

Microsoft Surface for IT professionals

Learn how to plan, deploy, and manage Microsoft Surface and Surface Hub devices.



TRAINING
Surface devices
documentation



TRAINING
Surface Hub
documentation



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Surface Duo
documentation

Surface devices

Find resources for your Microsoft Surface devices.

Surface overview

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Surface Duo community

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Surface Hub help

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Surface Duo help

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Surface devices documentation

Harness the power of Surface, Windows, and Office connected together through the cloud.

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GET STARTED

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[Built for sustainability - Surface design for a more repairable future ↗](#)

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What's new in Surface Thunderbolt 4 Dock

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

As the latest generation Surface dock, [Surface Thunderbolt™ 4 Dock](#) [↗] delivers ultra-high speed data transfer, built-in enterprise management and security ¹ and the versatility to connect your most important peripherals.

- **High-speed USB4®/Thunderbolt 4 on USB-C® ports.** Plug in one cable to power your device, connect two 4K monitors at up to 60 Hz², and transfer data and files at up to 40 Gbps.
- **The charging power you need for your devices and accessories.** Connect and power your laptop with up to 96 watts of power passthrough and extra charging power for your phone and accessories.³
- **More inclusive design with recycled materials.** Quickly access ports with raised tactile indicators for greater accessibility. The lightest Surface dock and PSU enclosures (excluding the AC cable) are attributed to 20% ocean-bound plastic.⁴ The packaging is ~99% recyclable in OECD countries and free of single-use plastics. The lightest Surface dock comes with 20% ocean-bound plastic and 99% recyclable packaging that's free of single-use plastics.⁵





Simple management and security from anywhere

Surface Thunderbolt 4 Dock helps improve IT efficiency and reduce overhead and support costs through optimization for Microsoft software.

- **Surface Enterprise Management Mode (SEMM) for Dock.** Designed to easily lock down the ports of your dock in mission-critical environments and restrict functionality to specific devices, enabling organizations to simplify and secure IT management. For more information, see [Secure Surface Dock ports with Surface Enterprise Management Mode](#).
- **Firmware update through Windows Update.** Seamlessly keep your dock up to date with automatic updates or downloadable update driver and firmware packs.
- **MAC Address Passthrough.**⁶ Maintain device network identity from one dock to another for ease of management in shared workspaces or dock environments.
- **Wake on LAN from Modern Standby.** IT admins can remotely wake up devices connected to Surface Thunderbolt 4 Dock and automatically perform management tasks.
- **Windows Management Instrumentation (WMI) support.** IT admins can remotely monitor and manage the latest firmware, policy settings, and related data across Surface Thunderbolt 4 Dock devices. For more information, see [Manage Surface Dock with WMI](#).
- **Centralized support & warranty service.** IT admins can get direct support via the [Surface Management Portal](#) or [Microsoft Hardware Support Portal](#) ↗.

General system requirements

Surface Thunderbolt 4 Dock is optimized for devices with a USB4/ Thunderbolt 4 port, including the following Surface devices:

- Surface Laptop 5
- Surface Laptop Studio
- Surface Pro 8
- Surface Pro 9 (Intel/Wi-Fi)

 **Note**

Thunderbolt 4 connection supports two 4K external displays at up to 60 Hz (when supported by device and display).

Surface Thunderbolt 4 Dock is compatible with the following Surface devices with USB-C ports:

- Surface Pro 9 with 5G
- Surface Pro 7+
- Surface Pro 7
- Surface Pro X
- Surface Laptop 4
- Surface Laptop 3
- Surface Laptop Go 2
- Surface Laptop Go
- Surface Go 3
- Surface Go 2
- Surface Book 3
- Surface Studio 2+ (no charging)

 **Note**

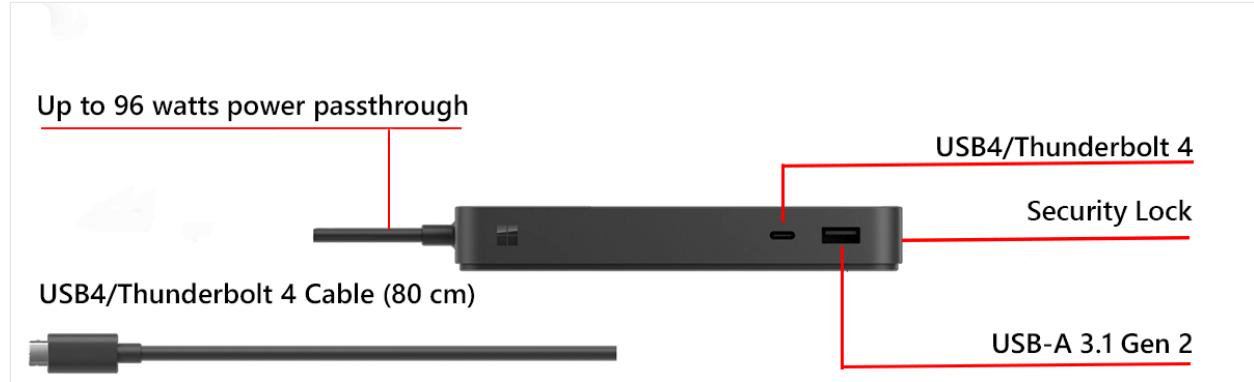
USB-C connection supports one 4K external display at up to 60 Hz (when supported by device and display). Or you can daisy chain more monitors, as described in the section on this page: [Connect multiple monitors to devices without USB4/Thunderbolt 4](#).

 **Tip**

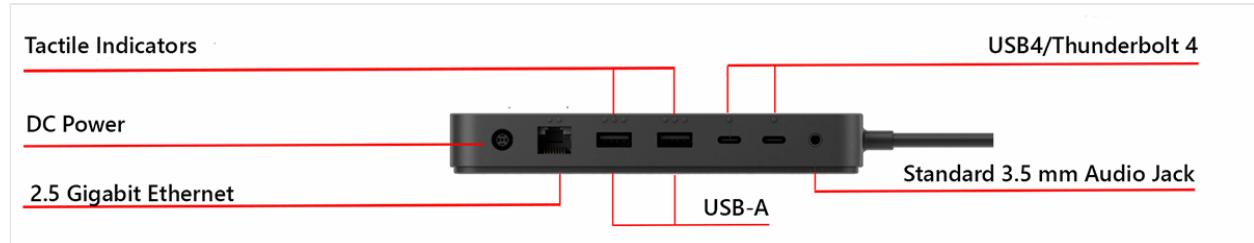
You can use Surface Thunderbolt 4 Dock with any host PC with USB4/ Thunderbolt 4. Full support for enterprise management and security features is exclusive to

Surface devices. Automatic firmware updates via Windows Update only work on Windows-based PCs.

Components



Front facing view



Rear facing view

USB

- One front-facing USB-A (USB 3.1 Gen 2, 7.5 W)
- One front-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W)
- Two rear-facing USB-A (USB 3.1 Gen 2, 7.5 W)
- Two rear-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W)

Ethernet

- 2.5-gigabit Ethernet port.

External Power supply

- 165-W power supply and up to 96-W passthrough to connected PC. Supports 100V-240V.

Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock

Optimize port access, save desk space and use enhanced security capabilities with the [Cable Matters Mount](#),[↗] purpose-built for Surface Thunderbolt 4 Dock and Designed for Surface certified.

- Facilitates single-handed interaction with Microsoft Surface Thunderbolt 4 Dock
- Improves port access through stabilization
- Saves desk space through cable management
- Integrates easily with locking devices for extra security



Compare Surface Docks

Feature	Surface Thunderbolt 4 Dock	Surface Dock 2	Surface Dock
Surface Connect	No	Yes	Yes
Optimal host devices	Surface Laptop 5, Surface Pro 9, Surface Pro 8, Surface Laptop Studio	Surface Pro 9 with 5G, Surface Laptop 4, Surface Laptop Go 2, Surface Go 3	Surface Go, Surface Laptop 2, Surface Laptop 3, Surface Pro 7+

Feature	Surface Thunderbolt 4 Dock	Surface Dock 2	Surface Dock
USB-A	One front-facing USB-A (USB 3.1 Gen 2, 7.5 W)	Two rear-facing USB 3.2 Gen 2 (7.5-W power)	Two front-facing USB 3.1 Gen 1
	Two rear-facing USB-A (USB 3.1 Gen 2, 7.5 W)		Two rear-facing USB 3.1 Gen 1
Mini Display port	None	None	Two rear facing (DP1.2)
USB-C	One front-facing USB-C (USB 4 Thunderbolt 4, video display enabled, 15 W)	Two front-facing USB 3.2 Gen 2 (15-W power)	None
	Two rear-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W)	Two rear-facing USB 3.2 Gen 2 (DP1.4a) (7.5-W power)	
3.5 mm Audio in/out	Yes	Yes	Yes
Ethernet	Yes 2.5 gigabit	Yes 1 gigabit	Yes, 1 gigabit
DC power in	Yes	Yes	Yes
Kensington lock	Yes	Yes	Yes
Cable length	80 cm	80 cm	65 cm
Host power	96 W	120 W	60 W
USB load power	67.5 W	60 W	30 W
USB bit rate	Up to 32 Gbps ⁶	Up to 10 Gbps	Up to 5 Gbps
Monitor support	2 x 4K @ 60 Hz or 1 x 4K @ 60 Hz	2 x 4K @ 60 Hz or 1 x 4K @120 Hz	2 x 4K @ 30 Hz, or 1 x 4K @ 60 Hz
Wake-on-LAN from Modern Standby	Yes	Yes	Yes

Feature	Surface Thunderbolt 4 Dock	Surface Dock 2	Surface Dock
Wake-on-LAN from S4/S5 sleep modes	No	Yes	No
Network PXE boot	Yes	Yes	Yes
SEMM host access control	Yes	Yes	No
SEMM port access control ⁷	Yes	Yes	No
Servicing support	Windows Update, Surface App, or MSI	Windows Update or MSI	MSI

Connect multiple monitors to devices without USB4/Thunderbolt 4

You can daisy chain up to eight monitors by connecting a series of display devices using a wired connection from monitor to monitor in a series, rather than connecting each monitor directly to Surface Thunderbolt 4 Dock.

To daisy chain monitors, you need two or more monitors that support at least **DisplayPort 1.2** and **Multi-Stream Transport (MST)**. Displays that function as a middle link in the chain must include **DisplayPort** output ports and input ports. You also need a video or graphics card (GPU) on your PC that supports **DisplayPort 1.2** and **MST**.

Note

Resolution and refresh rate is reduced when daisy chaining two or more monitors.

To connect your PC to multiple monitors using DisplayPort MST:

1. Connect your PC to the **DisplayPort-In** connection on the first monitor.
2. Connect the **DisplayPort-Out** connection on the first monitor to the **DisplayPort-In** connection on the second monitor. To daisy chain more than two monitors, follow

a similar sequence: The first monitor connects to the second, the second monitor connects to the third, and so on.

3. Use the On-Screen Display (OSD) menu, to enable **DisplayPort 1.2** on your monitor. To learn more, refer to the user manual of your monitor.

Place an order

- [Surface Thunderbolt 4 Dock ↗](#)
- [Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock ↗](#)

Appendix: Surface Dock Thunderbolt 4 tech specs

Feature	Description
Compatibility	<p>Designed for devices with USB-C with USB 4®/Thunderbolt 4 port:</p> <p>Surface Laptop 5 Surface Laptop Studio Surface Pro 8 Surface Pro 9 (Intel/Wi-Fi)</p> <p>Thunderbolt 4 connection supports two 4K external displays at up to 60 Hz (when supported by device and display)</p> <p>Compatible with devices with USB-C ports:</p> <p>Surface Pro 9 with 5G Surface Pro 7+ Surface Pro 7 Surface Pro X Surface Laptop 4 Surface Laptop 3 Surface Laptop Go 2 Surface Laptop Go Surface Go 3 Surface Go 2 Surface Book 3 Surface Studio 2+ (no charging)</p>
	<p>USB-C connection supports one 4K external display at up to 60 Hz (when supported by device and display)⁸</p>
Dimensions	5.91" x 2.95"x 0.84" (150 mm x 75 mm x 21.3 mm)
Weight	0.9 lb. (410 g)

Feature	Description
Connections	165 W power supply (up to 96 W passthrough) USB4/Thunderbolt 4 Cable with LED charging indicator (80 cm) 1 front-facing USB-A (USB 3.1 Gen 2, 7.5 W) 1 front-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15W) 2 rear-facing USB-A (USB 3.1 Gen 2, 7.5 W) 2 rear-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W) 1 Ethernet (2.5Gbit/s) 3.5 mm audio jack Security lock support (Kensington compatible) Screw nut for desk mounts Compatible with Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock ⁹
What's in the box	Microsoft Surface Thunderbolt 4 Dock 165 W Power Supply
Manageability	For supported host devices: Surface Enterprise Management Mode for Dock ¹⁰ Media Access Control (MAC) address emulation Firmware update through Windows Update and Surface app Wake on LAN from Modern Standby
Accessibility	Tactile indicators for port identification
Materials	Microsoft Surface Thunderbolt 4 Dock and PSU enclosures (excluding AC cable) are attributed to 20% ocean-bound plastic ¹¹
Warranty ¹²	1-year limited warranty

Learn more

- Simple management & security with our latest Surface Dock[↗]
- Secure Surface Dock ports with Surface Enterprise Management Mode
- Manage Surface Docks with WMI
- Wake On LAN with Surface Thunderbolt 4 Dock
- Surface Thunderbolt 4 Dock Firmware and Drivers[↗]

References

1. Surface Enterprise Management Mode for Dock and MAC address passthrough are available on select host devices and supported operating systems.
2. When supported by device and display.
3. USB-C port doesn't charge your Surface device or any device that requires more than 15 W.

4. Ocean-bound plastic is plastic waste recovered from oceans and waterways, cleaned, and processed into recycled plastic resin pellets. These recycled pellets are blended in with virgin plastic during the manufacturing process.
5. In OECD countries, Microsoft operates recycling programs either independently or through third parties covering Microsoft Devices. In addition, check local recycling programs for availability.
6. Requires device with USB4/Thunderbolt 4 port.
7. Software license required for some features. Sold separately.
8. 4K @ 60 Hz via USB-C requires High Bit Rate 3 (HBR3) support on both display and host computer.
9. Learn more at [Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock ↗](#).
10. Surface Enterprise Management Mode for Dock and MAC address passthrough are available on select host devices and supported operating systems.
11. Ocean-bound plastic is plastic waste recovered from oceans and waterways, cleaned, and processed into recycled plastic resin pellets. These recycled pellets are blended in with virgin plastic during the manufacturing process.
12. Microsoft's Limited Warranty is in addition to your consumer law rights.

Surface Pro 9 for Business overview

Article • 03/16/2023 • Applies to: Windows 10, Windows 11



Surface 2-in-1s combine the benefits of a laptop and tablet into one hyper-mobile package, with the ability to stay connected wherever that work happens. They're grounded in some important core principles: timeless design, versatile form factors, high performance, and best-in-class integration with Windows and Microsoft 365. Get the tablet flexibility you want and laptop performance you need.

Surface Pro 9 is our most powerful Pro ever, now featuring a choice of silicon and connectivity to help professionals get the best experience for their needs. Whether you're docked at your desk and require the highest performance for intense workloads, or need 5G connectivity for the field, there's a Surface Pro 9 for you.

Get powerful performance with 12th Gen Intel® Core™ processors built on the Intel® Evo™ platform to run productivity tools, creative apps and Thunderbolt™ 4 ports. From CAD files to Excel spreadsheets, your employees get pro-level performance with 12th Gen Intel® Core™ processors built on the Intel® Evo™ platform.²⁷ This device is great for your finance pros, sales reps, mobile engineers, and case workers.

For on-the-go professionals looking to supercharge their work with our AI-powered Neural Processing Unit (NPU), opt for the latest generation Microsoft SQ® 3 powered by

Qualcomm Snapdragon. With instant mobile 5G access, superior multitasking capabilities, and longer battery life, there's no nothing holding you back. Perfect in the hands of a real estate agent, highly mobile engineers or technicians, or people leading worksites.

Explore Surface devices

- [Explore Surface: Interactive tour ↗](#)

Order Surface Pro 9 for Business

- [Order Surface Pro 9 for Business ↗](#)

Surface Pro 9 commercial tech specs

Feature	Surface Pro 9	Surface Pro 9 with 5G
Processor	<ul style="list-style-type: none">- 12th Gen Intel® Core™ i5-1245U processor- 12th Gen Intel Core i7-1265U processor- Options with storage 256 GB and above built on the Intel Evo™ platform	<ul style="list-style-type: none">- Microsoft SQ® 3 processor- Neural Processing Unit (NPU)
Graphics	<ul style="list-style-type: none">- Intel Iris® Xe graphics	<ul style="list-style-type: none">- Microsoft SQ 3 Adreno™ 8CX Gen 3
Memory	<ul style="list-style-type: none">- 8 GB, 16 GB, 32 GB (LPDDR5 RAM)	<ul style="list-style-type: none">- 8 GB, 16 GB (LPDDR4X RAM)
Storage ¹	<ul style="list-style-type: none">- Removable² drive (SSD) options: 128 GB, 256 GB, 512 GB, 1 TB	<ul style="list-style-type: none">- Removable drive (SSD) options: 128 GB, 256 GB, 512 GB
Display	<ul style="list-style-type: none">- Screen: 13" PixelSense™ Flow Display- Resolution: 2880 × 1920 (267 PPI)- Color profile: sRGB and Vivid- Dynamic refresh rate up to 120 Hz- Aspect ratio: 3:2- Contrast ratio 1200:1- Adaptive Color- Auto Color Management supported- Touch: 10-point multi-touch- Dolby: Dolby Vision IQ™³ support- Glass: Gorilla® Glass 5	<ul style="list-style-type: none">- Screen: 13" PixelSense Flow Display- Resolution: 2880 × 1920 (267 PPI)- Color profile: sRGB and Vivid- Dynamic refresh rate up to 120 Hz- Aspect ratio: 3:2- Contrast: 1200:1- Adaptive Color- Touch: 10-point multi-touch- Glass: Gorilla Glass 5

Feature	Surface Pro 9	Surface Pro 9 with 5G
Size and Weight	<ul style="list-style-type: none"> - Length: 11.3 inch (287 mm) - Width: 8.2 inch (209 mm) - Height: 0.37 inch (9.3 mm) - Weight⁴: 1.94 lb. (879 g) 	<ul style="list-style-type: none"> - Length: 11.3 inch (287 mm) - Width: 8.2 inch (209 mm) - Height: 0.37 inch (9.3 mm) - Weight⁵: 1.95 lb. (883 g) (mmWave) or 1.94 lb. (878 g) (Sub6)
Battery Life ⁶	<ul style="list-style-type: none"> - Up to 15.5 hours of typical device usage 	<ul style="list-style-type: none"> - Up to 19 hours of typical device usage
Security	<ul style="list-style-type: none"> - TPM 2.0 chip for enterprise-grade security and BitLocker support - Enterprise-grade protection with Windows Hello face sign-in - Windows 11 Secured-core PC 	<ul style="list-style-type: none"> - Enhanced security with Microsoft Pluto - Enterprise-grade protection with Windows Hello face sign-in - Windows 11 Secured-core PC
Cameras	<ul style="list-style-type: none"> - Windows Hello face authentication camera (front-facing) - Front-facing camera with 1080p full HD video - 10.0MP rear-facing autofocus camera with 1080p HD and 4K video 	<ul style="list-style-type: none"> - Windows Hello face authentication camera (front-facing) - Front-facing camera with 1080p full HD video - 10.0 MP rear-facing autofocus camera with 1080p HD and 4K video
Audio	<ul style="list-style-type: none"> - Dual far-field Studio Mics - 2-W stereo speakers with Dolby® Atmos®⁷ 	<ul style="list-style-type: none"> - Dual far-field Studio Mics - 2-W stereo speakers
Ports	<ul style="list-style-type: none"> - 2 × USB-C® with USB 4.0/Thunderbolt 4 - 1 × Surface Connect port - 1 × Surface Keyboard port 	<ul style="list-style-type: none"> - 1 × nano SIM - 2 × USB-C 3.2 - 1 × Surface Connect port - 1 × Surface Keyboard Pen 225 port

Feature	Surface Pro 9	Surface Pro 9 with 5G
Network and connectivity	<ul style="list-style-type: none"> - Wi-Fi 6E: 802.11ax compatible - Bluetooth® Wireless 5.1 technology 	<ul style="list-style-type: none"> - Wi-Fi 6E: 802.11ax compatible - Bluetooth Wireless 5.1 technology - Location: GPS, Glonass, Galileo and Beidou support - NanoSIM and eSIM⁸support - Supports 5G⁹ - mmWave markets only: - 5G-NR NSA (mmWave): Release 15 DL 64 QAM up to 4.2 Gbps 4xDL CA (400 MHz), 2x2 MIMO - 5G-NR NSA (mmWave): Release 15 UL 64 QAM, 2xUL CA (200 MHz), 2x2 MIMO - 5G-NR NSA (mmWave) Bands: n257, n260, n261 <p>Sub-6 markets only:</p> <ul style="list-style-type: none"> - 5G-NR NSA (Sub-6): Release 15 DL 256 QAM up to 2.8 Gbps, 4x4 MIMO - 5G-NR NSA (Sub-6): Release 15 UL 256 QAM - 5G-NR NSA (Sub-6) Bands: n1, n2, n3, n5, n7, n8, n20, n25, n28, n38, n40, n41, n66, n71, n77, n78, n79 - Gigabit LTE - A Pro Release 15 with 4x4 MIMO and LAA - LTE DL Cat 20, 256 QAM up to 2 Gbps, 5xDL CA - LTE UL Cat 13, 64 QAM Contiguous 2x ULCA - LTE Bands: 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 19, 20, 25, 26, 28, 29, 30, 38, 39, 40, 41, 42, 46, 48, 66, 71 - WCDMA: 1,2,5,8
Pen compatibility	<ul style="list-style-type: none"> - Designed for Surface Slim Pen 2¹⁰ - Integrated storage and wireless charging for Surface Slim Pen 2 with Surface Pro Signature Keyboard* - Supports tactile signals¹¹ with Surface Slim Pen 2 - Supports Microsoft Pen Protocol (MPP) 	<ul style="list-style-type: none"> - Designed for Surface Slim Pen 2 - Integrated storage and wireless charging for Surface Slim Pen 2 with Surface Pro Signature Keyboard - Supports tactile signals with Surface Slim Pen 2 - Supports Microsoft Pen Protocol (MPP)

Feature	Surface Pro 9	Surface Pro 9 with 5G
Keyboard Compatibility	<ul style="list-style-type: none"> - Surface Pro Signature Keyboard - Surface Pro Keyboard - Surface Pro X Signature Keyboard - Surface Pro X Keyboard 	<ul style="list-style-type: none"> - Surface Pro Signature Keyboard - Surface Pro Keyboard - Surface Pro X Signature Keyboard - Surface Pro X Keyboard
Battery Capacities	<ul style="list-style-type: none"> - Battery Capacity Nominal (WH) 47.7 Wh - Battery Capacity Min (WH) 46.5 Wh 	<ul style="list-style-type: none"> - Battery Capacity Nominal (WH) 47.7 Wh - Battery Capacity Min (WH) 46.5 Wh
Software	<ul style="list-style-type: none"> - Windows 11 Pro or Windows 10 Pro - Preloaded Microsoft 365 Apps¹² - Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 30-day trial¹³ 	<ul style="list-style-type: none"> - Windows 11 Pro on ARM¹⁴ - Preloaded Microsoft 365 Apps - Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 30-day trial²⁸
Accessibility	<ul style="list-style-type: none"> - Compatible with Surface Adaptive Kit 	<ul style="list-style-type: none"> - Compatible with Surface Adaptive Kit
Serviceability ¹⁵ (commercial only)	<ul style="list-style-type: none"> - Replaceable components include: - Display - Battery - Surface Connect Port (Surface Connect) - Thermal Module with Fan (Surface Pro 9 only) - Cameras - Speakers - Buttons - Wi-Fi Deck (Surface Pro 9 only) - Back Cover (aka bucket) - Removable SSD - Removable SSD Door - Kickstand - Motherboard 	<ul style="list-style-type: none"> - Replaceable components include: - Display - Battery - Surface Connect Port (Surface Connect) - Thermal Module (Surface Pro 9 with 5G only) - Cameras - Camera Deck (Surface Pro 9 with 5G only) - Speakers - Buttons - Back Cover (unavailable in US) - Removable SSD - Removable SSD Door - Kickstand - Motherboard
Exterior	<ul style="list-style-type: none"> - Casing: Aluminum - Colors: ¹⁶ Platinum, Graphite, Sapphire, Forest - Physical Buttons: Volume, Power 	<ul style="list-style-type: none"> - Casing: Aluminum - Colors: Platinum - Physical Buttons: Volume, Power
Sensors	<ul style="list-style-type: none"> - Accelerometer - Gyroscope - Magnetometer - Ambient Color Sensor (Brightness and Color) 	<ul style="list-style-type: none"> - Accelerometer - Gyroscope - Magnetometer - Ambient Color Sensor (Brightness and Color)

Feature	Surface Pro 9	Surface Pro 9 with 5G
What's in the box	<ul style="list-style-type: none"> - Surface Pro 9 - Power Supply - Quick Start Guide - Safety and warranty documents - 	<ul style="list-style-type: none"> - Surface Pro 9 with 5G - Power Supply - Quick Start Guide - Safety and warranty documents - SIM Card access tool
Warranty ¹⁷	<ul style="list-style-type: none"> - One-year Microsoft limited hardware warranty 	<ul style="list-style-type: none"> - One-year Microsoft limited hardware warranty

References

1. System software and updates use significant storage space. Available storage is subject to change based on system software and updates and apps usage. 1 GB = 1 billion bytes. 1 TB = 1,000 GB. See Surface Storage for more details.
2. Components available through your Surface Commercial Authorized Device Reseller. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Microsoft tools (sold separately) may also be required for repair. Opening and/or repairing your device can present electric shock, fire and personal injury risk and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair won't be covered under Microsoft's Hardware Warranty or protection plans.
3. Requires Dolby Vision® encoded content and video.
4. Weight not including Surface Pro Signature Keyboard and Surface Slim Pen 2 (sold separately).
5. Weight not including Surface Pro Signature Keyboard and Surface Slim Pen 2 (sold separately).
6. Battery life varies significantly based on usage, network and feature configuration, signal strength, settings and other factors.
7. Requires Dolby Vision® encoded content and video.
8. eSIM support may vary by carrier. Individual device activation for eSIM is supported, however bulk activations leveraging eSIM on devices with Windows 10 aren't currently available.
9. 5G not available in all areas, mmWave in US only. Supports Sub-6 GHz, not available in all areas; compatibility and performance depend on carrier network, plan and other factors. See carrier for details and pricing.
10. Surface Slim Pen 2 sold separately.
11. Tactile signals with Surface Slim Pen 2 can be experienced on some applications on Surface B&P running Windows 11.
12. Activation required. If your device is managed by your organization's IT department, contact your IT administrator for activation. After 30 days, you'll be

- charged the applicable monthly or annual subscription fee. Credit card required.
- Cancel anytime to stop future charges.
13. Activation required. If your device is managed by your organization's IT department, contact your IT administrator for activation. After 30 days, you'll be charged the applicable monthly or annual subscription fee. Credit card required. Cancel anytime to stop future charges.
14. Surface Pro 9 with 5G comes with Windows 11 Pro on ARM processor. At this time, Surface Pro 9 with 5G with Windows 11 Pro on ARM processor won't install some games and CAD software, and some third-party drivers or anti-virus software. Certain features require specific hardware. Find out more in the [FAQ](#).
15. Customer Replaceable Units (CRUs) are components available for purchase through your Surface Commercial Authorize Device Reseller. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Opening and/or repairing your device can present electric shock, fire and personal injury risks and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair won't be covered under Microsoft's Hardware Warranty or protection plans. Components will be available shortly after initial launch; timing of availability varies by component and market.
16. Colors available on selected models only. Available colors, sizes, finishes, and processors may vary by store, market, and configuration.
17. Microsoft's Limited Warranty is in addition to your consumer law rights. See also: [Surface Warranty, Service Offerings & Support Plans – Microsoft Surface for Business](#) ↗ [Warranties](#) ↗

Surface Laptop 5 for Business overview

Article • 03/16/2023 • Applies to: Windows 10, Windows 11



The modern workplace has changed in the last few years. Employees need high-performance devices they can set up wherever they work, that still have the guts to get everything done. Keeping connections strong with a dispersed workforce is a massive challenge. Especially in highly collaborative teams, technology must facilitate building and maintaining strong connections with colleagues and customers alike.

With ultra-fast performance, sleek portability, an enhanced camera for more engaging video calls, Surface Laptop 5 keeps you connected and engaged with Windows 11 interactive features, high-quality cameras, Omnisonic® speakers, and Microsoft 365 apps that are optimized for the Surface signature 3:2 screen ratio.

Superpowered for serious productivity

- Lightning-fast performance and multitasking power comes from 12th Intel® Core™ i5 and i7 processors, now built on the Intel Evo platform. Employees can connect to external monitors and charge their devices simultaneously with USB-C and Thunderbolt™ 4 connecting to up to two 4k monitors at 60Hz to deliver superfast connections.
- Surface Laptop 5 is the perfect device for high achievers, power users, and executive talent: Users who need high-powered apps and intensive multitasking and professionals who take video calls, co-author presentations, and run analytical models simultaneously.

Deploy, manage, and stay secure from anywhere

- Give IT peace of mind knowing that your company, customer, and employee data are safe and secured with a Windows 11 Secured-core PC. Surface customers save time and money with streamlined deployment, modern device management, and built-in, cloud-powered security. Empower people, data, and systems with connected experiences from Surface and Microsoft 365.
- Secured-core PCs are the most secure Windows 11 devices for workers handling the most sensitive data. Secured-core PCs are designed to elevate the benefits of Windows 11 security, providing additional hardware and software protection for workers that handle the most sensitive data in your organization.
- More control with cloud-first device deployment and management. Deploy and manage down to the firmware layer through the cloud with Microsoft Endpoint Manager and DFCI. Every Surface ships with Windows Autopilot, reducing IT complexity by deploying straight to your employees.
- Get more out of your device with more components that are replaceable. Major components in Surface Laptop 5, including the display module, keyboard assembly, battery, storage, and more, are replaceable through a network of approved service providers.
- Make the most of your investment in Microsoft 365 with the essential foundation of Windows 10 or Windows 11 Pro, the protection of Microsoft Enterprise Mobility + Security, and the suite of Office 365 productivity apps you rely on every day.

Explore Surface devices

- [Explore Surface: Interactive tour](#)

Order Surface Laptop 5 for Business

- [Order Surface Pro 9 for Business](#)

Surface Laptop 5 tech specs

Feature	Description
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Feature	Description
Processor	<p>Surface Laptop 5 13.5"</p> <ul style="list-style-type: none"> - 12th Gen Intel® Core™ i5-1245U processor - 12th Gen Intel Core i7-1265U processor - Built on the Intel Evo platform <p>Surface Laptop 5 15"</p> <ul style="list-style-type: none"> - 12th Gen Intel Core i7-1265U processor - Built on the Intel Evo platform
Graphics	<ul style="list-style-type: none"> - Intel Iris® Xe Graphics
Memory & storage ¹	<ul style="list-style-type: none"> - 8 GB, 16 GB or 32 GB LPDDR4x RAM - Removable² solid-state drive (SSD) options: 128 GB, 256 GB, 512 GB, or 1 TB
Display	<p>Surface Laptop 5 13.5"</p> <ul style="list-style-type: none"> - Screen: 13.5" PixelSense™ Display - Resolution: 2256 x 1504 (201 PPI) - Aspect ratio: 3:2 - Contrast ratio: 1300:1 - Color profile: sRGB and Vivid individually color-calibrated display - Dolby: Dolby Vision IQ™ ³ support - Touch: 10-point multi-touch - Glass: Gorilla® Glass 3 display on laptop with Alcantara® material palm rest - Gorilla Glass 5 display on laptop with metal palm rest <p>Surface Laptop 5 15"</p> <ul style="list-style-type: none"> - Screen: 15" PixelSense Display - Resolution: 2496 x 1664 (201 PPI) - Aspect ratio: 3:2 - Contrast ratio: 1300:1 - Color profile: sRGB and Vivid - Individually color-calibrated display - Dolby: Dolby Vision IQ³ support - Touch: 10-point multi-touch - Glass: Gorilla Glass 5
Size & weight	<ul style="list-style-type: none"> - Length: 12.1" (308 mm) - Width: 8.8" (223 mm) - Height: 0.57" (14.5 mm) - Weight: Fabric 2.80 lbs (1,270 g), Metal 2.86 lbs (1,297 g) <p>Surface Laptop 5 15"</p> <ul style="list-style-type: none"> - Length: 13.4" (340 mm) - Width: 9.6" (244 mm) - Height: 0.58" (14.7 mm) - Weight: 3.45 lbs (1,560 g)

Feature	Description
Battery life ⁴	Surface Laptop 5 13.5" Intel Core i5
	- Up to 17 hours of typical device usage
	Surface Laptop 5 13.5" Intel Core i7
	- Up to 17 hours of typical device usage
Surface Laptop 5 15" Intel Core i7	
	- Up to 17 hours of typical device usage
Security	<ul style="list-style-type: none"> - TPM 2.0 chip for enterprise security and BitLocker support - Enterprise-grade protection with Windows Hello face sign-in - Windows 11 Secured-core PC
Cameras	<ul style="list-style-type: none"> - Windows Hello face authentication camera - 720p HD front-facing camera
Audio	<ul style="list-style-type: none"> - Dual far-field Studio Mics - Omnisonic Speakers with Dolby Atmos®⁵
Ports	<ul style="list-style-type: none"> - 1 x USB-C with USB 4.0/Thunderbolt 4 - 1 x USB-A 3.1 - 3.5-mm headphone jack - 1 x Surface Connect port
Network & connectivity	<ul style="list-style-type: none"> - Wi-Fi 6: 802.11ax compatible - Bluetooth® Wireless 5.1 technology
Pen & accessories compatibility	<ul style="list-style-type: none"> - Designed for Surface Pen⁸ - Supports Microsoft Pen Protocol (MPP)
Battery Capacities	<ul style="list-style-type: none"> - Battery Capacity Nominal (WH) 47.4 - Battery Capacity Min (WH) 45.8
Software	<ul style="list-style-type: none"> - Windows 11 Pro or Windows 10 Pro - Preloaded Microsoft 365 Apps⁶ - Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 30-day trial ⁷
Accessibility	<ul style="list-style-type: none"> - Compatible with Surface Adaptive Kit - Compatible with Microsoft Adaptive Mouse - Accessibility Features ↗ - Accessible Devices & Products for PC & Gaming ↗

Feature	Description
Serviceability ⁹	<p>Replaceable components include:</p> <ul style="list-style-type: none"> - SSD - AB Cover module (display) - C Cover - Battery + bucket - Motherboard - Charging Port (Surface Connect connector) - Thermal Module - Thermal pad and Desense tape - Feet
Exterior	<ul style="list-style-type: none"> - Casing: Aluminum - Power and Volume buttons on keyboard
Colors ¹⁰	<p>Surface Laptop 5 13.5"</p> <ul style="list-style-type: none"> - Platinum with Alcantara material palm rest - Sage with metal palm rest - Matte Black with metal palm rest - Sandstone with metal palm rest <p>Surface Laptop 5 15"</p> <ul style="list-style-type: none"> - Platinum with metal palm rest - Matte Black with metal palm rest
Sensors	<ul style="list-style-type: none"> - Ambient light sensor
What's in the box	<ul style="list-style-type: none"> - Surface Laptop 5 13.5" or Surface Laptop 5 15" - Power Supply 65 W - Quick Start Guide - Safety and warranty documents
Keyboard layout	<ul style="list-style-type: none"> - Activation: Moving keys - Backlight - Layout: QWERTY, full row of function keys (F1 – F12) - Windows key and dedicated buttons for media controls, screen brightness, & Keyboard backlight
Warranty ¹¹	<ul style="list-style-type: none"> - One-year limited hardware warranty
Best-in-class support from Microsoft Store	<ul style="list-style-type: none"> - 60-day return policy. 90 days of free technical phone support. - Free virtual workshops and training.

References

1. System software and updates use significant storage space. Available storage is subject to change based on system software and updates and apps usage. 1 GB = 1 billion bytes. 1 TB = 1,000 GB. See [Surface.com/Storage](#) for more details.

2. Customer Replaceable Units (CRUs) are components available for purchase through your Surface Commercial Authorize Device Reseller. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Opening and/or repairing your device can present electric shock, fire and personal injury risks and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair won't be covered under Microsoft's Hardware Warranty or protection plans. Components will be available shortly after initial launch; timing of availability varies by component and market.
3. Requires Dolby Vision encoded content and video.
4. Battery life varies significantly based on device configuration, usage, network and feature configuration, signal strength, settings and other factors.
5. Requires Dolby Atmos encoded content/audio.
6. Requires license or subscription (sold separately) to activate and use.
7. Activation required. If your device is managed by your organization's IT department, contact your IT administrator for activation. After 30 days, you'll be charged the applicable monthly or annual subscription fee. Credit card required. Cancel anytime to stop future charges.
8. Sold separately.
9. Customer Replaceable Units (CRUs) are components available for purchase through your Surface Commercial Authorize Device Reseller. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Opening and/or repairing your device can present electric shock, fire and personal injury risks and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair won't be covered under Microsoft's Hardware Warranty or protection plans. Components will be available shortly after initial launch; timing of availability varies by component and market.
10. Colors available on selected models only. Available colors, sizes, finishes, and processors may vary by store, market, and configuration.
11. Microsoft's Limited Warranty is in addition to your consumer law rights. See also: [Surface Warranty, Service Offerings & Support Plans – Microsoft Surface for Business](#) ↗ [Warranties](#) ↗

Learn more

- [Explore Surface: Interactive tour](#) ↗
- [Order Surface Laptop 5 for Business](#) ↗

Surface Studio 2+ for Business overview

Article • 01/03/2023 • Applies to: Windows 11



Surface Studio 2+ is a new type of business PC that offers inspiring design in both customer-facing scenarios and high-level workspaces. Over the last few years, we've seen massive changes in the workplace, and the hybrid workplace is one of them.

Featuring a 28" touchscreen laptop with a digital pen and a Zero Gravity Hinge, Surface Studio 2+ is designed to allow professionals to work their way, whether they are creatives, multitaskers, collaborators, or data-rich dashboard users. Surface Studio 2+ provides impactful design, versatile form factors, high performance, and advanced security features to help teams drive productivity, build closer connections, and collaborate freely.

Executives and advanced professionals need high-productivity, high-powered devices with great remote collaboration and connectivity features.

- The 11th Intel® Core™ i7-11375H processor gives employees the power they need for multitasking or high-powered apps.
- The NVIDIA® GeForce RTX® 3060 Laptop GPU provides the best GPU of any Surface device and features the latest RT Cores, Tensor Cores, and streaming multiprocessors.
- Improved camera experience for conferencing and auto color management for display
- Multiple ports help your employees craft the workspace they need to perform, with 3 USB-C ports, Thunderbolt™ 4, native external display support for up to three 4K UHD displays at 60Hz
- Your sensitive data is protected with Secured-core PCs on Windows 11, making them the most secure Windows PC

- Get more out of your device with more replaceable components. Major components in Surface Studio 2+ including the display module, feet, SSD module, PSU, thermal module, motherboard, are replaceable or repairable through a network of approved service providers.

Explore Surface devices

- [Explore Surface: Interactive tour ↗](#)

Order Surface Pro 9 for Business

- [Order Surface Pro 9 for Business ↗](#)

Surface Studio 2+ tech specs

Feature	Description
Processor	- 11th Gen Intel® Core™ i7-11375H Processor
Graphics	- NVIDIA® GeForce RTX® 3060 Laptop GPU with 6 GB GDDR6 GPU memory
Memory	- 32 GB (DDR4)
Storage ¹	- 1-TB solid-state drive (SSD)
Display	<ul style="list-style-type: none"> - Screen: 28" PixelSense™ Display - Touch: 10-point multi-touch - Aspect Ratio: 3:2 - Resolution: 4500 x 3000 (192 PPI) - Color profile: sRGB and Vivid - Individually color-calibrated display - 1 billion colors and better gradients with Auto Color Management - Contrast ratio: 1200:1 - Dolby Vision® support² - Gorilla® Glass 3 - Brightness: 500 nits (typical), 12 nits (minimum) - External display support: Up to three 4K UHD (@60Hz) or single 4K UHD (@60Hz)

Feature	Description
Size & weight	<p>Base</p> <ul style="list-style-type: none"> - Length: 9.8 inch (250 mm) - Width: 8.7 inch (220 mm) - Thickness: 1.2 inch (31.45 mm)
	<p>Display</p> <ul style="list-style-type: none"> - Length: 25.1 inch (637.35 mm) - Width: 0.5 inch (12.5 mm) - Height: 17.3 inch (438.90 mm) - Weight: 21 lbs max (9.56 kg max)
Security	<ul style="list-style-type: none"> - TPM 2.0 chip for enterprise security - Enterprise-grade protection with Windows Hello face sign-in - Windows 11 Secured-core PC.
Cameras	<ul style="list-style-type: none"> - Windows Hello face authentication camera (front-facing) - Front-facing camera with 1080p HD video
Audio	<ul style="list-style-type: none"> - Dual far-field studio microphones - Stereo 2.1 speakers with Dolby® Atmos™ ³
Ports	<ul style="list-style-type: none"> - 3 x USB-C® with Thunderbolt™ ⁴ - 2 x USB-A 3.0 - 3.5-mm headphone jack - 1-Gigabit Ethernet port
Network & connectivity	<ul style="list-style-type: none"> - Wi-Fi 6: 802.11ax compatible - Bluetooth® Wireless 5.1 technology
SKUs	<p>SKU 1 - i7/32/1TB with Pen, KB, Mouse</p> <p>Available in: US, Canada, Australia, NZ, China, HK, Japan, Austria, Germany, UK, Ireland, & France</p> <p>SKU 2 - i7/32/1TB device only</p> <p>Available in: Taiwan, Singapore, Netherlands, Switzerland, Luxembourg, Belgium, Denmark, Finland, Norway, Sweden, Poland, Italy, Portugal, Spain, Kuwait, Qatar, Saudi Arabia, & UAE</p>

Feature	Description
Pen & accessories compatibility	<p>Pen Support</p> <p>SKU 1: i7/32/1TB with Pen, KB, Mouse</p> <ul style="list-style-type: none"> - Designed for Surface Pen - Integrated magnetic storage with Surface Pen - Supports Microsoft Pen Protocol (MPP) <p>SKU 2: i7/32/1TB device only</p> <ul style="list-style-type: none"> - Designed for Surface Pen⁴ - Integrated magnetic storage with Surface Pen - Supports Microsoft Pen Protocol (MPP)
Accessories Support	
SKU 1: i7/32/1TB with Pen, KB, Mouse	
Compatible with:	
	<ul style="list-style-type: none"> - Surface Dial on-screen interaction. - Inbox accessories come pre-paired.
SKU 2: i7/32/1TB device only	
Compatible with:	
	<ul style="list-style-type: none"> - Surface Dial on-screen interaction. - Surface Pen - Surface Keyboard - Surface Mouse
Software	<ul style="list-style-type: none"> - Windows 11 Pro 22H2 - Preloaded Microsoft 365 Apps⁵ - Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 30-day trial⁶
Sensors	<ul style="list-style-type: none"> - Ambient light sensor

Feature	Description
Accessibility	<p>SKU 1: i7/32/1TB with Pen, KB, Mouse</p> <ul style="list-style-type: none"> - Compatible with Surface Adaptive Kit - Compatible with Microsoft Adaptive Mouse - Include Windows Accessibility Feature – Learn More Accessibility Features Microsoft Accessibility ↗ - Discover more Microsoft Accessible Devices & Products - Accessible Devices & Products for PC & Gaming Assistive Tech Accessories - Microsoft Store ↗ <p>SKU 2: i7/32/1TB device only</p> <ul style="list-style-type: none"> - Compatible with Microsoft Adaptive Mouse - Include Windows Accessibility Feature – Learn More Accessibility Features Microsoft Accessibility ↗ - Discover more Microsoft Accessible Devices & Products - Accessible Devices & Products for PC & Gaming Assistive Tech Accessories - Microsoft Store ↗
Serviceability⁷	- Replaceable components include Display, Motherboard, Thermals, PSU, Feet, C-cover, Hinge cover, SSD
Exterior	<ul style="list-style-type: none"> - Physical buttons: Volume, Power - Zero Gravity Hinge
What's in the box	<p>SKU 1 - i7/32/1TB with Pen, KB, Mouse</p> <ul style="list-style-type: none"> - Surface Studio 2+ - Surface Pen - Surface Keyboard - Surface Mouse - Power cord with grip-release cable - Quick Start Guide - Safety and warranty guide <p>SKU 2 - i7/32/1TB device only</p> <ul style="list-style-type: none"> - Surface Studio 2+ - Power cord with grip-release cable - Quick Start Guide Safety and warranty guide
Keyboard layout	<ul style="list-style-type: none"> - Activation: Moving keys - Backlight - Layout: QWERTY, full row of function keys (F1 – F12) - Windows key and dedicated buttons for media controls, screen brightness
Warranty⁸	<ul style="list-style-type: none"> - One-year limited hardware warranty

References

1. System software uses significant storage space. Available storage is subject to change based on system software updates and apps usage. 1 GB = 1 billion bytes. 1 TB = 1,000 GB. See Surface.com/Storage for more details.
2. Requires Dolby Vision® encoded content and video.
3. Requires Dolby Atmos® encoded content and video.
4. Sold separately.
5. Requires license or subscription (sold separately) to activate and use.
6. Activation required. If your device is managed by your organization's IT department, contact your IT administrator for activation. If you activate your trial outside your organization, after 30 days, you'll be charged the applicable monthly or annual subscription fee. Credit card required. Cancel anytime to stop future charges.
7. Customer Replaceable Units (CRUs) are components available for purchase through your Surface Commercial Authorized Device Reseller. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Opening and/or repairing your device can present electric shock, fire and personal injury risks and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair won't be covered under Microsoft's Hardware Warranty or protection plans. Components will be available shortly after initial launch; timing of availability varies by component and market.
8. Microsoft's Limited Warranty is in addition to your consumer law rights.

Learn more

- [Explore Surface: Interactive tour ↗](#)
- [Order Surface Studio 2+ for Business ↗](#)

Surface Laptop Go 2 overview

Article • 03/16/2023 • Applies to: Windows 10, Windows 11

Surface Laptop Go 2 for Business is designed to meet the needs of the hybrid workplace. With Firmware Attack Surface Reduction (FASR), our first Intel-based Secured-core PC brings more hardware and software protection for users handling the most sensitive data in your organization.



