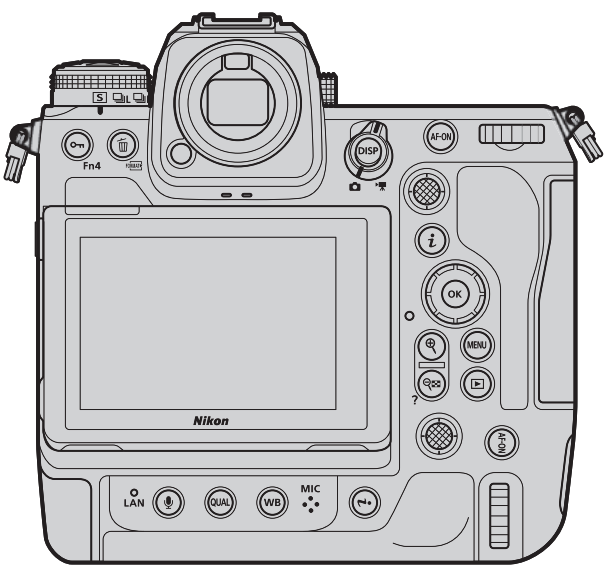
Nikon

Z 9 Professional

Technical guide
— N-RAW —



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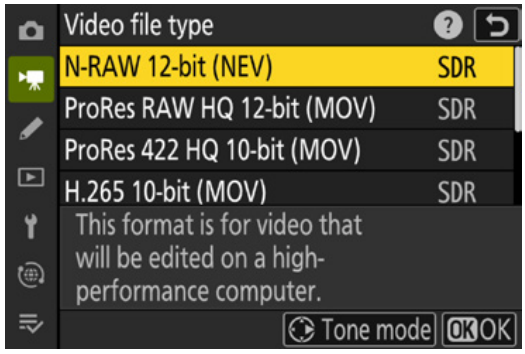
About RAW Video

RAW video is a video file that is output directly from the camera's image sensor without any in-camera image processing (RGB data before demosaicing)*. Like RAW still images, RAW video files record rich image information (tonal gradation, etc.), meaning they offer greater flexibility in color grading compared to Log video or video recorded in-camera.
N-RAW is a video format that maintains a fine structure preventing color banding from occurring, while achieving a file size approximately half that of ProRes RAW.

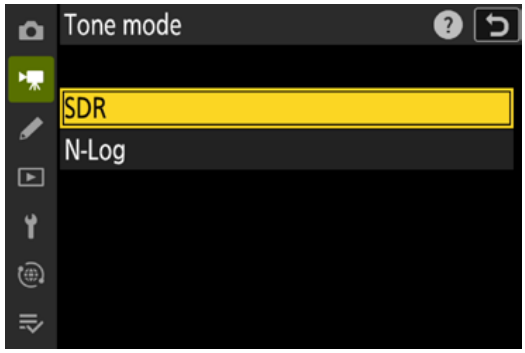
* Since noise reduction, lens aberration compensation and electronic VR are generally performed by in-camera processing, RAW video files that are not subject to in-camera processing do not go through these processing.

Camera settings

1. Select **Video file type** > **N-RAW 12-bit (NEV)**

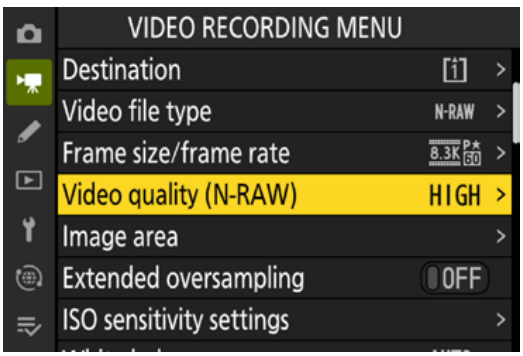


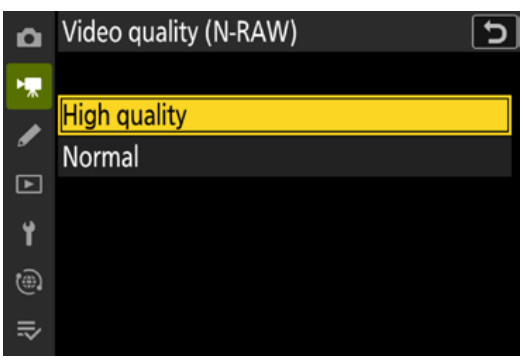
2. Select **Tone mode** > **SDR** or **N-Log**



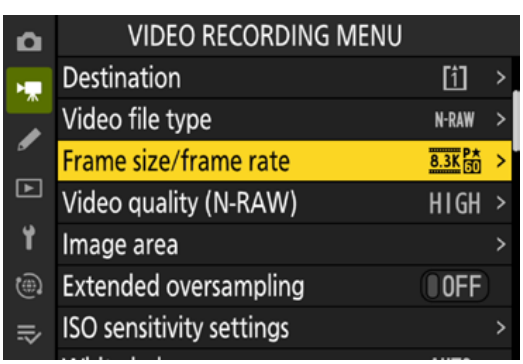
Camera settings

3. Select **VIDEO RECORDING MENU** > **Video quality (N-RAW)** > **High quality** or **Normal**





4. Select **VIDEO RECORDING MENU** > **Frame size/frame rate** to set your target output mode



About tone mode

Before recording in N-RAW, you must select the tone mode from either [SDR] or [N-Log].

Because each tone mode possesses different characteristics that cannot be changed in post-processing, select the tone mode according to your workflow and the expression you desire.

The [SDR] tone mode is optimal for SDR workflows, allowing for shooting at low sensitivities below ISO 800 and offering superior noise performance in dark areas compared to the [N-Log] mode.

The [N-Log] tone mode is appropriate for Log and HDR workflows. The minimum ISO sensitivity that can be set is 800. This mode is recommended for highly flexible color grading because it achieves superior dynamic range performance on the highlight side.

Restrictions for recording videos in N-RAW format

Restrictions on selecting the [SDR] or [N-Log] tone mode are as follows.

Restrictions when tone mode is [SDR]

	Selectability	Effectiveness
Image areas	Cannot be set	Disabled
Extended oversampling	Can be set	Disabled
ISO sensitivity settings	Can be set	High range is unavailable
Picture Control	Can be set	Disabled
Active D-Lighting	Cannot be set	Disabled
High ISO NR	Cannot be set	Disabled
Vignette control	Can be set	Disabled
Diffraction compensation	Cannot be set	Disabled
Auto distortion control (forced with lens mounted)	Cannot be set	Disabled
Auto distortion control (can be set with lens mounted)	Can be set	Disabled
Electronic VR	Cannot be set	Disabled

Restrictions when tone mode is [N-Log]

	Selectability	Effectiveness
Image areas	Cannot be set	Disabled
Extended oversampling	Can be set	Disabled
ISO sensitivity settings	Can be set	Cannot be set for ISO sensitivity of 800 or lower and high range
Picture Control	Cannot be set	Disabled
Active D-Lighting	Cannot be set	Disabled
High ISO NR	Cannot be set	Disabled
Vignette control	Can be set	Disabled
Diffraction compensation	Cannot be set	Disabled
Auto distortion control (forced with lens mounted)	Cannot be set	Disabled
Auto distortion control (can be set with lens mounted)	Can be set	Disabled
Electronic VR	Cannot be set	Disabled

Common restrictions

- Magnification of the display is disabled during video recording
- Video recording cannot be started when a memory card format is "FAT32"
- The maximum resolution of the HDMI output is "1920x1080"
- In-camera video editing is unavailable

N-RAW data information (image size, etc.)

