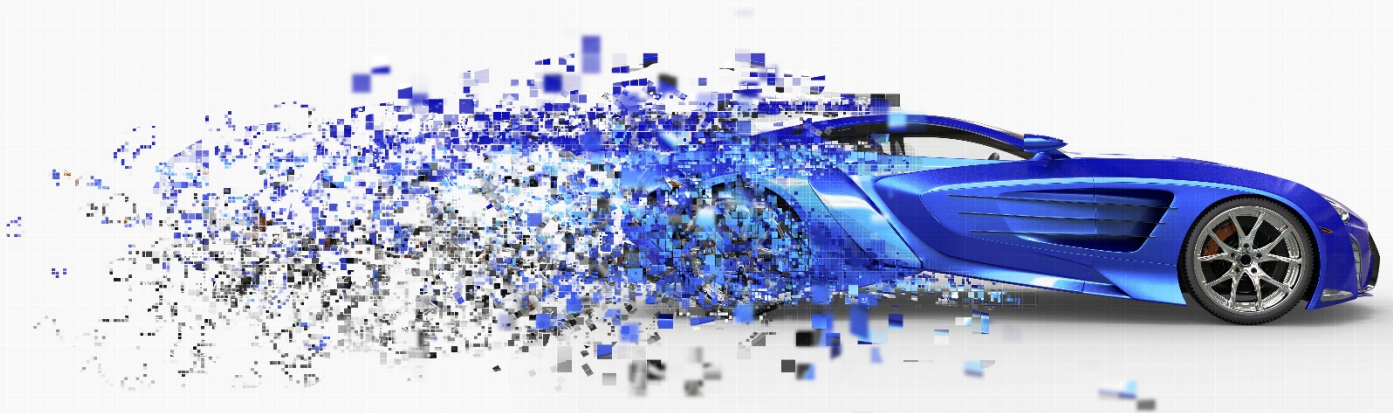# Radeon™ Pro SSG

Adobe® Premiere® Pro CC 2018 Solution Guide

VERSION 1.0

4/11/2018
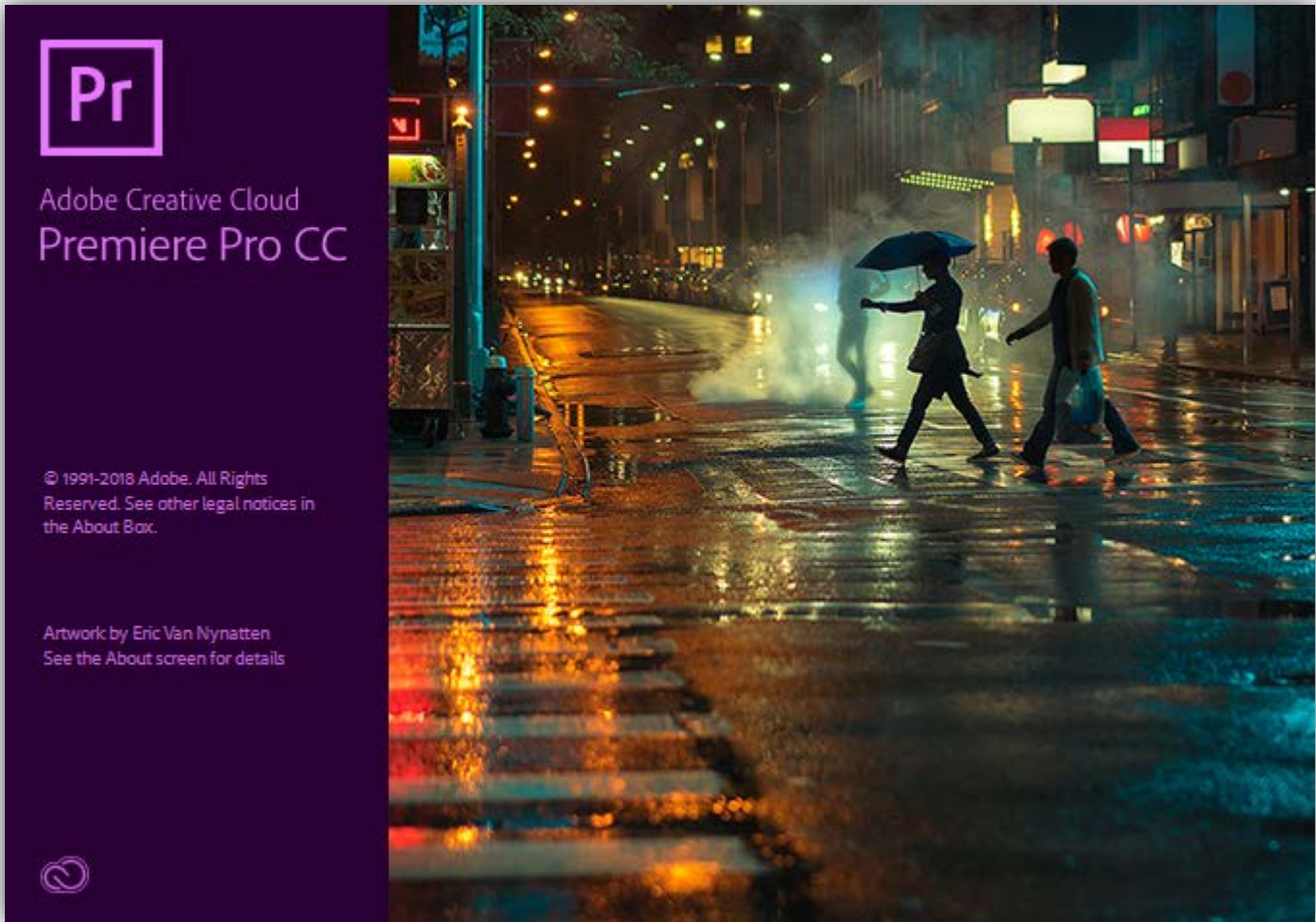
Adobe Premiere Pro CC 2018 Solution Guide

