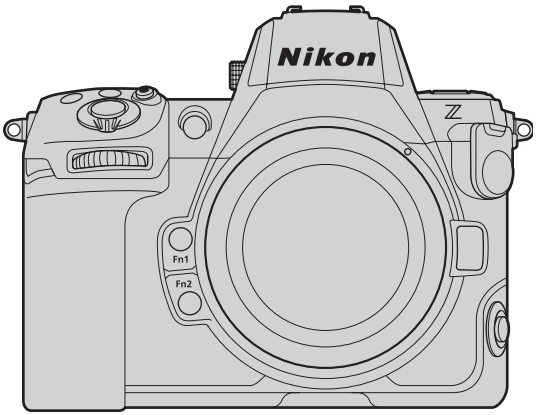
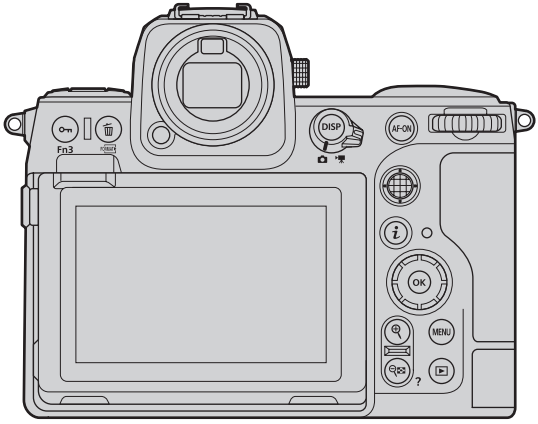
Nikon



Z 8 Professional Technical Guide

—HLG Photo Edition—



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HLG Photos

HLG Photos Defined

“HLG photos” are photos that support a wider range of brightnesses (i.e., dynamic range) than do SDR (Standard Dynamic Range) JPEG pictures. The Z 8 supports HLG with two formats: RAW (extension “.NEF”) and HEIF (extension “.HIF”).

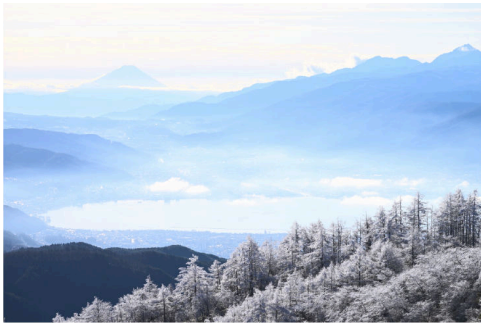
Tip: HLG

Developed for television broadcasting and other high-definition applications, Hybrid Log-Gamma (HLG) technology is a High Dynamic Range (HDR) standard that allows for photographs with a wider range of tones, minimizing loss of detail in highlights and shadows.

- Compared with Standard Dynamic Range (SDR), it increases the amount of detail that can be expressed in the upper half of the tone range for greater rendering potential.
- It matches SDR in the level of detail that can be expressed in the lower portion of the tone range to ensure compatibility with non-HDR displays.

The Benefits of HLG

HLG photos have a wider dynamic range than those recorded using SDR. They are consequently capable of reproducing colors in rich detail, similar to how they actually appear to the human eye. HLG minimizes loss of detail in highlights and shadows to render a richer range of tones in all areas of photos featuring scenes that include both bright and dark areas, such as, for example, sunsets and sunrises. It also serves to reduce loss of detail in highlights in scenes featuring bright light sources such as light shows or the sun.



SDR

HLG

Note: These images are concept art intended to illustrate the differences between SDR and HLG. The tones differ from those that would be seen in the actual images.

Taking and Editing HLG Photos

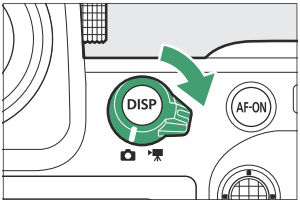
Configuring the Camera for HLG

Choosing the HLG Tone Mode

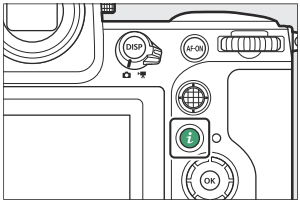
To take HLG photos, select the HLG tone mode. The selection can be made via either the i or the photo shooting menu.

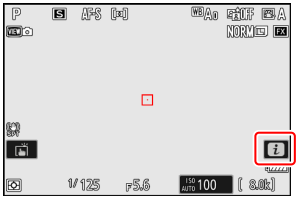
The i Menu

1 **Select photo mode by rotating the photo/video selector to .**



2 **Press the i button or tap the i icon in the monitor to view the i menu for photo mode.**



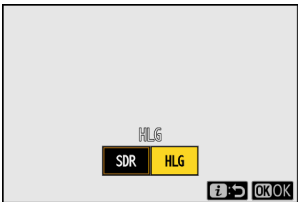


3 **Highlight [Tone mode] and press OK.**

- Tone mode options will be displayed.

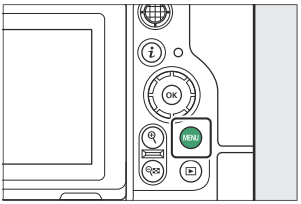
4 **Highlight [HLG] and press ⓚ.**

- This selects the highlighted option and returns you to the i menu.

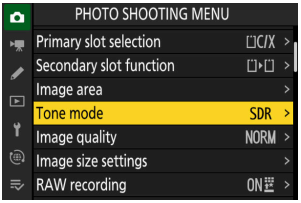


The Photo Shooting Menu

1 **Press the MENU button to view the menus.**

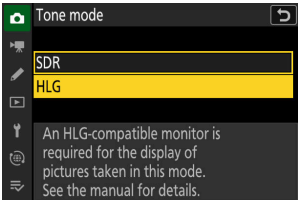


2 **After highlighting the 📷 tab to display the photo shooting menu, highlight [Tone mode], and press the multi selector right (▶).**



3 **Highlight [HLG] and press ⓚ.**

- This selects the highlighted option and returns you to the menus.

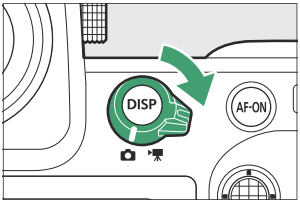


Adjusting Image Quality

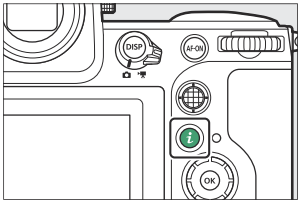
The Z 8 supports HLG with two formats: RAW (NEF) and HEIF. Depending on the option selected for image quality, photos can be recorded only in RAW (NEF) format, only in HEIF format, or in both formats. The selection can be made via either the **i** or the photo shooting menu.