As a Secured-core PC, [Surface Laptop Go 2](#) enables One Touch sign-in and has a removable hard drive. Surface customers can save time and money with streamlined deployment, modern device management, and built-in, cloud-powered security.

- **Get back to work quickly and securely** thanks to Fingerprint Power Button with Windows Hello and One Touch sign-in on select models.
- **More control with cloud-first device deployment and management.** Deploy and manage down to the firmware layer through the cloud with Microsoft Endpoint Manager and DFCI. Every Surface for Business device ships with Windows Autopilot, reducing IT complexity by deploying straight to your employees.
- **Secured-core PCs are the most secure Windows 11 devices** for workers handling the most sensitive data. Secured-core PCs are designed to elevate the benefits of Windows 11 security, providing more hardware and software protection for workers that handle the most sensitive data in your organization.

Repairability

Surface Laptop Go 2 is [built to be more serviceable](#). Skilled technicians can service devices by replacing components like the Feet, SSD, Keyboard Cover, Top Assembly, and Surface Connect connectors. The battery can be replaced through Microsoft or a Microsoft Authorized Service Provider.

Surface Management Portal

When you enroll Surface Laptop Go 2 for cloud management and users log in for the first time, information from these Surface devices automatically flows into the [Surface Management Portal](#), giving you a single pane of glass for Surface-specific device admin activities. You can get insights into device compliance, support activity, and warranty coverage. Quickly see the status of each device, which ones are still in warranty or expiring soon, and the status of active support requests.

Tech specs

Component	Description
Dimensions	<ul style="list-style-type: none">- 10.95" x 8.12" x 0.62"- (278.2 mm x 206.2 mm x 15.7 mm)
Display	<ul style="list-style-type: none">- Screen: 12.4" PixelSense™ Display- Resolution: 1532 x 1024 (148 PPI)- Aspect ratio: 3:2- Touch: 10-point multi-touch- Maximum brightness: 330 nits
Memory	<ul style="list-style-type: none">- 4 GB, 8 GB or 16 GB LPDDR4x RAM
Processor	<ul style="list-style-type: none">- 11th Gen Intel® Core™ i5-1135G7 processor
Security	<ul style="list-style-type: none">- Discrete hardware TPM 2.0- Enterprise-grade protection with Windows Hello sign-in- One-Touch sign-in with Fingerprint Power Button (Surface Laptop Go 2 i5/4 GB/128 GB does not include Fingerprint Power Button)
Software	<ul style="list-style-type: none">- Windows 11 Pro/Enterprise (21H2) with the option of Windows 10 Pro/Enterprise (21H2)- Preloaded Microsoft 365 Apps,¹ Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 1-month trial ²
Sensors	<ul style="list-style-type: none">- Ambient light sensor

Component	Description
Weight	- 2.48 lbs. (1127 g)
Storage³	- Removable drive (SSD) ⁴ options: 128 GB, 256GB
Battery life	- Up to 13.5 hours ⁵ of typical device usage
Graphics	- Intel Iris® Xe Graphics
Connections	- 1 x USB Type-A, USB3.2 Gen 2 (10 GBps) - 1 x USB Type C, USB3.2 Gen 2 (10 GBps) - 1 x Surface Connect - 1 x 3.5 mm headphone jack
Cameras, video & audio	- 720p HD f2.0 camera (front-facing) - Dual far-field Studio Mics - Omnisonic® speakers with Dolby® Audio™ Premium
Wireless	- Wi-Fi 6 : 802.11ax compatible, 2x2 MIMO - Bluetooth® Wireless 5.1 technology
Exterior	- Top: Aluminum - Base: Aluminum and polycarbonate composite resin system with glass fiber and 30% post-consumer recycled content
Colors⁶	- Ice Blue, Sandstone, Platinum, and Sage
Keyboard	- Activation: Moving keys - Layout: QWERTY, full row of function keys (F1 – F12) - Windows key and dedicated buttons for media controls, screen brightness
Serviceability⁷	- Replaceable components include: - AB Cover (Display) - C-cover (keyset and trackpad) - Battery ⁸ - Feet - SSD - Surface Connect cable
What's in the box	- Surface Laptop Go 2 - 39 W Power Supply - Quick Start Guide - Safety and warranty documents
Warranty⁹	- 1-year limited hardware warranty

Commercial availability

Surface Laptop Go 2 begins shipping June 7, 2022.

- Order Surface Laptop Go 2 [↗](#)

Learn more

- [Explore Surface](#) [↗](#)
- [SSD removal in compatible Surface devices](#)

References

1. Requires license or subscription to activate and use.
2. Activation required. If your device is managed by your organization's IT department, contact your IT administrator for activation. After one month trial, you will be charged the applicable monthly or annual subscription fee. Credit card required. Cancel any time to stop future charges. See [aka.ms/m365businesstrialinfo](#) [↗](#).
3. System software and updates use significant storage space. Available storage is subject to change based on system software and updates and apps usage. 1 GB = 1 billion bytes. 1 TB = 1,000 GB. See [Surface Storage](#) [↗](#) for more details.
4. This device does not contain user serviceable parts. Hard drive is only removable by an authorized technician following Microsoft-provided instructions.
5. Battery life varies based on usage, network and feature configuration, signal strength, settings and other factors. See [aka.ms/SurfaceBatteryPerformance](#) [↗](#) for details.
6. Available colors may vary by configuration and market
7. Customers can purchase Components through Surface Commercial Authorized Device Resellers. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Opening and/or repairing your device can present electric shock, fire and personal injury risks and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair will not be covered under Microsoft's Hardware Warranty or protection plans.
8. Battery will be available as a Field Replacement Unit (FRU) replaceable through Microsoft or a Microsoft Authorized Service Provider, where available.
9. Microsoft's Limited Warranty is in addition to your consumer law rights.

Surface Laptop SE overview

Article • 04/19/2023 • Applies to: Windows 11

Surface Laptop SE provides a managed device experience that simplifies learning for students at an affordable cost. It runs Windows 11 SE, a cloud-first OS, and [comes pre-loaded with widely used apps](#) like Microsoft Teams, Word, PowerPoint, Excel, OneNote, Microsoft Edge, Minecraft: Education Edition, Flipgrid, and more.

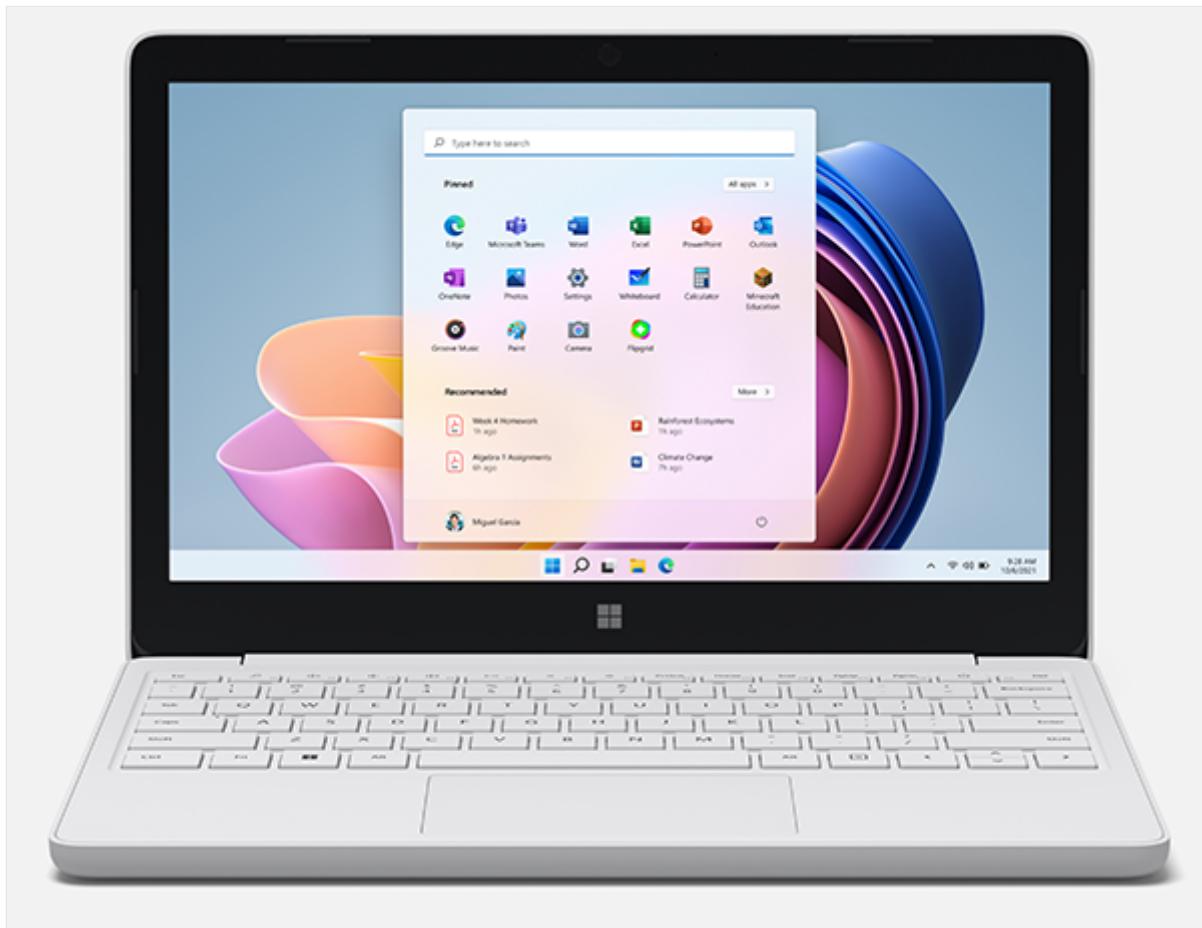


Figure 1. Surface Laptop SE showing Windows 11 SE Start menu

Surface Laptop SE supports most applications that students and educators need, including Progressive Web Apps (PWAs), Universal Windows Platform apps (UWPs), and a [curated set of Win32 & Microsoft Store apps](#). Unlike other Surface devices, Surface Laptop SE prevents users from installing their own apps. Instead, IT admins or technical leads manage Surface Laptop SE devices using Microsoft Intune admin center, which includes [Microsoft Intune](#), [Microsoft Intune for Education](#), and the new [Surface Management Portal](#).

ⓘ Note

This article is intended for IT admins and education personnel who deploy and manage devices for school users. For general information or to order devices, see

Simplified deployment, management & security

- Complete low-touch deployment for new devices using Windows Autopilot, quickly applying policies and installing apps. Windows Autopilot provides low-touch deployment and imaging out of the box, with many apps and policies pre-installed and preconfigured. IT can easily adjust device settings—including firmware settings—and install the apps students need so that everything is ready to go when they first power on their device.
- Once devices are deployed, Microsoft Intune delivers streamlined remote management throughout the school year, allowing IT to manage apps, control security and privacy, and generate compliance reports.
- Lock the operating system with lid-lock when the laptop is closed, and control physical access with the integrated Kensington Nano Security Slot™.
- A newly designed non-exposed hinge, a plastic chassis, and a plastic border surrounding the screen that goes out to the bezel provide extra durability to better meet the needs and demands of student use.
- Intune and DFCI support secure device updates and management to the firmware layer. IT admins can control hardware elements such as mics, USB ports, cameras, and Bluetooth—and remove power to peripherals. The unique scannable Surface packaging allows easy identification of devices, with the device ID number staying the same when it comes time to re-enroll.

Surface Management Portal

When you enroll Surface Laptop SE for cloud management and users sign in for the first time, information from these Surface devices automatically flows into the [Surface Management Portal](#), giving you a single pane of glass for Surface-specific device admin activities. You can get insights into device compliance, support activity, and warranty coverage. Quickly see the status of each device, which ones are still in warranty or expiring soon, and the status of active support requests.

This screenshot shows the Microsoft Endpoint Manager admin center's Coverage status dashboard. The URL is https://endpoint.microsoft.com/#blade/Microsoft_Azure_Surface/WarrantyViewAll.ReactView/warrantyStatusType/0/totalWarranties/23. The dashboard lists a single record for a Surface Laptop SE device named 'CONTOSOSCHOOL1'. The device is currently in coverage, ending on Wednesday, January 18, 2023, at 22:59:59. The coverage type is Standard Coverage, and it is managed by a company. The device runs Windows 10.0.22000.376 and is enrolled via windowsAzureADJoin.

Figure 2. Surface Management Portal showing warranty coverage for Surface Laptop SE

Common admin scenarios

Scenario	Description	Learn more
Remotely configure Surface Laptop SE devices with Windows Autopilot	Windows Autopilot provides low-touch deployment and imaging out of the box, with many apps and policies pre-installed and preconfigured. IT can easily adjust device settings—including firmware settings—and install the apps students need so that everything is ready to go when they first power on their device.	Set up Intune for Education devices with Windows Autopilot How should I enroll my devices?
Deploy updates via Intune for Education	IT admins can use Microsoft Intune to push out OS and app updates to Surface Laptop SE devices across the school and throughout the year. If necessary, they can disable hardware elements like the camera or Bluetooth on an individual device or reset a specific device if a student is experiencing technical issues.	Manage devices running Windows 11 SE Microsoft Education documentation and resources Get started with Intune for Education Use Intune for Education to manage groups, apps, and settings

Scenario	Description	Learn more
Replace devices as needed	If students crack their screen or otherwise damage the device, IT admins can quickly deploy spare devices, transferring the students' cloud identities to the new devices.	Remote device actions in Intune for Education
Deploy new apps via Intune	If teachers request a new app, IT admins can remotely install it on all student devices using Intune.	Install apps for all users
Reset devices via Intune	When students return their Surface Laptop SE devices at the end of the school year, IT admins can use Intune to reset the devices for the next class.	Use Autopilot Reset to reconfigure devices with Intune for Education

Known issues

Scenario	Description	Learn more
Windows Autopilot reports error code 0x81039023 on Windows 11 SE during deployment	There's currently a known issue affecting Windows 11 SE devices updated to the Windows 11 May updates (KB5013943) , which prevents applications from being installed during the Windows Autopilot pre-provisioning process. As a result, deployment fails when the Enrollment Status Page (ESP) timeout is reached (default is 60 minutes).	Recovering from Windows Autopilot error code 0x81039023 on Windows 11 SE

Pre-installed apps

Surface Laptop SE comes with the following pre-installed apps:

- Microsoft Excel
- Flipgrid
- Groove music
- Maps
- Microsoft Edge
- Microsoft News
- Microsoft Teams
- Microsoft To Do
- Microsoft Whiteboard

- Minecraft Education Edition
- Notepad
- Microsoft Office
- OneDrive
- OneNote
- Outlook on the web
- Paint
- Photos
- PowerPoint
- Snipping tool
- Sticky notes
- Surface app
- Surface Diagnostic Toolkit
- Tips
- Voice recorder
- Weather
- Word

Install optional apps

IT admins can install [more apps](#) such as Chrome or Zoom via Intune. Note there's no app store for Surface Laptop SE. Refer to the following instructions to complete your app deployment:

- [App deployment](#)

Repairability

Surface Laptop SE is designed to enable skilled technicians to service devices locally by quickly replacing core components:

- Display Module
- Keyboard & Bucket
- Speaker & Wi-Fi Module
- Battery
- Feet

Schools can use an Authorized Service Provider or their own skilled technicians to repair devices onsite following the Microsoft-provided "Surface Laptop SE Service Guide," available from [Surface Service Guides](#).

To learn more, see:

- [Surface Laptop SE Repair Video](#)
- [Top support solutions for Surface devices](#)

Surface Laptop SE tech specs

Feature	Description
Dimensions	- 11.17" x 7.6" x 0.70" (283.70 mm x 193.05 mm x 17.85 mm)
Storage ¹	- On board, Embedded Multimedia Card (eMMC) 64 GB or 128 GB
Display	- Screen: 11.6" TFT Liquid Crystal Display Module - Display Resolution: 1366 x 768 (135 PPI) - Aspect Ratio: 16:9 - Contrast ratio: 800:1 (Typical) - Luminance: 220 nits - No Cover Glass
Battery	- 35 Wh (nominal), 33.9 Wh (min) - 16 hours of battery life ²
Memory	- 4 GB or 8 GB DDR4 (2400 MHz min)
CPU / Graphics	- Intel® Celeron® Processor N4020 / Intel® UHD Graphics 600 - Intel® Celeron® Processor N4120 / Intel® UHD Graphics 600
Connections	- 1 x USB-A - 1 x USB-C - 1 x Barrel type DC connector - 1 x 3.5 mm Headphone/Mic Jack
Security	- Firmware TPM across all configurations (Commercial) - Nano Security Lock slot
Cameras, video, & audio	- 1MP front-facing camera with up to 720p 30-fps video - 2 W Stereo Speakers - Single digital microphone
Software	- Windows 11 SE - Microsoft 365 for Education ³
Wireless	- Wi-Fi: 802.11ac (2x2) - Bluetooth Wireless 5.0 LE
Sensors	- 1 x Hall-effect sensor

Feature	Description
Exterior	<ul style="list-style-type: none"> - Casing: All plastic body unpainted - Colors: Glacier - Physical buttons: Power and Volume on keyboard - Hinge: 135-degrees open angle
Weight	- 2.45 lb. (1,111.3 g)
Keyboard and trackpad	<ul style="list-style-type: none"> - Standard Windows Keyboard for 11.6" without backlight - Standard no floating precision trackpad
Thermals	<ul style="list-style-type: none"> - Passively cooled
Power supply	<ul style="list-style-type: none"> - In-box, 45 W with DC Barrel charger
In the box	<ul style="list-style-type: none"> - Surface device - Power supply - Quick Start Guide - Safety and warranty documents
Warranty ⁴	<ul style="list-style-type: none"> - One-year limited hardware warranty

References

1. System software and updates use significant storage space. Available storage is subject to change based on system software and updates and apps usage. 1 GB = 1 billion bytes. 1 TB = 1,000 GB. For more information, see [Surface Storage](#) for more details.
2. Battery life varies significantly based on usage, network and feature configuration, signal strength, settings and other factors. See [Surface battery testing and estimated performance](#) for details.
3. Requires qualifying Microsoft 365 or Microsoft 365 license; sold separately. [Compare Microsoft 365 education plans](#).
4. Microsoft's Limited Warranty is in addition to your consumer law rights.

Learn more

- [Order Surface Laptop SE](#)
- [Introducing Surface Laptop SE for Education](#)
- [Windows 11 SE for Education](#)
- [Manage devices running Windows 11 SE](#)
- [Set up Intune for Education devices with Windows Autopilot](#)
- [Microsoft Education documentation and resources](#)

- [Outlook on the web ↗](#)
- [A purpose-built hardware & software solution for education ↗](#)

OS choice for new Surface devices

Article • 05/08/2023 • Applies to: Windows 10, Windows 11

Commercial customers can choose to have Windows 10 or Windows 11 installed on new Surface devices:

- [Surface Pro 9](#)
- [Surface Laptop 5](#)
- [Surface Laptop Go 2 ↗](#)
- [Surface Laptop 4 ↗](#)
- [Surface Pro 8 ↗](#)
- [Surface Laptop Studio ↗](#)
- [Surface Go 3 ↗](#)

ⓘ Note

Surface Pro 9 is available for Windows 10. Surface Pro 9 with 5G is available for Windows 11 only.

Considerations for choosing your OS

Whether you choose to purchase new Surface devices running Windows 11 or opt for Surface devices with Windows 10¹ may depend on your current corporate environment:

- **Windows 10 only.** Designed for customers who require Windows 10 out of the box and deploy devices using Windows Autopilot or Azure Active Directory domain join (AADJ). With **Windows 10 SKUs**, you avoid the need to compile driver packs and reimagine devices before distributing them to users. It includes an additional fee of \$30 per device (based on MSRP, actual pricing may vary).²
- **Windows 10 & Windows 11.** Designed for customers who use Windows 11 and also deploy Windows 10 via traditional deployment methods that rely on reimaging devices. With **Windows 11 SKUs**, you can take advantage of built-in downgrade rights to Windows 10 and load custom Windows 10 images on devices as needed.

💡 Tip

Microsoft Windows 10 Pro is preinstalled with Windows 10 downgrade software. It includes a license for the Downgrade Facilitation Product available via downgrade rights from Windows 11 Pro. The appropriate build is indicated in the **Windows OS**

versions section on this page. End users may use only one version at a time; switching between versions requires uninstalling the other version.

Table 1. OS choice summary

Network environment	Deployment method	Recommended SKUs	Additional cost
Windows 10 only	Modern: Autopilot/AADJ	Windows 10	\$30
Windows 10 & Windows 11	Legacy: Custom image deployment	Windows 11	None

Windows 10 only

The ability to get the OS version you need directly from Surface includes delivery of factory shrink-wrapped devices fully configured with the requisite firmware, drivers, and security policies. The extra fee covers the cost of this service along with the following benefits that allow you to:

- Provide your users with the latest Surface hardware today while upgrading to Windows 11 at your own pace.
- Reduce your exposure to potential supply chain vulnerabilities by eliminating the need to reimagine to Windows 10.
- Save time with Windows Autopilot zero-touch deployment, including faster app and policy updates and fewer help desk calls.

Windows OS versions

Devices ship from the factory with one of the following OS versions, depending on your choice.

Tip

If you order devices from a reseller, please check with the reseller on the exact OS version that meets your requirements.

Device	Windows 10	Windows 11
Surface Laptop Go 2	21H2	21H2
Surface Laptop 4	21H2	21H2

Device	Windows 10	Windows 11
Surface Laptop Studio	21H2	21H2
Surface Go 3	21H2	21H2
Surface Pro 8	21H2	21H2
Surface Pro 9	21H2	22H2
Surface Laptop 5	21H2	22H2

How to order

Commercial customers can place orders for new devices via [authorized Microsoft Surface resellers](#).

References

1. Windows 10 Downgrade Facilitation SKU offered for Windows 11-capable devices.
2. Effective July 1, 2023, additional fee will increase from \$30 to \$50 for the following devices: Surface Pro 9, Surface Laptop 5, Surface Go 3 LTE, and Surface Pro 8 LTE. The fee will remain set at \$30 for Surface Laptop Go 2, Surface Laptop 4, and Surface Laptop Studio.

Learn more

- [Surface for Business](#)
- [Surface IT Pro blog](#)

Surface security overview

Article • 04/19/2023 • Applies to: Windows 10, Windows 11

Recent advances in security research demonstrate that as more protections are built into the OS and connected services, attackers are looking for other avenues of exploitation with firmware emerging as a top target.

Today, managing device firmware is an inconsistent experience and often involves third-party providers making firmware challenging to monitor and complicated to maintain. Ultimately, this can limit the ability of hardware manufacturers to detect and push out timely updates in response to threats.

Microsoft Surface has been using a unified approach to firmware protection and device security since 2015 through complete end-to-end ownership of the hardware design, in-house firmware development, and a holistic approach to device updates and management.

For Surface, our Unified Extensible Firmware Interface (UEFI)¹ is maintained in-house, regularly updated through Windows Update, and seamlessly deployed for management through Windows Autopilot, minimizing risk and maximizing control at the firmware level before the device boots. Microsoft provides full transparency of the codebase in our UEFI through the Open Source [Project Mu](#) on GitHub, managed by Microsoft Intune admin center.

Microsoft designed and built components

Every layer of Surface from chip to cloud is maintained by Microsoft, giving you ultimate control, proactive protection, and peace of mind wherever and however work gets done. Surface devices ship with the strongest security protocols Microsoft offers and enables streamlined management that reduces IT complexity and helps users stay focused on their work.

Surface drives security through a defense-in-depth approach by utilizing a layering of independent defensive sub-components. From chip to cloud, or a UEFI that ensures a Root of Trust to the AI-powered Microsoft Defender for Endpoint that works to prevent, detect, investigate, and respond to advanced threats, Surface enforces the position that built-in from Microsoft is better than bolt-on.

Feature	Description	Learn more
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Feature	Description	Learn more
Microsoft Built UEFI	Software that configures the device and boots Windows 10 Controls initial boot of device and Windows 10, then provides firmware runtime services to the OS. ensures significantly more control over the hardware of a device through SEMM on-prem management and DFCI cloud-based management through Microsoft Intune admin center	Manage Surface UEFI settings
Physical TPM 2.0	Trusted Platform Module - Dedicated microcontroller designed to secure hardware through integrated cryptographic keys. Encrypts and stores keys (BitLocker, Windows Hello, AD Credentials) PCR - Platform Configuration Registers that secure measurements and relevant metrics to detect changes to previous configuration	Trusted Platform Module Technology Overview
Windows Hello for Business	Replaces passwords with strong two-factor authentication on PCs and mobile devices. This biometric authentication consists of a new type of user credential that is tied to a device.	How Windows Hello for Business works - Microsoft 365 Security
Integrated encryption	Integrated encryption is enabled by BitLocker to secure and encrypt your data, and Windows Hello to enable passwordless login, combined with physical TPM and UEFI.	BitLocker (Windows 10) - Microsoft 365 Security
Microsoft Defender for Endpoint	Provides an enterprise endpoint security platform designed to help networks prevent, detect, investigate, and respond to advanced threats.	Microsoft Defender for Endpoint

Factory level security protocols and inspection

From firmware to the operating system and every hardware component before final assembly, Surface devices are safe from supply chain attacks in our physically secured development and manufacturing facilities.

By definition, a secure supply chain delivers finished products that meet quality, performance, and operational goals. Simply put, a secure supply chain ensures that all components are genuine and free of unauthorized or malicious manipulation or sabotage. We manufacture devices in highly secured factories where everything from the UEFI firmware to the operating system comes directly from Microsoft. No third-party BIOS vendors are involved. This is a strong part of how we protect against supply chain attacks for Surface products. We have reduced the attack Surface in our UEFI by

removing any unused code, including system management mode SMM functions that our devices do not need.

Protecting facilities from external Internet-based attacks, intrusion, and other threats requires an ongoing investment across critical areas including:

- Rigorous inspection and testing of all components at final assembly locations.
- Maintaining high levels of physical security at the factory.
- Use of only Microsoft maintained firmware, drivers, and OS.
- Secure logistics and trusted carrier delivery of Surface devices direct to Microsoft resellers.

Upon leaving the factory, Surface for Business devices are protected via Windows Update throughout the lifecycle.

Advanced Windows security features

Escalation of privilege attacks is a malicious actor's best friend, and they often target sensitive information stored in memory. These kinds of attacks can turn a minor user mode compromise into a total compromise of your OS and device. To combat these kinds of attacks, Microsoft developed virtualization-based security (VBS) and Hypervisor-protected code integrity (HVCI, also commonly referred to as memory integrity). VBS and HVCI use the power of hardware capabilities like virtualization to provide better protection against common and sophisticated malware by performing sensitive security operations in an isolated environment.

Surface ships with these Windows enhanced hardware security features enabled out of the box to give customers even more robust security that is built in and turned on by default.

Virtualization-based security

Virtualization-based security, or VBS, uses hardware virtualization features to create and isolate a secure region of memory from the regular operating system. Windows can use this "virtual secure mode" to host a number of security solutions, providing them with significantly increased protection from vulnerabilities in the operating system, and preventing the use of malicious exploits which attempt to defeat protections.

Hypervisor-Enforced Code Integrity (HVCI)

HVCI uses VBS to significantly strengthen code integrity policy enforcement. Kernel-mode code integrity checks all kernel-mode drivers and binaries before they're started and prevents unsigned drivers or system files from being loaded into system memory. As shown in the following diagram, HVCI runs in an isolated execution environment and verifies the integrity of the kernel code according to kernel signing policy.

Both VBS and HVCI are enabled out of the box in the following Surface devices:

- Surface Pro 8
- Surface Pro 9
- Surface Pro 9 with 5G
- Surface Laptop Studio
- Surface Go 3
- Surface Laptop 4
- Surface Laptop 5
- Surface Pro 7+
- Surface Book 3
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Pro X
- Surface Studio 2+

Secure boot and boot guard

Surface devices' Root of Trust checks signatures and measurements to ensure each stage is secure and authentic before allowing the next phase of boot to proceed.

Enabled by UEFI and TPM 2.0, Secure Boot ensures that only code signed, measured, and correctly implemented code can execute on a Surface device.

As shown in the following figure, the integrity of the firmware is checked at each stage from pressing the power button to running the operating system.

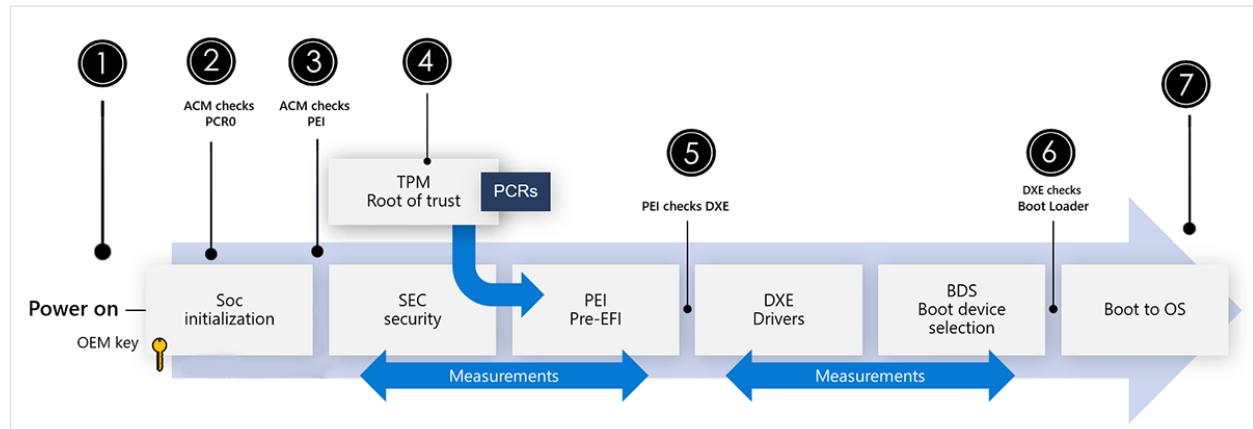


Figure 1. Secure Boot for Surface devices

Step	Secure Boot Phase
1	Security is instantiated every time the power button is pressed from a root of trust provided by the TPM. When a device is first powered on, the system runs a series of security checks to ensure device firmware has not been tampered with or corrupted.
2	When powered on, the SoC uses a chipset vendor key to validate and initiates the loading of microcode using the Authenticated Code Module (ACM) (on Intel-based devices).
3	The ACM measures the UEFI code before loading and compares it to the known measurement in the TPM's Platform Configuration Register [PCR] to ensure the UEFI code has not been altered.
4	Before allowing UEFI to run, Boot Guard checks that the UEFI is signed with a Surface OEM key. The initially checked UEFI module is the SEC security and the PEI Pre-EFI sections shown in the diagram.
5	The PEI section checks for a Surface signature on the driver execution environment, the DXE module, as it is loaded. The DXE module includes the boot device selection phase.
6	Once the boot device is selected, UEFI reads the boot device and checks the signature of the OS boot loader before allowing it to execute.
7	The OS then checks its signatures on its main component as it brings up the OS.

Malware protection

To help protect your device from malicious software attacks, Surface enables Secure boot to ensure an authentic version of Windows 10 is started and that the firmware is as genuine as it was when it left the factory.

The SoC on Surface devices has a security processor separate from every other core. When you first start a Surface device, only the security processor starts before anything else can be loaded. Secure Boot is used to verify that the boot process components, including drivers and the operating system, are validated against a database of valid and known signatures. This helps prevent attacks from a cloned or modified system running malicious code hidden in what appears to be an otherwise everyday user experience. For more information, see [Secure Boot overview](#).

Once the operating system is verified as originating from Microsoft and your Surface device completes the boot process, the device scrutinizes the executable code. Our approach to securing the operating system involves identifying the code signature of all executables, allowing only those that pass our restrictions to be loaded into the runtime.

This code signing method enables the operating system to verify the author and confirm that code was not altered before running on the device.

DRTM protection in AMD devices

Surface devices containing AMD processors equivalently implement Secure Boot. Surface Laptop 4 with AMD Ryzen Microsoft Surface Edition processor protects firmware from the initial power-on using Dynamic Root of Trust Measurements (DRTM). DRTM controls all the CPUs, forcing execution along a measured path, and reestablishes trust at various stages to verify the integrity of the system firmware/software. Transitioning into this trusted state early provides added protection against potential attacks in the boot stages.

DRTM protects measurements by encrypting them using Total System Memory Encryption (TSME). Once TSME is set, it cannot be cleared except by a system reset. A new encryption key for each reset ensures single-use encryption for security.

Runtime calls to System Management Mode (SMM) execute at the highest level, which can be risky if the SMM code has any issues. Surface Laptop 4 with AMD Ryzen guards the system by intercepting the System Management Interrupts (SMI) and dispatches the execution of the SMM code to a lesser level (user) to protect the system from invalid access to code and data. SMM protection uses hardware protections to restrict the code, data, and system resources that can be accessed, further enforcing protection against inadvertent or malicious incidents.

Surface Laptop 4 with AMD Ryzen supports [NIST 800-193 Platform Firmware Resiliency Guidelines](#), in addition to the robust firmware update support. The resilient update mechanism for boot firmware uses an A-B Recovery mechanism that provides auto-recovery to a backup copy of firmware should the boot sequence detect a corrupted copy of the firmware during boot.

To learn more about DRTM and SMM, see [How a Windows Defender System Guard helps protect Windows 10](#).

Remote device management control

IT admins can remotely manage Surface devices without physically touching every device. Microsoft Intune admin center with Intune and Windows Autopilot enables full remote management of Surface devices from the Azure Cloud, delivering fully configured devices to users upon startup. Wipe and retire features allow IT to repurpose a device easily for a new remote user and wipe a device that's been stolen. This enables

rapid and secure response capabilities in the event of loss or theft of a Surface device allowing you to remotely remove all company data and reconfigure Surface as an entirely new device.

Feature	Description	Learn more
DCFI (Device Firmware Configuration Interface)	Delivers cloud-scale remote firmware management with zero-touch device provisioning. Microsoft's UEFI allows stronger DFCI implementation, enabling organizations to disable hardware elements and remotely lock UEFI using Intune. ¹	Intune management of Surface UEFI settings Manage Surface UEFI settings
SEMM (Surface Enterprise Management Mode)	Enables centralized enterprise engagement of UEFI firmware settings across on-premises, hybrid, and cloud environments. ¹	Surface Enterprise Management Mode
Windows Update for Business	Enables IT admins to keep the Windows 10 devices in their organization continually updated with the latest security defenses, Windows features, and Surface firmware by directly connecting these systems to the Windows Update service. You can use Group Policy or MDM solutions such as Microsoft Intune to configure the Windows Update for Business settings that control how and when Surface devices are updated.	Windows Update for Business Manage and deploy Surface driver and firmware updates

References

1. Surface Go and Surface Go 2 use a third-party UEFI and do not support DFCI. DFCI is currently available for Surface Studio 2+, Surface Pro 9 & Surface Pro 9 with 5G, Surface Laptop 5, Surface Laptop 4, Surface Laptop 3, Surface Laptop Studio, Surface Book 3, Surface Laptop SE, Surface Laptop Go 2, Surface Laptop Go, Surface Pro 8, Surface Pro 7+, Surface Pro 7, Surface Pro X, and Surface Go 3.

Learn more

- New Surface PCs enable virtualization-based security (VBS) by default to empower customers to do more, securely ↗

- Study highlights critical role of Surface firmware protection ↗
- Enhancing security and compliance with Microsoft Surface and Microsoft 365 ↗
- Manage Surface UEFI settings
- Intune management of Surface UEFI settings
- Project Mu ↗

Azure Virtual Desktop on Surface

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Azure Virtual Desktop on Surface lets you run Virtual Desktop Infrastructure (VDI) on a Surface device — blurring the lines between the local desktop experience and the virtual desktop where touch, pen, ink, and biometric authentication span both physical and virtual environments. Representing another milestone in the evolution of computing, Azure Virtual Desktop on Surface ¹ combines Microsoft 365 — virtualized in the Azure cloud — with the advanced security protections, enterprise-level manageability, and enhanced productivity tools of Windows 10 or Windows 11 on Surface. This fusion of premium form factors and Virtual Desktop Infrastructure in Azure equips organizations to deliver advanced user experiences, portability, security, business continuity, and modern management.

Azure Virtual Desktop

Azure Virtual Desktop (AVD) is a comprehensive desktop and app virtualization service running in the Azure cloud. It's the only virtual desktop infrastructure that delivers simplified management, multi-session Windows 10 or Windows 11, optimizations for [Microsoft 365 Apps](#)  and support for Remote Desktop Services (RDS) environments. With AVD, you can quickly deploy and scale Windows desktops and apps on Azure and get built-in security and compliance features.

Azure Virtual Desktop partner integrations

For a list of approved partner providers and independent software vendors, visit the [Azure Marketplace](#)  and search for Azure Virtual Desktop. Some partners also provide Virtual Desktop as a Service (DaaS). DaaS frees you from having to maintain your own virtual machines (VMs) by providing a fully managed, turnkey desktop and virtualization service. The ability to deliver customized desktops to users globally enables companies to quickly adjust to changing market conditions by spinning up cloud desktops on-demand — when and where they're needed.

Microsoft Surface Devices

Surface engineering has long set new standards for innovation by going beyond the keyboard and mouse to imagine more natural ways of interacting with devices, whether by touch, voice, ink, or Surface Dial. And with chip-to-cloud integration of Microsoft 365 and the security and manageability of Windows 10 and Windows 11 Pro, Surface

delivers connected hardware, software, apps, and services the way they were intended. Although it's possible to run AVD from Windows devices dating back to Windows 7, Microsoft Surface devices provide unique advantages, including support for:

- **Flexible form factors** - like 2-in-1 devices such as Surface Pro 8, Surface Go 3, and Surface Pro X with pen, touch and detachable keyboard. You can even use [Surface Duo](#) to connect to AVD.
- **Persistent, on-demand, just-in-time work scenarios** - with offline and on-device access for more productive experiences.
- **Modern device security and manageability** - providing the flexibility to be productive anywhere.

Flexible form factors and premium user experience

The Microsoft Surface for Business family comprises a diverse portfolio of form factors, including traditional laptops, all-in-one machines, and 2-in-1 devices. Surface devices deliver experiences people love with the choice and flexibility they need to work on their terms.

The modern virtual desktop endpoint

Surface 2-in-1 devices, including [Surface Go 3](#) (10.5"), [Surface Pro 8](#) (12") and [Surface Pro X](#) (13"), provide users with the ideal cloud desktop endpoint bringing together the optimal balance of portability, versatility, power, and an all-day battery. From site engineers relying on Surface Go 3 in tablet mode to financial advisers attaching Surface Pro 8 to a dock and multiple monitors, 2-in-1 devices deliver the versatility that has come to define the modern workplace.

Unlike traditional, fixed VDI terminals, Surface devices allow users to work from anywhere and enable companies to remain viable and operational during unforeseen events -- from severe weather to public health emergencies. With support for persistent, on-demand and just-in-time scenarios, Surface devices effectively help companies sustain ongoing operations and mitigate risk from disruptive events. Features designed to enhance productivity on Surface 2-in-1 devices include:

- Vibrant, high-resolution displays with a 3:2 aspect ratio to get work done.
- Natural inking and multi-touch for more immersive experiences.
- With a wide variety of built-in and third-party accessibility features, Surface devices let you choose how to interact with your device, express ideas, and get work done.
- Far-field mics and high-performance speakers for improved virtual meetings.

- Biometric security includes a built-in Windows Hello camera that comes standard on every Surface device.
- Long battery life ² and fast charging.
- LTE options ³ on modern devices like Surface Pro X and Surface Go 3 for hassle-free and secure connectivity.
- Support for a wide range of peripherals such as standard printers, 3D printers, cameras, credit card readers, barcode scanners, and many others. A large ecosystem of Designed for Surface partners provides licensed and certified Surface accessories.
- A broad range of Device Redirection support.

Device Redirection Support

The Surface-centric productivity experiences listed above become even more compelling in Azure Virtual Desktop environments by taking advantage of the device redirection capabilities in Windows 10 and Windows 11. Surface provides a broad range of device redirection support, especially when compared to OEM thin clients and fixed terminals, Android, iOS/macOS and web-based access. The Windows Inbox (MSTSC) and Windows Desktop (MSRDC) clients provide the most device redirection capabilities, including Input Redirection (keyboard, mouse, pen and touch), Port Redirection (serial and USB) and Other Redirections (cameras, clipboard, local drive/storage, location, microphones, printers, scanners, smart cards and speakers). For a detailed comparison of device redirection support, refer to the [device redirection documentation](#).

Familiar Desktop Experience

Not only does running the Windows Desktop Client on Surface devices provide users with a broad set of device redirection capabilities, but it also lets everyone launch apps in familiar ways — directly from the Start Menu or Search bar.

Persistent, on-demand and just-in-time work scenarios

Azure Virtual Desktop on Surface helps customers meet increasingly complex business and security requirements across industries, employee roles, and work environments. These include:

- Multi-layered security of access to data and organizational resources
- Compliance with industry regulations
- Support for an increasingly elastic workforce
- Employee-specific needs across a variety of job functions.
- Ability to support specialized, processor-intensive workloads.

- Resilience for sustaining operations during disruptions.

Table 1. Azure Virtual Desktop business conversations

Security & regulation	Elastic workforce	Work Roles	Special workloads	Business continuity
- Financial Services	- Merger & acquisition	- BYOD & mobile	- Design & engineering	- On-demand
- Healthcare	- Short term employees	- Customer support/service	- Support for legacy apps	- Just-in-Time (JIT)
- Government	- Contractors & partners	- Branch workers	- Software dev & test	- Work @ Home

Offline and on-device access for more productive experiences

Traditionally, VDI solutions only work when the endpoint is connected to the internet. But what happens when the internet or power is unavailable?

To support business continuity and help employees be productive, Microsoft designed Surface devices to augment the virtual desktop experience with offline access to files, Microsoft 365 and third-party applications. Traditional apps like Microsoft Office, available across multiple platforms (x86, x64, Universal Windows Platform, ARM), enable users to stay productive in offline mode. Files from the virtual desktop cloud environment can be synced locally on Surface using OneDrive for Business for offline access. You can be confident that all locally cached information is up-to-date and secure.

In addition to adding support for offline access to apps and files, Surface devices are designed to optimize collaborative experiences like Microsoft Teams "On-Device." Although some VDI solutions support the use of Teams through a virtual session, users can benefit from the more optimized experience provided by a locally installed instance of Teams. Localizing communications and collaboration apps for multimedia channels like voice, video, live captioning allows organizations to take full advantage of Surface devices' ability to provide optimized Microsoft 365 experiences. The emergence of Surface AI or "AI-on-device" brings new capabilities to life, such as eye gaze technology (available on Surface Pro X) that adjusts the appearance of your eyes, so the audience sees you looking directly at the camera when communicating via video.

An alternative to locally installing traditional applications is to take advantage of the latest version of Microsoft Edge, which comes with support for Progressive Web Apps

(PWA). PWAs are just websites that are progressively enhanced to function like native apps on supporting platforms. The qualities of a PWA combine the best of the web and native apps with additional features, such as push notifications, background data refresh, offline support, and more.

Virtual GPUs

GPUs are ideal for AI compute and graphics-intensive workloads, helping customers to fuel innovation through scenarios like high-end remote visualization, deep learning, and predictive analytics. However, this isn't ideal for professionals who need to work remotely or on the go because varying degrees of internal GPU horsepower are tied to the physical devices, limiting mobility and flexibility.

To solve this, Azure offers the N-series family of Virtual Machines with NVIDIA GPU capabilities (vGPU). With vGPUs, IT can either share GPU performance across multiple virtual machines or power-demanding workloads by assigning multiple GPUs to a single virtual machine. For Surface, this means that no matter what device you're using, from Surface Go 3 to Surface Laptop 4, your device has access to powerful server-class graphics performance. Surface and vGPUs allow you to combine all the things you love about Surface, including pen, touch, keyboard, trackpad and PixelSense displays, with graphics capability only available in high-performance computing environments.

Azure N-series brings these capabilities to life on your Surface device, allowing you to work in any way you want, wherever you go. [Learn more about Azure N-Series and GPU-optimized virtual machine sizes.](#)

Microsoft 365 and Surface

Even in a virtualized desktop environment, Microsoft 365 and Surface deliver the experiences employees love, the protection organizations demand, and flexibility for teams to work their way. According to [Forrester Research:](#)⁴

- Microsoft 365-powered Surface devices give users up to five hours in weekly productivity gains with up to nine hours saved per week for highly mobile workers, providing organizations with 112 percent ROI on Microsoft 365 with Surface.
- Seventy-five percent agree Microsoft 365-powered Surface devices help improve employee satisfaction and retention.

Security and management

From chip to cloud, Microsoft 365 and Surface helps organizations stay protected and up to date. With Surface hardware and software — designed, built, and tested by Microsoft — users can be confident they're productive and protected by leading technologies from chip to cloud. As more users work remotely, corporate data and intellectual property protection become more paramount than ever. Azure Virtual Desktop on Surface is designed around a zero-trust security model. Every access request is strongly authenticated, authorized within policy constraints, and inspected for anomalies before granting access.

By maximizing efficiencies from cloud computing, modern management enables IT to better serve the needs of users, stakeholders and customers in an increasingly competitive business environment. For example, you can get Surface devices up and running with minimal interaction from your team. Setup is automatic and self-serviced. Updates are quick and painless for both your team and your users. You can manage devices regardless of their physical location.

Security and management features delivered with Azure Virtual Desktop on Surface include:

- **Windows Update.** Keeping Windows up to date helps you stay ahead of new security threats. Windows 10 and Windows 11 have been engineered from the ground up to be more secure and utilize the latest hardware capabilities to improve security. With a purpose-built UEFI ⁵ and Windows Update for Business that responds to evolving threats, end-to-end protection is secure and simplified.
- **Hardware encryption.** Device encryption lets you protect the data on your Surface so only authorized individuals can access it. All Surface for Business devices feature a discrete Trusted Platform Module (dTPM) that is hardware-protected against intrusion while software uses protected keys and measurements to verify software validity.
- **Microsoft Defender** Microsoft Defender for Endpoint brings together machine learning, big-data analysis, in-depth threat resistance research, and the Microsoft cloud infrastructure to protect devices. The tool is built-in and needs no extra agents to be deployed on devices or in the VDI environment, simplifying management and optimizing device startup.
- **Removable drives.** Several newer Surface devices feature removable SSD drives⁶, providing greater control over data retention.
- **Modern authentication.** Microsoft 365 and Surface is a unified platform delivering every Windows security feature (subject to licensing and enablement). All Surface portfolio devices ship with a custom-built camera, designed for Windows Hello for Business, providing biometric security that persists seamlessly from on-device to VDI-based experiences.