Contents

In recent years, the demand for high resolution video content has grown substantially, first with the adoption of 4K UHD, and subsequently with the rise of 8K UHD for those on the cutting edge of visual fidelity.

High-end cinematic cameras, such as the RED® WEAPON® 8K, have the capability of capturing reality in visually stunning 8K full format (8192x4320). However, current hardware and software solutions often struggle to play back this type of content at full frame rate during editing or post-processing due to the computationally expensive decoding of codecs such as REDCODE RAW. As a result, video playback or editing is often not very responsive when attempting to play back at full resolution. The common workaround has been to work with downsampled previews of the high quality source that are typically a fraction of the original resolution, and this is suboptimal for parts of the video editing workflow, such as color adjustment, that require full resolution previews and full frame rate playback.

By implementing native support for Radeon Pro SSG graphics, Adobe Premiere Pro CC 2018 is capable of video playback performance that meets most real-time performance requirements. In addition, smooth scrubbing through uncompressed 8K content now becomes possible as the user has almost instant access to any position in the video stream. The Radeon Pro SSG graphics card can empower the user to play back, manipulate, stitch and post-process uncompressed 8K content in Adobe Premiere Pro similar to how current solutions handle 4K content today.
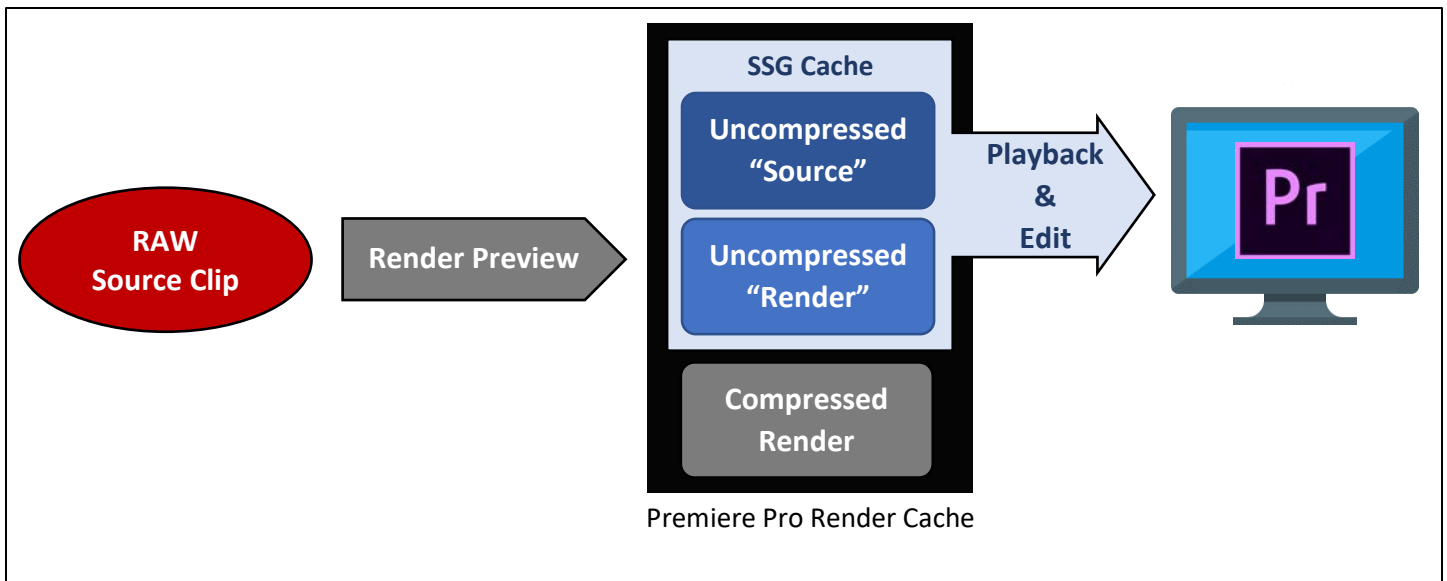
This solution guide provides an example of editing 8192x4320 video clips shot in REDCODE RAW (.R3D) video format using the latest Adobe Premiere Pro CC 2018 with Radeon Pro SSG graphics support.

Radeon Pro SSG architectural overview

