Mark2.	Yes	No

a) Depending on RM-B750 version

b) The camcorder's built-in menu can be operated from the RM-B170/B750.

Adjustments of the lens functions

The following functions can also be controlled from the RM-B170/B750.

Function	Operation on the lens	RM-B170	RM-B750
Iris adjustment	Iris ring	Yes	Yes
Iris close	–	No	Yes
Switching between auto iris and manual iris	IRIS switch	Yes	Yes
Zooming	Zoom ring	Yes	No
Focus adjustment	Focus ring	Yes	No

Functions That Can Be Controlled from the RCP-1001/1501

You can adjust the functions in the following table by using menu operations, adjustment knobs, switches, and the touch panel on the RCP-1001/1501.

For details on operations, refer to the operation manual of the RCP-1001/1501.

How to Read the Table

In the RCP-1001, and RCP-1501 columns of the table below, "Yes" and "No" mean the following.
Yes: The operation can be performed from the unit.
No: The operation cannot be performed from the unit.

Menu items	Sub-item	Setting	Description	RCP-1001/1501
Gain	Step Gain	–	Sets the master gain.	Yes
	L/M/H	Low/Mid/High	Switches between three gain levels, when the master gain has been set from a menu.	No
	Step	–3/0/3/6/9/12/18/24/30/36/42dB	Sets the master gain.	Yes
Bars	Bars	On/Off	Turns color bar output on or off.	Yes
White Balance	AWB	Start/Stop	Starts execution of auto white balance adjustment, or stops execution.	Yes
	ATW	On/Off	Turns ATW on or off.	Yes
	5600K	On/Off	Turns color temperature conversion on or off.	Yes
Black	ABB	Start/Stop	Starts execution of auto black balance adjustment, or stops execution.	Yes
Iris	Iris Mode	Auto/Manual	Selects the iris mode.	Yes
	Iris Level	–99 to **±0** to +99	Adjusts the level of the auto iris target value.	Yes
	Close	On/Off	Turns forcible iris closing on or off.	Yes
Camcorder Menu	Menu	On/Off	Operates the camcorder menu.	Yes
	Cancel/Preset	Cancel/Preset		Yes
	Select/Set	Select (Up/Down)/Set		Yes
Panel Active	Panel Active	On/Off	Enables (On) or disables (Off) panel operations.	Yes
Standard	Standard	On/Off	Selects standard mode.	Yes
ND Filter	ND Filter	Display only	Turns the display of ND filter settings on or off. (The settings cannot be changed, only displayed.)	Yes
CC Filter	CC Filter	A/B/C/D	Selects a CC filter.	Yes
Call	Call	On/Off	Enables (On) or disables (Off) calls from externally connected equipment.	Yes

Menu items	Sub-item	Setting	Description	RCP-1001/1501
Switch Status	Gamma	**On**/Off	Turns gamma correction on or off.	Yes
	Black Gamma	On/**Off**	Turns black gamma correction on or off.	Yes
	Matrix	On/**Off**	Turns linear matrix correction and user matrix correction on or off.	Yes
	Knee	**On**/Off	Turns knee correction on or off.	Yes
	White Clip	**On**/Off	Turns white clip correction on or off.	Yes
	Detail	**On**/Off	Turns detail correction on or off.	Yes
	Flare	**On**/Off	Turns flare correction on or off.	Yes
	Test Saw	On/**Off**	Turns the test saw signal on or off.	Yes
White	R Gain<A>	–99 to **±0** to +99	Specifies the white balance R gain value saved in memory A.	Yes
	B Gain<A>	–99 to **±0** to +99	Specifies the white balance B gain value saved in memory A.	Yes
	R Gain<B>	–99 to **±0** to +99	Specifies the white balance R gain value saved in memory B.	Yes
	B Gain<B>	–99 to **±0** to +99	Specifies the white balance B gain value saved in memory B.	Yes
Black	Master Black	–99 to **±0** to +99	Specifies the master black level.	Yes
	R Black	–99 to **±0** to +99	Specifies the R black level.	Yes
	B Black	–99 to **±0** to +99	Specifies the B black level.	Yes
Detail(HD mode)/ Detail(SD mode)	Level	–99 to **±0** to +99	Specifies the detail level.	Yes

Using a Wi-Fi Adapter

Mounting an optional CBK-WA01 Wi-Fi Adapter on this camcorder allows a Wi-Fi connection between a computer and the camcorder.

For details about the CBK-WA01, refer to the Mounting Instructions and Operating Instructions supplied with the CBK-WA01.

Making a Wi-Fi connection between a computer and the camcorder enables you to do the following.

- You can transfer planning metadata and other files between a computer and this camcorder.
- You can also use the Live Logging function to add shot marks to the video currently being shot.

Note

Check the firmware version of your camcorder to make sure that the camcorder supports the Wi-Fi adapter.

For details, contact your Sony dealer or your Sony service representative.

Fixing the CBK-WA01

For details about attaching the CBK-WA01, refer to the Operating Instructions or Installation Manual of the CBK-WA01.

Making a Wi-Fi Connection

Two types of Wi-Fi connections are available. In "ad-hoc mode", you can make a peer-to-peer Wi-Fi connection between a computer and camcorder. In "infrastructure mode", you can make Wi-Fi connections between a computer and multiple camcorders via a wireless LAN access point (building a LAN).

To make a network setting

Change settings under "MAINTENANCE" > "Network Setting" in the setup menu as required.

Item	Setting
DHCP	Setting that specifies whether to acquire the IP address automatically from a DHCP server **Enabled:** Acquire automatically. **Disabled:** Do not acquire automatically (factory default setting).
IP Address	IP address [a] (factory default setting: 192.168.1.10)
Subnet Mask	Subnet mask (factory default setting: 255.255.255.0)
Default Gateway	Default gateway (factory default setting: 0.0.0.0)
User Name	User name for log-in (factory default setting: admin)
Password	Password for log-in (factory default setting: model name "pmw-400")

a) The IP address determined by DHCP server is displayed here.

When you have changed a setting

Set the "Set" item to "Execute." When a confirmation message appears, turn the MENU knob to select "Execute" and press the knob.

To make a connection in ad hoc mode

1. **Refer to "Settings on the Computer" under "Making a Wi-Fi Connection to Your Computer (Ad hoc Mode)" in the Operating Instructions supplied with the CBK-WA01 to make settings on the computer.**
2. **Start a connection on the computer.**
3. **Set "MAINTENANCE" > "Wi-Fi Setting" > "Wi-Fi" to "Enable" in the setup menu.**
4. **Set "MAINTENANCE" > "Wi-Fi Setting" > "Scan Networks" to "Execute" and press the MENU knob.**
   The camcorder starts scanning for a network connection.
   When networks are detected, the NETWORK SCAN list appears.

5 Turn the MENU knob to select a network and press the knob.
The "MAINTENANCE" menu appears again.

6 Confirm that the settings for the Wi-Fi Setting item conform to the network setting on the computer.
SSID (network name): Selected network name
Network Type (connection mode): "Adhoc"
CH (channel): "1"
Authentication (network authentication): Depending the settings on the computer, "Open," "Shared," or "WPA"
Encryption (data encryption): Depending the settings on the computer, "Disable," "WEP," "TKIP," or "AES"
WEP Key Index (key index): "1" when "Encryption" is set to "WEP"
Input Select (key input format): Depending the network key (or security key), "ASCII5," "ASCII13," "HEX10," or "HEX26" when "Encryption" is set to "WEP," "ASCII8-63" or "HEX64" when "Encryption" is set to "TKIP" or "AES"

7 Set the Key item to the network key (or security key) set on the computer and press the MENU knob.

8 Set the Set item to "Execute" and press the MENU knob.
The message "Wi-Fi Setting Executing…" appears and the camcorder starts connection. If the connection to the computer is complete, then the message changes to "Wi-Fi Setting OK".
Black squares appear in the Wi-Fi Status column to show the connection status. (The number of squares shows the level of connection status.) In the Wireless Mode column, the IEEE802.11 standard of the established connection appears (802.11b, 802.11g or 802.11n).

Tip

It is also possible to make a connection by accessing a network connection started on the camcorder from the computer.

To terminate the connection

Terminate the connection on the computer.

To revert to the default settings (reset)

If you have trouble making a connection, or you want to start over, you can reset your Wi-Fi connection settings to their defaults.

Set "MAINTENANCE" > "Network Setting" > "Net Config Reset" in the setup menu to "Execute" and press the MENU knob.
If the reset is executed, the message "Done" appears.
The camcorder attempts to connect to the network using a MAC address as the SSID.

To make a connection in infrastructure mode

Setting up the wireless LAN access point

The following settings are required.
- Network ID (SSID)
- Encryption method
- Network key (Key)

For details about setting up the wireless LAN access point, refer to the Operation Manual of the wireless LAN access point.

To find and connect to a wireless LAN from the camcorder

Perform the same procedure in *"To make a connection in ad hoc mode" (page 76)* excluding the following.
- Do not perform steps **1** and **2**.
- The settings made in step **7** change as follows.
  SSID (network name): Selected network connection name
  Network Type (connection mode): "Infra"
  Ch (channel): "Auto"
  Authentication (network authentication): Depending the settings on the computer, "Open," "Shared," "WPA," or "WPA2"
  Encryption (data encryption): Depending the settings on the computer, "Disable," "WEP," "TKIP," or "AES"
  WEP Key Index (key index): "1" when "Encryption" is set to "WEP"
  Input Select (key input format): Depending the network key (or security key), "ASCII5," "ASCII13," "HEX10," or "HEX26" when "Encryption" is set to "WEP," "ASCII8-63" or "HEX64" when "Encryption" is set to "TKIP" or "AES"

Using the Web Menu

You can operate the Web menu built in the camcorder from a computer when it is connected to the camcorder via a Wi-Fi connection.
You can check the information and setting status of the camcorder, and upload a planning metadata file, using the Web menu.

Note

You cannot access the Web menu during recording/playback. (You cannot send/receive files via a Wi-Fi connection.)

Example Web menu

Product Information
- Model name
- Serial No.

Network
- MAC Address
- IP Address
- Subnet Mask

Wi-Fi Status
- Wireless Mode
- SSID
- Type
- Channel
- Authentication (network authentication)
- Data Encryption (data encryption)

Planning Metadata
Clicking "Upload" displays the Planning Metadata screen which allows upload of a planning metadata file *(see page 78)*.

Note

The configuration of items displayed in the Web menu varies depending on the browser you are using.

To display the Web menu

1 Launch a web browse on the computer, and navigate to "http://<camcorder's IP address> (setting of "MAINTENANCE" > "Network Setting" > "IP Address" in the setup menu)".
Example (when the IP address is "192.168.1.10"):
Type "http://192.168.1.10/" in the address bar.
If the connection is complete, a dialog appears asking you to enter the user name and password.

2 Enter the user name and password, and click "OK."
User name: admin
Password: pmw-400 (Lower-case the model name.)

To upload a planning metadata file

1 Insert a media such as an SxS memory card.

2 Click "Upload" in the Web menu.
The Planning Metadata screen appears.

3 Click "Select" to show Choose File dialog.

4 Select the planning metadata file you want to upload, and then click "Open."
The path of the selected file appears.

5 Click "Execute."
The planning metadata file is loaded into the camcorder's memory and stored in the media.
"OK" appears in the Status field when the transfer is complete.

To upload a planning metadata file automatically

In the planning metadata file you want to load automatically, add a "load" property to the PlanningMetadata tag and set the value of the property to "True."
When you display the Web menu and insert a media, the planning metadata file is immediately loaded into the camcorder's memory.
Example: <PlanningMetadata …sp
sp load="true" sp spversion="1.00">

For details on the planning metadata, refer to the Operating Instructions supplied with the camcorder.

Using Live Logging Functions

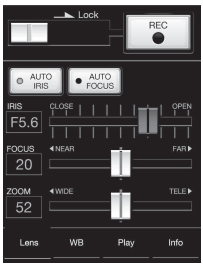
The Live Logging function allows you to record shot marks using a computer while you are shooting. That is, you can use a computer to record shot marks on the video being shot while you are monitoring the video output from this camcorder.

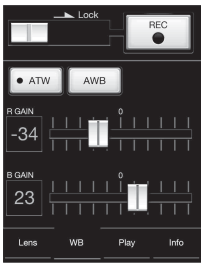
Using the Wi-Fi Remote Commander

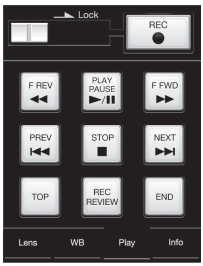
When a Wi-Fi connection is established between a device such as smartphone, tablet, PC, etc., and the camcorder, the Wi-Fi remote commander appears on the device screen and the device can be used as a remote commander.
You can start/stop recording, adjust iris/focus/zoom, etc., with a Wi-Fi connected device. This function is useful for setting the camcorder in a remote place, such as the top of a crane, etc.

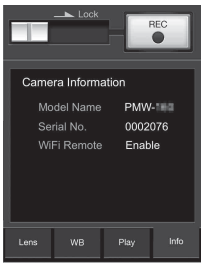
The displays of Wi-Fi remote commander

For smartphone

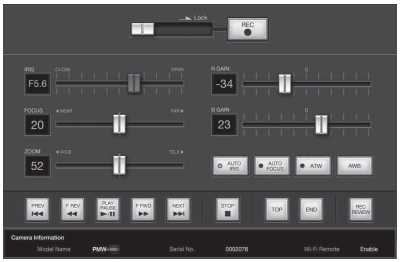








For Tablet



Notes

- Some serial lenses cannot be controlled from the Wi-Fi remote commander. With any of such lenses mounted on the camcorder, even when you try to perform focus/zoom control from the Wi-Fi remote commander, the focus/zoom setting value displayed on the Wi-Fi remote commander continues to be [0].
- Even when a lens controllable from the Wi-Fi remote commander is mounted on the camcorder, zoom control from the remote commander is not possible if the servo function for the zoom operation is disabled on the lens.
- When a remote control unit is connected to the camcorder's REMOTE connector and the white balance memory setting on the camcorder is other than "A (memory A)," turning the Wi-Fi remote commander on or off may cause the color to change.
- When a remote control unit is connected to the camcorder's REMOTE connector, that unit has control priority and therefore the Wi-Fi remote commander cannot work.

To display the Wi-Fi remote commander

To display the Wi-Fi remote commander on a device screen, settings are required on both the device and camcorder.

Camcorder settings

1 Set "MAINTENANCE" > "Wi-Fi Setting" > "Wi-Fi" to "Enable" in the setup menu.

2 Set "MAINTENANCE" > "Wi-Fi Setting" > "Wi-Fi Remote" to "On" in the setup menu.

Device settings

Set the smartphone, tablet, PC, etc., to be used as the Wi-Fi remote commander.

1 Make a Wi-Fi connection between the device and camcorder *(page 76)*.

2 Launch the browser and input http://<camcorder's IP address>/rm.html in the address bar.

Example: When the IP address is 192.168.1.10, input http://192.168.1.10/rm.html in the address bar.

The Wi-Fi remote commander will appear on the device screen when the Wi-Fi connection is established.

Thereafter operate the camcorder as shown on the screen of the Wi-Fi connected device. The REC button becomes unavailable when the Lock switch is dragged to the right.

Notes

- Depending on the device, the Wi-Fi remote commander may not appear properly on the device's screen even though you input http://<camcorder's IP address>/rm.html in the address bar. In this case, input "rms.html" for a smartphone or "rmt.html" for a tablet at the end of the address to display the Wi-Fi remote commander properly.
- The Wi-Fi remote commander on the device's screen may no longer match the actual status of the camcorder in the following cases. When this happens, refresh the browser on the device.
  - when the camcorder is restarted while the Wi-Fi connection is established
  - when the camcorder is controlled directly while the Wi-Fi connection is established
  - when the device is reconnected
  - when you operate forward/backward on the device's browser.
- If the Wi-Fi signal is poor, the Wi-Fi remote commander may not work properly.
- Your smartphone/tablet may not be compatible with the ad hoc mode. For details, refer to the operating instructions supplied with the smartphone/tablet.

Compatible devices

The following devices, using the specified versions or higher, can be used as Wi-Fi remote commanders.

Device	OS	Browser
PC	Windows 7	Internet Explorer 8 or Internet Explorer 9
Mac	OS 10.7.4	Safari 5.1.6
Smartphone	Android 2.3.3	Standard browser
	iOS 5.1.1	Safari
Tablet	Android 4.0.3	Standard browser
	iOS 5.1.1	Safari

Basic Operations

1 Attach a fully charged battery pack *(see page 29)*.

2 Load one or two SxS memory cards *(see page 58)*.

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 11)* to ON.

4 Make the following settings.

Marker display: On *(see page 113)*
Iris: Auto *(see page 50)*
Zoom: Auto *(see page 51)*
Camera output: Select the picture currently being shot (camera picture), and turn the DCC function on *(see page 15)*.
Timecode advance mode: F-RUN (Free Run) or R-RUN (Rec Run) *(see page 54)*
Audio input channel selection: Auto *(see page 21)*

5 Push the AUTO W/B BAL switch to the BLACK side to adjust the black balance *(see page 45)*.

6 Select a filter according to the lighting conditions, and adjust the white balance *(see page 46)*.

7 Point the camcorder at the subject, and adjust the focus *(see page 52)* and zoom.

8 If you are using the electronic shutter, select an appropriate shutter mode and speed *(see page 48)*.

9 Do one of the following to start recording.

- Press the REC START button *(see page 13)*.
- Press the VTR button on the lens *(see page 24)*.

- Turn on the assignable switch to which the Rec function has been assigned *(see page 149)*.

During recording, the TALLY indicators, the tally indicator on the front panel of the viewfinder, and the REC indication 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 lamp on the right-side panel is lit in blue and the ACCESS lamp 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.

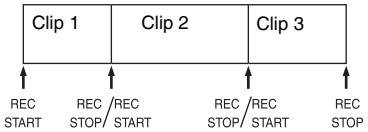
The TALLY indicators, the tally indicator on the front panel of the viewfinder, and the REC indication on the viewfinder screen go out, and camcorder enters recording standby (STBY) mode.
A clip is created from the video and audio data and the metadata recorded between steps 9 and 10.

To check the recording (recording review)

With the camcorder in recording standby (STBY) mode, turn on the assignable switch to which the Rec Review function or the Freeze Mix function has been assigned *(see page 148)*.
The camcorder plays the entire last clip, or the last few seconds of that clip (3 seconds or 10 seconds), and then returns to standby 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 file sizes

Clip file sizes vary according to file formats.

File format	File size	Clip size
MP4	Less than 4 GB	Less than half an hour
AVI	Less than 2 GB	Less than 9 minutes and 30 seconds
MXF	Less than 43 GB	Less than 6 hours

If you continue recording for an extended period, recorded materials may be segmented into multiple files, depending on the file size (the maximum number of partitions is 99).
The camcorder regards continuous recording as one clip even if it has been segmented into multiple files.

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” *(see page 121)* 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, counting up in order 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 81)*.

1 **Insert the SxS memory card to play *(see page 58)*.**

2 **Press the PREV button *(see page 16)* 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 16)* 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 19)* 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 91)* 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.

Deleting Recorded Clips

You can use the assignable switches to delete the last recorded clips (Last Clip DEL function).

You can also use the THUMBNAIL menu to delete all recorded clips (All Clips DEL function) or to delete selected clips. For details, see "Deleting Clips" (page 100).

1 **Turn on the assignable switch to which the Last Clip DEL function has been assigned *(see page 149)*.**
A confirmation message appears.

2 **Turn the MENU knob to select "Execute," and then press the knob.**

Advanced Operations

Recording Shot Marks

On this camcorder, two types of shot marks are available in HD mode. You can record them at user-specified positions to make it easier for editors to cue up those positions.
You can record up to 127 shot marks per clip.

Note

Shot marks cannot be recorded in SD mode.

You can also use the THUMBNAIL menu to add and delete shot marks in clips. For details, see "Adding and Deleting Shot Marks (UDF and FAT-HD Mode Only)" (page 102).

To record shot marks

Do one of the following.

- Turn on an assignable switch to which Shot Mark 1 or Shot Mark 2 has been assigned *(see page 148)*.
- If Lens RET has been assigned to the RET button on the lens, operate as follows.
  To record shot mark 1: Press the RET button once.
  To record shot mark 2: Press the RET button twice in quick succession.

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 indication.

Setting OK Marks

To make it easier for editors to select good clips, you can set OK marks in clips recorded in HD mode.

Notes

- OK marks cannot be set in SD mode.
- OK marks cannot be set or deleted during recording or playback.

To add/delete OK marks

You can also use the THUMBNAIL menu to add and delete OK marks in previously recorded clips. For details, see *"Adding/Deleting the OK Mark (FAT-HD Mode Only)" (page 99).*

Starting to Record from Pre-stored Video (Picture Cache Function)

The camcorder is equipped with enough internal memory to pre-store up to 15 seconds of video and audio data in a picture cache. This allows you to begin recording a specified number of seconds in advance of the time when you press a recording start button.

Selecting picture cache mode and setting the picture cache time

Before recording in picture cache mode, you need to perform the "Picture Cache Rec" and "P. Cache Rec Time" settings in the "OPERATION" menu *(see page 111)*.
You can also select picture cache mode by using an assignable switch to which the Picture Cache function has been assigned *(see page 148)*.
The picture cache time determines how far in advance you can start recording, counting back in seconds from the operation that starts recording. Note that it may not be possible to start this far in advance in the special cases explained in the following notes.

Notes

- Storage of picture data to memory begins when you select picture cache mode. Therefore, if you start recording immediately after selecting picture cache mode, the picture data from before the selection is not recorded.
- No data is recorded to picture cache memory during playback or recording review and display of thumbnails. It is not possible to record picture data from the time you were conducting playback or a recording review.
- Picture cache recording is not possible in Frame Rec, Interval Rec, and Slow & Quick Motion mode. The camcorder exits Frame Rec, Interval Rec, or Slow & Quick Motion mode whenever you select picture cache mode. The camcorder exits picture cache mode automatically whenever you select Frame Rec, Interval Rec, or Slow & Quick Motion mode.
- The data stored in picture cache memory is cleared when you change the system settings, for example by

selecting a different video format. Picture data from before the change is not recorded even if you start recording immediately after the change. The camcorder exits picture cache mode automatically.
- It is not possible to set the picture cache time during recording.

Camcorder data handling while recording in picture cache mode

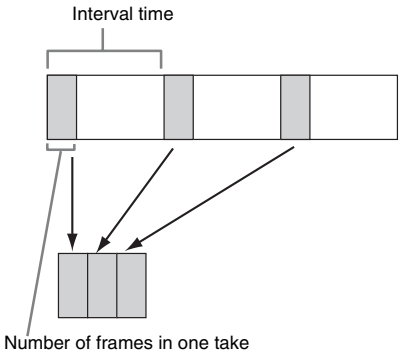
Recording procedures in picture cache mode are basically the same as normal recording procedures. However, note the following differences with respect to how the camcorder handles video, time, and output data.
- If you start recording while the media is being accessed, the start point of the video that is actually recorded may be later than the currently specified picture cache time. Because the delay increases as the number of recorded clips increases, you should avoid rapid start-and-stop recording operations in picture cache mode.
- Regardless of the setting of the F-RUN/SET/R-RUN switch, the advance mode of the internal timecode generator is always F-RUN.
- In picture cache mode, you cannot set time data by setting the F-RUN/SET/R-RUN switch to SET.
  To set time data, exit picture cache mode.
- If the remaining free capacity of the media in the currently selected slot is less than the picture cache time, and the media in the other slot has enough remaining capacity, then data is recorded to the media in the other slot. However, no data is recorded when there is no media in the other slot, and when the media in the other slot does not have enough remaining capacity. (A message appears in the viewfinder to inform you that there is not enough remaining capacity.)
- Shot marks are not recorded if they are set before the recording start operation.
- When you select a video format that supports i.LINK HDV output and play a clip that was recorded in picture cache mode, two or more frames with the same picture and timecode may follow on each other.
- i.LINK output is possible during picture cache recording. However, the picture cache time is limited.