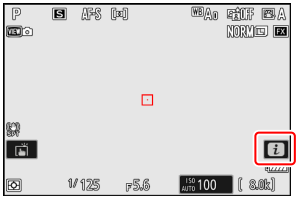
The i Menu

1 **Select photo mode by rotating the photo/video selector to .**



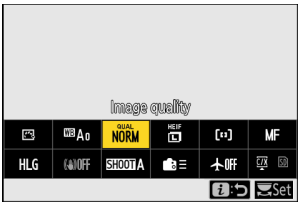
2 **Press the i button or tap the i icon in the monitor to view the i menu for photo mode.**





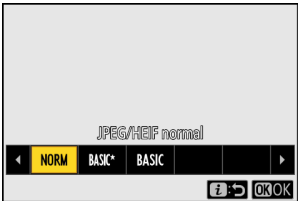
3 **Highlight [Image quality] and press OK.**

- Image quality options will be displayed.



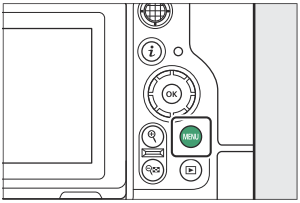
4 **Highlight the desired option and press OK.**

- This selects the highlighted option and returns you to the **i** menu.
- For information on the options available, see “Image Quality Options” (📖 9).

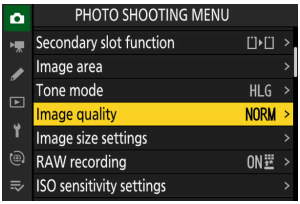


The Photo Shooting Menu

1 **Press the MENU button to view the menus.**



2 **After highlighting the tab to display the photo shooting menu, highlight [Image quality], and press the multi selector right (▶).**



3 **Highlight the desired option and press OK.**

- This selects the highlighted option and returns you to the menus.
- For information on the options available, see “Image Quality Options” (9).

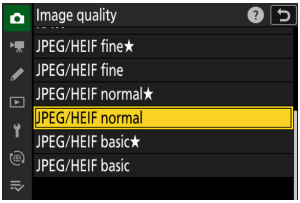


Image Quality Options

The image quality options available when HLG is selected for tone mode are listed below.

Option	Description
[**RAW + JPEG/HEIF fine★**]	Record two copies of each photo: an NEF (RAW) picture and an HEIF copy. • Choose options with a star ("★") to maximize the quality of the HEIF copies. Choose options without a star ("★") to ensure that the HEIF copies all have more or less the same file size. • The camera displays only the HEIF copy of dual-format pictures taken with one memory card inserted. • If the photo was recorded with only one memory card inserted or with [**Overflow**] or [**Backup**] selected for [**Secondary slot function**] in the photo shooting menu and two memory cards inserted, deleting the HEIF copy on the camera will also delete the NEF (RAW) picture.
[**RAW + JPEG/HEIF fine**]	
[**RAW + JPEG/HEIF normal★**]	
[**RAW + JPEG/HEIF normal**]	
[**RAW + JPEG/HEIF basic★**]	
[**RAW + JPEG/HEIF basic**]	
[**RAW**]	Record photos in NEF (RAW) format.
[**JPEG/HEIF fine★**]	Record photos in HEIF format. "Fine" produces higher quality pictures than "normal" and "normal" higher quality pictures than "basic". • Choose options with a star ("★") to maximize image quality. Choose options without a star ("★") to ensure that the files are more or less the same size.
[**JPEG/HEIF fine**]	
[**JPEG/HEIF normal★**]	
[**JPEG/HEIF normal**]	
[**JPEG/HEIF basic★**]	
[**JPEG/HEIF basic**]	

Taking Photos in HLG

- Pictures taken with HLG selected for tone mode exhibit more “noise” (in the form of randomly-spaced bright pixels, fog, and lines) than do pictures taken using SDR.
- The performance of subject-detection may drop during autofocus.
- The lowest value available for the [**ISO sensitivity settings**] > [**Maximum sensitivity**] item in the photo shooting menu is ISO 800.
- ISO sensitivities of Hi 0.3 through Hi 2.0 are not available.
- The video file type for time-lapse videos is fixed at [**H.265 10-bit (MOV)**].
- [**Color space**] in the photo shooting menu is fixed at "BT.2100".
- [**Active D-Lighting**], [**Multiple exposure**], and [**HDR overlay**] are not available in the photo shooting menu.
- [**C30**], [**C60**], and [**C120**] cannot be selected for release mode and Custom Setting d3 [**Pre-Release Capture options**] is not available.
- Buffer capacity drops when [**Large**] is selected for [**Image size settings**] > [**Image size**].

Cautions: HLG Photos

- Photos shot with HLG selected for tone mode are subject to the following restrictions:
  - Image overlay is not available with HLG photos. HLG photos will not be displayed in the picture selection dialogs for the various image overlay options available via [**Retouch**] in the playback ***i*** menu.
  - The SnapBridge app can be used to download but not to view HLG photos.
- Photos taken with HLG selected for tone mode may not display correctly on monitors that are not HDR-compatible.

Camera Shooting and Playback Displays

When HLG is selected for tone mode, the shooting and playback displays in the camera monitor and viewfinder may include “noise” in the form of randomly-spaced bright pixels, fog, or lines or may fail to accurately reproduce highlights and highly-saturated colors. In addition, abrupt tone discontinuities may be visible in the camera monitor or viewfinder when photos are displayed full-frame, although the photos themselves are unaffected. For accurate tone reproduction, use monitors, computers, operating systems, applications, and other equipment compatible with HDR.

Tip: Editing HLG Photos

- HLG photos can be edited on the Z 8 using the [**Retouch**] item in the playback ***i*** menu. The following options can be used:
  - RAW processing (current picture; NEF/RAW pictures only)
  - RAW processing (multiple pictures; NEF/RAW pictures only)
  - Trim
  - Resize (current picture)
  - Resize (multiple pictures)
  - D-Lighting
  - Straighten
  - Distortion control
  - Perspective control
  - Monochrome
- HLG photos can also be edited using Nikon's NX Studio software. The options available vary with the file format. For more information, see "Editing (Enhancing) HLG Photos in NX Studio" (🕮 18).

Tip: RAW Processing

- NEF (RAW) photos shot with HLG selected for tone mode can be converted to JPEG or HEIF using the [**Retouch**] item in the playback ***i*** menu (RAW processing). During this process, Picture Controls and settings such as exposure compensation and white balance can be freely adjusted. Note, however, that the JPEG copies may exhibit more "noise" in the form of randomly-spaced bright pixels, fog, or lines than do JPEG copies created from NEF (RAW) pictures taken with SDR selected for tone mode.
- NEF (RAW) photos can also be saved in other formats using Nikon's NX Studio software. For more information, see "Saving Pictures in Other Formats Using NX Studio" (🕮 25).