Radeon Pro SSG graphics cards augment existing Premiere Pro CC functionality by providing the option to cache uncompressed video frames as part of the render process. In a typical non-linear editing (NLE) workflow, renders are generated for the purpose of real-time playback of computationally expensive video effects. This is achieved by encoding a new video, with all of the effects included, for the rendered sections. These renders typically rely on lossy compression codecs, such as MPEG2, for the benefit of encoding speed and small file size. While rendering lossy previews has been a common aspect of workflows for many years, the inherent limitation is clear: it does not offer full visual fidelity, and this is an especially important requirement (and deficiency) as users adopt the latest video standards such as 8K full format.

The added benefit of Radeon Pro SSG graphics in this workflow is that the video frames cached on the graphics card are lossless and uncompressed. AMD and Adobe have collaborated to integrate the efficient SSG API natively into Premiere Pro CC, which it uses to load and display these uncompressed video frames with minimal impact on CPU utilization. More details about the SSG API can be found at the Radeon Pro SSG product page.

Below is a simplified diagram of the Radeon Pro SSG graphics card's render cache architecture.

SSG Cache

Uncompressed "Source"

Uncompressed "Render"

Playback & Edit

Compressed Render

RAW Source Clip

Render Preview

Pr

Premiere Pro Render Cache

At a high level, Premiere Pro CC caches two frames per frame of timeline video onto the Radeon Pro SSG card – one frame for the original source video with no effects applied, and one with all effects applied. If no effects are applied to the timeline, then the two cached frames would be identical. The reason for this design is such that once effects are rendered and cached, the user can disable or modify the effect while still retaining high performance playback because the source video is also cached. If only the rendered copy of the frame is cached, then modifying the effects would cause Premiere Pro CC to fall back to reading from the uncached source video, resulting in low performance playback.