If power is lost during recording

- If you set the camcorder's POWER switch to OFF, the camcorder is powered off automatically after a few seconds, during which the media is accessed to record the video and audio data stored in the camcorder's memory up to that point.
- If power is lost because the battery was removed, the DC cable was disconnected, or the power was turned off on the AC adaptor side, then the video and audio data stored in memory is lost. The data stored in memory is not recorded. Be careful to avoid this when exchanging the battery.

Recording Time-lapse Video (Interval Rec Function)

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



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

Interval Rec settings and shooting

Before recording in Interval Rec mode, you need to perform the "Interval Rec," "Number of Frames," "Interval Time," and "Pre-Lighting" settings in the "OPERATION" menu *(see page 111)*.
The camcorder exits Interval Rec mode when it is powered off, but the "Number of Frames," "Interval Time," and "Pre-Lighting" settings are

maintained. You do not need to set them again the next time you shoot in Interval Rec mode.

Notes

- The Interval Rec, Picture Cache Rec, Frame Rec, and Slow & Quick Motion function cannot be used at the same time. When you select one of those modes, the previously selected function is disabled automatically.
- The data stored in picture cache memory is cleared when you change the system settings, for example by selecting a different video format. Picture data from before the change is not recorded even if you start recording immediately after the change. The camcorder exits picture cache mode automatically.
- Interval Rec settings cannot be changed during recording.
- Interval Rec is disabled when the following formats are selected.
  - SP 1440/59.94i or SP 1440/50i, when the output setting is HD and "OPERATION" > "Input/Output" > "i.LINK I/O" in the setup menu is set to "Enable"
  - SP 1440/23.98P (pull-down recording)
  - Other than HQ 1920/23.98P or HQ 1280/23.98P, when the output setting is SD and "OPERATION" > "Input/Output" > "i.LINK I/O" in the setup menu is set to "Enable"
- If you want to turn the video light on before the start of recording, set the camcorder's LIGHT switch to AUTO. The video light's switch must also be turned on. When this is done, the video light turns on and off automatically. However, the video light remains lit when the time that it is off is five seconds or less.
- If you set the LIGHT switch to MANUAL and turn the video light's switch on, the video light is always lit. (It does not go on and off automatically.)

To shoot in Interval Rec mode

Make the settings and preparations described in *"Basic Operations" (page 80)*, secure the camcorder so that it does not move, and begin shooting.

When recording starts, the "Interval" indication in the viewfinder changes from flashing to lit, and "INT REC" and "INT STBY" appear alternatively at the position of the REC indication. The TALLY indicators and the tally indicator on the front panel of the viewfinder light as they do during normal recording.
If you are using the pre-lighting function, the video light comes on before recording starts.

Limitations during recording

- The i.LINK (HDV/DV) connector cannot be used.
- 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.
- Recording review is not possible.
- If you press the SLOT SELECT button, the camcorder completes recording of the specified number of frames, creates a clip, and switches to the other media.
- Genlock is not possible.

If power is lost during recording

- If you set the camcorder's POWER switch to OFF, the camcorder is powered off automatically after a few seconds, during which the media is accessed to record the video and audio data stored in the camcorder's memory up to that point.
- If power is lost because the battery was removed, the DC cable was disconnected, or the power was turned off on the AC adaptor side, then the video and audio data shot up to that point may be lost (maximum 15 seconds). Be careful to avoid this when exchanging the battery.

Shooting Stop Motion Animations (Frame Rec Function)

The Frame Rec function is useful for shooting stop motion animations, such as animations with puppets or clay figures.
Each time that you press the recording start button, the camcorder shoots a specified number of frames and then stops.

Frame Rec settings and shooting

Before recording in Frame Rec mode, you need to perform the "Frame Rec" and "Number of Frames" settings in the "OPERATION" menu *(see page 111)*.
The camcorder exits Frame Rec mode when it is powered off, but the setting for the number of frames setting is maintained. You do not need to set it again the next time you shoot in Frame Rec mode.

Notes

- The Interval Rec, Picture Cache Rec, Frame Rec, and Slow & Quick Motion function cannot be used at the same time. When you select one of those modes, the previously selected function is disabled automatically.
- The data stored in memory is cleared when you change the system settings, for example by selecting a different video format. Picture data from before the change is not recorded even if you start recording immediately after the change. The camcorder exits Frame Rec mode automatically.
- Frame Rec settings cannot be changed during recording.
- Frame Rec is disabled when the following formats are selected.
  - SP 1440/59.94i or SP 1440/50i, when the output setting is HD and "OPERATION" > "Input/Output" > "i.LINK I/O" in the setup menu is set to "Enable"
  - SP 1440/23.98P (pull-down recording)
  - Other than HQ 1920/23.98P or HQ 1280/23.98P, when the output setting is SD and "OPERATION" > "Input/Output" > "i.LINK I/O" in the setup menu is set to "Enable"

To shoot in Frame Rec mode

Make the settings and preparations described in *"Basic Operations" (page 80)*, secure the camcorder so that it does not move, and begin shooting.

When recording starts, the "Frame Rec" indication in the viewfinder changes from flashing to lit, and "FRM REC" and "FRM STBY" appear alternatively at the position of the REC indication. The TALLY indicators and the tally indicator on the front panel of the viewfinder light as they do during normal recording.

Limitations during recording

- The i.LINK (HDV/DV) connector cannot be used.
- 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.
- Recording review is not possible.
- If you press the SLOT SELECT button, the camcorder completes recording of the specified number of frames, creates a clip, and switches to the other media.
- Genlock is not possible.

If power is lost during recording

- If you set the camcorder's POWER switch to OFF, the camcorder is powered off automatically after a few seconds, during which the media is accessed to record the video and audio data stored in the camcorder's memory up to that point.
- If power is lost because the battery was removed, the DC cable was disconnected, or the power was turned off on the AC adaptor side, then the video and audio data shot up to that point may be lost (maximum 15 seconds). Be careful to avoid this when exchanging the battery.

Shooting with Slow & Quick Motion

When the camcorder is in HD mode and 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.

When the "Country" setting is "NTSC Area"/"NTSC(J) Area": HQ 1920/29.97P, HQ 1920/23.98P, HQ 1280/59.94P, HQ 1280/29.97P, HQ 1280/23.98P

When the "Country" setting is "PAL Area": HQ 1920/25P, HQ 1280/50P, HQ 1280/25P

Slow & Quick Motion settings and shooting

Before recording in Slow & Quick Motion mode, you need to perform the "Slow & Quick" and "Frame Rate" settings in the "OPERATION" menu *(see page 111)*.

When you finish making these settings, the system frequency and the frame rate appear at the top of the viewfinder screen. You can change the frame rate while viewing the display in the viewfinder by turning the MENU knob.

The Slow & Quick Motion mode setting and the frame rate are retained even after the camcorder is powered off.

Notes

- The Interval Rec, Picture Cache Rec, Frame Rec, and Slow & Quick Motion function cannot be used at the same time. When you select one of those modes, the previously selected function is disabled automatically.
- Slow & Quick Motion is disabled when the slow shutter function (viewfinder display "SLS") function is enabled. The slow shutter function is disabled when the Slow & Quick Motion function is enabled.
- Slow & Quick Motion is disabled when "OPERATION" > "Input/Output" > "i.LINK I/O" in

the setup menu is set to “Enable.” When Slow & Quick Motion is enabled, “i.LINK I/O” is fixed as “Disable.”
- Slow & Quick Motion settings cannot be changed during recording.

To shoot in Slow & Quick Motion mode

Shoot as described in *“Basic Operations” (page 80)*.

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.

Limitations during recording

- The i.LINK (HDV/DV) connector cannot be used.
- 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.
- Recording 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 $^1/_{60}$.
  If is not possible to select a shutter speed that is slower than the recording frame rate.
- Genlock is not possible.

Framing Shots with the Freeze Mix Function

The freeze mix function allows you to temporarily overlap a still image (freeze picture) from a clip shot in HD mode onto the current camera picture. This makes it easier to frame the shot.

Note

The freeze mix function is not available in the following cases.
- When the recording format is SP 1440/23.98P
- When the video formats of the recorded picture and the camera picture differ
- When you are shooting in Slow & Quick Motion mode or slow shutter mode
- When there is i.LINK input

To display a freeze mix picture

1 Play a clip or conduct a recording review of a clip with the same format as the camera picture.

2 Display the picture that you want to use as the frame, and then turn on the assignable switch to which the Freeze Mix function has been assigned.
The recording review picture is frozen and overlaps the camera picture.

Note

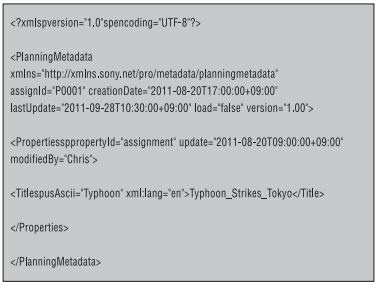
The following functions are disabled at the freeze mix times.
- Menu operations
- During Focus Mag display
- Marker display
- Zebra display
- Peaking display
- Skin details display

To cancel the freeze mix display

Do one of the following.
- Press an assignable switch again to which the Freeze Mix function has been assigned.
  The freeze mix display is canceled and the display returns to the normal camera picture.
- Start recording *(see page 80)*.
  Normal recording starts.

Planning Metadata Operations

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



Example of a planning metadata file

You can shoot using clip names and shot mark names defined in advance in a planning metadata file.

The camcorder can display clip names and shot mark names defined in the following languages.

- English
- Chinese
- German
- French [1)]
- Italian
- Spanish
- Dutch [1)]
- Portuguese
- Swedish
- Norwegian
- Danish
- Finnish [1)]

1) Some characters are displayed as different but similar characters.

Note

If you define clip name and shot mark names in languages other than the above, they may not be displayed on the viewfinder screen.

On the viewfinder screen, only alphanumeric characters and symbols can be displayed.

Loading a planning metadata file into camcorder's internal memory

To record planning metadata together with recording clips, you need to load a planning metadata file into the camcorder's memory before starting to shoot.

Insert the SxS memory card on which the planning metadata (.xml) is stored in the following directories, into the SxS memory card slot of the PMW-400. Then select the loading file by selecting "OPERATION" > "Plan.Metadata" > "Load/Slot(A)" or "Load/Slot(B)" *(see page 122)* in the setup menu.

Media	Directory to which files are written
SxS memory card	BPAV/General/Sony/Planning
SDHC	PRIVATE/SONY/BPAV/General/Sony/Planning

- When a Wi-Fi connection is made between the camcorder and a computer, operate the Web menu built in the camcorder from the computer to transfer a file.

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.

Select "OPERATION" > "Plan.Metadata" > "Properties" *(see page 122)* in the setup menu, then select "Execute."

To clear the planning metadata loaded

Select "OPERATION" > "Plan.Metadata" > "Clear" *(see page 122)* in the setup menu, then select "Execute."

Defining clip names in planning metadata

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

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

Select “OPERATION” > “Plan.Metadata” > “Clip Name Disp” *(see page 122)* in the setup menu, then select which type of clip name is displayed.
When a clip name is set with planning metadata, the name is displayed under the depth of field indication on the viewfinder screen.

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="
2011-08-20T17:00:00+09:00" sp
lastUpdate="
2011-09-28T10:30:00+09:00" sp
version="1.00">↵
  <Properties sp propertyId="
  assignment" sp update="
  2011-09-28T10:30:00+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) string is available for the clip name.
  If the UTF-8 format string exceeds 44 bytes, 44 bytes string is used as the clip name.
  If only ASCII format name is specified, 44 characters 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.

You can use the Sony Planning Metadata Add-in application software supplied with the CBK-WA01 Wi-Fi Adapter to define clip names. For details, refer to the Operating Instructions supplied with the CBK-WA01.

To set clip names

Load a planning metadata file that contains clip names into this camcorder, select “OPERATION” > “Clip” > “Auto Naming” *(see page 120)* in the setup menu, then select “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 four-digit serial number (0001 to 9999).
Examples: Typhoon_Strikes_Tokyo_0001, Typhoon_Strikes_Tokyo_0002, ...

Note

- When the serial number reaches to 9999, it returns to 0001 with the next recording operation.
- When you load another planning metadata file, the serial number returns to 0001.

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

Shot Mark 1 and Shot Mark 2 can be recorded on the camcorder. Shot Mark 3 to Shot Mark 9 and Shot Mark 0 can be recorded by operation from a computer which is connected with the camcorder via Wi-Fi.