Viewing HLG Photos on a Computer

What You'll Need

The following are the system requirements for the correct display of tones when viewing HLG photos.

Windows

OS	• Windows 11 • Windows 10 - Version 1709 or later - Latest graphics driver (WDDM)
GPU	HDR10 compatible with support for PlayReady digital rights management (DRM)
Monitor	DisplayHDR 1000 (recommended)
Cable	HDMI 2.0a or later DisplayPort 1.4 or later
Software	NX Studio (be sure to install the latest version)

Monitors That Do Not Satisfy the DisplayHDR 1000 Standard

Highlights in HLG photos may seem "washed out" when viewed on DisplayHDR/True Black 400, 500, or 600 monitors.

● NX Studio

To display HLG photos, you will need to install Nikon's NX Studio software. Doing so allows you to view and edit photos and videos shot with Nikon digital cameras. Download the latest version of the NX Studio installer from the website below and follow the on-screen instructions to complete installation.
https://downloadcenter.nikonimglib.com/

Installing the Codec

Viewing HLG photos in NX Studio requires the corresponding "Imaging Codec 01" codec. The codec can be installed by following the instructions displayed the first time an HEIF-format (extension ".hif") HLG photo is opened, selected, or saved in another format in NX Studio.

- You must provide the camera serial number before downloading Imaging Codec 01.

● Configuring Your Computer

The computer must be configured as described below. More information on the settings below is available from the Microsoft website.

- Enable HDR in Windows display settings.
- Enable HDR video streaming.

Displaying HLG Photos in Single-Frame View

Selecting high values for HDR/SDR brightness balance will brighten the entire display, making the difference between HLG and non-HLG (SDR) photo displays difficult to discern. Selecting the lowest setting for HDR/SDR brightness balance when viewing HLG photos brings the mid-tones for HDR closer to those for SDR, making the HDR effect easier to see.

Tip: Monitor Settings

Depending on the model, you may need to adjust settings on your monitor. See the monitor documentation for more information.

macOS

Monitor	Liquid Retina XDR (including built-in MacBook Pro displays) or Pro Display XDR
Software	NX Studio (be sure to install the latest version)

Other Monitors

Highlights in HLG photos may seem “washed out” if not viewed on a Liquid Retina XDR or Pro Display XDR monitor. This can sometimes be addressed by lowering display (monitor) brightness in the computer’s system settings.

● NX Studio

To display HLG photos, you will need to install Nikon’s NX Studio software. Doing so allows you to view and edit photos and videos shot with Nikon digital cameras. Download the latest version of the NX Studio installer from the website below and follow the on-screen instructions to complete installation.

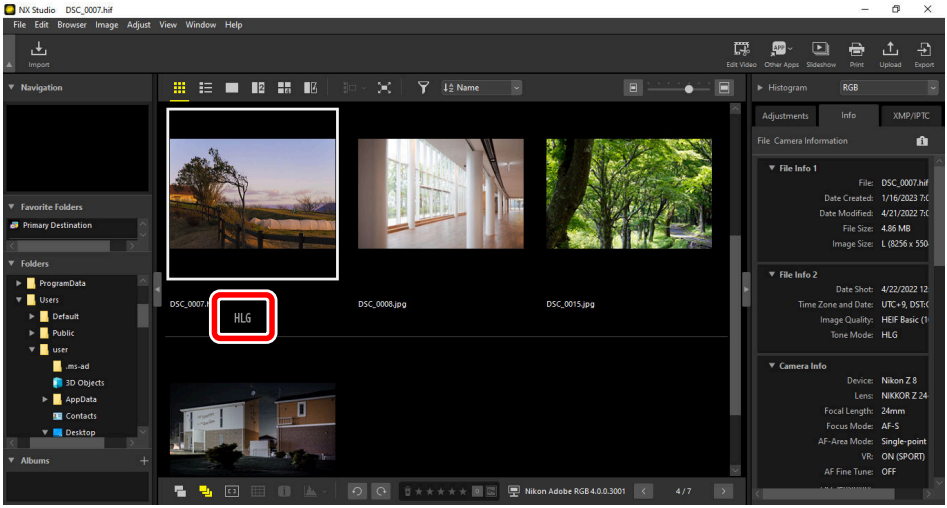
https://downloadcenter.nikonimglib.com/

● Configuring Your Computer

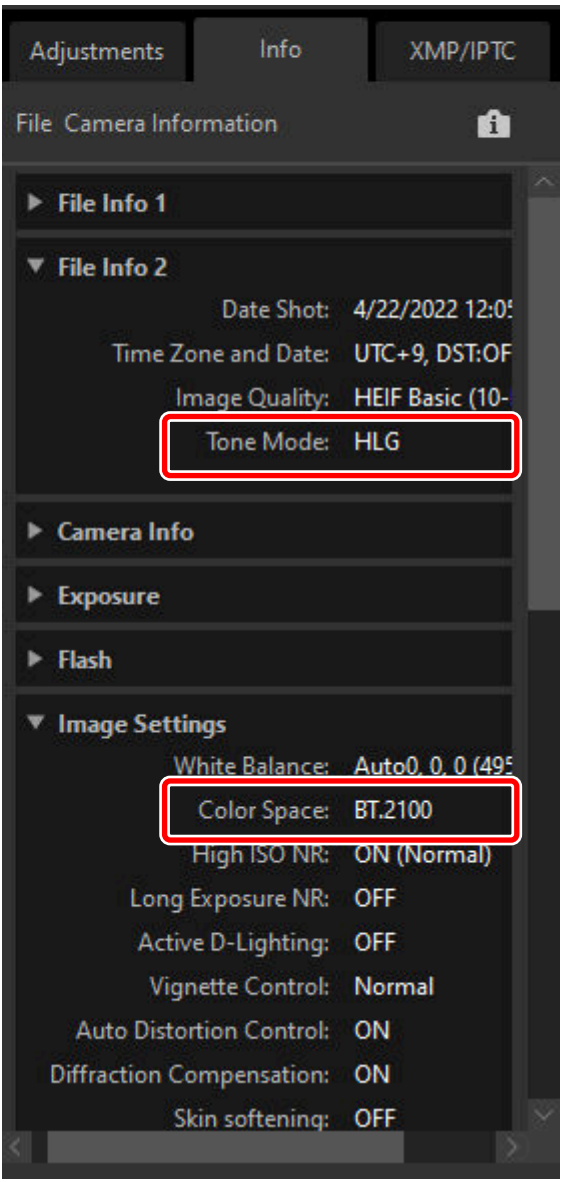
You will need to select the “HDR Video (P3-ST 2084)” reference mode preset in display settings. More information is available from the Apple website.