Minimum system requirements

| CPU	3.5 - 4.0 GHz quad-core CPU recommended Intel® Core™ i7 Intel® Core™ i9 Intel® Xeon® **Note**: Certain LGA2011 and LGA2066 platforms may exhibit compatibility issues with Radeon Pro SSG graphics functionality. We are currently working with hardware vendors to address the issues.
System memory	16 GB 32 GB (recommended)
Hard drive	8 GB (for application) 50 GB (for preview cache)
Display	1920x1080 or larger
Operating system	Microsoft® Windows® 10 (64-bit) Fall Creators Update

Radeon Pro SSG graphics card setup

The latest graphics driver for Radeon Pro SSG cards can be found on amd.com. Please install the graphics driver for the Radeon Pro SSG card and ensure that it automatically created a new 2 TB drive volume. Note that it might not always be D: drive as shown below depending on drive letter availability of the system.
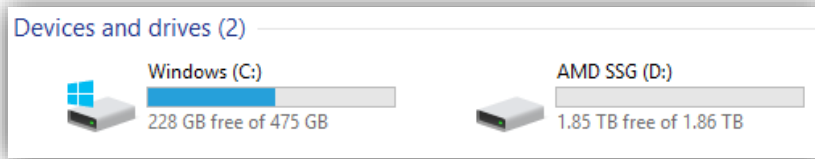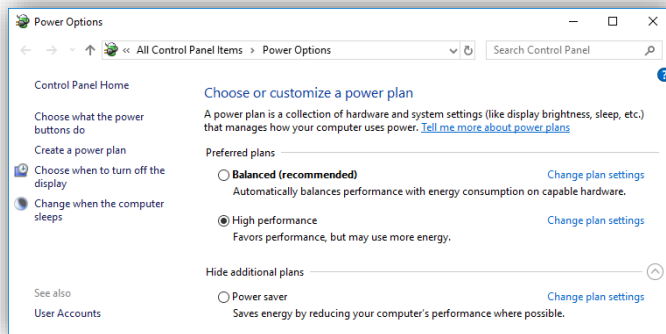

Adobe Premiere Pro CC setup and configuration

Install and launch the latest version of Adobe Premiere Pro CC via Adobe Creative Cloud.
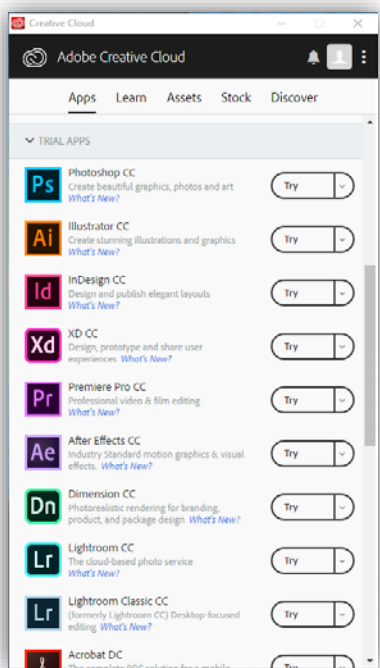
For optimal performance, we recommend setting the Windows® power profile to "High Performance"

R3D 8K usage example

The following is a walkthrough for editing a series of REDCODE 8K FF (8192x4320) video clips. The screenshots below are based on REDCODE 8K 24 FPS clips. Additional sample clips are publicly available at on RED's website.

Creating and editing a basic timeline

1. Start a new project in Premiere Pro CC
   File → New → Project
2. Give it a project name of your choice, and ensure that the following options are available and selected:
   Renderer: Mercury Playback Engine GPU Acceleration (OpenCL™)
   Preview Cache: AMD SSG Memory
   The other settings can be left at their defaults for this example.
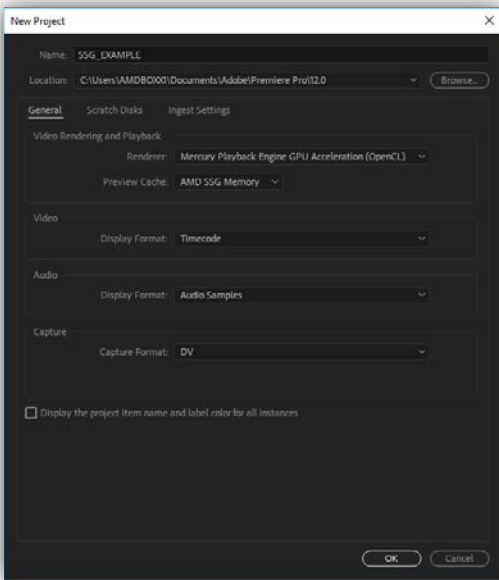
3. Upon starting a new project, Premiere Pro CC should default to the "Editing" workspace layout. Add the R3D source clips to the project by right-clicking in the Media Browser panel in the bottom-left section of the screen and selecting "Import". Add the two .R3D files mentioned previously. These clips will not be cached to the Radeon Pro SSG card's NVMe storage just yet.
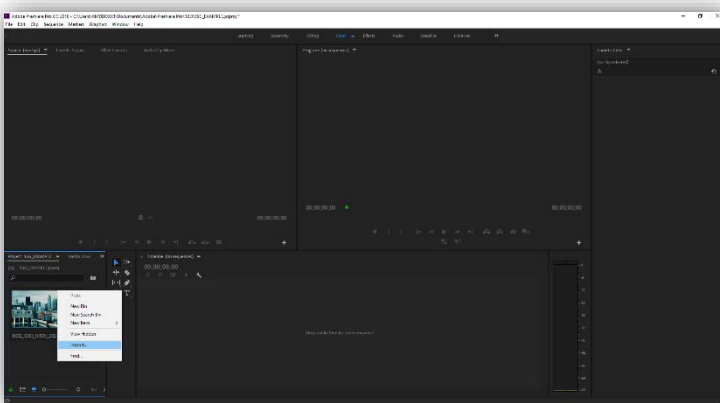