The Image area/frame size/frame rate for N-RAW is as follows:

Image area	Category	Frame size	Frame rate
FX	8K	8.3K (8256×4644)	60p
			50p
			30p
			25p
			24p
	4K	4.1K (4128×2322)	120p
			100p
			60p
			50p
			30p
			25p
			24p
DX		5.4K (5392×3032)	60p
			50p
			30p
			25p
			24p
2.3×		3.8K (3840×2160)	120p
			100p

DaVinci Resolve

Editing procedure for N-RAW

1 Create a new project

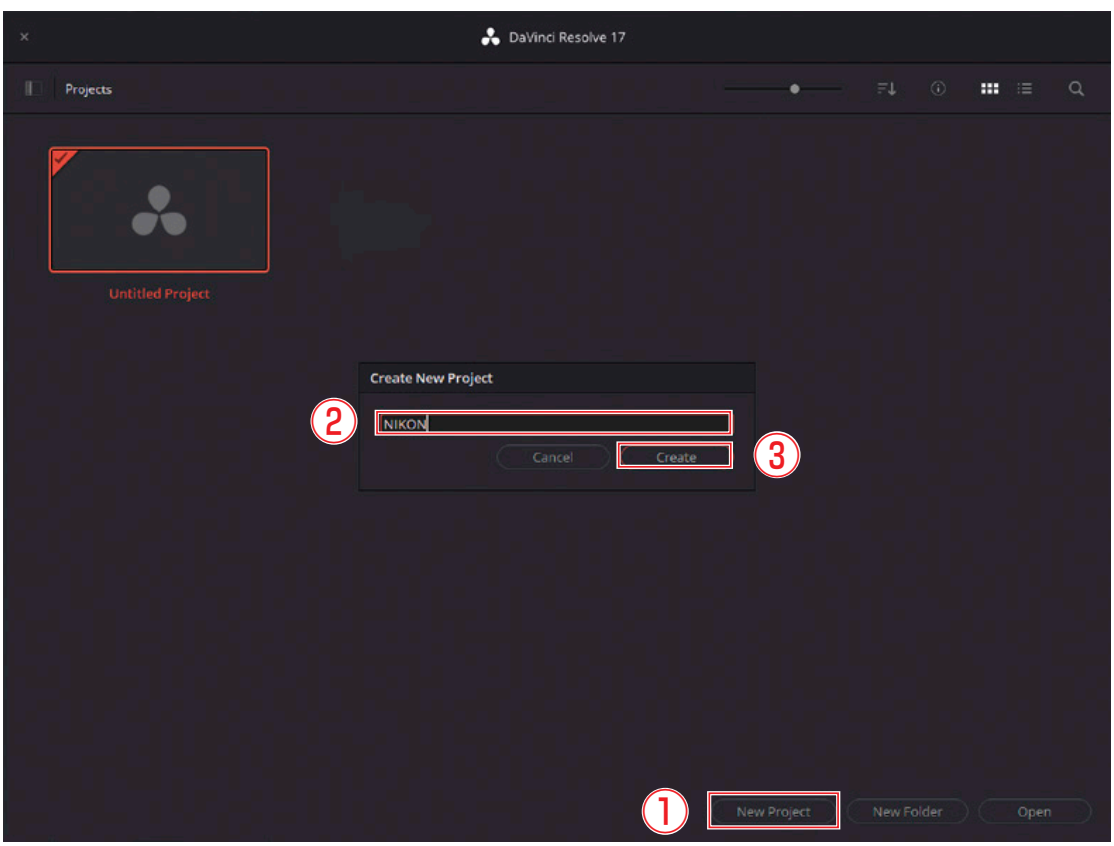
* The following procedure explains how to create a video that can be viewed in Rec.709 Gamma 2.4 using N-RAW data recorded in 8K/60p, tone mode **N-Log**, as a typical example.

* Paid version of DaVinci Resolve 17.4.6 or later is required for editing work including rendering.

* Please download and install DaVinci Resolve from the URL below.

<URL> https://www.blackmagicdesign.com/products/davinciresolve

Note: This URL is as of June, 2022.

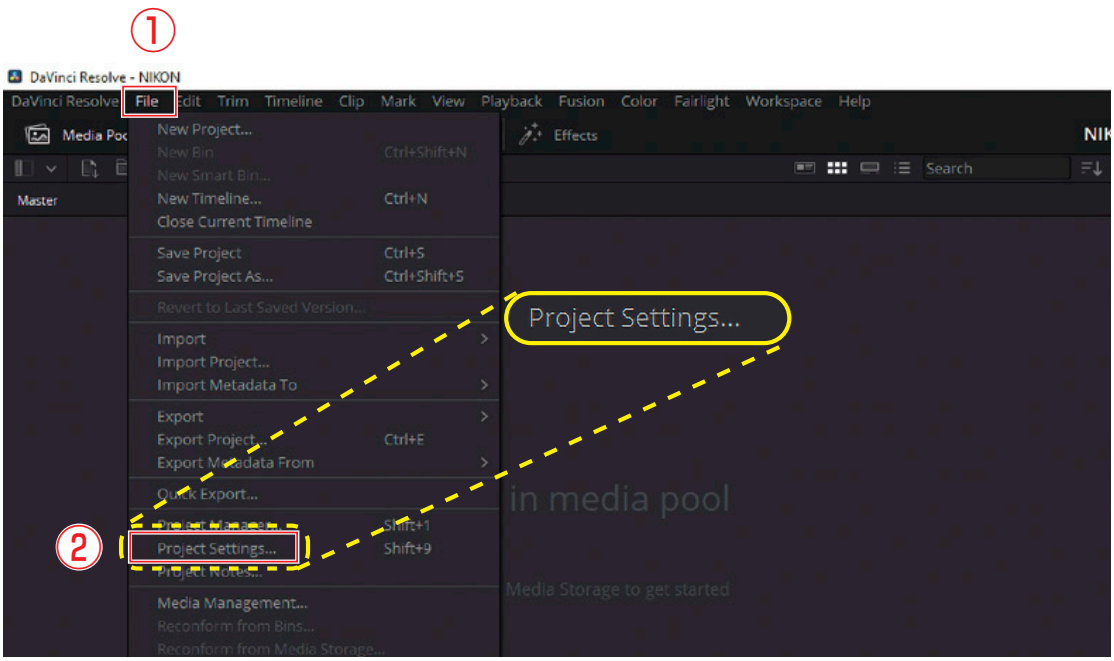


① Select **New Project** at the bottom of the screen

② Name the new project

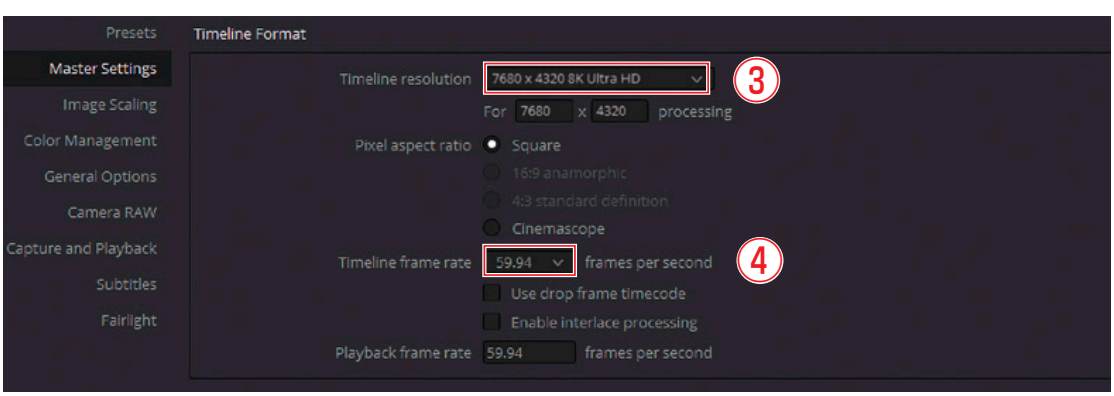
③ Select **Create** to create a new project