Viewing HLG Photos on a Computer

- HLG photos are identified by “HLG” icons in the NX Studio thumbnail list.

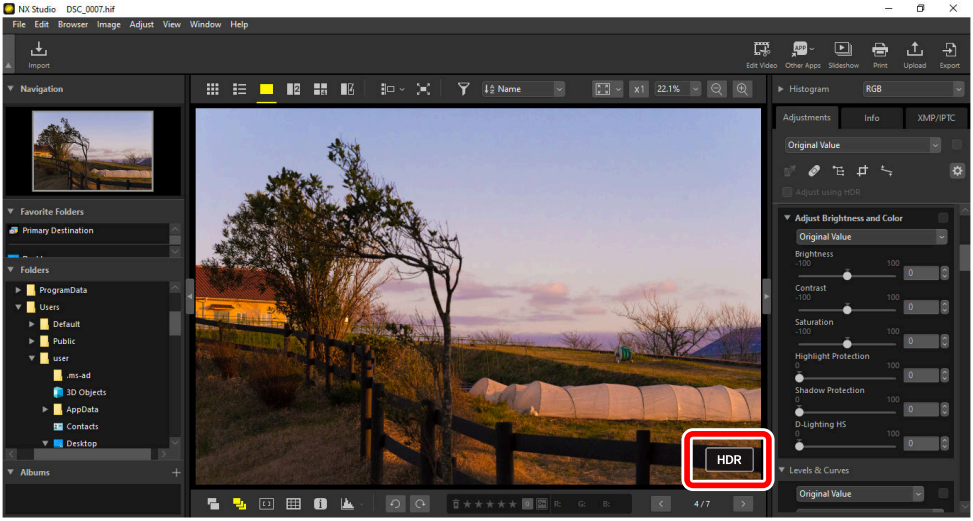


• The [**File Info 2**] pane in the info tab of the adjustments/info palette lists the tone mode as "HLG", while the [**Image Settings**] pane lists the color space as "BT.2100".



Ensuring That Tones Are Displayed Correctly

“HDR” icons appear at the bottom right corners of HLG photos displayed in single-frame view in NX Studio on HDR-compatible monitors. This indicates that tones are displayed correctly.

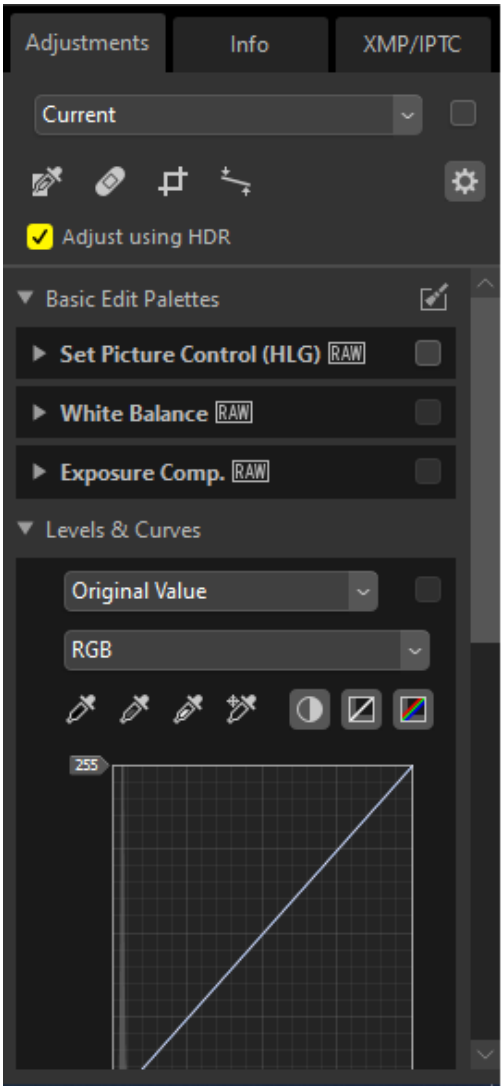


Monitors That Do Not Satisfy the DisplayHDR 1000 Standard

Highlights in HLG photos may seem “washed out” when viewed on a Windows computer with a display that does not satisfy the DisplayHDR 1000 standard.

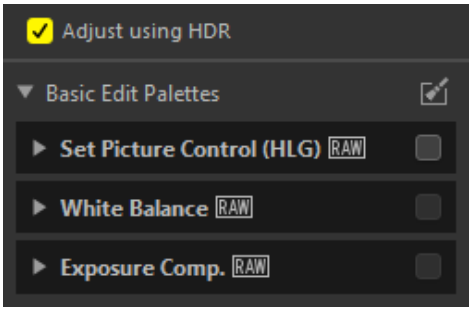
Editing (Enhancing) HLG Photos in NX Studio

HLG photos can be edited (enhanced) using the tools in the [**Adjustments**] tab of the NX Studio adjustments/info palette. The following tools are available.



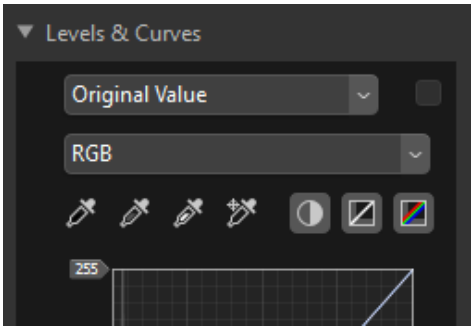
[Basic Edit Palettes] (RAW pictures only)

- Picture Controls
- White balance
- Exposure compensation



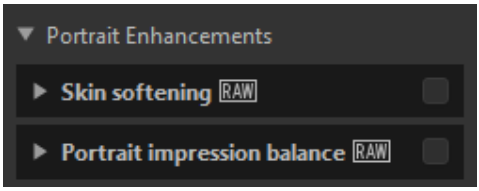
[Levels & Curves]

- Contrast
- Tone curves (brightness)
- Color balance



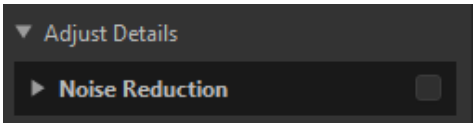
[Portrait Enhancements] (RAW pictures only)

- Skin softening
- Portrait impression balance



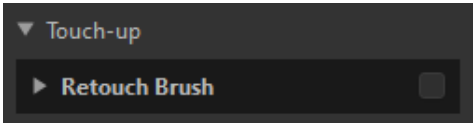
[Adjust Details] (RAW pictures only)