4. For each source clip you'd like to use, drag and drop it from the Media Browser panel into the Source panel in the top-left section of the screen. Select the approximate beginning and end of the segment you wish to add to the

video timeline by using the "Mark In" and "Mark Out" buttons in the panel, or by using the 'I' and 'O' shortcut keys on your keyboard.
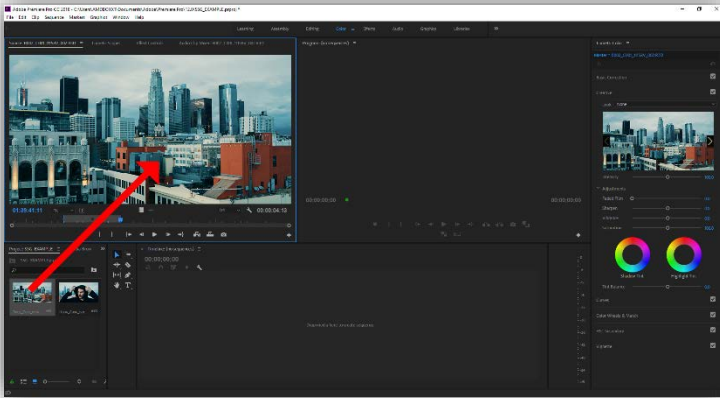
5. Drag and drop the selected source segment into the timeline panel.
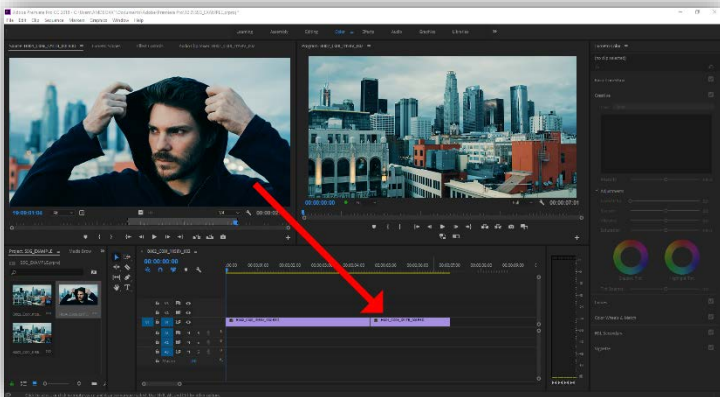

