

# V-Ray GPU Setup

This page provides information on the V-Ray GPU rendering engine within 3ds Max.

## Overview

V-Ray GPU is a separate rendering engine in 3ds Max, provided by Chaos, that offers GPU hardware acceleration. It also works with CPU hardware and utilizes both CPU and GPU devices for smooth hybrid rendering.

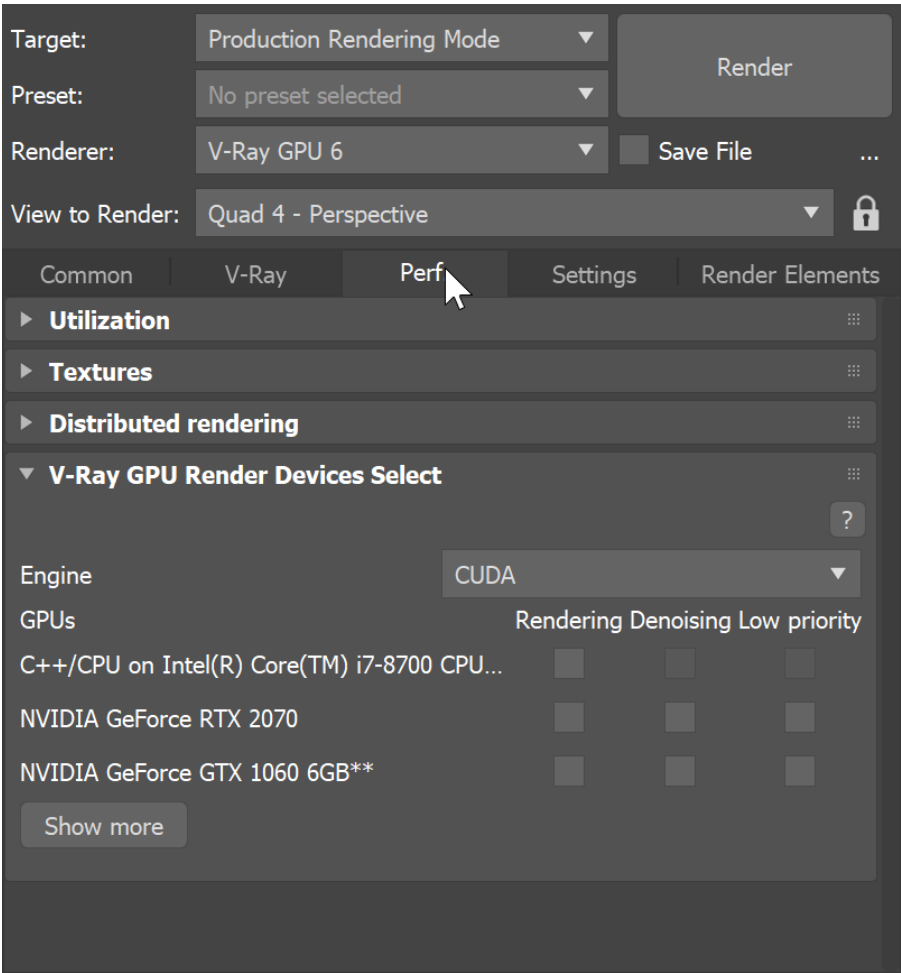
GPU rendering allows the V-Ray GPU render engine to perform the raytracing calculations on the GPU(s) installed on the system, rather than the CPU. Since GPUs are specifically designed for massively parallel calculations, they can speed up the rendering process by an order of magnitude.

For answers to common questions about V-Ray GPU, see the [V-Ray GPU FAQ](#) page.

For more information on NVidia RTX, check the [OptiX](#) and [NVLink](#) FAQ page.

## Enable GPU Rendering

To enable GPU rendering, select the CUDA or RTX value for the Engine type parameter in Render Setup window > Perf. tab > [V-Ray GPU Render Devices](#) Select rollout.



