Surface Laptop Studio graphics overview

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Surface Laptop Studio integrates fully modernized compute and graphics capabilities into a new versatile form factor. Led by the quad-core 11th Gen Intel® Core™ i7 and NVIDIA® RTX™ A2000 or NVIDIA® GeForce RTX™ 3050 Ti, Surface Laptop Studio provides architects, engineers, data scientists, and creative professionals with the compute power to do their best work.

A significant differentiator across Surface Laptop Studio models is the GPU configuration. All but the Core i5 device feature a discrete NVIDIA RTX GPU, enabling hardware-accelerated ray tracing, AI and video. The design also optimizes energy efficiency for mobile form factors. The models with NVIDIA GPUs are part of the NVIDIA Studio Products program, benefiting from RTX-accelerations in the top creative apps, reliable NVIDIA Studio Drivers, and having access to exclusive NVIDIA apps like Canvas or Broadcast. Ray tracing is a computationally intensive technique that simulates the physical behavior of light to achieve greater realism in computer-generated scenes. It's used both in gaming and in 3D rendering. NVIDIA RTX also features deep learning super sampling (DLSS), an AI technology that boosts frame rates.

These advanced graphics rendering capabilities come in two primary configurations: NVIDIA GeForce RTX 3050 Ti Laptop GPU for consumers or creative professionals and NVIDIA RTX A2000 Laptop GPU for architects, engineers, creative professionals, and other business professionals who need advanced graphics capabilities.

Surface Laptop Studio GPUs

This section describes the integrated and discrete GPUs across Surface Laptop Studio models.

Intel Iris™ Xe Graphics

As the integrated GPU (iGPU) on Surface Laptop Studio, Intel Iris™ Xe Graphics functions as the singular GPU in the Core i5 model. It supports richer gaming experiences and greater speeds for designers and creators. With advanced graphics capabilities and an AI-enhanced experience, Intel Iris Xe enables consumers, hobbyists, and online creators to run the latest productivity software like Adobe Creative Cloud or enjoy gaming titles in 1080p.

It also increases the number of supported displays from three to a total of four. Now you can use up to three external displays alongside the internal display or four external displays at once -- for both integrated GPU and discrete GPU models.[1]

Comparing discrete GPUs

NVIDIA GeForce RTX 30 Series and RTX professional GPUs provide massive speedups for games, 3D rendering, video editing, graphic design and AI-accelerated workflows in addition to many other creative tasks. This is thanks to the latest NVIDIA Ampere architecture:

- 2nd generation RT Cores and DLSS, providing up to 2x performance boosts in top renderers, including Blender Cycles, Chaos V-Ray, and Autodesk Arnold.
- 3rd generation Tensor Cores that accelerate AI features. Tensor Cores also bring AI to graphics with capabilities like DLSS, AI denoising, and enhanced editing for select applications.
- The best-in-class video encoder (NVENC) and new hardware acceleration for ray-traced motion blur, a common technique used in production rendering, is now boosted by up to 5x.

NVIDIA GeForce RTX 3050 Ti Laptop GPU

The GeForce RTX 3050 Ti Laptop GPU is a great GPU for gamers and content creators. It's powered by the NVIDIA Studio drivers for enhanced reliability and performance in creator apps.

GeForce RTX 3050 Ti enables:

- Video editing and live streaming accelerations, thanks to the dedicated hardware encoder, enhanced AI features, and app accelerations in apps like Adobe Premiere® Pro, DaVinci Resolve or OBS.
- Graphic design and photography, with AI-accelerated features in apps like Adobe Lightroom or Photoshop.
- Ultra-fast 3D rendering thanks to RTX and DLSS accelerations in apps like Blender or Autodesk® Maya.
- Next-generation gaming with RTX graphics and high performance thanks to DLSS and ultra-low latency with NVIDIA Reflex.

NVIDIA RTX A2000 Laptop GPU

The NVIDIA RTX A2000 offers professional graphics rendering and AI capabilities for demanding professional workflows, including manufacturing and product design, media and entertainment modeling, animating and rendering, architecture, engineering and construction design.

NVIDIA RTX A2000 builds on the GeForce RTX 3050 Ti features with the following additional capabilities:

- Enterprise-grade reliability, including ISV certification for professional apps and enterprise drivers tuned for software compatibility and stability.
- Enterprise-level hardware, drivers and support.
- Dedicated IT enterprise tools for remote management that help maximize uptime and minimize IT support requirements.
- Enhanced support for professional applications using Open GL graphics.

Table 1. Discrete GPUs on Surface Laptop Studio

GPU	NVIDIA GeForce RTX 3050 Ti Laptop GPU	NVIDIA RTX A2000 Laptop GPU
GPU memory	4GB GDDR6	4GB GDDR6
GPU boost clock	1035Mhz	1207.5Mhz
Streaming multiprocessors	2x FP32	2x FP32
NVIDIA CUDA processing cores	2560	2560
NVIDIA RT cores	2nd Gen / 20	2nd Gen / 20
Tensor cores	3rd Gen / 80	3rd Gen / 80
Memory rate	11 Gbps	11 Gbps
Memory bandwidth	192 GB/s	192 GB/s
Memory interface	128-bit	128-bits
Maximum graphics power (w)	50 watts	50 watts
DLSS	Yes	Yes
Dynamic boost 2.0	Yes	Yes

GPU	NVIDIA GeForce RTX 3050 Ti Laptop GPU	NVIDIA RTX A2000 Laptop GPU
Resizable BAR	Yes	Yes
NVIDIA Optimus	Yes	Yes
Nvidia Encoder	7th Gen	7th Gen
Nvidia Decoder	5th Gen	5th Gen
Tensor performance	42.4 TFLOPS, Peak	49.5 TFLOPS, Peak
Single precision floating point performance	5.3 TFLOPS, Peak	6.2 TFLOPS, Peak
PCIe generation	4 (Gen3 configured)	4 (Gen3 configured)
Shader model	7.0	7.0
Vulkan RT	1.2	1.2
OpenCL	3.0	3.0
OpenGL	4.6	4.6
DirectX	12 Ultimate	12 Ultimate

References

1. Subject to the limitations of the display connection. DisplayPort 1.4a over USB-C permits 4K displays up to the following configurations: 1x 4K at 120Hz; 2x 4K at 60Hz; 1x 4K at 60Hz + 2x 4K at 30Hz; 4x 4K at 30Hz. Display configurations of more than two displays require display support for daisy-chaining or display adapters with support for multiple displays.