- **Modern firmware management** -Using Device Firmware Configuration Interface (DFCI), IT administrators can remotely disable hardware elements at a firmware level such as mics, USB ports, SD card slots, cameras, and Bluetooth, which removes power to the peripheral. Windows Defender Credential Guard uses virtualization-based security so that only privileged system software can access them.
- **Backward and forward compatibility.** Windows 10 and Windows 11 devices provide backward and forward compatibility across hardware, software and services. Microsoft has a strong history of maintaining legacy support of hardware, peripherals, software and services while incorporating the latest technologies. Businesses can plan IT investments to have a long useful life.
- **Bridge for legacy Windows 7 workloads.** For solution scenarios dependent on legacy Windows OS environments, enterprises can use VDI instances of Windows 7 running in Azure. This enables support on modern devices like Surface without the risk of relying on older Windows 7 machines that no longer receive the latest security updates. In addition to these "future-proofing" benefits, migration of any legacy workloads becomes greatly simplified when modern Windows 10 or Windows 11 hardware is already deployed.
- **Zero-Touch Deployment.** Autopilot is the recommended modern management deployment option for Surface devices. Windows Autopilot on Surface is a cloud-based deployment technology in Windows 10 and Windows 11. You can use Windows Autopilot on Surface to remotely deploy and configure devices in a zero-touch process right out of the box. Windows Autopilot-registered devices are identified over the internet at first startup through a unique device signature called a hardware hash. They're automatically enrolled and configured using modern management solutions such as Azure Active Directory (Azure AD) and mobile device management.

Surface devices: Minimizing environmental impacts

Surface performs life cycle assessments to calculate the environmental impact of devices across key stages of the product life cycle enabling Microsoft to minimize these impacts. Each Surface product has an ECO profile with data on greenhouse gas emissions, primary energy consumption and material composition, packaging, recycling, and related criteria. To download profiles for each Surface device, see [ECO Profiles](#).

Summary

Azure Virtual Desktop on Surface provides organizations with greater flexibility and resilience in meeting the diverse needs of users, stakeholders, and customers. Running

Azure Virtual Desktop solutions on Surface devices offers unique advantages over continued reliance on legacy devices. Flexible form factors like Surface Go 3 and Surface Pro 8 connected to the cloud (or offline) enable users to be productive from anywhere, at any time. Whether employees work in persistent, on-demand, or just-in-time scenarios, Azure Virtual Desktop on Surface affords businesses the versatility to sustain productivity throughout disruptions from unforeseen events. Using the built-in, multi-layered security and modern manageability of Windows 10 and Windows 11, companies can take advantage of an expanding ecosystem of cloud-based services to rapidly deploy and scale Windows desktops and apps. Simply put, Azure Virtual Desktop on Surface delivers critically needed technology to organizations and businesses of all sizes.

Learn more

For more information, see the following resources:

- [Azure Virtual Desktop ↗](#)
- [Surface for Business ↗](#)
- [Modernize your workforce with Microsoft Surface ↗](#)
- [A guide to Surface Technical Content and Solutions ↗](#)
- [Microsoft zero-trust security ↗](#)

References

1. Azure Virtual Desktop on Surface refers to running Azure Virtual Desktop Infrastructure on a Surface device and is described here as an architectural solution, not a separately available product.
2. Battery life varies significantly with settings, usage and other factors.
3. Service availability and performance subject to service provider's network. Contact your service provider for details, compatibility, pricing, SIM card, and activation. See all specs and frequencies at surface.com.
4. Forrester Consulting, "A Forrester Total Economic Impact™ Study: Maximizing Your ROI from Microsoft 365 Enterprise with Microsoft Surface," commissioned by Microsoft, 2018.
5. Surface Go and Surface Go 2 use a third-party UEFI and do not support DFCI. DFCI is currently available for Surface Studio 2+, Surface Pro 9 & Surface Pro 9 with 5G, Surface Laptop 5, Surface Laptop 4, Surface Laptop 3, Surface Laptop Studio, Surface Book 3, Surface Laptop SE, Surface Laptop Go 2, Surface Laptop Go, Surface Pro 8, Surface Pro 7+, Surface Pro 7, Surface Pro X, and Surface Go 3.
6. Removable SSD is available on Surface Laptop Studio, Surface Pro 8, Surface Pro 7+, Surface Laptop 4, Surface Laptop 3, and Surface Pro X.

Surface Laptop 4 processors tech overview

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface Laptop 4 is designed to provide commercial customers with a rich set of device options to help decision-makers better align device procurement goals with increasingly specific role requirements. Compared with Surface Laptop 3:

- Surface Laptop 4 equipped with AMD Ryzen™ Microsoft Surface Edition processors provides superior multi-threading performance making it a great choice for information workers needing better multitasking capabilities.
- Surface Laptop 4 equipped with 11th gen Intel® Core™ processors provide a stronger GPU and faster single-threaded performance, making it a great choice for developers, researchers, data scientists and the like - especially when paired with the greater memory and storage offered in the top end Intel SKU.

Choice of SKU depends on customer priorities:

- If multi-threaded app performance and longer battery life is a top priority, Surface Laptop 4 with AMD Ryzen Surface Edition processors is a good choice.
- If faster single-threaded performance is more important, along with options for greater memory and storage, Surface Laptop 4 with Intel 11th gen core processors is a good choice.

To learn more, see [Surface Laptop 4 for Business](#).

Processor tech specs

Surface Laptop 4 13.5"

- Quad Core 11th Gen Intel Core i5-1145G7 processor
- Quad Core 11th Gen Intel Core i7-1185G7 processor
- AMD Ryzen 5 4680U Mobile Processor with Radeon™ Graphics Microsoft Surface Edition (6 cores)
- AMD Ryzen 7 4980U Mobile Processor with Radeon Graphics Microsoft Surface Edition (8 cores)

Surface Laptop 4 15"

- Quad Core 11th Gen Intel Core™ i7-1185G7 processor

- AMD Ryzen 7 4980U Mobile Processor with Radeon™ Graphics Microsoft Surface Edition (8 cores)

11th Gen Intel Core i5/i7 in Surface Laptop 4

Feature	i5-1145G7	i7-1185G7
Cores	4	4
Threads	8	8
Max turbo frequency	4.40 GHz	4.80 GHz
Cache	8 MB Intel Smart Cache	12 MB Intel Smart Cache
Bus speed	4 GT/s	4 GT/s
Max memory size	16 GB	32 GB
Memory types	DDR4-3200, LPDDR4x-4267	DDR4-3200, LPDDR4x-4267
Max memory channels	2	2

For general information about the Intel processors in Surface Laptop 4, see:

- [Intel Core i5-1145G7 Processor ↗](#)
- [Intel Core i7-1185G7 Processor ↗](#)

AMD Ryzen Microsoft Surface Edition processors

Feature	AMD Ryzen 5 4680U	AMD Ryzen 7 4980U
CPU cores	6	8
Threads	12	16
GPU cores	7	8
Base clock	2.1 GHz	2.0 GHz
Max boost clock	4.0 GHz	4.4 GHz
Total L2 cache	3 MB	4 MB
Total L3 cache	8 MB	8 MB

Feature	AMD Ryzen 5 4680U	AMD Ryzen 7 4980U
CMOS	TSMC 7nm FinFET	TSMC 7nm FinFET
Package	FP6	FP6
PCI Express® Version	3.0	3.0
Default TDP / TDP	15W	15W
Max Temps	105C	105 C

For general information about AMD processors in Surface Laptop 4, see [Microsoft Surface Laptop 4 Powered by AMD Ryzen Mobile Processors](#).

Surface Laptop 4 SKUs

Configuration	Processor	GPU
R5/8/256GB	AMD Ryzen 5 4680U Mobile Processor with Microsoft Surface Edition	Radeon™ Graphics
i5/8/256GB	11th Gen Intel Core i5 1145G7 processor	Intel Iris® Xe Graphics
R5/16/256GB	AMD Ryzen 5 4680U Mobile Processor with Microsoft Surface Edition	Radeon Graphics
i5/8/512GB	11th Gen Intel Core i5 1145G7 processor	Intel Iris Xe Graphics
i5/16/512GB	11th Gen Intel Core i5 1145G7 processor	Intel Iris Xe Graphics
i7/16/256GB	11th Gen Intel Core i7 1185G7 processor	Intel Iris Xe Graphics
R7/16/512GB	AMD Ryzen 7 4980U Mobile Processor with Microsoft Surface Edition	Radeon Graphics
i7/16/512GB	11th Gen Intel Core i7 1185G7 processor	Intel Iris Xe Graphics
i7/32/1TB	11th Gen Intel Core i7 1185G7 processor	Intel Iris Xe Graphics

[Learn more](#)

- Surface Laptop 4 for Business ↗

Surface Headphones 2+ tech overview

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Built for the hybrid workplace, [Surface Headphones 2+ ↗](#) reduces unwanted ambient noise, enables clear remote meeting participation, and provides high-fidelity sound. Surface Headphones 2+ includes 13 levels of active noise cancellation, ear cup dials, and an advanced 8-microphone system for voice clarity, 18.5 hours of music¹ listening time or up to 15 hours of voice² calling time.

Certified for Microsoft Teams

Surface Headphones 2+ meets audio/video specification standards while using Teams software to ensure a high-quality call experience. A "Certified for Microsoft Teams" experience is enabled via one of the following methods:

- **Surface USB link dongle.** Use the included dongle for a dedicated connection when using multiple Bluetooth® devices.
- **Bluetooth.** Now available for Windows 11, ensure you update the headphones to run the latest firmware, [as described below](#). A subsequent firmware update for the headphones to meet Teams certification standards on Windows 10 is coming soon.

Surface Headphones 2+ includes a Teams button to join calls or bring Teams to the forefront, integrated call controls, and an LED status indicator on the dongle to indicate mute status.

Using with Microsoft 365

Surface Headphones 2+ integrates with productivity features in Microsoft 365, such as helping improve the accuracy of speech-to-text dictation or enabling captions to appear on-screen while you speak during a presentation.

- Talk rather than type with dictation in Microsoft Word, Outlook, and PowerPoint.
- Enable live captions and subtitles on-screen while you're talking, and translate what you're saying into one of 60+ languages for more accessible presentations.

A software license is required for some Microsoft 365 features and is sold separately. To learn more, see [Use Microsoft 365 with Surface Headphones ↗](#).

Updating firmware

Headphones

- To update Surface Headphones 2+, use the Surface App installed on your Surface device. Or you can download the [Surface App](#) from the Microsoft Store (version 61.5058.139 or later).
- For Apple Mac users, use the [Microsoft Accessory Updater tool](#) available from the Mac App Store.
- Once you connect the Surface Headphones 2+ to your host device (PC/Mac), the update will automatically apply to the headphones.
- To confirm if your Surface Headphones 2+ received the update, go to the Surface App. Under Device information, verify the firmware version is **1.0.7.44** or later. If not, select **Update using Bluetooth, as shown below**.

Surface Headphones



Connected 50% 7h left



Volume level

66%



Noise cancellation

High



Equalizer

Flat



Settings



Device information



Device name	Surface Headphones
Model	Surface Headphones
Serial number	000000000000
Firmware version	1.0.6.81.29
Hardware version	1919-600B
Language	English (United States)



Firmware update

A new update for your headphones is available. New version for Surface Headphones: 1.07.44

Update using Bluetooth

Surface USB link dongle

Firmware for the USB link dongle is maintained via Windows Update, which automatically pushes updates to firmware on the dongle.

Surface Headphones 2 + tech specs

Feature	Description
Dimensions	<ul style="list-style-type: none">- Length: 8.03" (204 mm)- Width: 7.68" (195 mm)- Depth: 1.89" (48 mm)
Weight	<ul style="list-style-type: none">- 0.64 lbs (290 g)
Exterior	<ul style="list-style-type: none">- Colors: Matte Black
Frequency response	<ul style="list-style-type: none">- 20 Hz – 20 kHz
Noise cancellation	<ul style="list-style-type: none">- Up to 30 dB for active noise cancellation- Up to 40 dB for passive noise cancellation
Speaker	<ul style="list-style-type: none">- 40 mm Free Edge driver
Sound pressure level output	<ul style="list-style-type: none">- Up to 115 dB (1 kHz, 1 Vrms via cable connector with power on)- Up to 115 dB (1 kHz, 0dBFS over Bluetooth connection)
Charging	<ul style="list-style-type: none">- Full charge in less than two hours
Battery Life	<ul style="list-style-type: none">- Up to 18.5 hours of music listening time¹ or up to 15 hours of voice calling on Microsoft Teams²
USB cord length	<ul style="list-style-type: none">- 1.5 m
Audio cable length	<ul style="list-style-type: none">- 1.2 m
Inputs	<ul style="list-style-type: none">- Headphones: USB C® connector, 3.5-mm audio connector- Surface USB Link: USB-A³
Sensors	<ul style="list-style-type: none">- Wear detection sensors on ear cups- Touch sensors on ear cups
Compatibility	<ul style="list-style-type: none">- Bluetooth (without Surface USB Link): Windows 10/11, Android 11 / 10 / 9, iOS 14 / 13 / 12, macOS 11 / 10.14, Bluetooth 5.0 / 4.2 / 4.1- With Surface USB Link: Windows 10, macOS 11 / 10.14, Bluetooth 5.0
Audio Codec	<ul style="list-style-type: none">- SBC and aptX™⁴
Buttons/controls	<ul style="list-style-type: none">- Power button, Microsoft Teams button, Volume dial (right ear), Noise Cancellation dial (left ear), Single ear cup tap (Mute)

Feature	Description
What's in the box	<ul style="list-style-type: none"> - Surface Headphones 2+ - Carrying case - USB cable - Audio cable - Surface USB Link (USB-A)4 - Quick Start Guide - Safety and warranty documents
Warranty	<ul style="list-style-type: none"> - 1-year limited hardware warranty⁵

Replacement parts

The USB dongle and ear pads for Surface Headphones + are available as replacement parts. To learn more, see [Get a replacement for Microsoft Surface USB Link ↗](#)

Microsoft Surface USB Link tech specs

Feature	Description
Dimensions	<ul style="list-style-type: none"> - Length: 0.75" (19.0 mm) - Width: 0.57" (14.4 mm) - Depth: 0.27" (6.9 mm)
Weight	<ul style="list-style-type: none"> - 0.067 oz (1.9 g)
Exterior	<ul style="list-style-type: none"> - Colors: Black
Wireless Platform	<ul style="list-style-type: none"> - Bluetooth® 5.0
Interface	<ul style="list-style-type: none"> - USB-A⁶ 2.0 full speed
Compatibility	<ul style="list-style-type: none"> - Windows 10/11, macOS 11 / 10.14,⁷ Bluetooth 5.0
Product Compatibility	<ul style="list-style-type: none"> - Surface Headphones 2+

Microsoft Surface Headphones Ear Pads tech specs

Feature	Description
Dimensions	<ul style="list-style-type: none"> - Each ear pad: 3.62" x 3.62" x 1.16" (92 mm x 92 mm x 29.5 mm)
Weight	<ul style="list-style-type: none"> - Each ear pad: 0.08 lbs (34.3 g)
Color	<ul style="list-style-type: none"> - Black

Feature	Description
Product Compatibility	- Surface Headphones 2+

References

1. Music listening testing conducted by Microsoft in Feb 2021 using prerelease Surface Headphones + Dongle package with prerelease software. The dongle was plugged into Surface Laptop 3 and/or Surface Pro 7. Playlist consisted of 44 songs transmitted using SBC encoding. Volume was set to 46% with maximum noise cancellation. Bluetooth A2DP profile was used. Testing consisted of full Surface Headphones battery discharge while playing audio until the Surface Headphones disconnected from the host device. Battery life depends on device settings, environment, usage, and many other factors.
2. Voice calling testing conducted by Microsoft in Feb 2021 using prerelease Surface Headphones + Dongle package with prerelease software. The dongle was plugged into Surface Laptop 3 and/or Surface Pro 7. Volume was set to 52% with maximum noise cancellation. Bluetooth Hands-Free profile was used. Testing consisted of full Surface Headphones battery discharge with a Microsoft Teams call until the Surface Headphones disconnected from the host device. Battery life depends on device settings, environment, usage, and many other factors.
3. USB-A to USB-C® adapter should work for a C-capable source. Performance varies based on the quality of the adapter and the cable length.
4. AptX™ only works with Surface Headphones 2+ when not using the Surface USB Link.
5. Microsoft's Limited Warranty is in addition to your consumer law rights.
6. USB-A to USB-C® adapter should work for a C-capable source. Performance varies based on the quality of the adapter and the cable length
7. To pair your replacement Surface USB Link to Surface Headphones 2+, you'll need the Surface App available on devices running Windows 10 or Windows 11. Or you can download the [Surface App](#) from the Microsoft Store (version 61.5058.139 or later).

Surface Dock 2 overview

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

Surface Dock 2, the next-generation Surface dock, lets users connect external monitors and multiple peripherals for a fully modernized desktop experience from a Surface device. Built to maximize efficiency at the office, in a flexible workspace, or at home, Surface Dock 2 features seven ports, including two front-facing USB-C ports, with 15 watts of fast charging power for phones and accessories.

Full device management support

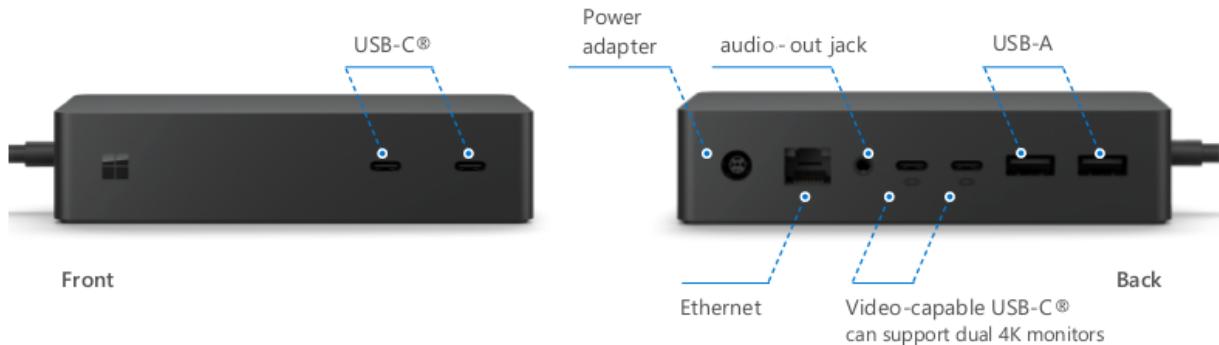
Surface Dock 2 is designed to simplify IT management, enabling admins to automate firmware updates using Windows Update or centralize updates with internal software distribution tools.

- Surface Enterprise Management Mode (SEMM) enables IT admins to secure ports on Surface Dock 2. For more information, see [Secure Surface Dock 2 ports with Surface Enterprise Management Mode](#).
- Windows Management Instrumentation (WMI) support enables IT admins to remotely monitor and manage the latest firmware, policy state, and related data across Surface Dock 2 devices. For more information, see [Manage Surface Dock 2 with WMI](#).
- Centralize updates on your local network using software distribution tools. [Download Surface Dock 2 Firmware and Drivers](#) ↗.

General system requirements

- Windows 10 version 1809 and later. There's no support for Windows 7, Windows 8, or non-Surface host devices. Surface Dock 2 works with the following Surface devices:
 - Surface Pro (5th Gen) and later
 - Surface Laptop (1st Gen) and later
 - Surface Book 2 and later
 - Surface Go and later
 - Surface Laptop Go and later
 - Surface Laptop Studio

Surface Dock 2 Components



USB

- Two front-facing USB-C ports
- Two rear-facing USB-C (gen 2) ports
- Two rear-facing USB-A ports

Video

- Dual 4K@60Hz. Supports up to two displays on the following devices:
 - Surface Laptop Studio
 - Surface Book 3
 - Surface Pro 8
 - Surface Pro 7
 - Surface Pro 7+
 - Surface Pro X
 - Surface Laptop 3
 - Surface Laptop 4
 - Surface Laptop 5
 - Surface Pro 9
 - Surface Pro 9 with 5G
- Dual 4K@30Hz. Supports up to two displays on the following devices:
 - Surface Pro 6
 - Surface Pro (5th Gen)
 - Surface Laptop 2
 - Surface Laptop (1st Gen)
 - Surface Go
 - Surface Go 2
 - Surface Go 3
 - Surface Book 2

Ethernet

- 1-gigabit Ethernet port.

External Power supply

- 199 watts supporting 100V-240V.

Compare Surface Dock

Table 1. Surface Dock and USB-C Travel Hub .

Component	Surface Dock	Surface Dock 2	USB-C Travel Hub
Surface Connect	Yes	Yes	No
USB-A	2 front facing USB 3.1 Gen 1 2 rear facing USB 3.1 Gen 1	2 rear facing USB 3.2 Gen 2 (7.5W power)	1 USB 3.1 Gen 2
Mini Display port	2 rear facing (DP1.2)	None	None
USB-C	None	2 front facing USB 3.2 Gen 2 (15W power) 2 rear facing USB 3.2 Gen 2 (DP1.4a) (7.5W power)	1 USB 3.2 Gen 2
3.5 mm Audio in/out	Yes	Yes	Yes
Ethernet	Yes, 1 gigabit	Yes 1 gigabit	Yes, 1 gigabit
DC power in	Yes	Yes	
Kensington lock	Yes	Yes	
Surface Connect cable length	65 cm	80 cm	20 cm
Surface Connect host power	60 W	120 W	N/A
USB load power	30 W	60 W	
USB bit rate	5 Gbps	10 Gbps	10 Gbps

Component	Surface Dock	Surface Dock 2	USB-C Travel Hub
Monitor support	2 x 4K @30Hz, or 1 x 4K @60 Hz	2 x 4K @60 Hz or 1 x 4K @120Hz	1 x 4K @ 60 Hz
Wake-on-LAN from Connected Standby	Yes	Yes	Yes
Wake-on-LAN from S4/S5 sleep modes	No	Yes	Yes
Network PXE boot	Yes	Yes	Yes
SEMM host access control	No	Yes	No
SEMM port access control ¹	No	Yes	No
Servicing support	MSI	Windows Update or MSI	

1. Software license required for some features. Sold separately.

Streamlined device management

Surface has released streamlined management functionality via Windows Update enabling IT admins to utilize the following enterprise-grade features:

- **Frictionless updates.** Update your docks silently and automatically, with Windows Update or Microsoft Endpoint Configuration Manager (formerly System Center Configuration Manager - SCCM) or other MSI deployment tools.
- **Wake from the network.** Manage and access corporate devices without depending on users to keep their devices powered on. Even when a docked device is in sleep, hibernation, or power off mode, your team can wake from the network for service and management, using Endpoint Configuration Manager or other enterprise management tools.
- **Centralized IT control.** Control who can connect to Surface Dock 2 by turning ports on and off. Restrict which host devices can be used with Surface Dock 2. Limit dock access to a single user or configure docks for access only by specific users in your team or across the entire company.

Next steps

- Secure Surface Dock 2 ports with Surface Enterprise Management Mode ↗
- Surface Enterprise Management Mode

- Best practice power settings for Surface devices

Surface Laptop Studio graphics overview

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

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 OpenGL 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
Resizable BAR	Yes	Yes
NVIDIA Optimus	Yes	Yes
Nvidia Encoder	7th Gen	7th Gen
Nvidia Decoder	5th Gen	5th Gen

GPU	NVIDIA GeForce RTX 3050 Ti Laptop GPU	NVIDIA RTX A2000 Laptop GPU
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.

Surface Laptop Studio ISV-tested/certified apps

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface Laptop Studio with Nvidia RTX A2000 is tested and verified for leading ISV applications and provides significantly faster acceleration across professional applications.

App	Description
Autodesk AutoCAD	Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is approved and recommended by Autodesk for AutoCAD: ¹ <ul style="list-style-type: none">- GPU-accelerated viewport graphics for fast, interactive 3D modeling and design.
Autodesk Maya	Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is approved and recommended by Autodesk for Maya: <ul style="list-style-type: none">- RTX-accelerated ray tracing and AI denoising with the default Arnold renderer.- OpenGL Viewport Acceleration.
Autodesk Revit	Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is approved and recommended by Autodesk for Revit: <ul style="list-style-type: none">- GPU-accelerated viewport for a smoother, more interactive design experience.- Supports 3rd party GPU-accelerated 3D renderers such as V-Ray and Enscape.
McNeel & Associates Rhino3D®	Rhino 7 is supported on Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6, as tested and verified by Microsoft: <ul style="list-style-type: none">- GPU-accelerated viewport for a smooth and interactive modeling and design experience.- Supports cycles for GPU-accelerated 3D rendering.
Siemens SolidEdge 2022	Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is certified and recommended by Siemens.

App	Description
Esri ArcGIS Pro	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is certified and recommended by ESRI for ArcGIS Pro:</p> <p><i>"I'd absolutely see a GIS professional, even one that specializes in advanced 3D geospatial work, use this in place of a heavy workstation." - Philip Mielke, 3D GIS product manager</i></p>
Dassault Systemes Solidworks	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is certified and recommended by Dassault Systemes for Solidworks.</p> <ul style="list-style-type: none"> - Solidworks Interactive Ray Tracer accelerated by both RT Cores and Tensor Cores; AI-accelerated denoiser.
PTC Creo	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 is certified and recommended by PTC for PTC Creo:</p> <ul style="list-style-type: none"> - PTC Creo's real-time engineering simulation tool (Creo Simulation Live) built on CUDA. - Up to 11% faster performance on PTC Creo workload than Surface Book 3 15" with NVIDIA Quadro RTX. - Up to a 45% faster performance on PTC Creo workload than Surface Laptop Studio with Nvidia GeForce RTX.

Adobe applications

Microsoft Surface engineering works closely with Adobe to test and verify that Surface Laptop Studio is optimized for the following Adobe® Creative Cloud™ applications.

App	Description
Adobe Photoshop	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Photoshop:</p> <ul style="list-style-type: none"> - CUDA core acceleration enables faster editing with more than 30 GPU-accelerated features, including blur gallery, liquify, smart sharpen, and perspective warp. Photographers and designers can modify images smoothly and quickly.

App	Description
Adobe Premiere Pro	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Premiere Pro:</p> <ul style="list-style-type: none"> - Faster editing and rendering video with GPU-accelerated effects vs. CPU. - GPU-accelerated effects with NVIDIA CUDA technology for real-time video editing and faster final frame rendering. - GPU-accelerated AI Auto Reframe feature for intelligently converting landscape video to dynamically tracked portrait or square video. <p>Adobe Premiere Pro² is now aware of the mode in which you're using Surface Laptop Studio and will adjust the interface to help you edit or present on the go.</p> <p>With tactile signals in Surface Slim Pen 2,² you'll get feedback to help you precisely trim and edit clips and align graphics.³</p>
Adobe After Effects	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe After Effects:</p> <ul style="list-style-type: none"> - RTX-accelerated ray tracing delivers photorealistic 3D rendering to 2D artists and designers.
Adobe Substance Painter	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Substance Painter:</p> <ul style="list-style-type: none"> - Create and blend materials with ease, featuring RTX-accelerated AI.
Adobe Dimension	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Dimension:</p> <ul style="list-style-type: none"> - RTX-accelerated ray tracing delivers photorealistic 3D rendering to 2D artists and designers.
Adobe Lightroom	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Lightroom:</p> <ul style="list-style-type: none"> - Faster editing of high-resolution images with a GPU-accelerated viewport enables the modeling of larger 3D scenes and the creation of more complex animations. - GPU-accelerated image processing enables significantly more responsive adjustments, especially on 4K or higher resolution displays. - GPU-accelerated AI-powered "Enhance Details" for refining fine color detail of RAW images.

App	Description
Adobe Illustrator	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Illustrator:</p> <ul style="list-style-type: none"> - Pan and zoom with GPU-accelerated canvas, enabling graphic designers and illustrators to pan across and zoom in and out of complex vector graphics smoothly and interactively.
Adobe Fresco	<p>Surface Laptop Studio with Nvidia RTX A2000 with 4GB GDDR6 has been tested and verified by Microsoft for Adobe Fresco.</p> <p>When Adobe Fresco is paired with tactile signals in Surface Slim Pen 2, creators can discover — or rediscover — the joy of drawing and painting. It feels like creating on an actual canvas – only better.</p>

ⓘ Note

ISV-tested apps for Surface Book 3 also run on Surface Laptop Studio. To learn more, see [ISV testing & app acceleration](#).

References

1. AutoCAD was tested on versions 2021 and 2022.
2. Some accessories and software sold separately.
3. Tactile signals in Adobe Premiere Pro are available in Beta only. Visit [Adobe.com](#) ↗ for more details.

Surface Studio 2+ for Business overview

Article • 01/03/2023 • Applies to: Windows 11



Surface Studio 2+ is a new type of business PC that offers inspiring design in both customer-facing scenarios and high-level workspaces. Over the last few years, we've seen massive changes in the workplace, and the hybrid workplace is one of them.

Featuring a 28" touchscreen laptop with a digital pen and a Zero Gravity Hinge, Surface Studio 2+ is designed to allow professionals to work their way, whether they are creatives, multitaskers, collaborators, or data-rich dashboard users. Surface Studio 2+ provides impactful design, versatile form factors, high performance, and advanced security features to help teams drive productivity, build closer connections, and collaborate freely.

Executives and advanced professionals need high-productivity, high-powered devices with great remote collaboration and connectivity features.

- The 11th Intel® Core™ i7-11375H processor gives employees the power they need for multitasking or high-powered apps.
- The NVIDIA® GeForce RTX® 3060 Laptop GPU provides the best GPU of any Surface device and features the latest RT Cores, Tensor Cores, and streaming multiprocessors.
- Improved camera experience for conferencing and auto color management for display
- Multiple ports help your employees craft the workspace they need to perform, with 3 USB-C ports, Thunderbolt™ 4, native external display support for up to three 4K UHD displays at 60Hz
- Your sensitive data is protected with Secured-core PCs on Windows 11, making them the most secure Windows PC

- Get more out of your device with more replaceable components. Major components in Surface Studio 2+ including the display module, feet, SSD module, PSU, thermal module, motherboard, are replaceable or repairable through a network of approved service providers.

Explore Surface devices

- [Explore Surface: Interactive tour ↗](#)

Order Surface Pro 9 for Business

- [Order Surface Pro 9 for Business ↗](#)

Surface Studio 2+ tech specs

Feature	Description
Processor	- 11th Gen Intel® Core™ i7-11375H Processor
Graphics	- NVIDIA® GeForce RTX® 3060 Laptop GPU with 6 GB GDDR6 GPU memory
Memory	- 32 GB (DDR4)
Storage ¹	- 1-TB solid-state drive (SSD)
Display	<ul style="list-style-type: none"> - Screen: 28" PixelSense™ Display - Touch: 10-point multi-touch - Aspect Ratio: 3:2 - Resolution: 4500 x 3000 (192 PPI) - Color profile: sRGB and Vivid - Individually color-calibrated display - 1 billion colors and better gradients with Auto Color Management - Contrast ratio: 1200:1 - Dolby Vision® support² - Gorilla® Glass 3 - Brightness: 500 nits (typical), 12 nits (minimum) - External display support: Up to three 4K UHD (@60Hz) or single 4K UHD (@60Hz)

Feature	Description
Size & weight	<p>Base</p> <ul style="list-style-type: none"> - Length: 9.8 inch (250 mm) - Width: 8.7 inch (220 mm) - Thickness: 1.2 inch (31.45 mm)
	<p>Display</p> <ul style="list-style-type: none"> - Length: 25.1 inch (637.35 mm) - Width: 0.5 inch (12.5 mm) - Height: 17.3 inch (438.90 mm) - Weight: 21 lbs max (9.56 kg max)
Security	<ul style="list-style-type: none"> - TPM 2.0 chip for enterprise security - Enterprise-grade protection with Windows Hello face sign-in - Windows 11 Secured-core PC.
Cameras	<ul style="list-style-type: none"> - Windows Hello face authentication camera (front-facing) - Front-facing camera with 1080p HD video
Audio	<ul style="list-style-type: none"> - Dual far-field studio microphones - Stereo 2.1 speakers with Dolby® Atmos™ ³
Ports	<ul style="list-style-type: none"> - 3 x USB-C® with Thunderbolt™ ⁴ - 2 x USB-A 3.0 - 3.5-mm headphone jack - 1-Gigabit Ethernet port
Network & connectivity	<ul style="list-style-type: none"> - Wi-Fi 6: 802.11ax compatible - Bluetooth® Wireless 5.1 technology
SKUs	<p>SKU 1 - i7/32/1TB with Pen, KB, Mouse</p> <p>Available in: US, Canada, Australia, NZ, China, HK, Japan, Austria, Germany, UK, Ireland, & France</p> <p>SKU 2 - i7/32/1TB device only</p> <p>Available in: Taiwan, Singapore, Netherlands, Switzerland, Luxembourg, Belgium, Denmark, Finland, Norway, Sweden, Poland, Italy, Portugal, Spain, Kuwait, Qatar, Saudi Arabia, & UAE</p>

Feature	Description
Pen & accessories compatibility	<p>Pen Support</p> <p>SKU 1: i7/32/1TB with Pen, KB, Mouse</p> <ul style="list-style-type: none"> - Designed for Surface Pen - Integrated magnetic storage with Surface Pen - Supports Microsoft Pen Protocol (MPP) <p>SKU 2: i7/32/1TB device only</p> <ul style="list-style-type: none"> - Designed for Surface Pen⁴ - Integrated magnetic storage with Surface Pen - Supports Microsoft Pen Protocol (MPP)
Accessories Support	
SKU 1: i7/32/1TB with Pen, KB, Mouse	
Compatible with:	
	<ul style="list-style-type: none"> - Surface Dial on-screen interaction. - Inbox accessories come pre-paired.
SKU 2: i7/32/1TB device only	
Compatible with:	
	<ul style="list-style-type: none"> - Surface Dial on-screen interaction. - Surface Pen - Surface Keyboard - Surface Mouse
Software	<ul style="list-style-type: none"> - Windows 11 Pro 22H2 - Preloaded Microsoft 365 Apps⁵ - Microsoft 365 Business Standard, Microsoft 365 Business Premium, or Microsoft 365 Apps 30-day trial⁶
Sensors	<ul style="list-style-type: none"> - Ambient light sensor

Feature	Description
Accessibility	<p>SKU 1: i7/32/1TB with Pen, KB, Mouse</p> <ul style="list-style-type: none"> - Compatible with Surface Adaptive Kit - Compatible with Microsoft Adaptive Mouse - Include Windows Accessibility Feature – Learn More Accessibility Features Microsoft Accessibility ↗ - Discover more Microsoft Accessible Devices & Products - Accessible Devices & Products for PC & Gaming Assistive Tech Accessories - Microsoft Store ↗ <p>SKU 2: i7/32/1TB device only</p> <ul style="list-style-type: none"> - Compatible with Microsoft Adaptive Mouse - Include Windows Accessibility Feature – Learn More Accessibility Features Microsoft Accessibility ↗ - Discover more Microsoft Accessible Devices & Products - Accessible Devices & Products for PC & Gaming Assistive Tech Accessories - Microsoft Store ↗
Serviceability⁷	- Replaceable components include Display, Motherboard, Thermals, PSU, Feet, C-cover, Hinge cover, SSD
Exterior	<ul style="list-style-type: none"> - Physical buttons: Volume, Power - Zero Gravity Hinge
What's in the box	<p>SKU 1 - i7/32/1TB with Pen, KB, Mouse</p> <ul style="list-style-type: none"> - Surface Studio 2+ - Surface Pen - Surface Keyboard - Surface Mouse - Power cord with grip-release cable - Quick Start Guide - Safety and warranty guide <p>SKU 2 - i7/32/1TB device only</p> <ul style="list-style-type: none"> - Surface Studio 2+ - Power cord with grip-release cable - Quick Start Guide Safety and warranty guide
Keyboard layout	<ul style="list-style-type: none"> - Activation: Moving keys - Backlight - Layout: QWERTY, full row of function keys (F1 – F12) - Windows key and dedicated buttons for media controls, screen brightness
Warranty⁸	<ul style="list-style-type: none"> - One-year limited hardware warranty

References

1. System software uses significant storage space. Available storage is subject to change based on system software updates and apps usage. 1 GB = 1 billion bytes. 1 TB = 1,000 GB. See Surface.com/Storage for more details.
2. Requires Dolby Vision® encoded content and video.
3. Requires Dolby Atmos® encoded content and video.
4. Sold separately.
5. Requires license or subscription (sold separately) to activate and use.
6. Activation required. If your device is managed by your organization's IT department, contact your IT administrator for activation. If you activate your trial outside your organization, after 30 days, you'll be charged the applicable monthly or annual subscription fee. Credit card required. Cancel anytime to stop future charges.
7. Customer Replaceable Units (CRUs) are components available for purchase through your Surface Commercial Authorized Device Reseller. Components can be replaced on-site by a skilled technician following Microsoft's Service Guide. Opening and/or repairing your device can present electric shock, fire and personal injury risks and other hazards. Use caution if undertaking do-it-yourself repairs. Device damage caused during repair won't be covered under Microsoft's Hardware Warranty or protection plans. Components will be available shortly after initial launch; timing of availability varies by component and market.
8. Microsoft's Limited Warranty is in addition to your consumer law rights.

Learn more

- [Explore Surface: Interactive tour ↗](#)
- [Order Surface Studio 2+ for Business ↗](#)

Surface Book 3 GPU tech overview

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Introduction

Surface Book 3, the most powerful Surface laptop yet released, integrates fully modernized compute and graphics capabilities into its famous detachable form factor. Led by the quad-core 10th Gen Intel® Core™ i7 and NVIDIA® Quadro RTX™ 3000 graphical processing unit (GPU) on the 15-inch model, Surface Book 3 comes in a wide range of configurations for consumers, creative professionals, architects, engineers, and data scientists. This article explains the major differences between the GPU configurations across 13-inch and 15-inch models of Surface Book 3.

A significant differentiator across Surface Book 3 models is the GPU configuration. In addition to the integrated Intel GPU built into all models, all but the entry-level 13.5-inch Core i5 device also feature a discrete NVIDIA GPU with Max-Q Design, which incorporates features that optimize energy efficiency for mobile form factors.

Built into the keyboard base, the additional NVIDIA GPU provides advanced graphics rendering capabilities and comes in two primary configurations: GeForce® GTX® 1650/1660 Ti for consumers or creative professionals and Quadro RTX 3000 for creative professionals, engineers, and other business professionals who need advanced graphics or deep learning capabilities. This article also describes how to optimize app utilization of GPUs by specifying which apps should use the integrated iGPU versus the discrete NVIDIA GPU.

Surface Book 3 GPUs

This section describes the integrated and discrete GPUs across Surface Book 3 models. For configuration details of all models, refer to [Appendix A: Surface Book 3 SKUs](#).

Intel Iris™ Plus Graphics

The integrated GPU (iGPU) included on all Surface Book 3 models incorporates a wider graphics engine and a redesigned memory controller with support for LPDDR4X. Installed as the secondary GPU on most Surface Book 3 models, Intel Iris Plus Graphics functions as the singular GPU in the Core i5, 13.5-inch model. Although nominally the entry-level device in the Surface Book 3 line, it delivers advanced graphics capabilities

enabling consumers, hobbyists, and online creators to run the latest productivity software like Adobe Creative Cloud or enjoy gaming titles in 1080p.

NVIDIA GeForce GTX 1650

NVIDIA GeForce GTX 1650 with Max-Q design delivers a major upgrade of the core streaming multiprocessor to more efficiently handle the complex graphics of modern games. Its concurrent execution of floating-point and integer operations boosts performance in the compute-heavy workloads of modern games. A new unified memory architecture with twice the cache of its predecessor allows for better performance on complex modern games. New shading advancements improve performance, enhance image quality, and deliver new levels of geometric complexity.

NVIDIA GeForce GTX 1660 Ti

Compared with the GeForce GTX 1650, the faster GeForce GTX 1660 Ti provides Surface Book 3 with additional performance improvements and includes the new and upgraded NVIDIA Encoder, making it better for consumers, gamers, live streamers, and creative professionals.

Thanks to 6 GB of GDDR6 graphics memory, Surface Book 3 models equipped with NVIDIA GeForce GTX 1660 Ti provide superior speeds on advanced business productivity software and popular games, especially when running the most modern titles or live streaming. With an optional 2 TB SSD (available in U.S. only), the 15-inch model with GeForce GTX 1660 Ti delivers the most storage of any Surface Book 3 device.

NVIDIA Quadro RTX 3000

NVIDIA Quadro RTX 3000 unlocks several key features for professional users: ray-tracing rendering and AI acceleration and advanced graphics and compute performance. A combination of 30 RT cores, 240 tensor cores, and 6 GB of GDDR6 graphics memory enables multiple advanced workloads, including AI-powered workflows, 3D content creation, advanced video editing, professional broadcasting, and multi-app workflows. Enterprise-level hardware and software support integrate deployment tools to maximize uptime and minimize IT support requirements. Certified for the world's most advanced software, Quadro drivers are optimized for professional applications and are tuned, tested, and validated to provide app certification, enterprise-level stability, reliability, availability, and support with extended product availability.

Comparing GPUs across Surface Book 3

NVIDIA GPUs provide users with great performance for gaming, live streaming, and content creation. GeForce GTX products are great for gamers and content creators. Quadro RTX products are targeted at professional users, provide great performance in gaming and content creation, and also add the following features:

- RTX acceleration for ray tracing and AI. This makes it possible to render film-quality, photorealistic objects and environments with physically accurate shadows, reflections and refractions. And its hardware-accelerated AI capabilities mean the advanced AI-based features in popular applications can run faster than ever before.
- Enterprise-level hardware, drivers and support, as well as ISV app certifications.
- IT management features include an additional layer of dedicated enterprise tools for remote management that help maximize uptime and minimize IT support requirements.

Unless you count yourself among the ranks of advanced engineering, design, architecture, or data science professionals, Surface Book 3 equipped with NVIDIA GeForce graphics capabilities will likely meet your needs. Conversely, if you're already in -- or aspiring to join -- a profession that requires highly advanced graphics capabilities in a portable form factor that lets you work from anywhere, Surface Book 3 with Quadro RTX 3000 deserves serious consideration. To learn more, refer to the Surface Book 3 Quadro RTX 3000 technical overview.

Table 1. Discrete GPUs on Surface Book 3

	GeForce GTX 1650	GeForce GTX 1660 Ti	Quadro RTX 3000
Target users	Gamers, hobbyists, and online creators	Gamers, creative professionals, and online creators	Creative professionals, architects, engineers, developers, data scientists
Workflows	Graphic design Photography Video	Graphic design Photography Video	AI-powered Workflows App certifications High-res video Pro broadcasting Multi-app workflows
Key apps	Adobe Creative Suite	Adobe Creative Suite	Adobe Creative Suite Autodesk AutoCAD Dassault Systemes SolidWorks
GPU acceleration	Video and image processing	Video and image processing	Ray tracing + AI + 6K video Pro broadcasting features Enterprise support

Table 2. GPU tech specs on Surface Book 3

	GeForce GTX 1650	GeForce GTX 1660 Ti	Quadro RTX 3000
NVIDIA CUDA processing cores	1024	1536	1920
NVIDIA Tensor Cores	No	No	240
NVIDIA RT Cores	No	No	30
GPU memory	4 GB	6 GB	6 GB
Memory Bandwidth (GB/sec)	Up to 112	Up to 288	Up to 288
Memory type	GDDR5	GDDR6	GDDR6
Memory interface	128-bit	192-bit	192-bit
Boost clock MHz	1245	1425	1305
Base clock (MHz)	1020	1245	765
Real-time ray tracing	No	No	Yes
AI hardware acceleration	No	No	Yes
Hardware Encoder	Yes	Yes	Yes
Game Ready Driver (GRD)	Yes ¹	Yes ¹	Yes ²
Studio Driver (SD)	Yes ¹	Yes ¹	Yes ¹
Optimal Driver for Enterprise (ODE)	No	No	Yes
Quadro New Feature Driver (QNF)	No	No	Yes
Microsoft DirectX 12 API, Vulkan API, Open GL 4.6	Yes	Yes	Yes
High-bandwidth Digital Content Protection (HDCP) 2.2	Yes	Yes	Yes
NVIDIA GPU Boost	Yes	Yes	Yes

1. Recommended

2. Supported

Optimizing power and performance on Surface Book 3

Surface devices can adjust performance-related power settings by changing the Windows performance power slider position in Windows 10, also known as power mode in Windows 11. Surface Book 3 implements this functionality algorithmically to optimize power and performance across the following components:

- CPU Energy Efficiency Registers (Intel Speed Shift technology) and other SoC tuning parameters to maximize efficiency.
- Fan Maximum RPM with four modes: quiet, nominal, performance, and max.
- Processor Power Caps (PL1/PL2).
- Processor IA Turbo limitations.

By default, when the battery drops below 20 percent, the Battery Saver adjusts settings to extend battery life. When connected to power, Surface Book 3 defaults to “Best Performance” settings to ensure apps run in high-performance mode on the secondary NVIDIA GPU present on all i7 Surface Book 3 systems.

Using default settings is recommended for optimal performance when used as a laptop or detached in tablet or studio mode. You can access Battery Saver by selecting the battery icon on the far right of the taskbar.

Game mode

Surface Book 3 includes a new game mode that automatically selects maximum performance settings when launched.

Safe Detach

New in Surface Book 3, apps enabled for Safe Detach let you disconnect while the app is using the GPU. For supported apps like *World of Warcraft*, your work is moved to the iGPU.