## Supported Hardware and Drivers

V-Ray GPU offers rendering with NVIDIA CUDA platform.

Below is a list of tests we have performed and the results:

- **NVIDIA CUDA** – The CUDA engine is supported only in 64-bit builds of V-Ray for Maxwell, Pascal-, Turing- or Volta-based NVIDIA cards. See [here](#) if your card has the minimum required compute capability of 5.2.
- **NVIDIA RTX** – Choosing RTX GPU mode works with RTX cards.
- **Hybrid Rendering (running CUDA on GPU and CPU)** – V-Ray GPU CUDA rendering can be performed on CPUs and NVIDIA GPUs at the same time. Using the [Select Devices for V-Ray GPU rendering](#) tool you can enable your CPUs as CUDA devices and allow the CUDA code to combine your CPUs and GPUs to utilize all available resources.

If V-Ray GPU cannot find a supported CUDA device on the system, it silently falls back to CPU code. To see if V-Ray is actually rendering on the GPU, check out its console output.

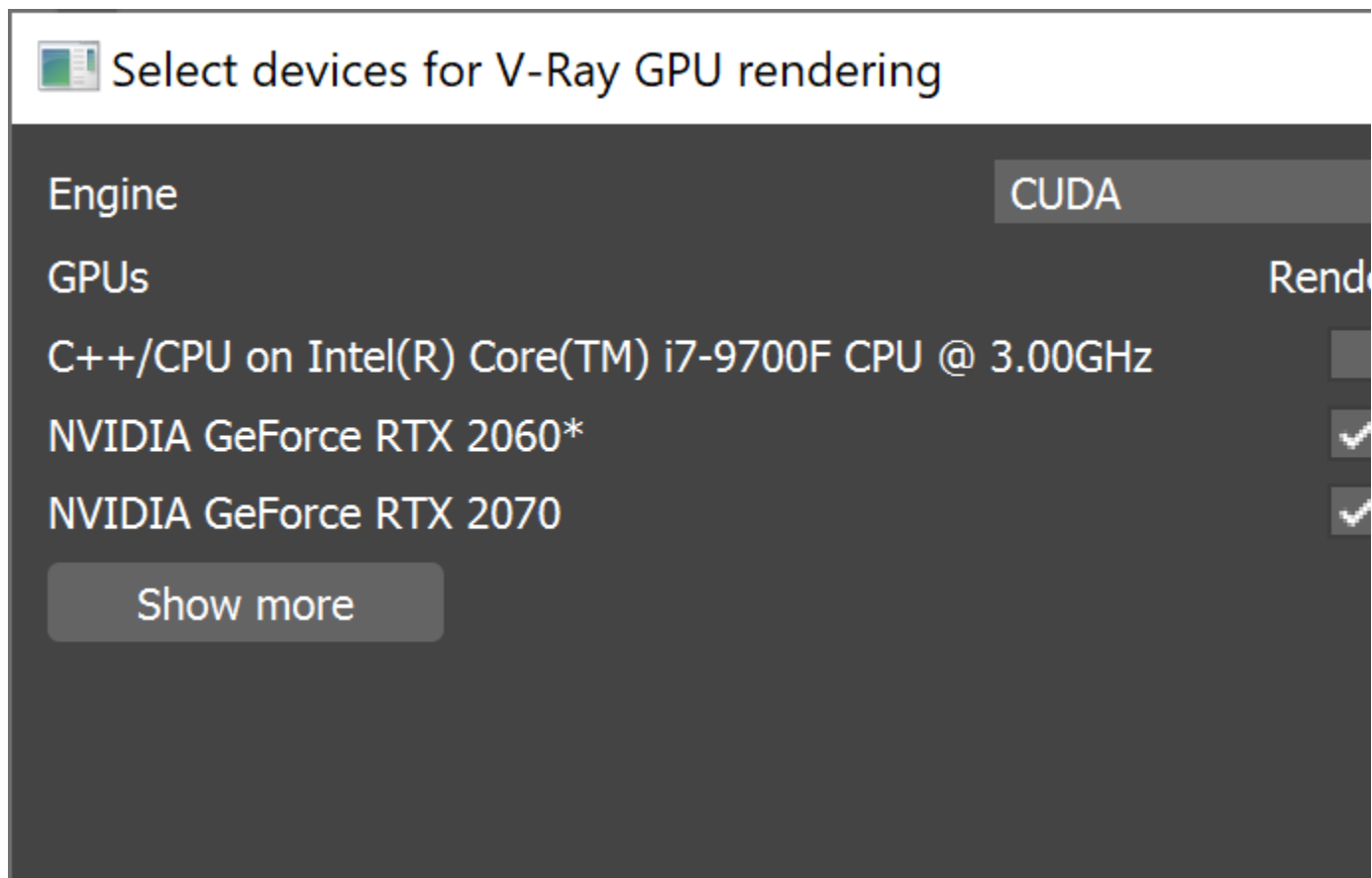
When rendering, the V-Ray messages (log) provides information about your current driver version. If the version is not compatible with V-Ray GPU, you will find a message with the recommended version.