2 Set the master settings for the project you created



① Select **File** on the menu bar

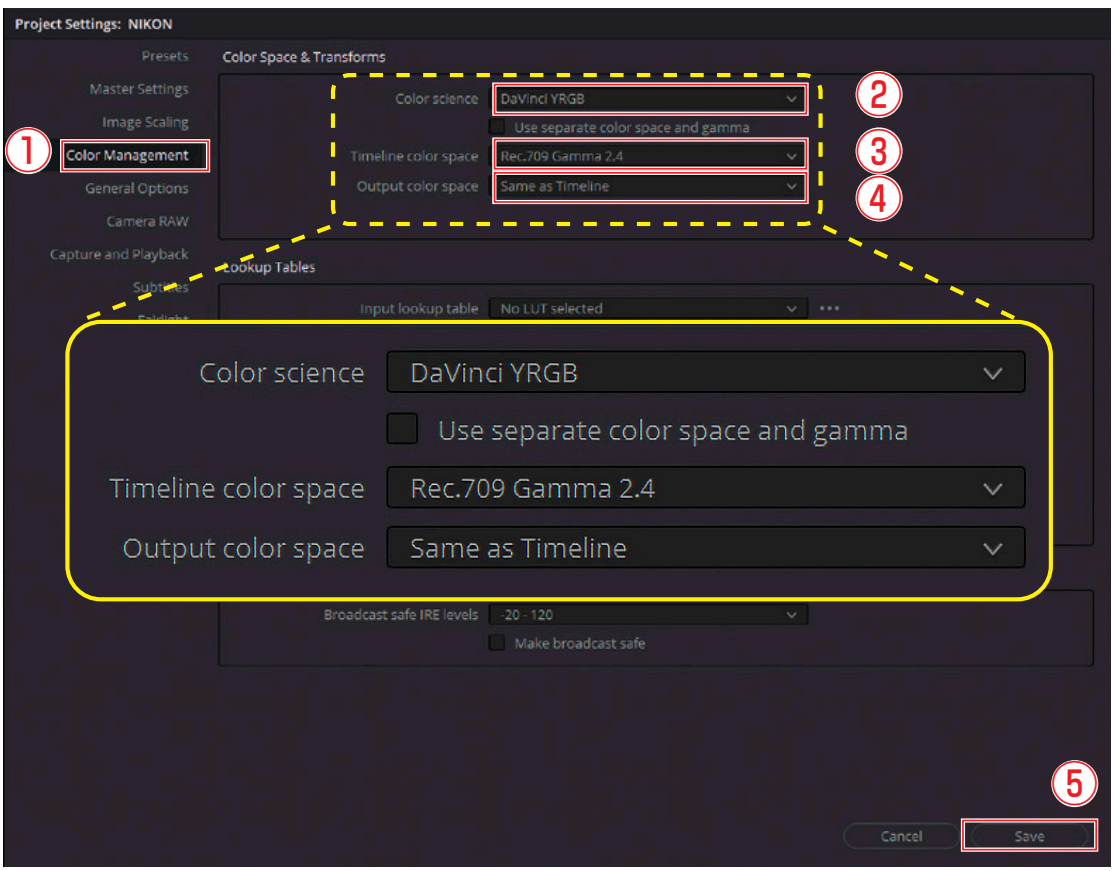
② Select **Project Settings**



③ Select **Timeline resolution**
> 7680 x 4320 8K Ultra HD

④ Select **Timeline frame rate > 59.94**

3 Check the color management settings



① Select **Color Management** in the project settings

② Confirm that **Color science** is set to the default setting of **DaVinci YRGB**

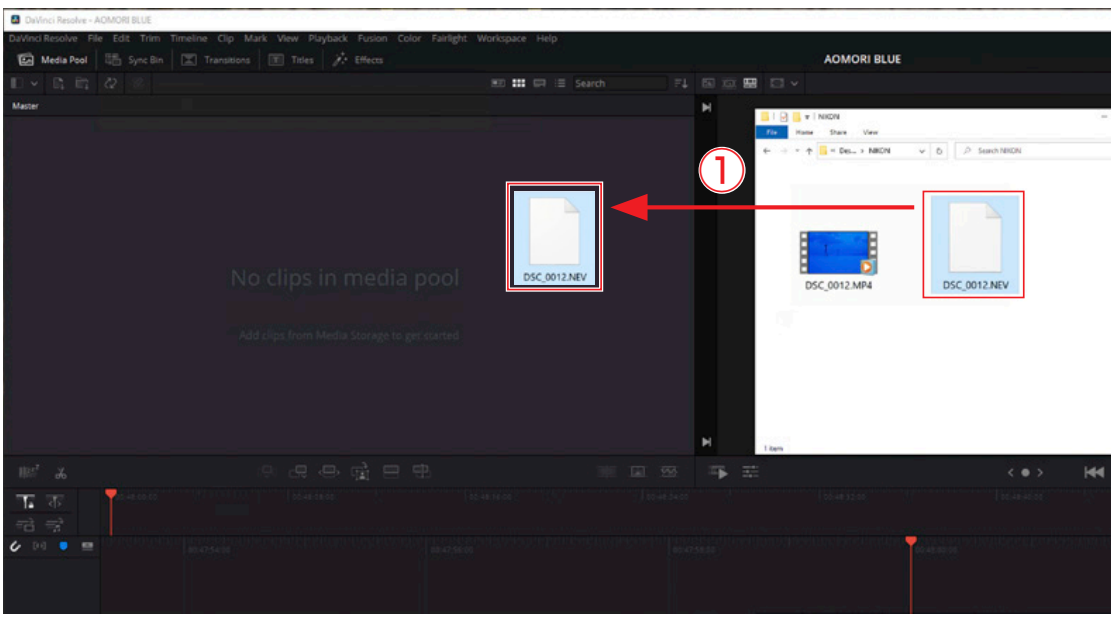
③ Confirm that **Timeline color space** is set to the default setting of **Rec.709 Gamma 2.4**

④ Confirm that **Output color space** is set to the default setting of **Same as Timeline**

⑤ Save the project settings

Editing procedure for N-RAW

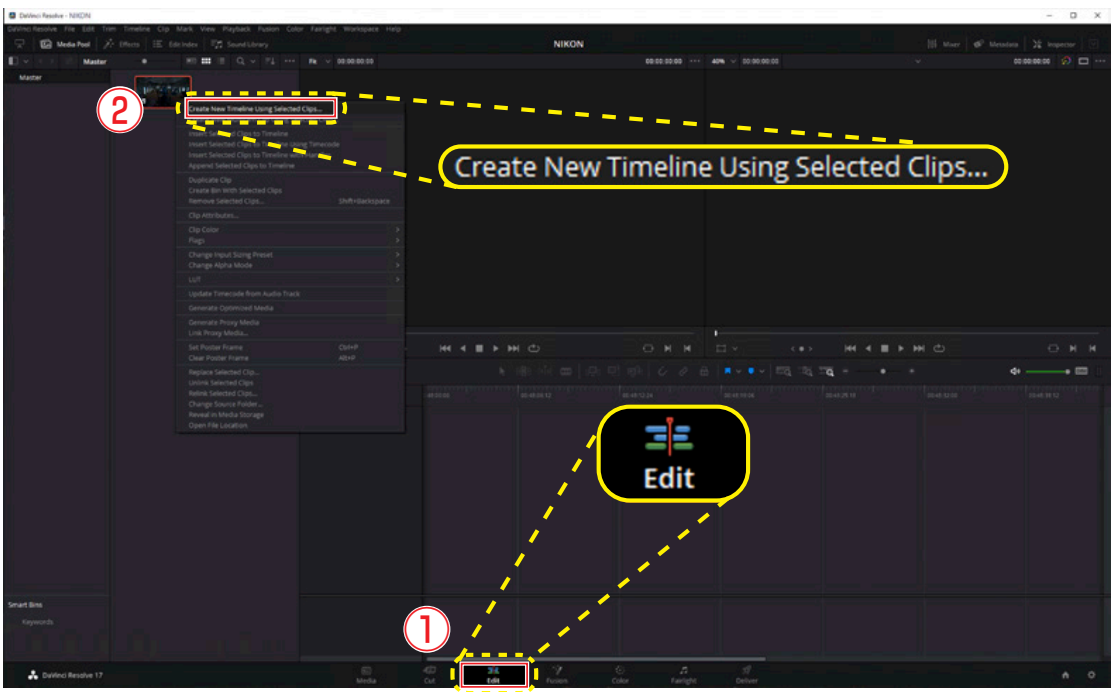
4 Import the data recorded in 8K/60p N-RAW



① Open the folder where the data is stored and drag-and-drop to the media pool

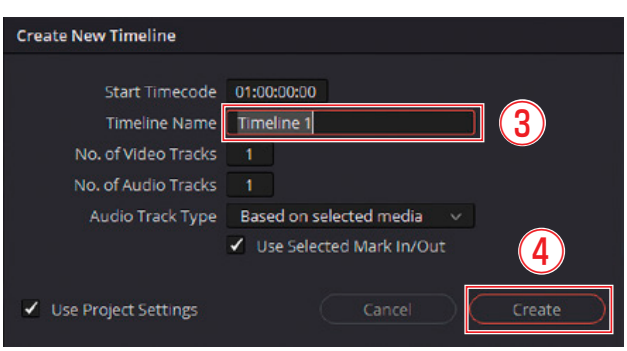
Editing procedure for N-RAW

5 Edit the video



① Select the **Edit** tab at the bottom of the screen to move to the edit page

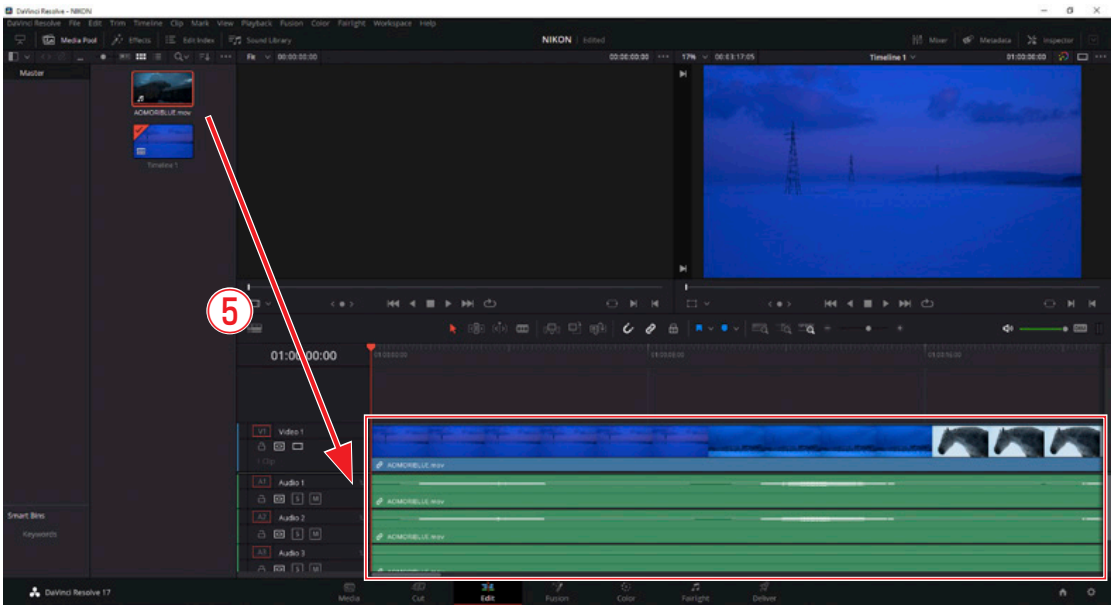
② Right-click the data and select **Create New Timeline Using Selected Clips**