Shot mark name string example

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

Note

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

```
<?xml sp version="1.0" sp encoding="
UTF-8"?>↵
<PlanningMetadata xmlns="http://
```

```
xmlns.sony.net/pro/metadata/
planningmetadata" assignId="
H00123" creationDate="
2011-04-15T08:00:00Z" lastUpdate="
2011-04-15T15:00:00Z" version=
"1.00">↵
<Properties propertyId=
"assignment" class="original"
update="2011-04-15T15:00:00Z"
modifiedBy="Chris">↵
  <Title usAscii="Football
  Game" xml:lang="en">
  Football Game 15/04/2011</
  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.

You can use the Sony Planning Metadata Add-in application software supplied with the CBK-WA01 Wi-Fi Adapter to Essence mark names. For details, refer to the Operating Instructions supplied with the CBK-WA01.

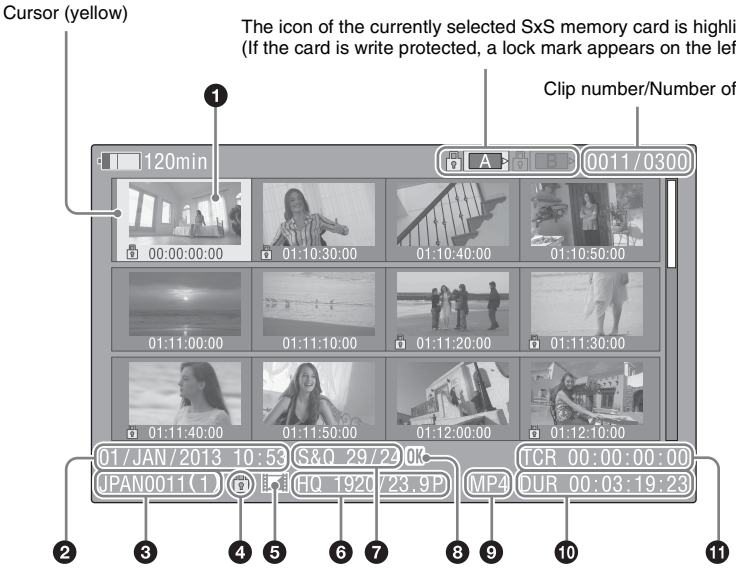
Chapter 5 Clip Operations

Clip Playback

A thumbnail screen appears if you press the THUMBNAIL button in E-E or playback mode. Thumbnail screens display lists of the clips stored on SxS memory cards in the form of index pictures. (A message appears if you insert a memory card that contains no clips.)
You can select any clip *(see page 92)* in a thumbnail screen and start playback of that clip *(see page 93)*.
To exit the thumbnail screen, press the THUMBNAIL button again.

Thumbnail Screen

In thumbnail screens, the timecode of the index picture appears beneath the thumbnail for each clip. (An OK mark also appears when a clip has been marked with an OK mark.)
The clip information on the cursor location is displayed at the bottom of the screen.



❶ Index picture

UDF, FAT-HD mode: When a clip is recorded, its first frame is set automatically as the index picture. You can change the index picture to any frame *(see page 102)*. If the clip is locked or the OK mark is on the clip, the lock mark appears.
FAT-SD mode: When a clip is recorded, its first frame is set automatically as the index picture. If the file size is larger than 2 GB, and that the clip has been split before being saved, the take mark appears.You can check the segment files on the expand thumbnail screen *(see page 100)*.

❷ Date and start time of recording

❸ Clip name

The number after the clip name (delimited by /) is the number of components. This appears only for clips larger than 2 GB in size, which have been split into smaller files for storage in the FAT-SD mode.

❹ Lock mark (UDF and FAT-HD mode only)

Indicates the selected clip is marked with an OK mark.

❺ Independent AV file icon (UDF and FAT-HD mode only)

Appears only when a clip is an independent AV file. SxS memory cards may contain independent files that have been added directly from a computer. Because independent files lack the associated management files, some operations and information displays may not be available.

❻ Video format of recording

❼ Special recording information (UDF and FAT-HD mode only)

Displays the mode of clips that have been recorded in a special mode (Slow & Quick Motion, Interval Rec, Frame Rec).
For Slow & Quick Motion clips, the frame rates are displayed to the right as "Recording frame rate/Playback frame rate" fps.

❽ OK, NG, KP mark (UDF and FAT-HD mode only)

UDF: When an OK, NG, or KP flag is added to the selected clip, the corresponding mark is added to the clip.
FAT-HD mode: When an OK mark is added to the selected clip, the OK mark is added to the clip.

❾ File format

Indicates the file format of the selected clip (MXF, MP4. AVI). (File format does not indicate when in UDF/HD mode.)

❿ Clip duration

⓫ Timecode

This is the timecode of the index picture.

Note

Normal thumbnail screens display SD clips only or HD clips only, even if the SxS memory card contains clips in both formats. You can select the format to display by selecting a mode with "OPERATION" > "Format" > "HD/SD" *(see page 107)* in the setup menu.
If you want to display all recorded clips, regardless of the HD/SD mode, switch to the all clips thumbnail screen. However, it is not possible to start playback from the all clips thumbnail screen *(see page 97)*.

To switch between SxS memory cards

When two SxS memory cards are loaded, you can switch between them by pressing the SLOT SELECT button.

Note

While an expand thumbnail screen *(see page 93)* or a shot mark (essence mark) thumbnail screen *(see page 101)* is displayed, SxS memory cards cannot be switched.

Playing Clips

To select clip thumbnails

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

To select the first thumbnail

With the F REV button held down, press the PREV button.

To select the last thumbnail

With the F FWD button held down, press the NEXT button.

To play clips sequentially starting from a selected clip

1 **Select the thumbnail of the clip that you want to play first.**

2 **Press the PLAY/PAUSE button.**
Play begins from the top of the selected clip.

Play continues through all clips after the selected clip.
When the last clip has been played to the end, 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.
Playback also stops if you eject the memory card. In this case, the camera picture appears in the viewfinder.

Notes

- There may be momentary picture breakup or still image display at the transition from one clip to another. During this time, the playback controls and the THUMBNAIL button cannot be operated.
- When you select a clip in the thumbnail screen and begin playback, there may be momentary picture breakup at the top of the clip. To view the top of the clip without breakup, put the camcorder into playback mode, pause, use the PREV button to return to the top of the clip, and start playback again.
- On SxS memory cards that contain both HD-mode and SD-mode clips, you cannot play all clips in sequence. For example, while an HD mode thumbnail screen is displayed, only HD mode clips are played in sequence.

To cue up clips

To play from the top of the first clip

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

To play from the top of the last clip

Simultaneously press the NEXT and F FWD buttons. This jumps to the top of the last clip on the SxS memory card.

To add a shot mark during play (HD mode only)

You can add shot marks to clips during play by using the same method used during recording *(see page 83)*.

Notes

- Shot marks cannot be recorded when the SxS memory card is write protected.
- Shot marks cannot be added at the first frame of each clip or last frame of the last clip.

Using Thumbnails to Search Inside Clips

- Expand thumbnail screen
- Shot mark thumbnail screen (HD mode only)

Like the normal thumbnail screen and the OK clip thumbnail screen, these screens allow you to select clip thumbnails *(see page 92)* and to start clip playback *(see page 93)*.

To search for scenes in clips with the expand thumbnail screen

To display the expand thumbnail screen, select a clip in the thumbnail screen and press the EXPAND button *(see page 17)* or select "THUMBNAIL" > "Thumbnail View" > "Forward Expansion" in the setup menu. The selected clip is displayed as follows.

HD mode: The clip is divided into 12 equally-sized blocks, and a thumbnail of the first frame in each block is displayed.

SD mode: Only in the case of clips that have been split into partial files because the file size was larger than 2 GB, a thumbnail of the first frame of each partial file is displayed.

See "Displaying the Expand Thumbnail Screen (UDF and FAT-HD Mode only)" (page 100) for more information about the expand thumbnail screen.

To search for shot marks in clips with the shot mark thumbnail screen (HD mode only)

When a clip contains one or more shot marks, you can easily find them with the shot mark thumbnail screen. The shot mark thumbnail screen displays a thumbnail of each shot mark frame in the clip. To display the shot mark thumbnail screen, press the ESSENCE MARK button *(see page 18)* or select “THUMBNAIL” > “Thumbnail View” > “Essence Mark Thumbnail” in the setup menu.

See “Displaying the Shot Mark Thumbnail Screen (UDF and FAT-HD Mode Only)” (page 101) for more information about the shot mark thumbnail screen.

Thumbnail Operations

You can use the THUMBNAIL menu to perform various operations on clips, to check clip properties, and to change clip metadata.

THUMBNAIL Menu Configuration

Menu items	Sub-items	Description
Clip Properties	—	Displays detailed properties *(see page 98)*.
Set Index Picture UDF / FAT-HD	—	Changes index pictures in the expand thumbnail screen or the essence mark thumbnail screen *(see page 102)*.
Thumbnail View	Forward Expansion	• Displays the expand thumbnail screen *(see page 100)*. • In the expand thumbnail screen, increases the number of divisions *(see page 101)*.
	Back Expansion	In the expand thumbnail screen, decreases the number of divisions.
UDF / FAT-HD	Essence Mark Thumbnail	Displays the essence mark thumbnail screen *(see page 101)*.
	Clip Thumbnail	Displays the normal thumbnail screen.
	All Clip Thumbnail	Displays the all clips thumbnail screen *(see page 97)*.
Set Shot Mark UDF / FAT-HD	Add Shot Mark1	In the expand thumbnail screen or the essence mark thumbnail screen, adds a Shot Mark1 mark *(see page 102)*.
	Delete Shot Mark1	In the expand thumbnail screen or the essence mark thumbnail screen, deletes a Shot Mark1 mark *(see page 102)*.
	Add Shot Mark2	In the expand thumbnail screen or the essence mark thumbnail screen, adds a Shot Mark2 mark *(see page 102)*.
	Delete Shot Mark2	In the expand thumbnail screen or the essence mark thumbnail screen, deletes a Shot Mark2 mark *(see page 102)*.
Set Clip Flag UDF	OK	Adds an OK mark.
	NG	Adds an NG mark.
	KP(Keep)	Adds a KP mark.
	None	Deletes an OK, an NG or a KP mark.
Add OK Mark FAT-HD	—	Adds an OK mark and protects a clip *(see page 99)*.
Delete OK Mark FAT-HD	—	Deletes an OK mark and unprotects a clip *(see page 99)*.
Lock Clip UDF	—	Protects a clip.
Unlock Clip UDF	—	Cancels protection of a clip.

Menu items	Sub-items	Description
Copy Clip	—	Copies a clip *(see page 99)*.
Delete Clip	—	Deletes a clip *(see page 100)*.
Divide Clip FAT-HD	—	Divides a clip *(see page 102)*.
Filter Clips FAT-HD	—	Displays the OK clip thumbnail screen *(see page 97)*.
Filter Clips UDF	OK	Displays the OK clip thumbnail screen.
	NG	Displays the NG clip thumbnail screen.
	KP(Keep)	Displays the KP clip thumbnail screen.
	None	Displays a None clip (clip which has not been marked OK, NG, or KP) thumbnail screen.
Lock All Clips UDF	—	Protects all clips displayed.
Unlock All Clips UDF	—	Cancels protection of all clips displayed.
Copy All	All Clips	Batch copies groups of clips/files *(see page 99)*.
	General Files	
	All Clips & General Files	
Delete All Clips	Execute/Cancel	Deletes all unprotected clips *(see page 100)*.

Basic THUMBNAIL Menu Operations

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

To display the THUMBNAIL menu

1. **Press the THUMBNAIL button to display the thumbnail screen.**
2. **Set the MENU ON/OFF switch to ON, or press the MENU button.**
3. **Turn the MENU knob to select "TH," and then press the knob. Or press the ⇧ or ⇩ button to select "TH," and then press the SET button.**
   The THUMBNAIL menu appears.

To hide the THUMBNAIL menu, press the MENU 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, and then press the knob.
- Press the arrow buttons (⇧, ⇩, ⇦, ⇨) to select an item or sub-item, and then press the SET button.

According to the selected item or sub-item, a selection list or a clip properties screen appears *(see page 98)*.

To return to the previous state, push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE side.

Notes

- Some items cannot be operated, when an SxS memory card is write protected.
- Some items cannot be selected, depending on the state of the camcorder when the menu was displayed.

To hide the clip properties screen

Do one of the following.

Press the RESET/RETURN button: This returns to the THUMBNAIL menu.

Press the THUMBNAIL button: The camcorder enters E-E mode, and the camera picture appears.

Press the PLAY/PAUSE button: Playback from the selected clip starts.

Changing the Thumbnail Screen Type

To display OK clip thumbnails (HD mode only)

When the normal thumbnail screen is displayed, you can select "THUMBNAIL" > "Filter Clips" to switch to the OK clip thumbnail screen.

See "Adding/Deleting the OK Mark (FAT-HD Mode Only)" (page 99) for information about how to add OK marks.

OK/NG/KP/None-Clip thumbnail screen

Only the clips flagged OK/NG/KP—or clips with no flag ("None")—among the clips on the current SxS memory card are displayed.
You can select the type of flag to display with "THUMBNAIL" > "Filter Clips" *(see page 96)*.

To display the all clips thumbnail screen

When the normal thumbnail screen is displayed, you can switch to the all clips thumbnail screen by selecting "THUMBNAIL" > "All Clip Thumbnail."

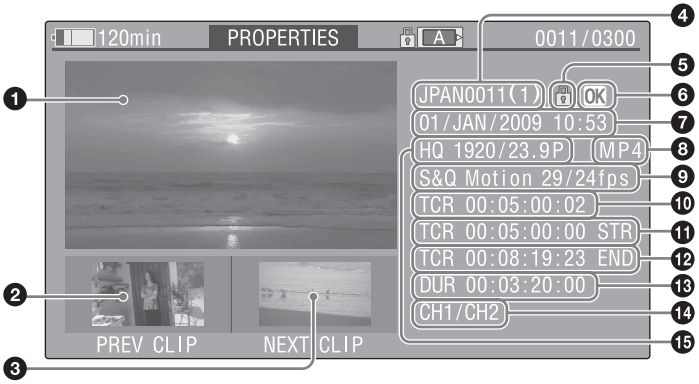
Pressing the RESET/RETURN button returns you to the normal thumbnails screen, where you can perform playback and other clip operations.

Note

You cannot start playback from the all clips thumbnail screen.

Displaying Clip Properties

Select “Clip Properties” in the THUMBNAIL menu.



❶ Image of the current clip

❷ Image of the previous clip

Press the PREV button to display the properties of the previous clip.

❸ Image of the next clip

Press the NEXT button to display the properties of the next clip.

❹ Clip name

When clip names are 12 characters or longer, only the first five characters and the last five characters are displayed. If you want to check the hidden characters, press the MENU knob to display all characters of the clip (long display mode).
Press the MENU knob again to exit long display mode. Pressing the PREV or NEXT button to display the previous or next clip also exists long display mode.
In FAT-SD mode, only for clips that have been divided because the file size was greater than 2 GB, the number of component clips appears after the clip name.

❺ Lock mark (UDF and FAT-SD mode only)

This appears when the clip is marked with an OK mark or protected.

❻ OK/NG/KP mark (UDF and FAT-SD mode only)

UDF: When an OK, NG, or KP flag is added to the selected clip, the corresponding mark is added to the clip.
FAT-HD mode: When an OK mark is added to the selected clip, the OK mark is added to the clip.

❼ Date and start time of recording

❽ File format

The file format of the clip (MXF, MP4 or AVI) appears.

❾ Special recording information (UDF and FAT-SD mode only)

Displays the mode of clips that have been recorded in a special mode (Slow & Quick Motion, Interval Rec, Frame Rec).
For Slow & Quick Motion clips, the frame rates are displayed to the right as “Recording frame rate/Playback frame rate.”

⓾ **Timecode of the displayed image**

⓫ **Timecode of the recording start point**

⓬ **Timecode of the recording end point**

⓭ **Duration**

⓮ **Recorded audio channels**

⓯ **Video format of recording**

Adding/Deleting a Flag (UDF Only)

You can add an OK/NG/KP flag to clips recorded in UDF. By adding flags, you can set the camcorder to display only clips with certain flag settings on the thumbnail screen (OK/NG/KP/None-Clip thumbnail screen) *(see page 97)*. When adding a flag, you can select from "OK," "NG," "KP" (Keep) in "Set Clip Flag" of the THUMBNAIL menu *(see page 95)* on the thumbnail screen. When deleting a flag, select "None."

Note

Flagged clips are not protected. To protect clips from deletion, select "Lock Clip" in the THUMBNAIL menu *(see page 95)* on the thumbnail screen. To remove the protection, select "Unlock Clip."

Adding/Deleting the OK Mark (FAT-HD Mode Only)

By adding an OK mark to clips recorded in FAT-HD Mode, you can set the camcorder to display only the necessary clips on the thumbnail screen *(see page 97)*. Clips with an OK mark added are blocked from being deleted or segmented. To delete or segment them, remove the OK mark. From the THUMBNAIL menu *(see page 97)* on the thumbnail screen, you can select "Add OK Mark" to add an OK mark, or "Delete OK Mark" to delete the OK mark.

Copying Clips

You can copy clips to other SxS memory cards. Clips are copied to destination SxS memory cards using the same names as the original clips.

Notes

- If a clip with the same name already exists at the copy destination SxS memory card, a one-digit number in parentheses is added to the original name.
  The number in parentheses is the smallest number that does not exist at the copy destination.

  Examples:
  ABCD0002→ABCD0002(1)
  ABCD0002(1)→ABCD0002(2)
  ABCD0005(3)→ABCD0005(4)
- If the parenthetical numbers (1) to (9) already exist at the copy destination, it is not possible to copy any more clips under that name. (A tenth clip cannot be copied.)
- A message appears if there is not enough free capacity at the copy destination SxS memory card. Exchange the card for one with more free capacity.
- When multiple clips are recorded in a source SxS memory card, it may not be possible to copy all clips to the end. Depending on memory characteristics and usage of the memory cards, this can occur even when the source and destination memory cards have the same capacity.

Copying a specified clip

You can copy a clip selected on the thumbnail screen to another SxS memory card.
Select "THUMBNAIL" > "Copy Clip" > "Execute" in the setup menu, then press the MENU knob.

To cancel a copy operation

Press the RESET/RETURN button.

To batch copy groups of clips/files

Select "THUMBNAIL" > "Copy All" > "All Clips" > "Execute" in the setup menu, then press the MENU knob.
When both HD-mode and SD-mode clips exist on the source SxS memory card, only clips in the currently selected mode are copied. This is a convenient way to extract clips in one of the modes.
You can also copy of the files in the General directory, either together with or separately from clips.

To cancel the copy operation

Press the RESET/RETURN button.

To copy all files in the General directory

To copy all files only, without copying clips, select “THUMBNAIL” > “Copy All” > “General Files.”

To copy all files together with all clips, select “THUMBNAIL” > “Copy All” > “All Clips & General Files.”

Deleting Clips

You can delete clips that is selected in the thumbnail screen.

Select “THUMBNAIL” > “Delete Clip” > “Execute” in the setup menu, then press the MENU knob.

Note

HD clips with OK marks cannot be deleted.

If you want to delete such clips, first delete the OK marks *(see page 99)*.

To batch delete groups of clips

You can delete clips that is selected in the thumbnail screen.

Select “THUMBNAIL” > “Delete All Clips” > “Execute” in the setup menu, then press the MENU knob.

Notes

- When both HD-mode and SD-mode clips exist on the SxS memory card, only clips in the currently selected mode are deleted.
- In HD mode, clips with OK marks are not deleted, even when a deletion is executed for a group of clips that includes them.

To cancel the deletion

Press the RESET/RETURN button.

Displaying the Expand Thumbnail Screen (UDF and FAT-HD Mode only)

The expand thumbnail screen allows you to search inside clips by using thumbnails *(see page 93)*, to change index pictures *(see page 102)*, and to add and delete shot marks *(see page 102)*.

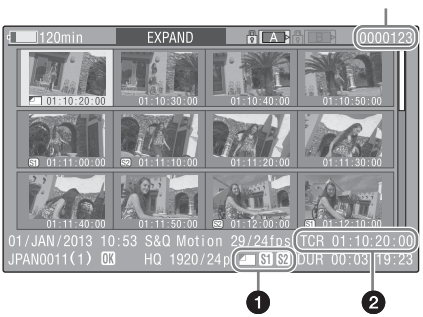
To display the screen

In the thumbnail screen, select a thumbnail and press the EXPAND button *(see page 17)* or select “THUMBNAIL” > “Thumbnail View” > “Forward Expansion.”

An expand thumbnail screen for the selected clip appears.

Expand thumbnail screen in FAT-HD mode

In HD mode, the selected clip is divided into 12 equally-sized blocks, and a thumbnail of the first frame in each block is displayed.



Clip properties are shown at the bottom of the screen.

Except for the items listed below, the information displayed here is the same as the information displayed in the normal thumbnail screen.

❶ Frame information

This displays frame information using icons.

	Index picture
S1	Frame with Shot Mark1
S2	Frame with Shot Mark2

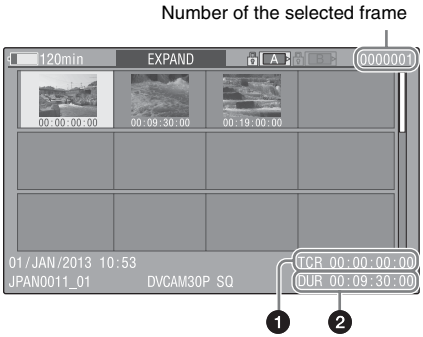
The same icons are also displayed beneath the thumbnails. However, when several icons could be displayed for the same frame, one icon is selected for display, in the order of priority Index picture > Shot Mark1 > Shot Mark2.

❷ Timecode

This displays the timecode of the selected frame in the expand thumbnail screen.

Expand thumbnail screen in FAT-SD mode

In SD mode, only in the case of clips that have been split into partial files because the file size was larger than 2 GB, a thumbnail of the first frame of each partial file is displayed.



Clip properties are displayed at the bottom of the screen.

Except for the items listed below, the information displayed here is the same as the information displayed in the normal thumbnail screen.

❶ Timecode

This is the timecode of the selected partial file.

❷ Duration

This is the duration of the selected partial file.

To increase the number of divisions

When you press the EXPAND button, or select "THUMBNAIL" > "Thumbnail View" > "Forward Expansion," the divided clip or file is further divided into 12 equally-sized blocks (a clip or file that has been divided into 12 is further divided into 12, for 12 × 12 = 144 divisions). You can repeat the same operation to increase the number of division.

To return to the previous division level

Press the EXPAND button with the SHIFT button held down, or select "THUMBNAIL" > "Thumbnail View" > "Back Expansion." The expand thumbnail screen returns to the previous division level.

Displaying the Shot Mark Thumbnail Screen (UDF and FAT-HD Mode Only)

You can search for shot marks in clips *(see page 93)*, change index pictures *(see page 102)*, and add and delete shot marks *(see page 102)*.

1 In the thumbnail screen, select the thumbnail of a clip, and press the ESSENCE MARK button *(see page 18)* **or select "THUMBNAIL" > "Thumbnail View" > "Essence Mark Thumbnail."**

The shot mark thumbnail screen appears, and a selection list is displayed.

2 Select the type of the essence mark thumbnail screen.

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

Shot Mark1: Display only frames marked with Shot Mark1 marks.

Shot Mark2: Display only frames marked with Shot Mark2 marks.

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 defined names for Shot Mark 0 to Shot Mark 9, the defined names are displayed instead of the above item names in the list.

Example shot mark thumbnail screen (with Shot Mark1 selected)

The properties of the clip appear at the bottom of the screen.

Except for the following item, the information displayed here is the same as the information displayed in the expand thumbnail screen.

❶ Timecode

This is the timecode of the selected frame in the shot mark thumbnail screen.

Adding and Deleting Shot Marks (UDF and FAT-HD Mode Only)

To add shot marks

1. **Select the frame where you want to add a shot mark, and then select "THUMBNAIL" > "Set Shot Mark" > "Add Shot Mark1" (or "Add Shot Mark2").**
   The properties screen of the selected frame appears, and a confirmation message appears below the image.
2. **Select "Execute," and press the MENU knob.**

To delete shot marks

1. **Select the frame where you want to delete a shot mark, and then select "THUMBNAIL" > "Set Shot Mark" > "Delete Shot Mark1" (or "Delete Shot Mark2").**
   The properties screen of the selected frame appears, and a confirmation message appears below the image.
2. **Select "Execute," and press the MENU knob.**

Changing Clip Index Pictures (UDF and FAT-HD Mode Only)

1. **Select the thumbnail of the frame that you want to use as the index picture, and then select "THUMBNAIL" > "Set Index Picture."**
   The properties screen of the selected frame appears, and a confirmation message appears below the image.
2. **Select "Execute," and press the MENU knob.**

Note

Even if you set the index picture to a frame that is not the first frame of a clip, playback of that clip from a thumbnail screen always begins at the first frame.

Dividing Clips (FAT-HD Mode Only)

1. **Select the thumbnail of the frame where you want to divide the clip, and then select "THUMBNAIL" > "Divide Clip."**
   The properties screen of the selected frame appears, and a confirmation message appears below the image.
2. **Select "Execute," and press the MENU knob.**
   The clip is divided at the selected frame, and two clips with different names are created.

The first four characters of the clip name are taken from the name of the original clips, and the last four characters are new serial numbers.

Example: When the name of a newly recorded clip would be EFGH0100, and a clip named ABCD0002 is divided, the names of the two newly created clips are ABCD0100 and ABCD0101.

Note

When there is not enough remaining capacity on the SxS memory cards to store the divided clips, a message appears to inform you that there is not enough capacity.

Chapter 6 Menu and Detailed Settings

Setup Menu Organization and Levels

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 158)*.

Setup Menu Organization

The setup menu consists of the following menus.

Op: OPERATION menu
Settings related to shooting, except settings related to picture quality *(see page 107)*

Pa: PAINT menu
Settings related to picture quality *(see page 123)*

Th: THUMBNAIL menu
Settings related to clip thumbnails *(see page 95)*

Note

The THUMBNAIL menu is used only when a thumbnail screen *(see page 91)* is displayed. It is disabled when no thumbnail screen is displayed.

Ma: MAINTENANCE menu
Settings related to audio and timecode *(see page 129)*

Fi: FILE menu
Settings related to file operations *(see page 144)*

Setup Menu Levels

See "THUMBNAIL Menu Configuration" (page 95) for the organization of the THUMBNAIL menu.

OPERATION Menu *(see page 107)*

- OPERATION
  - Format
  - Format Media
  - Input/Output
  - Super Impose
  - Rec Function
  - Assignable SW
  - VF Setting
  - Marker
  - Gain Switch
  - TLCS
  - Zebra
  - Display On/Off
  - Auto Iris
  - White Setting
  - Offset White
  - Shutter
  - Time Zone
  - Clip
  - Plan.Metadata

PAINT Menu *(see page 123)*

- PAINT
  - Switch Status
  - White
  - Black
  - Flare
  - Gamma
  - Black Gamma
  - Knee
  - White Clip
  - Detail(HD Mode)
  - Detail(SD Mode)
  - Aperture
  - Skin Detail
  - Matrix
  - Multi Matrix
  - V Modulation
  - Low Key Saturation
  - Noise Suppress

MAINTENANCE Menu ***(see page 129)***

MAINTENANCE
- White Shading
- Black Shading