- Noise reduction



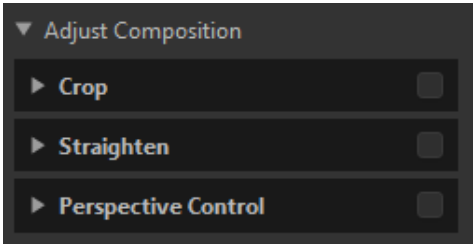
[Touch-up]

- Retouch brush



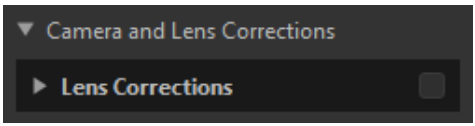
[Adjust Composition]

- Crop
- Straighten
- Perspective control



[Camera and Lens Corrections]

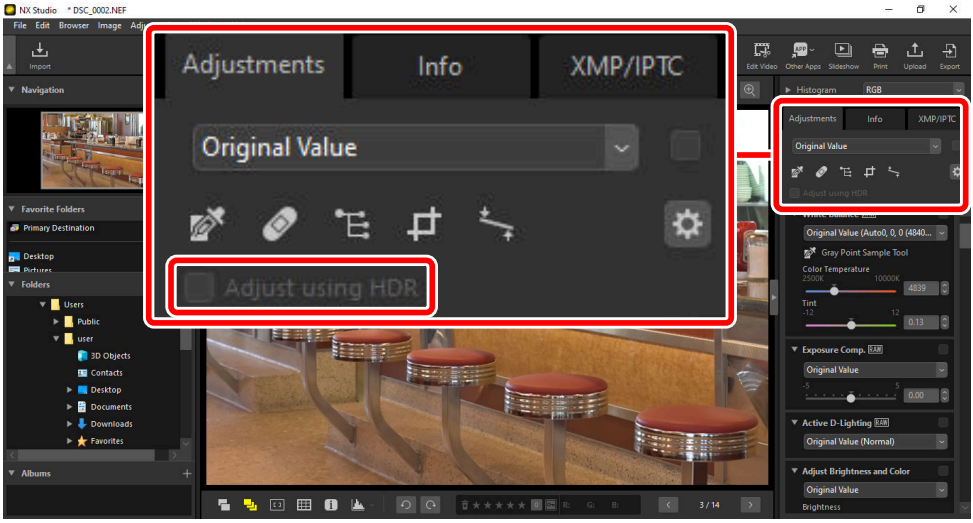
- Lateral color aberration
- Auto distortion control
- Vignette control
- Diffraction compensation (RAW pictures only)
- Fisheye



Enhancing HLG Photos

Enable [**Adjust using HDR**] in the [**Adjustments**] tab. Enabling this option allows edits to photos in the HDR tone range.

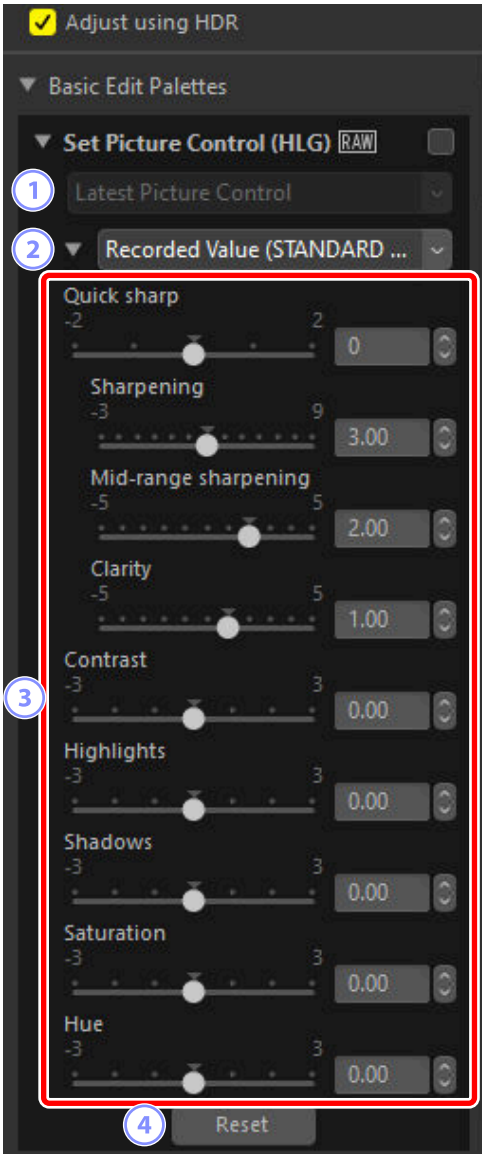
- Remove the check to use the SDR tone range.



Picture Controls (HLG)

Enabling [**Adjust using HDR**] enables the [**Set Picture Control (HLG)**] Picture Control tool. Note that HLG Picture Controls are available only with RAW pictures taken with HLG selected for tone-mode.

- The Picture Control tool changes to [**Set Picture Control**] when [**Adjust using HDR**] is disabled.



1. **Color reproduction process**: Fixed at [**Camera compatible**]; cannot be changed.
2. **Picture Control**: Choose a Picture Control for the pictures in the current selection.
3. **Picture Control parameters**: Adjust Picture Control parameters. Note that even in the case of pictures taken under similar conditions, the results may vary with exposure and the position and size of the subject in the frame.
4. [**Reset**]: Reset all parameters to their default values.

Caution: Enabling or Disabling "Adjust Using HDR"

Enabling or disabling [**Adjust using HDR**] resets all Picture Control settings.

- Disabling [**Adjust using HDR**] after choosing [**[HLG SD] Standard**], [**[HLG MC] Monochrome**], or [**[HLG FL] Flat**] for [**Set Picture Control (HLG)**] changes the selection to the corresponding [**Picture Control**] option, respectively [**Standard**], [**Monochrome**], or [**Flat**].

Picture Control (HLG) Parameters

Adjust Picture Control parameters. The parameters available vary with the Picture Control selected.

[Quick sharp]

Quickly adjust levels for balanced [**Sharpening**], [**Mid-range sharpening**], and [**Clarity**]. The various sharpening parameters can also be adjusted individually.

- [**Sharpening**]: Control the sharpness of details and outlines.
- [**Mid-range sharpening**]: Adjust the sharpness of patterns and lines at levels of detail between those to which [**Sharpening**] and [**Clarity**] apply.
- [**Clarity**]: Adjust overall sharpness and the sharpness of thicker outlines without affecting brightness or dynamic range.

[Contrast]

Adjust contrast. Choose lower values for less contrast, higher values for more contrast.