③ Name the timeline

④ Select **Create**

Editing procedure for N-RAW

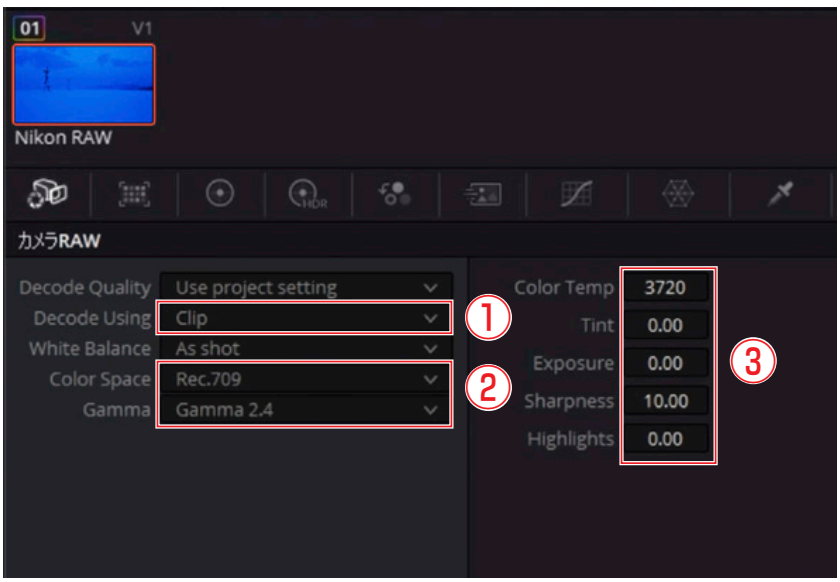


⑤ Drag-and-drop the N-RAW data to the timeline

Editing procedure for N-RAW

6 Change the color space and gamma of the recorded data according to the timeline color space and output color space

Conversion pattern 1: Convert from the camera RAW



① Select **Decode Using** > **Clip** to allow **Color Space** and **Gamma** to be changed for each clip

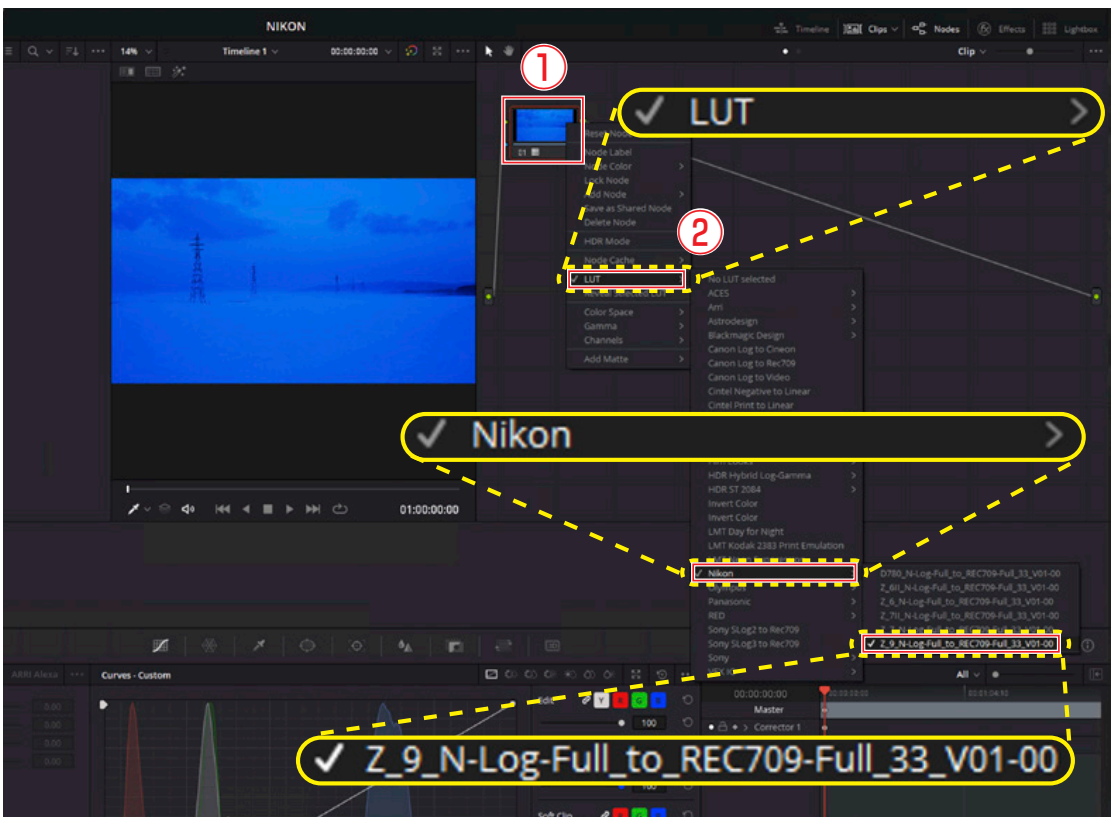
② Set **Color Space** to **Rec.709** and **Gamma** to **Gamma 2.4**

③ Change the color temperature and exposure as you would when editing RAW stills

Editing procedure for N-RAW

Conversion pattern 2: Use N-Log 3D LUT

* It is assumed that the N-Log 3D LUT provided by Nikon is registered with DaVinci Resolve.



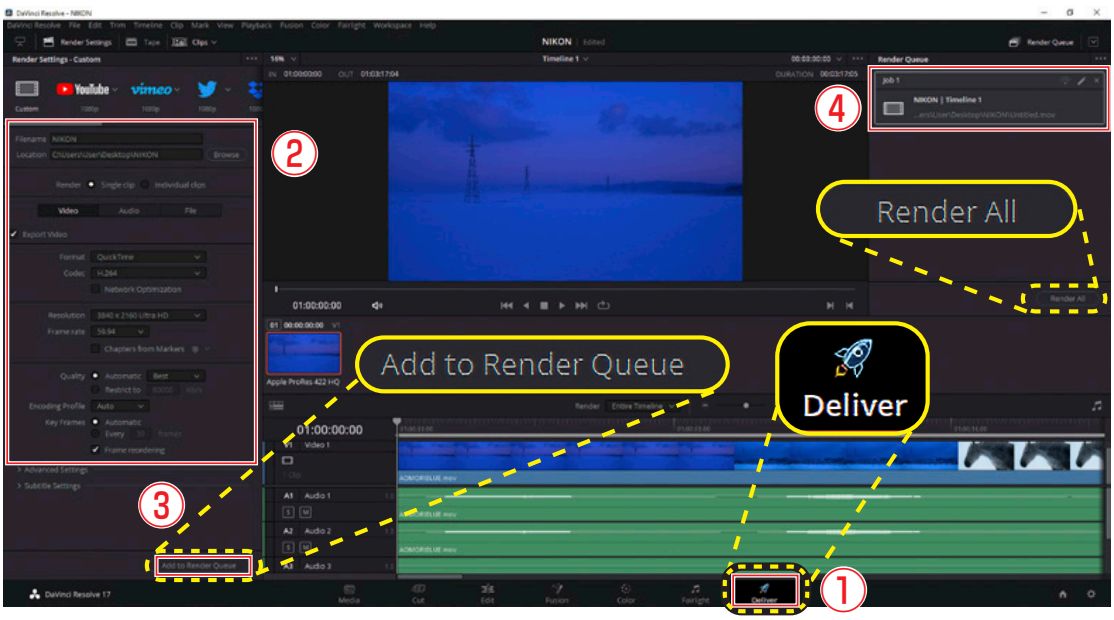
① Right-click the image displayed in the Node editor at the top right

② Select **LUT** > **Nikon** > **Z_9_N-Log-Full_to_REC709-Full_33_V01-00**

③ As with pattern 1, changing **Clip** from **Project**, which is the default setting for **Decode Using**, allows you to change **Color Space** and **Gamma** for each clip, and adjust the color temperature as well