6. Repeat steps 4 and 5 as necessary to build a timeline made up of multiple segments
7. At this stage of the workflow, typical users should be able to play back and edit using the R3D source clips at 1/4 preview resolution smoothly. This setting downsamples the preview resolution to 4K, in this case, to trade visual fidelity for playback performance.
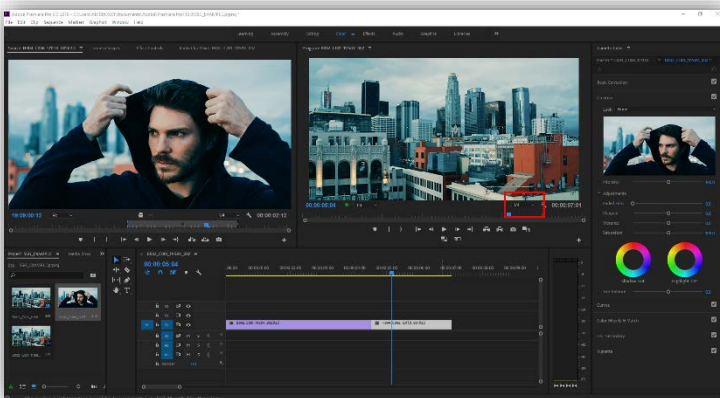
8. Apply effects such as scene transitions and Lumetri color adjustments as desired to the timeline.
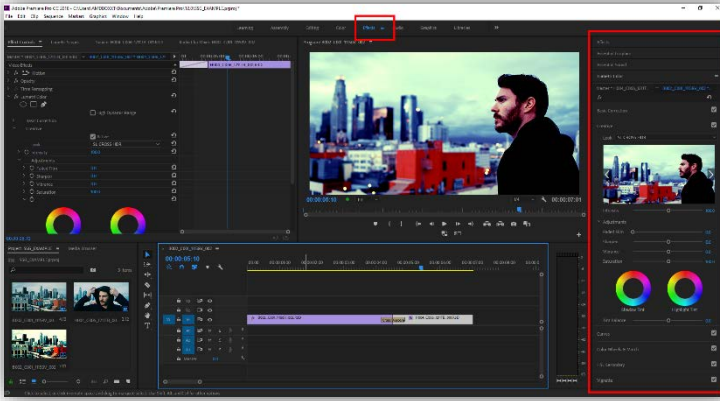
## Generating the 8K uncompressed preview cache

Because the Radeon Pro SSG card has 2 TB of onboard storage, there is a hard limit to how much video data it can cache. For R3D 8K video at 25 frames-per-second (FPS), it can cache a maximum of roughly 4500 frames, or 180 seconds of footage. The following table shows the cache capacity limits for a variety of video formats.

| Format	Size per frame	Frame count limit	Time limit
R3D 6K (6144x2592) @ 48 FPS	121.5 MB	8037	166 sec
R3D 6K (6144x3160) @ 23.976 FPS	121.5 MB	8037	334 sec
R3D 8K (8192x3456) @ 23.976 FPS	216 MB	4521	188 sec
R3D 8K (8192x3456) @ 30 FPS	216 MB	4521	150 sec
R3D 8K (8192x4320) @ 24 FPS	270 MB	3616	150 sec