[Highlights]

Adjust brightness in bright areas of the photo (highlights). Choose higher values for greater brightness.

[Shadows]

Adjust brightness in dark areas of the photo (shadows). Choose higher values for greater brightness.

[Saturation]

Control the vividness of colors. Choose lower values for more muted colors and higher values for more vivid colors.

[Hue]

Adjust hue.

[Filter Effect]

Simulate the effects of color filters on monochrome photos. This parameter is available only with the [**[HLG MC] Monochrome**] Picture Control.

[Toning]

Choose a base tint for results that mimic the effects of printing photos on tinted paper. This parameter is available only with the [**[HLG MC] Monochrome**] Picture Control.

[Adjust Saturation]

Choose the saturation of the tint selected for [**Toning**]. This parameter is available only with the [**[HLG MC] Monochrome**] Picture Control. Note, however, that saturation cannot be adjusted when [**B&W**] is selected for [**Toning**].

Saving Pictures in Other Formats Using NX Studio

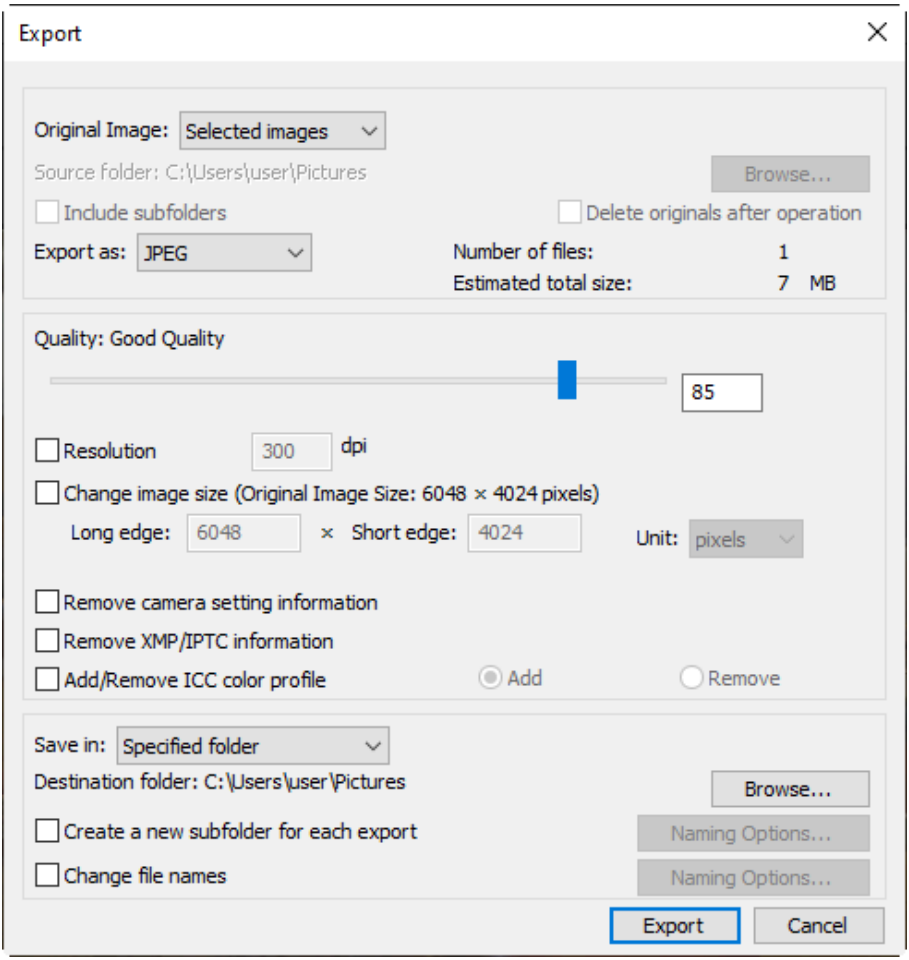
NX Studio can be used to create JPEG, HEIF, or TIFF format copies of photos taken with HLG selected for tone mode. RAW (NEF) and HEIF photos can be viewed in third-party software that does not support these formats by converting them to JPEG or TIFF. If desired, entire folders can be selected for conversion to other formats.

Saving Pictures in Other Formats: An Overview

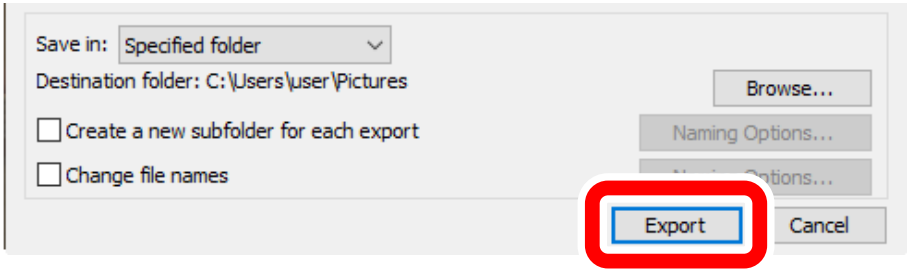
1 **Click [Export] in the toolbar.**

2 A dialog will be displayed where you can adjust image quality, size, and other settings.

- For information on the options available, see “Export Options” (28).



3 **Click [Export].**



- The copies will be saved in the selected folder.

RAW Pictures

[**Export**] can be used to save RAW pictures in other formats. To save RAW pictures without converting them to other formats, use [**Save**] or [**Save As**] in the [**File**] menu. More options for use when saving pictures can be found in the [**Save**] section of the [**Options**] dialog.

Export Options

The following settings can be adjusted:

[Original Image]

Export the pictures in the current selection or in selected folders.

- [**Selected images**]: Export the pictures in the current selection.
- [**Selected folder**]: Export all pictures in a selected folder. To choose the folder, click [**Browse**].
  - [**Include subfolders**]: Include pictures in all sub-folders under the selected folder.
  - [**Delete originals after operation**]: Delete the original pictures from the folder once export is complete.

[Export as]

Choose a format for the exported files from [**JPEG**], [**TIFF (8 Bit)**], [**TIFF (16 Bit)**], [**HEIF (HLG)**], and [**HEIF (PQ)**].

- Files with thumbnails marked "PQ" cannot be saved in other formats.
- [**HEIF (HLG)**] and [**HEIF (PQ)**] will be available only if the thumbnail for the source file is marked "HLG".
- The estimated total size is not displayed when an HEIF option is selected.
- [**Quality**]: Choose the compression ratio for pictures exported in JPEG or HEIF format. The JPEG compression ratio can be selected by dragging the slider or entering the desired value. In the case of HEIF, Windows offers a choice of [**Highest Compression Ratio**], [**Good Compression Ratio**], [**Good Balance**], [**Good Quality**], and [**Excellent Quality**]. macOS does not offer a choice of HEIF compression settings.
- [**Use LZW Compression**]: This option is available when pictures are saved in TIFF format. Select it to compress the files using a lossless LZW compression algorithm.