Editing procedure for N-RAW

7 Export the data



① Select the **Deliver** tab at the bottom right of the screen

② Type the file name in the **Render Settings**

③ Scroll down and confirm that the resolution and frame rate of the timeline is the same as the project. When the setting is finished, select **Add to Render Queue**

④ When the job is added to the **Render Queue**, select the objective job and select **Render All**

EDIUS X Pro

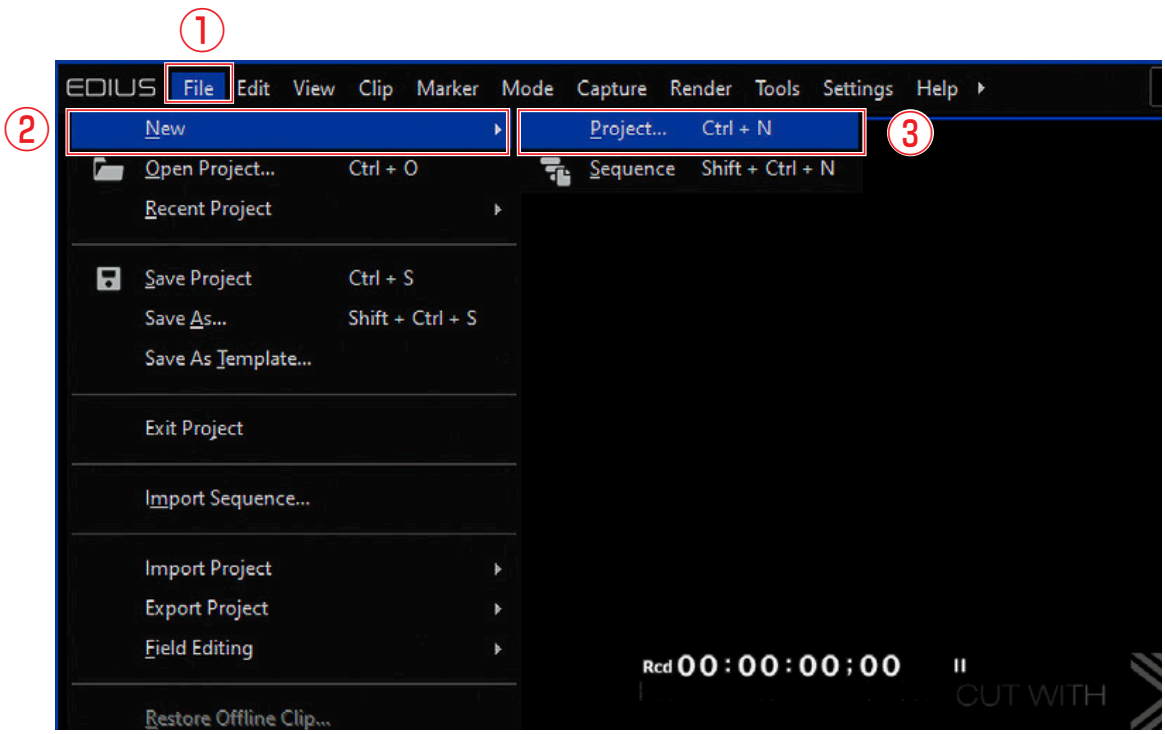
Editing procedure for N-RAW

1 Create new project

* The following procedure explains how to create a video that can be viewed in SDR using N-RAW data recorded in 8K/60p, tone mode N-Log, as a typical example.
* Paid version of EDIUS X Pro 10.32 or later is required for editing work including rendering.
* Please download and install EDIUS X Pro from the URL below.

<URL> https://www.ediusworld.com/products/index.html

Note: This URL is as of June, 2022.



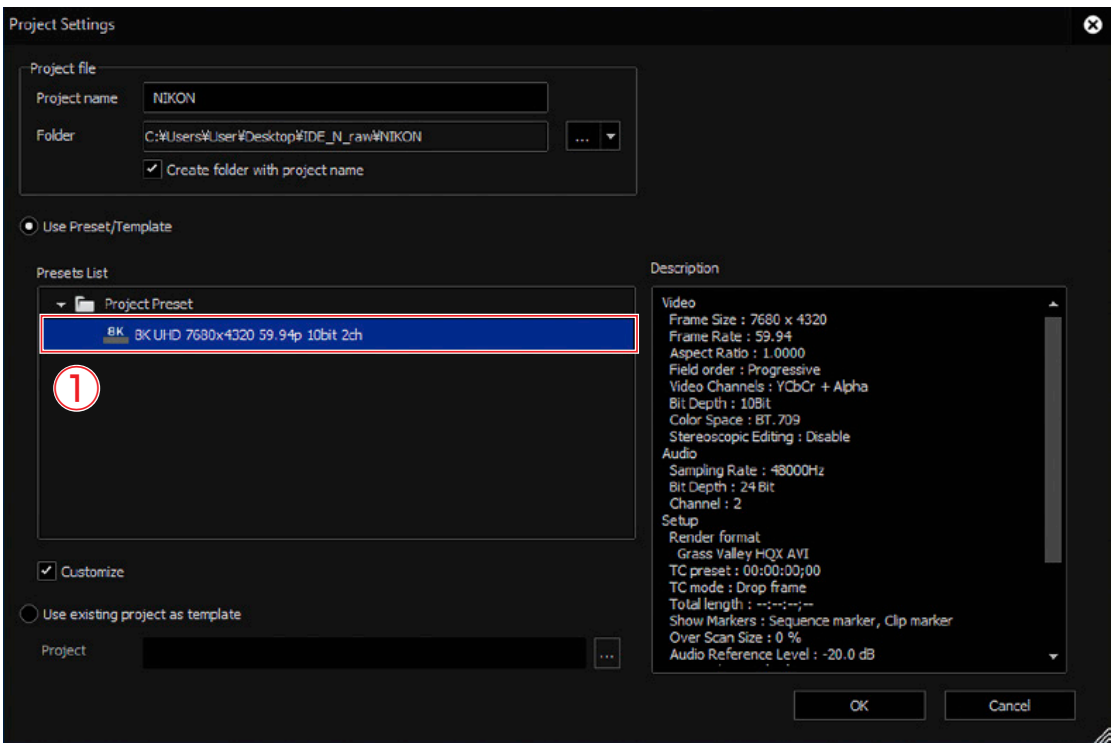
① Select **File** on the menu bar

② Select **New**

③ Select **Project** to create a new project

Editing procedure for N-RAW

2 Configure the project settings



① Select an available preset

② Select **Customize**

③ Select **OK**

3 Change the detailed settings of the project

① Select **Video Preset** > **8K UHD 7680 x 4320 59.94p**

② Select **Video Bit Depth** > **10bit**

③ Select **Color Space** > **BT.709**

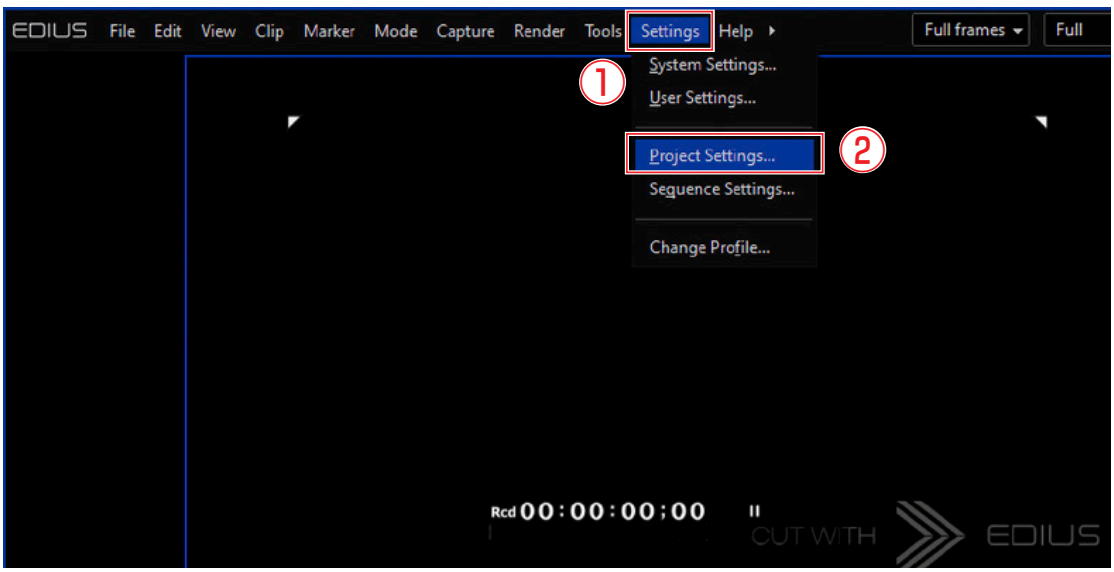
④ Confirm that **HDR/SDR gain** is set to the default setting of **6.15 dB**