Modifying app settings to always use a specific GPU

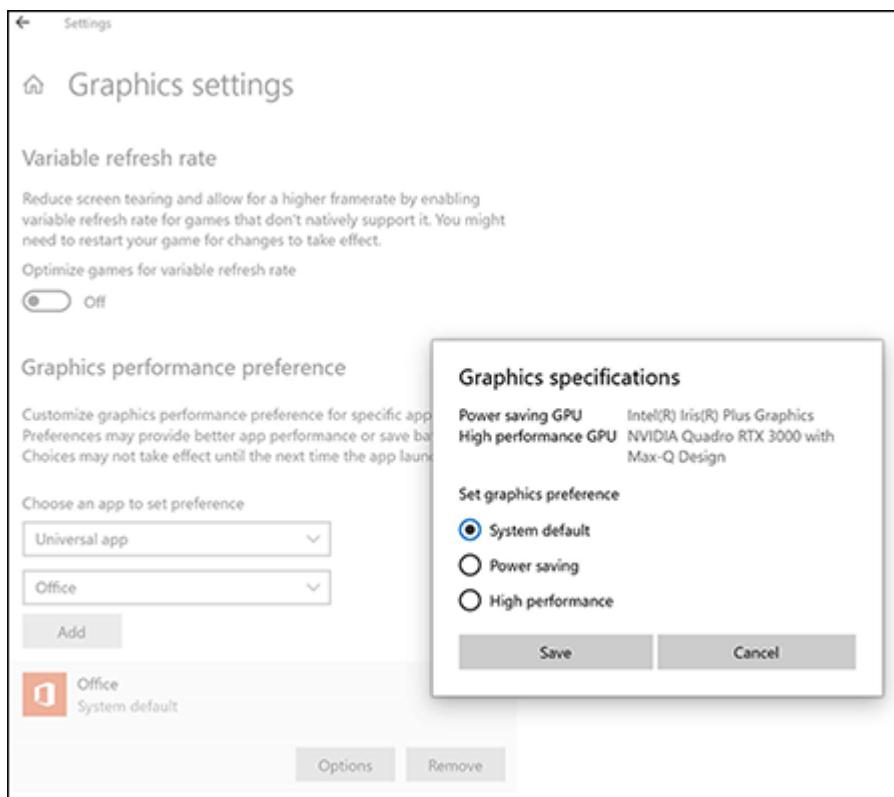
You can switch between the power-saving but still capable built-in Intel graphics and the more powerful discrete NVIDIA GPU and associate a GPU with a specific app. By default, Windows 10 and Windows 11 automatically choose the appropriate GPU, assigning graphically demanding apps to the discrete NVIDIA GPU. In most instances, you don't need to manually adjust these settings. However, if you frequently detach and reattach the display from the keyboard base while using a graphically demanding app, you'll typically need to close the app prior to detaching. To enable continuous use of the app

without having to close it every time you detach or reattach the display, you can assign it to the integrated GPU, albeit with some loss of graphics performance.

In some instances, the OS may assign a graphically demanding app to be iGPU; for example, if the app is not fully optimized for hybrid graphics. To remedy this, you can manually assign the app to the discrete NVIDIA GPU.

To configure apps using custom per-GPU options:

1. Go to **Settings > System > Display** and select **Graphics Settings**.
 - a. For a Windows desktop program, choose **Classic App > Browse** and then locate the program.
 - b. For a UWP app, choose **Universal App** and then select the app from the drop-down list.
2. Select **Add** to create a new entry on the list for your selected program, select **Options** to open **Graphics Specifications**, and then select your desired option.



3. To verify which GPU is used for each app, open **Task Manager**, select **Performance**, and view the **GPU Engine** column.

Appendix A: Surface Book 3 SKUs

Display	Processor	GPU	RAM	Storage
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Display	Processor	GPU	RAM	Storage
13.5-inch	Quad-core 10th Gen Core i5-1035G7	Intel Iris™ Plus Graphics	16 LPDDR4x	256 GB
13.5-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1650. Max-Q Design with 4GB GDDR5 graphics memory	16 LPDDR4x	256 GB
13.5-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1650. Max-Q Design with 4GB GDDR5 graphics memory	32 LPDDR4x	512 GB
13.5-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1650. Max-Q Design with 4GB GDDR5 graphics memory	32 LPDDR4x	1 TB
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1660 Ti. Max-Q Design with 6GB GDDR6 graphics memory	16 LPDDR4x	256 GB
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1660 Ti. Max-Q Design with 6GB GDDR6 graphics memory	32 LPDDR4x	512 GB
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1660 Ti. Max-Q Design with 6GB GDDR6 graphics memory	32 LPDDR4x	1 TB
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA GeForce GTX 1660 Ti. Max-Q Design with 6GB GDDR6 graphics memory	32 LPDDR4x	2 TB
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA Quadro RTX 3000. Max-Q Design with 6GB GDDR6 graphics memory	32 LPDDR4x	512 GB
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris Plus Graphics NVIDIA Quadro RTX 3000. Max-Q Design with 6GB GDDR6 graphics memory	32 LPDDR4x	1 TB

ⓘ Note

2TB SSD available in U.S. only: Surface Book 3 15" with NVIDIA GTX 1660Ti

Summary

Built for performance, Surface Book 3 includes different GPU configurations optimized to meet specific workload and use requirements. An integrated Intel Iris graphics GPU functions as the sole GPU on the entry-level Core i5 device and as a secondary GPU on all other models. GeForce GTX 1650 features a major upgrade of the core streaming multiprocessor to run complex graphics more efficiently. The faster GeForce GTX 1660 Ti provides Surface Book 3 with additional performance improvements making it better for consumers, gamers, live streamers, and creative professionals. Quadro RTX 3000 unlocks several key features for professional users: ray-tracing rendering and AI acceleration, and advanced graphics and compute performance.

Learn more

- [Surface Book 3 Quadro RTX 3000 technical overview](#)
- [Surface for Business](#)

Surface Book 3 Quadro RTX 3000 tech overview

Article • 01/03/2023

Surface Book 3 for Business powered by the NVIDIA® Quadro RTX™ 3000 GPU is built for professionals who need real-time rendering, AI acceleration, advanced graphics, and compute performance in a portable form factor. Quadro RTX 3000 fundamentally changes what you can do with the new Surface Book 3:

- **Ray Tracing** - Produce stunning renders, designs and animations faster than ever before with 30 RT Cores for hardware-accelerated ray tracing.
- **Artificial Intelligence** - Remove redundant, tedious tasks and compute-intensive work with 240 Tensor Cores for GPU-accelerated AI.
- **Advanced Graphics and Compute Technology** - Experience remarkable speed and interactivity during your most taxing graphics and compute workloads with 1,920 CUDA Cores and 6GB of GDDR6 memory.

Enterprise-grade solution

Of paramount importance to commercial customers, Quadro RTX 3000 brings a fully professional-grade solution that combines accelerated ray tracing and deep learning capabilities with an integrated enterprise-level management and support solution.

Quadro drivers are tested and certified for more than 100 professional applications by leading ISVs, providing an additional layer of quality assurance to validate stability, reliability, and performance.

Quadro includes dedicated enterprise tools for remote management of Surface Book 3 devices with Quadro RTX 3000. IT admins can remotely configure graphics systems, save/restore configurations, continuously monitor graphics systems, and perform remote troubleshooting if necessary. These capabilities, along with deployment tools, help maximize uptime and minimize IT support requirements.

NVIDIA develops and maintains Quadro Optimal Drivers for Enterprise (ODE) that are tuned, tested, and validated to provide enterprise-level stability, reliability, availability, and support with extended product availability. Each driver release involves more than 2,000 man-days of testing with professional applications test suites and test cases, as well as WHQL certification. Security threats are continually monitored, and regular security updates are released to protect against newly discovered vulnerabilities. In addition, Quadro drivers undergo an additional layer of testing by Surface engineering prior to release via Windows Update.

Built for compute-intensive workloads

The Surface Book 3 with Quadro RTX 3000 delivers the best graphics performance of any Surface laptop, enabling advanced professionals to work from anywhere.

- **Creative professionals such as designers and animators.** Quadro RTX enables real-time cinematic-quality rendering through Turing-optimized ray tracing APIs such as NVIDIA OptiX, Microsoft DXR, and Vulkan.
- **Architects and engineers using large, complex computer-aided design (CAD) models and assemblies.** The RTX platform features the new NGX SDK to infuse powerful AI-enhanced capabilities into visual applications. This frees up time and resources through intelligent manipulation of images, automation of repetitive tasks, and optimization of compute-intensive processes.
- **Software developers across manufacturing, media and entertainment, medical, and other industries.** Quadro RTX speeds application development with ray tracing, deep learning, and rasterization capabilities through industry-leading software SDKs and APIs.
- **Data scientists using Tensor Cores and CUDA cores to accelerate computationally intensive tasks and other deep learning operations.** By using sensors, increased connectivity, and deep learning, researchers and developers can enable AI applications for everything from autonomous vehicles to scientific research.

Table 1. Quadro RTX 3000 performance features

Component	Description
RT cores	Dedicated hardware-based ray-tracing technology allows the GPU to render film quality, photorealistic objects and environments with physically accurate shadows, reflections, and refractions. The real-time ray-tracing engine works with NVIDIA OptiX, Microsoft DXR, and Vulkan APIs to deliver a level of realism far beyond what is possible using traditional rendering techniques. RT cores accelerate the Bounding Volume Hierarchy (BVH) traversal and ray casting functions using a low number of rays casted through a pixel.
Enhanced tensor cores	Mixed-precision cores purpose-built for deep learning matrix arithmetic deliver 8x TFLOPS for training compared with the previous generation. Quadro RTX 3000 utilizes 240 Tensor Cores; each Tensor Core performs 64 floating point fused multiply-add (FMA) operations per clock, and each streaming multiprocessor (SM) performs a total of 1,024 individual floating-point operations per clock. In addition to supporting FP16/FP32 matrix operations, new Tensor Cores added INT8 (2,048 integer operations per clock) and experimental INT4 and INT1 (binary) precision modes for matrix operations.

Component	Description
Turing optimized software	Deep learning frameworks such as the Microsoft Cognitive Toolkit (CNTK), Caffe2, MXNet, TensorFlow, and others deliver significantly faster training times and higher multi-node training performance. GPU accelerated libraries such as cuDNN, cuBLAS, and TensorRT deliver higher performance for both deep learning inference and High-Performance Computing (HPC) applications.
NVIDIA CUDA parallel computing platform	Natively execute standard programming languages like C/C++ and Fortran, and APIs such as OpenCL, OpenACC and Direct Compute to accelerate techniques such as ray tracing, video and image processing, and computation fluid dynamics.
Advanced streaming multiprocessor (SM) architecture	Combined shared memory and L1 cache improve performance significantly while simplifying programming and reducing the tuning required to attain the best application performance.
High-performance GDDR6 Memory	Quadro RTX 3000 features 6GB of frame buffer, making it the ideal platform for handling large datasets and latency-sensitive applications.
Single instruction, multiple thread (SIMT)	New independent thread scheduling capability enables finer-grain synchronization and cooperation between parallel threads by sharing resources among small jobs.
Mixed-precision computing	16-bit floating-point precision computing enables the training and deployment of larger neural networks. With independent parallel integer and floating-point data paths, the Turing SM handles workloads more efficiently using a mix of computation and addressing calculations.
Dynamic load balancing	Provides dynamic allocation capabilities of GPU resources for graphics and compute tasks as needed to maximize resource utilization.
Compute preemption	Preemption at the instruction level provides finer grain control over compute tasks to prevent long-running applications from either monopolizing system resources or timing out.
H.264, H.265 and HEVC encode/decode engines	Enables faster than real-time performance for transcoding, video editing, and other encoding applications with two dedicated H.264 and HEVC encode engines and a dedicated decode engine that is independent of the 3D/compute pipeline.
NVIDIA GPU boost 4.0	Maximizes application performance automatically without exceeding the power and thermal envelope of the GPU. Allows applications to stay within the boost clock state longer under a higher temperature threshold before dropping to a secondary temperature setting base clock.

Table 2. Quadro RTX tech specs

Component	Description
NVIDIA CUDA processing cores	1,920
NVIDIA RT Cores	30
Tensor Cores	240
GPU memory	6 GB
Memory bandwidth	288 Gbps
Memory type	GDDR6
Memory interface	192-bit
TGP max power consumption	65W
Display port	1.4
OpenGL	4.6
Shader model	5.1
DirectX	12.1
PCIe generation	3
Single precision floating point performance (TFLOPS, Peak)	5.4
Tensor performance (TOPS, Peak)	42.9
NVIDIA FXAA/TX AA antialiasing	Yes
GPU direct for video	Yes
Vulkan support	Yes
NVIDIA 3D vision Pro	Yes
NVIDIA Optimus	Yes

ISV testing & app acceleration

As shown in Table 3, Surface Book 3 with Quadro RTX 3000 is tested and approved by leading ISVs and provides significantly faster acceleration across professional applications. SPECview perf 13 benchmark test results compare Surface Book 3 15-inch

with NVIDIA Quadro RTX 3000 versus the Surface Book 2 15-inch with NVIDIA GeForce GTX 1060 devices.

Table 3. ISV testing & app acceleration on Surface Book 3 with Quadro RTX 3000

App	Description
Adobe Dimension	<p>Adobe-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - RTX-accelerated ray tracing delivers photorealistic 3D rendering to 2D artists and designers.
Adobe Illustrator	<ul style="list-style-type: none"> - Pan and zoom with GPU-accelerated canvas faster, which enables graphic designers and illustrators to pan across and zoom in and out of complex vector graphics smoothly and interactively.
Adobe Lightroom	<p>Adobe-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - Faster editing high res images with GPU-accelerated viewport, which enables the modeling of larger 3D scenes, and the rigging of more complex animations. - GPU-accelerated image processing enables dramatically more responsive adjustments, especially on 4K or higher resolution displays. - GPU-accelerated AI-powered “Enhance Details” for refining fine color detail of RAW images.
Adobe Photoshop	<p>Adobe-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - CUDA core acceleration enables faster editing with 30+ GPU-accelerated features such as blur gallery, liquify, smart sharpen, and perspective warp, enabling photographers and designers to modify images smoothly and quickly.
Adobe Premiere Pro	<p>Adobe-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - Significantly faster editing and rendering video with GPU-accelerated effects vs. CPU. - GPU-accelerated effects with NVIDIA CUDA technology for real-time video editing and faster final frame rendering. - GPU-accelerated AI Auto Reframe feature for intelligently converting landscape video to dynamically tracked portrait or square video.
Adobe Substance Alchemist	<ul style="list-style-type: none"> - Create and blend materials with ease, featuring RTX-accelerated AI.

App	Description
Adobe Substance Painter	<p>Adobe-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - Paint materials onto 3d models, featuring RTX accelerated bakers and Iray RTX rendering, which generates photorealistic imagery for interactive and batch rendering workflows.
Adobe Substance Designer	<ul style="list-style-type: none"> - Author procedural materials featuring RTX accelerated bakers. - Uses NVIDIA Iray rendering, including textures/substances and bitmap texture export to render in any Iray that is compatible with MDL. - DXR-accelerated light and ambient occlusion baking.
ANSYS	<p>ANSYS-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - ANSYS real-time engineering simulation tool built on CUDA.
Autodesk Revit	<p>Autodesk-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - GPU-accelerated viewport for a smoother, more interactive design experience. - Supports 3rd party GPU-accelerated 3D renderers such as V-Ray and Enscape.
Autodesk AutoCad	<p>Autodesk-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - GPU-accelerated viewport graphics for fast, interactive 3D modeling and design. - RTX-accelerated ray tracing and AI denoising with the default Arnold renderer. - More than 70 percent faster compared with Surface Book 2 15".
Autodesk Maya	<p>Autodesk-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - RTX-accelerated ray tracing and AI denoising with the default Arnold renderer. - OpenGL Viewport Acceleration.
Bentley MicroStation	<p>Bentley-tested and approved for Surface Book 3 with Quadro RTX 3000</p>
Dassault Systems 3D Experience Platform	<ul style="list-style-type: none"> - CATIA Interactive Ray Tracer (Live Rendering) accelerated by RT Cores. - Catia runs more than 100% faster compared with Surface Book 2 15".

App	Description
Dassault Systemes Solidworks	<ul style="list-style-type: none"> - Solidworks Interactive Ray Tracer (Visualize) accelerated by both RT Cores and Tensor Cores; AI-accelerated denoiser. - Runs more than 50% faster compared with Surface Book 2 15".
ImageVis3D	<ul style="list-style-type: none"> - Runs more than 2x faster compared with Surface Book 2 15".
Esri ArcGIS Pro	<p>Esri-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <p>3D Analysis and real-time visualization workflow performed much better than the previous generation and leverage RayTracing capability for Voxel layer visualization</p>
Luxion KeyShot	<ul style="list-style-type: none"> - 3rd party Interactive Ray Tracer used by Solidworks, Creo, and Rhino. Accelerated by RT Cores, OptiX™ AI-accelerated denoising.
McNeel & Associates Rhino 3D	<p>Rhino-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - GPU-accelerated viewport for a smooth and interactive modeling and design experience. - Supports Cycles for GPU-accelerated 3D rendering.
PTC Creo	<p>PTC-tested and approved for Surface Book 3 with Quadro RTX 3000</p> <ul style="list-style-type: none"> - Creo's real-time engineering simulation tool (Creo Simulation Live) built on CUDA. - Runs more than 15% faster compared with Surface Book 2 15".
Siemens SolidEdge 2020	<p>Siemens-tested and approved for Surface Book 3 with Quadro RTX 3000</p>
Siemens NX	<ul style="list-style-type: none"> - Siemens NX Interactive Ray Tracer (Ray Traced Studio) accelerated by RT Cores. - Runs more than 10x faster compared with Surface Book 2 15".

SKUs

Table 4. Surface Book 3 with Quadro RTX 3000 SKUs

Display	Processor	GPU	RAM	Storage

Display	Processor	GPU	RAM	Storage
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris™ Plus Graphics NVIDIA Quadro RTX 3000. Max-Q Design with 6GB GDDR6 graphics memory	32	512 GB LPDDR4x
15-inch	Quad-core 10th Gen Core i7-1065G7	Intel Iris™ Plus Graphics NVIDIA Quadro RTX 3000. Max-Q Design with 6GB GDDR6 graphics memory	32	1 TB LPDDR4x

Summary

The Surface Book 3 with Quadro RTX 3000 delivers the best graphics performance of any Surface laptop, providing architects, engineers, developers, and data scientists with the tools they need to work efficiently from anywhere:

- RTX-acceleration across multiple workflows like design, animation, video production, and more.
- Desktop-grade performance in a mobile form factor.
- Enterprise-class features, reliability, and support for mission-critical projects.

Learn more

- [Surface Book 3 GPU technical overview](#)
- [Surface for Business ↗](#)
- [Microsoft Cognitive Toolkit \(CNTK\)](#)

OS choice for new Surface devices

Article • 05/08/2023 • Applies to: Windows 10, Windows 11

Commercial customers can choose to have Windows 10 or Windows 11 installed on new Surface devices:

- [Surface Pro 9](#)
- [Surface Laptop 5](#)
- [Surface Laptop Go 2 ↗](#)
- [Surface Laptop 4 ↗](#)
- [Surface Pro 8 ↗](#)
- [Surface Laptop Studio ↗](#)
- [Surface Go 3 ↗](#)

ⓘ Note

Surface Pro 9 is available for Windows 10. Surface Pro 9 with 5G is available for Windows 11 only.

Considerations for choosing your OS

Whether you choose to purchase new Surface devices running Windows 11 or opt for Surface devices with Windows 10¹ may depend on your current corporate environment:

- **Windows 10 only.** Designed for customers who require Windows 10 out of the box and deploy devices using Windows Autopilot or Azure Active Directory domain join (AADJ). With **Windows 10 SKUs**, you avoid the need to compile driver packs and reimagine devices before distributing them to users. It includes an additional fee of \$30 per device (based on MSRP, actual pricing may vary).²
- **Windows 10 & Windows 11.** Designed for customers who use Windows 11 and also deploy Windows 10 via traditional deployment methods that rely on reimaging devices. With **Windows 11 SKUs**, you can take advantage of built-in downgrade rights to Windows 10 and load custom Windows 10 images on devices as needed.

💡 Tip

Microsoft Windows 10 Pro is preinstalled with Windows 10 downgrade software. It includes a license for the Downgrade Facilitation Product available via downgrade rights from Windows 11 Pro. The appropriate build is indicated in the **Windows OS**

versions section on this page. End users may use only one version at a time; switching between versions requires uninstalling the other version.

Table 1. OS choice summary

Network environment	Deployment method	Recommended SKUs	Additional cost
Windows 10 only	Modern: Autopilot/AADJ	Windows 10	\$30
Windows 10 & Windows 11	Legacy: Custom image deployment	Windows 11	None

Windows 10 only

The ability to get the OS version you need directly from Surface includes delivery of factory shrink-wrapped devices fully configured with the requisite firmware, drivers, and security policies. The extra fee covers the cost of this service along with the following benefits that allow you to:

- Provide your users with the latest Surface hardware today while upgrading to Windows 11 at your own pace.
- Reduce your exposure to potential supply chain vulnerabilities by eliminating the need to reimagine to Windows 10.
- Save time with Windows Autopilot zero-touch deployment, including faster app and policy updates and fewer help desk calls.

Windows OS versions

Devices ship from the factory with one of the following OS versions, depending on your choice.

Tip

If you order devices from a reseller, please check with the reseller on the exact OS version that meets your requirements.

Device	Windows 10	Windows 11
Surface Laptop Go 2	21H2	21H2
Surface Laptop 4	21H2	21H2

Device	Windows 10	Windows 11
Surface Laptop Studio	21H2	21H2
Surface Go 3	21H2	21H2
Surface Pro 8	21H2	21H2
Surface Pro 9	21H2	22H2
Surface Laptop 5	21H2	22H2

How to order

Commercial customers can place orders for new devices via [authorized Microsoft Surface resellers](#).

References

1. Windows 10 Downgrade Facilitation SKU offered for Windows 11-capable devices.
2. Effective July 1, 2023, additional fee will increase from \$30 to \$50 for the following devices: Surface Pro 9, Surface Laptop 5, Surface Go 3 LTE, and Surface Pro 8 LTE. The fee will remain set at \$30 for Surface Laptop Go 2, Surface Laptop 4, and Surface Laptop Studio.

Learn more

- [Surface for Business](#)
- [Surface IT Pro blog](#)

Surface device compatibility with Windows 10 Long-Term Servicing Channel (LTSC)

Article • 01/03/2023

Surface devices are designed to provide best-in-class experiences in productivity and general-purpose scenarios. Regular updates enable Surface devices to bring innovations and evolve with the new capabilities delivered by Windows 10 Feature Updates. Feature Updates are available only in Windows 10 Pro or Windows 10 Enterprise editions that receive continuous updates through the Semi-Annual Channel (SAC).

In contrast to the SAC servicing option, formerly known as the Current Branch (CB) or Current Branch for Business (CBB) servicing options, you cannot select the Long-Term Servicing Channel (LTSC) option in Windows 10 settings. To use the LTSC servicing option, you must install a separate edition of Windows 10 Enterprise, known as Windows 10 Enterprise LTSC, formerly known as Windows 10 Enterprise LTSB (Long-Term Servicing Branch).

Tip

For the latest information about LTSC, refer to the following FAQ: [The next Windows 10 Long Term Servicing Channel \(LTSC\) release](#).

In addition to providing an extended servicing model, the Windows 10 Enterprise LTSC edition also provides an environment with several Windows components removed. The core Surface experiences that LTSC impacts include:

- Windows Feature Updates, including enhancements such as:
 - Improvements to Direct Ink and palm rejection provided in Windows 10, version 1607 (also referred to as the Anniversary Update)
 - Improved support for high DPI applications provided in Windows 10, version 1703 (also referred to as the Creators Update)
- Pressure sensitivity settings provided by the Surface app
- The Windows Ink Workspace
- Key touch-optimized in-box applications including Microsoft Edge, OneNote, Calendar, and Camera

The use of the Windows 10 Enterprise LTSC environment on Surface devices results in sub-optimal end-user experiences, and you should avoid using it in environments where users want and expect a premium, up-to-date user experience.

The LTSC servicing option is designed for device types and scenarios where the key attribute is for features or functionality to never change. Examples include power manufacturing or medical equipment systems, or embedded systems in kiosks, such as ATMs or airport ticketing systems.

 **Note**

For general information about Windows servicing branches, including LTSC, see [Overview of Windows as a service](#).

As a general guideline, devices that fulfill the following criteria are considered general-purpose devices and should be paired with Windows 10 Pro or Windows 10 Enterprise using the Semi-Annual Channel servicing option:

- Devices that run productivity software such as Microsoft Office
- Devices that use Microsoft Store applications
- Devices that are used for general Internet browsing (for example, research or access to social media)

Before you choose to use Windows 10 Enterprise LTSC edition on Surface devices, consider the following limitations:

- Driver and firmware updates are not explicitly tested against releases of Windows 10 Enterprise LTSC.
- If you encounter problems, Microsoft Support will provide troubleshooting assistance. However, due to the servicing nature of the Windows LTSC, issue resolution may require that devices be upgraded to a more recent version of Windows 10 Enterprise LTSC or Windows 10 Pro or Enterprise with the SAC servicing option.
- Surface device replacements (for example, devices replaced under warranty) may contain subtle variations in hardware components that require updated device drivers and firmware. Compatibility with these updates may require the installation of a more recent version of Windows 10 Enterprise LTSC or Windows 10 Pro or Enterprise with the SAC servicing option.

 **Note**

Organizations that standardize on a specific version of Windows 10 Enterprise LTSC may be unable to adopt new generations of Surface hardware such as Surface Pro 8, Surface Pro X, or Surface Laptop 4 without updating to a later version of Windows 10 Enterprise LTSC or Windows 10 Pro or Enterprise. For more information, refer to the [Lifecycle FAQ - Windows](#).

Surface devices running Windows 10 Enterprise LTSC edition will not receive new features. In many cases, customers request these features to improve the usability and capabilities of Surface hardware. For example, further improvements for High DPI applications in Windows 10, version 1703. Customers that use Surface devices in the LTSC configuration will not see the improvements until they either update to a new Windows 10 Enterprise LTSC release or upgrade to a version of Windows 10 with support for the SAC servicing option.

Devices can be changed from Windows 10 Enterprise LTSC to a more recent version of Windows 10 Enterprise, with support for the SAC servicing option, without losing user data by performing an upgrade installation. You can also perform an upgrade installation on multiple devices by leveraging the Upgrade Task Sequence Templates available in the Microsoft Deployment Toolkit (MDT) and Microsoft Endpoint Configuration Manager. For more information, see [Upgrade Surface devices to Windows 10 with Microsoft Deployment Toolkit](#).

Long-Term Servicing Channel (LTSC) for Surface devices

Article • 01/26/2023

⚠️ Warning

For updated information on this topic, see [Surface device compatibility with Windows 10 Long-Term Servicing Channel](#). For additional information on this update, see the [Documentation Updates for Surface and Windows 10 LTSB Compatibility](#) post on the Surface Blog for IT Pros.

General-purpose Surface devices in the Long-Term Servicing Channel (LTSC) are not supported. As a general guideline, if a Surface device runs productivity software, such as Microsoft Office, it is a general-purpose device that does not qualify for LTSC and should instead be on the Semi-Annual Channel.

ⓘ Note

For more information about the servicing branches, see [Overview of Windows as a service](#).

LTSC prevents Surface devices from receiving critical Windows 10 feature updates and certain non-security servicing updates. Customers with poor experiences using Surface devices in the LTSC configuration will be instructed to switch to the Semi-Annual Channel. Furthermore, the Windows 10 Enterprise LTSB edition removes core features of Surface devices, including seamless inking and touch-friendly applications. It does not contain key in-box applications including Microsoft Edge, OneNote, Calendar or Camera. Therefore, productivity is impacted and functionality is limited. LTSC is not supported as a suitable servicing solution for general-purpose Surface devices.

General-purpose Surface devices are intended to run on the Semi-Annual Channel to receive full servicing and firmware updates and forward compatibility with the introduction of new Surface features. In the Semi-Annual Channel, feature updates are available as soon as Microsoft releases them.

Surface devices in specialized scenarios—such as PCs that control medical equipment, point-of-sale systems, and ATMs—might consider the use of LTSC. These special-purpose systems typically perform a single task and do not require feature updates as frequently as other devices in the organization.

Ethernet adapters and Surface deployment

Article • 04/06/2023 • Applies to: Windows 10, Windows 11

This article describes how to perform a network deployment of the latest Surface devices including Surface Pro 3 and later.

Network deployment to Surface devices can pose some unique challenges for system administrators. Due to the lack of a native wired Ethernet adapter, administrators must provide connectivity through a removable Ethernet adapter.

Select an Ethernet adapter for Surface devices

Before you can address how devices will be recognized by your deployment solution, you have to use a wired network adapter.

When selecting Ethernet adapters, the primary concern is how adapters will boot your Surface devices from the network. Suppose you're prestaging clients with Windows Deployment Services (WDS) or using Microsoft Endpoint Configuration Manager. In that case, you may also want to consider whether the removable Ethernet adapters will be dedicated to a specific Surface device or shared among multiple devices. For more information on potential conflicts with shared adapters, see [Manage MAC addresses with removable Ethernet adapters](#) later in this article.

Booting from the network (PXE boot) is only supported when using an Ethernet adapter or docking station from Microsoft. The chipset in the Ethernet adapter or dock must be detected and configured as a boot device in the firmware of the Surface device.

Microsoft Ethernet adapters, such as the Surface Ethernet Adapter and the [Surface Dock](#), use a chipset compatible with the Surface firmware.

The following Ethernet devices are supported for network boot with Surface devices:

- Surface Thunderbolt™ 4 Dock
- Surface Dock 2
- Surface Dock
- Surface USB-C® to Ethernet and USB 3.0 Adapter
- Surface USB 3.0 to Gigabit Ethernet Adapter
- Microsoft USB-C Travel Hub
- Docking Station for Surface 3
- Docking Station for Surface Pro 3

- Docking Station for Surface Pro and Surface Pro 2

Third-party Ethernet adapters are also supported for network deployment, although they don't support PXE boot. To use a third-party Ethernet adapter, you must load the drivers into the deployment boot image, and you must launch that boot image from a separate storage device, such as a USB stick.

Boot Surface devices from the network

To boot from the network or a connected USB stick, you must instruct the Surface device to boot from an alternate boot device. You can alter the boot order in the system firmware to prioritize USB boot devices or boot from an alternate boot device during the boot-up process.

To boot from an alternate boot device:

1. Ensure the Surface device is powered off.
2. Press and hold the **Volume Down** button.
3. Press and release the **Power** button.
4. After the system begins to boot from the USB stick or Ethernet adapter, release the **Volume Down** button.

Note

In addition to an Ethernet adapter, a keyboard must also be connected to the Surface device to enter the preinstallation environment and navigate the deployment wizard.

For Windows 10, version 1511 and later – including the Windows Assessment and Deployment Kit (Windows ADK) for Windows 10, version 1511 – the drivers for Microsoft Surface Ethernet Adapters are present by default. If you're using a deployment solution that uses Windows Preinstallation Environment (WinPE), like the Microsoft Deployment Toolkit, and booting from the network with PXE, ensure that your deployment solution uses the latest version of the Windows ADK.

Manage MAC addresses with removable Ethernet adapters

Another consideration for administrators performing Windows deployment over the network is identifying computers when using the same Ethernet adapter to deploy to

more than one computer. A common identifier used by deployment technologies is the Media Access Control (MAC) address associated with each Ethernet adapter. However, when you use the same Ethernet adapter to deploy to multiple computers, you can't use a deployment technology that inspects MAC addresses because there's no way to differentiate the MAC address of the removable adapter when used on different computers.

The simplest solution to avoid MAC address conflicts is to provide a dedicated removable Ethernet adapter for each Surface device. This solution can make sense in many scenarios where the Ethernet adapter or the extra functionality of the docking station will be used regularly. However, not all scenarios call for the extra connectivity of a docking station or support for wired networks.

Another potential solution to avoid conflict when adapters are shared is to use the [Microsoft Deployment Toolkit \(MDT\)](#) to perform deployment to Surface devices. MDT doesn't use the MAC address to identify individual computers and thus isn't subject to this limitation. However, MDT does use Windows Deployment Services to provide PXE boot functionality, and is subject to the limitations regarding prestaged clients, as described later in this section.

When you use a shared adapter for deployment, the solution for affected deployment technologies is to use another means to identify unique systems. For Configuration Manager and WDS, the solution is to use the System Universal Unique Identifier (System UUID) embedded in the computer firmware by the computer manufacturer. For Surface devices, you can see this entry in the computer firmware under **Device Information**.

To access the firmware of a Surface device:

1. Ensure the Surface device is powered off.
2. Press and hold the **Volume Up** button.
3. Press and release the **Power** button.
4. After the machine begins to boot, release the **Volume Up** button.

When deploying with WDS, the MAC address is only used to identify a computer when the deployment server is configured to respond only to known, prestaged clients. When prestaging a client, an administrator creates a computer account in Active Directory and defines that computer by the MAC address or the System UUID. To avoid the identity conflicts caused by shared Ethernet adapters, you should use [System UUID to define prestaged clients](#).

Alternatively, you can configure WDS to respond to unknown clients that don't require definition by either MAC address or System UUID. Select the **Respond to all client**

computers (known and unknown) option on the [PXE Response tab](#) in Windows Deployment Server Properties.

The potential for conflicts with shared Ethernet adapters is higher with Configuration Manager. Where WDS only uses MAC addresses to define individual systems, Configuration Manager uses the MAC address to define separate systems whenever deploying to new or unknown computers. This can result in improperly configured devices or even the inability to deploy more than one system with a shared Ethernet adapter. Several potential solutions for this situation are described in detail in [How to Use The Same External Ethernet Adapter For Multiple SCCM OSD](#).

Surface System SKU reference

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

This document provides a reference that can be used for various IT tasks such as executing commands or installing drivers based on device model/SKU names. System Model and System SKU are variables stored in System Management BIOS (SMBIOS) tables in the UEFI layer of Surface devices. Use the System SKU name whenever you need to differentiate between devices with the same System Model name, such as Surface Pro and Surface Pro with LTE Advanced. SKUs listed in the following table refer to commercial devices unless labeled as Consumer.

Device	System Model	System SKU
Surface 3 Wi-Fi	Surface 3	Surface_3
Surface 3 LTE AT&T	Surface 3	Surface_3_US1
Surface 3 LTE Verizon	Surface 3	Surface_3_US2
Surface 3 LTE North America	Surface 3	Surface_3_NAG
Surface 3 LTE outside of North America and Y!mobile in Japan	Surface 3	Surface_3_ROW
Surface Book 2 13"	Surface Book 2	Surface_Book_1832
Surface Book 2 15"	Surface Book 2	Surface_Book_1793
Surface Book 3 13"	Surface Book 3	Surface_Book_3_1900
Surface Book 3 15"	Surface Book 3	Surface_Book_3_1899
Surface Go Commercial	Surface Go	Surface_Go_1824_Commercial
Surface Go Consumer	Surface Go	Surface_Go_1824_Consumer
Surface Go LTE Commercial	Surface Go	Surface_Go_1825_Commercial
Surface Go 2 Commercial	Surface Go 2	Surface_Go_2_1926

Device	System Model	System SKU
Surface Go 2 Consumer	Surface Go 2	Surface_Go_2_1901
Surface Go 2 LTE	Surface Go 2	Surface_Go_2_1927
Surface Go 3 Commercial	Surface Go 3	Surface_Go_3_1926
Surface Go 3 Consumer	Surface Go 3	Surface_Go_3_1901
Surface Go 3 LTE	Surface Go 3	Surface_Go_3_2022
Surface Hub 2S 50"	Surface Hub 2S	Surface_Hub_2S
Surface Hub 2S 85"	Surface Hub 2S	Surface_Hub_2S_85
Surface Laptop	Surface Laptop	Surface_Laptop
Surface Laptop 2 Commercial	Surface Laptop 2	Surface_Laptop_2_1769_Commercial
Surface Laptop 2 Consumer	Surface Laptop 2	Surface_Laptop_2_1769_Consumer
Surface Laptop 3 13" Intel	Surface Laptop 3	Surface_Laptop_3_1867:1868
Surface Laptop 3 15" AMD	Surface Laptop 3	Surface_Laptop_3_1873
Surface Laptop 3 15" Intel	Surface Laptop 3	Surface_Laptop_3_1872
Surface Laptop 4 13" AMD	Surface Laptop 4	Surface_Laptop_4_1958:1959
Surface Laptop 4 13" Intel	Surface Laptop 4	Surface_Laptop_4_1950:1951
Surface Laptop 4 15" AMD	Surface Laptop 4	Surface_Laptop_4_1952:1953

Device	System Model	System SKU
Surface Laptop 4 15" Intel	Surface Laptop 4	Surface_Laptop_4_1978:1979
Surface Laptop 5 13" Consumer	Surface Laptop 5	Surface_Laptop_5_1950:1951
Surface Laptop 5 13" Commercial	Surface Laptop 5	Surface_Laptop_5_for_Business_1950:1951
Surface Laptop 5 15" Consumer	Surface Laptop 5	Surface_Laptop_5_1979
Surface Laptop 5 15" Commercial	Surface Laptop 5	Surface_Laptop_5_for_Business_1979
Surface Laptop Go	Surface Laptop Go	Surface_Laptop_Go_1943
Surface Laptop Go 2	Surface Laptop Go 2	Surface_Laptop_Go_2_2013
Surface Laptop SE	Surface Laptop SE	Surface Laptop SE
Surface Laptop Studio	Surface Laptop Studio	Surface_Laptop_Studio_1964
Surface Pro (5th Gen)	Surface Pro	Surface_Pro_1796
Surface Pro with LTE Advanced (5th Gen)	Surface Pro	Surface_Pro_1807
Surface Pro 6 Commercial	Surface Pro 6	Surface_Pro_6_1796_Commercial
Surface Pro 6 Consumer	Surface Pro 6	Surface_Pro_6_1796_Consumer
Surface Pro 7	Surface Pro 7	Surface_Pro_7_1866
Surface Pro 7+	Surface Pro 7+	Surface_Pro_7+_1960
Surface Pro 7+ LTE	Surface Pro 7+	Surface_Pro_7+_with_LTE_Advanced_1961

Device	System Model	System SKU
Surface Pro 8	Surface Pro 8	Surface_Pro_8_for_Business_1983
Surface Pro 8 Consumer	Surface Pro 8	Surface_Pro_8_1983
Surface Pro 8 LTE	Surface Pro 8	Surface_Pro_8_for_Business_with_LTE_Advanced_1982
Surface Pro 9 Consumer	Surface Pro 9	Surface_Pro_9_2038
Surface Pro 9 Commercial	Surface Pro 9	Surface_Pro_9_for_Business_2038
Surface Pro 9 with 5G (U.S.)	Surface Pro 9	Surface_Pro_9_With_5G_1997
Surface Pro 9 with 5G (outside of U.S.)	Surface Pro 9	Surface_Pro_9_With_5G_1996
Surface Pro X with SQ1 processor	Surface Pro X	Surface_Pro_X_1876
Surface Pro X with SQ2 processor	Surface Pro X	Surface_Pro_X_H_1876
Surface Pro X (Wi-Fi)	Surface Pro X	Surface_Pro_X_2010
Surface Studio	Surface Studio	Surface_Studio
Surface Studio 2	Surface Studio 2	Surface_Studio_2_1707_Commercial
Surface Studio 2+	Surface Studio 2+	Surface_Studio_2+_2028

Examples

Retrieving the SKU by using PowerShell

Use the following PowerShell command to pull the System SKU information:

```
PowerShell
```

```
(Get-CimInstance -Namespace root\wmi -ClassName MS_SystemInformation).SystemSKU
```

Retrieving the SKU by using System Information

You can also find the System SKU and System Model for a device in **System Information**. To do this, follow these steps:

1. Select **Start**, and then type **MSInfo32** in the search box.
2. Select **System Information**.

Using the SKU in a task sequence WMI condition

You can use the System SKU information in the Microsoft Deployment Toolkit (MDT) or Microsoft Endpoint Configuration Manager as part of a task sequence WMI condition.

PowerShell

```
- WMI Namespace - Root\WMI  
- WQL Query - SELECT * FROM MS_SystemInformation WHERE SystemSKU =  
"Surface_Pro_1796"
```

Learn more

- [WMI reference](#)
- [Surface Registration Support for Windows Autopilot](#)

Surface Management Portal overview

Article • 05/05/2023 • Applies to: Windows 10, Windows 11

Built into Microsoft Intune admin center, the Surface Management Portal provides a centralized solution to self-serve, manage and monitor Surface devices at scale.

Introduction

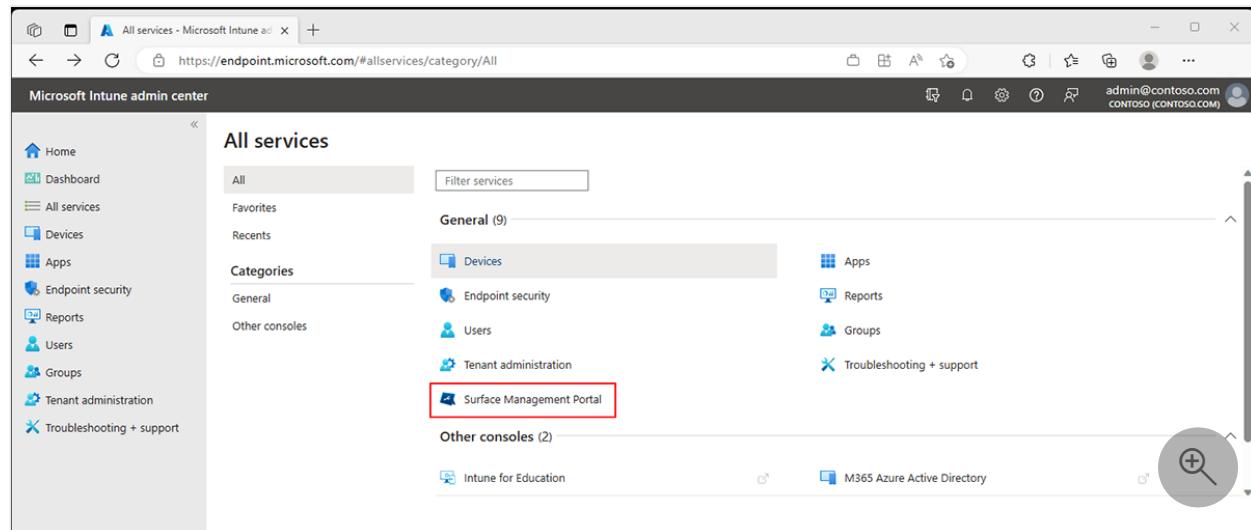
As a single environment for the end-to-end visibility of corporate or user-owned Surface devices, the Surface Management Portal lets you quickly see any issues that need prompt attention before they hit your help desk.

Get insights into device compliance, support activity, and warranty coverage. Quickly see the status of each device, which ones are still in warranty or expiring soon, and the status of active support requests with your hardware providers.

When your Surface devices are enrolled for cloud management and users log in for the first time, information from these Surface devices automatically flows into the Surface Management Portal, giving you a single pane of glass for Surface-specific device admin activities.

Get started

Sign in to [Microsoft Intune admin center](#), select All services > Surface Management Portal.



Azure AD roles for Surface Management Portal

Role	Permissions
Microsoft Hardware Warranty Administrator ¹	View all service requests Create/manage device replacement requests Add/edit/delete ship-to address(es) Read-only access to the M365 tenant outside of the Hardware Support Portal
Microsoft Hardware Warranty Specialist ¹	View own service requests Create/manage device replacement requests Read-only access to the M365 tenant outside of the Hardware Support Portal
Global Admin	View service requests Create/manage device replacement requests Add/edit/delete ship-to address(es) Create/manage users and their roles
Service Support Admin	View service requests Create/manage device replacement requests
Billing Admin	View service requests Create/manage device replacement requests Add/edit/delete ship-to address(es)

1. Requires **Read Only Operator** role for access.

Monitor Surface devices

Select **Monitor** to display insights for all your Surface devices, including:

- Devices out of compliance, which could mean users can't access information requiring Azure AD login.
- Devices that aren't registered.
- Devices with critically low storage available on disk, a leading indicator of potential user experience issues.
- Devices requiring updates.
- Devices without drive encryption enabled.
- Devices that are currently inactive.

Select **View report** to see details on each insights category, giving you diagnostic information that you can customize and export.

The screenshot shows the Microsoft Intune admin center interface. At the top, it says "Microsoft Intune admin center" and "admin@contoso.com CONTOSO (CONTOSO.COM)". Below that, there's a breadcrumb navigation "All services > Surface Management Portal". On the left, there's a sidebar with various icons for Home, Devices, Reports, and Support. The main content area has tabs for "Monitor", "Warranty and coverage", "Support", and "Repair". Under "Monitor", there's a section titled "Device information" with a bar chart showing the count of devices by type: Surface Laptop 4 (6), Surface Hub 2S (2), Surface Duo 2 (3), Other (36), and Surface Duo (2). It also shows a total of 137 devices. A "View report" button is highlighted with a red box. To the right, there's an "Insights" section for "Warranty and coverage" with the following data: 41 devices expired (red icon), 5 devices covered (green checkmark icon), 1 device expiring within 60 days (yellow warning icon), and 0 devices eligible for optional coverage (blue info icon). A "View report" button is also present here, also highlighted with a red box. A magnifying glass icon is at the bottom right.

💡 Tip

The portal shows device information for your top four registered devices with all others listed under **Other**. Select **View report** to see all your devices.

Device warranty and coverage

If you manage hundreds or thousands of devices, having direct access to the warranty status of each device is especially useful, letting you quickly see the following information:

- Devices within the warranty period
- Devices expiring
- Devices out of warranty
- Devices eligible for optional coverage

Support requests

The Surface Management Portal gives complete visibility into support activity along with the status of each request.

The screenshot shows the Microsoft Intune admin center's Surface Management Portal. The left sidebar lists various services: Home, Dashboard, All services, Devices, Apps, Endpoint security, Reports, Users, Groups, Tenant administration, and Troubleshooting + support. The main content area is titled "Surface Management Portal" and has tabs for Monitor, Warranty and coverage, Support (which is selected), and Repair. Under "Support activity", it shows 0 Open requests and 17 Closed requests. Below this are sections for "Recently created support requests" (listing items like 2210190010000872, 2206280010000186, etc.) and "Resources" (links to Microsoft Surface for IT Professionals, Download Surface service guides, Before you contact support, Surface for business online service center, and Surface Device Self-Serve Warranty and Service). A large circular button with a magnifying glass icon is in the bottom right.

Create Support Requests

Newly added to the portal is the ability to create and submit new requests for one device or many.

1. Select **Create support request**.
2. Select the Product (Device) from the drop-down list.
3. Based on the Product selected, pick the device model.
4. Select the device or devices based on the serial number (SN).
5. Provide details and supporting information about the issue.
6. Provide your contact information and a contact preference.
7. Review and submit the request.

Create support request

 Devices  Issue description  Contact details  Review and submit

Devices

Device name	Serial number	Device model
JORDAN	0F00XV721	Surface Pro 8
STEVEN	0F00NNY21	Surface Pro 8

Issue description

Category	Surface Pro
Description	Display and Screen

Primary contact details

Preferred contact method: Email

💡 Tip

Track request status using the current insights and detailed views.

Try for free

Surface Management Portal is available to customers who use Microsoft Intune admin center and have enrolled Surface devices through Intune. If you're new to Intune, set up your Intune tenant today by visiting [Quickstart: Try Microsoft Intune for free](#).