- Battery
- Audio
- WRR Setting
- Timecode
- Essence Mark
- Camera Config
- Preset White
- White Filter
- DCC Adjust
- Auto Iris2
- Flicker Reduce
- Genlock
- ND Comp
- Lens
- Auto Shading
- Trigger Mode
- Network Setting
- Wi-Fi Setting
- Clock set
- Language
- Hours Meter
- Version

FILE Menu ***(see page 144)***

FILE
- All
- Scene
- Reference
- Lens

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.

A cursor appears over the first two characters of the most recently used menu, and the corresponding menu item selection area appears to the right.

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.

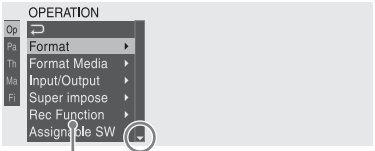
A list of selectable menu items appears in the menu item selection area to the right of the icon.

2 Press the MENU knob or the SET button.

The cursor moves to the menu item selection area.

You can also move the cursor to the menu item selection area 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. Triangles appear at the upper right and lower right of the menu item selection area to indicate that a menu is scrollable.

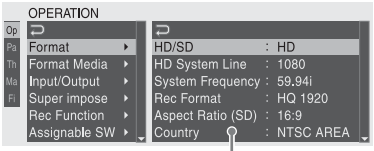


Appears when more menu items are available below the last line. (▲ appears when more menu items are available above the first line.)

Menu item selection area
- ► appears to the right when more detailed sub-items are available.
- Settings appear to the right when a menu item has no sub-items.
- You can select ⮌ 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.

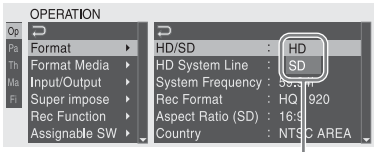
The sub-items area appears to the right of the menu item selection area, and the cursor moves to the first sub-item.



Sub-items area
- Displays sub-items and their current settings
- To return to the previous level, select ⮌, press the ⇦ button, or push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE side.

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.



Settings area

- The settings area displays a maximum of seven lines. You can scroll through menus with more than seven sub-items by moving the cursor up and down. Triangles appear at the upper right and lower right of the settings area to indicate that a sub-item menu is scrollable.
- 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

Some items, such as time data or file names, must be set by entering text. When you select one of these items, the text entry area is highlighted, with "SET" displayed to the right.

1 **Turn the MENU knob, or press the ⇧ or ⇩ button, to select a character, and then confirm by pressing the MENU knob or the SET button.**
The cursor moves to the next position.
To return to the previous position, push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE side.

2 **Select characters for all positions up to the last.**
The cursor moves to "SET."

3 **Press the MENU knob or the SET button.**
This confirms the setting.

To cancel the setting change

Push the MENU CANCEL/PRST/ESCAPE switch down to the ESCAPE side.

To reset a setting to the initial value

1 **Before a setting is changed or after a setting change is cancelled, push the MENU CANCEL/PRST/ESCAPE switch up to the CANCEL/PRST side.**

2 **When the message to confirm whether the current setting is reset to the initial value, push the MENU CANCEL/PRST/ESCAPE switch up to the CANCEL/PRST side again.**
The current setting is reset to the initial value.

To exit the menu

Set the MENU ON/OFF switch to OFF or press the MENU button.
The normal camera picture reappears.

Menu List

OPERATION Menu

Settings in bold are the factory default values.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Format Specifies the camcorder's operating mode and recording format.	File System	**UDF**/FAT	Switches between UDF and FAT as the recording mode (execute by selecting "Execute").
	HD/SD	**HD**/SD	Switches between HD or SD as the operating mode (execute by selecting "Execute").
	HD System Line	**1080**/720	When the operating mode is HD, sets the number of system lines to 1080 or 720 (execute by selecting "Execute").
	System Frequency	The available settings vary depending on the settings of "HD/SD," "HD System Line," and "Country."	Selects the system frequency (execute by selecting "Execute").
		59.94i/29.97P/23.98P	When "HD/SD" is set to "HD," "HD System Line" is set to "1080," and "Country" is set to other than "PAL Area."
		59.94P/29.97P/23.98P	When "HD/SD" is set to "HD," "HD System Line" is set to "720," and "Country" is set to other than "PAL Area."
		59.94i/29.97P	When "HD/SD" is set to "SD" and "Country" is set to other than "PAL Area."
		50i/25P	• When "HD/SD" is set to "HD," "HD System Line" is set to "1080," and "Country" is set to "PAL Area." • When "HD/SD" is set to "SD" and "Country" is set to "PAL Area."
		50P/25P	When "HD/SD" is set to "HD," "HD System Line" is set to "720," and "Country" is set to "PAL Area."

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Format Specifies the camcorder's operating mode and recording format.	Rec Format	The available settings vary depending on the settings in UDF/FAT, HD/SD, HD System Line, and System Frequency.	Selects the recording format (execute by selecting "Execute").
		HD422 50/ HD420 HQ1440/ HD420 HQ1280	• When the UDF/FAT setting is [UDF], the HD/SD setting is [HD], the HD System Line setting is [1080]. • When the UDF/FAT setting is [UDF], the HD/SD setting is [HD], the HD System Line setting is [720], and the System Frequency setting is [23.98P].(When the System Frequency setting is [25P], [29.97P], or [50P], this setting is fixed to [HD422 50].)
		HQ 1920/HQ 1440	When the UDF/FAT setting is FAT, the HD/SD setting is [HD], the HD System Line setting is [1080], and the System Frequency setting is [29.97P] or [25P].
		HQ 1920/HQ 1440/ SP 1440	When the UDF/FAT setting is FAT, the HD/SD setting is [HD], the HD System Line setting is [1080], and the System Frequency setting is other than [29.97P] and [25P].
		HQ 1280	When the UDF/FAT setting is FAT, the HD/SD setting is [HD], and the HD System Line setting is [720].
		IMX50/DVCAM	When the UDF/FAT setting is [UDF] and the HD/SD setting is [SD].
		DVCAM	When the UDF/FAT setting is [FAT] and the HD/SD setting is [HD].
	Aspect Ratio (SD)	**16:9**/4:3	Selects the aspect ratio when SD mode (recording format: DVCAM) is selected (execute by selecting "Execute").
	Audio Length(IMX)	24bit/**16bit**	Selects the audio bit rate for recording in IMX format.
	Country	NTSC Area/NTSC(J) Area/PAL Area	Selects the area of use (execute by selecting "Execute").
Format Media Executes a media format.	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").

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Input/Output Makes settings related to I/O signals.	In FAT mode Output& i.LINK	**HD&HDV**/SD&HDV/SD&DV/480P/576P	Selects the signals output from the video connectors and the i.LINK (HDV/DV) connector. When the HD/SD setting is SD, "SD&DV" or "SD" is selected.
	In UDF mode Output	**HD**/SD/480P/576P	
	23.98P Output	**PsF**/Pull Down	When the video format is HQ 1920/23.98P or HQ 1440/23.98P, selects whether to use progressive output (PsF) or pulldown output (Pull Down).
	Source Select	**Camera**/i.LINK	Selects whether to use the video camera picture (Camera) or the signal input from the i.LINK (HDV/DV) connector (i.LINK) as the video input source.
	i.LINK I/O	Enable/**Disable**	Selects whether to enable or disable input and output of signals via the i.LINK (HDV/DV) connector. When "Enable" is selected, you can execute auto black balance adjustment during i.LINK output.
	SDI Output	**On**/Off	Turns on or off the output of signals from the two HD/SD SDI OUT connectors. When the camcorder is connected to a computer via USB, set to "Off."
	HDMI Output	**On**/Off	Turns on or off the output of signals from the HDMI connector.
	SDI/HDMI Out Super	On/**Off**	Turns on or off the superimposition of text information on the output of the HD/SD SDI OUT and HDMI connectors.
	Video Out Super	On/**Off**	Turns on or off the superimposition of text information on the output of the VIDEO OUT connector.
	Down Converter	Crop/Letter/**Squeeze**	Selects the signal conversion mode for output of SD signals. **Crop:** Crop the edges of the 16:9 picture and output as a 4:3 picture. **Letter:** Mask the top and bottom of the 4:3 picture and display in the center of the screen as a 16:9 picture. **Squeeze:** Squeeze the 16:9 picture horizontally and output as a 4:3 picture.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Input/Output Makes settings related to I/O signals.	Wide ID	**Through/**Auto	Selects whether to add a wide ID signal to the SD output signal. **Through:** Output without adding a wide ID signal. **Auto:** Add and output a wide ID signal when the Down Converter setting is Squeeze.
Super Impose Makes settings related to superimposed text and markers.	Super(VF Display)	**On/**Off	When "Input/Output" > "SDI/HDMI Out Super" or "Video Out Super" is set to "On," superimpose text information on the output from the HD/SD SDI OUT connector, HDMI connector, and VIDEO OUT connector, as specified ("On" or "Off") for each item.
	Super(Menu)	**On/**Off	
	Super(Timecode)	On/**Off**	
	Super(Marker)	On/**Off**	When "Input/Output" > "Video Out Super" is set to "On," specifies whether to superimpose markers on the output from the VIDEO OUT connector.
	Super(Rec Status Indicator)	On/**Off**	Selects whether to superimpose ("On") or not impose ("Off") the recording status indication on the following two outputs. • Output from the VIDEO OUT connector with "Input/Output" > "Video Out Super" set to "On" • Output from the SDI connector and the HDMI connector with "Input/Output" > "SDI/HDMI Out Super" set to "On"

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Rec Function Makes settings related to special recording modes. **Note** When Picture Cache is assigned to an assignable switch, this item is disabled (displayed in grey).	Slow & Quick	On/**Off**	Turns the Slow & Quick Motion function on or off. (When this is set to On, the Picture Cache Rec, Interval Rec, and Frame Rec sub-items are set to Off.)
	Frame Rate	The available settings vary depending on the "Format" > "HD System Line" setting.	When "Slow & Quick" is set to "On," sets the frame rate for Slow & Quick Motion shooting.
		When "Format" > "Country" is set to other than "PAL Area" in UDF mode or in FAT mode: 1 to **30** When "Format" > "Country" is set to "PAL Area" in UDF mode: 1 to **25**	When "HD System Line" is set to "1080."
		When "Format" > "Country" is set to other than "PAL Area" in UDF mode or in FAT mode: 1 to **30**/31 to 60 When "Format" > "Country" is set to "PAL Area" in UDF mode: 1 to **25**/26 to 50	When "HD System Line" is set to "720."
	Clip Continuous Rec	On/**Off**	Turns the Clip Continuous Rec function on or off. (When this is set to "On," "Slow & Quick," "Picture Cache Rec," "Interval Rec," and "Frame Rec" are set to "Off.")
	Picture Cache Rec	On/**Off**	Turns the picture cache function on or off. (When this is set to "On," "Slow & Quick," "Interval Rec," "Frame Rec" are set to "Off.")
	P. Cache Rec Time	**0-2sec**/2-4sec/4-6sec/6-8sec/8-10sec/10-12sec/12-14sec/13-15sec	When "Picture Cache Rec" is set to "On," set the picture cache time.
	Interval Rec	On/**Off**	Turns the Interval Rec function on or off. (When this is set to "On," "Slow & Quick" "Picture Cache Rec," and "Frame Rec" are set to "Off.")
	Frame Rec	On/**Off**	Turns the Frame Rec function on or off. (When this is set to "On," "Slow & Quick," "Picture Cache Rec," and "Interval Rec" are set to "Off.")

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Rec Function Makes settings related to special recording modes. **Note** When Picture Cache is assigned to an assignable switch, this item is disabled (displayed in grey).	Number of Frames	The available settings vary depending on the settings in "Format" > "HD System Line and Format" > "System Frequency."	When "Interval Rec" or "Frame Rec" is set to "On," specifies the number of frames to shoot in one Interval Rec or Frame Rec take.
		2frame/6frame/12frame	When "HD System Line" is set to "720," and "System Frequency" is set to "59.94P" or "50P."
		1frame/3frame/6frame/9frame	When "HD System Line" is set to other than "720", or "System Frequency" is set to other than "59.94P" or "50P."
	Interval Time	**1**/2/3/4/5/6/7/8/9/10/15/20/30/40/50 (sec) 1/2/3/4/5/6/7/8/9/10/15/20/30/40/50 (min) 1/2/3/4/6/12/24 (hour)	Set the interval for Interval Rec shooting, when "Interval Rec" is set to "On."
	Pre-Lighting	**Off**/2sec/5sec/10sec	If you want the video light to be turned on before Interval Rec shooting, select a number of seconds before the start of shooting. If you do not want it to be turned on, select Off.
Assignable SW Assigns functions to assignable switches. *See "Assigning Functions to Assignable Switches" (page 148) for more information about assigning functions.*	<0>	*See page 148.*	Assigns function to ASSIGN. 0 switch.
	<1>		Assigns function to ASSIGN. 1 switch.
	<2>		Assigns function to ASSIGN. 2 switch.
	<3>		Assigns function to ASSIGN. 3 switch.
	<4>		Assigns function to ASSIGNABLE 4 switch.
	<5>		Assigns function to ASSIGNABLE 5 switch.
	RET		Assigns function to RET button on the lens.
	C. Temp		Assigns function to COLOR TEMP. button.
	Zoom Speed	0 to **20** to 99	When Zoom has been assigned to the ASSIGNABLE 4 or 5 switch, specifies the zoom speed. **Note** When the lens supplied with the PMW-400 is used, zooming may not operate smoothly if the zoom speed is low.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
VF Setting Makes settings related to the viewfinder screen.	Color	–99 to **±0** to +99	Adjusts the density of the colors displayed in the viewfinder screen.
	Mode	**Color**/B&W	Selects “Color” or “B&W” as the display mode of the viewfinder screen. (Even when “B&W” is selected, some indications are always displayed in color. Examples include tally indications, thumbnails, and the skin gate area.)
	Peaking Type	**Normal**/Color/Both	Selects the peaking type. **Normal:** Normal peaking **Color:** Color peaking **Both:** Both
	Peaking Frequency	**Normal**/High	Selects “Normal” or “High” as the peaking frequency.
	Peaking Color	**White**/Red/Yellow/Blue	When “Peaking Type” is set to “Color,” selects the peaking color from among “White,” “Red,” “Yellow,” and “Blue.”
	Peaking Level	Low/**Mid**/High	When “Peaking Type” is set to “Both,” selects the color peaking level from among “Low,” “Mid,” and “High.”
	DXF Rec Tally	**Upper**/Both	When a separately sold viewfinder is installed, specified whether to light the tally indicator on the upper side only (“Upper”), or on both the upper and lower sides (“Both”).
Marker Makes settings related to marker display in the viewfinder screen.	Setting	**On**/Off	Turns all markers on or off. **Note** When Marker is assigned to the ASSIGN. 2 switch, this setting is disabled.
	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. **Note** When “Safety Zone,” “User Box,” and “Guide Frame” are set to “On,” this setting cannot be turned on.
	Center H Position	–40 to **0** to 40	Specifies the horizontal position of the center marker.
	Center V Position	–40 to **0** to 40	Specifies the vertical position of the center marker.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Marker Makes settings related to marker display in the viewfinder screen.	Safety Zone	On/**Off**	Turns the safety zone display on or off. **Note** When "Center Marker," "User Box," and "Guide Frame" are set to "On," this setting cannot be turned on.
	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:** Display by lowering the video signal level of areas outside the marker range.
	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 **30%** to 90% (10% step)	When "Aspect Marker" is set to "Mask," specifies the video signal level of areas outside the marker range as a percentage value relative to the video signal level of areas inside the marker range.
	User Box	On/**Off**	Turns the box cursor display on or off. **Note** When "Center Marker," "Safety Zone," and "Guide Frame" are set to "On," this setting cannot be turned on.
	User Box Width	40 to **500** to 999	Specifies the box cursor width (distance from the center to the left and right edges).
	User Box Height	70 to **500** to 999	Specifies the box cursor height (distance from the center to the top and bottom edges).
	User Box H Position	–479 to **0** to 479	Specifies the horizontal position of the box cursor center.
	User Box V Position	–464 to **0** to 464	Specifies the vertical position of the box cursor center.
	Guide Frame	On/**Off**	Turns display of the guide frame on or off. **Note** When "Center Marker," "Safety Zone," and "User Box" are set to "On", this setting cannot be turned on.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Gain Switch Makes settings related to the GAIN switch.	Gain Low	–3dB/**0dB**/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Specifies the gain value for the L position of the GAIN switch.
	Gain Mid	–3dB/0dB/3dB/**6dB**/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Specifies the gain value for the M position of the GAIN switch.
	Gain High	–3dB/0dB/3dB/6dB/9dB/**12dB**/18dB/24dB/30dB/36dB/42dB	Specifies the gain value for the H position of the GAIN switch.
	Gain Turbo	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/**42dB**	Specifies the gain value for the Turbo Gain function, which can be assigned to an assignable switch.
	Shockless Gain	On/**Off**	Turns shockless gain (a function that switches smoothly when the gain is switched) on or off.
TLCS Makes settings related to total level control.	Mode	Backlight/**Standard**/Spotlight	Selects the auto iris mode used when the TLCS system is activated. **Backlight:** Backlight mode (lessens the blackout of the main subject that occurs under backlit conditions) **Standard:** Standard mode **Spotlight:** Spotlight mode (lessens the whiteout of the main subject that occurs under a spotlight)
	Speed	–99 to **±0** to +99	Specifies the control speed (speed of reaction to changes in the video) used when the TLCS system is activated. (Larger values specify quicker reaction times.)
	AGC	On/**Off**	Turns the AGC (auto gain control) function on or off.
	AGC Limit	3dB/6dB/9dB/**12dB**/18dB	Specifies the maximum gain used when AGC is on.
	AGC Point	F5.6/F4/**F2.8**	Specifies the F value where control by auto iris switches to control by AGC, used when AGC is on.
	Auto Shutter	On/**Off**	Turns the auto shutter function on or off.
	Auto Shutter Limit	1/100 / 1/150 / 1/200 / **1/250**	Selects the maximum shutter speed used when auto shutter is on.
	Auto Shutter Point	F5.6/F8/F11/**F16**	Specifies the F value where control by auto iris switches to control by auto shutter, used when auto shutter is on.
Zebra Makes settings related to zebra displays.	Zebra Select	**1**/2/BOTH	Selects the zebra pattern type (Zebra1, Zebra2, Both).
	Zebla1 Level	50% to **70%** to 107%	Specifies the Zebra1 display level.
	Zebra1 Aperture Level	1 to **10%** to 20%	Specifies the Zebra1 aperture level.
	Zebra2 Level	52% to **100%** to 109%	Specifies the Zebra2 display level.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Display On/Off Selects the items to display in the viewfinder screen.	Video Level Warnings	**On**/Off	Turns the warnings that appear when the video level is too bright or too dark on or off.
	Brightness Display	On/**Off**	Turns the numerical indication of the video brightness on or off.
	Histogram Display	On/**Off**	Turns the histogram display of video signal levels on or off (in HD mode only).
	Lens Info	**Off**/Meter/Feet	Selects whether or not to display the depth of field indication and the unit for display of the depth of field. **Meter:** Displayed in meters **Feet:** Displayed in feet **Off:** Do not display
	Focus Position	**On**/Off	Turns the indication of the lens focus position on or off.
	Zoom Position	**On**/Off	Turns the indication of the lens zoom position on or off.
	Audio Level Meter	**On**/Off	Turns the display of the audio level meters on or off.
	Timecode	**On**/Off	Turns the display of time data (timecode, user bits, counter, duration) on or off.
	Battery Remain	**On**/Off	Turns the indications of the remaining battery time and input voltage on or off.
	Media Remain	**On**/Off	Turns the indication of the remaining media capacity on or off.
	TLCS Mode	**On**/Off	Turns the indication of the TLCS operating mode on or off.
	Focus Mode	**On**/Off	Turns the indication of the focus operating mode on or off.
	White Balance Mode	**On**/Off	Turns the indication of the white balance mode on or off.
	Filter Position	**On**/Off	Turns the indication of the ND filter setting on or off.
	Iris Position	**On**/Off	Turns the indication of the iris position on or off.
	Gain Setting	**On**/Off	Turns the indication of the gain setting on or off.
	Shutter Setting	**On**/Off	Turns the indications of the shutter mode and shutter speed on or off.
	Color Temp	**On**/Off	Turns the indication of the color temperature on or off.
	Video Format	**On**/Off	Turns the indication of the video format on or off.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Display On/Off Selects the items to display in the viewfinder screen.	System Line	**On**/Off	Turns the indication of the system lines on or off.
	Rec Mode	**On**/Off	Turns the indication of special recording modes (S&Q, Interval, Frame Rec, Picture Cache Rec) on or off.
	Extender	**On**/Off	Turns the lens extender indication on or off.
	WRR RF Level	On/**Off**	Turns the indication of the digital wireless receiver reception level on or off.
	Clip Number(PB)	**On**/Off	Turns the indication of clip information on or off.
Auto Iris Makes settings related to auto iris.	Iris Override	On/**Off**	Turns iris override (a setting that opens or closes the iris more than normal) on or off.
	Iris Speed	–99 to **±0** to +99	Specifies the iris control speed (speed of reaction to changes in the video). (Larger values specify quicker reaction times.)
	Clip High light	On/**Off**	Turns on or off the function that disregards highlights and forces a flatter reaction to high luminance.
	Iris Window	**1**/2/3/4/5/6/Var	Selects the auto iris detection window type. **Var:** Variable
	Iris Window Indication	On/**Off**	Turns the indication of the auto iris detection window frame on or off.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
White Setting Makes settings related to auto white balance adjustments.	White Switch<B>	**Memory**/ATW	Specifies 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	Specifies the reaction speed when the WHITE BAL switch setting is changed. “Off” is an instant reaction, and “1” is faster than “2” or “3.”
	ATW Speed	1/2/**3**/4/5	Specifies the reaction speed when “White Switch<B>” is set to “ATW.” “1” is the fastest reaction.
	ATW Mode	**Natural**/Pure	**Natural:** Depending on the brightness of scenes, automatically adjusts the white balance to natural ambience. **Pure:** Not leaving the blue color or red color, automatically adjusts the white balance closer to original colors.
	AWB Fixed Area	On/**Off**	Specifies whether auto white balance is executed at the center of the screen. **On:** Execute in an area corresponding to 25% of the height and width of the screen. **Off:** Execute in an area corresponding to 70% of the height and width of the screen.
	Filter White Memory	On/**Off**	Specifies whether to allocate a white balance memory area for each FILTER knob position. **On:** Allocation a white balance memory area for each FILTER knob position. **Off:** Use A/B memory regardless of the filter position.

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Offset White Makes settings related to white balance offset values.	Offset White <A>	On/**Off**	Specifies whether to add (“On”) or not to add (“Off”) an offset value to the white balance value in memory A.
	Warm Cool <A>	Approximate color temperature	When “Offset White<A>” is set to “On,” specifies (as a color temperature) the offset to add to the white balance value in memory A. (Note that the error range becomes larger for higher offset color temperatures. Adjust while viewing the actual video.)
	Warm Cool Balance<A>	–99 to **±0** to +99	Specifies a more precise color temperature, for use when satisfactory video cannot be obtained with the “Warm Cool <A>” setting.
	Offset White <B>	On/**Off**	When this is set to “On,” the offset adjusted set with this item is added to the white balance of channel B.
	Warm Cool <B>	Approximate color temperature	When “Offset White<B>” is set to “On,” specifies (as a color temperature) the offset to add to the white balance value in memory B. (Note that the error range becomes larger for higher offset color temperatures. Adjust while viewing the actual video.)
	Warm Cool Balance<B>	–99 to **±0** to +99	Specifies a more precise color temperature, for use when satisfactory video cannot be obtained with the “Warm Cool <B>” setting.
	Offset White <ATW>	On/**Off**	When this item is set to “On,” the offset value adjusted here is added to the ATW white balance value.
	Warm Cool <ATW>	Display adjustment guide color temperature	When “Offset White <ATW>” is set to “On,” use color temperature to set an offset value to add to the ATW white balance value (the higher the offset color temperature, the greater the error, so make adjustment while observing the video).

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Shutter Makes settings related to shutter speed selection.	Shutter Select	**Second**/Degree	Specifies the unit used to select shutter speeds. **Second:** Select in units of seconds. **Degree:** Select in units of degrees.
	Slow Shutter	On/**Off**	Turns the SLS mode on or off.
	SLS Frames	**2Frames**/3Frames/ 4Frames/5Frames/ 6Frames/7Frames/ 8Frames/16Frames/ 32Frames/64Frames	Selects the number of accumulated frames in SLS mode.
Time Zone Specifies the time zone.	Zone	–12:00 to **+0:00** to +13:30 (in steps of 30 minutes)	Specifies a difference from UTC (Greenwich Mean Time) in units of 30 minutes.
Clip Make settings for clip name or clip 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 on the application software for computers.	Auto Naming	In Fat mode: Title/**Plan** In UDF mode: C****/ Title/**Plan**	Selects the clip naming format. **C****:** XDCAM standard name (In UDF mode only) **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 selected.)

OPERATION			
Menu items	**Sub-item**	**Settings**	**Description**