⑤ Confirm that **Tone mapping** is set to the default setting of **Soft Clip**

⑤ Select **OK**

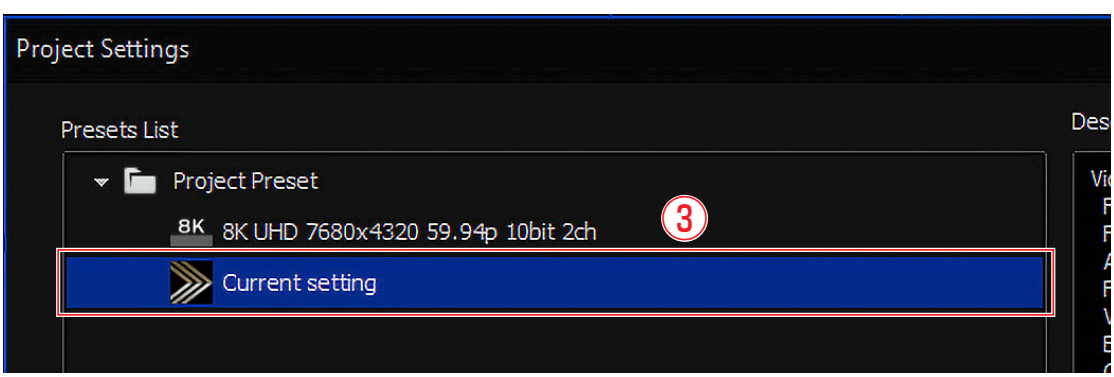
Editing procedure for N-RAW

* You can also change the settings of projects that you have previously finished.



① Select **Settings** on the menu bar

② Select **Project Settings**



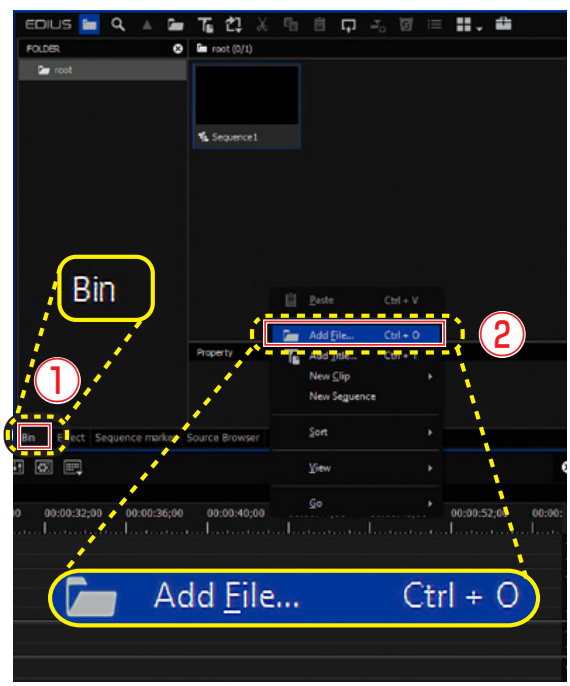
③ Change the settings from **Current setting**

Editing procedure for N-RAW

4 Import the data recorded in 8K/60p N-RAW

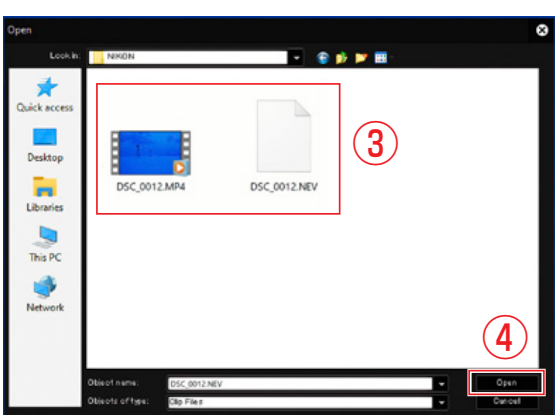
* Proxy files need to be imported at the same time, assuming editing utilizing the EDIUS proxy mode.

* Editing RAW videos of 8K/60p requires high CPU processing power. Therefore, the EDIUS proxy mode is recommended for editing.



① Right-click any empty space in the **Bin** panel at the top right where you manage imported clips

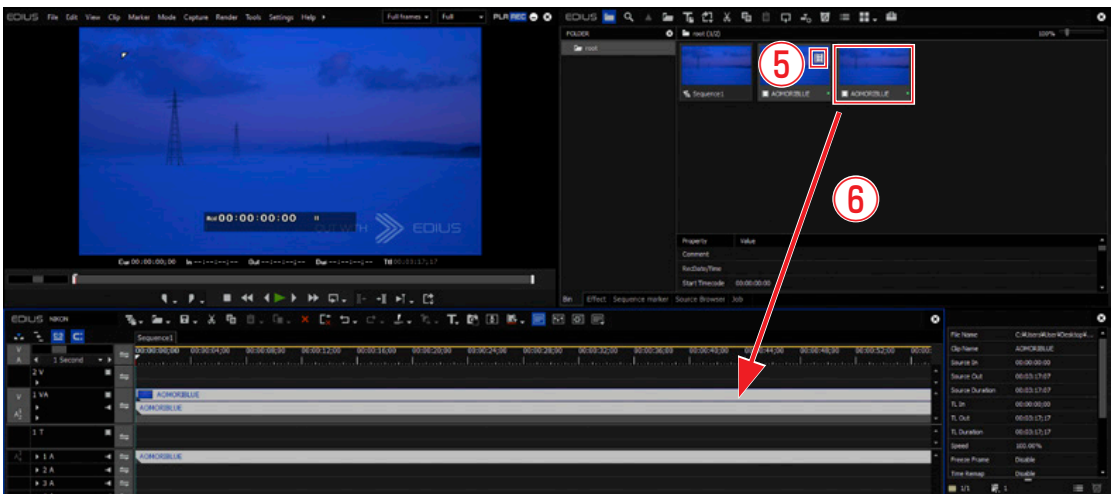
② Select **Add File**



③ When you record RAW videos with the Z 9, both N-RAW and proxy files are generated in the same folder. Select the proxy file as well as the N-RAW file

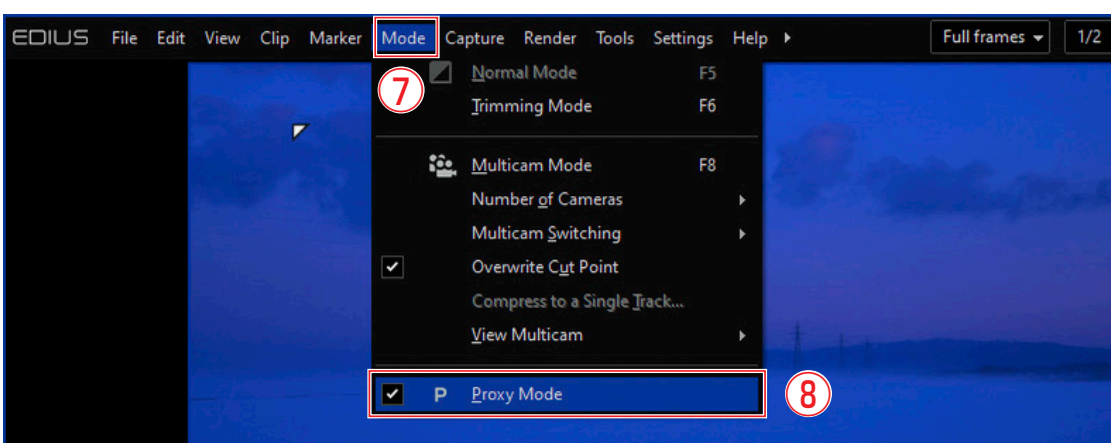
④ Select **Open**

Editing procedure for N-RAW



⑤ When the proxy file that is paired with the N-RAW file is imported to EDIUS, a temporary editing clip mark appears at the top right corner on the image displayed in the **Bin** panel

⑥ Drag-and-drop the N-RAW file to the timeline



⑦ Select **Mode** on the menu bar

⑧ Select **Proxy Mode**

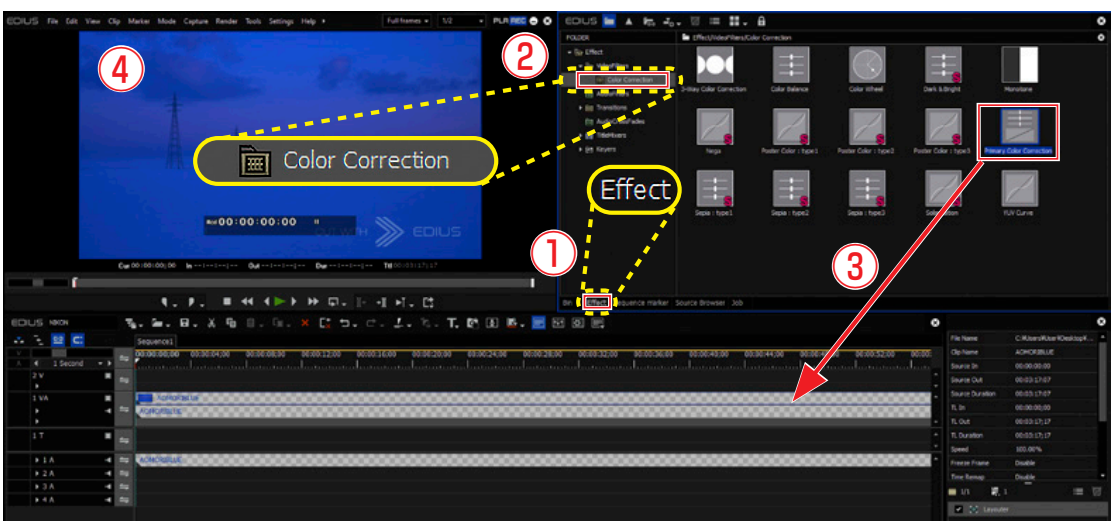
* When the display of the clip shows a grid-like display appearing on the timeline, the system has switched from the original N-RAW to a proxy-handling state.