To use NVLINK on supported hardware, NVLINK devices **must** be set to TCC mode. This is recommended for Pascal, Volta and Turing-based Quadro models. For GeForce RTX cards, a SLI setup is sufficient. Also note that to prevent performance loss, not all data is shared between devices.

## Choosing Which Devices to Use for Rendering

You may not want to use all available GPU devices for rendering, especially if you have multiple GPUs and you want to leave one of them free for working on the user interface or you may want to combine your CPU and GPU together (see the [Hybrid Rendering](#) section below). To do this, you can use the control in the [V-Ray GPU Render Devices Select](#) in 3ds Max, which allows you to specify which devices you want to use for GPU rendering without restarting 3ds Max.

Alternatively, you can use the supplied GUI tool, which you can find in **Start Menu > Programs > V-Ray 6 for 3ds Max #### > Select rendering devices for V-Ray GPU for 3ds Max ####**, where #### is the 3ds Max version.



After changing this option, you need to restart the 3ds Max (or V-Ray Standalone) if it is running for the changes to take effect. If the V-Ray GPU render server is running as a Windows service, you may need to stop it from the Services applet in the Control Panel.

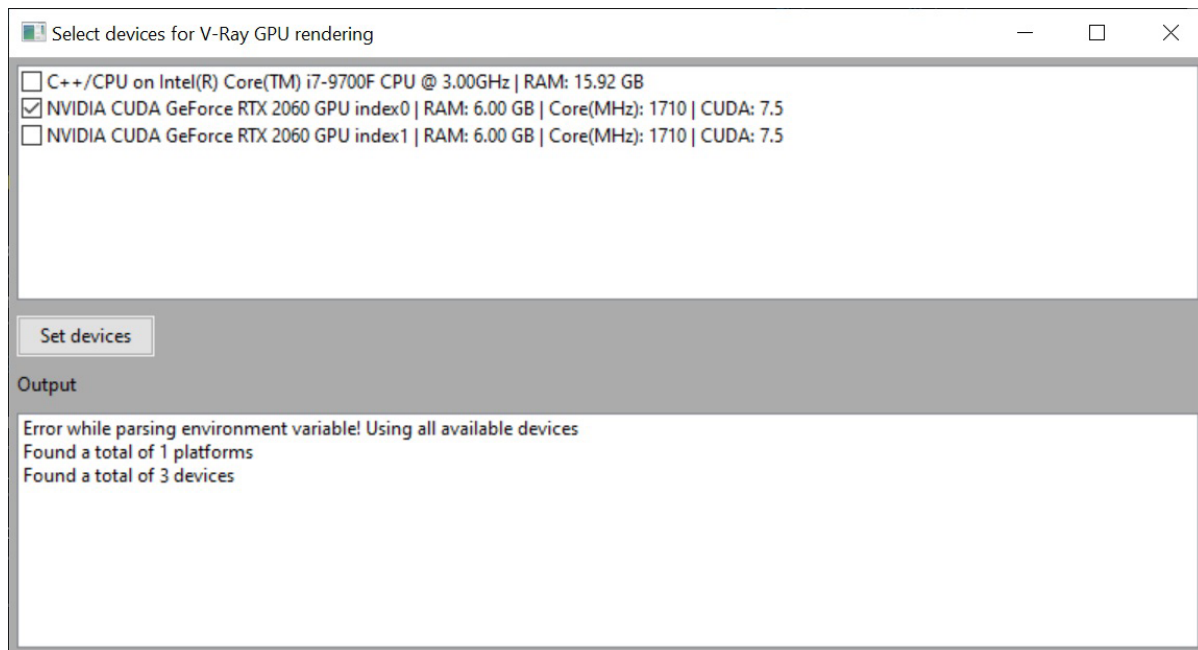
The Select devices for V-Ray rendering tool also allows for selecting GPU devices for denoising. It can also set Low GPU Thread Priority per device. When Low priority is enabled, V-Ray tries to lessen the load on GPUs working on displaying graphics to the monitor(s) in order to give them more resources to complete other processes and tasks for the OS. This is done by internally using a lower value for Rays bundle size/IPR rays bundle size for those GPUs with attached displays (*Rays per pixel is still the same for all GPUs*). This can affect the overall performance, and the render speed might be reduced. It is recommended to utilize a separate GPU for the display, if possible.

Note that when multiple devices are selected for denoising, out of all the devices that match the query only the device with the highest compute capability is used for the denoising process.