1. To enable 8K preview caching on the Radeon Pro SSG card, begin by changing the sequence settings.
   Sequence → Sequence Settings
   Preview File Format: GoPro CineForm (YUV 10-bit)
   Press "Reset" to automatically set the preview resolution to the source clip resolution
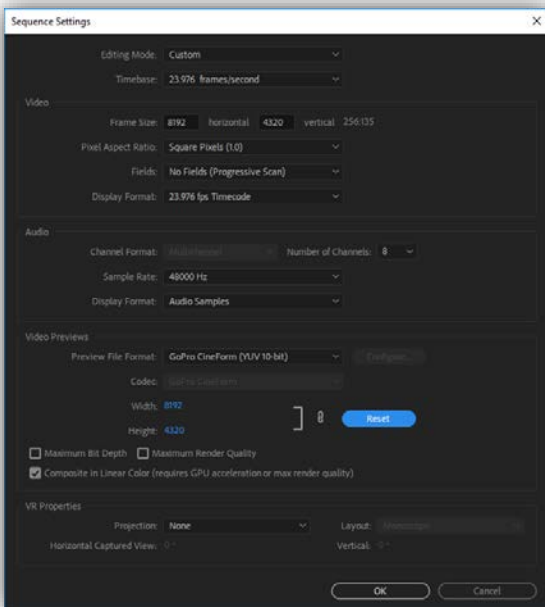
2. Select the sections of the timeline you wish to cache by using the 'I' and 'O' keys to set the Mark In and Mark Out points on the timeline. Ensure that the Program pane is still set to 1/4 resolution playback to retain real-time playback of the non-cached sections. The cached section will always play back at the specified 8K resolution regardless of the Program pane downsampling setting. For this section, we will mark the scene transition to cache in full resolution in order to check for artifacts during the transition.
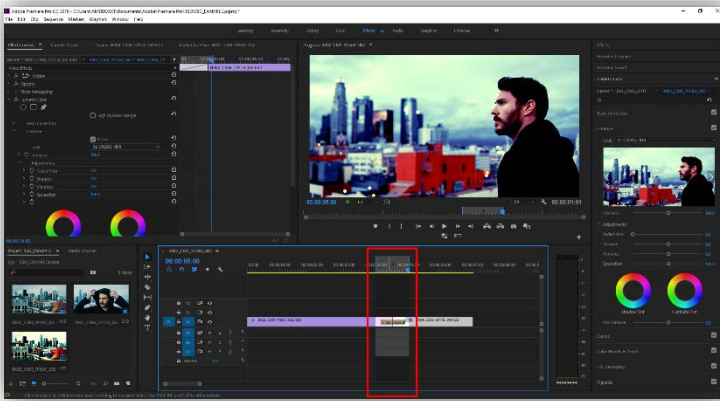
3. Initiate the uncompressed caching by using the **Render In to Out** command. It is at this stage where Premiere Pro CC writes the 8K CineForm compressed video preview to the working project directory (typically in the Documents folder) as well as the uncompressed video data to the Radeon Pro SSG card.
Sequence → Render In to Out
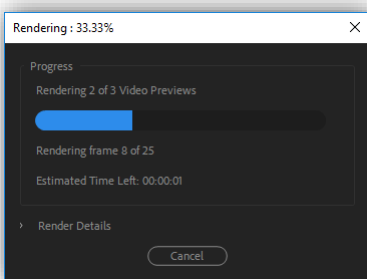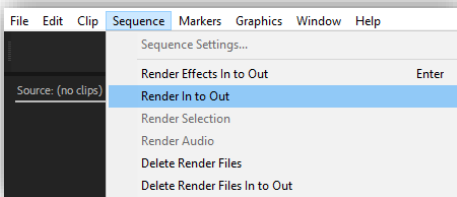
4. When **Render In to Out** completes, the performance indicator at the top of the timeline should change from yellow to green. Verify that Premiere Pro CC is reading from the Radeon Pro SSG card's cache by monitoring disk usage in Windows Task Manager when it is playing back from the cached section of the timeline. The Radeon Pro SSG card's disk utilization should be fairly high during the cached playback, and Premiere Pro CC should automatically toggle between low quality preview from the source files and reading from the 8K cached frames.
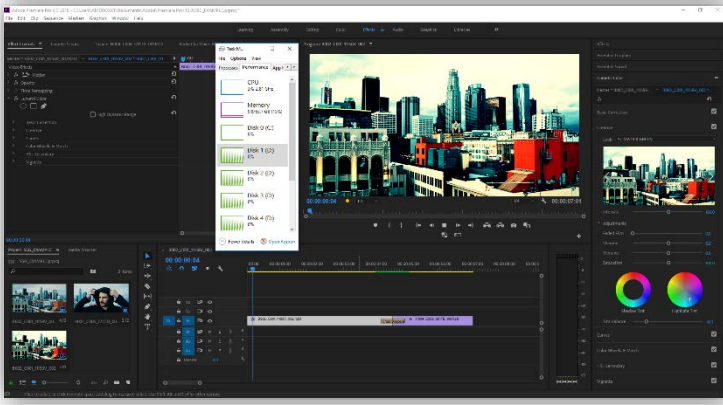
Alternatively, it is also possible to cache larger sections of the timeline, or even the entire timeline, to the Radeon Pro SSG card's storage if desired. It is completely up to the user to decide how much to cache given the card's storage capacity limit. Caching longer sections of the timeline would take considerably longer time to render, but it may be desired if the workflow benefits from full 8K visualization for longer durations of the timeline.

Additional editing in the timeline after caching

Once the footage in the timeline has been cached, any subsequent changes to the sequence, such as cutting clips or applying effects, can be applied without re-caching. However, depending on how computationally intensive the effects are, re-caching may be required to regain full frame rate playback. This is typical of Adobe Premiere Pro CC workflows with or without Radeon Pro SSG cards.

Copyright and trademarks