Editing procedure for N-RAW

5 Convert the color space and gamma of the recorded data according to the project settings

* As previously set up, it is assumed that the video will be viewed in SDR and color space BT.709.
* When N-RAW data is imported to EDIUS, it is decoded as N-Log, so that color space is set to rec.2020 and the gamma is set to N-Log.

Conversion pattern 1: Convert from the effect



For the conversion, apply color grading to the clip recorded in Log format and use the primary color correction that allows you to adjust brightness and color.

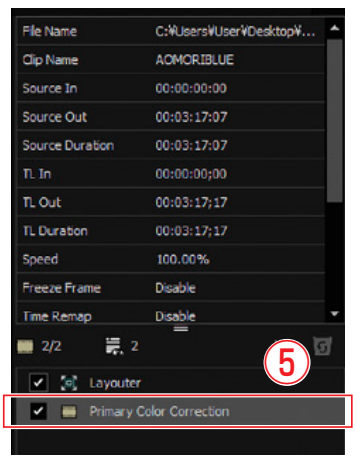
① Change the tab of the panel at the top right from **Bin** to **Effect**

② Select **Video Filters** > **Color Correction**

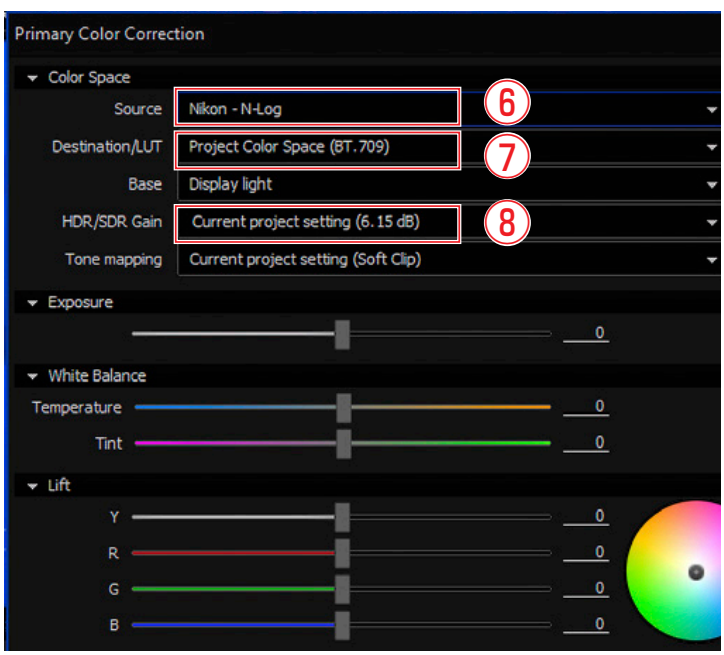
③ Open the folder, select **Primary Color Correction**, and drag and drop the effect to the clip in the timeline

Editing procedure for N-RAW

④ Confirm that the display of the preview window changes



⑤ Double-click the **Primary Color Correction** in the **Information** panel to open the **Primary Color Correction**



⑥ Confirm that **Color Space** > **Source** is set to **N-log**

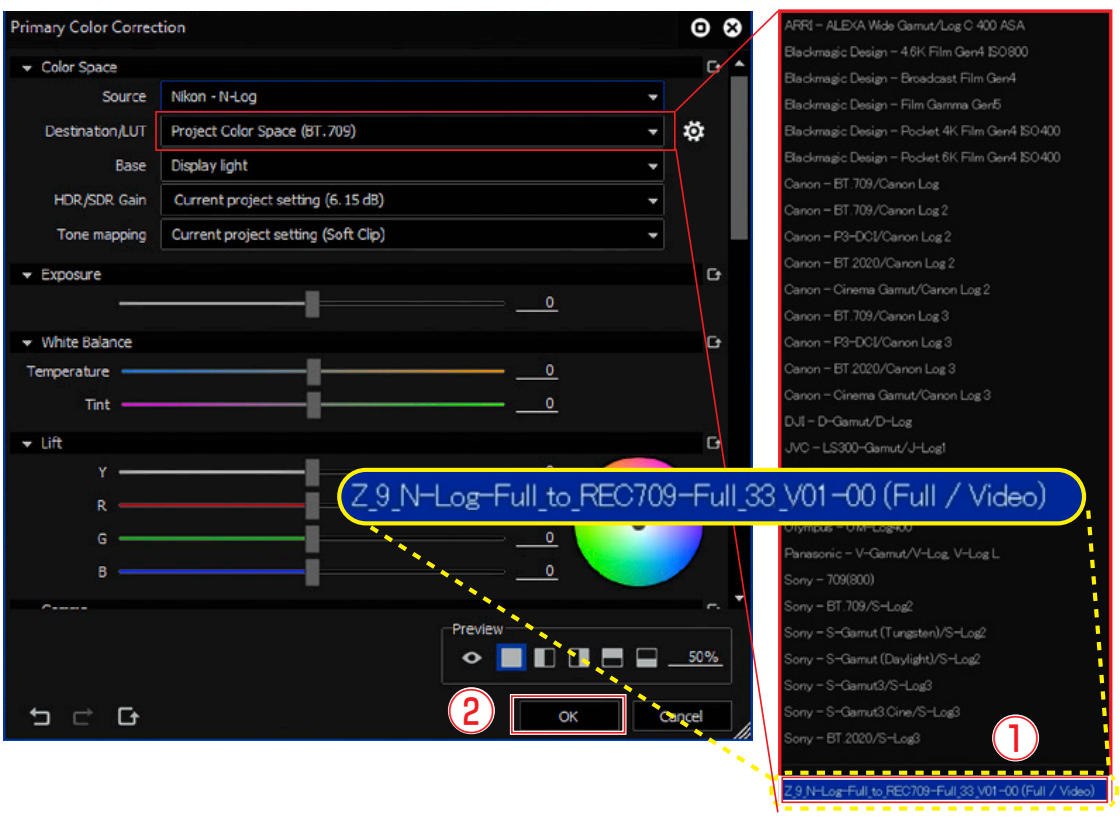
⑦ Confirm that **Destination/LUT** is set to **Project Color Space (BT.709)**

⑧ Confirm that **HDR/SDR Gain** is the same as the project settings, and that N-Log (decoded from N-RAW) as source file is converted to SDR BT.709

Editing procedure for N-RAW

Conversion pattern 2: Use N-Log 3D LUT

* It is assumed that the 3D-LUT provided by Nikon is registered with EDIUS.