☑ LZW Compression

Enabling LZW compression when converting pictures to 16-bit TIFF may increase file size.

☑ "HEIF (HLG)" and "HEIF (PQ)"

Pictures exported with [**HEIF (HLG)**] or [**HEIF (PQ)**] selected for [**Export as**] will be saved respectively in HLG or PQ (Perceptual Quantization) HEIF format.

- While HLG and PQ formats both conform to the HDR standard, they differ in the following respects.
  - HLG represents luminosity as a relative value, meaning that luminosity varies with the device on which the picture is displayed.
  - PQ represents luminosity as an absolute value, meaning that luminosity does not vary with the device on which the picture is displayed.
- Pictures converted to PQ HEIF using the [**HEIF (PQ)**] option have thumbnails marked "PQ" and can no longer be edited in NX Studio.

[Resolution]

Export pictures at new resolutions.

[Change image size]

Resize pictures during export. Entering a value for [**Long edge**] automatically updates [**Short edge**] to maintain aspect ratios. The units can be selected from [**pixels**], [**inch**] (inches), and [**cm**] (centimeters).

[Remove camera setting information]

Strip shooting data from pictures during export.

[Remove XMP/IPTC information]

Strip XMP/IPTC information from pictures during export.

[Add/Remove ICC color profile] (not displayed when [**HEIF (HLG)**] or [**HEIF (PQ)**] is selected for [**Export as**])

To add or remove color profiles, select this option and choose [**Add**] or [**Remove**]. The profiles added when [**Add**] is selected vary with the option selected for [**Color Management**] in the [**Options**] dialog. The color profiles available for [**Color management**] are described below.

- If only [**Use this instead of an embedded profile when opening images**] is selected, the [**Default RGB color space**] profile (or in macOS, [**RGB Default Profile**]) will be embedded in pictures during export.
- If only [**Convert images to sRGB color space when they are converted into JPEG/TIFF format**] is selected, the sRGB color profile will be embedded in pictures during export.
- If both are selected, the sRGB color profile will be embedded in pictures during export.
- If neither is selected, the original color profile will be embedded in pictures during export.

[Save in]

Choose the destination folder for the exported pictures.

- [**Same folder as originals**]: Save the exported pictures to the same folders as the original files.
- [**Specified folder**]: Save the exported pictures to a selected folder. To choose the destination, click [**Browse**].
  - [**Create a new subfolder for each export**]: Automatically create a new sub-folder within the chosen folder each time pictures are exported. To choose how the folders are named, click [**Naming Options**].

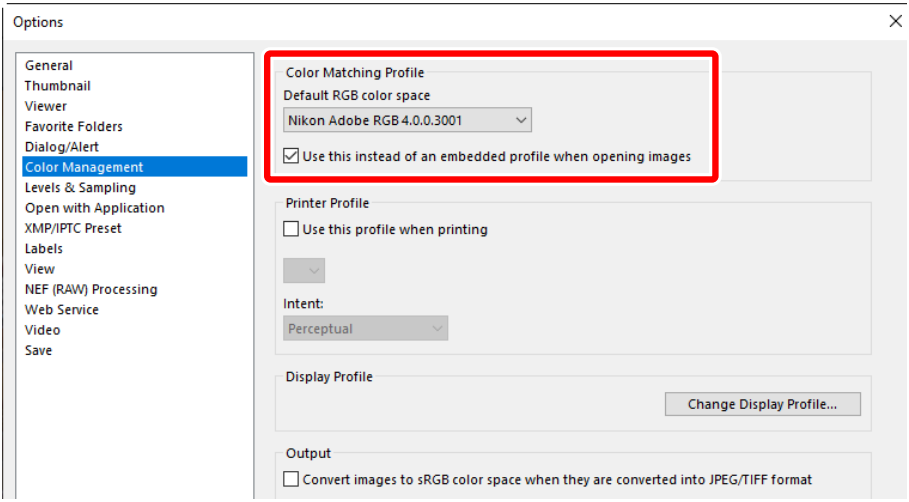
[Change file names]

Rename files during export. To choose how the files are named, click [**Naming Options**].

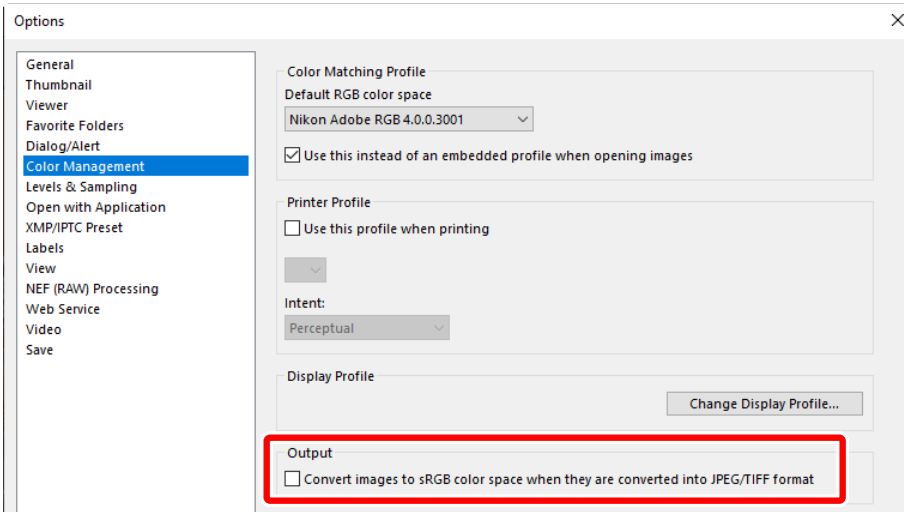
Converting Pictures to Color Spaces Other than sRGB

RAW pictures taken in the sRGB color space can be converted to other color spaces during export. Note, however, that the color space for RAW pictures recorded with HLG selected for tone mode is fixed at BT.2100, regardless of the color space selected at export or in the options (preferences) dialog.