The asterisk (\*) sign next to a GPU device's name in the list means that a monitor is connected to that GPU device. If two or more monitors are connected to the GPU device, there are 2 or more asterisks next to the GPU device name.

There is a tooltip that appears upon hovering over the asterisks that shows information on the GPU and number of monitors connected to it.

The Select devices for V-Ray rendering tool has less functionalities and different design in earlier versions of V-Ray. It is located again in **Start Menu > Programs > V-Ray 5.0 for 3ds Max > Select rendering devices for V-Ray GPU 5.0 for 3ds Max**.



## Balancing the GPU Load

If you have only one GPU on your system, you may find that the user interface becomes sluggish and unresponsive while V-Ray GPU is rendering. To alleviate this problem, reduce the **Rays per pixel** and/or the **Rays bundle size / IPR ray bundle size** parameters in the Performance tab of the V-Ray GPU renderer settings. For example, you can try values like **64/1** or **32/1**. This breaks up the data passed to the GPU into smaller chunks so that the user interface requests can be processed faster. Note, however, that this reduces the rendering speed. Turn on the statistics display to check the difference in render speed and to find the optimal settings for your system.

## Hybrid Rendering with CPUs and the CUDA Engine

V-Ray GPU can perform hybrid rendering with the CUDA engine utilizing both the CPU and NVIDIA GPUs. V-Ray can now execute the CUDA source on the CPU, as though the CPU was another CUDA device. To enable the hybrid rendering mode, simply enable the **C++/CPU** device from the list of CUDA devices.

The hybrid rendering mode does not require any special drivers. Furthermore, you can use the CPU as a CUDA device even if you don't have an NVIDIA GPU and/or NVIDIA drivers installed. Meaning, this mode can be used on computers that don't even have GPUs. The hybrid render engine running on a CPU [supports the same features](#) as the regular V-Ray GPU CUDA engine.

## References

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The NVIDIA CUDA developer zone:<https://developer.nvidia.com/category/zone/cuda-zone>

For more information on hardware recommendations, see the [Hardware Recommendations](#) article.