Clip Make settings for clip name or clip 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 on the application software for computers.	Title Prefix	Text input	Specifies the title part (4 to 46 alphanumeric characters) of clip titles. When the currently specified title is eight characters or fewer in length, the entire title appears. When the title is longer than eight characters, the first seven characters appear and a "···" symbol appears in place of the eighth character. Displays the Character Set screen. **Character Set screen configuration** • Character selection area (three lines) Select the character to insert at the title prefix cursor position. !#$%()+.-.;=@[]^_~0123456789 abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ • Cursor operation area (one line) **Space:** Changes the character at the cursor position to a space **INS:** Inserts a space at the cursor position **DEL:** Deletes the character at the cursor position **←:** Moves the cursor to the left **→:** Moves the cursor to the right **ESC:** Cancels the change and return to the normal menu **END:** Executes the change and return to the normal menu • Title prefix area (one line) An area to enter the title **To set titles** 1 Turn the MENU knob or press the arrow buttons to select a character, highlighting it, in the character selection area, and then press the MENU knob or the SET button to insert it at the cursor position in the title prefix area. (The cursor moves to the right.) 2 Repeat step 1 to add more characters to the title (using Space, INS, and DEL as required). 3 When you have finished entering the title, select END to close the Character Set screen.

OPERATION Menu items	Sub-item	Settings	Description
Clip Make settings for clip name or clip management.	Number Set	**0001** to 9999	Specifies the initial value of the numeric part (four digits) of clip names (unless the name specified in planning metadata with "Auto Naming" set to "Plan").
	Name Display	Off/**On**	Selects whether to display the name of the next clips to be recorded in E-E mode ("On") or not ("Off").
	Update	Media<A>/Media<B>	Updates the management files on the media in the selected slot (execute by selecting "Execute").
Plan.Metadata Makes settings for operating planning metadata.	Load/Slot(A)	Execute/Cancel	Executes load of planning metadata from the SxS memory card in slot A. Select "Execute" to show the list of the planning metadata files stored in the slot A SxS memory card and select a file to execute the load.
	Load/Slot(B)	Execute/Cancel	Executes load of planning metadata from the SxS memory card in slot B. Select "Execute" to show the list of the planning metadata files stored in the slot B SxS memory card and select a file to execute the load.
	Load/USB (in UDF mode only)	Execute/Cancel	Executes load of planning metadata from the USB flash drive connected to the external device connector. Select "Execute" to show the list of the planning metadata files stored in the USB flash drive and select a file to execute the load.
	Properties	Execute/Cancel	Displays the detailed information in the planning metadata loaded on the camcorder (execute by selecting "Execute").
	Clear	Execute/Cancel	Clears the planning metadata loaded on the camcorder (execute by selecting "Execute").
	Clip Name Disp	**Title1(ASCII format)** Title2(UTF-8 format)	Selects the display mode of the clip name specified in planning metadata *(see page 89)*. **Note** When you define both of ASCII format name and UTF-8 format name with planning metadata, the UTF-8 format string is used as the clip name string. If you define either of ASCII format name and UTF-8 format name with planning metadata, the defined format name is displayed though it is not selected by menu setting.

PAINT Menu

Settings in bold are the factory default values.

PAINT			
Menu items	**Sub-item**	**Settings**	**Description**
Switch Status Turns various signal correction functions and a test signal on or off.	Gamma	**On**/Off	Turns gamma correction on or off.
	Black Gamma	On/**Off**	Turns black gamma correction on or off.
	Matrix	**On**/Off	Turns linear matrix correction and user matrix correction on or off.
	Knee	**On**/Off	Turns knee correction on or off.
	White Clip	**On**/Off	Turns white clip correction on or off.
	Detail	**On**/Off	Turns detail correction on or off.
	Aperture	**On**/Off	Turns aperture correction on or off.
	Flare	**On**/Off	Turns flare correction on or off.
	Test Saw	On/**Off**	Turns the test saw signal on or off.
White Sets the color temperature, and performs manual white balance adjustment.	Color Temp <A>	1500K to **3200K** to 50000K	Displays the white balance color temperature saved in memory A.
	Color Temp BAL <A>	–99 to **±0** to +99	Specifies the white balance gain values saved in memory A (linked R gain and B gain).
	R Gain <A>	–99 to **±0** to +99	Specifies the white balance R gain value saved in memory A.
	B Gain <A>	–99 to **±0** to +99	Specifies 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 BAL <B>	–99 to **±0** to +99	Specifies the white balance gain values saved in memory B (linked R gain and B gain).
	R Gain <B>	–99 to **±0** to +99	Specifies the white balance R gain value saved in memory B.
	B Gain <B>	–99 to **±0** to +99	Specifies the white balance B gain value saved in memory B.
Black Specifies the black level (level of the unilluminated parts of the video). You can achieve a desired look by adjusting the black level for deeper or shallower blacks.	Master Black	–99 to **±0** to +99	Specifies the master black level.
	R Black	–99 to **±0** to +99	Specifies the R black level.
	B Black	–99 to **±0** to +99	Specifies the B black level.

PAINT			
Menu items	**Sub-item**	**Settings**	**Description**
Flare Makes settings related to flare. Flare is light generated from a bright image region that spreads broadly across the image, adding light to dark regions and reducing contrast. It is caused by reflection inside the lens system.	Flare	**On**/Off	Turns flare correction on or 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.
Gamma Makes settings related to gamma. Gamma correction allows you to significantly alter the impression made by the video by adjusting the contrast.	Gamma	**On**/Off	Turns gamma correction on or off.
	Step Gamma	0.35 to **0.45** to 0.90 (0.05 step)	Specifies a gamma correction value in steps of 0.05
	Master Gamma	–99 to **±0** to +99	Specifies the master gamma level.
	R Gamma	–99 to **±0** to +99	Specifies the R gamma level.
	G Gamma	–99 to **±0** to +99	Specifies the G gamma level.
	B Gamma	–99 to **±0** to +99	Specifies the B gamma level.
	Gamma Select	The available settings vary depending on the setting in “Gamma Category” (see “Description”).	Select the gamma table to use in gamma correction. **When Gamma Category is STD:** **1 DVW:** DVW camcorder equivalent **2 ×4.5:** ×4.5 gain **3 ×3.5:** ×3.5 gain **4 240M:** SMPTE-240M equivalent **5 R709:** ITU-R709 equivalent (default setting) **6 ×5.0:** ×5.0 gain **When Gamma Category is HG:** **1 3250:** Condense 325% video input to 100% video output **2 4600:** Condense 460% video input to 100% video output **3 3259:** Condense 325% video input to 109% video output **4 4609:** Condense 460% video input to 109% video output (default setting)
	Gamma Category	**STD**/HG	Selects use of standard gamma (“STD”) or HyperGamma (“HG”).
Black Gamma Makes settings related to black gamma correction. Black gamma correction allows you to reproduce gradations and color nuances in black or near-black (dark) parts of the picture.	Black Gamma	On/**Off**	Turns black gamma correction on or off.
	Gamma Level	–99 to **±0** to +99	Specifies the master black gamma level.
	Range	Low/L.Mid/H.Mid/**High**	Selects the black gamma correction effective range. **LOW:** 0 to 3.6% **L.MID:** 0 to 7.2% **H.MID:** 0 to 14.4% **HIGH:** 0 to 28.8%

PAINT			
Menu items	**Sub-item**	**Settings**	**Description**
Knee Makes settings related to knee correction. Knee correction is processing that prevents washout by compressing the bright parts of the video according to an upper limit for the dynamic range of the recorded and output picture. The signal level where knee processing begins is called the "knee point," and the slope of knee compression is called the "knee slope."	Knee	**On**/Off	Turns knee correction on or off.
	Knee Point	50.0% to **95.0%** to 109.0%	Specifies the knee point.
	Knee Slope	–99 to **±0** to +99	Specifies the knee slope.
	Knee Saturation	**On**/Off	Turns the knee saturation function on or off.
	Knee Saturation Level	–99 to **±0** to +99	Specifies the knee saturation level.
White Clip Makes settings related to white clipping adjustments. White clipping is processing that limits the maximum level of video output signals. The maximum video signal output value is called the "white clip level."	White Clip	**On**/Off	Turns white clipping adjustment on or off.
	Level	"NTSC Area" or "NTSC (J)Area" is selected for "Country" 90.0% to **108.0%** to 109.0% "PAL Area" is selected for "Country" 90.0% to **105.0%** to 109.0%	Specifies the white clip level.

PAINT			
Menu items	**Sub-item**	**Settings**	**Description**
Detail(HD Mode)/ Detail(SD Mode) Makes settings related to details adjustments in HD mode and SD mode. Detail adjustment is processing that improves the clarity of the video by adding detail signals to the edges of the subject.	Detail	**On**/Off	Turns detail adjustment on or off.
	Level	–99 to **±0** to +99	Specifies the detail level.
	H/V Ratio	–99 to **±0** to +99	Specifies the mix ratio between the H detail level and the V detail level.
	Crispening	–99 to **±0** to +99	Specifies the crispening level.
	Level Depend	**On**/Off	Turns the level depend adjustment function on or off.
	Level Depend Level	–99 to **±0** to +99	Specifies the level depend level.
	Frequency	–99 to **±0** to +99	Specifies the central frequency for H detail signals. Larger values give finer details.
	Knee Aperture	On/**Off**	Turns the knee aperture function on or off.
	Knee Aperture Level	–99 to **±0** to +99	Specifies the knee aperture level.
	Limit	–99 to **±0** to +99	Specifies the detail limiter values for both the white-side and black-side direction.
	White Limit	–99 to **±0** to +99	Specifies the white-side detail limiter value.
	Black Limit	–99 to **±0** to +99	Specifies the black-side detail limiter value.
	V-BLK Limit	–99 to **±0** to +99	Specifies the black-side V detail limiter value.
	V Detail Creation	NAM/G/**R+G**/Y	Selects the source signal used to generate the V detail signal. **NAM:** A V detail signal created from the R signal, or a V detail signal created from the G signal, or a V detail signal created from the B signal, whichever is the signal with the highest level **G:** G signal **G+R:** Composite signal comprising the G signal and R signal in a 1:1 ratio **Y:** Y signal
Aperture Makes settings related to aperture correction. Aperture correction is processing to improve resolution by adding high-frequency aperture signals to the video signal, which corrects degeneration due to high-frequency characteristics.	Aperture	**On**/Off	Turns aperture correction on or off.
	Level	–99 to **±0** to +99	Sets the aperture level.

PAINT			
Menu items	**Sub-item**	**Settings**	**Description**
Skin Detail Makes settings related to skin detail correction. Skin detail correction is processing that increases or decreases the detail level of a specified color range (skin tone range), for the purpose of obtaining attractive reproduction of skin tones.	Skin Detail	On/**Off**	Turns skin detail correction on or off.
	Area Detection	Color detection screen	Detects the color to be targeted by skin detail correction.
	Area Indication	On/**Off**	Turns on or off the function that displays a zebra pattern in the area targeted by skin detail correction.
	Level	–99 to **±0** to +99	Specifies the skin detail level.
	Saturation	–99 to **±0** to +99	Specifies the saturation of the color targeted by skin detail correction.
	Hue	**0** to 359	Specifies the hue of the color targeted by skin detail correction.
	Width	0 to **40** to 90	Specifies a range for the hue of the color targeted by skin detail correction.
Matrix Makes settings related to matrix correction. Matrix correction allows you to adjust the color and vividness of the video. Depending on the effect you want, you can select one from among a number of preset matrixes, which define different parameter sets. Or you can select a user matrix with your own parameters.	Matrix	**On**/Off	Turns the matrix correction function on or off.
	Preset Matrix	**On**/Off	Turns the preset matrix function on or off.
	Preset Select	1/**2**/3/4/5/6	Selects a preset matrix. **1:** SMPTE-240M equivalent **2:** ITU-709 equivalent **3:** SMPTE WIDE equivalent **4:** NTSC equivalent **5:** EBU equivalent **6:** PAL equivalent
	User Matrix	On/**Off**	Turns the user matrix function on or off.
	User Matrix R-G	–99 to **±0** to +99	Specifies a freely defined R-G user matrix.
	User Matrix R-B	–99 to **±0** to +99	Specifies a freely defined R-B user matrix.
	User Matrix G-R	–99 to **±0** to +99	Specifies a freely defined G-R user matrix.
	User Matrix G-B	–99 to **±0** to +99	Specifies a freely defined G-B user matrix.
	User Matrix B-R	–99 to **±0** to +99	Specifies a freely defined B-R user matrix.
	User Matrix B-G	–99 to **±0** to +99	Specifies a freely defined B-G user matrix.

PAINT			
Menu items	**Sub-item**	**Settings**	**Description**
Multi Matrix Makes settings related to multi matrix correction. Multi-matrix correction allows specific colors to be selected for saturation correction in a 16-axis hue space.	Multi Matrix	On/**Off**	Turns the multi matrix correction function on or off.
	Area Indication	On/**Off**	Turns on or off the function that displays a zebra pattern in the color area targeted by multi matrix correction.
	Color Detection	Color detection screen	Detects colors targeted by multi matrix correction.
	Axis	**B**/B+/MG–/MG/MG+/R/R+/YL–/YL/YL+/G–/G/G+/CY/CY+/B–	Specifies a color targeted by multi matrix correction (16-axis mode)
	Hue	–99 to **±0** to +99	Specifies the hue of the color targeted by multi matrix correction for each 16-axis mode.
	Saturation	–99 to **±0** to +99	Specifies the saturation of the color targeted by multi matrix correction for each 16-axis mode.
V Modulation Makes settings related to V modulation shading. V modulation shading corrects vertical imbalances in sensitivity arising from the relationship between a lens and prism.	V Modulation	**On**/Off	Turns V modulation shading on or off.
	Master V Modulation	–99 to **±0** to +99	Specifies the master V modulation level.
	R V Modulation	–99 to **±0** to +99	Specifies the V modulation level of R signals.
	G V Modulation	–99 to **±0** to +99	Specifies the V modulation level of G signals.
	B V Modulation	–99 to **±0** to +99	Specifies the V modulation level of B signals.
Low Key Sat. Makes settings related to low key saturation correction. You can correct the saturation of colors in dark parts of the video only.	Low Key Saturation	On/**Off**	Turns low key saturation correction on or off.
	Level	–99 to **±0** to +99	Specifies the saturation of colors in low luminance areas.
	Range	Low/L.Mid/H.Mid/**High**	Specifies the luminance level for which low key saturation is enabled.
Noise Suppress Makes settings related to noise suppression (noise compression). You can effectively suppress noise components while preserving fine edge components in the subject.	Noise Suppress	**On**/Off	Turns noise suppression on or off.

MAINTENANCE Menu

Settings in bold are the factory default values.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
White Shading Makes settings related to white shading. White shading is required for each different lens to correct irregularities arising from lens characteristics. It corrects luminance and color irregularities in bright areas.	Channel Select	**Red**/Green/Blue	Selects the target of white shading correction.
	R/G/B White H Saw	–99 to **±0** to +99	Specifies a SAW white shading correction value for the horizontal direction.
	R/G/B White H Para	–99 to **±0** to +99	Specifies a parabola white shading correction value for the horizontal direction.
	R/G/B White V Saw	–99 to **±0** to +99	Specifies a SAW white shading correction value for the vertical direction.
	R/G/B White V Para	–99 to **±0** to +99	Specifies a parabola white shading correction value for the vertical direction.
	White Saw/Para	**On**/Off	Turns the white shading SAW and parabola correction functions on or off.
Black Shading Makes settings related to black shading correction.	Channel Select	**Red**/Green/Blue	Selects the target of black shading correction.
	R/G/B Black H Saw	–99 to **±0** to +99	Specifies a SAW black shading correction value for the horizontal direction.
	R/G/B Black H Para	–99 to **±0** to +99	Specifies a parabola black shading correction value for the horizontal direction.
	R/G/B Black V Saw	–99 to **±0** to +99	Specifies a SAW black shading correction value for the vertical direction.
	R/G/B Black V Para	–99 to **±0** to +99	Specifies a parabola black shading correction value for the vertical direction.
	Black Saw/Para	**On**/Off	Turns the black shading SAW and parabola correction functions on or off.
	Master Black	–99 to **±0** to +99	Specifies the master black level.
	Master Gain (TMP)	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Specifies a temporary master gain value.
Battery Makes settings related to batteries.	Info Before End	**5%**/10%/15%...95%/100%	Specifies a threshold value that triggers a “Battery Near End” warning when a BP-GL95A battery pack is used.
	Info End	**0%**/1%/2%/3%/4%/5%	Specifies a threshold value that triggers a “Battery End” warning when a BP-GL95A battery pack is used.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Battery Makes settings related to batteries.	Sony Before End	**11.5V** to 17V (0.1V step)	Specifies a threshold value that triggers a “Battery Near End” warning when a BP-L60S/L80S battery pack is used.
	Sony End	**11.0V** to 11.5V (0.1V step)	Specifies a threshold value that triggers a “Battery End” warning when a BP-L60S/L80S battery pack is used.
	Other Before End	11.5V to **11.8V** to 17.0V (0.1V step)	Specifies a threshold value that triggers a “Battery Near End” warning when a non-Sony battery pack is used.
	Other End	**11.0V** to 14.0V (0.1V step)	Specifies a threshold value that triggers a “Battery End” warning when a non-Sony battery pack is used.
	DC In Before End	11.5V to **11.8V** to 17.0V (0.1V step)	Specifies a threshold value that triggers a “Battery Near End” warning when an external power source is connected to the DC IN connector.
	DC In End	**11.0V** to 14.0V (0.1V step)	Specifies a threshold value that triggers a “Battery End” warning when an external power source is connected to the DC IN connector.
	Detected Battery	Info/Sony/Other/DC IN	Displays the results of automatic battery pack type detection.
	Type Detection	**Auto**/Other	**Auto:** Detect the battery type automatically. **Other:** Fix battery type detection as “Other.”
	Segment No.10	11.0V to **17.0V** (0.1V step)	Specify voltage threshold values that cause remaining capacity segments to go off in the display of remaining battery capacity *(see page 26)*. (The segments go off below the specified value.) These values are used when the battery type has been found to be “Other.”
	Segment No.9	11.0V to **16.0V** to 17.0V (0.1V step)	
	Segment No.8	11.0V to **15.0V** to 17.0V (0.1V step)	
	Segment No.7	11.0V to **14.0V** to 17.0V (0.1V step)	
	Segment No.6	11.0V to **13.5V** to 17.0V (0.1V step)	
	Segment No.5	11.0V to **13.0V** to 17.0V (0.1V step)	
	Segment No.4	11.0V to **12.5V** to 17.0V (0.1V step)	
	Segment No.3	11.0V to **12.0V** to 17.0V (0.1V step)	
	Segment No.2	11.0V to **11.5V** to 17.0V (0.1V step)	
	Segment No.1	**11.0V** to 17.0V (0.1V step)	

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Audio Makes settings related to audio.	Front MIC Select	Mono/**Stereo**	Selects whether the front microphone is monaural (“Mono”) or stereo (“Stereo”).
	Audio CH3/4 Mode	Ch1/2 / **Switch**	Selects the input signals for the AUDIO IN CH-3/CH-4 connectors. **Ch1/2:** The same signals as the AUDIO IN CH-1/ CH-2 connectors. **Switch:** The signals selected with the AUDIO IN CH-3/CH-4 switches.
	Front MIC CH1 Ref	–70dB/–60dB/**–50dB**/–40dB/–30dB/–20dB	Selects the reference level for channel 1 of the front microphone.
	Front MIC CH2 Ref	–70dB/–60dB/**–50dB**/–40dB/–30dB/–20dB	Selects the reference level for channel 2 of the front microphone.
	Rear MIC CH1 Ref	–70dB/**–60dB**/–50dB/–40dB/–30dB/–20dB	Selects the reference input level when the setting of the AUDIO IN CH1 switch is MIC.
	Rear MIC CH2 Ref	–70dB/**–60dB**/–50dB/–40dB/–30dB/–20dB	Selects the reference input level when the setting of the AUDIO IN CH2 switch is MIC.
	Line Input Ref	**+4dB**/0dB/–3dB/EBUL	Selects the reference input level when the AUDIO IN CH1 and AUDIO IN CH2 switches are set to LINE.
	Min Alarm Volume	**Off**/Set	Selects the volume when the ALARM knob is turned all the way down. **Off:** Almost inaudible **Set:** Fairly audible
	Speaker Attenuate	**Off**/3dB/6dB/9dB/12dB	Selects the volume from the monitor speaker (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	Selects the output level of the 1 kHz test signal.
	Reference Out	**0dB**/+4dB/–3dB/EBUL	Specifies the output level with respect to the reference input level.
	CH1&2 AGC Mode	**Mono**/Stereo	For automatic adjustment of the input level of analog audio signals recorded on channels 1 and 2, specifies whether to make the adjustments separately for each channel (“Mono”) or in stereo mode (“Stereo”).

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Audio Makes settings related to audio.	CH3&4 AGC Mode	**Mono**/Stereo	For automatic adjustment of the input level of analog audio signals recorded on channels 3 and 4, specifies 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 saturation level.
	Limiter Mode	**Off**/–6dB/–9dB/–12dB/–15dB/–17dB	For manual audio level adjustments, selects the saturation level for the limiter applied to loud input signals. Select “Off” if you do not wish to use the limiter.
	Output Limiter	On/**Off**	Turns the audio output limiter on or off.
	CH1 Wind Filter	On/**Off**	Turns the channel 1 wind filter on or off.
	CH2 Wind Filter	On/**Off**	Turns the channel 2 wind filter on or off.
	CH3 Wind Filter	On/**Off**	Turns the channel 3 wind filter on or off.
	CH4 Wind Filter	On/**Off**	Turns the channel 4 wind filter on or off.
	Audio SG (1KHz)	On/**Off**/Auto	Selects whether to output (“On”) or not output (“Off”) a 1 kHz test signal in color bar mode. **Auto:** Output a test signal only when the AUDIO SELECT CH1 switch is set to AUTO.
	MIC CH1 Level	Side1/**Front**/Front+Side1	For recording input audio from the front microphone on channel 1, selects the knob that adjusts the audio level. **Side1:** The LEVEL knob (left) on the side panel **Front:** The MIC LEVEL control on the front panel **Front+Side1:** Adjust with both the LEVEL knob (left) and the MIC LEVEL control.
	MIC CH2 Level	Side2/**Front**/Front+Side2	For recording input audio from the front microphone on channel 2, selects the knob that adjusts the audio level. **Side2:** The LEVEL knob (right) on the side panel **Front:** The MIC LEVEL control on the front panel **Front+Side2:** Adjust with both the LEVEL knob (right) and the MIC LEVEL control.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Audio Makes settings related to audio.	Rear1/WRR Level	**Side1**/Front/Front+Side1	Selects the knob that adjusts the audio levels of a wireless microphone and a device connected to the AUDIO IN CH-1 connector on the rear panel. **Side1:** The LEVEL knob (left) on the side panel **Front:** The MIC LEVEL control on the front panel **Front+Side1:** Adjust with both the LEVEL knob (left) and the MIC LEVEL control.
	Rear2/WRR Level	**Side2**/Front/Front+Side2	Selects the knob that adjusts the audio levels of a wireless microphone and a device connected to the AUDIO IN CH-2 connector on the rear panel. **Side2:** The LEVEL knob (right) on the side panel **Front:** The MIC LEVEL control on the front panel **Front+Side2:** Adjust with both the LEVEL knob (right) and the MIC LEVEL control.
	Audio CH3 Level	**Side3**/Front/Front+Side3	Selects the knob that adjusts the level of audio recorded on channel 3. **Side3:** The LEVEL knob on side panel **Front:** The MIC LEVEL control on the front panel **Front+Side3:** Adjust with both the LEVEL knob and the MIC LEVEL control.
	Audio CH4 Level	**Side4**/Front/Front+Side4	Selects the knob that adjusts the level of audio recorded on channel 4. **Side4:** The LEVEL knob on side panel **Front:** The MIC LEVEL control on the front panel **Front+Side4:** Adjust with both the LEVEL knob and the MIC LEVEL control.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**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 receiver (“All”) or channel 1 only (“CH1”).
	WRR CH Select	**TX1**/TX2	Specifies the target channel for other sub-items. **TX1:** Channel 1 **TX2:** Channel 2
	WRR Delay Comp	**On**/Off	Enables (“On”) or disables (“Off”) delay compensation for wireless audio input. (When “On” is selected, the audio in all E-E output 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 Freq	---	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	Specifies the amount of audio delay. **Auto:** Automatically adjusts the amount of delay so that the delay in the audio received from the wireless transmitter is zero. **0.0ms to 8.0ms:** Sets the amount of anticipated wireless system delay, for cases in which several wireless systems are being used over a devices such as an audio mixer.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Timecode Makes settings related to timecode.	TC Out	**Auto/**Generator	Selects the source for timecode output. **Auto:** During recording, output values generated by the timecode generator, and during playback output values obtained by the timecode reader. **Generator:** Output values generated by the timecode generator during both recording and playback.
	DF/NDF	**DF/**NDF	When "Country" is set to other than "PAL Area," selects drop-frame mode ("DF") or non-drop-frame mode ("NDF").
	LTC UBIT	**Fix/**Time	Specifies the data recorded in LTC user bits. **Fix:** Record user-specified data. **Time:** Record the current time.