Learn more

- [What is Microsoft Surface Management Portal?](#)
- [Microsoft Mechanics ↗](#)
- [Surface IT Pro Blog post: Surface Management Portal ↗](#)

What is Microsoft Surface Management Portal?

Article • 03/02/2023

Microsoft Surface Management Portal is a centralized place in the Microsoft Intune admin center where you can self-serve, manage, and monitor your organization's Intune-managed Surface devices at scale.

Surface Management Portal offers insights about the enrolled Surface devices in your organization, such as warranty eligibility and open support requests. Use it to:

- See all enrolled Surface devices in your organization.
- Drill down into reports, support requests, and individual devices.
- View warranty data and expiration dates.
- Track warranty and support requests.
- Access Microsoft Surface news and resources.

This article describes the main features of Microsoft Surface Management Portal. To access Surface Management Portal, sign in to the [admin center](#) and go to **All services > Surface Management Portal**.

Monitor

For an overview of Surface devices, support requests, and warranty coverage in your organization, select **Monitor**. You can drill down into any of the information, including:

- **Count:** See the number of enrolled Surface devices by model. Select **View report** for a list of all enrolled devices.
- **Insights:** Get notifications about the state of Surface devices regarding things such as compliance, hardware, and device activity. Select an insight to view all affected Surface devices.
- **Last updated support requests:** Track the status of recently updated support requests. Select a request ID to see details such as who filed the request, when it was created, and what device it pertains to. Select **View all support requests** for a list of all active requests.
- **Warranty and coverage:** Review notifications about the status of your Surface warranties, such as number of expired warranties, and devices eligible for warranty coverage. Select an insight to view all affected Surface devices. Select **View report** to see the coverage status for all Surface devices.
- **News:** Check out the Microsoft Surface IT blog for Microsoft Surface news.

Warranty and coverage

Warranty information is available for devices enrolled in Microsoft Intune. Select **Warranty and coverage** to manage all of the warranty data that's associated with your Surface devices. You can use the information in this tab to plan for new devices and support requests.

The **coverage status** tracks the expiration and coverage of Surface warranties. Select any status to view and drill down into affected devices. Statuses shown include:

- **Expired:** Number of devices with expired warranties.
- **Covered:** Number of devices still covered under warranty.
- **Expiring:** Number of devices approaching the warranty expiration date.
- **Eligible:** Number of devices eligible for optional coverage.

Links to other resources are provided under **Warranty and coverage resources** and **Customer service and support resources**.

Support

Select **Support** to access and monitor all Surface support requests. This area is for self-service and troubleshooting, and tracks support activity, including:

- Open requests
- Closed requests
- Last updated support requests

If a Surface device isn't working properly, the Microsoft Surface Diagnostic Toolkit (SDT) for Business can help you find and solve problems. Select **Troubleshoot with SDT** to learn how to install and use SDT to target problems on Surface devices. More support channels are listed under **Resources**.

Next steps

- Harness the power of Surface, Windows, and Office connected together through the cloud. To learn how to plan, deploy, and manage Microsoft Surface and Surface Hub devices, see [Microsoft Surface for IT professionals](#).
- To get set up in Microsoft Intune quickly, step through the Intune guided scenarios. If you're new to Intune, set up your Intune tenant by following the [free trial quickstart](#).

Windows Autopilot and Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Windows Autopilot is a cloud-based deployment technology in Windows 10 and Windows 11. You can use Windows Autopilot to remotely deploy and configure devices in a zero-touch process right out of the box.

Traditionally, IT pros spend a lot of time building and customizing images that will later be deployed to devices that already come with a perfectly good OS already installed on them. Windows Autopilot introduces a new zero-touch deployment approach using a collection of technologies to set up and configure Windows devices. This enables an IT department to configure/customize images with little to no infrastructure to manage and a process that is easy and simple. From the user's perspective, it only takes a few simple steps to get Surface to a productive state. In fact, the only interaction required from the end user is to connect to a network and to verify their credentials. Everything after that is fully automated.

Windows Autopilot allows you to:

- Automatically join devices to Azure Active Directory (Azure AD).
- Auto-enroll devices into MDM services, such as Microsoft Intune (requires an Azure AD Premium subscription).
- Restrict the Administrator account creation. Autopilot is the only way to have the first person who logs into Windows enter as a standard user.
- Create and auto-assign devices to configuration groups based on device profiles.
- Customize OOB (Out of Box Experience) content and branding to meet organizational requirements.
- Enable full device configuration with Intune.
- Reset or restart devices remotely.

How it works

Windows Autopilot-registered devices are identified over the Internet at first startup through a unique device signature that's called a *hardware hash*. They're automatically enrolled and configured by using modern management solutions such as Azure Active Directory (Azure AD) and mobile device management.

You can register Surface devices at the time of purchase from a Surface partner that's enabled for Windows Autopilot. These partners can ship new devices directly to your users. The devices will be automatically enrolled and configured when they are first

turned on. This process eliminates reimaging during deployment, which lets you implement new, agile methods of device management and distribution.

Modern management

Autopilot is the recommended deployment option for Surface devices, including Surface Pro 9, Surface Pro 9 with 5G, Surface Studio 2+, Surface Pro 8, Surface Laptop Studio, Surface Go 3, Surface Pro 7+, Surface Laptop 5, Surface Laptop 4, and Surface Pro X.

It's best to enroll your Surface devices with the help of a Microsoft Cloud Solution Provider. This step allows you to manage UEFI firmware settings on Surface directly from Intune. It eliminates the need to physically touch devices for certificate management. See [Intune management of Surface UEFI settings](#) for details.

Windows version considerations

Broad deployment of Surface devices through Windows Autopilot, including enrollment by Surface partners at the time of purchase, requires Windows 10 Version 1709 (Fall Creators Update) or later.

These Windows versions support a 4,000-byte (4k) hash value that uniquely identifies devices for Windows Autopilot, which is necessary for deployments at scale.

Exchange experience on Surface devices in need of repair or replacement

Microsoft automatically checks every Surface for Autopilot enrollment and will deregister the device from the customer's tenant. Microsoft ensures the replacement device is enrolled into Windows Autopilot once a replacement is shipped back to the customer. This service is available on all device exchange service orders directly with Microsoft.

Note

When customers use a Partner to return devices, the Partner is responsible for managing the exchange process including deregistering and enrolling devices into Windows Autopilot.

Microsoft Support registration

Customers and Microsoft Cloud Solution Providers (CSPs) have the option of registering Surface devices by submitting requests to Microsoft Support. To learn more, see [Surface Registration Support for Windows Autopilot](#).

Surface partners enabled for Windows Autopilot

Select Surface partners can enroll Surface devices in Windows Autopilot for you at the time of purchase. They can also ship enrolled devices directly to your users. The devices can be configured entirely through a zero-touch process by using Windows Autopilot, Azure AD, and mobile device management.

Surface partners that are enabled for Windows Autopilot include:

US partners	Global partners	US distributors
CDW	ALSO	Synnex
Connection	ATEA	Techdata
Insight	Bechtle	Ingram
SHI	Cancom	
LDI Connect	Computacenter	
F1		
Protected Trust		

Learn more

For more information about Windows Autopilot, see:

- [Overview of Windows Autopilot](#)
- [Windows Autopilot requirements](#)
- [Surface Registration Support for Windows Autopilot](#)

Surface Registration Support for Windows Autopilot

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

A simplified process of registering Surface devices for Windows Autopilot deployment is now available from Microsoft Support. Customers and Microsoft Cloud Solution Providers (CSPs) can register Surface devices by submitting requests to Microsoft Support. This page outlines the requirements for the following supported Autopilot registration scenarios:

- **Surface Device Autopilot Registration.** Submits request to register Surface devices into Windows Autopilot.
- **Surface Device Hardware Hash Request.** Submits request to Microsoft Support to provide you with hardware hashes that customers or CSPs can use to self-register devices via Microsoft Intune or the Microsoft Partner Center.
- **Surface Device Autopilot Deregistration.** Submits request to delete devices from Windows Autopilot, typically used in device end of life scenarios.

See the following table for details of the information you will need to collect prior to submitting registration requests to Microsoft Support. For the official System Model names of all Surface devices, refer to [Surface System SKU reference](#).

Table 1. Required information for Autopilot registration requests

Required information	Description	Autopilot Registration	Hardware Hash	Autopilot Deregistration Request
Azure Active Directory Tenant ID	Your Azure Active Directory tenant ID is a globally unique identifier (GUID) that is different than your organization name or domain. To find your Tenant ID sign into the Azure Portal here .	Y	N	Y
Azure Active Directory Domain Name	Your top-level domain name; for example, contoso.com.	Y	N	Y

Required information	Description	Autopilot Registration	Hardware Hash	Autopilot Deregistration Request
Proof of ownership	<p>Verify proof of ownership by uploading the original bill of sale or invoice in PDF format.</p> <p>Screenshots are not accepted.</p> <p>The bill of sale or invoice must include the following:</p> <ul style="list-style-type: none"> Device serial numbers. Company name. 	Y	Y	Y
Device serial numbers	<p>Upload Excel file in CSV format with each device serial number in a new line.</p>	Y	Y	Y

Submit support requests

[Get Autopilot Registration Support for Surface](#)



Learn more

- [Windows Autopilot and Surface devices](#)
- [Enroll Windows devices in Intune by using Windows Autopilot](#)
- [Overview of Windows Autopilot](#)
- [Surface System SKU reference](#)

Surface Autopilot Cookbook for Cloud Solution Providers

Article • 03/20/2023

With Windows Autopilot, customers can quickly deploy and manage Surface devices without having to manually configure them or maintain their own infrastructure. When users first receive a Surface device, they must connect to a network and verify their credentials. Everything after that is fully automated.

This [downloadable step-by-step walkthrough](#) is primarily intended for [Cloud Solution Providers \(CSPs\)](#) with access to the [Microsoft Partner Center](#).

Contents

Introduction

- CSP Microsoft Partner Center requirements
- Network connectivity requirements

Register Surface devices to Autopilot

- CSP partner submits Autopilot registration to Microsoft Support
- CSP partner registers Autopilot devices via Microsoft Partner Center
- Customer self-registers Autopilot devices via Intune

Prepare Surface devices for Autopilot

- Reset current in-market devices to OOBE
- Reset earlier Surface devices to OOBE

Prepare Azure demo tenant

- Create demo tenant from CDX
- Select demo user

AAD and Intune setup

- Configure automatic MDM enrollment

- Configure company branding
- Create Azure AD Group for all new Autopilot devices
- Configure Autopilot deployment profile

Intune device configuration

- Device profiles
- Enable the enrollment status page
- Deploy software – Microsoft 365 Apps
- Windows edition upgrade

DFCI - Intune management of Surface UEFI settings

- Configure Device Firmware Configuration Interface (DFCI) management for Surface devices

Remove devices from Windows Autopilot Enrollment

- Check device registration status in Intune
- Assign device to a user

Reset devices and deregister from Autopilot

- Reset the device to OOB
- Deregister the device from Windows Autopilot

Return and exchange scenarios

- Prepare devices for repair
- Remove devices from Autopilot and Device Firmware Configuration Interface (DFCI)
- Reset UEFI to enable boot from USB to reimage
- Enroll device into Autopilot and DFCI to restore previous state

Appendix

- Generate hardware hash with PowerShell script
- Create and manage Autopilot profiles in the Microsoft Partner Center
- Configure settings as a partner on behalf of your customer from the Microsoft Partner Center

- Apply an Autopilot profile to devices in the Microsoft Partner Center
- Manage devices not supported for OEM enrollment
- Order Specific OS Versions for Windows Autopilot customers

Learn more

- [Windows Autopilot and Surface devices](#)
- [Surface Registration Support for Windows Autopilot](#)
- [Enroll Windows devices in Intune by using Windows Autopilot](#)
- [Overview of Windows Autopilot](#)
- [Surface System SKU reference](#)

Surface System SKU reference

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

This document provides a reference that can be used for various IT tasks such as executing commands or installing drivers based on device model/SKU names. System Model and System SKU are variables stored in System Management BIOS (SMBIOS) tables in the UEFI layer of Surface devices. Use the System SKU name whenever you need to differentiate between devices with the same System Model name, such as Surface Pro and Surface Pro with LTE Advanced. SKUs listed in the following table refer to commercial devices unless labeled as Consumer.

Device	System Model	System SKU
Surface 3 Wi-Fi	Surface 3	Surface_3
Surface 3 LTE AT&T	Surface 3	Surface_3_US1
Surface 3 LTE Verizon	Surface 3	Surface_3_US2
Surface 3 LTE North America	Surface 3	Surface_3_NAG
Surface 3 LTE outside of North America and Y!mobile in Japan	Surface 3	Surface_3_ROW
Surface Book 2 13"	Surface Book 2	Surface_Book_1832
Surface Book 2 15"	Surface Book 2	Surface_Book_1793
Surface Book 3 13"	Surface Book 3	Surface_Book_3_1900
Surface Book 3 15"	Surface Book 3	Surface_Book_3_1899
Surface Go Commercial	Surface Go	Surface_Go_1824_Commercial
Surface Go Consumer	Surface Go	Surface_Go_1824_Consumer
Surface Go LTE Commercial	Surface Go	Surface_Go_1825_Commercial
Surface Go 2 Commercial	Surface Go 2	Surface_Go_2_1926

Device	System Model	System SKU
Surface Go 2 Consumer	Surface Go 2	Surface_Go_2_1901
Surface Go 2 LTE	Surface Go 2	Surface_Go_2_1927
Surface Go 3 Commercial	Surface Go 3	Surface_Go_3_1926
Surface Go 3 Consumer	Surface Go 3	Surface_Go_3_1901
Surface Go 3 LTE	Surface Go 3	Surface_Go_3_2022
Surface Hub 2S 50"	Surface Hub 2S	Surface_Hub_2S
Surface Hub 2S 85"	Surface Hub 2S	Surface_Hub_2S_85
Surface Laptop	Surface Laptop	Surface_Laptop
Surface Laptop 2 Commercial	Surface Laptop 2	Surface_Laptop_2_1769_Commercial
Surface Laptop 2 Consumer	Surface Laptop 2	Surface_Laptop_2_1769_Consumer
Surface Laptop 3 13" Intel	Surface Laptop 3	Surface_Laptop_3_1867:1868
Surface Laptop 3 15" AMD	Surface Laptop 3	Surface_Laptop_3_1873
Surface Laptop 3 15" Intel	Surface Laptop 3	Surface_Laptop_3_1872
Surface Laptop 4 13" AMD	Surface Laptop 4	Surface_Laptop_4_1958:1959
Surface Laptop 4 13" Intel	Surface Laptop 4	Surface_Laptop_4_1950:1951
Surface Laptop 4 15" AMD	Surface Laptop 4	Surface_Laptop_4_1952:1953

Device	System Model	System SKU
Surface Laptop 4 15" Intel	Surface Laptop 4	Surface_Laptop_4_1978:1979
Surface Laptop 5 13" Consumer	Surface Laptop 5	Surface_Laptop_5_1950:1951
Surface Laptop 5 13" Commercial	Surface Laptop 5	Surface_Laptop_5_for_Business_1950:1951
Surface Laptop 5 15" Consumer	Surface Laptop 5	Surface_Laptop_5_1979
Surface Laptop 5 15" Commercial	Surface Laptop 5	Surface_Laptop_5_for_Business_1979
Surface Laptop Go	Surface Laptop Go	Surface_Laptop_Go_1943
Surface Laptop Go 2	Surface Laptop Go 2	Surface_Laptop_Go_2_2013
Surface Laptop SE	Surface Laptop SE	Surface Laptop SE
Surface Laptop Studio	Surface Laptop Studio	Surface_Laptop_Studio_1964
Surface Pro (5th Gen)	Surface Pro	Surface_Pro_1796
Surface Pro with LTE Advanced (5th Gen)	Surface Pro	Surface_Pro_1807
Surface Pro 6 Commercial	Surface Pro 6	Surface_Pro_6_1796_Commercial
Surface Pro 6 Consumer	Surface Pro 6	Surface_Pro_6_1796_Consumer
Surface Pro 7	Surface Pro 7	Surface_Pro_7_1866
Surface Pro 7+	Surface Pro 7+	Surface_Pro_7+_1960
Surface Pro 7+ LTE	Surface Pro 7+	Surface_Pro_7+_with_LTE_Advanced_1961

Device	System Model	System SKU
Surface Pro 8	Surface Pro 8	Surface_Pro_8_for_Business_1983
Surface Pro 8 Consumer	Surface Pro 8	Surface_Pro_8_1983
Surface Pro 8 LTE	Surface Pro 8	Surface_Pro_8_for_Business_with_LTE_Advanced_1982
Surface Pro 9 Consumer	Surface Pro 9	Surface_Pro_9_2038
Surface Pro 9 Commercial	Surface Pro 9	Surface_Pro_9_for_Business_2038
Surface Pro 9 with 5G (U.S.)	Surface Pro 9	Surface_Pro_9_With_5G_1997
Surface Pro 9 with 5G (outside of U.S.)	Surface Pro 9	Surface_Pro_9_With_5G_1996
Surface Pro X with SQ1 processor	Surface Pro X	Surface_Pro_X_1876
Surface Pro X with SQ2 processor	Surface Pro X	Surface_Pro_X_H_1876
Surface Pro X (Wi-Fi)	Surface Pro X	Surface_Pro_X_2010
Surface Studio	Surface Studio	Surface_Studio
Surface Studio 2	Surface Studio 2	Surface_Studio_2_1707_Commercial
Surface Studio 2+	Surface Studio 2+	Surface_Studio_2+_2028

Examples

Retrieving the SKU by using PowerShell

Use the following PowerShell command to pull the System SKU information:

```
PowerShell
```

```
(Get-CimInstance -Namespace root\wmi -ClassName MS_SystemInformation).SystemSKU
```

Retrieving the SKU by using System Information

You can also find the System SKU and System Model for a device in **System Information**. To do this, follow these steps:

1. Select **Start**, and then type **MSInfo32** in the search box.
2. Select **System Information**.

Using the SKU in a task sequence WMI condition

You can use the System SKU information in the Microsoft Deployment Toolkit (MDT) or Microsoft Endpoint Configuration Manager as part of a task sequence WMI condition.

PowerShell

```
- WMI Namespace - Root\WMI  
- WQL Query - SELECT * FROM MS_SystemInformation WHERE SystemSKU =  
"Surface_Pro_1796"
```

Learn more

- [WMI reference](#)
- [Surface Registration Support for Windows Autopilot](#)

Microsoft Surface Deployment Accelerator

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Microsoft Surface Deployment Accelerator (SDA) automates the creation and configuration of a Microsoft recommended deployment experience by using free Microsoft deployment tools.

Redesigned in April 2020 to simplify and automate deployment of Surface images in a corporate environment, the SDA tool allows you to build a “factory-like” Windows image that you can customize to your organizational requirements.

The open source, script-driven SDA tool leverages the Windows Assessment and Deployment Kit (ADK) for Windows 10, facilitating the creation of Windows images (WIM) in test or production environments. If the latest ADK is not already installed, it will be downloaded and installed when running the SDA tool.

The resulting image closely matches the configuration of Bare Metal Recovery (BMR) images, without any pre-installed applications such as Microsoft Office or the Surface UWP application.

Requirements

1. A USB thumb drive at least 16 GB in size. The USB drive will be formatted.
2. An .iso file with Windows 10/11 Pro or Windows 10/11 Enterprise. The media creation tool can be used to download Windows 10 or Windows 11 and create an .iso file. For more information, see [Download Windows 10](#).
3. A device running Windows 10, version 2004 or later with Internet access.

See the [Prerequisites](#) section of the README document for a detailed list of requirements.

How to run the SDA

To run SDA:

1. Go to [SurfaceDeploymentAccelerator](#) on GitHub.
2. Review the [README](#) documentation.

3. On the [SurfaceDeploymentAccelerator](#) page, click the **Code** button and then select **Download ZIP** to save the files locally on your computer.

4. Right-click the .zip file and then click **Properties**.

5. On the **General** tab, select the **Unblock** checkbox and then click **OK**.

6. Extract the .zip file to a location on your hard drive (ex: C:\SDA).

7. Open an elevated Windows PowerShell prompt and set ExecutionPolicy for the current session to Unrestricted.

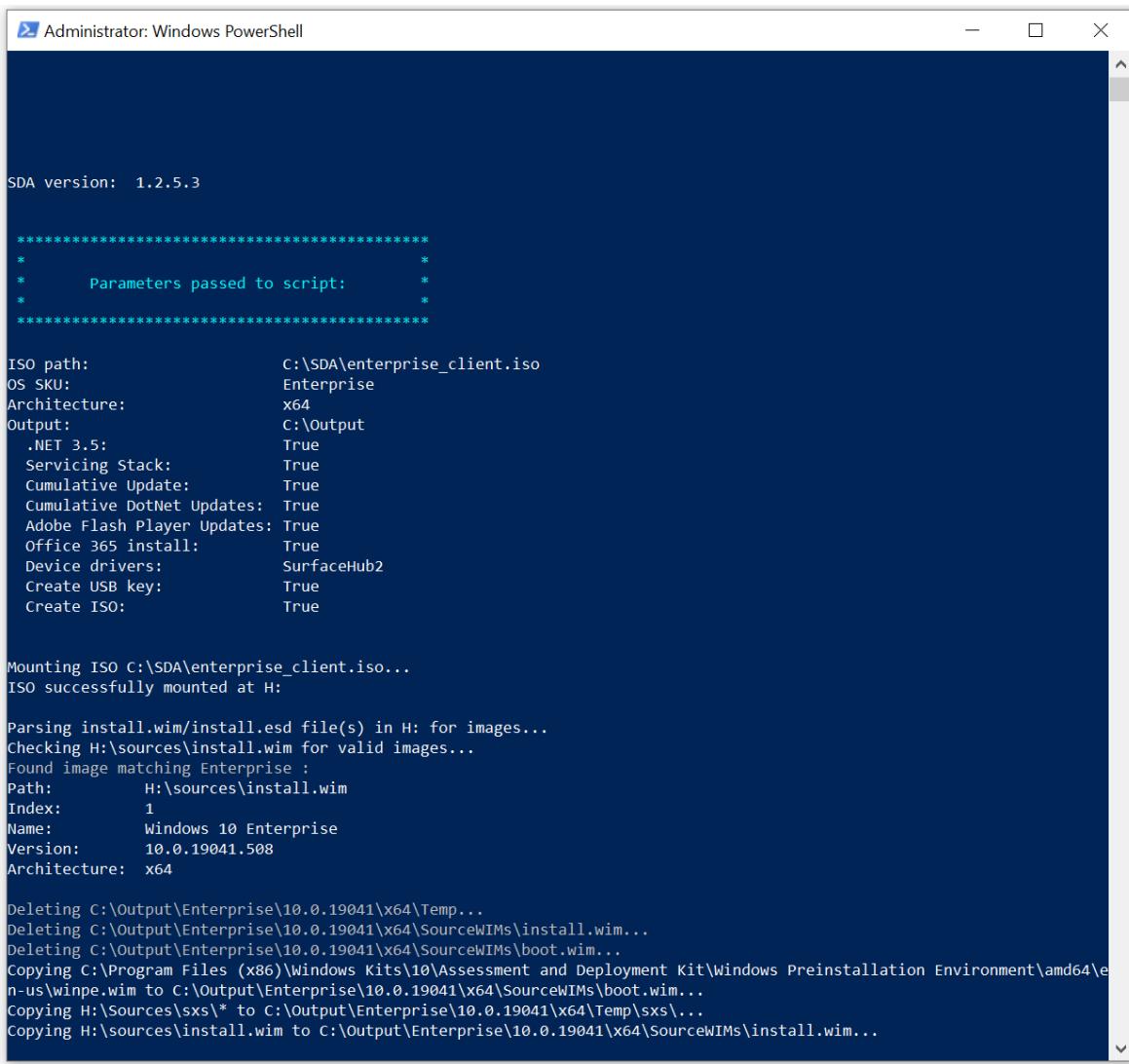
```
PowerShell  
Set-ExecutionPolicy -Scope Process -ExecutionPolicy Unrestricted -Force
```

8. Run the SDA script specifying parameters for your environment. The script can be used to create images to install Windows 10 or Windows 11 on a variety of Surface devices. For a full list of supported devices, see the [Device parameter description](#) in the SDA README article.

For example, the following command will create a bootable USB drive that can be used to [install Windows 10 on Surface Hub 2](#):

```
PowerShell  
. \CreateSurfaceWindowsImage.ps1 -ISO C:\SDA\enterprise_client.iso -  
OSSKU Enterprise -DestinationFolder C:\Output -Device SurfaceHub2 -  
CreateUSB $True
```

Sample script output is below.



```
Administrator: Windows PowerShell
SDA version: 1.2.5.3

*****
*      Parameters passed to script:
*
*****


ISO path:          C:\SDA\enterprise_client.iso
OS SKU:           Enterprise
Architecture:     x64
Output:            C:\Output
    .NET 3.5:      True
    Servicing Stack: True
    Cumulative Update: True
    Cumulative DotNet Updates: True
    Adobe Flash Player Updates: True
    Office 365 install: True
    Device drivers: SurfaceHub2
    Create USB key:  True
    Create ISO:     True

Mounting ISO C:\SDA\enterprise_client.iso...
ISO successfully mounted at H:

Parsing install.wim/install.esd file(s) in H: for images...
Checking H:\sources\install.wim for valid images...
Found image matching Enterprise :
Path:          H:\sources\install.wim
Index:         1
Name:          Windows 10 Enterprise
Version:       10.0.19041.508
Architecture:  x64

Deleting C:\Output\Enterprise\10.0.19041\x64\Temp...
Deleting C:\Output\Enterprise\10.0.19041\x64\SourceWIMs\install.wim...
Deleting C:\Output\Enterprise\10.0.19041\x64\SourceWIMs\boot.wim...
Copying C:\Program Files (x86)\Windows Kits\10\Assessment and Deployment Kit\Windows Preinstallation Environment\amd64\en-us\winpe.wim to C:\Output\Enterprise\10.0.19041\x64\SourceWIMs\boot.wim...
Copying H:\Sources\sxs\* to C:\Output\Enterprise\10.0.19041\x64\Temp\sxs\...
Copying H:\sources\install.wim to C:\Output\Enterprise\10.0.19041\x64\SourceWIMs\install.wim...
```

The script will require about 45 minutes to run, but could take longer depending on available CPU and disk resources.

After creating a Windows image, the script will ask you to insert and confirm the drive letter of your USB drive. The USB drive will then be formatted, configured as bootable, and files copied to enable installation of the custom Windows 10 or Windows 11 image for Surface devices.

9. Insert the USB drive into the device where you want to install Windows 10 or Windows 11 and reboot to begin the installation. USB boot must be enabled in BIOS, which can require that you temporarily disable Secure Boot.

Important

Booting from the USB drive will immediately begin installing the OS. Ensure that your device is ready before inserting the USB and restarting.

Related links

- Open source image deployment tool released on GitHub ↗
- Download and install the Windows ADK

Prepare Surface deployment with Microsoft Deployment Toolkit

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Applies to

- Surface Studio (all generations)
- Surface Pro 4 and later
- Surface Book (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)
- Surface Go (all generations)
- Surface 3
- Windows 10

Note

MDT is not supported on Surface Pro X. For more information, refer to [Deploying, managing, and servicing Surface Pro X](#).

For the latest information about using MDT, refer to [Deploy a Windows 10 image using MDT](#).

How to enable the Surface Laptop keyboard during MDT deployment

Article • 05/09/2023 •

Applies Surface Laptop (1st Gen), Surface Laptop 2, Surface Laptop 3, Surface Laptop 4, Surface Laptop 5, to: Surface Laptop Studio, Surface Pro 8, Surface Pro 9, Windows 10, Windows 11

This article addresses a deployment approach that uses Microsoft Deployment Toolkit (MDT). You can also apply this information to other deployment methodologies. On most types of Surface devices, the keyboard should work during Lite Touch Installation (LTI). However, Surface Laptop requires some extra drivers to enable the keyboard. For Surface Laptop (1st Gen) and Surface Laptop 2 devices, you must prepare the folder structure and selection profiles that allow you to specify keyboard drivers for use during the Windows Preinstallation Environment (Windows PE) phase of LTI. For more information about this folder structure, see [Deploy a Windows 10 image using MDT: Step 5: Prepare the drivers repository](#).

💡 Tip

When using keyboard drivers for Surface Laptop 2 and Surface Laptop 3 in the same Windows PE boot instance, you may need to manually reset the firmware if the keyboard or touchpad don't work in Windows PE:

- Press and hold the Power button for 30 seconds. If you are connected to a power supply unit (PSU), press and hold the Power button until you see the light at the end of the PSU cord briefly turn off before turning back on.

ⓘ Important

If you are deploying a Windows 10 image to a Surface Laptop that has Windows 10 in S mode preinstalled, see [KB 4032347, Problems when deploying Windows to Surface devices with preinstalled Windows 10 in S mode](#).

Add keyboard drivers to the selection profile

1. Download the latest Surface Laptop .msi file from the appropriate locations:

- [Surface Pro 9 with Intel Processor Drivers and Firmware](#)
- [Surface Pro 8 Drivers and Firmware](#)
- [Surface Laptop Studio Drivers and Firmware](#)
- [Surface Laptop 5 with Intel Processor Drivers and Firmware](#)
- [Surface Laptop 4 with Intel Processor Drivers and Firmware](#)
- [Surface Laptop 4 with AMD Processor Drivers and Firmware](#)
- [Surface Laptop 3 with Intel Processor Drivers and Firmware](#)

- [Surface Laptop 2 Drivers and Firmware ↗](#)
- [Surface Laptop \(1st Gen\) Drivers and Firmware ↗](#)

2. Extract the contents of the Surface Laptop .msi file to a folder that you can easily locate (for example, c:\surface_laptop_drivers). To extract the contents, open an elevated Command Prompt window and run the command from the following example:

```
Windows Command Prompt  
  
Msieexec.exe /a SurfaceLaptop_Win10_15063_1703008_1.msi  
targetdir=c:\surface_laptop_drivers /qn
```

3. Open the Deployment Workbench and expand the **Deployment Shares** node and your deployment share, then navigate to the **WindowsPEX64** folder.
4. Right-click the **WindowsPEX64** folder and select **Import Drivers**.
5. Follow the instructions in the Import Driver Wizard to import the driver folders into the WindowsPEX64 folder.

 **Note**

Check the downloaded .msi package to determine the format and directory structure. The directory structure will start with either SurfacePlatformInstaller (older .msi files) or SurfaceUpdate (newer .msi files) depending on when the .msi file was released.

Import drivers for Surface devices

Import the following folders as appropriate for your Surface Laptop device.

Device	Import folders	More information

Device	Import folders	More information
Surface Pro 9 with Intel processor	adlserial alderlakepchpsystem alderlakesystem gna intelprecisetouch managementengine msump64x64sta surfaceacpiplatformextension surfacebattery surfacedockintegration surfacehidmini surfacehotplug surfaceintegrationdriver surfacesarmanager surfaceserialhubdriver surfaceservicenulldriver surfacetimealarmacpifilter surfaceucmucsihidclient bttslimhostcontroller	n/a
Surface Laptop Studio	intelthcbase managementengine surfaceacpiplatformextension surfacebattery SurfaceEthernetAdapter surfacehidmini surfacehotplug surfaceintegration surfacesar surfaceserialhub surfacesmfclient surfacesmfdisplayclient surfacesptclient surfacetimealarmacpifilter surfacevirtualfunctionenum bttslimhostcontroller tglchipset tglserial	n/a

Device	Import folders	More information
Surface Pro 8	intelthcbase ManagementEngine surfaceacpiplatformextension SurfaceBattery SurfaceCoverClick SurfaceEthernetAdapter SurfaceHidMini SurfaceHotPlug surfaceintegrationdriver SurfaceSar SurfaceSerialHub surfacetimealarmacpifilter surfacytypecoverv7fprude SurfaceUcmUcsiHidClient surfacevirtualfunctionenum tbtslimhostcontroller TglChipset TglSerial	n/a
Surface Laptop 5 with Intel processor	adlserial alderlakepchpsystem gna heci intelprecisetouch msump64x64sta surfaceacpiplatformextensiondriver surfacebattery surfacebutton surfacedockintegration surfacehidminidriver surfacehotplug surfaceintegration surfaceserialhubdriver surfacetimealarmacpifilter tbtslimhostcontroller	n/a
Surface Laptop 4 with Intel processor	TglSerial IntelPreciseTouch SurfaceEthernetAdapter SurfaceBattery SurfaceHidMini SurfaceHotPlug SurfaceSerialHub SurfaceTconDriver surfacetimealarmacpifilter surfacevirtualfunctionenum TglChipset ManagementEngine	n/a

Device	Import folders	More information
Surface Laptop 4 with AMD processor	U0361415 AMDfendr AMDGPIO2 AMDI2c AMDLpcFilterDriverAMDMicroPEP AMDPsp AMDSmf AMDSpi AMDUart SurfaceEthernetAdapter SMBUS SurfaceBattery SurfaceButton SurfaceDigitizerHidSpiExtnPackage SurfaceHIDFriendlyNames SurfaceHidMini SurfaceHotPlug SurfaceOemPanel SurfacePowerMeter SurfacePowerTrackerCore SurfaceSerialHub SurfaceSMFClient SurfaceSmfDisplayClient SurfaceSystemManagementFramework SurfaceTconDriver SurfaceThermalPolicy Surfacetimealarmacpifilter SurfaceUcmUcsiHidClient	n/a
Surface Laptop 3 with Intel processor	SurfaceUpdate\SerialIOGPIO SurfaceUpdate\SerialIOI2C SurfaceUpdate\SerialIOSPI SurfaceUpdate\SerialIOUART SurfaceUpdate\SurfaceHidMini SurfaceUpdate\SurfaceSerialHub SurfaceUpdate\SurfaceHotPlug SurfaceUpdate\Itouch	Importing the following folders will enable full keyboard, trackpad, and touch functionality in PE: SerialIOGPIO SerialIOI2C SerialIOSPI SerialIOUART itouch Chipset ChipsetLPSS ChipsetNorthpeak ManagementEngine SurfaceAcpiNotify SurfaceBattery SurfaceDockIntegration SurfaceHidMini SurfaceHotPlug SurfaceIntegration SurfaceSerialHub SurfaceService SurfaceStorageFwUpdat

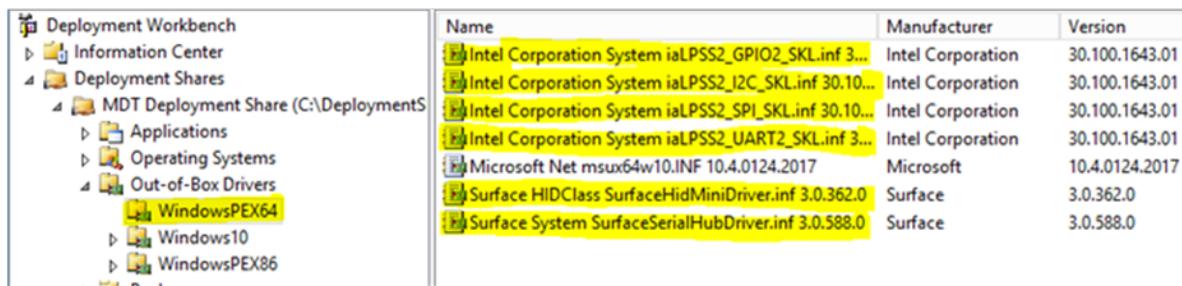
Device	Import folders	More information
Surface Laptop 2	SurfacePlatformInstaller\Drivers\System\GPIO SurfacePlatformInstaller\Drivers\System\SurfaceHIDMiniDriver SurfacePlatformInstaller\Drivers\System\SurfaceSerialHubDriver SurfacePlatformInstaller\Drivers\System\I2C SurfacePlatformInstaller\Drivers\System\SPI SurfacePlatformInstaller\Drivers\System\UART SurfacePlatformInstaller\Drivers\System\PreciseTouch	For newer .msi files beginning with "SurfaceUpdate", use: SurfaceUpdate\SerialGPIO SurfaceUpdate\serialioi2c SurfaceUpdate\SerialOSPI SurfaceUpdate\SerialUART SurfaceUpdate\SurfaceHidMini SurfaceUpdate\SurfaceSerialHub SurfaceUpdate\ltouch
Surface Laptop (1st Gen)	SurfacePlatformInstaller\Drivers\System\GPIO SurfacePlatformInstaller\Drivers\System\SurfaceHidMiniDriver SurfacePlatformInstaller\Drivers\System\SurfaceSerialHubDriver SurfacePlatformInstaller\Drivers\System\PreciseTouch	For newer .msi files beginning with "SurfaceUpdate", use: SurfaceUpdate\SerialGPIO SurfaceUpdate\SurfaceHidMiniDriver SurfaceUpdate\SurfaceSerialHubDriver SurfaceUpdate\ltouch

Tip

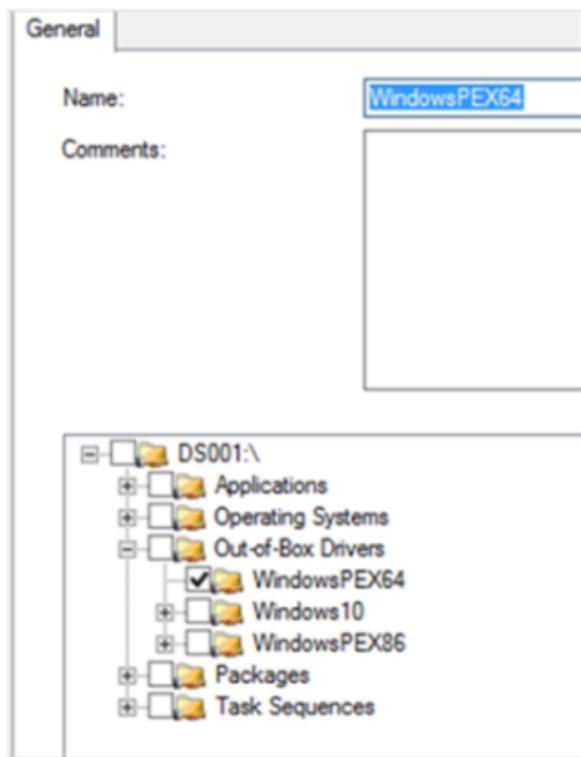
Check the downloaded .msi package to determine the format and directory structure. The directory structure will start with either SurfacePlatformInstaller (older .msi files) or SurfaceUpdate (Newer .msi files) depending on when the .msi was released.

Verify imported drivers & configure Windows PE properties

1. Verify that the WindowsPEX64 folder now contains the imported drivers, as shown in the following figure:

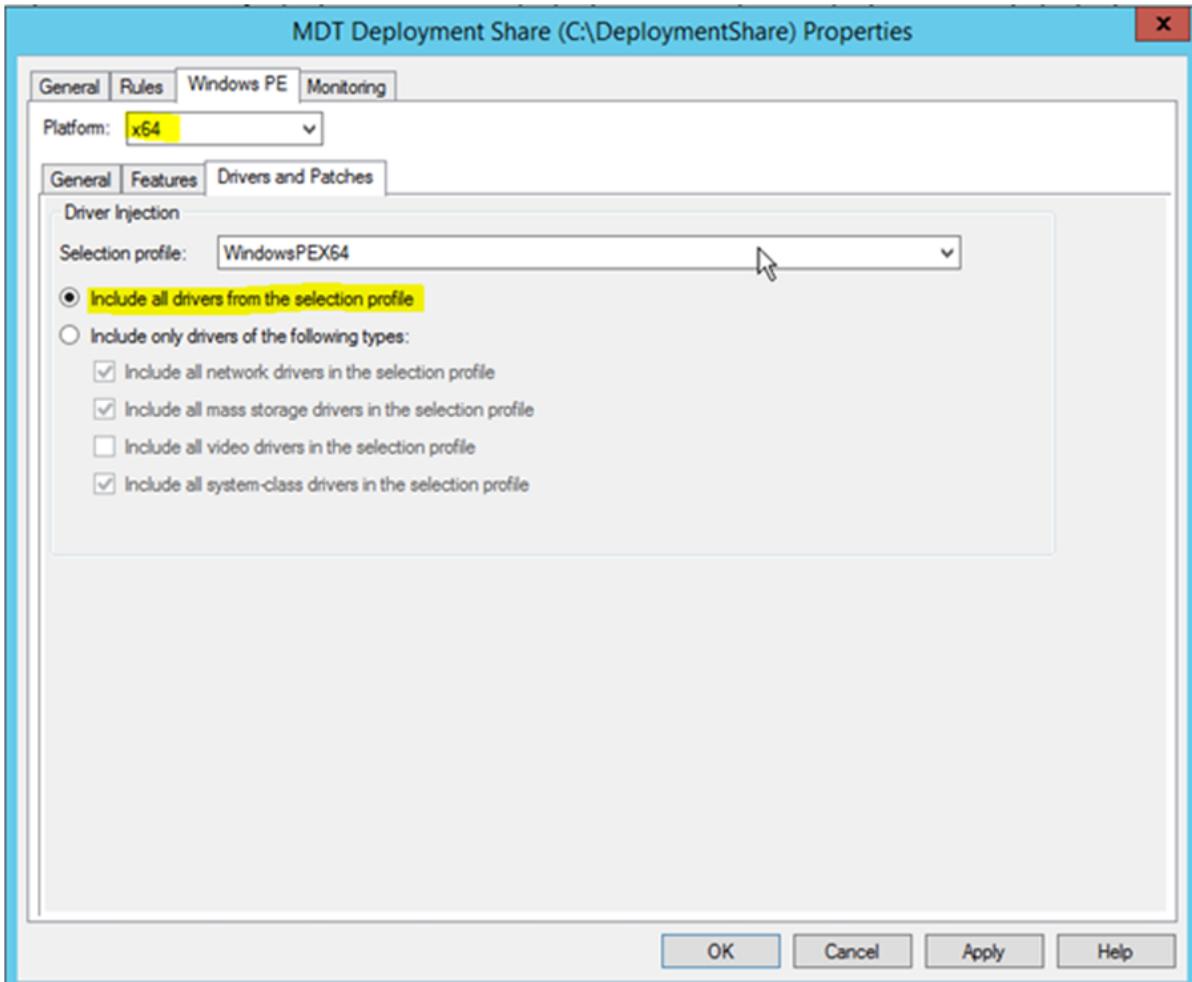


2. Configure a selection profile that uses the WindowsPEX64 folder, as shown in the following figure:



3. Configure the Windows PE properties of the MDT deployment share to use the new selection profile, as follows:

- For Platform, select x64.
- For Selection profile, select the new profile.
- Select Include all drivers from the selection profile.



4. Verify that you have configured the remaining Surface Laptop drivers by using either a selection profile or a **DriverGroup001** variable.

- For Surface Laptop (1st Gen), the model is **Surface Laptop**. The remaining Surface Laptop drivers should reside in the \MDT Deployment Share\Out-of-Box Drivers\Windows10\x64\Surface Laptop folder as shown in the following figure.
- For Surface Laptop 2, the model is **Surface Laptop 2**. The remaining Surface Laptop drivers should reside in the \MDT Deployment Share\Out-of-Box Drivers\Windows10\x64\Surface Laptop 2 folder.
- For Surface Laptop 3 with Intel processor, the model is Surface Laptop 3. The remaining Surface Laptop drivers are located in the \MDT Deployment Share\Out-of-Box Drivers\Windows10\x64\Surface Laptop 3 folder.

The screenshot shows the 'Deployment Workbench' interface. On the left, the tree view displays the deployment share structure under 'MDT Deployment Share (C:\Deployment)'. The 'Out-of-Box Drivers' folder is expanded, showing sub-folders for 'WindowsPEX64', 'Windows10' (which is also expanded to show 'X64' and 'Surface Laptop'), and 'WindowsPEX86'. To the right of the tree view is a table listing drivers. The table has two columns: 'Name' and 'Manufacturer'. The 'Name' column lists various driver files, and the 'Manufacturer' column lists the manufacturer for each. The manufacturers listed include Fingerprint Cards AB, Intel Corporation, and INTEL.

Name	Manufacturer
Fingerprint Cards AB Biometric KeyboardBluetooth.inf	Fingerprint Cards AB
Fingerprint Cards AB Biometric KeyboardFingerpri...	Fingerprint Cards AB
Intel Corporation Display 64ih4636.inf 21.20.16.4636	Intel Corporation
Intel Corporation HIDClass iaPreciseTouch.inf 1.2.0...	Intel Corporation
Intel Corporation System CSi2HostControllerDriver...	Intel Corporation
Intel Corporation System iactrllogic64.inf 30.15031....	Intel Corporation
Intel Corporation System iaLPSS2_GPIO2_SKL.inf 3...	Intel Corporation
Intel Corporation System iaLPSS2_I2C_SKL.inf 30.10...	Intel Corporation
Intel Corporation System iaLPSS2_SPI_SKL.inf 30.10...	Intel Corporation
Intel Corporation System iaLPSS2_UART2_SKL.inf 3...	Intel Corporation
Intel Corporation System ov7251.inf 30.15031.1094...	Intel Corporation
Intel Corporation System ov9734.inf 30.15031.1094...	Intel Corporation
Intel DPTF dptf_acpi.inf 8.2.11004.3973	Intel
Intel DPTF dptf_cpu.inf 8.2.11004.3973	Intel
Intel DPTF dptf_pch.inf 8.2.11004.3973	Intel
Intel DPTF esif_manager.inf 8.2.11004.3973	Intel
INTEL MEDIA iacameras64.inf 30.15031.10941.4180	Intel
INTEL SDHost SunrisePoint-LPSDHost.inf 10.1.1.38	INTEL
INTEL System CommonSystem.inf 10.1.1.38	INTEL

After configuring the MDT Deployment Share to use the new selection profile and related settings, continue the deployment process as described in [Deploy a Windows 10 image using MDT: Step 6: Create the deployment task sequence](#).

Upgrade Surface devices to Windows 10 with Microsoft Deployment Toolkit

Article • 01/03/2023

Applies to

- Surface Book (all editions)
- Surface Go (all editions)
- Surface Pro X (all editions)
- Surface Laptop (all editions)
- Surface Laptop Go
- Surface Studio (all editions)
- Surface Pro 2 and later

In addition to the traditional deployment method of reimaging devices, administrators who want to upgrade Surface devices that are running Windows 8.1 or Windows 10 have the option of deploying upgrades. By performing an upgrade deployment, Windows 10 can be applied to devices without removing users, apps, or configuration. The users of the deployed devices can simply continue using the devices with the same apps and settings that they used prior to the upgrade.

For the latest information about upgrading surface devices using MDT, refer to [Perform an in-place upgrade to Windows 10 with MDT](#).