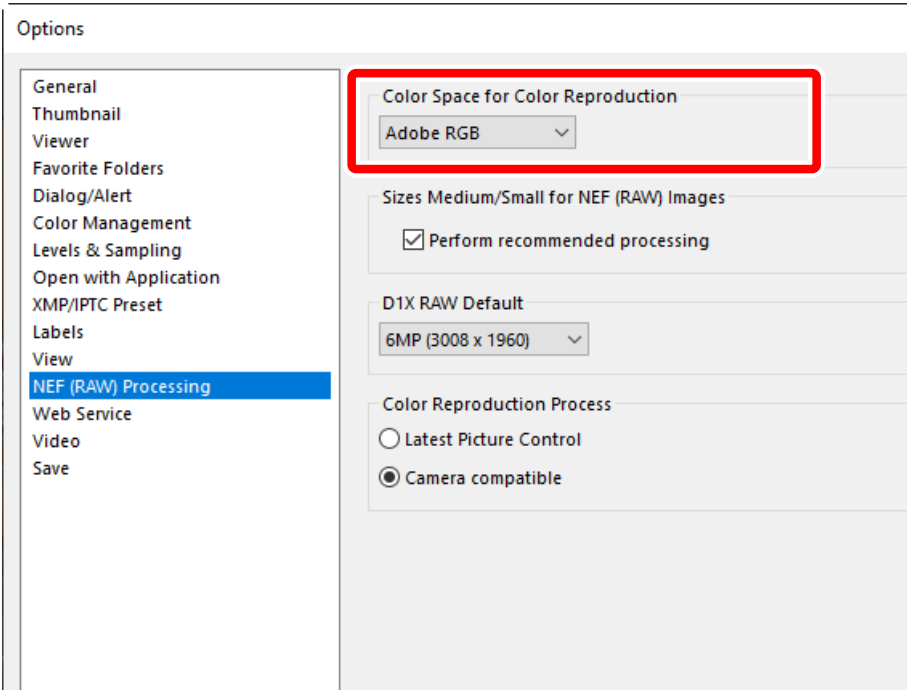
1 **Choose the desired default RGB color space for [Options] > [Color Management] > [Color Matching Profile] and select [Use this instead of an embedded profile when opening images].**



2 **Remove the check from [Convert images to sRGB color space when they are converted into JPEG/TIFF format] under [Output] in the [Color Management] panel.**



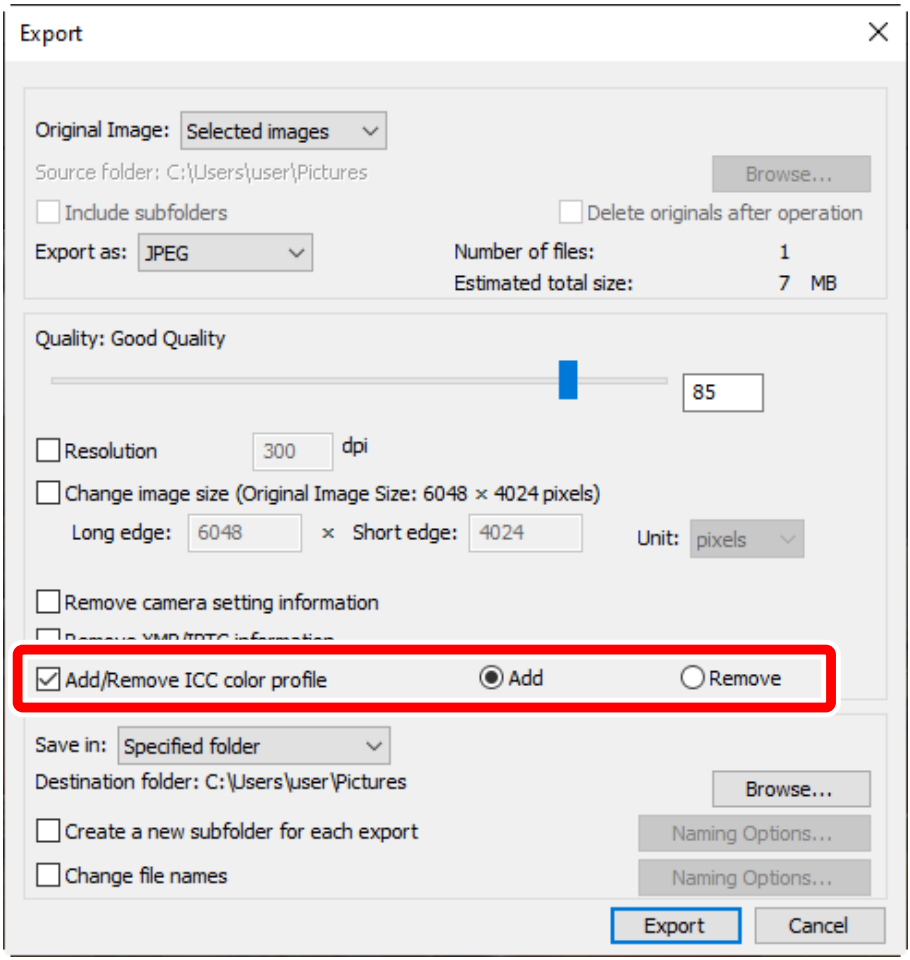
3 **Select the desired option for [Options] > [NEF (RAW) Processing] > [Color Space for Color Reproduction].**



Tip: "Color Space for Color Reproduction"

The current color space for color reproduction can be viewed using the **i** button on the camera.

4 **Select [Export] > [Add/Remove ICC color profile] and choose [Add].**



5 **Click [Export].**

- The pictures will be exported in the selected color space.

Tip: Restoring the sRGB Color Space

To restore pictures to the sRGB color space:

- select [**sRGB**] for [**Options**] > [**NEF (RAW) Processing**] > [**Color Space for Color Reproduction**],
- place a check next to [**Convert images to sRGB color space when they are converted into JPEG/TIFF format**] under [**Output**] in the [**Color Management**] panel, and
- select [**Nikon Adobe sRGB 4.0.0.3002**] for [**Options**] > [**Color Management**] > [**Color Matching Profile**] and remove the check from [**Use this instead of an embedded profile when opening images**].

Troubleshooting

Problems and Solutions

- **HLG (HEIF) photos do not display correctly:**

  Pictures taken with HLG selected for tone mode may not display correctly when viewed on other devices (for example, when output to other devices directly or when opened on a computer after upload). View the pictures on an HDR-compatible computer or other device. For more information on viewing HLG pictures on a computer, visit the following website:
  https://onlinemanual.nikonimglib.com/notice/hlg_setting_guide/en/

- **Output to HDMI devices does not function as expected:**

  Photos taken with HLG selected for tone mode may not display correctly on devices that are not HDR-compatible.

- **The effects of [Set Picture Control], [Set Picture Control (HLG)], [Active D-Lighting], or [Vignette control] are not visible when pictures are viewed on a computer:**

  In the case of NEF (RAW) pictures, the effects can (as of May 2023) only be viewed using Nikon software. View NEF (RAW) pictures using NX Studio.

Nikon