	Counter Display	**Counter/**Duration	Select the method used to reset the counter value displayed on the viewfinder screen. **Counter:** Continue to increment until the RESET button is pressed. **Duration:** Reset each time that recording is started.
Essence Mark Makes settings related to shot marks and clip index picture thumbnails.	Ret Shot Mark 1	**On/**Off	Specify whether to input Shot Mark1 marks using the RET button on the lens.
	Ret Shot Mark 2	**On/**Off	Specify whether to input Shot Mark2 marks using the RET button on the lens.
	Index Picture Pos	**0**sec to 10sec (in 1 sec steps)	Specifies which frame to use as the clip thumbnail image
	Find Mode	**Clip/**Rec Start	Specify the frame to be cued up when the PREV or NEXT button is pressed. **Rec Start:** The next frame or the previous frame where a Rec Start essence mark is set. **Clip:** Pressing the NEXT button moves to the start frame of the next clip. Pressing the PREV button moves to the start frame of the current clip. (Pressing the PREV button at the start frame of the current clip moves to the start frame of the previous clip.)

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Camera Config Makes settings related to various camcorder operations.	Rec Tally Blink	**On**/Off	Turns warning flashes by the TALLY indicator on or off. The warnings alert you an almost exhausted battery pack or low remaining media capacity.
	Rec Review	**3sec**/10sec/Clip	Selects the recording review time. **Clip:** Review all of the most recently recorded clip.
	HD SDI Remote I/F	**Off**/Chara/G-Tally/ R-Tally	Selects whether to use the function that enables recording control from this camcorder of an external device connected to the HD/SD SDI OUT connector (HDSDI output). When the function is used, also selects the indication that shows whether the external device is recording. **Off:** Do not use the remote recording control function. **Chara:** Indicate by the external device control indication on the viewfinder screen. **G-Tally:** Indicate by the green tally indicator on the viewfinder screen. **R-Tally:** Indicates by the recording mode/operation status indication on the viewfinder screen.
	Color Bars Select	**ARIB**/100%/75%/ SMPTE	Selects the color bar type.
	RM Common Memory	**On**/Off	Selects whether to share (“On”) or not share (“Off”) settings between times when a remote control unit is connected and times when the camcorder is used locally.
	RM Rec Start	**RM**/CAM/PARA	For times when a remote control unit is connected, selects whether recording start/stop buttons are enabled on the camcorder or the remote control unit. **RM:** Remote control unit **CAM:** Camcorder **PARA:** Both
	Image Invert	On/**Off**	Turns the function that inverts images vertically on or off.
	Rec Start/Stop Beep	On/**Off**	Specifies whether to generate (“On”) or not generate (“Off”) a beep alarm when recording starts/ stops. With this item set to “On,” a single beep sounds when recording starts and a double beep sounds when recording stops.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Camera Config Makes settings related to various camcorder operations.	Rec Status Indicator	On/**Off**	Specifies whether to display the recording status indicator in the viewfinder.
Fan Control Sets the fan control mode.	Setting	**Auto**/Off in Rec	Sets the fan control mode.
Preset White Makes settings related to white balance preset values.	Color Temp<P>	1500K to **3200K** to 50000K	Specifies the white balance preset value.
	Color Temp Balance<P>	–99 to **±0** to +99	Specifies finer color temperature settings, for use when satisfactory video cannot be obtained with "Color Temp<P>."
	R Gain <P>	–99 to **±0** to +99	Specifies the R gain preset value.
	B Gain <P>	–99 to **±0** to +99	Specifies the B gain preset value.
	AWB Enable <P>	On/**Off**	Turns on and off execution of the AWB (auto white balance) function 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 or off.
	ND FLT C.Temp<1>	**3200K**/4300K/5600K/6300K	Selects the color temperature for when electrical CC filters are assigned to ND filters.
	ND FLT C.Temp<2-4>	3200K/4300K/**5600K**/6300K	Selects the color temperature for when electrical CC filters are assigned to ND filters.
	Electrical CC<A>	**3200K**/4300K/5600K/6300K	Selects the color temperature for when the electrical CC filter switching function is assigned to an assignable switch.
	Electrical CC<B>	3200K/**4300K**/5600K/6300K	Selects the color temperature for when the electrical CC filter switching function is assigned to an assignable switch.
	Electrical CC<C>	3200K/4300K/**5600K**/6300K/-----	Selects the color temperature for when the electrical CC filter switching function is assigned to an assignable switch. Select "----" if you do not want to use C.
	Electrical CC<D>	3200K/4300K/5600K/**6300K**/-----	Selects the color temperature for when the electrical CC filter switching function is assigned to an assignable switch. Select "----" if you do not want to use D.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
DCC Adjust Makes settings related to DCC (dynamic contrast control).	DCC Function Select	**DCC**/Fix	Enables or disables automatic knee point adjustment when the OUTPUT/DCC switch is set to CAM, DCC: ON. **DCC:** Automatically adjust the knee point according to the luminance of the subject. **Fix:** Set the knee point to a fixed value.
	DCC Dynamic Range	400%/450%/500%/ 550%/**600%**	Specifies the dynamic range when the OUTPUT/DCC switch is set to CAM, DCC: ON.
	DCC Point	–99 to **±0** to +99	Adjusts the DCC minimum knee point.
	DCC Gain	–99 to **±0** to +99	Specifies gain with respect to the DCC detected value.
	DCC Delay Time	–99 to **±0** to +99	Specifies the DCC control speed (speed of reaction to changes in the video).
	DCC Peak Filter	–99 to **±0** to +99	Adjusts response sensitivity with respect to peaks in DCC detected values.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Auto Iris2 Makes settings related to auto iris.	Iris Window	**1**/2/3/4/5/6/Var	Selects the type of iris detection window. **Var:** Variable
	Iris Window Ind	On/**Off**	Turns on or off the function that displays a frame marker for the auto iris detection window.
	Iris Level	–99 to **±0** to +99	Adjusts the level of the auto iris target value.
	Iris APL Ratio	–99 to **±0** to +99	Adjusts the mix ratio of auto iris detection peak value and average value (available when "OPERATION" > "TLCS" > "Mode" is set to "Standard").
	Iris Var Width	40 to **500** to 999	Adjusts the width of the detection window when "Iris Window" is set to "VAR."
	Iris Var Height	70 to **500** to 999	Adjusts the height of the detection window when "Iris Window" is set to "VAR."
	Iris Var H Position	–249 to **0** to +249	Specifies the horizontal position of the detection window when "Iris Window" is set to "VAR."
	Iris Var V Position	–249 to **0** to +249	Specifies the vertical position of the detection window when "Iris Window" is set to "VAR."
	Iris Speed	–99 to **±0** to +99	Specifies the control speed (speed of reaction to changes in the video). (Larger values specify quicker reaction times.)
	Clip High Light	On/**Off**	Turns on or off the function that disregards highlights and forces a flatter reaction to high luminance.
Flicker Reduce Makes settings related to flicker reduction. Reduces the flicker that can occur when a subject is shot under a light source with a periodically varying brightness, such as fluorescent lights, due to the relationship with the camcorder's recording frame rate.	Mode	Auto/On/**Off**	Enables or disables flicker reduction. **On:** Always enabled. **Auto:** Enabled when flicker is detected. **Off:** Disabled
	Frequency	60Hz/50Hz	Set to the frequency of the lighting fixture that is causing the flicker. (The factory default setting is "50 Hz" when "Country" is set to "PAL Area," "60 Hz" when "Country" is set to other than "PAL Area.")
Genlock Makes settings related to genlock.	H Phase(HD)	–999 to **±0** to +999	Specifies the H phase of HD output when genlock is enabled.
	H Phase(SD)	–99 to **±0** to +99	Specifies the H phase of SD output when genlock is enabled.
	Reference	Internal/Genlock	Displays the type of reference signal used by the camcorder.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
ND Comp Makes settings related to ND filter color compensation. Although the differences are very slight, each of the built-in ND filters has different color characteristics. When you switch between ND filters, the white balance may be disturbed. You can correct for these slight color differences automatically by registering compensation values for each filter.	ND Offset Adjust	On/**Off**	ND filter color compensation function.
	Clear ND Offset	Execute/Cancel	Clears ND filter color compensation values (execute by selecting “Execute”).
Lens Executes auto flange back adjustment.	Auto FB Adjust	Execute/Cancel	Executes auto flange back adjustment, only for supported lenses (execute by selecting “Execute”).
Auto Shading Executes auto black shading compensation.	Auto Black Shading	Execute/Cancel	Executes auto shading compensation (execute by selecting “Execute”).
	Reset Black Shading	Execute/Cancel	Clears black shading compensation values (execute by selecting “Execute”).
	Master Gain (TMP)	–3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB	Specifies a temporary master gain value. (The value is the same as the value selected with the GAIN switch.)
Trigger Mode Makes settings related to triggers for starting and stopping recording.	i.LINK Trigger Mode	Internal/**Both**/External	Select Internal when recording start and stop operations target SxS memory cards only. Select External when they target only devices connected to the i.LINK (HDV/DV) or HD/SD SDI OUT connectors. Select Both when they target both memory cards and external devices.

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Network Setting [a] Makes settings for network connection. **Notes** • The CBK-WA01 Wi-Fi Adapter is required. • This item is disabled (displayed in grey) during recording and play. *For details on Wi-Fi connection, refer to "Using a Wi-Fi Adapter" (page 76).*	DHCP	Enable/**Disable**	Selects whether to acquire the IP address automatically from a DHCP server ("Enable") or not ("Disable").
	IP Address	0.0.0.0 to 255.255.255.255 **(192.168.1.10)**	When "DHCP" is set to "Disable," sets the IP address.
	Subnet Mask	0.0.0.0 to **255.255.255.255**	When "DHCP" is set to "Disable," sets the subnet mask.
	Default Gateway	**0.0.0.0** to 255.255.255.255	When "DHCP" is set to "Disable," sets the default gateway.
	User Name	**admin**	Sets a desired user name in 1 to 31 alphanumeric characters.
	Password	**pmw-400** (model name)	Sets a password (model name) in 0 to 31 alphanumeric characters.
	Set	Execute/Cancel	Confirms the settings in "Network Settings" (execute by selecting "Execute").
	MAC Address		Displays the MAC address.
	Net Config Reset	Execute/Cancel	Resets the settings in "Network Settings" to the preset values (execute by selecting "Execute").
Wi-Fi Setting Makes settings for Wi-Fi connection. **Notes** • The CBK-WA01 Wi-Fi Adapter is required. • This item is disabled (displayed in grey) during recording and play. *For details on Wi-Fi connection, refer to "Using a Wi-Fi Adapter" (page 76).*	Scan Networks	Execute/Cancel	When "Wi-Fi" is set to "Enable," scan the available network connection.
	SSID	Network connection name	Sets the network connection name of up to 32 characters.
	Network Type	Infra/**Adhoc**	Selects the connection mode. **Infra:** Infrastructure mode **Adhoc:** Ad hoc mode
	Ch	**1** to 11	When "Network Type" is set to "Adhoc," set the wireless channel.
	Authentication	**Open**/Shared/WPA/WPA2	Selects the network authentication. **OPEN:** Open system authentication **SHARED:** Shared key authentication **WPA:** WPA (Wi-Fi Protected Access) authentication **WPA2:** WPA2 (Wi-Fi Protected Access 2) authentication when "Network Type" is set to "Infra"

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Wi-Fi Setting Makes settings for Wi-Fi connection. **Notes** • The CBK-WA01 Wi-Fi Adapter is required. • This item is disabled (displayed in grey) during recording and play. *For details on Wi-Fi connection, refer to "Using a Wi-Fi Adapter" (page 76).*	Encryption	**Disable**/WEP/TKIP/AES	Selects whether to apply data encryption and the type of data encryption. **Disable:** Do not apply data encryption. **WEP:** Apply WEP (Wired Equivalent Privacy) when "Authentication" is set to "Open" or "Shared" **TKIP:** Apply TKIP (Temporal Key Integrity Protocol) when "Authentication" is set to "WPA" or "WPA2" **AES:** Apply AES (Advanced Encryption Standard) when "Authentication" is set to "WPA" or "WPA2"
	WEP Key Index	**1**/2/3/4	When "Encryption" is "WEP," selects the key index.
	Input Select	When "Encryption" is set to "WEP": **ASCII5**, ASCII13, HEX10, HEX26 When "Encryption" is set to "TKIP" or "AES": ASCII8-63, HEX64	Selects the input format depending on the network key (or security key). **ASCII5:** Five characters ASCII format **ASCII13:** 13 characters ASCII format **HEX10:** 10 hexadecimal digits **HEX26:** 26 hexadecimal digits **ASCII8-63:** 8 to 63 characters ASCII 8-bit format **HEX64:** 64 hexadecimal digits (characters)
	Key		Sets the network key (or security key).
	Set		Enables settings for "Wi-Fi Setting" when "Wi-Fi" is set to "Enable" (execute by selecting "Execute").
	Wi-Fi Status	■■■■■ Connecting	Displays "Connecting" while connection is being attempted. Displays black squares to show the connection status by the number of squares when the camcorder is connected to a computer or a LAN.
	Wireless Mode	802.11b/802.11g/802.11n	Displays an IEEE802.11 standard.
	Wi-Fi	Enable/**Disable**	Selects whether to enable or disable Wi-Fi connection.
	Wi-Fi Remote	On/**Off**	Select "On" when using the Wi-Fi remote commander. **Note** Unselectable when "Wi-Fi" is set to "Disable."

MAINTENANCE			
Menu items	**Sub-item**	**Settings**	**Description**
Clock Set Sets the internal clock.	Date/Time		Sets the current date and time.
	12H/24H	12H/**24H**	Selects the 12-hour format (“12H”) or the 24-hour format (“24H”) for display of times.
	Date Mode	**YYMMDD**/MMDDYY/ DDMMYY	Selects the display format for dates. **YYMMDD:** Year, Month, Day **MMDDYY:** Month, Day, Year **DDMMYY:** Day, Month Year
Language Selects the language for messages.	Language	**English**/Chinese	Selects the language for messages from “English” or “Chinese.”
Hours Meter Makes settings related to the digital hours meter.	Hours(Sys)		Displays the cumulative hours of use (cannot be reset).
	Hours(Reset)		Displays the hours of use (can be reset).
	Reset	Execute/Cancel	Resets “Hours(Reset)” to “0.” (Execute by selecting “Execute”.)
Menu Scroll Selects the scroll method for the menu.	Menu Scroll	**Normal**/Loop	Selects the scroll method for the menu. **Normal:** The cursor stops when it reaches to the top or bottom while scrolling. **Loop:** The cursor continues scrolling from the bottom when it reaches to the top, or from the top when it reaches to the bottom.
Version Displays the version of the camcorder, and updates the camcorder.	Version		Displays the software version of the camcorder (Vx.xx).
	Version Up	Execute/Cancel	Updates the camcorder (execute by selecting “Execute”). **Note** This cannot be selected unless an SxS memory card is inserted.

FILE Menu

Settings in bold are the factory default values.

FILE			
Menu items	**Sub-item**	**Settings**	**Description**
All Makes settings related to ALL file operations.	Display Mode	**Date&Time/**Model Name	Selects the items to be displayed in the list box that appears when a file is saved or loaded.
	All Load SxS	Execute/Cancel	Loads an ALL file from an SxS memory card (execute by selecting “Execute”).
	All Save SxS	Execute/Cancel	Stores an ALL file to an SxS memory card (execute by selecting “Execute”).
	All Load USB (in UDF mode only)	Execute/Cancel	Loads an ALL file from a USB flash drive (execute by selecting “Execute”).
	All Save USB (in UDF mode only)	Execute/Cancel	Stores an ALL file to a USB flash drive (execute by selecting “Execute”).
	File ID		Assigns a name to a file. Names can be up to 16 characters in length.
	All Preset	Execute/Cancel	Return all items to their preset values (execute by selecting “Execute”).
	Store All Preset	Execute/Cancel	Store the current settings of all items as the preset values (execute by selecting “Execute”).
	Clear All Preset	Execute/Cancel	Clear the preset values of all items (execute by selecting “Execute”).
	3Sec Clr Preset	On/**Off**	Turns on or off the function that clears each preset value when the MENU CANCEL/PRST/ESCAPE switch is pushed up and held for three seconds on the CANCEL/PRST side.
	Network Data	**Off**/On	Selects whether to load (“On”) or not load (“Off”) network settings when loading an ALL file.

FILE			
Menu items	**Sub-item**	**Settings**	**Description**
Scene Makes settings related to scene file operations.	☐1	Standard	File number and file ID
	☐2	Standard	File number and file ID
	☐3	Standard	File number and file ID
	☐4	Standard	File number and file ID
	☐5	Standard	File number and file ID
	☐Standard		Standard settings
	Display Mode	**Date&Time/**Model Name	Selects the items to be displayed in the list box that appears when a file is saved or loaded.
	Scene Recall Mem	Execute/Cancel	Loads a file from internal memory (execute by selecting “Execute”).
	Scene Store Mem	Execute/Cancel	Stores a file in internal memory (execute by selecting “Execute”).
	Scene Recall SxS	Execute/Cancel	Loads a file from an SxS memory card (execute by selecting “Execute”).
	Scene Store SxS	Execute/Cancel	Stores a file to an SxS memory card (execute by selecting “Execute”).
	Scene Recall USB (in UDF mode only)	Execute/Cancel	Loads a file from a USB flash drive (execute by selecting “Execute”).
	Scene Store USB (in UDF mode only)	Execute/Cancel	Stores a file to a USB flash drive (execute by selecting “Execute”).
	File ID		Assigns a name to a file. Names can be up to 16 characters in length.
Reference Makes settings related to reference file operations.	Reference Store	Execute/Cancel	Stores the current settings of reference file items in the reference file that is maintained in internal memory (execute by selecting “Execute”).
	Reference Clear	Execute/Cancel	Clears the reference file (execute by selecting “Execute”).
	Reference Load SxS	Execute/Cancel	Loads a reference file from an SxS memory card (execute by selecting “Execute”).
	Reference Save SxS	Execute/Cancel	Stores a reference file to an SxS memory card (execute by selecting “Execute”).
	Reference Load USB (in UDF mode only)	Execute/Cancel	Loads a file from a USB flash drive (execute by selecting “Execute”).
	Reference Save USB (in UDF mode only)	Execute/Cancel	Stores a file to a USB flash drive (execute by selecting “Execute”).
	File ID		Assigns a name to a file. Names can be up to 16 characters in length.
	Scene White Data	On/**Off**	Selects whether to load (“On”) or not load (“Off”) white balance data when “Scene” > “Scene Recall” or “Scene” > “Standard” is executed.

FILE			
Menu items	**Sub-item**	**Settings**	**Description**
Lens Makes settings related to lens file operations.	Display Mode	**Date&Time/**Model Name	Selects the items to be displayed in the list box that appears when a file is saved or loaded.
	Lens Recall Mem	Execute/Cancel	Loads a file from internal memory (execute by selecting “Execute”).
	Lens Store Mem	Execute/Cancel	Stores a file in internal memory (execute by selecting “Execute”).
	Lens Recall SxS	Execute/Cancel	Loads a file from an SxS memory card (execute by selecting “Execute”).
	Lens Store SxS	Execute/Cancel	Stores a file to an SxS memory card (execute by selecting “Execute”).
	Lens Recall USB (in UDF mode only)	Execute/Cancel	Loads a file from a USB flash drive (execute by selecting “Execute”).
	Lens Store USB (in UDF mode only)	Execute/Cancel	Stores a file to a USB flash drive (execute by selecting “Execute”).
	File ID		Assigns a name to the most recently loaded file. Names can be up to 16 characters in length.
	Source		Displays the number of the selected file.
	Lens No Offset	Execute/Cancel	Clears a file (execute by selecting “Execute”).
	Lens Auto Recall	**Off**/On/Serial Number	When the installed lens supports serial communication, specifies whether to automatically load that reference file. **Off:** Do not use this function. **On:** Load the reference for the model name and reflect the contents of the file. **Serial Number:** For lenses that support serial number communication, load the lens file that corresponds to the serial number and model name, and reflect the contents of that file. For lenses that do not support serial number communication, load the reference for the model name (in the same way as when On is selected).
	Serial Number		Displays the serial number of the installed lens (only for lenses that support serial communication).
	Lens ID		Displays the model name of the installed lens (only for lenses that support serial communication).

FILE			
Menu items	**Sub-item**	**Settings**	**Description**
Lens Makes settings related to lens file operations.	L Manufacturer		Displays the name of the manufacturer of the installed lens (only for lenses that support serial communication).
	M V Modulation	–99 to **±0** to +99	Sets a vertical SAW shading compensation value in the lens file.
	Lens Center H	–40 to **0** to 40	Sets a center marker horizontal position in the lens file.
	Lens Center V	–40 to **0** to 40	Sets a center marker vertical position in the lens file.
	Lens R Flare	–99 to **±0** to +99	Sets a R flare level in the lens file.
	Lens G Flare	–99 to **±0** to +99	Sets a G flare level in the lens file.
	Lens B Flare	–99 to **±0** to +99	Sets a B flare level in the lens file.
	Lens W-R Offset	–99 to **±0** to +99	Sets a R white balance compensation value in the lens file.
	Lens W-B Offset	–99 to **±0** to +99	Sets a B white balance compensation value in the lens file.
	Shading Ch Sel	**Red**/Green/Blue	Selects the white shading compensation target.
	L R/G/B H Saw	–99 to **±0** to +99	Sets a horizontal SAW white shading compensation value in the lens file.
	L R/G/B H Para	–99 to **±0** to +99	Sets a horizontal parabola white shading compensation value in the lens file.
	L R/G/B V Saw	–99 to **±0** to +99	Sets a vertical SAW white shading compensation value in the lens file.
	L R/G/B V Para	–99 to **±0** to +99	Sets a vertical parabola white shading compensation value in the lens file.

Assigning Functions to Assignable Switches

Using the Assignable SW 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 SW setting
ASSIGN. 0 switch	No assignment	Off
ASSIGN. 1 switch	Execute EZ mode, according to the setting of "OPERATION" > "TLCS."	EZ Mode
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	**During recording or playback:** Write a shot mark. **In the other states:** Conduct a recording review (if playback is allowed).	Lens RET
COLOR TEMP. button	Adjust the white balance with the preset white balance value of 5600K.	Color Temp SW 5600K

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 or off.	Setting retained
ATW Hold	Hold the white balance setting in the ATW (auto-tracking white balance) mode	—
Picture Cache	Turn the picture cache function on or off.	Setting retained
Freeze Mix	Execute the freeze mix function.	—
Focus Mag	Turn the focus magnification function on or off.	Setting not retained
Zebra	Turn zebra display on or 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 flag to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Add/clear an NG flag to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Add/clear a KP flag 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 or off.
Picture Cache a)	Turn the picture cache function on or off.
Zebra	Turn zebra display on or off.
Clip Continuous Rec	Turn the Clip Continuous Rec mode on or off.
Digital Extender b)	Turn the screen magnification function on or off when the optional CBK-CE01 50 Pin Interface and Digital Extender is installed.

Note

a) When Picture Cache is assigned, "OPERATION" > "Rec Function" in the setup menu is disabled (displayed in grey) to keep the setting unchanged.

b) When the digital extender function is turned on, it is not possible to show the return video.

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 or off.	Setting retained
Last Clip Delete	Delete the most recently recorded clip.	—
ATW	Turn ATW (auto tracing white balance) mode on or off.	Setting not retained
ATW Hold	Hold the white balance setting in the ATW mode.	—
EZ Mode	Execute EZ mode according to the setting of "OPERATION" > "TLCS."	Setting retained
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.	—
Picture Cache	Turn the picture cache function on or off.	Setting retained
Freeze Mix	Execute the freeze mix function.	Setting not retained
Spotlight	Turn the spotlight function in auto iris mode on or off.	Setting retained
Backlight	Turn the backlight function in auto iris mode on or off.	Setting retained
EVF Mode	Switch the viewfinder screen between B&W (On) and color (Off).	Setting retained

Assignable switch setting	Function	State when camcorder is next powered on
BRT Disp	Turn the display of the brightness level on or off.	Setting retained
Histogram	Turn the histogram display on or off.	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).	—
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).	—
Manual Focus Assist	Turn the manual focus assist function on or off.	Setting retained
Focus Mag	Turn the focus magnification function on or off.	Setting not retained
Zebra	Turn zebra display on or off.	Setting not retained
Lens RET	Display return video signals when the optional CBK-CE01 is installed and a camera control unit is connected. When a camera control unit is not connected, function as follows. **During recording or playback:** Write a shot mark. **In the other states:** Conduct a recording review (if playback is allowed).	—
Return Video [a)]	Display return video signals during operating the system, when the optional CBK-CE01 is installed and a camera adaptor and camera control unit are connected.	—
Return Video2	Display return video signals during operating the system, when the optional CBK-CE01 is installed and a camera adaptor is connected.	—
Return Video3	Display return video signals during operating the system, when the optional CBK-CE01 is installed and a camera adaptor is connected.	—
Return Video4	Display return video signals during operating the system, when the optional CBK-CE01 is installed and a camera adaptor is connected.	—