Customize the OOBE for Surface deployments

Article • 01/26/2023 • Applies to: Windows 10, Windows 11

This article describes customizing the Surface out-of-box experience for end users in your organization.

It is common practice in a Windows deployment to customize the user experience for the first startup of deployed computers — the out-of-box experience, or OOBE.

💡 Tip

OOBE is also often used to describe the phase, or configuration pass, of Windows setup during which the user experience is displayed. For more information about the OOBE phase of setup, see [How Configuration Passes Work](#).

In some scenarios, you may want to provide complete automation to ensure that at the end of a deployment, computers are ready for use without any interaction from the user. In other scenarios, you may want to leave key elements of the experience for users to perform necessary actions or select between important choices. For administrators deploying to Surface devices, each of these scenarios presents a unique challenge to overcome.

ⓘ Note

This article does not apply to Surface Pro X. For more information, refer to [Deploying, managing, and servicing Surface Pro X](#)

This article provides a summary of the scenarios where a deployment might require additional steps. It also provides the required information to ensure that the desired experience is achieved on any newly deployed Surface device. This article is intended for administrators who are familiar with the deployment process, as well as concepts such as answer files and [reference images](#).

ⓘ Note

Although the OOBE phase of setup is still run as part of an automated deployment solution such as the [Microsoft Deployment Toolkit \(MDT\)](#) or [Microsoft Endpoint](#)

Configuration Manager Operating System Deployment (OSD), it is automated by the settings supplied in the deployment wizard and task sequence.

Scenario 1: Wireless networking in OOBЕ with MDT 2013

When a wireless network adapter is present during OOBЕ, the **Join a wireless network** page is displayed, which prompts a user to connect to a wireless network. This page is not automatically hidden by deployment technologies, including MDT 2013, and therefore will be displayed even when a deployment is configured for complete automation.

To ensure that an automated deployment is not stopped by this page, the page must be hidden by configuring an additional setting in the answer file, `HideWirelessSetupInOOBE`. You can find additional information about the `HideWirelessSetupInOOBE` setting in [Unattended Windows Setup Reference](#).

Scenario 2: Surface Pen pairing in OOBЕ

When you first take a Surface device and start it up, the first-run experience of the factory image includes a prompt that asks you to pair the included Surface Pen to the device. This prompt is only provided by the factory image that ships with the device and is not included in other images used for deployment, such as the Windows Enterprise installation media downloaded from the Volume Licensing Service Center. Because pairing the Bluetooth Surface Pen outside of this experience requires that you enter the Control Panel or PC Settings and manually pair a Bluetooth device, you may want to have users or a technician use this prompt to perform the pairing operation.

To provide the factory Surface Pen pairing experience in OOBЕ, you must copy four files from the factory Surface image into the reference image. You can copy these files into the reference environment before you capture the reference image, or you can add them later by using Deployment Image Servicing and Management (DISM) to mount the image. The four required files are:

- %windir%\system32\oobe\info\default\1033\oobe.xml
- %windir%\system32\oobe\info\default\1033\PenPairing_en-US.png
- %windir%\system32\oobe\info\default\1033\PenError_en-US.png
- %windir%\system32\oobe\info\default\1033\PenSuccess_en-US.png

 Tip

You should copy the files from a factory image for the same model Surface device that you intend to deploy to. For example, you should use the files from a Surface Pro 8 to deploy to Surface Pro 8, and the files from Surface Book 3 to deploy Surface Book 3, but you should not use the files from a Surface Pro 8 to deploy Surface Book 3 or Surface Pro 7.

The step-by-step process for adding these required files to an image is described in [Deploying Surface Pro 3 Pen and OneNote Tips](#). This blog post also includes tips to ensure that the necessary updates for the Surface Pen Quick Note-Taking Experience are installed, which allows users to send notes to OneNote with a single click.

Deploy Surface app with Microsoft Store for Business and Education

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Applies to:

- Surface Laptop (all generations)
- Surface Pro 3 and later
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Go (all generations)
- Surface Book (all generations)
- Surface Studio (all generations)
- Surface Laptop Studio
- Surface Pro with LTE Advanced (Model 1807)
- Surface Pro (Model 1796)
- Surface 3 LTE
- Surface 3

The Surface app is a lightweight Microsoft Store app that provides control of many Surface-specific settings and options with quick access to device information including serial number, Surface model name, UEFI version, and related drivers.

Customers using Windows Update will ordinarily receive Surface app as part of automatic updates. But if your organization is preparing images for deployment to your Surface devices, you may want to include the Surface app (formerly called the Surface Hub) in your imaging and deployment process instead of requiring users of each individual device to download and install the app from the Microsoft Store or your Microsoft Store for Business.

Note

This article does not apply to Surface Pro X or Surface Pro 9 with 5G. For more information, refer to [Deploying, managing, and servicing Surface Pro X](#)

Surface app overview

The Surface app is available as a free download from the [Microsoft Store](#). Users can download and install it from the Microsoft Store, but if your organization uses Microsoft

Store for Business instead, you will need to add it to your store's inventory and possibly include the app as part of your Windows deployment process. These processes are discussed throughout this article. For more information about Microsoft Store for Business, see [Microsoft Store for Business](#).

Add Surface app to a Microsoft Store for Business account

Before users can install or deploy an app from a company's Microsoft Store for Business account, the desired app(s) must first be made available and licensed to the users of a business.

1. If you have not already done so, create a [Microsoft Store for Business account](#).
2. Sign in to the portal.
3. Enable offline licensing: click **Manage > Settings** and then select the **Show offline licensed apps to people shopping in the store** checkbox, as shown in Figure 1. For more information about Microsoft Store for Business app licensing models, see [Apps in Microsoft Store for Business and Education](#).

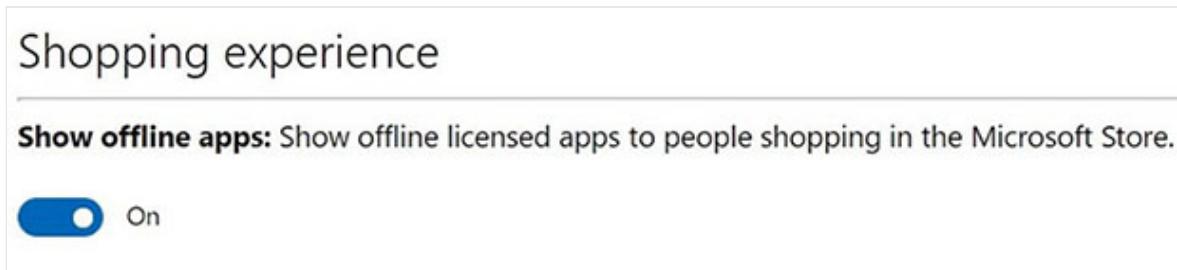


Figure 1. Enable apps for offline use

4. Add Surface app to your Microsoft Store for Business account:
 - Search the store for **Surface app**
 - After the Surface app is presented in the search results, click the app's icon.
 - You are presented with a choice (select **Online** or **Offline**), as shown in Figure 2.

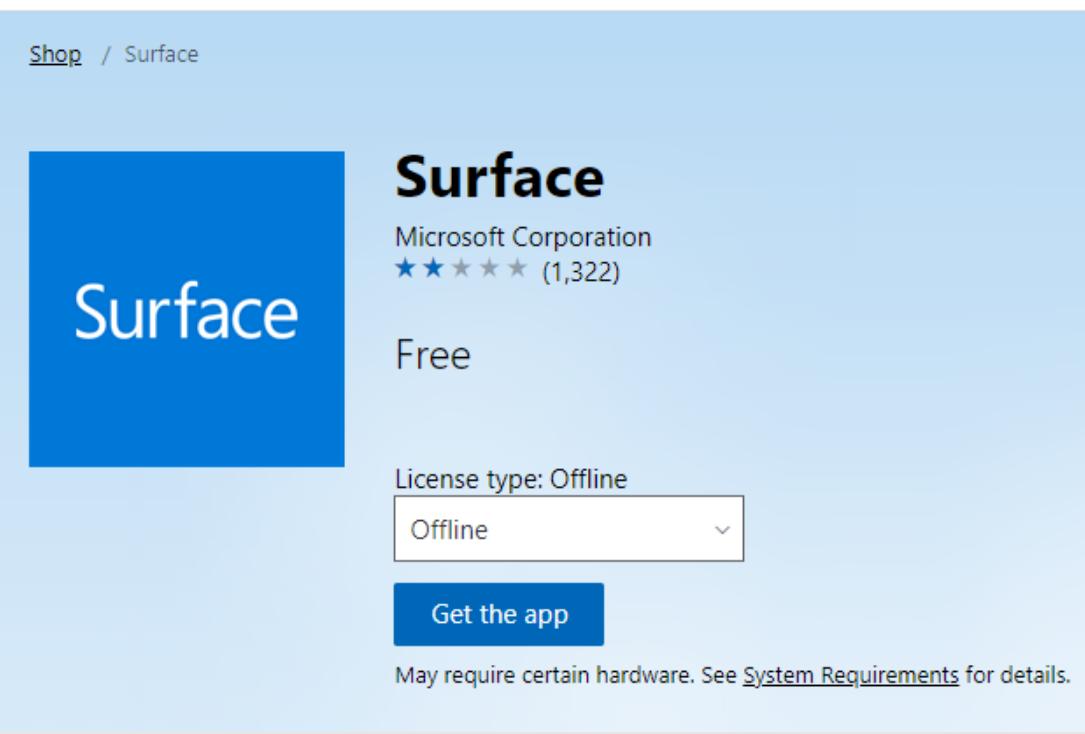


Figure 2. Select the Offline licensing mode and add the app to your inventory

- Click **Offline** to select the Offline licensing mode.
- Click **Get the app** to add the app to your Microsoft Store for Business inventory. As shown in Figure 3, you'll see a dialog box that prompts you to acknowledge that offline apps can be deployed using a management tool or downloaded from the company's inventory page in their private store.

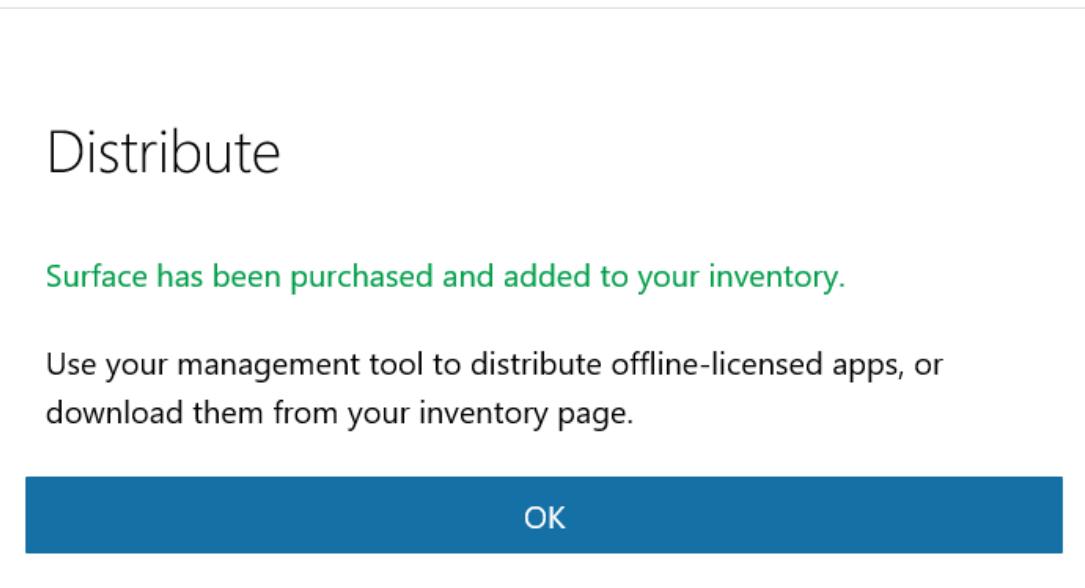


Figure 3. Offline-licensed app acknowledgement

- Click **OK**.

Download Surface app from a Microsoft Store for Business account

After you add an app to the Microsoft Store for Business account in Offline mode, you can download and add the app as an AppxBundle to a deployment share.

1. Log on to the Microsoft Store for Business account at
<https://businessstore.microsoft.com>
2. Click **Manage->Apps & software**. A list of all of your company's apps is displayed, including the Surface app you added in the [Add Surface app to a Microsoft Store for Business account](#) section of this article.
3. Under **Actions**, click the ellipsis (...), and then click **Download for offline use** for the Surface app.
4. Select the desired **Platform** and **Architecture** options from the available selections for the selected app, as shown in Figure 4.

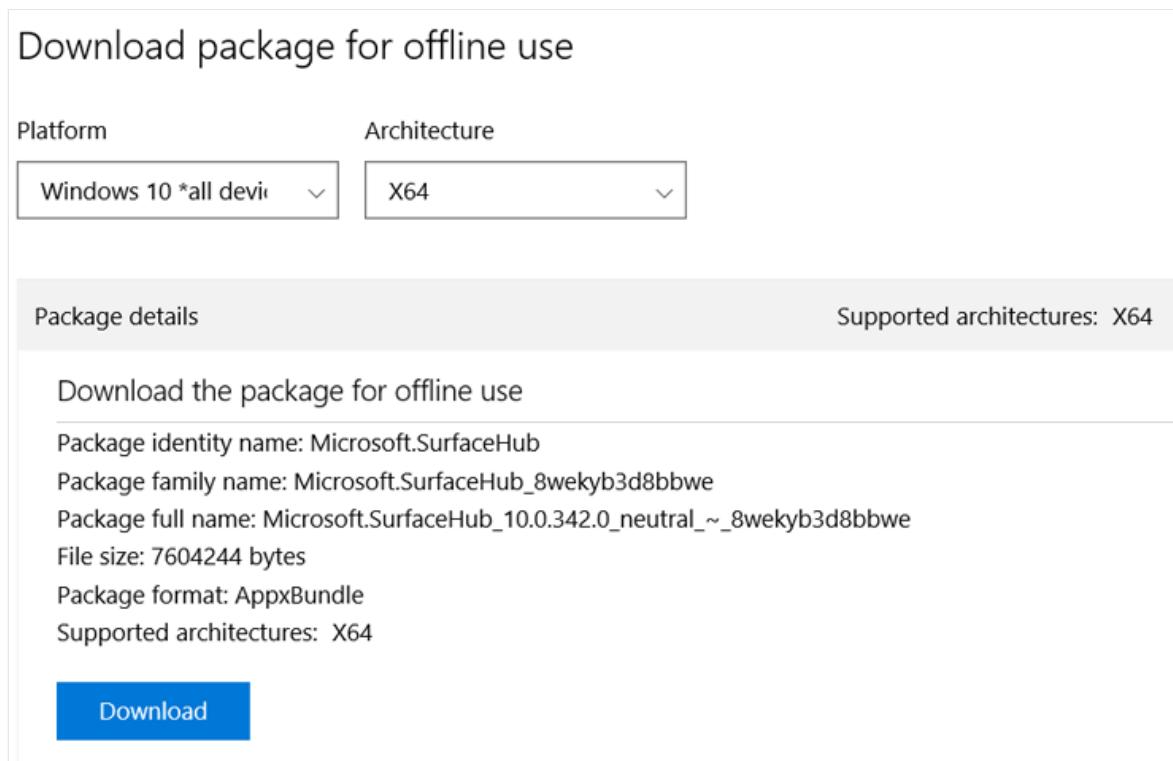


Figure 4. Download the AppxBundle package for an app

5. Click **Download**. The AppxBundle package will be downloaded. Make sure you note the path of the downloaded file because you'll need that later in this article.
6. Click either the **Encoded license** or **Unencoded license** option. Use the Encoded license option with management tools like Microsoft Endpoint Configuration Manager or when you use Windows Configuration Designer to create a provisioning package. Select the Unencoded license option when you use Deployment Image Servicing and Management (DISM) or deployment solutions based on imaging, including the Microsoft Deployment Toolkit (MDT).

7. Click **Generate** to generate and download the license for the app. Make sure you note the path of the license file because you'll need that later in this article.

① Note

When you download an app for offline use, such as the Surface app, you may notice a section at the bottom of the page labeled **Required frameworks**. Your target computers must have the frameworks installed for the app to run, so you may need to repeat the download process for each of the required frameworks for your architecture (either x86 or x64) and also include them as part of your Windows deployment discussed later in this article.

Figure 5 shows the required frameworks for the Surface app.

Required frameworks	
Microsoft.VCLibs.140.00_14.0.23816.0_x86_8wekyb3d8bbwe File size: 611134 bytes Architecture X86	Download
Microsoft.VCLibs.140.00_14.0.23816.0_x64_8wekyb3d8bbwe File size: 805707 bytes Architecture X64	Download
Microsoft.NET.Native.Runtime.1.1_1.1.23406.0_x64_8wekyb3d8bbwe File size: 231672 bytes Architecture X64	Download
Microsoft.NET.Native.Runtime.1.1_1.1.23406.0_x86_8wekyb3d8bbwe File size: 189961 bytes Architecture X86	Download

Figure 5. Required frameworks for the Surface app

① Note

The version numbers of the Surface app and required frameworks will change as the apps are updated. Check for the latest version of Surface app and each framework in Microsoft Store for Business. Always use the Surface app and recommended framework versions as provided by Microsoft Store for Business. Using outdated frameworks or the incorrect versions may result in errors or application crashes.

To download the required frameworks for the Surface app, follow these steps:

1. Click the **Download** button under

Microsoft.VCLibs.140.00_14.0.23816.0_x64_8wekyb3d8bbwe. This downloads the **Microsoft.VCLibs.140.00_14.0.23816.0_x64_8wekyb3d8bbwe.Appx** file to your specified folder.

2. Click the **Download** button under

Microsoft.NET.Native.Runtime.1.1_1.1.23406.0_x64_8wekyb3d8bbwe. This

downloads the Microsoft.NET.Native.Runtime.1.1_1.1.23406.0_x64_8wekyb3d8bbwe.Appx file to your specified folder.

 **Note**

Only the 64-bit (x64) version of each framework is required for Surface devices. Surface devices are native 64-bit UEFI devices and are not compatible with 32-bit (x86) versions of Windows that would require 32-bit frameworks.

Install Surface app on your computer with PowerShell

The following procedure provisions the Surface app onto your computer and makes it available for any user accounts created on the computer afterwards.

1. Using the procedure described in the [How to download Surface app from a Microsoft Store for Business account](#) section of this article, download the Surface app AppBundle and license file.
2. Begin an elevated PowerShell session.

 **Note**

If you don't run PowerShell as an Administrator, the session won't have the required permissions to install the app.

3. In the elevated PowerShell session, copy and paste the following command:

```
PowerShell  
  
Add-AppxProvisionedPackage -Online -PackagePath <DownloadPath>\  
Microsoft.SurfaceHub_10.0.342.0_neutral__8wekyb3d8bbwe.AppxBundle -  
LicensePath <DownloadPath>\  
Microsoft.SurfaceHub_8wekyb3d8bbwe_a53ef8ab-9dbd-dec1-46c5-  
7b664d4dd003.xml
```

Where `<DownloadPath>` is the folder where you downloaded the AppBundle and license file from the Microsoft Store for Business account.

For example, if you downloaded the files to `c:\Temp`, the command you run is:

PowerShell

```
Add-AppxProvisionedPackage -Online -PackagePath c:\Temp\Microsoft.SurfaceHub_10.0.342.0_neutral__8wekyb3d8bbwe.AppxBundle -LicensePath c:\Temp\ Microsoft.SurfaceHub_8wekyb3d8bbwe_a53ef8ab-9dbd-dec1-46c5-7b664d4dd003.xml
```

4. The Surface app will now be available on your current Windows computer.

Before the Surface app is functional on the computer where it has been provisioned, you must also provision the frameworks described earlier in this article. To provision these frameworks, use the following procedure in the elevated PowerShell session you used to provision the Surface app.

5. In the elevated PowerShell session, copy and paste the following command:

PowerShell

```
Add-AppxProvisionedPackage -Online -SkipLicense -PackagePath <DownloadPath>\Microsoft.VCLibs.140.00_14.0.23816.0_x64_8wekyb3d8bbwe.Appx
```

6. In the elevated PowerShell session, copy and paste the following command:

PowerShell

```
Add-AppxProvisionedPackage -Online -SkipLicense -PackagePath <DownloadPath>\Microsoft.NET.Native.Runtime.1.1_1.1.23406.0_x64_8wekyb3d8bbwe.Appx
```

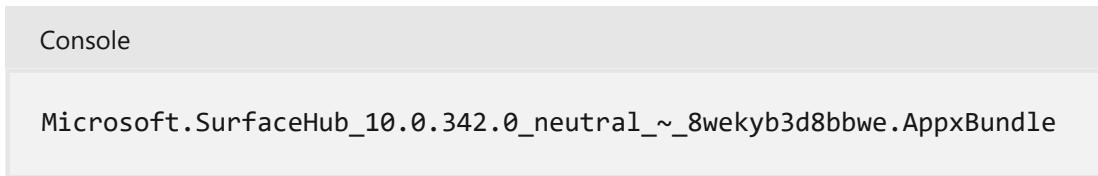
Install Surface app with MDT

The following procedure uses MDT to automate installation of the Surface app at the time of deployment. The application is provisioned automatically by MDT during deployment and thus you can use this process with existing images. This is the recommended process to deploy the Surface app as part of a Windows deployment to Surface devices because it does not reduce the cross platform compatibility of the Windows image.

1. Using the procedure described [earlier in this article](#), download the Surface app AppxBundle and license file.
2. Using the New Application Wizard in the MDT Deployment Workbench, import the downloaded files as a new **Application with source files**.

3. On the **Command Details** page of the New Application Wizard, specify the default **Working Directory** and for the **Command** specify the file name of the AppxBundle, as follows:

- Command:



- Working Directory: %DEPLOYROOT%\Applications\SurfaceApp

For the Surface app to function on the target computer, it will also require the frameworks described earlier in this article. Use the following procedure to import the frameworks required for the Surface app into MDT and to configure them as dependencies.

1. Using the procedure described earlier in this article, download the framework files.
Store each framework in a separate folder.
2. Using the New Application Wizard in the MDT Deployment Workbench, import the downloaded files as a new **Application with source files**.
3. On the **Command Details** page, type the file name of each application you downloaded in the **Command** field and the default Working Directory.

To configure the frameworks as dependencies of the Surface app, use this process:

1. Open the properties of the Surface app in the MDT Deployment Workbench.
2. Click the **Dependencies** tab, and then click **Add**.
3. Select the check box for each framework using the name you provided in the New Application Wizard.

After import, the Surface app will be available for selection in the **Applications** step of the Windows Deployment Wizard. You can also install the application automatically by specifying the application in the deployment task sequence by following this process:

1. Open your deployment task sequence in the MDT Deployment Workbench.
2. Add a new **Install Application** task in the **State Restore** section of deployment.
3. Select **Install a single application** and specify the **Surface App** as the **Application to be installed**.

For more information about including apps into your Windows deployments, see [Prepare for deployment with MDT](#).

Microsoft Surface Enterprise Management Mode (SEMM)

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

Microsoft Surface Enterprise Management Mode (SEMM) is a feature of Surface devices with Surface Unified Extensible Firmware Interface (UEFI). You can use SEMM to:

- Secure and manage firmware settings in your organization.
- Prepare UEFI settings configurations and install them on a Surface device.

SEMM also uses a certificate to protect the configuration from unauthorized tampering or removal. To migrate a Surface Hub 2S to Windows 10 Pro or Windows Enterprise, SEMM is required.

Supported devices

SEMM is only available on devices with Surface UEFI firmware including:

- Surface Pro 9 (commercial SKUs only)
- Surface Pro 9 with 5G (commercial SKUs only)
- Surface Pro 8 (commercial SKUs only)
- Surface Pro 7+ (commercial SKUs only)
- Surface Pro 4 and later (all SKUs)
- Surface Pro X (all SKUs)
- Surface Laptop SE (all SKUs)
- Surface Laptop Studio (commercial SKUs only)
- Surface Hub 2S
- Surface Laptop 5 (commercial SKUs only)
- Surface Laptop 4 (commercial SKUs only)
- Surface Laptop 3 (Intel processors only)
- Surface Laptop Go
- Surface Laptop Go 2 (commercial SKUs only)
- Surface Book (all generations)
- Surface Go, Surface Go 2
- Surface Go 3 (commercial SKUs only)
- Surface Studio (all SKUs)

 Tip

Commercial SKUs (aka Surface for Business) run Windows 10 Pro/Enterprise or Windows 11 Pro/Enterprise; consumer SKUs run Windows 10/Windows 11 Home. To learn more, see [View your system info](#).

Getting started

When Surface devices are configured by SEMM and secured with the SEMM certificate, they're considered *enrolled* in SEMM. When the SEMM certificate is removed and control of UEFI settings is returned to the user of the device, the Surface device is considered *unenrolled* in SEMM.

There are two administrative options that you can use to manage SEMM and enroll Surface devices:

- SEMM standalone tool, Microsoft Surface UEFI Configurator, is described in this article.
- Integration with Microsoft Endpoint Configuration Manager. For information, see [Use Microsoft Endpoint Configuration Manager to manage devices with SEMM](#).

Microsoft Surface UEFI Configurator

The primary workspace of SEMM is Microsoft Surface UEFI Configurator, as shown in Figure 1.

You can use Microsoft Surface UEFI Configurator to:

- Create Windows Installer (.msi) packages.
- Use WinPE images to enroll, configure, and unenroll SEMM on a Surface device.

These packages contain a configuration file that specifies the UEFI settings. SEMM packages also contain a certificate that's installed and stored in firmware and is used to verify the signature of configuration files before UEFI settings are applied.

Tip

You can now use Surface UEFI Configurator and SEMM to manage ports on Surface Dock 2 or Surface Thunderbolt 4 Dock. To learn more, see [Secure Surface Dock ports with SEMM](#).

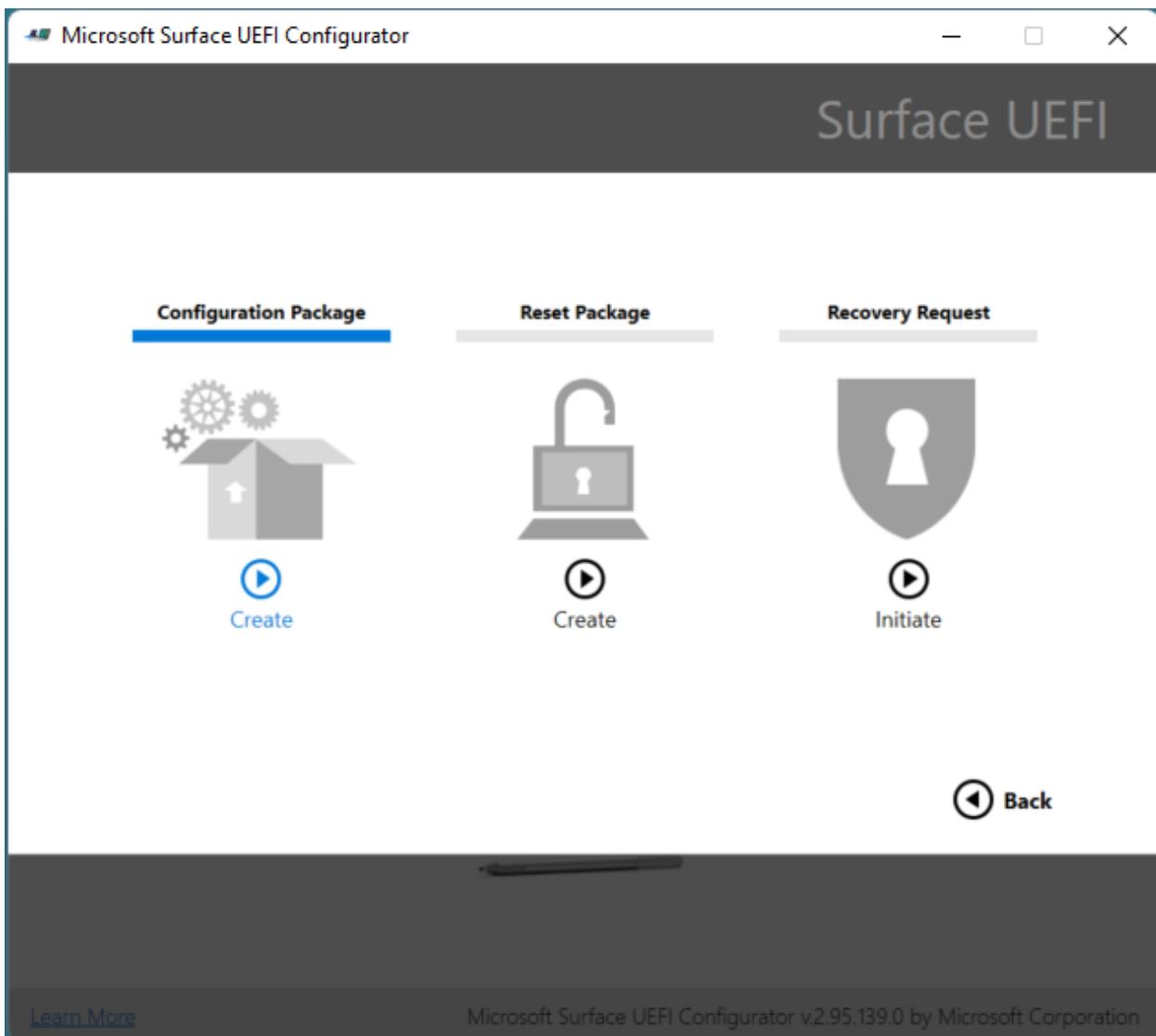


Figure 1. Microsoft Surface UEFI Configurator

You can use the Microsoft Surface UEFI Configurator tool in three modes:

- **Surface UEFI Configuration Package.** Use this mode to create a Surface UEFI configuration package to enroll a Surface device in SEMM and to configure UEFI settings on enrolled devices.
- **Surface UEFI Reset Package.** Use this mode to unenroll a Surface device from SEMM.
- **Surface UEFI Recovery Request.** Use this mode to respond to a recovery request to unenroll a Surface device from SEMM where a Reset Package operation isn't successful.

Download Microsoft Surface UEFI Configurator

You can download Microsoft Surface UEFI Configurator from the [Surface Tools for IT](#) page in the Microsoft Download Center.

- For Intel/AMD devices, download: [SurfaceUEFI_Configurator_v2.97.139.0_x64.msi](#)

- For ARM devices, download: SurfaceUEFI_Configurator_v2.97.139.0_x86.msi

Configuration package

Surface UEFI configuration packages are the primary mechanism to implement and manage SEMM on Surface devices. These packages contain a configuration file and a certificate file, as shown in Figure 2. The configuration file contains UEFI settings that are specified when the package is created in Microsoft Surface UEFI Configurator. When a configuration package runs for the first time on a Surface device that's not already enrolled in SEMM, it provisions the certificate file in the device's firmware and enrolls the device in SEMM. When enrolling a device in SEMM, and before the certificate is stored and the enrollment finishes, you're prompted to confirm the operation by providing the last two digits of the SEMM certificate thumbprint. This confirmation requires a user to be physically present at the device during enrollment to perform the confirmation.

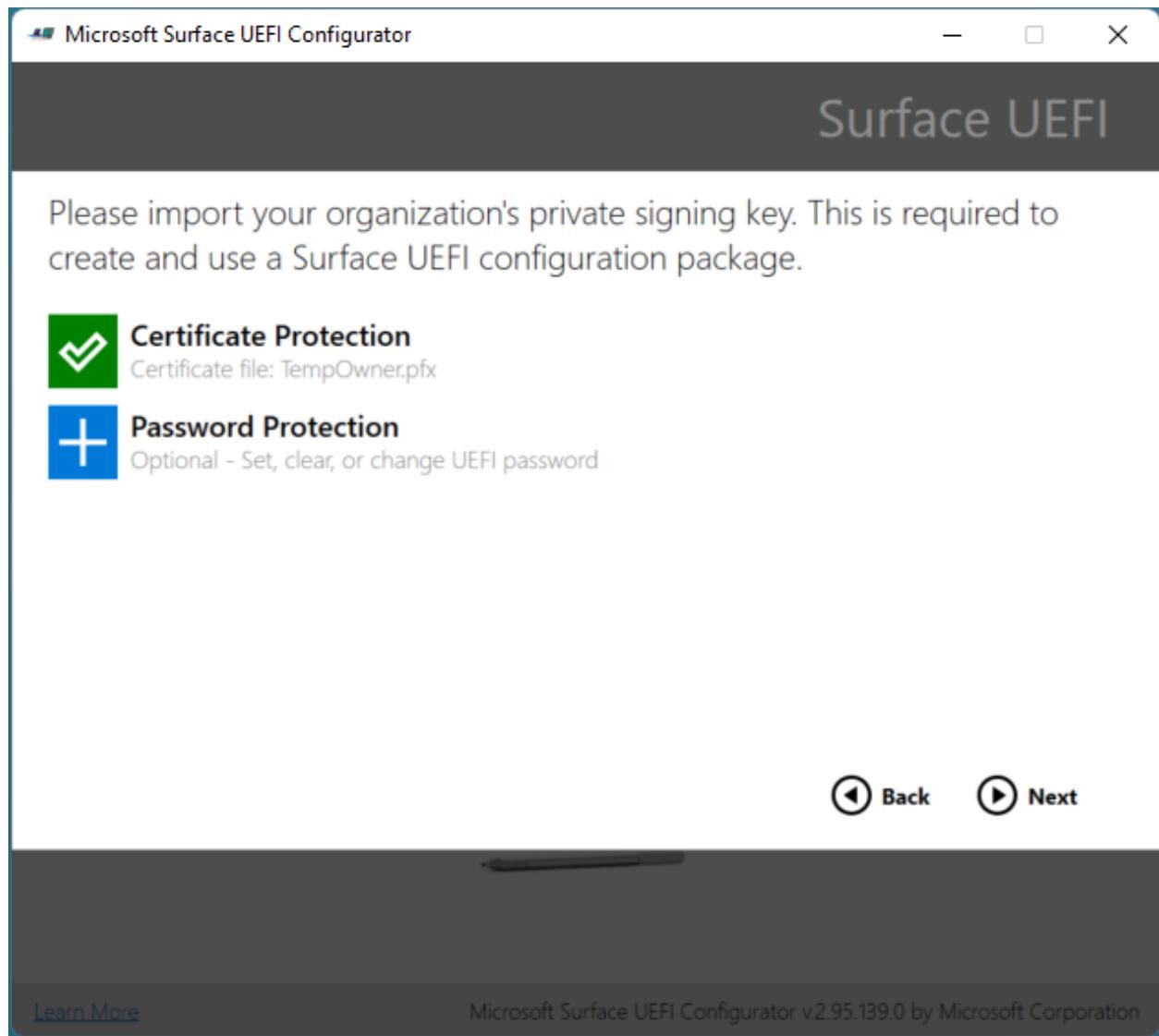


Figure 2. Secure a SEMM configuration package with a certificate

For more information about the requirements for the SEMM certificate, see the [Surface Enterprise Management Mode certificate requirements](#) section later in this article.

💡 Tip

You have the option to require a UEFI password with SEMM. If you do, the password is required to view the **Security**, **Devices**, **Boot Configuration**, and **Enterprise Management** pages of Surface UEFI.

After a device is enrolled in SEMM, the configuration file is read, and the settings specified in the file are applied to UEFI. When you run a configuration package on a device that's already enrolled in SEMM, the signature of the configuration file is checked against the certificate that's stored in the device firmware. If the signature doesn't match, no changes are applied to the device.

Enable or disable devices in Surface UEFI with SEMM

The following list shows all the available devices that you can manage in SEMM:

- Docking USB port
- On-board audio
- Digital graphics processing unit
- Type cover
- Micro SD card
- Front camera
- Rear camera
- Infrared camera (for Windows Hello)
- Bluetooth only
- Wireless network and Bluetooth
- Long-term evolution (LTE)
- Discrete GPU (dGPU)
- On-board microphone
- MAC address emulation
- Wired LAN
- Near-field communication (NFC)

ⓘ Note

On the UEFI Devices page, the built-in devices might vary, depending on your device or corporate environment. For example, the UEFI Devices page isn't supported on Surface Pro X; LTE appears only on LTE-equipped devices.

Configure advanced settings with SEMM

Table 1. Advanced settings

Setting	Description
IPv6 for PXE Boot	Allows you to manage IPv6 support for PXE boot. If you don't configure this setting, IPv6 support for PXE boot is enabled.
Alternate Boot	Allows you to manage the use of an Alternate boot order to boot directly to a USB or Ethernet device by pressing both the Volume Down button and Power button during boot. If you don't configure this setting, Alternate boot is enabled.
Boot Order Lock	Allows you to lock the boot order to prevent changes. If you don't configure this setting, Boot Order Lock is disabled.
USB Boot	Allows you to manage booting to USB devices. If you don't configure this setting, USB Boot is enabled.
Network Stack	Allows you to manage Network Stack boot settings. If you don't configure this setting, the ability to manage Network Stack boot settings is disabled.
Auto Power On	Allows you to manage Auto Power-on boot settings. If you don't configure this setting, Auto Power-on is enabled.
Simultaneous Multi-Threading (SMT)	Allows you to manage Simultaneous Multi-Threading (SMT) to enable or disable hyperthreading. If you don't configure this setting, SMT is enabled.
Enable Battery limit	Allows you to manage Battery limit functionality. If you don't configure this setting, Battery limit is enabled
Security	Displays the Surface UEFI Security page. If you don't configure this setting, the Security page is displayed.
Devices	Displays the Surface UEFI Devices page. If you don't configure this setting, the Devices page is displayed.
Boot	Displays the Surface UEFI Boot page. If you don't configure this setting, the Boot page is displayed.
DateTime	Displays the Surface UEFI DateTime page. If you don't configure this setting, the DateTime page is displayed.

Setting	Description
EnableOSMigration	Allows you to migrate Surface Hub 2 from Windows 10 Team to Windows 10/11 Pro or Enterprise. If you don't configure this setting, Surface Hub 2 devices can run only the Windows 10 Team OS. Note: Dual booting between Windows 10 Team and Windows 10/11 Pro/Enterprise isn't available on Surface Hub 2.
Secured Core	Allows you to manage Secured Core functionality. If you don't configure this setting, Secured Core functionality is enabled on supported devices.
Wake on LAN	Allows you to manage Wake on LAN functionality. If you don't configure this setting, Wake on LAN is enabled on supported devices.
Wake on Power	Allows you to manage Wake on Power functionality. If you don't configure this setting, Wake on Power is disabled on supported devices.

 **Tip**

When you create a SEMM configuration package, two characters are shown on the **Successful** page, as shown in Figure 3.

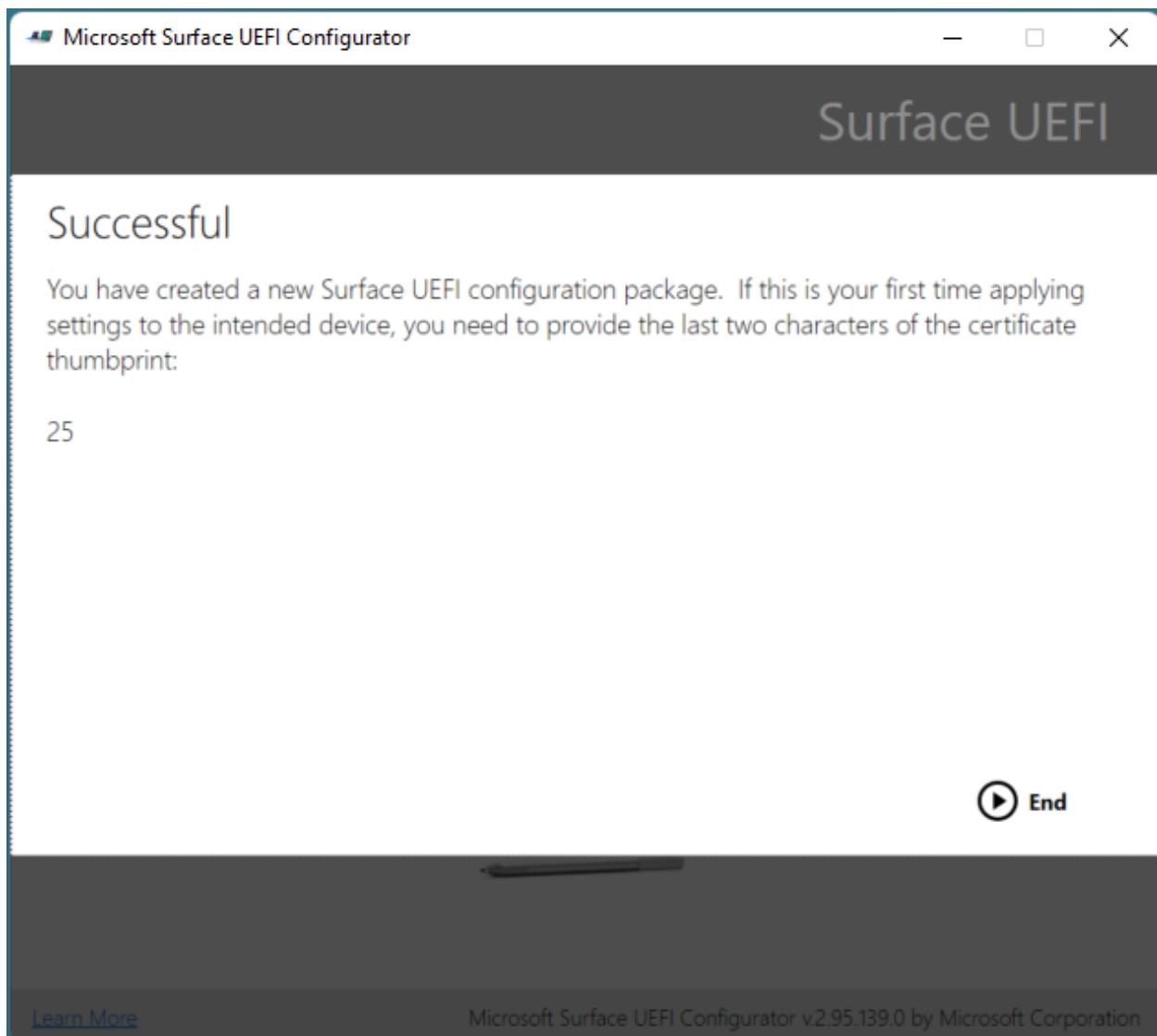


Figure 3. Display of the last two characters of the certificate thumbprint on the Successful page

These characters are the last two characters of the certificate thumbprint and should be written down or recorded. The characters are required to confirm enrollment in SEMM on a Surface device, as shown in Figure 4.

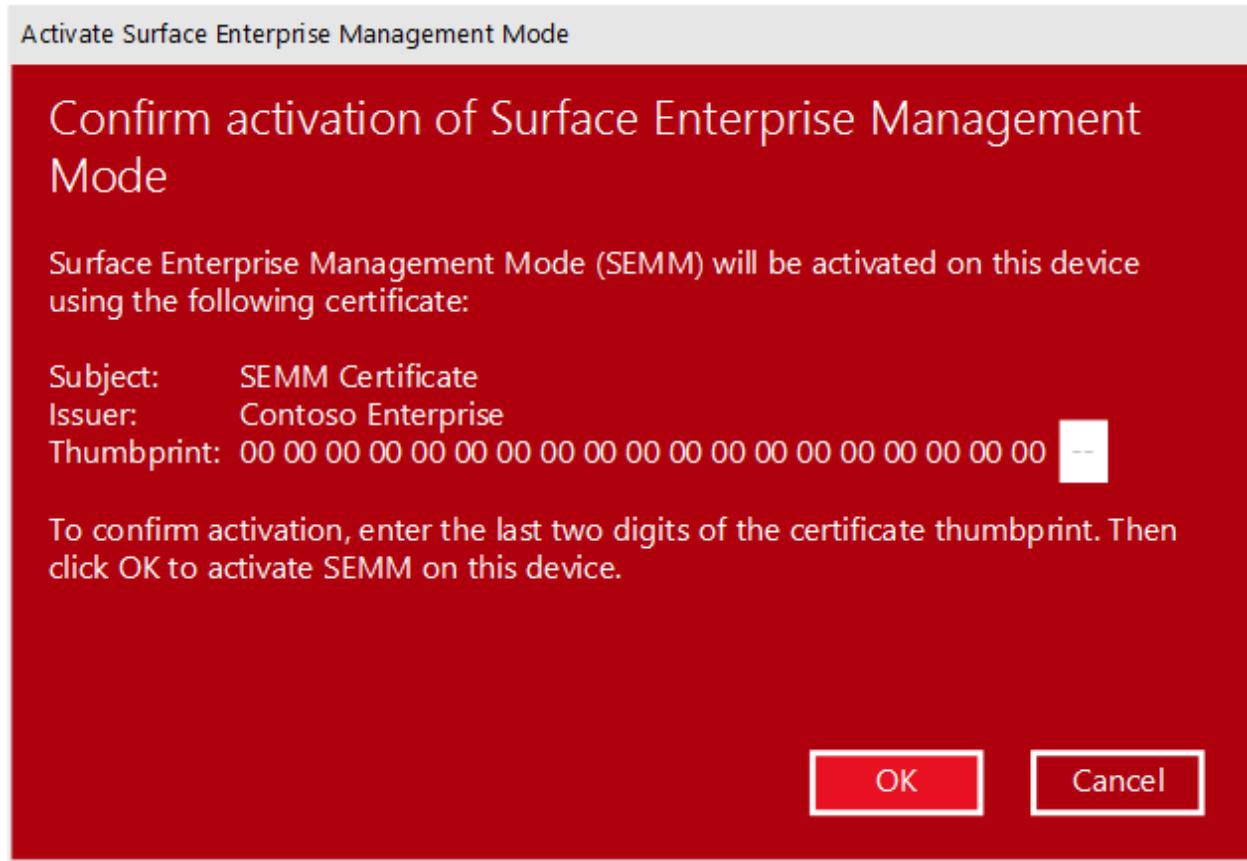


Figure 4. Enrollment confirmation in SEMM with the SEMM certificate thumbprint

Administrators with access to the certificate file (.pfx) can read the thumbprint at any time by opening the .pfx file in CertMgr. To view the thumbprint with CertMgr:

1. Select and hold (or right-click) the .pfx file, and then select **Open**.
 2. In the navigation pane, expand the folder.
 3. Select **Certificates**.
 4. In the main pane, select and hold (or right-click) your certificate, and then select **Open**.
 5. Select the **Details** tab.
 6. In the **Show** drop-down menu, **All** or **Properties Only** must be selected.
 7. Select the **Thumbprint** field.