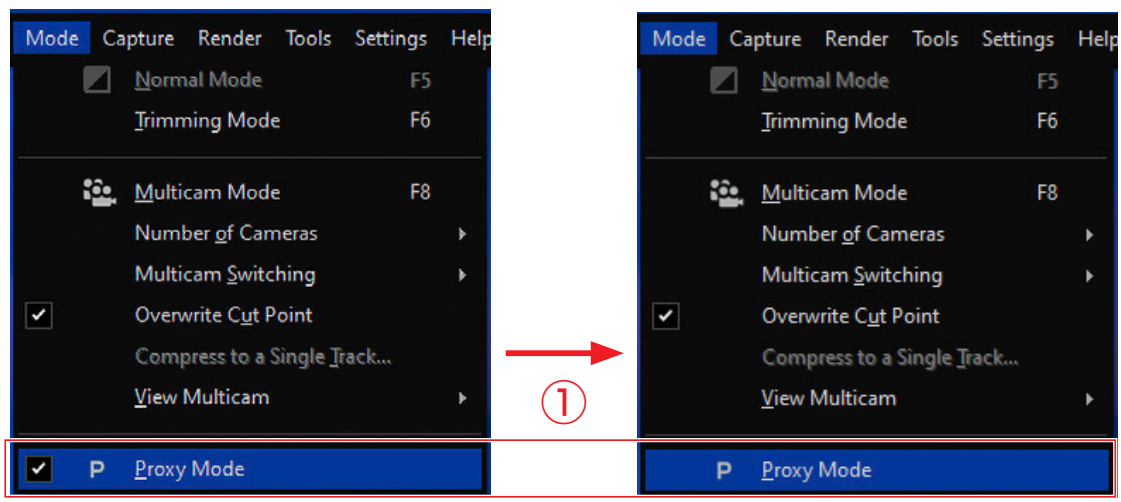


① Select **Destination/LUT** > **Z_9_N-Log-Full_to_REC709-Full_33_V01-00(Full/Video)**

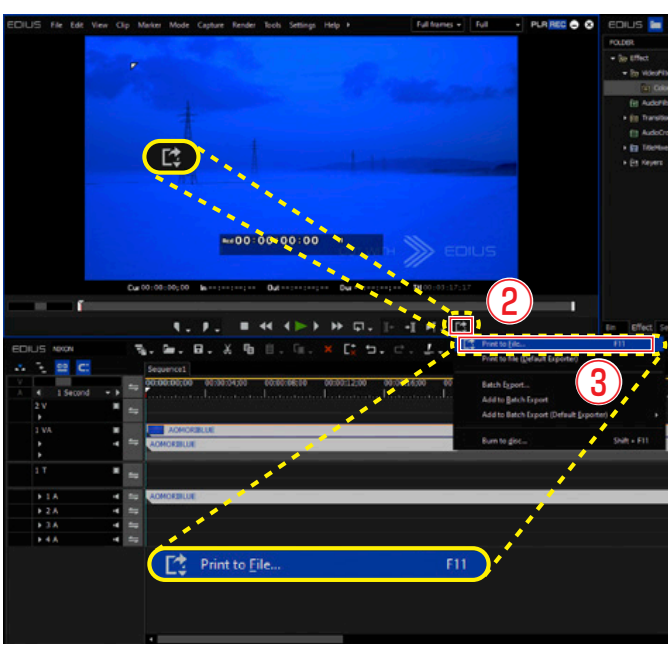
② Select **OK**

6 Export the video in the timeline

* It can be assumed that an actual workflow has editing and color grading before the following steps, however, this manual omits the explanation.



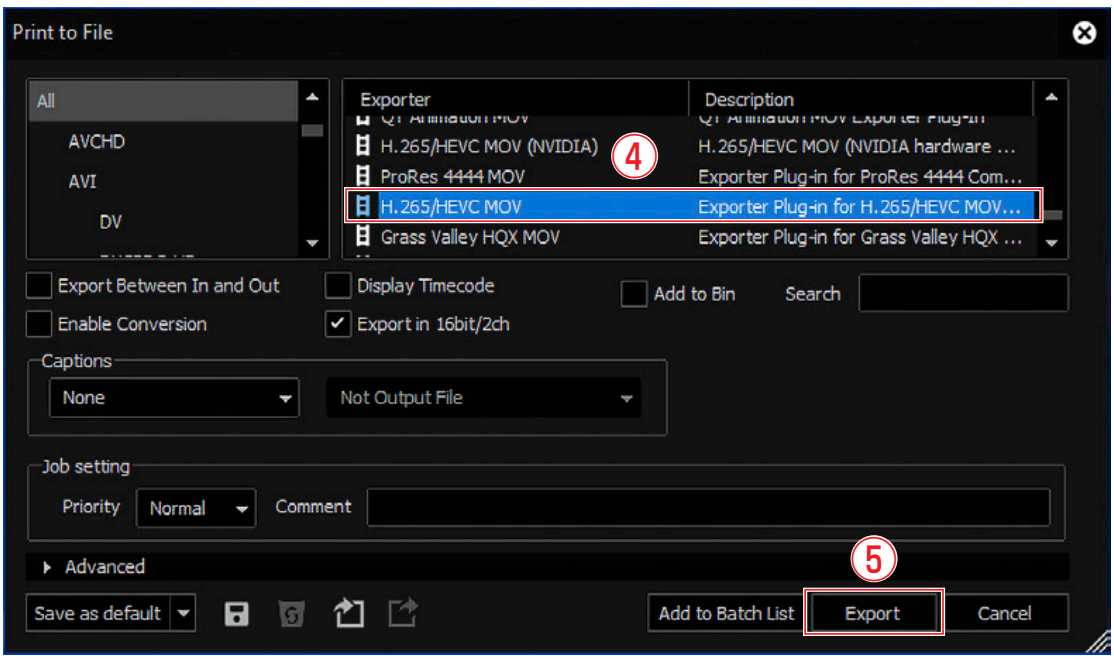
① Select **Mode** on the menu bar and uncheck **Proxy Mode**



② Select **Export** at the bottom of the preview window

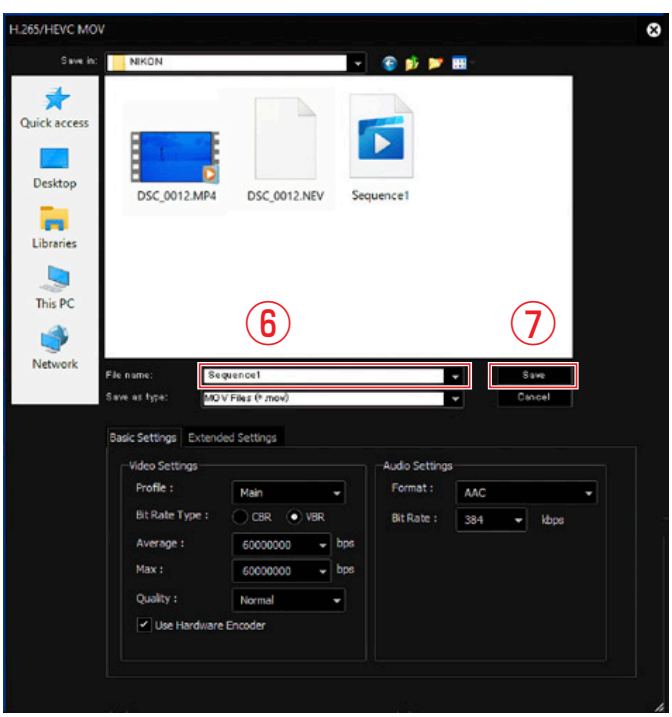
③ Select **Print to File**

Editing procedure for N-RAW



④ Select an exporter

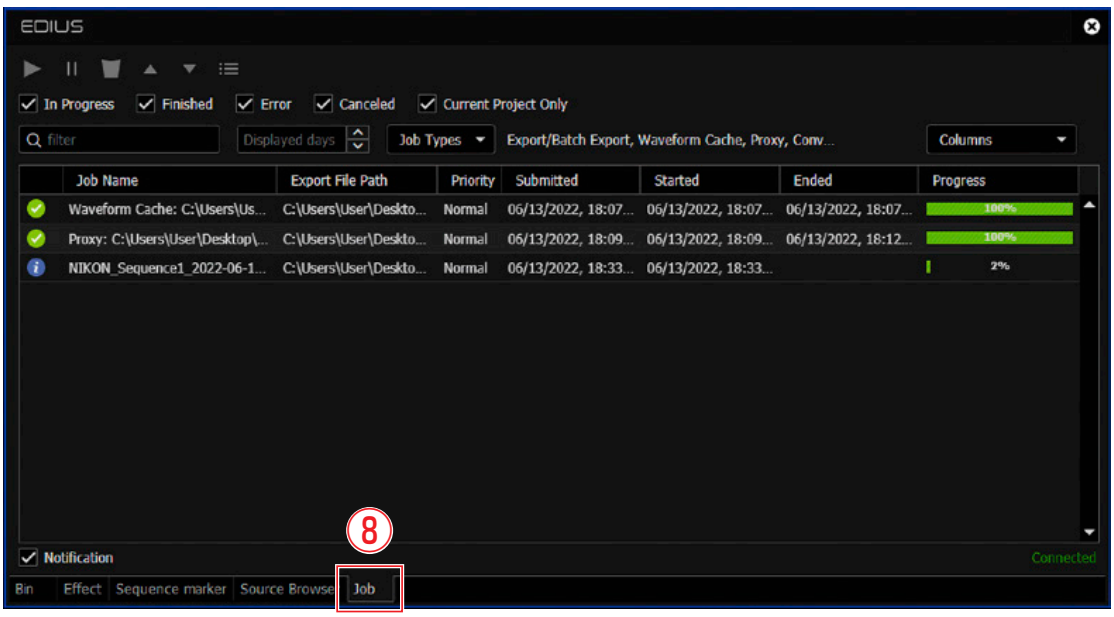
⑤ Select **Export**



⑥ Name the file

⑦ Select **Save**

Editing procedure for N-RAW



⑧ Select the **Job** tab and check the rendering progress

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