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 flag to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Add/Clear an NG flag to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Add/Clear a KP flag to/from the clip being recorded or played.	Setting not retained
Color Temp SW 3200K	Adjust the white balance with a 3200K preset value.	Setting retained
Color Temp SW 4300K	Adjust the white balance with a 4300K preset value.	Setting retained
Color Temp SW 5600K	Adjust the white balance with a 5600K preset value.	Setting retained

Assignable switch setting	Function	State when camcorder is next powered on
Color Temp SW 6300K	Adjust the white balance with a 6300K preset value.	Setting 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 or off.	Setting not retained
Slot Select	When both slots A and B have recording media inserted in them, select the media to use.	—
Digital Extender a)	Turn the screen magnification function on or off when the optional CBK-CE01 50 Pin Interface and Digital Extender is installed.	Setting not retained

a) When the digital extender function is turned on, it is not possible to show the return video.

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 signals when the optional CBK-CE01 is installed and a camera control unit is connected. When a camera control unit is not connected, function as follows. **During recording or playback:** Write a shot mark. **In the other states:** Conduct a recording review (if playback is allowed).	—
Return Video [a)]	Display return video signals when the optional CBK-CE01 is installed and a camera control unit is connected.	—
Rec Review	Execute recording review.	—
Shot Mark1	Write Shot Mark1.	—
Shot Mark2	Write Shot Mark2.	—
Clip Flag OK	Add/Clear an OK flag to/from the clip being recorded or played.	Setting not retained
Clip Flag NG	Add/Clear an NG flag to/from the clip being recorded or played.	Setting not retained
Clip Flag Keep	Add/Clear a KP flag to/from the clip being recorded or played.	Setting not retained
OK Mark	Add or delete an OK mark.	—
Focus Mag	Turn the focus magnification function on or off.	Setting not retained

a) When the digital extender function is turned on, it is not possible to show the return video.

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 SxS memory 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.

ALL files: ALL files save the setting data of all menus. You can save up to 64 ALL files on an SxS memory card.

Note

Device specific data (shading, output levels, and other data that requires adjustment for the specific device) is not saved.

Scene files: Scene file 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 SxS memory card.

Reference files: Reference files save the reference values that are set when you execute "FILE" > "Scene" > "Standard" in the setup menu. You can save one reference file in the camcorder's internal memory and one on an SxS memory 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 SxS memory card.

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 154)*.

Saving Setting Data

Before starting, insert a writable SxS memory card into a memory card slot.

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 Select "FILE" > "All" in the setup menu.

To assign a name to the data before saving it

Assign a name before proceeding to step 2.

For details, see "To assign names to files" (page 154).

2 Select "All File Save" > "Execute."

An ALL file list box appears.

File numbers where "No File" is displayed are empty file numbers. File numbers with a file name or a date and time are the number of files that already contain data.

3 Turn the MENU knob to select the desired file number.

4 Press the MENU knob.

A confirmation message appears.

5 To execute the save, select "Execute," and then press the MENU knob.
To cancel the save, select "Cancel," and then press the MENU knob.

If you choose to execute the save, the ACCESS lamp lights (in blue on the right-side panel and in orange in the card slot section). A completion message appears and the ACCESS lamp goes out when the data has been saved to the SxS memory card.

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 to the SxS memory card.

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 assign names to files

Assigning a name before you save data in an ALL file can make it easier to distinguish your files. The following characters can be used in file names.
Alphanumeric characters (a–z, A–Z, 0–9) and special characters (! # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ~)

1 **Select "FILE" > "All" > "File ID" in the setup menu.**

2 **Turn the MENU knob to select a character, and then press the MENU knob.**

3 **Repeat step 3.**

4 **When you have finished entering characters, press the MENU knob to move the cursor to "SET," and then press the MENU knob.**
The specified name is displayed.
When you save the file *(see page 153)*, the data will be saved under this name.

Loading Setting Data

Note

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

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 **Select "FILE" > "All" in the setup menu.**

2 **Select "All Load SxS" > "Execute."**
A list box of ALL files appears.
File numbers where "No File" is displayed are empty file numbers. File numbers with a file name or a date and time are the number of files that already contain data.

3 **Turn the MENU knob to select the desired file number.**

4 **Press the MENU knob.**
A confirmation message appears.

5 **To execute the load, select "Execute," and then press the MENU knob.**
To cancel the load, select "Cancel," and then press the MENU knob.
If you choose to execute the load, the ACCESS lamp lights (in blue on the right-side panel and in orange in the card slot section). The ACCESS lamp goes out and a completion message appears when the data has been loaded from the SxS memory card.

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 from the SxS memory card.

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

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 **Select "FILE" > "All" in the setup menu.**

2 **Select "All Preset," and then press the MENU knob.**

3 **To execute the reset, select "Execute," and then press the MENU knob.**
To cancel the reset, select "Cancel," and then press the MENU knob.
If you choose to execute the reset, all settings in the ALL file are reset to 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" > "Reference" > "Scene White Data" in the setup menu.

Saving Scene Files

Insert an SxS memory card into a memory card slot, then proceed as follows.

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 Select "FILE" > "Scene" in the setup menu.

To assign a name to the data before saving it

Assign a name before proceeding to step 2.

For details, see "To assign names to files" (page 154).

2 Select "Scene Store Mem" or "Scene Store SxS."

Select "Scene Store Mem" if you want to save the data in the camcorder's internal memory, and select "Scene Store SxS" if you want to save the data on an SxS memory card.

3 Press the MENU knob.

A list box of scene files appears.
File numbers where "No File" is displayed are empty file numbers

4 Select the file number under which you want to save the data, and then press the MENU knob.

A confirmation message appears.

5 To execute the save, select "Execute," and then press the MENU knob.
To cancel the save, select "Cancel," and then press the MENU knob.

If you selected Scene Store SxS in step 2, the ACCESS lamp lights when you execute the save (in blue on the right-side panel and in orange in the card slot section).
When the data has been saved to the SxS memory card, a completion message appears and the ACCESS lamp goes out.

Loading Scene Files

Insert an SxS memory card into a memory card slot, then proceed as follows.

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 Select "FILE" > "Scene" in the setup menu.

2 Select "Scene Recall Mem" or "Scene Recall SxS."

Select "Scene Recall Mem" if you want to load the file from the camcorder's internal memory, and select "Scene Recall SxS" if you want to load the file from an SxS memory card.

3 Press the MENU knob.

A list box of scene files appears. File numbers where "No File" is displayed are empty file numbers.

4 Select the desired file number, and then press the MENU knob.

A confirmation message appears.

5 To execute the load, select "Execute," and then press the MENU knob.
To cancel the load, select "Cancel," and then press the MENU knob.

If you selected "Scene Recall SxS" in step 2, the ACCESS lamp lights when you execute the load (in blue on the right-side panel and in orange in the card slot section).
When the data has been loaded from the SxS memory card, a completion message appears and the ACCESS lamp goes out.

Saving and Loading Lens Files

Setting Lens File Data

Set the data in lens files on "FILE" > "Lens" in the setup menu *(see page 146)*.
You can set the following data and save it as a lens file.

Setting data	Sub-items
V modulation shading compensation values	M V Modulation
Center marker position	Lens Center H Lens Center V
Flare level	Lens R Flare Lens G Flare Lens B Flare
White balance compensation value	Lens W-R Offset Lens W-B Offset
White shading compensation value	L R/G/B H Saw L R/G/B H Para L R/G/B V Saw L R/G/B V Para

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

Saving Lens Files

Insert an SxS memory card into a memory card slot, then proceed as follows.

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 Select "FILE" > "Lens" in the setup menu.

To assign a name to the data before saving it
Assign a name before proceeding to step 2.

For details, see "To assign names to files" (page 154).

2 Select "Lens Store Mem" or "Lens Store SxS," and press the MENU knob.
Select "Lens Store Mem" if you want to save the data in the camcorder's internal memory, and select "Lens Store SxS" if you want to save the data on an SxS memory card.

3 To execute the save, select "Execute," and then press the MENU knob.
To cancel the save, select "Cancel," and then press the MENU knob.
If you select "Execute," a list box of lens file number appears. File numbers where "No File" is displayed are empty file numbers.

4 Select the file number under which you want to save the data, and then press the MENU knob.
A confirmation message appears.

5 To execute the save, select "Execute," and then press the MENU knob.
To cancel the save, select "Cancel," and then press the MENU knob.
If you selected Lens Store SxS in step 2, the ACCESS lamp lights when you execute the save (in blue on the right-side panel and in orange in the card slot section).
When the data has been saved to the SxS memory card, a completion message appears and the ACCESS lamp goes out.

Loading Lens Files

Insert an SxS memory card into a memory card slot, then proceed as follows.

See "Basic Setup Menu Operations" (page 104) for information about menu operations.

1 Select "FILE" > "Lens" in the setup menu.

2 Select "Lens Recall Mem" or "Lens Recall SxS," and press the MENU knob.
Select "Lens Recall Mem" if you want to load the file from the camcorder's internal memory, and select "Lens Recall SxS" if you want to load the file from an SxS memory card.

3 **To execute the load, select “Execute,” and then press the MENU knob.**
To cancel the load, select “Cancel,” and then press the MENU knob.
If you select “Execute,” a list box of lens files appears. File numbers where “No File” is displayed are empty file numbers.

4 **Select the desired file number, and then press the MENU knob.**
A confirmation message appears.

5 **To execute the load, select “Execute,” and then press the MENU knob.**
To cancel the load, select “Cancel,” and then press the MENU knob.
If you selected “Lens Recall SxS” in step 2, the ACCESS lamp lights when you execute the load (in blue on the right-side panel and in orange in the card slot section).
When the specified lens file has been loaded from the SxS memory card, a completion message appears and the ACCESS lamp goes out.

Loading Lens Files Automatically

When you are using a lens that support 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” > “Lens Auto Recall” in the setup menu to one of the following.

On: Load the lens file that corresponds to the model name.
Off: Do not use the Lens Auto Recall function.
Serial Number: Load the lens file that corresponds to the model name and serial number (when the lens supports communication of the serial number).

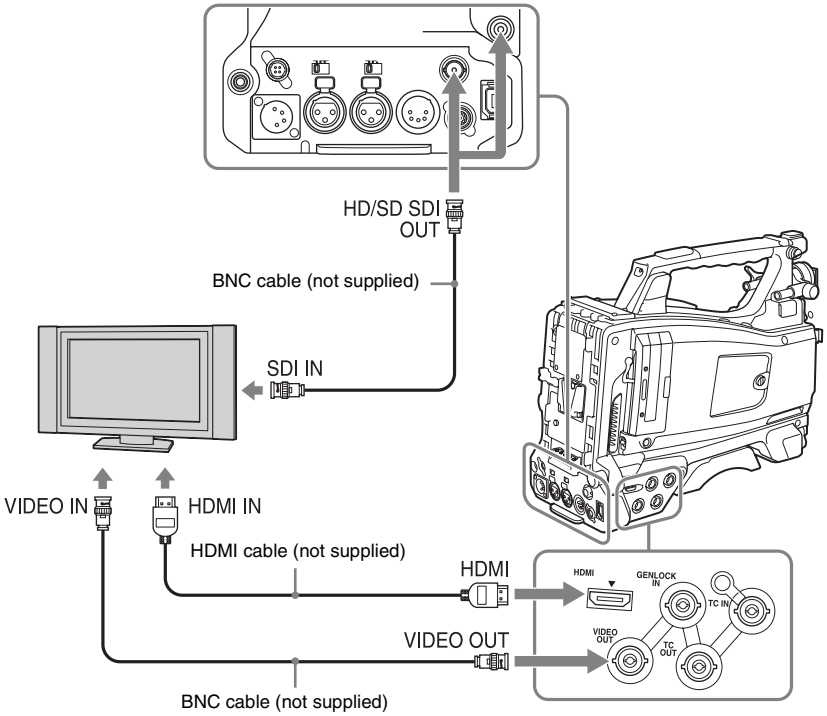
If the lens does not support communication of the serial number, both settings load the lens file that corresponds to the model name.

Chapter 8 Connecting External Devices

You can connect a control device such as an RM-B170/B750 Remote Control Unit or RCP-1001/1501 Remote Control Panel and operate this camcorder. For details on connection and operation of the control device, refer to *"Operating via the REMOTE Connector" (page 62)*.

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

SD signals down-converted for output have the following restrictions:
Images of 50P/50i/25P are output as PAL signals, those of 59.94P/59.94i/29.97P are output as NTSC signals, and those of 23.98P are output as 2-3 pulled-down NTSC signals.

HD/SD SDI OUT connectors (BNC)

The PMW-400 has two HD/SD SDI OUT connectors.
You can connect a monitor or switcher, or recording device such as a VTR, etc., that supports SDI.
The output from these connectors can be turned on and off with “OPERATION” > “Input/Output” > “SDI Output” in the setup menu *(see page 109)*.
For connection, use a BNC cable (not supplied).

HDMI connector

You can connect a monitor or recording device such as a VTR, etc., that supports HDMI.
The output from this connector can be turned on and off with “OPERATION” > “Input/Output” > “HDMI Output” in the setup menu *(see page 109)*.
For connection, use an HDMI cable (not supplied).

VIDEO OUT connector

You can connect a monitor or recording device such as a VTR, etc., that supports analog composite signals.
The analog composite signal output from this connector is the same as the NTSC or PAL encoded signal that is output from the HD/SD SDI OUT connector when the setting of output is SD signal (you can switch between NTSC and PAL with “OPERATION” > “Format” > “Country” in the setup menu *(see page 107)*).
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 be matched with the analog composite signal setting for the VIDEO OUT connector.
To input camcorder output audio to an external device such as a monitor or 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).

i.LINK (HDV/DV) connector

The i.LINK (HDV/DV) connector supports HDV and DV input/output. However, DV streams cannot be recorded on this camcorder.
This connector can be used to connect a device that supports i.LINK (HDV). The device type can be a monitor, read/write device such as VTR or HDD, or computer.

To input/output HDV signals

HDV input/output is supported when the video format is an HDV compatible format (SP 1440/59.94i, SP 1440/50i, or SP 1440/23.98P), “OPERATION” > “Input/Output” > “Output&i.LINK” in the setup menu is set to “HD&HDV” or “SD&HDV,” and “Input/Output” > “i.LINK I/O” is set to “Enable.”
When the video format is SP 1440/23.98P, a 59.94i HDV signal subjected to 2-3 pulldown processing is output.

To input/output DV signals

DV input/output is supported under either of the following conditions.

- “OPERATION” > “Input/Output” > “i.LINK I/O” in the setup menu is set to “Enable” on SD mode.
- On HD mode, the video format is other than DV incompatible formats (HQ 1920/23.98P, HQ 1440/23.98P, and HQ 1280/23.98P), “OPERATION” > “Input/Output” > “Output&i.LINK” in the setup menu is set to “SD&DV,” and “Input/Output” > “i.LINK I/O” is set to “Enable.”

Operating Clips with a Computer

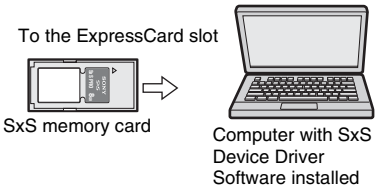
Using the ExpressCard Slot of a Computer

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 to the files.

Notes

- The SxS Device Driver Software and the UDF 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, visit the following URL:
http://www.sony.net/SxS-Support/



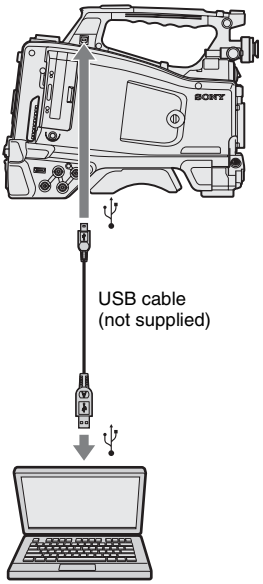
With a Windows computer
Check that a Removable Disk appears in My Computer. This indicates normal status.

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

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 acknowledged as an extended drive by the computer.
When two memory cards are mounted in this camcorder, they are acknowledged as two independent extended drives by the computer.



Notes

- When connecting the USB cable to the computer, be careful to check the form and direction of the PC 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 side 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 this camcorder is recognized as an extension drive. You can carry out the same operations by using the arrow buttons (⇧, ⇩, ⇦, ⇨) *(see page 17)*.

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, HDMI connector, and HD/SD SDI OUT connector 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 operation 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.

Note

If you connect the camcorder to the computer using an i.LINK cable, you cannot use the computer to operate files stored in a recording media loaded in the memory card slot of this camcorder.

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 Trash.

If the SxS memory card icon is located on Finder, click on the eject icon on its side.

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 the 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.

Connecting an External Device (i.LINK Connection)

You can record the same images as those recorded on the memory card in this camcorder on an external device connected to the i.LINK (HDV/DV) connector, or record the playback picture of the external device on the memory card in the camcorder.
When you connect the camcorder to a non-linear editing system that supports HDV format, you can edit the images recorded on the memory card in the camcorder.

Notes

- When you set "OPERATION" > "Input/Output" > "Output&i.LINK" in the setup menu to "480P (570P)," no signal is output from the HD/SD SDI OUT connector.
- Use the i.LINK (HDV/DV) connector only for one-to-one i.LINK connection.
- When you change a setting which affects output signals from the i.LINK (HDV/DV) connector, such as "HD/SD," "HD System Line," "System Frequency," and "Rec Format" under "OPERATION" > "Format" in the setup menu or "i.LINK I/O" and "Down Converter" under "OPERATION" > "Input/Output" in the setup menu, disconnect the i.LINK cable and change the setting. Changing such a setting with the i.LINK cable connected may cause improper operation of the connected i.LINK device.
- The external signal input via the i.LINK connection that can be recorded on the camcorder is HDV streams only. You cannot record DV streams via the i.LINK connection.

Recording the Camera Picture on an External Device

The picture being shot with this camcorder is output as an HDV or DV stream via the i.LINK (HDV/DV) connector. It can be recorded on a connected HDV or DVCAM recorder in synchronization with a recording start/stop operation on this camcorder.

1 Perform the preparatory settings of the camcorder.

- Set "OPERATION" > "Input/Output" > "Output & i.LINK" in the setup menu *(see page 109)* to "HD & HDV" or "SD & HDV."
  HD & HDV or SD & HDV: To output an HDV stream in HD mode when the video format is set to an HDV compatible format (SP 1440/59.94i, SP 1440/50i, or SP 1440/23.94P)
  SD & DV: To output a DV stream
- Set "OPERATION" > "Input/Output" > "i.LINK I/O" in the setup menu to "Enable."
- Set "MAINTENANCE" > "Trigger Mode" > "i.LINK Trigger Mode" in the setup menu *(see page 140)* to "Both" or "External."
  Both: To perform recording both on the memory card in this camcorder and on the external device
  External: To perform recording only on the external device

2 Set the external device to recording standby status.

For operations of the external device, refer to the operation manual of that device.

3 Start recording.

The external device starts recording in synchronization.

The status of the external device is displayed in the i.LINK status indication area *(see page 27)* on the viewfinder screen.

Indication	Status of the external device
STBY HDV	In HDV recording standby
●REC HDV	In HDV recording
STBY DV	In DV recording standby
●REC DV	In DV recording

Notes

- Operation may be different depending on the type of external device.
- When you execute the operation to make a recording on the recording media loaded in the camcorder while HDV signals are output from the i.LINK (HDV/DV) connector, HDV signal output stops for about one second before the recording starts, and then it resumes.
- While you can record shot marks on the memory card during recording, they are not added to the pictures recorded on the external device.

Nonlinear Editing

You can transfer an HDV stream to a nonlinear editing system connected via the i.LINK (HDV/DV) connector.

Notes

- The i.LINK (HDV/DV) connector of this camcorder is a 6-pin connector. Check the number of pins of the i.LINK connector on your computer and use an appropriate i.LINK cable.
- In searching pictures of this camcorder on the computer, it may take some time until the display is reflected on the computer.
- If the playback clip is short or the playback starting point is near the end of the clip, the i.LINK signal may be interrupted between the clip and the next clip. When you try to capture such a signal using the nonlinear editing system, a malfunction may occur, depending on the nonlinear editing software in use.
- If you specify a search speed other than 4, 15, or 24 times normal with the nonlinear editing system, no i.LINK signal is fed out. In such a case, the picture on the viewfinder monitor may stay frozen.
- High-speed playback picture may not be displayed on the computer screen, depending on the nonlinear editing software in use.

Setting on this camcorder

Set "OPERATION" > "Input/Output" > "i.LINK I/O" in the setup menu to "Enable."

For operations of the nonlinear editing software, refer to the operation manual of the software.

Recording External Input Signals

The HDV stream input from a device connected via the i.LINK (HDV/DV) connector can be recorded on an SxS memory card in this camcorder.The timecodes superimposed on the i.LINK input are recorded regardless of the settings of the camcorder.

Note

DV stream cannot be recorded.

1 Set the external signal to a format that can be recorded on the camcorder.

Select an HDV compatible format (SP 1440/59.94i, SP 1440/50i, or SP 1440/23.94P) for the video format.

2 Make the following settings with "OPERATION" > "Input/Output" in the setup menu *(see page 109)*.

- **Set "Output&i.LINK" to "HD&HDV" or "SD&HDV."**
- **Set "i.LINK I/O" to "Enable."**
- **Set "Source Select" to "i.LINK."**

The input video is displayed on the viewfinder screen or the monitor connected to the VIDEO OUT connector.

Audio signals are output through the built-in speaker, the headphones connected to the EARPHONE connector, and the speakers of the monitor connected to the VIDEO OUT connector.

3 Start the recording.

Notes

- An error is generated in the following cases. In such a case, cancel Recording mode.
  - The video format of input signal does not match that specified on the camcorder.
  - A copy-protected stream is being fed in.
- If the input to the camcorder becomes no signal during recording, the TALLY indicators, the tally indicator on the front of the viewfinder, and the REC indication (●REC) on the viewfinder screen flash, indicating that no signal is being recorded on the SxS memory card. When an input signal is resumed, recording is restarted, incrementing the clip number on the memory card.

Configuring a Shooting and Recording System

If you install the optional CBK-CE01 on this camcorder, you can attach the CA-FB70/TX70 Camera Adaptor and connect a camera control unit. This allows you to configure a shooting and recording system by connecting multiple camcorders, camera control units, and remote control units.

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.

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 lens, the LCD screen, and mirror inside the viewfinder barrel.

Note

Never use organic solvents such as thinners.

Note about the Battery Terminal

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 problem occurs when the camcorder is powered or is being operated, a warning is issued by various visible and audible indicators. These visible and audible indicators are:

- Error/warning message (“A” in the “Layout of the table of warning messages” below)
- WARNING indicator (“B”), warning sound from the speaker and earphones (“C”), tally/REC indication (“D”), and battery remaining indicator (“E”).

A warning message, and the REC indication appear on the viewfinder screen.

The volume of the warning sound can be adjusted with the ALARM knob. Set the ALARM knob to the minimum position to suppress the sound.

Layout of the table of warning messages

A	WARNING indicator	Warning sound	Tally/REC	Battery remaining
	B	C	D	E
	Problem	**Operation in the recorder module**	**Action to take**	

- The operation of the WARNING indicator, the tally/REC indication, and the battery indicator is represented by graphic symbols as follows.
  - ☼: Continuous
  - ☀: 1 flash/s
  - ☀: 4 flashes/s
- The warning sounds are represented by graphic symbols as follows.
  - •))))))))))))))))))))))))))))) : Continuous beep
  - •))))))))))))))) : 1 beep/s

Error Indication

E-*****	WARNING indicator	Warning sound	Tally/REC	Battery remaining
	—	•))))))))))))))))))))))))))))))	☀	—
	Problem	**Operation in the recorder module**	**Action to take**	
	The camcorder is abnormal.	Recording stops.	Turn off the power and confirm whether an error occurs on the connected devices, the cables, and the media or not. (If power cannot be turned off by setting the POWER switch to OFF, remove the battery pack or the AC power source.) If the problem continues after the camcorder is restarted, contact your Sony service representative.	

Warning Indication

Media Near Full

WARNING indicator	Warning sound	Tally/REC	Battery remaining
			—