To enroll a Surface device in SEMM or apply the UEFI configuration from a configuration package, run the .msi file with administrative privileges on the intended Surface device. You can use application deployment or operating system deployment technologies, like [Microsoft Endpoint Configuration Manager](#) or the [Microsoft Deployment Toolkit](#). When you enroll a device in SEMM, you must be physically present to confirm the enrollment.

on the device. When you apply a configuration to devices that are already enrolled in SEMM, user interaction isn't required.

For a step-by-step walkthrough of how to enroll a Surface device in SEMM or apply a Surface UEFI configuration with SEMM, see [Enroll and configure Surface devices with SEMM](#).

Reset package

A Surface UEFI reset package is used to perform only one task—to unenroll a Surface device from SEMM. The reset package contains signed instructions to remove the SEMM certificate from the device's firmware and to reset UEFI settings to the factory default settings. Like a Surface UEFI configuration package, a reset package must be signed with the same SEMM certificate that's provisioned on the Surface device. When you create a SEMM reset package, you're required to supply the serial number of the Surface device that you intend to reset. SEMM reset packages aren't universal—they're specific to one device.

Recovery request

In some scenarios, it might be impossible to use a Surface UEFI reset package. (For example, if Windows becomes unusable on the Surface device.) In these scenarios, you can unenroll the Surface device from SEMM through the **Enterprise Management** page of Surface UEFI (shown in Figure 5) with a Recovery Request operation.

Figure 5. Initiate a SEMM recovery request on the Enterprise Management page

When you use the process on the **Enterprise Management** page to reset SEMM on a Surface device, you're given a Reset Request. This Reset Request can be saved as a file to a USB drive, copied as text, or read as a QR Code with a mobile device to be easily emailed or messaged. Use the Microsoft Surface UEFI Configurator Reset Request option to load a Reset Request file or to enter the Reset Request text or QR Code. Microsoft Surface UEFI Configurator generates a verification code that can be entered on the Surface device. If you enter the code on the Surface device and select **Restart**, the device is unenrolled from SEMM.

Note

A Reset Request expires two hours after it's created.

For a step-by-step walkthrough of how to unenroll Surface devices from SEMM, see [Unenroll Surface devices from SEMM](#).

Surface Enterprise Management Mode certificate requirements

When you use SEMM with Microsoft Surface UEFI Configurator and want to apply UEFI settings, a certificate is required to verify the signature of configuration files. This certificate ensures that after a device enrolls in SEMM, only packages created with the approved certificate can be used to modify the UEFI settings.

Note

To make any modification to SEMM or Surface UEFI settings on enrolled Surface devices, the SEMM certificate is required. If the SEMM certificate is corrupt or lost, SEMM can't be removed or reset. Manage your SEMM certificate accordingly with an appropriate solution for backup and recovery

Packages created with the Microsoft Surface UEFI Configurator tool are signed with a certificate. This certificate ensures that after a device is enrolled in SEMM, only packages created with the approved certificate can be used to modify the settings of UEFI.

Recommended certificate settings

The following settings are recommended for the SEMM certificate:

- **Key Algorithm** – RSA
- **Key Length** – 2048
- **Hash Algorithm** – SHA-256
- **Type** – SSL Server Authentication
- **Key Usage** – Digital signature, Key Encipherment
- **Provider** – Microsoft Enhanced RSA and AES Cryptographic Provider
- **Expiration Date** – 15 Months from certificate creation
- **Key Export Policy** – Exportable

It's also recommended that the SEMM certificate is authenticated in a two-tier public key infrastructure (PKI) architecture where the intermediate certification authority (CA) is dedicated to SEMM, enabling certificate revocation. For more information about a two-tier PKI configuration, see [Test Lab Guide: Deploying an AD CS Two-Tier PKI Hierarchy](#).

Self-signed certificate

You can use the following example PowerShell script to create a self-signed certificate for use in proof-of-concept scenarios. To use this script, copy the following text into Notepad, and then save the file as a PowerShell script (.ps1).

Note

This script creates a certificate with a password of 12345678. The certificate generated by this script isn't recommended for production environments.

PowerShell

```
if (-not (Test-Path "Demo Certificate")) { New-Item -ItemType Directory -Force -Path "Demo Certificate" }
if (Test-Path "Demo Certificate\TempOwner.pfx") { Remove-Item "Demo Certificate\TempOwner.pfx" }

# Generate the Ownership private signing key with password 12345678
$pw = ConvertTo-SecureString "12345678" -AsPlainText -Force

$TestUefiV2 = New-SelfSignedCertificate ` 
-Subject "CN=Surface Demo Kit, O=Contoso Corporation, C=US" ` 
-Type SSLServerAuthentication ` 
-HashAlgorithm sha256 ` 
-KeyAlgorithm RSA ` 
-KeyLength 2048 ` 
-KeyUsage KeyEncipherment ` 
-KeyUsageProperty All ` 
-Provider "Microsoft Enhanced RSA and AES Cryptographic Provider" ` 
-NotAfter (Get-Date).AddYears(25) `
```

```
-TextExtension @("2.5.29.37={text}1.2.840.113549.1.1.1") `  
-KeyExportPolicy Exportable  
  
$TestUefiV2 | Export-PfxCertificate -Password $pw -FilePath "Demo  
Certificate\TempOwner.pfx"
```

ⓘ Important

For use with SEMM and Microsoft Surface UEFI Configurator, the certificate must be exported with the private key and with password protection. Microsoft Surface UEFI Configurator prompts you to select the SEMM certificate file (.pfx) and certificate password.

To create a self-signed certificate:

1. On your C: drive, create the folder where you'll save the script; for example, C:\SEMM.
2. Copy the example script into Notepad (or equivalent text editor), and then save the file as a PowerShell script (.ps1).
3. Sign in to your computer with administrator credentials, and then open an elevated PowerShell session.
4. Make sure that your permissions are set to allow scripts to run. By default, scripts are blocked from running unless you modify the execution policy. To learn more, see [About Execution Policies](#).
5. At the command prompt, enter the full path of the script and then press **Enter**. The script creates a Demo Certificate named TempOwner.pfx.

Alternatively, you can create your own self-signed certificate using PowerShell. For more information, see [New-SelfSignedCertificate](#).

ⓘ Note

For organizations that use an offline root in their PKI infrastructure, Microsoft Surface UEFI Configurator must be run in an environment connected to the root CA to authenticate the SEMM certificate. The packages generated by Microsoft Surface UEFI Configurator can be transferred as files, so they can be transferred outside the offline network environment with removable storage, such as a USB stick.

Managing certificates FAQ

The recommended *minimum* length is 15 months. You can use a certificate that expires in less than 15 months or use a certificate that expires in longer than 15 months.

 **Note**

When a certificate expires, it doesn't automatically renew.

Will an expired certificate affect the functionality of SEMM-enrolled devices?

No, a certificate only impacts IT admin management tasks in SEMM and has no effect on device functionality when it expires.

Will the SEMM package and certificate need to be updated on all machines that have it?

If you want SEMM reset or recovery to work, the certificate needs to be valid and not expired.

Can bulk reset packages be created for each surface that we order? Can one be built that resets all machines in our environment?

The PowerShell samples that create a config package for a specific device type can also be used to create a reset package that's serial-number independent. If the certificate is still valid, you can create a reset package using PowerShell to reset SEMM.

Version history

Version 2.100.139.0

This version of SEMM includes:

- Support for Surface Laptop 5, Surface Pro 9, Surface Pro 9 with 5G, and Surface Studio 2+

Version 2.97.139.0

This version of SEMM includes:

- Support for Surface Laptop Go 2

Version 2.94.139.0

This version of SEMM includes:

- Support for Surface Laptop Studio, Surface Pro 8, and Surface Go 3

Version 2.83.139.0

This version of SEMM includes:

- Support for Surface Laptop 4
- Support for simultaneous multithreading option for Surface Pro 7
- Removal of obsolete SEMM settings
- Improved MSI signing

Version 2.79.139.0

This version of SEMM includes:

- Support for Surface Pro 7+.
- User experience improvements.

Version 2.78.139.0

This version of SEMM includes:

- Support for Surface Laptop Go and Surface Pro X.
- Notifications for new version releases.
- The ability to create custom packages to change ownership.
- Bug fixes.

Version 2.73.136.0

This version of SEMM includes:

- The ability for audio to be disabled on Surface Hub2S using SEMM.
- Support for Surface Pro X for Dock 2.
- Support for UEFI Manager for Dock 2-related operations.
- A Surface Go reset package bug fix.
- Support for migrating Surface Hub 2 devices from Windows 10 Team OS to Windows 10 Pro or Enterprise.

Version 2.71.139.0

This version of SEMM adds support for Surface Dock 2 management features for Surface Book 3, Surface Laptop 3, and Surface Pro 7. It includes:

- The ability to enable audio (lock/unlock), and Ethernet and USB ports.
- The ability to create dock packages for both authenticated and unauthenticated hosts.

Version 2.70.130.0

This version of SEMM includes:

- Support for Surface Go 2.
- Support for Surface Book 3.
- Bug fixes.

Version 2.59.139.0

This version of SEMM includes:

- Support for Surface Pro 7, Surface Pro X, and Surface Laptop 3 13.5" and 15" models with Intel processor.

 **Note**

Surface Laptop 3 15" AMD processor isn't supported.

- Support for the Wake on Power feature.

Version 2.54.139.0

This version of SEMM includes:

- Support for Surface Hub 2S.
- Bug fixes.

Version 2.43.136.0

This version of SEMM includes:

- Support to enable/disable simultaneous multithreading.
- Separate options for wireless networking and Bluetooth for some devices.
- Battery Limit removed for Surface Studio.

Version 2.26.136.0

This version of SEMM includes:

- Support for Surface Studio 2.
- Battery Limit feature.

Version 2.21.136.0

This version of SEMM includes:

- Support for Surface Pro 6.
- Support for Surface Laptop 2.

Version 2.14.136.0

This version of SEMM includes:

- Support for Surface Go.

Version 2.9.136.0

This version of SEMM includes:

- Support for Surface Book 2.
- Support for Surface Pro LTE.
- Accessibility improvements.

Version 1.0.74.0

This version of SEMM includes:

- Support for Surface Laptop.
- Support for Surface Pro.
- Bug fixes and general improvements.

Related articles

- [Enroll and configure Surface devices with SEMM](#)
- [Unenroll Surface devices from SEMM](#)
- [Secure Surface Dock ports with SEMM](#)

Enroll and configure Surface devices with SEMM

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

With Microsoft Surface Enterprise Management Mode (SEMM), you can securely configure the settings of Surface UEFI on a Surface device and manage those settings on Surface devices in your organization. When a Surface device is managed by SEMM, that device is considered *enrolled* (sometimes referred to as activated). This article shows you how to create a Surface UEFI configuration package that will control the settings of Surface UEFI and enroll a Surface device in SEMM.

For a more high-level overview of SEMM, see [Microsoft Surface Enterprise Management Mode](#).

As an alternative to SEMM, newer Surface devices support remote management of a subset of firmware settings via Microsoft Intune. For more information, refer to [Intune management of Surface UEFI settings](#).

ⓘ Note

SEMM is supported on Surface Pro X via the UEFI Manager only. For more information, refer to [Deploying, managing, and servicing Surface Pro X](#).

Download and install Microsoft Surface UEFI Configurator

The tool used to create SEMM packages is Microsoft Surface UEFI Configurator. You can download Microsoft Surface UEFI Configurator from the [Surface Tools for IT](#) page in the Microsoft Download Center. Run the Microsoft Surface UEFI Configurator Windows Installer (.msi) file to start the installation of the tool. When the installer completes, find Microsoft Surface UEFI Configurator in the All Apps section of your Start menu.

ⓘ Note

Microsoft Surface UEFI Configurator is supported only on Windows 10 and Windows 11.

Create a Surface UEFI configuration package

The Surface UEFI configuration package performs both the role of applying a new configuration of Surface UEFI settings to a Surface device managed with SEMM and the role of enrolling Surface devices in SEMM. The creation of a configuration package requires you to have a signing certificate to be used with SEMM to secure the configuration of UEFI settings on each Surface device. For more information about the requirements for the SEMM certificate, see [Microsoft Surface Enterprise Management Mode](#).

To create a Surface UEFI configuration package, follow these steps:

1. Open Microsoft Surface UEFI Configurator from the Start menu.
2. Click **Start**.
3. Click **Configuration Package**, as shown in Figure 1.

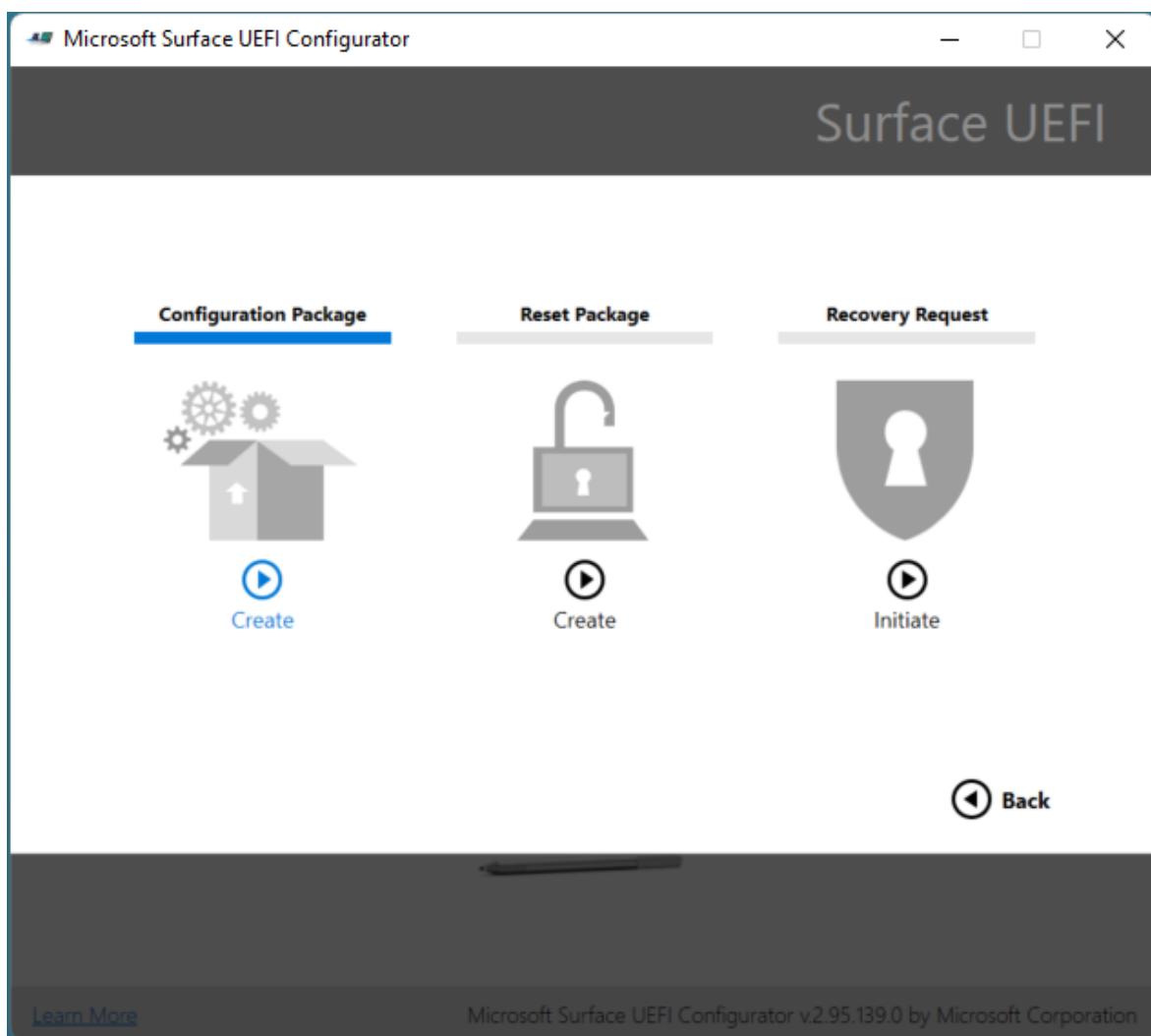


Figure 1. Select Configuration Package to create a package for SEMM enrollment and configuration

4. Click **Certificate Protection** to add your exported certificate file with private key (.pfx), as shown in Figure 2. Browse to the location of your certificate file, select the file, and then click **OK**.

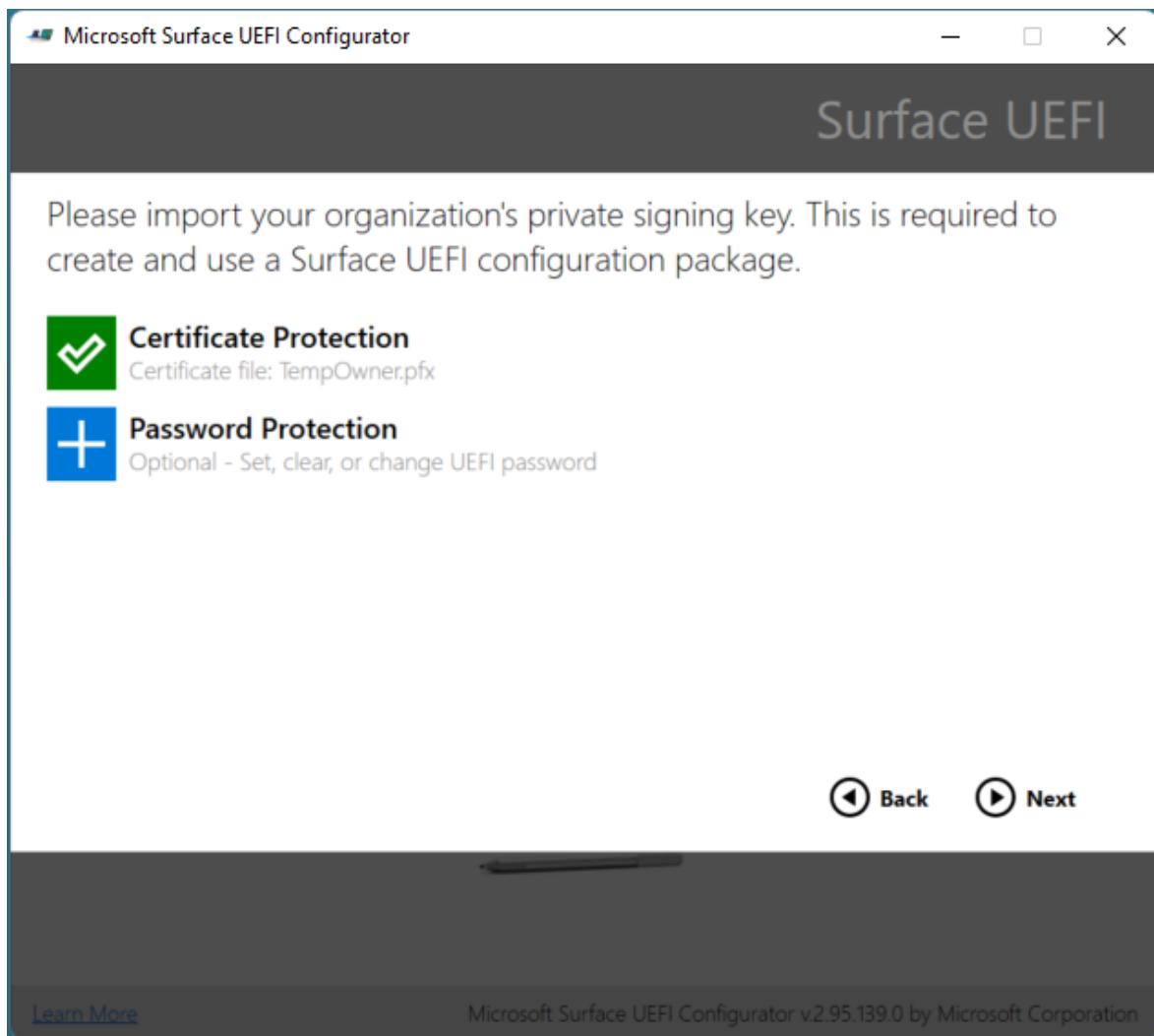


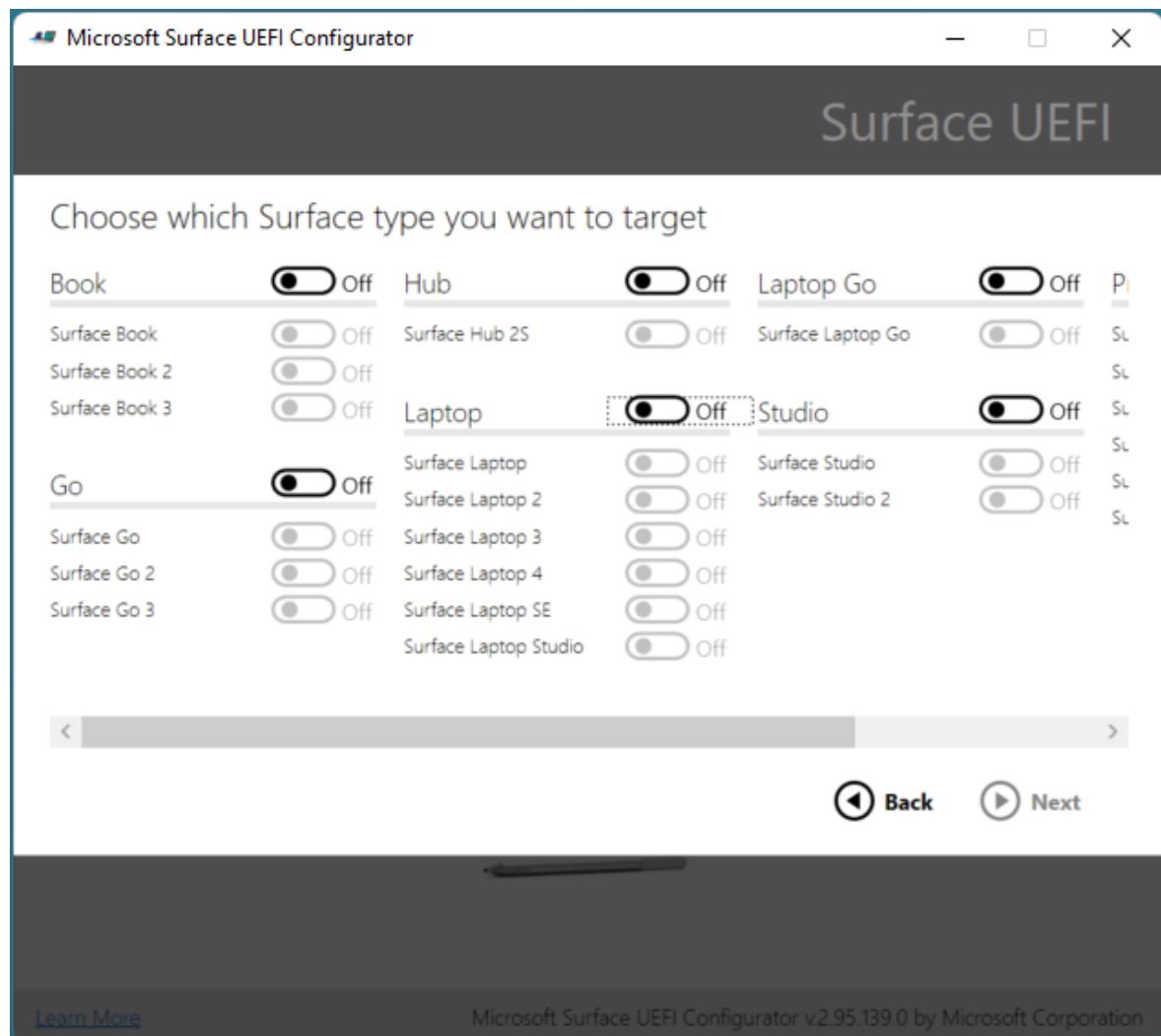
Figure 2. Add the SEMM certificate and Surface UEFI password to the Surface UEFI configuration package

5. When prompted to confirm the certificate password, enter and confirm the password for your certificate file, and then click **OK**.
6. Click **Password Protection** to add a password to Surface UEFI. This password will be required whenever you boot to UEFI. If this password is not entered, only the **PC information**, **About**, **Enterprise management**, and **Exit** pages will be displayed. This step is optional.
7. When prompted, enter and confirm your chosen password for Surface UEFI, and then click **OK**. Leave the password field blank if you want to clear an existing Surface UEFI password.
8. If you do not want the Surface UEFI package to apply to a particular device, on the **Choose which Surface type you want to target** page, click the slider beneath the

corresponding device so that it is in the **Off** position, as shown in Figure 3.

💡 Tip

You must select a device as none are selected by default. Scroll to the right to view all available devices.



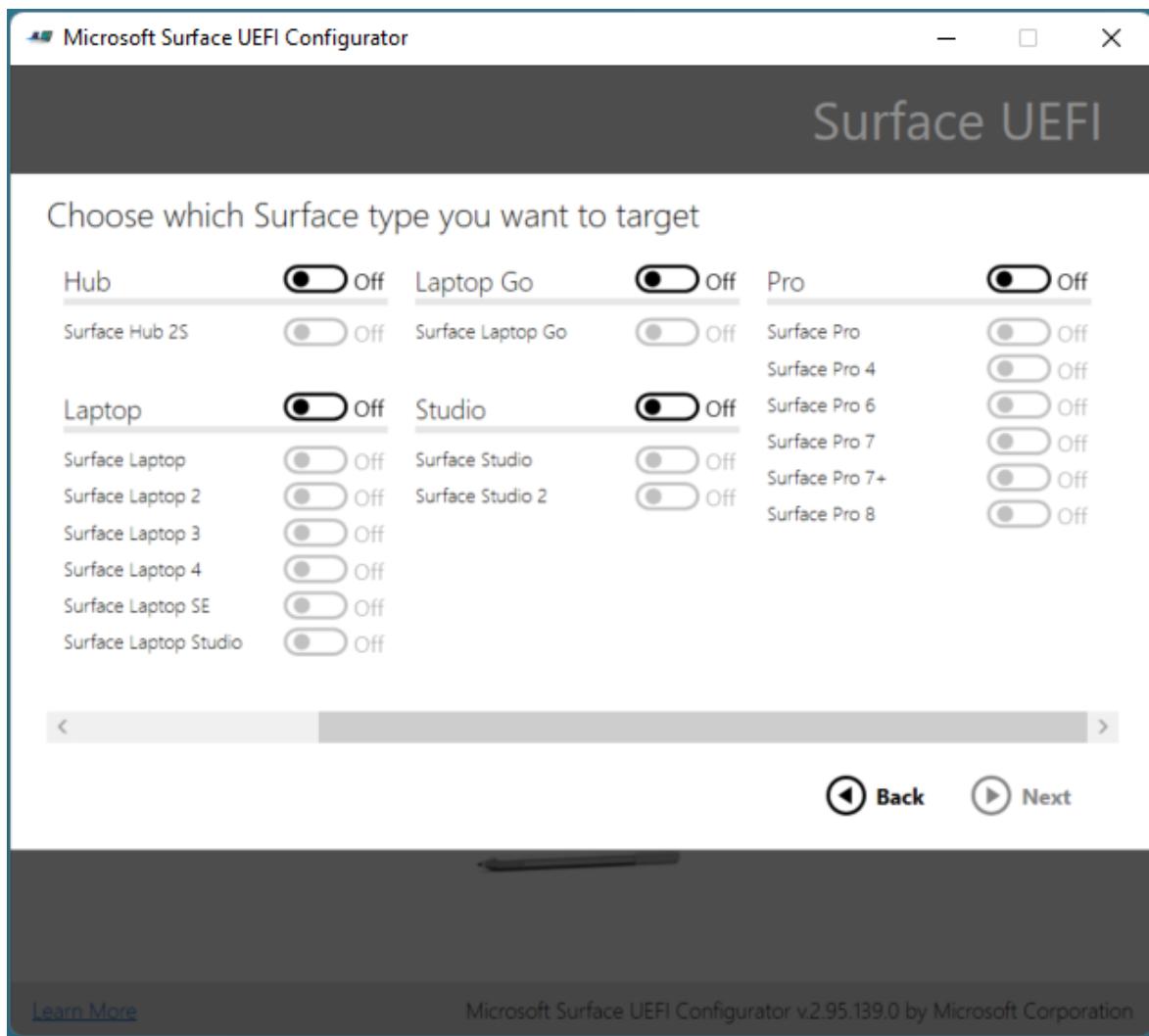


Figure 3. Choose the devices for package compatibility

9. Click **Next**.
10. If you want to deactivate a component on managed Surface devices, on the **Choose which components you want to activate or deactivate** page, click the slider next to any device or group of devices you wish to deactivate so that the slider is in the **Off** position. (Shown in Figure 4.) The default configuration for each device is **On**. Click the **Reset** button to return all sliders to the default position.

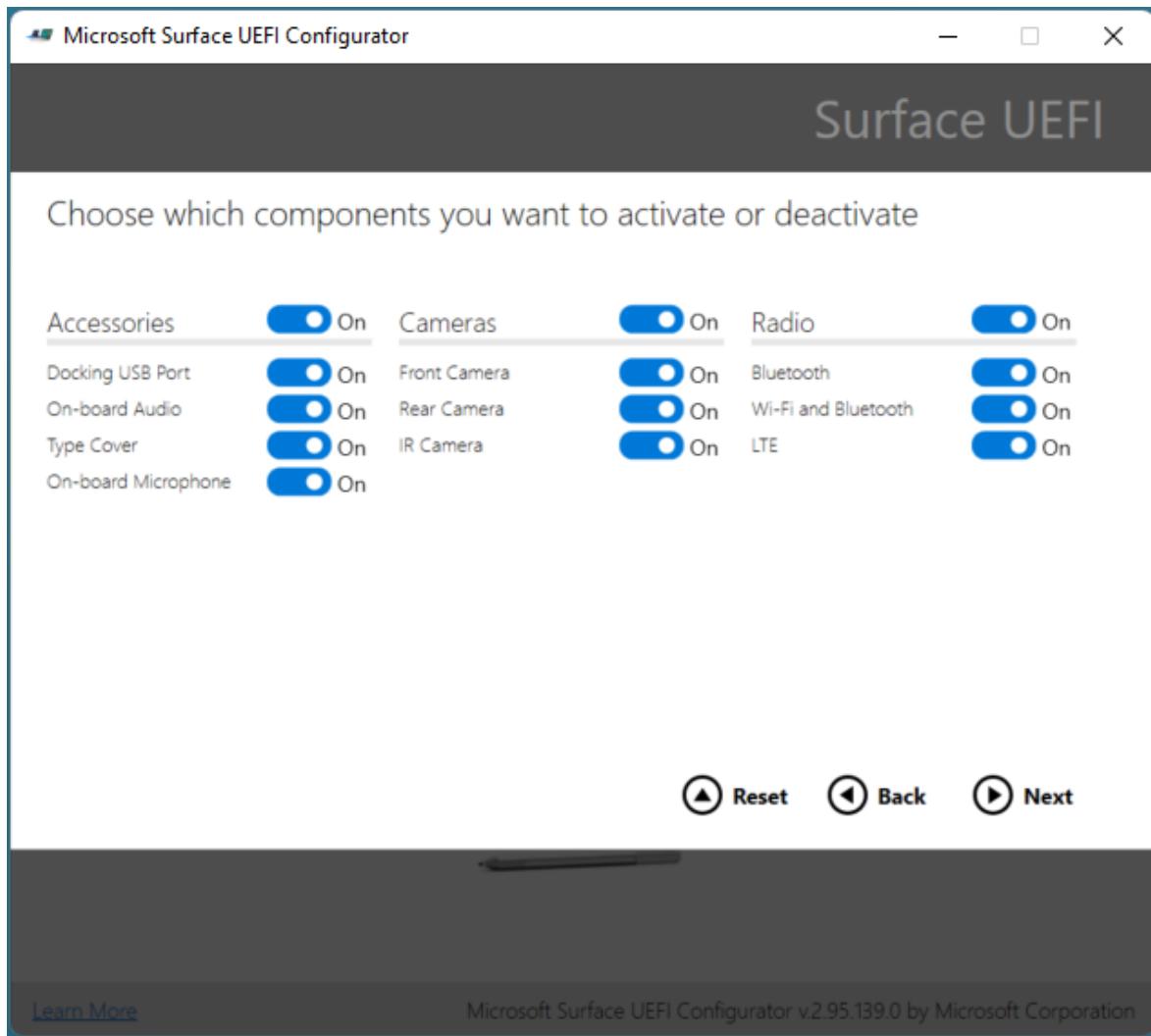


Figure 4. Disable or enable individual Surface components

11. Click **Next**.
12. To enable or disable advanced options in Surface UEFI or the display of Surface UEFI pages, on the **Choose the advanced settings for your devices** page, click the slider beside the desired setting to configure that option to **On** or **Off** (shown in Figure 5). In the **UEFI Front Page** section, you can use the sliders for **Security**, **Devices**, and **Boot** to control what pages are available to users who boot into Surface UEFI. (For more information about Surface UEFI settings, see [Manage Surface UEFI settings](#).) When you have finished selecting options to generate and save the package, click **Build**.

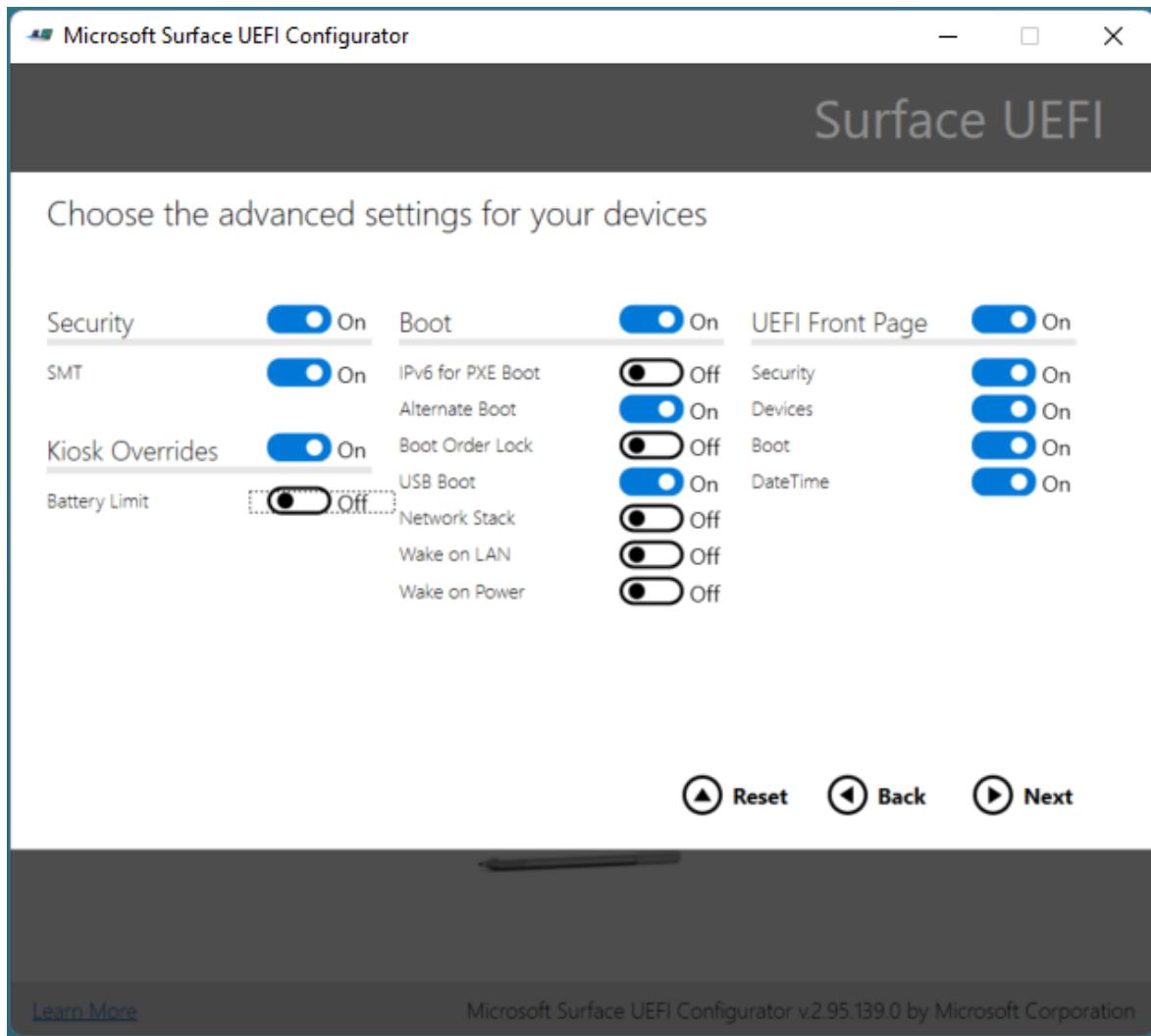


Figure 5. Control advanced Surface UEFI settings and Surface UEFI pages with SEMM

13. In the **Save As** dialog box, specify the Surface UEFI configuration package name, browse to the location where you would like to save the file, and click **Save**.
14. When the package is created and saved, the **Successful** page is displayed.

! Note

Record the certificate thumbprint characters displayed on this page, as shown in Figure 6. You will need these characters to confirm enrollment of new Surface devices in SEMM. Click **End** to complete package creation and close Microsoft Surface UEFI Configurator.

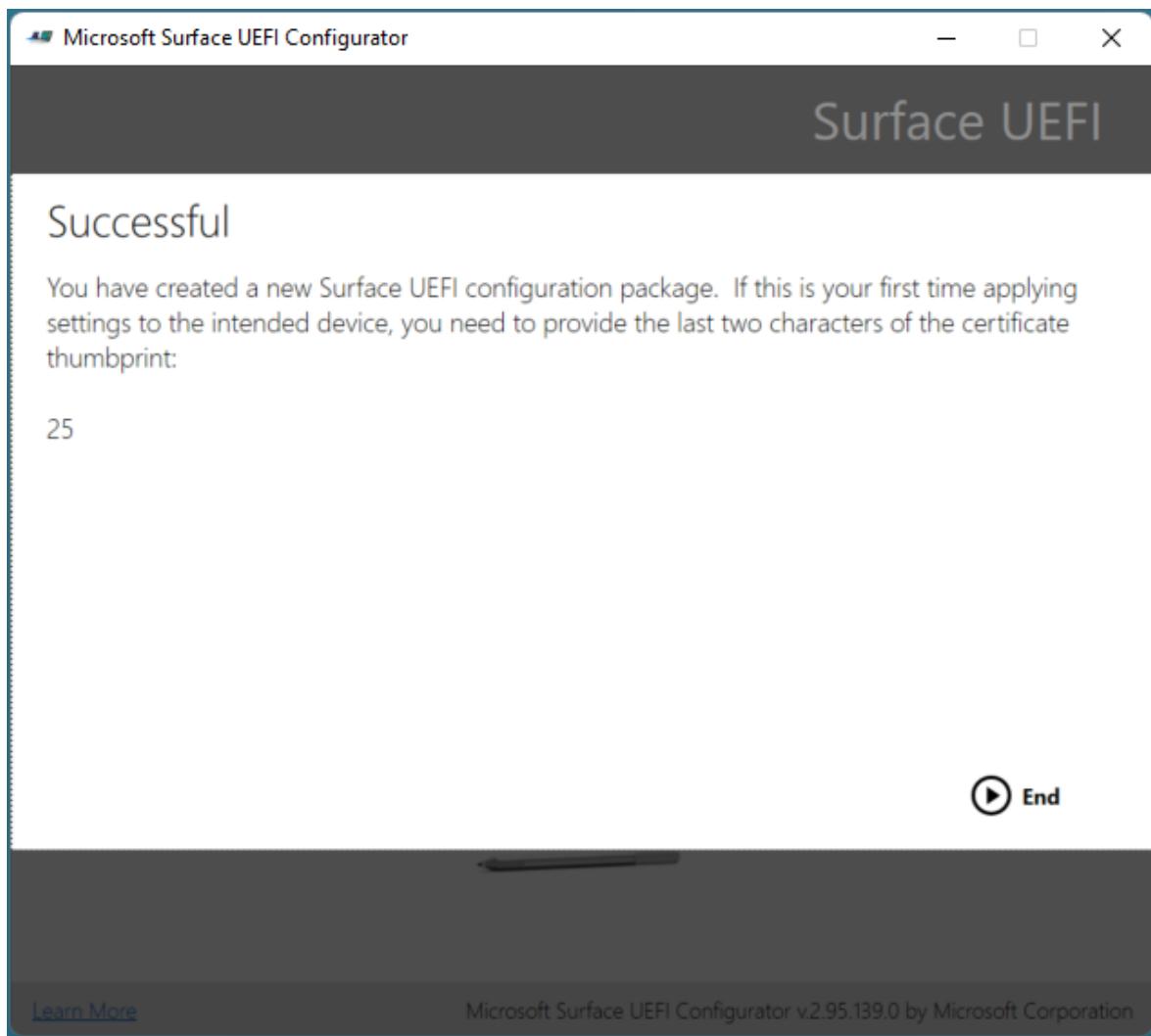


Figure 6. The last two characters of the certificate thumbprint are displayed on the Successful page

Now that you have created your Surface UEFI configuration package, you can enroll or configure Surface devices.

ⓘ Note

When a Surface UEFI configuration package is created, a log file is displayed on the desktop with details of the configuration package settings and options.

Enroll a Surface device in SEMM

When the Surface UEFI configuration package is executed, the SEMM certificate and Surface UEFI configuration files are staged in the firmware storage of the Surface device. When the Surface device reboots, Surface UEFI processes these files and begins the process of applying the Surface UEFI configuration or enrolling the Surface device in SEMM, as shown in Figure 7.

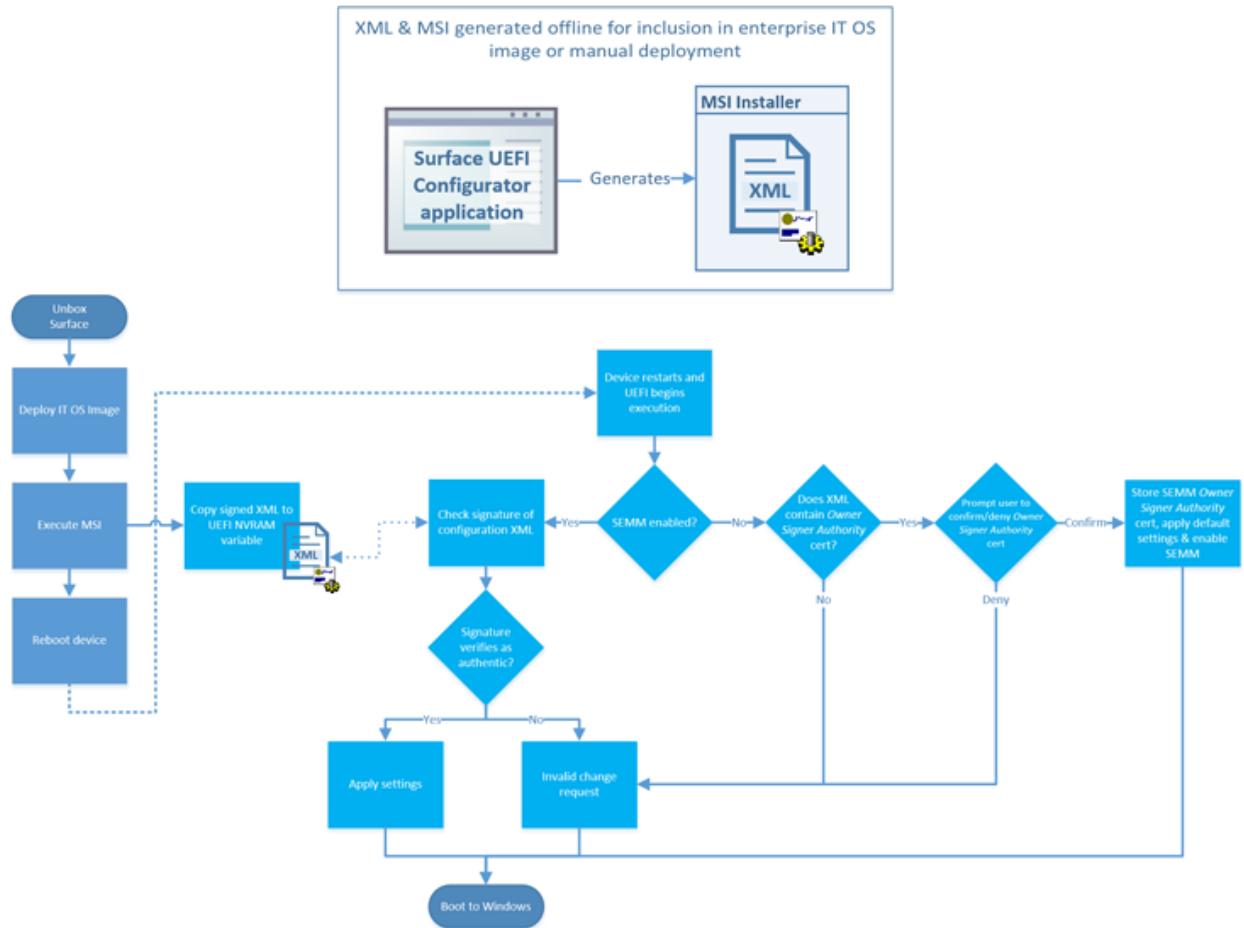


Figure 7. The SEMM process for configuration of Surface UEFI or enrollment of a Surface device

Before you enroll a Surface device in SEMM, ensure that you have the last two characters of the certificate thumbprint on hand. You will need these characters to confirm the device's enrollment (see Figure 6).

To enroll a Surface device in SEMM with a Surface UEFI configuration package, follow these steps:

1. Run the Surface UEFI configuration package .msi file on the Surface device you want to enroll in SEMM. This will provision the Surface UEFI configuration file in the device's firmware.
2. Select the **I accept the terms in the License Agreement** check box to accept the End User License Agreement (EULA), and click **Install** to begin the installation process.
3. Click **Finish** to complete the Surface UEFI configuration package installation and restart the Surface device when you are prompted to do so.
4. Surface UEFI will load the configuration file and determine that SEMM is not enabled on the device. Surface UEFI will then begin the SEMM enrollment process,

as follows:

- Surface UEFI will verify that the SEMM configuration file contains a SEMM certificate.
 - Surface UEFI will prompt you to enter the last two characters of the certificate thumbprint to confirm enrollment of the Surface device in SEMM, as shown in Figure 8.