Problem	**Operation in the recorder module**	**Action to take**	
Free space on the SxS memory card has become insufficient.	Recording continues.	Replace it with another at the earliest opportunity.	

Media Full

WARNING indicator	Warning sound	Tally/REC	Battery remaining
			—
Problem	**Operation in the recorder module**	**Action to take**	
No space is left on the SxS memory card. Recording, clip copying and clip division cannot be performed.	Recording stops.	Replace it with another.	

Battery Near End

WARNING indicator	Warning sound	Tally/REC	Battery remaining
			
Problem	**Operation in the recorder module**	**Action to take**	
The battery power will be exhausted soon.	Recording continues.	Charge the battery pack at the earliest opportunity.	

Battery End

WARNING indicator	Warning sound	Tally/REC	Battery remaining
			
Problem	**Operation in the recorder module**	**Action to take**	
The battery pack is exhausted. Recording cannot be performed.	Recording stops.	Connect a power source via the DC IN connector or stop operation to charge the battery pack.	

Temperature High

WARNING indicator	Warning sound	Tally/REC	Battery remaining
			—
Problem	**Operation in the recorder module**	**Action to take**	
The internal temperature has risen above a safe operation limit.	Recording continues.	Suspend operation, turn off the power, and wait until the temperature falls.	

Voltage Low	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	☀	•)))))))))))))	☀	☀
	Problem	**Operation in the recorder module**	**Action to take**	
	The DC IN voltage has become low (stage 1).	Recording continues.	Check the power supply.	
Insufficient Voltage	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	☼	•))))))))))))))))))))))	☀	☀
	Problem	**Operation in the recorder module**	**Action to take**	
	The DC IN voltage is too low (stage 2). Recording cannot be performed.	Recording stops.	Connect other power source.	
Battery Error Please Change Battery.	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	An error was detected with the battery pack.	Recording stops.	Replace the battery pack with a normal one.	
Backup Battery End Please Change.	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	The remaining power of the backup battery is insufficient.	Recording continues.	Refer to a Sony service representative to replace the battery with a new one.	
Unknown Media(A)[1] Please Change.	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	A partitioned memory card or one that contains recorded clips exceeding the number permitted with this camcorder is loaded.	Recording continues.	This card cannot be used with this camcorder. Remove it and load a compatible card.	

Reached Clip Number Limit / Cannot Record to Media(A)[1)]

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
The maximum number of clips for a single memory card is reached. No more clip can be recorded on the card.	Recording stops.	Replace it with another card.

Media Error / Media(A)[1)] Needs to be Restored

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
An error occurred with the memory card. The card requires restoration.	Recording stops.	Remove the card, load it again, and restore it.

Media Error / Cannot Record to Media(A)[1)]

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
Recording cannot be done, as the memory card is defective.	Recording stops.	As playback may be possible, it is recommended to replace it with another card after copying the clips, as required.

Media Error / Cannot Use Media(A)[1)]

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
Neither recording nor playback can be done, as the memory card is defective.	Recording stops.	It cannot be operated with this camcorder. Replace it with another card.

Cannot Use Media(A)[1)] / Unsupported File System

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
A card of a different file system was inserted.	Recording stops.	It cannot be used with this camcorder. Replace it with another card.

Video Format Mismatch

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
The external signal input via the i.LINK connection cannot be recorded, as the Video Format setting is different from the signal format of the external input signal.	Recording stops.	Change settings of "OPERATION" > "Format" in the setup menu to match it to that of the external signal.

Copy Protected Input Cannot Record

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
The external signal input via the i.LINK connection cannot be recorded, as the stream is copy-protected.	Recording stops.	Check the input signal.

DVCAM Input Signal! Cannot Record

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
The external signal input via the i.LINK connection cannot be recorded, as it is a DV stream.	Recording stops.	—

Media Error Playback Halted

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
An error occurred in reading data from the memory card, and playback cannot be continued.	Recording stops.	If this frequently occurs, change the memory card after copying the clips, as required.

Media(A)[1] Error

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
Recording cannot be done, as an error occurred with the memory card.	Recording stops.	If this frequently occurs, change the memory card.

HDD A [2] Battery Near End

WARNING indicator	Warning sound	Tally/REC	Battery remaining
☀	•)))))))))))))	☀	—

Problem	Operation in the recorder module	Action to take
The battery power of the connected HDD will be exhausted soon.	Recording continues.	Change the battery at the earliest opportunity.

HDD A [2] Battery End

WARNING indicator	Warning sound	Tally/REC	Battery remaining
☼	•)))))))))))))))))))))	☀	—

Problem	Operation in the recorder module	Action to take
The battery of the connected HDD is exhausted. Recording cannot be performed.	Recording stops.	Stop operation to change the battery.

Not Enough Capacity Change Media (A) [1]

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
There is not enough capacity for copying.	Recording continues (disallowing copy).	Replace the card in slot A with another one.

Reached Duplication Limit Change Media (A) [1]

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
The card has already ten clips having the same name as that you tried to duplicate.	Recording continues (disallowing copy).	Replace the card in slot A with another one.

Not Enough Capacity Cannot Divide

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
There is not enough capacity for dividing a clip.	Recording continues (disallowing divide).	—

Will Switch Slots Soon

WARNING indicator	Warning sound	Tally/REC	Battery remaining
—	—	—	—

Problem	Operation in the recorder module	Action to take
Will switch to other slot soon.	Recording continues.	Make sure that a memory card is loaded in the other slot.

No Clip	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	There is no clip to be displayed.	Recording continues.	—	
No OK Clip	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	There is no clip with the OK mark.	Recording continues.	—	
Same File Already Exists Change Media(A)[1)]	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	The card has already clips having the same name as that you tried to duplicate.	Recording continues (disallowing copy).	Replace the card in slot A with another one.	
Media Reached Rewriting Limit Change Media (A)[1)]	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	The memory card comes to the end of its service life.	Recording stops.	Make a backup copy and replace the card with another one as soon as possible. Recording/playback may not be performed properly if you continue to use the card. For details, refer to the operating instructions of the memory card.	
Unsupported Clip Included Cannot Use Media (A)[1)]	**WARNING indicator**	**Warning sound**	**Tally/REC**	**Battery remaining**
	—	—	—	—
	Problem	**Operation in the recorder module**	**Action to take**	
	The inserted memory card contains clips recorded in a format that is not supported by this camcorder.	—	The card in slot A cannot be used with this camcorder.	

1) (B) for the card in slot B
2) B for a HDD connected to slot B

Appendix

Important Notes on Operation

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 steeped 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: 0°C to 40°C (32°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 malfunctions and interference with audio and video signals.
It is recommended that the portable communications devices near this camcorder be powered off.

Note on laser beams

Laser beams may damage the CMOS image sensors.
If you shoot a scene that includes a laser beam, be careful not to let the laser beam be directed into the lens of the camcorder.

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 36).*

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.

On 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.

Phenomena specific to CMOS image sensors

The following phenomena that may appear in images are specific to CMOS (Complementary Metal Oxide Semiconductor) image sensors. They do not indicate malfunctions.

White flecks

Although the CMOS image sensors are produced with high-precision technologies, fine white flecks may be generated on the screen in rare cases, caused by cosmic rays, etc. This is related to the principle of CMOS image sensors and is not a malfunction.

The white flecks especially tend to be seen in the following cases:

- when operating at a high environmental temperature
- when you have raised the master gain (sensitivity)
- when operating in Slow-Shutter mode

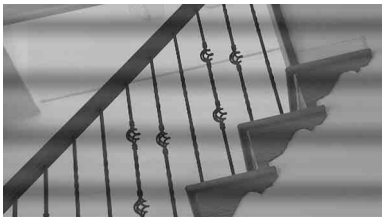
The problem may be alleviated by executing automatic black balance adjustment.

Aliasing

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

Flicker

If recording is made under lighting produced by discharge tubes, such as fluorescent, sodium, or mercury-vapor lamps, the screen may flicker, colors may vary, or horizontal stripes may appear distorted.



In such cases, set the flicker-reduction function to auto mode *(see page 139)*.

If the frame rate selected for recording is close to the power-supply frequency, flicker may not be reduced sufficiently even if you activate the Flicker-Reduction function. In such cases, use the electronic shutter.

Focal plane

Owing to the characteristics of the pickup elements (CMOS image sensors) for reading video signals, subjects that quickly move across the screen may appear slightly skewed.

Flash band

The luminance at the top and bottom of the screen may change when shooting a flashlight beam or a light source that quickly flashes.

You can use the supplied application software to correct clips that contain frames with flash bands.

Note on data compatibility with other XDCAM EX-series products

When you use a PMW-EX1/EX3/EX30 to play materials recorded on the camcorder, any media in which clips of formats not supported by the PMW-EX1/EX3/EX30 have been recorded cannot be used.

The PMW-EX1/EX3/EX30 cannot divide a clip recorded on this camcorder, even if the clip is in a video format supported by the PMW-EX1/EX3/EX30.

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 108)* 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.

Output Formats and Limitations

Video Formats and Output Signals

Output formats of the HD/SD SDI OUT connector and HDMI output connector

Output signal that is output from the SDI OUT connector or HDMI output connector corresponds to the setup menu setting or format of played clip.
The output format is converted in the following settings.

When recording: Format of the OPERATION menu When playing back: Video format of the played video clip	Output format Input/Output setting of the OPERATION menu	
	HD HD&HDV	SD SD&HDV SD&DV
HD422 1920/59.94i, HQ1920/59.94i, HQ1440/59.94i, SP1440/59.94i	1920×1080/59.94i	720×480/59.94i
HD422 1920/29.97P, HQ1920/29.97P, HQ1440/29.97P	1920×1080/29.97PsF	720×480/29.97PsF
HD422 1920/23.98P, HQ1920/23.98P, HQ1440/23.98P (23.98P Output: 2-3 Pull Down)	1920×1080/23.98PsF 1920×1080/59.94i [1)]	720×480/59.94i [1)]
SP1440/23.98P (23.98P Output: 2-3 Pull Down)	1920×1080/59.94i [1)]	720×480/59.94i [1)]
HD422 1280/59.94P	1280×720/59.94P	720×480/59.94i [2)]
HD422 1280/29.97P	1280×720/59.94P [3)]	720×480/29.97PsF
HD422 1280/23.98P (23.98P Output: 2-3 Pull Down)	1280×720/59.94P [4)]	720×480/59.94i [1)]
HQ1280/59.94P	720×480/59.94P	720×480/59.94i [2)]
HQ1280/29.97P		720×480/29.97PsF
HQ1280/23.98P		720×480/59.94i [1)]
IMX 512/59.94i, DVCAM 480/59.94i, DVCAM 59.94i		720×480/59.94i
IMX 512/29.97P, DVCAM 480/29.97P, DVCAM 29.97P		720×480/29.97PsF
HD422 1920/50i, HQ 1920/50i HQ 1440/50i, SP 1440/50i	1920×1080/50i	720×576/50i
HD422 1920/25P HQ 1920/25P, HQ 1440/25P	1920×1080/25PsF	720×576/25PsF
HD422 1280/50P	1280×720/50P	720×576/50i
HD422 1280/25P		720×576/25PsF
HQ 1280/50P	720×576/50P	720×576/50i [5)]
HQ 1280/25P		720×576/25PsF
IMX 608/50i, DVCAM 480/50i, DVCAM 50i		720×576/50i
IMX 608/25P, DVCAM 480/25P, DVCAM 25P		720×576/25PsF

1) Converted from 23.98P by 2-3 pull-down processing.
2) Converted from 59.94P.
3) Converted from 29.97P by displaying each 2 same pictures of 29.97P.
4) Converted from 23.98P by displaying each 2 or 3 same pictures of 23.98P.
5) Converted from 50P.

Output formats of the VIDEO OUT connector

When the output signal from the SDI OUT or HDMI OUT connector is HD, the Y signal whose format is the same as the output signal from the SDI OUT or HDMI OUT connector, is output from the VIDEO OUT connector.
When the output signal from the SDI OUT or HDMI OUT connector is SD, an analog composite signal is output from the VIDEO OUT connector.

Output formats of the i.LINK (HDV/DV) connector

The output signal from the i.LINK (HDV/DV) connector corresponds to the setup menu setting or format of the played clip, and output in the following format.

Note

When you set "OPERATION" > "Format" > "File System" to "UDF" in the setup menu, no signal is output from the i.LINK (HDV/DV) connector.

When recording: Format of the OPERATION menu **When playing back: Video format of the played video clip**	**Output format** **Input/Output setting of the OPERATION menu** **HD&HDV**	**SD&HDV**	**SD&HDV**
HQ1920/59.94i, HQ1440/59.94i	Input/output is not possible.		DV (720×480/59.94i)
SP1440/59.94i	HDV (1440×1080/59.94i)		DV (720×480/59.94i)
HQ1920/29.97P, HQ1440/29.97P	Input/output is not possible.		DV (720×480/29.97PsF)
HQ1920/23.98P, HQ1440/23.98P	Input/output is not possible.		
SP1440/23.98P	HDV (1440×1080/59.94i 2-3 pull-down)	HDV (1440×1080/59.94i 2-3 pull-down)	DV (720×480/59.94i 2-3 pull-down)
HQ1280/59.94P	Input/output is not possible.		DV (720×480/59.94i Converted from P to i)
HQ1280/29.97P	Input/output is not possible.		DV (720×480/29.97PsF)
HQ1280/23.98P	Input/output is not possible.		
DVCAM 59.94i	–	–	DV (720×480/59.94i)
DVCAM 29.97P	–	–	DV (720×480/29.97PsF)
HQ 1920/50i, HQ 1440/50i	Input/output is not possible.		DV (720×576/50i)
SP 1440/50i	HDV (1440×1080/50i)		DV (720×576/50i)
HQ 1920/25P, HQ 1440/25P	Input/output is not possible.		DV (720×576/25PsF)
HQ 1280/50P	Input/output is not possible.		DV (720×576/50i Converted from P to i)
HQ 1280/25P	Input/output is not possible.		DV (720×576/25PsF)
DVCAM 50i	–	–	DV (720×576/50i)
DVCAM 25P	–	–	DV (720×576/50i)

Output Signals and Operation Restrictions When a Camcorder System is Configured (in HD Mode Only)

The table below shows output signals from the camcorder and operation restrictions to the camcorder when it is connected with a camera adaptor and camera control unit to configure a shooting and recording system.
When the camcorder is equipped with the CA-FB70/CA-TX70 HD Camera Adaptor, full HD signals complying with the HD-SDI standard are transferred to the camera adaptor.

Note

When configuring a camcorder system with a camera adaptor and camera control unit, install the optional CBK-CE01 50 Pin Interface and Digital Extender and set "OPERATION" > "Format" > "HD/SD" to "HD" in the setup menu.

Settings of Rec Format and System Frequency under OPERATION >Format in the setup menu	SDI outputs to the camera adaptor	System format of the camera adaptor and camera control unit	Operation restrictions to the camcorder	
			Genlock	Return video display
HQ1920/59.94i	1920×1080/59.94i	1920×1080/59.94i	Available	Available
HQ1440/59.94i				
SP1440/59.94i				
HQ1920/29.97P	1920×1080/29.97PsF			
HQ1440/29.97P				
SP1440/23.98P	1920×1080/59.94i (2-3PD)			
HQ1920/23.98P [a)]	Output disabled	Not supported	Unavailable	Unavailable
HQ1920/23.98P [b)]	1920×1080/59.94i (2-3PD)	1920×1080/59.94i	Available	Unavailable
HQ1440/23.98P [a)]	Output disabled	Not supported	Unavailable	Unavailable
HQ1440/23.98P [b)]	1920×1080/59.94i (2-3PD)	1920×1080/59.94i	Available	Unavailable
HQ1920/50i	1920×1080/50i	1920×1080/50i	Available	Available
HQ1440/50i				
SP1440/50i				
HQ1920/25P	1920×1080/25PsF			
HQ1440/25P				
HQ1280/59.94P	1280×720/59.94P	1920×1080/59.94i	Available	Available
HQ1280/50P	1280×720/50P	1920×1080/50i	Available	Available

a) PsF output
b) PD output

Specifications

General

Power requirements

12 V DC (11 V to 17.0 V)

Power consumption

Approx. 26 W

Main unit (camcorder) + LCD viewfinder + auto focus lens + microphone

During recording, power source: battery pack

Notes

- Do not use a video light with power consumption of over 50 W.
- When connecting a device to the DC OUT connector, use one with current consumption of 0.5 A or less.

Operating temperature

0ºC to 40ºC (32ºF to 104ºF)

Storage temperature

–20ºC to +60ºC (–4ºF to 140ºF)

Recording/playback formats

Video

HD HQ Mode: MPEG-2 MP@HL, 35 Mbps/VBR

1920 × 1080/59.94i, 50i, 29.97P, 25P, 23.98P

1440 × 1080/59.94i, 50i, 29.97P, 25P, 23.98P

1280 × 720/59.94P, 50P, 29.97P, 25P, 23.98P

HD SP Mode: MPEG-2 MP@H-14, 25 Mbps/CBR

1440 × 1080 /59.94i, 50i

(23.98P is converted to 59.94i in 2-3 pull-down processing.)

SD Mode: DVCAM

720 × 480/59.94i

720 × 576/50i

720 × 480/29.97P

720 × 576/25P

Audio

LPCM (16 bits, 48 kHz, HD: 4 channels, SD: 2 channels)

Recording/playback time

With one SBP-32/SBS-32G1A

SP or DVCAM mode: Approx.130 min.

HQ mode: Approx. 100 min.

With one SBP-64A/SBS-64G1A

SP mode: About 280 minutes

DVCAM mode: About 260 minutes

HQ mode: About 200 minutes

Note

The actual recording/playback time may differ slightly from the values shown here, depending on usage conditions, memory characteristics, etc.

Continuous operation time

With the BP-L80S

Approx. 180 min.

Mass

Main body only: 3.4 kg (7 lb 7.9 oz)

Dimensions

See page 182.

Supplied accessories

See page 181.

Camera Block

Pickup device

$^{2}/_{3}$-type, 3-"Exmor" Full HD CMOS image sensors

Effective picture elements:

1920 (H) × 1080 (V)

Format

3-chip RGB

Optical system

F1.4 prism system

Built-in filters

1: Clear

2: $^{1}/_{4}$ND

3: $^{1}/_{16}$ND

4: $^{1}/_{64}$ND

Sensitivity

F12 (System frequency: 59.94i)

F13 (System frequency: 50i)

(2000lx, 89.9% reflection)

Minimum illumination

0.003 lx (F1.4, +42 dB, 64-frame accumulation)

S/N ratio

56 dB (Noise Suppress Off)

60 dB (Noise Suppress On)

Horizontal resolution

1000TV lines or more

Gain

–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.

Shutter speed (Slow shutter (SLS))

2 to 8, 16, 32, 64 frames

Audio Block

Sampling frequency

48 kHz

Quantization

16 bits

Headroom

20 dB (the factory default setting)

(20, 18, 16, 12 dB)

Frequency response

MIC: 50 Hz to 20 kHz (within ±3 dB)

LINE: 20 Hz to 20 kHz (within ±3 dB)

WRR Analog: 50 Hz to 20 kHz (within ±3 dB)

WRR Digital: 20 Hz to 20 kHz (within ±3 dB)

Dynamic range

90 dB (typical)

Distortion

0.08% max. (with input level 40dBu)

Built-in speaker

Monaural

Output: 300 mW

Display

Viewfinder (supplied)

Screen size

8.8 cm diagonal (3.5-inch)

Aspect ratio

16:9

Picture elements

640 (H) × 3 × 480 (V) Sequence delta

Media Block

Card slots

Type: Express Card34

Number of slots: 2

Connector: Conforms to PCMCIA Express Card Standard

Writing rate

50 Mbps or more

Reading rate

50 Mbps or more

Inputs/Outputs

Input/Output Connectors

Signal inputs

Audio input: XLR type, 3-pin, female (2), Line/Mic/Mic +48 V selectable

–60 dBu/–4 dBu (0 dBu=0.775 Vrms)

Microphone input: XLR type, 5-pin, female

–60 dBu

GENLOCK input: BNC type (1)

1.0 Vp-p, 75 Ω, unbalanced

Timecode input: BNC type (1)

0.5 V to 18 Vp-p, 10 kΩ

Signal outputs

Video output: BNC type (1), HD-Y or analog composite

HDMI: Type A, 19-pin (1)

SDI output: BNC type (2), HD-SDI/SD-SDI selectable

Audio output: XLR type, 5-pin, male

0 dBu

Timecode output: BNC type (1)

1.0 Vp-p, 75 Ω

Earphone output (stereo minijack) (1)

8 Ω, – ∞ to –18 dBs variable

Others

DC input: XLR type, 4-pin, male
11 to 17 V DC
DC output: 4-pin
11 to 17 V DC, maximum rated current: 0.5 A
Lens: 12-pin
Supplying power to the lens
11 to 17 V DC, maximum rated current: 1.0 A
Remote: 8-pin
LIGHT: 2-pin
USB: 4-pin, Type B (1), Host Type A (1)
i.LINK: 6-pin (1), complies with IEEE1394
HDV (HDV1080i)/DVCAM stream input/output, S400
VF: 26-pin, rectangular, 20-pin round
For wireless receiver: D-sub 15-pin

Lens Block (PMW-400K Only)

Lens mount

Sony $^{2}/_{3}$-type bayonet mount

Focal length

8 mm ($^{11}/_{32}$ inches) to 128 mm (5 $^{1}/_{8}$ inches) (equivalent to 31.5 mm (1 $^{1}/_{4}$ inches) to 503 mm (19 $^{7}/_{8}$ inches) on 35 mm (1 $^{7}/_{16}$ inches) lens)

Zoom

Servo/Manual selectable

Zoom ratio

16×

Maximum relative aperture

1:1.9

Iris

Auto/Manual selectable
F1.9 to F16 and C (close)

Focus range

Auto/Manual selectable
Ranges:
800 mm (31 $^{1}/_{2}$ inches) to ∞ (Macro OFF)
50 mm (2 inches) to ∞ (Macro ON, Wide)
732 mm (28 $^{7}/_{8}$ inches) to ∞ (Macro ON, Telephoto)

Filter thread

M82 mm, pitch 0.75 mm

Macro

ON/OFF switchable

Supplied Accessories

Viewfinder (1)
Shoulder strap (1)
Stereo microphone (1)
Windscreen (1)
Cold shoe kit (1 set)
Lens mount cap
Flange back adjustment chart
Auto focus lens (1)
Before Using this Unit (1)
Operating Instructions (CD-ROM) (1)

Recommended Additional Equipment

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

$^{2}/_{3}$-type bayonet mount lenses only

Viewfinder

DXF-20W/51/C50WA

Viewfinder Rotation Bracket

BKW-401

Note

The BKW-401 can only be used with the viewfinder supplied with the camcorder or the DXF-20W.

Equipment for Remote Control

Remote Control Unit

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

Note

The command network unit (CNU) is not supported.

50 Pin Interface and Digital Extender

CBK-CE01

HD Camera Adaptor

CA-FB70/TX70 (when an optional CBK- CE01 is installed)

Note

When using SDIOUT2 with the CA-FB70 attached to the camcorder, use an L angle bracket.

MPEG TS Adaptor

HDCA-702 (when an optional CBK- CE01 is installed)

Note

SDIOUT2 cannot be used when the MPEG TS adaptor is attached.

Wi-Fi Adapter

CBK-WA01

Media Adaptor

MEAD-MS01 (for "Memory Stick PRO-HG Duo HX" series)
MEAD-SD01 (for SDHC card)

XQD ExpressCard Adapter

QDA-EX1 (for XQD memory card)

Media

SxS Memory Card

SxS PRO series
SxS-1 series

Audio Equipment

Microphone

ECM-678/674/673/680S

Microphone Holder

CAC-12

Wireless Microphone

DWR-S01D
WRR-855S/860C/861/862

Other Peripheral Devices

Tripod adaptor

VCT-14/U14

Video Light

UC-D200A (PROTECH)
Ultralight (Anton Bauer)

Pad

CBK-SP01 Soft Type Shoulder Pad

Equipment for Maintenance and Easier Handling

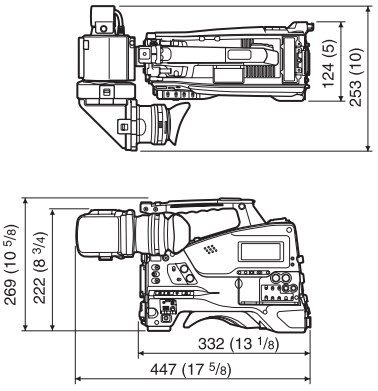
Hard Carrying Case

LC-H300

Soft Carrying Case

LC-DS300SFT

Dimensions



(in mm (inches))

Design and specifications are subject to change without notice.

Notes

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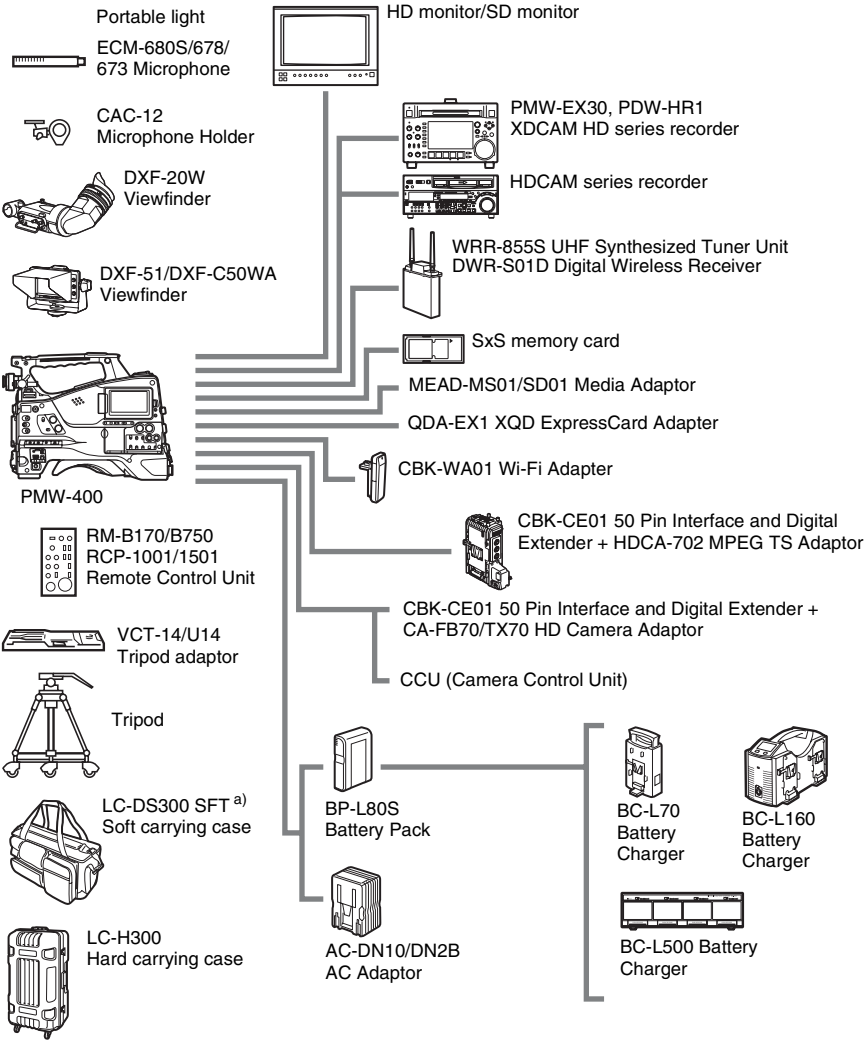
Chart of Optional Components and Accessories



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.

About i.LINK

This section explains the specifications and features of i.LINK.

What is i.LINK?

i.LINK is a digital serial interface designed to integrate devices equipped with i.LINK connectors. i.LINK allows your device to:

- Perform two-way transmission and reception of data such as digital audio and digital video signals.
- Control other i.LINK devices.
- Easily connect multiple devices with a single i.LINK cable.

Your i.LINK device is capable of connecting to a wide range of digital AV devices for data transfer and other operations.
Other advantages include the following feature.
When connected to multiple i.LINK devices, your i.LINK device can perform data transfer and other operations not only
with the directly connected devices but also with any of the devices that are connected to those devices. Therefore, you do not need to be concerned with device connection order.
However, depending on the features and specifications of the connected devices, you may need to use certain functions differently, and you may not be able to transfer data or perform certain operations.

i.LINK, a nickname for IEEE 1394 proposed by Sony, is a trademark supported by many companies worldwide.
IEEE 1394 is an international standard defined by IEEE, the Institute of Electrical and Electronics Engineers, Inc.

Note

The camcorder can be connected to one device with the i.LINK cable (DV cable). When you connect with an HDV or DV device that has two or more i.LINK connectors, refer to the operating instructions supplied with the connected device.

About data transfer speed of i.LINK

i.LINK defines a maximum data transfer speed of approximately 100, 200 and 400 Mbps [1)] that are described as S100, S200 and S400 respectively. For i.LINK devices, a maximum data transfer speed that the device supports is identified on "Specifications" page of the operating instructions supplied with the device or near its i.LINK connector.

1) When connecting with the device that support different data transfer speed, the actual data transfer speed may be different from those described on the i.LINK connectors.

What is Mbps?

Mega bits per second. A measure of the rate at which data is transmitted per second. In case of 100 Mbps, 100 Mega bits of data can be transmitted per second.

i.LINK operation with your camcorder

For details on operation when other equipment with i.LINK (HDV or DV) connector is connected, see *page 162*.

For details on connection with i.LINK cable and necessary software, refer to the operating instructions supplied with the connected device.

About the required i.LINK cable

Use the Sony 6-pin-to-4-pin or 6-pin-to-6-pin i.LINK cable to connect the i.LINK devices.

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