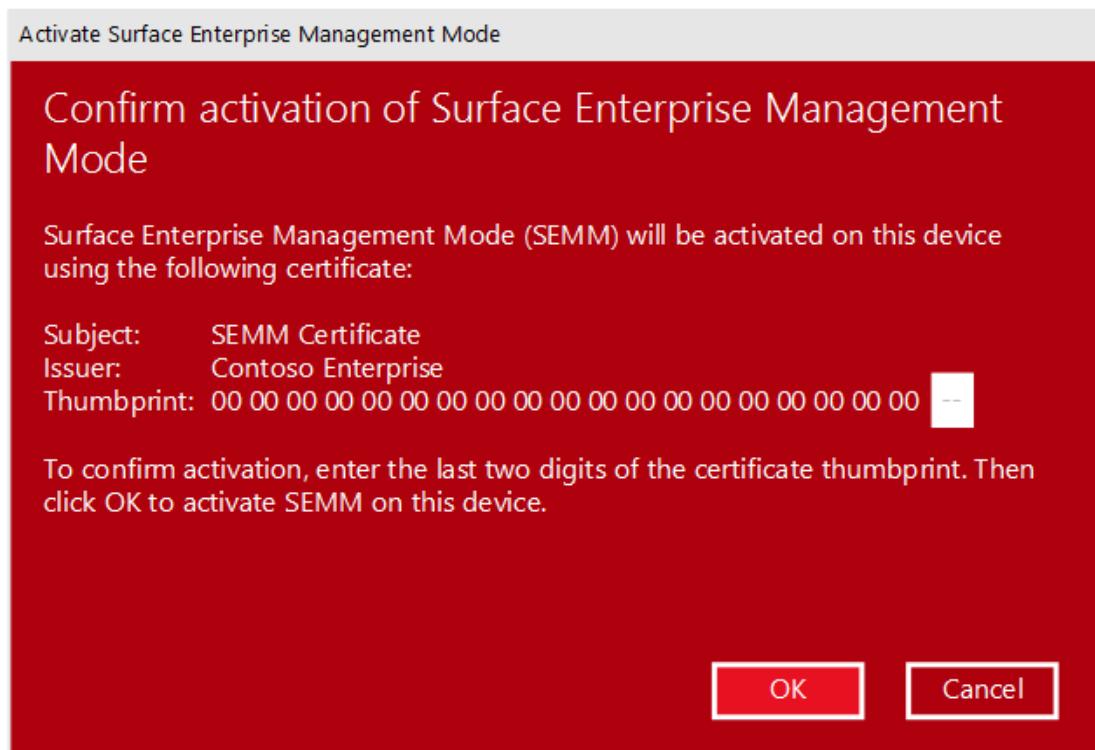


Figure 8. SEMM enrollment requires the last two characters of the certificate thumbprint

- Surface UEFI will store the SEMM certificate in firmware and apply the configuration settings that are specified in the Surface UEFI configuration file.

5. The Surface device is now enrolled in SEMM and will boot to Windows.

You can verify that a Surface device has been successfully enrolled in SEMM by looking for **Microsoft Surface Configuration Package** in **Programs and Features** (as shown in Figure 9), or in the events stored in the **Microsoft Surface UEFI Configurator** log, found under **Applications and Services Logs** in Event Viewer (as shown in Figure 10).

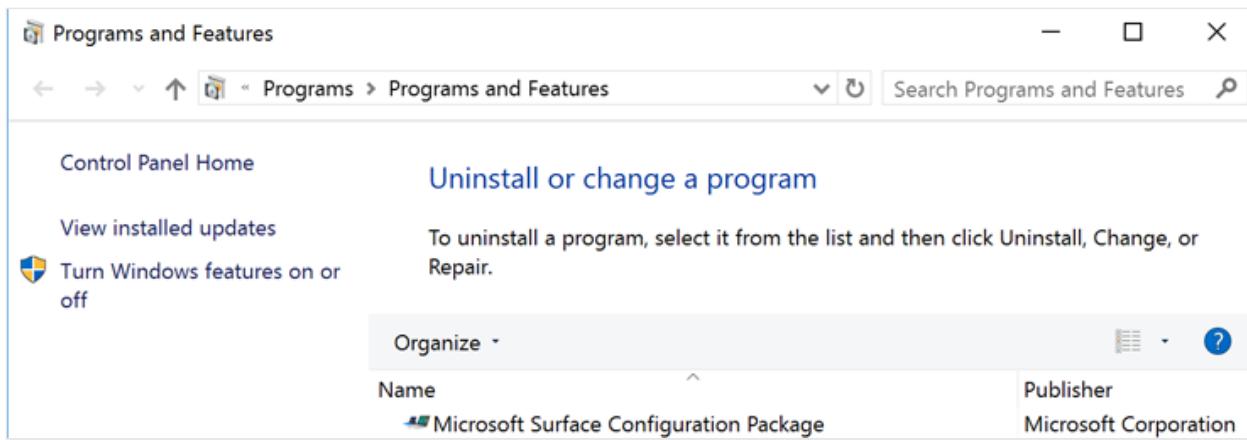


Figure 9. Verify the enrollment of a Surface device in SEMM in Programs and Features

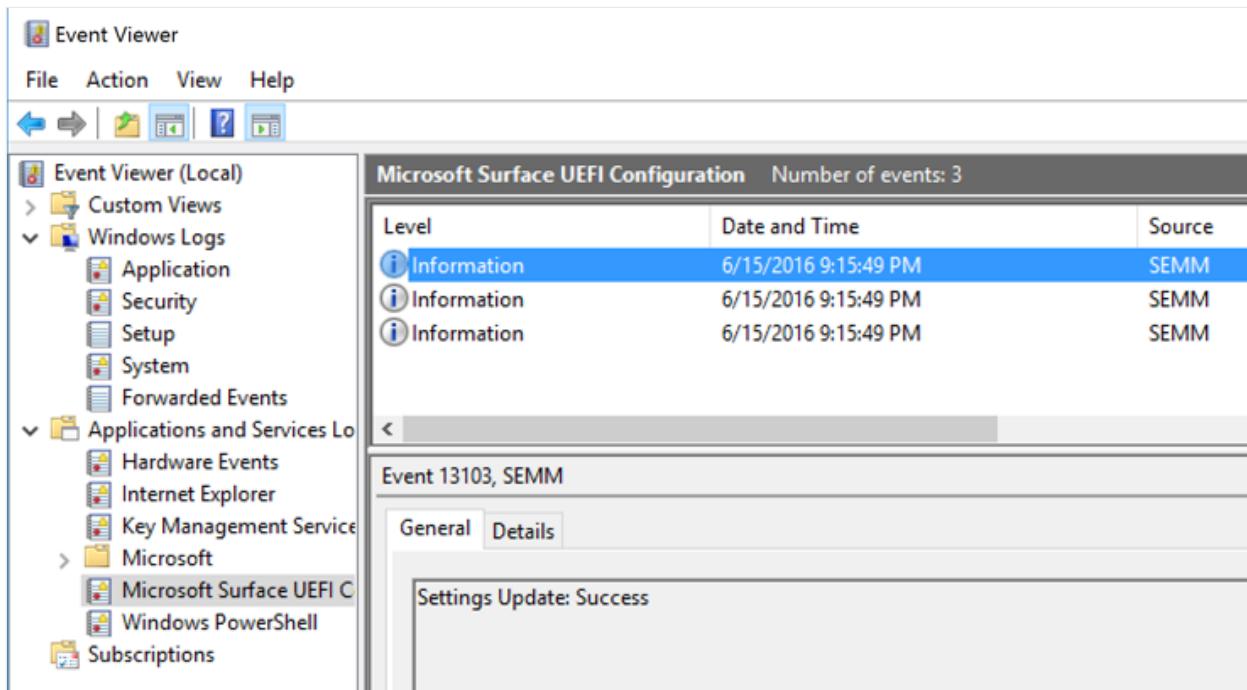


Figure 10. Verify the enrollment of a Surface device in SEMM in Event Viewer

You can also verify that the device is enrolled in SEMM in Surface UEFI – while the device is enrolled, Surface UEFI will contain the **Enterprise management** page (as shown in Figure 11).

Figure 11. The Surface UEFI Enterprise management page

Configure Surface UEFI settings with SEMM

After a device is enrolled in SEMM, you can run Surface UEFI configuration packages signed with the same SEMM certificate to apply new Surface UEFI settings. These settings are applied automatically the next time the device boots, without any interaction from the user. You can use application deployment solutions like Microsoft Endpoint Configuration Manager to deploy Surface UEFI configuration packages to Surface devices to change or manage the settings in Surface UEFI.

For more information about how to deploy Windows Installer (.msi) files with Configuration Manager, see [Deploy and manage applications with Microsoft Endpoint Configuration Manager](#).

Suppose you have secured Surface UEFI with a password. In that case, users without the password who attempt to boot to Surface UEFI will only have the **PC information**, **About**, **Enterprise management**, and **Exit** pages displayed to them.

If you have not secured Surface UEFI with a password or a user enters the password correctly, settings configured with SEMM will be dimmed (unavailable) indicating **Some settings are managed by your organization**, as shown in Figure 12.



Surface UEFI

PC information

Some settings are managed by your organization.

Security

Devices

Devices

Choose which devices and ports are enabled on this Surface.

Boot configuration

Docking port

On

Enterprise management

microSD port

Off

About

Rear camera

Off

Exit

Front camera

Off

Wi-Fi

On

Bluetooth

On

Speakers & microphone

Off

Figure 12. Settings managed by SEMM will be disabled in Surface UEFI

Unenroll Surface devices from SEMM

Article • 01/26/2023 • Applies to: Windows 10, Windows 11

When a Surface device is enrolled in Surface Enterprise Management Mode (SEMM), a certificate is stored in the firmware of that device. The presence of that certificate and the enrollment in SEMM prevent any unauthorized changes to Surface UEFI settings or options while the device is enrolled in SEMM. To restore control of Surface UEFI settings to the user, the Surface device must be unenrolled from SEMM, a process sometimes described as reset or recovery. There are two methods you can use to unenroll a device from SEMM—a Surface UEFI reset package and a Recovery Request.

⚠️ Warning

To unenroll a device from SEMM and restore user control of Surface UEFI settings, you must have the SEMM certificate that was used to enroll the device in SEMM. If this certificate becomes lost or corrupted, it is not possible to unenroll from SEMM. Back up and protect your SEMM certificate accordingly.

For more information about SEMM, see [Microsoft Surface Enterprise Management Mode](#).

Unenroll a Surface device from SEMM with a Surface UEFI reset package

The Surface UEFI reset package is the primary method you use to unenroll a Surface device from SEMM. Like a Surface UEFI configuration package, the reset package is a Windows Installer (.msi) file that configures SEMM on the device. Unlike the configuration package, the reset package will reset the Surface UEFI configuration on a Surface device to its default settings, remove the SEMM certificate, and unenroll the device from SEMM.

Reset packages are created specifically for an individual Surface device. To begin the process of creating a reset package, you will need the serial number of the device you want to unenroll, as well as the SEMM certificate used to enroll the device. You can find the serial number of your Surface device on the **PC information** page of Surface UEFI, as shown in Figure 1. This page is displayed even if Surface UEFI is password protected and the incorrect password is entered.



PC information

Security

Devices

Boot configuration

About

Exit

PC information

Model	Surface Book or Surface Pro 4
System UUID	00000000-0000-0000-0000-000000000000
Serial Number	000000000000
Asset tag	None

Firmware

System UEFI	000.0000.000
SAM Controller	000.0000.000
Intel Management Engine	00.0.0.0000
System Embedded Controller	000.000.000
Touch Firmware	0.00.000.000.00

Figure 1. The serial number of the Surface device is displayed on the Surface UEFI PC information page

① Note

To boot to Surface UEFI, press **Volume Up** and **Power** simultaneously while the device is off. Hold **Volume Up** until the Surface logo is displayed and the device begins to boot.

To create a Surface UEFI reset package, follow these steps:

1. Open Microsoft Surface UEFI Configurator from the Start menu.
2. Click **Start**.
3. Click **Reset Package**, as shown in Figure 2.

Surface UEFI

[Learn More](#)

Microsoft Surface UEFI Configurator by Microsoft Corporation

Figure 2. Click Reset Package to create a package to unenroll a Surface device from SEMM

4. Click **Certificate Protection** to add your SEMM certificate file with private key (.pfx), as shown in Figure 3. Browse to the location of your certificate file, select the file, and then click **OK**.

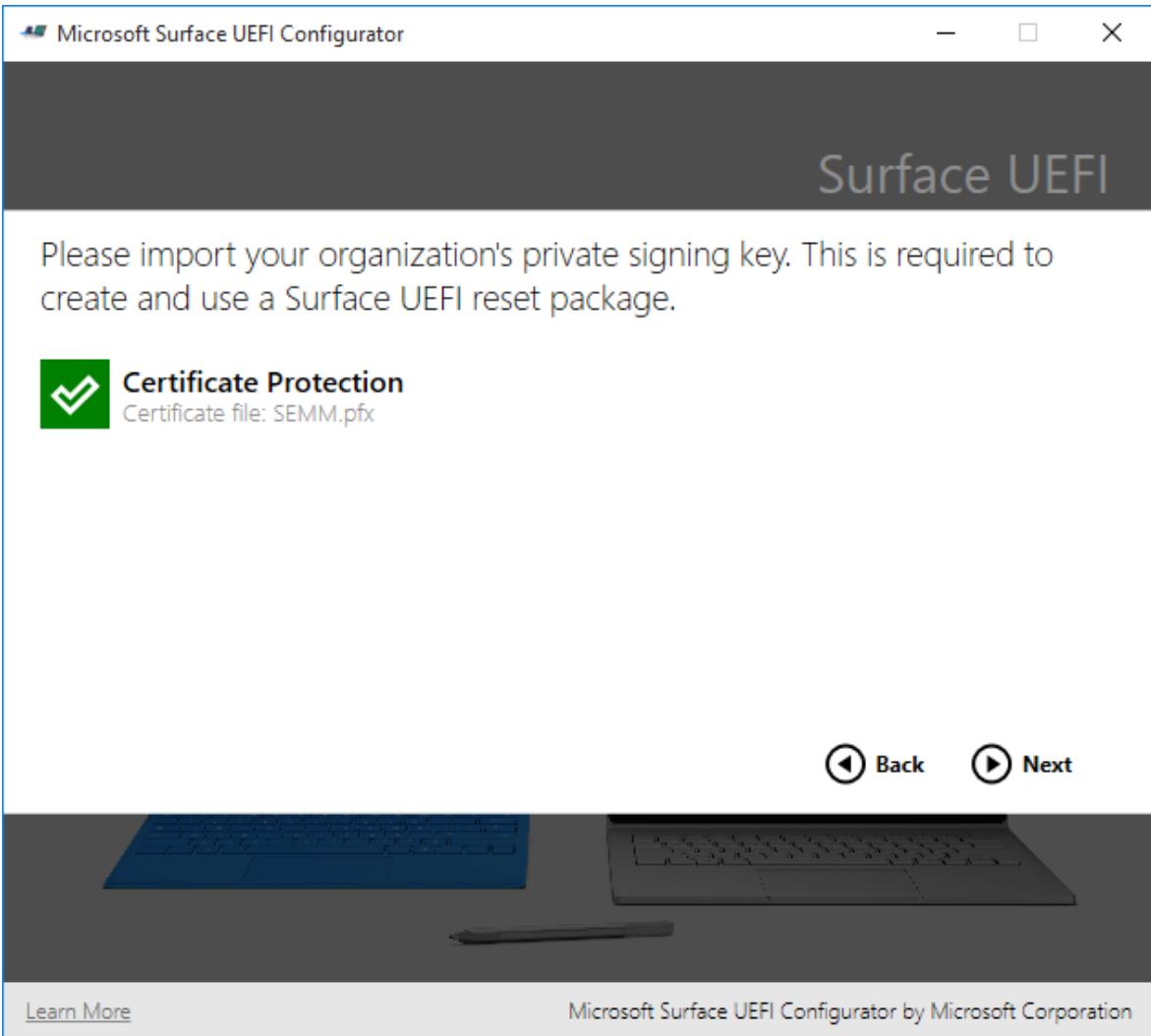


Figure 3. Add the SEMM certificate to a Surface UEFI reset package

5. Click **Next**.
6. Type the serial number of the device you want to unenroll from SEMM (as shown in Figure 4), and then click **Build** to generate the Surface UEFI reset package.

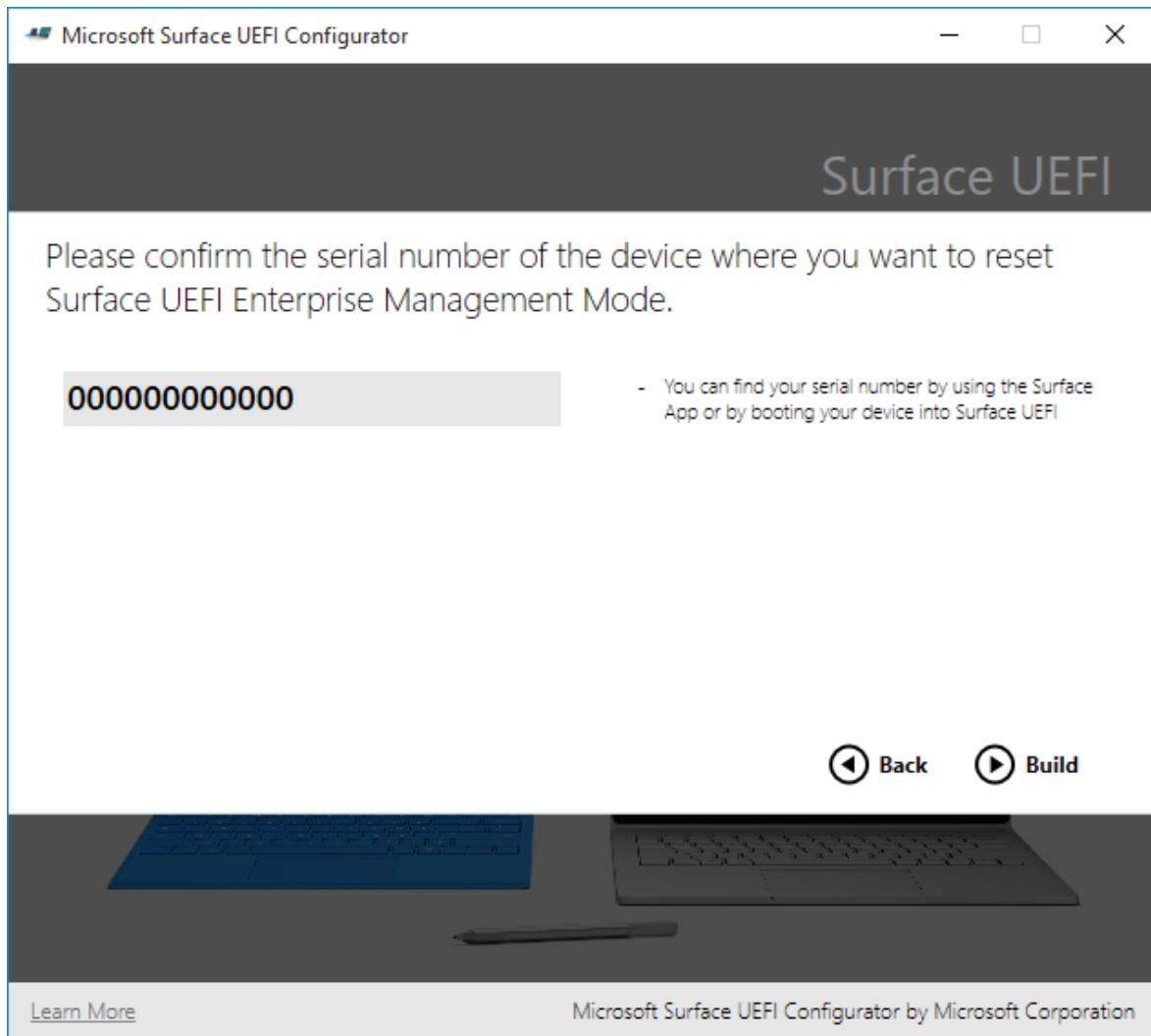


Figure 4. Use the serial number of your Surface device to create a Surface UEFI reset package

7. In the **Save As** dialog box, specify a name for the Surface UEFI reset package, browse to the location where you would like to save the file, and then click **Save**.
8. When the package generation has completed, the **Successful** page is displayed. Click **End** to complete package creation and close Microsoft Surface UEFI Configurator.

Run the Surface UEFI reset package Windows Installer (.msi) file on the Surface device to unenroll the device from SEMM. The reset package will require a reboot to perform the unenroll operation. After the device has been unenrolled, you can verify the successful removal by ensuring that the **Microsoft Surface Configuration Package** item in **Programs and Features** (shown in Figure 5) is no longer present.

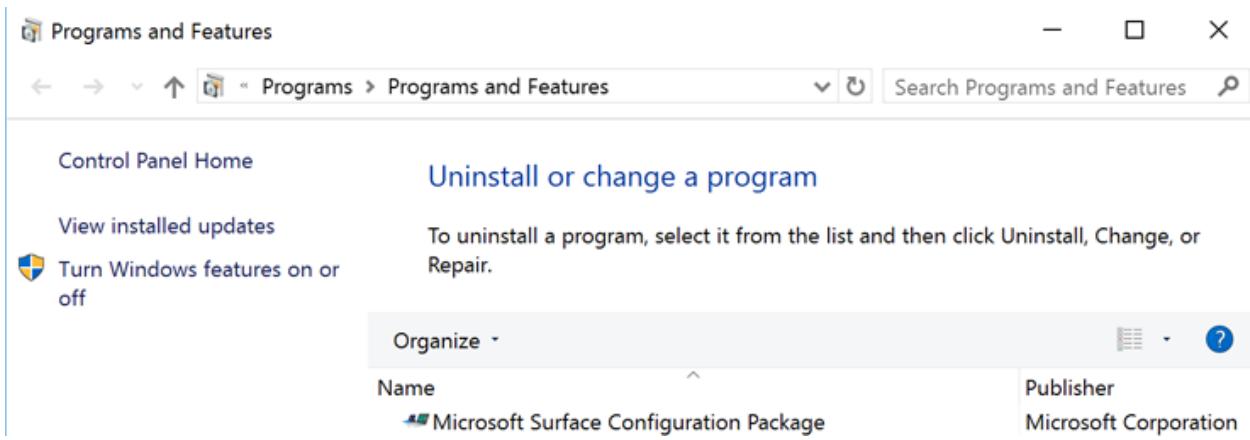


Figure 5. The presence of the Microsoft Surface Configuration Package item in Programs and Features indicates that the device is enrolled in SEMM

Unenroll a Surface device from SEMM with a Recovery Request

In some scenarios, a Surface UEFI reset package may not be a viable option to unenroll a Surface device from SEMM (for example, where Windows has become unusable). In these scenarios you can unenroll the device by using a Recovery Request generated from within Surface UEFI. The Recovery Request process can be initiated even on devices where you do not have the Surface UEFI password.

The Recovery Request process is initiated from Surface UEFI on the Surface device, approved with Microsoft Surface UEFI Configurator on another computer, and then completed in Surface UEFI. Like the reset package, approving a Recovery Request with Microsoft Surface UEFI Configurator requires access to the SEMM certificate that was used to enroll the Surface device.

To initiate a Recovery Request, follow these steps:

1. Boot the Surface device that is to be unenrolled from SEMM to Surface UEFI.
2. Type the Surface UEFI password if you are prompted to do so.
3. Click the **Enterprise management** page, as shown in Figure 6.

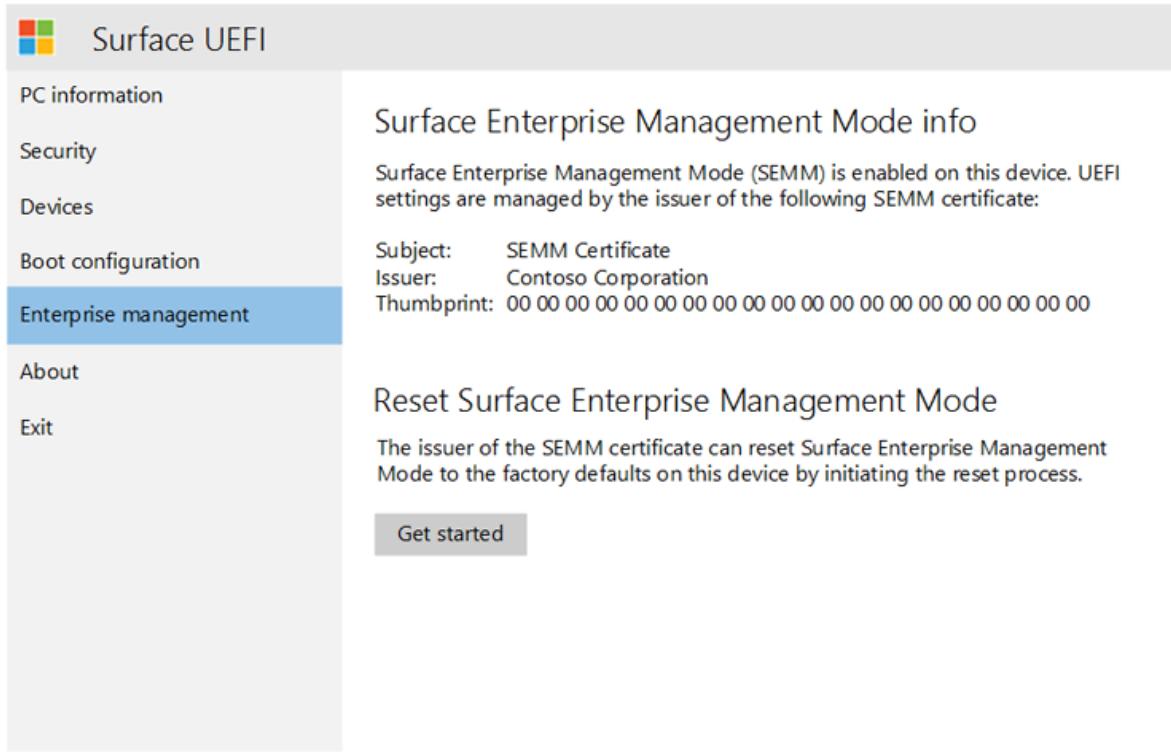


Figure 6. The Enterprise management page is displayed in Surface UEFI on devices enrolled in SEMM

4. Click or press **Get Started**.
 5. Click or press **Next** to begin the Recovery Request process.

! Note

A Recovery Request expires two hours after it is created. If a Recovery Request is not completed in this time, you will have to restart the Recovery Request process.

6. Select **SEMM Certificate** from the list of certificates displayed on the **Choose a SEMM reset key** page (shown in Figure 7), and then click or press **Next**.

Choose a SEMM reset key

The following keys are capable of resetting SEMM on this device. Choose the key you want to use for this Reset Request:

SEMM Certificate

Cancel

Next

Figure 7. Choose SEMM Certificate for your Recovery Request (Reset Request)

7. On the **Enter SEMM reset verification code** page you can click the **QR Code** or **Text** buttons to display your Recovery Request (Reset Request) as shown in Figure 8, or the **USB** button to save your Recovery Request (Reset Request) as a file to a USB drive, as shown in Figure 9.

Enter SEMM reset verification code

A Reset Request was generated for this device. Provide this Reset Request to your IT department to obtain the verification code to complete the reset process. Click an option below to format the Reset Request as required by your IT department. This Reset Request is valid for 2 hours.

USB

QR Code

Text

Enter the reset verification code provided by your IT department to reset SEMM on this device.

Verification code



This Reset Request expires in 2:00:00.
Device serial number: 1234567890

Restart

Verify

Figure 8. A Recovery Request (Reset Request) displayed as a QR Code

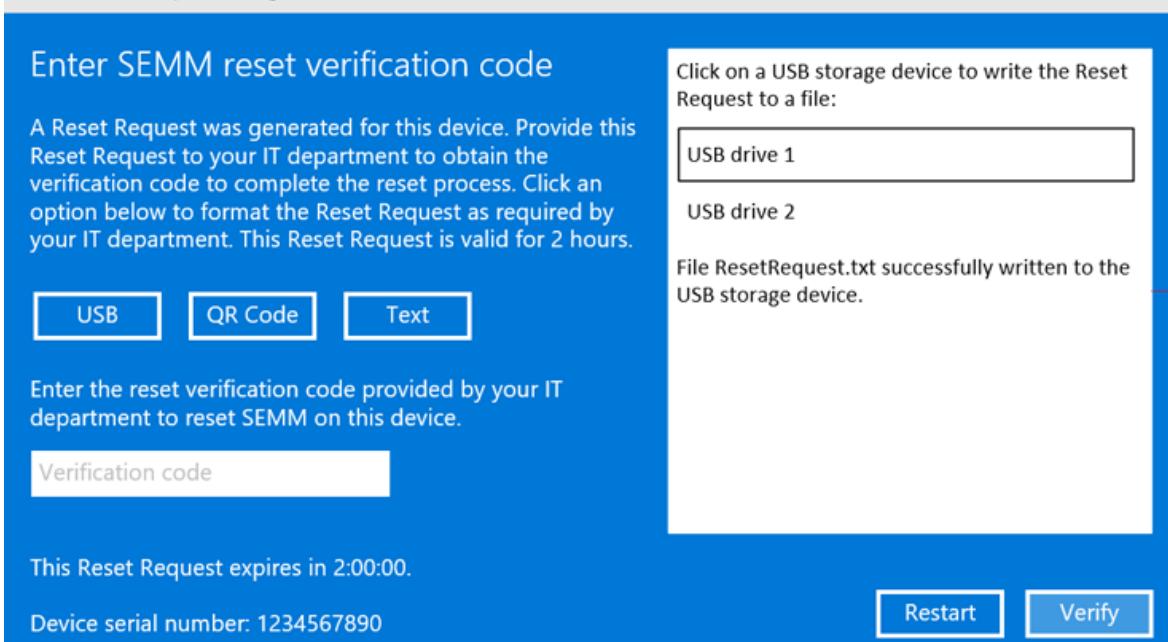


Figure 9. Save a Recovery Request (Reset Request) to a USB drive

- To use a QR Code Recovery Request (Reset Request), use a QR reader app on a mobile device to read the code. The QR reader app will translate the QR code into an alphanumeric string. You can then email or message that string to the administrator that will produce the reset verification code with Microsoft Surface UEFI Configurator.
- To use a Recovery Request (Reset Request) saved to a USB drive as a file, use the USB drive to transfer the file to the computer where Microsoft Surface UEFI Configurator will be used to produce the Reset Verification Code. The file can also be copied from the USB drive on another device to be emailed or transferred over the network.
- To use the Recovery Request (Reset Request) as text, simply type the text directly into Microsoft Surface UEFI Configurator.

8. Open Microsoft Surface UEFI Configurator from the Start menu on another computer.

(!) Note

Microsoft Surface UEFI Configurator must run in an environment that is able to authenticate the certificate chain for the SEMM certificate.

9. Click Start.

10. Click Recovery Request, as shown in Figure 10.

Surface UEFI

Configuration Package



Create

Reset Package



Create

Recovery Request



Initiate



[Learn More](#)

Microsoft Surface UEFI Configurator by Microsoft Corporation

Figure 10. Click Recovery Request to begin the process to approve a Recovery Request

11. Click **Certificate Protection** to authenticate the Recovery Request with the SEMM certificate.
12. Browse to and select your SEMM certificate file, and then click **OK**.
13. When you are prompted to enter the certificate password as shown in Figure 11, type and confirm the password for the certificate file, and then click **OK**.

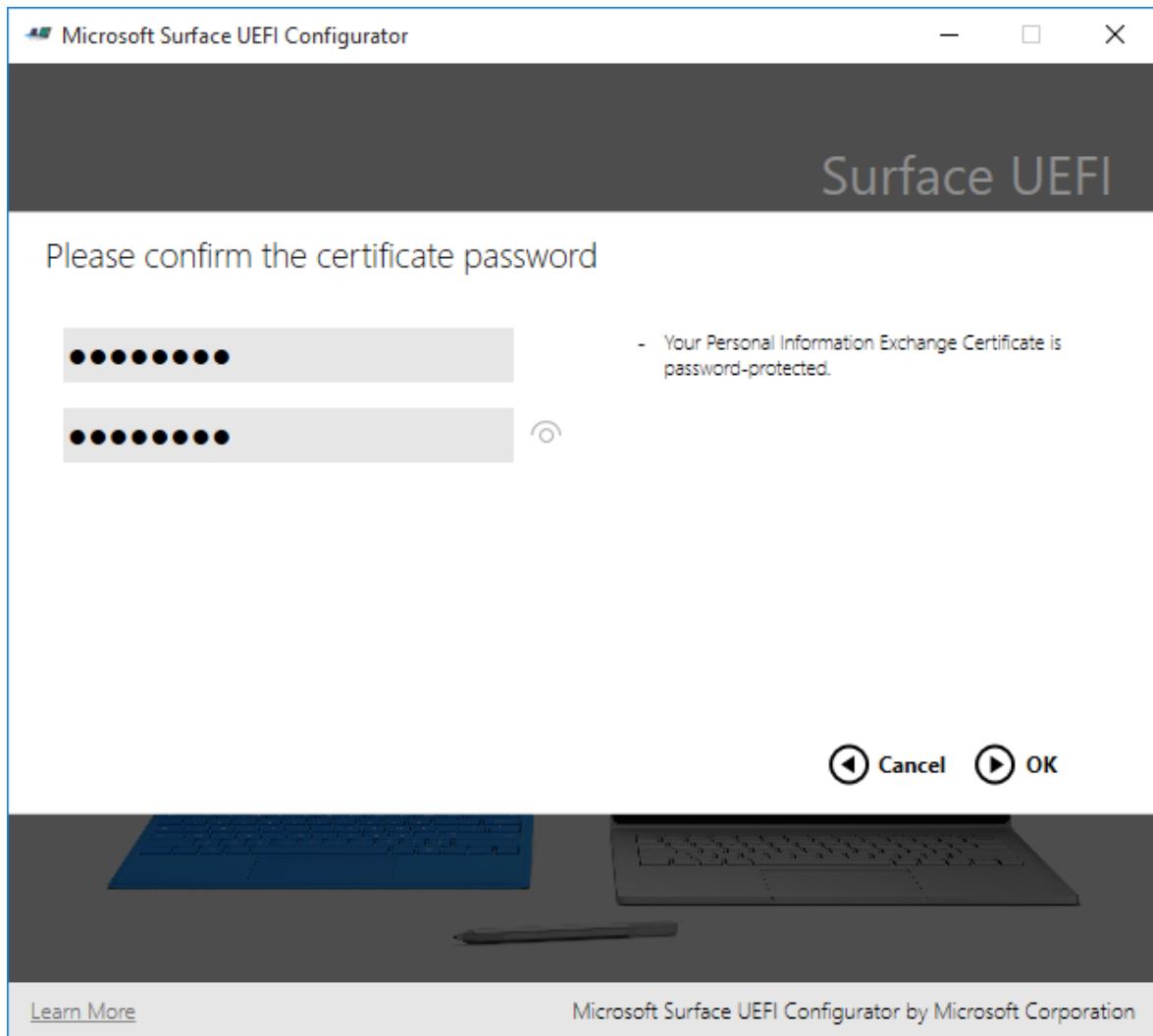


Figure 11. Type the password for the SEMM certificate

14. Click **Next**.

15. Enter the Recovery Request (Reset Request), and then click **Generate** to create a reset verification code (as shown in Figure 12).

Surface UEFI

You can enter here the reset request provided by your user to generate a reset verification code

```
3534996D702619A40E2C01BD2
16585517CB2284750E7F769796
1215C989F7F8EDB19EDA88452E
6433FFFF3E0E1787BEA4126C30
E2C905FCAB018490E6391391CF
FED8537421B7AAB0F8FE9EC79
```

- Note that the reset request provided by your user is valid for 2 hours

 Import

 Back  Generate

[Learn More](#)

Microsoft Surface UEFI Configurator by Microsoft Corporation

Figure 12. Enter the Recovery Request (Reset Request)

- If you displayed the Recovery Request (Reset Request) as text on the Surface device being reset, use the keyboard to type the Recovery Request (Reset Request) in the provided field.
- If you displayed the Recovery Request (Reset Request) as a QR Code and then used a messaging or email application to send the code to the computer with Microsoft Surface UEFI Configurator, copy and paste the code into the provided field.
- If you saved the Recovery Request (Reset Request) as a file to a USB drive, click the **Import** button, browse to and select the Recovery Request (Reset Request) file, and then click **OK**.

16. The reset verification code is displayed in Microsoft Surface UEFI Configurator, as shown in Figure 13.

Surface UEFI

Provide the generated reset verification code to your user to allow un-enrolling from the Surface Enterprise Management Mode

0000000000000000

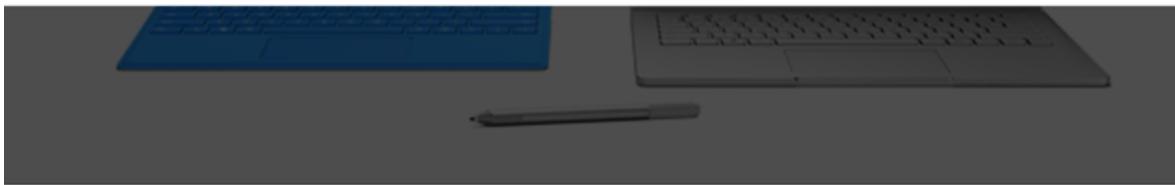
- Please ensure that your user enters the provided reset verification code within 2 hours

Date & Time:

Serial number:

Share

Back End



[Learn More](#)

Microsoft Surface UEFI Configurator by Microsoft Corporation

Figure 13. The reset verification code displayed in Microsoft Surface UEFI Configurator

- Click the **Share** button to send the reset verification code by email.
17. Enter the reset verification code in the provided field on the Surface device (shown in Figure 8), and then click or press **Verify** to reset the device and unenroll the device from SEMM.
18. Click or press **Restart now** on the **SEMM reset successful** page to complete the unenrollment from SEMM, as shown in Figure 14.

SEMM reset successful

SEMM was successfully reset on this device. The UEFI configuration on this device can no longer be remotely managed by your organization.

[Restart now](#)

Figure 14. Successful unenrollment from SEMM

19. Click **End** in Microsoft Surface UEFI Configurator to complete the Recovery Request (Reset Request) process and close Microsoft Surface UEFI Configurator.

Use Microsoft Endpoint Configuration Manager to manage devices with SEMM

Article • 03/04/2023 • Applies to: Windows 10, Windows 11

The Microsoft Surface Enterprise Management Mode (SEMM) feature of Surface UEFI devices lets administrators manage and help secure the configuration of Surface UEFI settings. For most organizations, this process is accomplished by creating Windows Installer (.msi) packages with the Microsoft Surface UEFI Configurator tool. These packages are then run or deployed to the client Surface devices to enroll the devices in SEMM and to update the Surface UEFI settings configuration.

For organizations with Microsoft Endpoint Configuration Manager, there's an alternative to using the Microsoft Surface UEFI Configurator .msi process to deploy and administer SEMM. Microsoft Surface UEFI Manager is a lightweight installer that makes required assemblies for SEMM management available on a device. When you install these assemblies with Microsoft Surface UEFI Manager on a managed client, you can manage SEMM via Configuration Manager with PowerShell scripts, deployed as applications. Doing so eliminates the need for the external Microsoft Surface UEFI Configurator tool.

ⓘ Note

Although the process described in this article may work with earlier versions of Endpoint Configuration Manager or with other third-party management solutions, management of SEMM with Microsoft Surface UEFI Manager and PowerShell is supported only with the Current Branch of Endpoint Configuration Manager.

Prerequisites

Before you begin the process outlined in this article, familiarize yourself with the following technologies and tools:

- [Surface UEFI](#)
- [Surface Enterprise Management Mode \(SEMM\)](#)
- [PowerShell scripting](#)
- [Deploy applications with Configuration Manager](#)

ⓘ Important

You will also need access to the certificate that you intend to use to secure SEMM. For details about the requirements for this certificate, see [Surface Enterprise Management Mode certificate requirements](#).

It is very important that this certificate be kept in a safe location and properly backed up. If this certificate becomes lost or unusable, it is not possible to reset Surface UEFI, change managed Surface UEFI settings, or remove SEMM from an enrolled Surface device.

Download Microsoft Surface UEFI Manager

Management of SEMM with Configuration Manager requires the installation of Microsoft Surface UEFI Manager on each client Surface device. You can download Microsoft Surface UEFI Manager (SurfaceUEFIManager.msi) from the [Surface Tools for IT](#) page on the Microsoft Download Center.

Download SEMM scripts for Configuration Manager

After Microsoft Surface UEFI Manager is installed on the client Surface device, SEMM can be deployed and managed with PowerShell scripts. Get samples of [SEMM management scripts](#) by downloading SEMM_PowerShell.zip from Surface Tools for IT.

Deploy Microsoft Surface UEFI Manager

Deployment of Microsoft Surface UEFI Manager is a typical application deployment. The Microsoft Surface UEFI Manager installer file is a standard Windows Installer file that you can install with the [standard quiet option](#).

The command to install Microsoft Surface UEFI Manager is as follows.

```
msiexec /i "SurfaceUEFIManagerSetup.msi" /q
```

The command to uninstall Microsoft Surface UEFI Manager is as follows.

```
msiexec /x {541DA890-1AEB-446D-B3FD-D5B3BB18F9AF} /q
```

To create a new application and deploy it to a collection that contains your Surface devices, perform the following steps:

1. Open Configuration Manager Console from the **Start** screen or **Start** menu.
2. Select **Software Library** in the bottom left corner of the window.

3. Expand the **Application Management** node of the Software Library, and then select **Applications**.
 4. Select the **Create Application** button under the **Home** tab at the top of the window. This starts the Create Application Wizard.
 5. The Create Application Wizard presents a series of steps:
 - **General** – The **Automatically detect information about this application from installation files** option is selected by default. In the **Type** field, **Windows Installer (.msi file)** is also selected by default. Select **Browse** to navigate to and select **SurfaceUEFIManagerSetup.msi**, and then select **Next**.
-  **Note**

The location of SurfaceUEFIManagerSetup.msi must be on a network share and located in a folder that contains no other files. A local file location cannot be used.
- **Import Information** – The Create Application Wizard parses the .msi file and read the **Application Name** and **Product Code**.
SurfaceUEFIManagerSetup.msi should be listed as the only file under the line **Content Files**, as shown in Figure 1. Select **Next** to proceed.

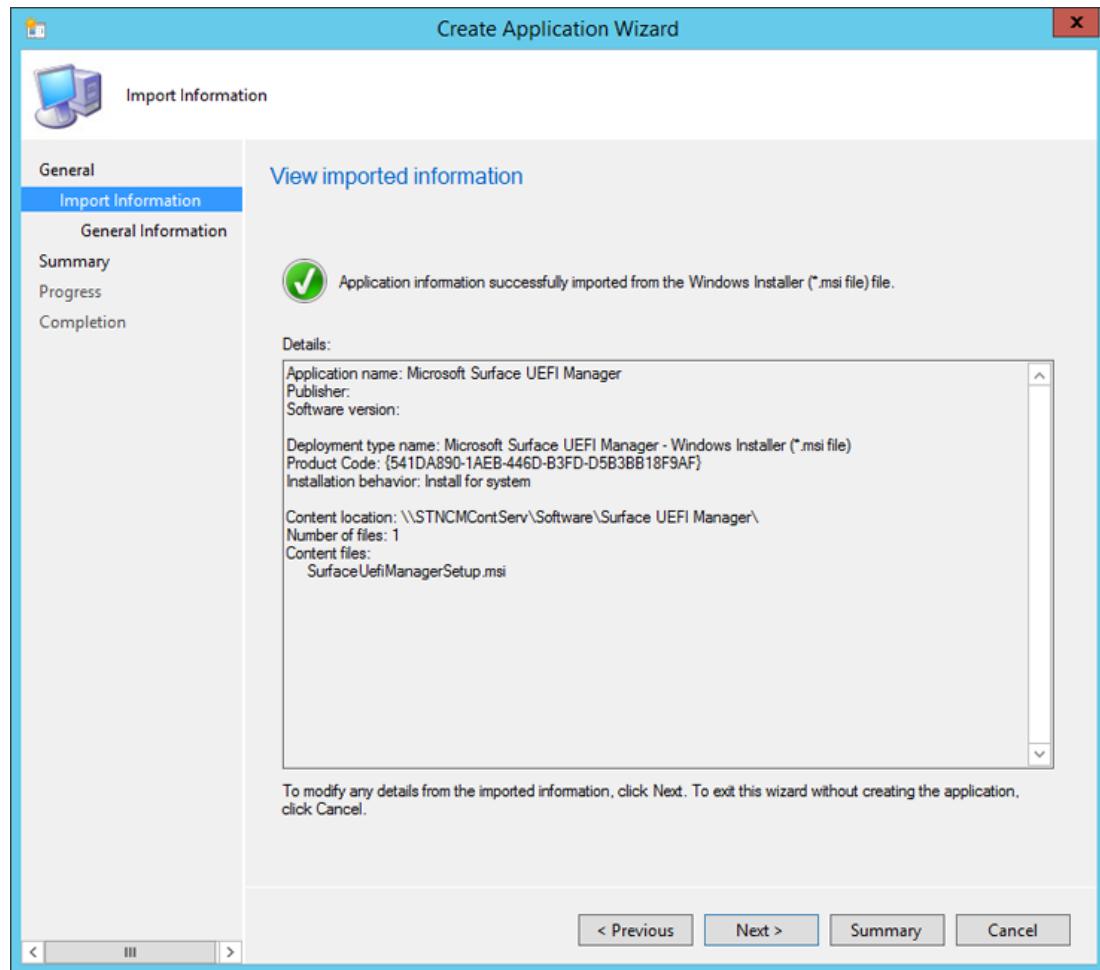


Figure 1. Information from Microsoft Surface UEFI Manager setup is automatically parsed

- **General Information** – You can modify the name of the application and information about the publisher and version, or add comments on this page. The installation command for Microsoft Surface UEFI Manager is displayed in the Installation Program field. The default installation behavior of Install for system allows Microsoft Surface UEFI Manager to install the required assemblies for SEMM even if a user isn't logged on to the Surface device. Select **Next** to proceed.
- **Summary** – The information that was parsed in the **Import Information** step and your selections from the **General Information** step is displayed on this page. Select **Next** to confirm your selections and create the application.
- **Progress** – Displays a progress bar and status as the application is imported and added to the Software Library.
- **Completion** – Confirmation of the successful application creation is displayed when the application creation process is complete. Select **Close** to finish the Create Application Wizard.

After the application is created in Configuration Manager, you can distribute it to your distribution points and deploy it to the collections including your Surface devices. This application won't install or enable SEMM on the Surface device. It only provides the assemblies required for SEMM to be enabled using the PowerShell script.

If you don't want to install the Microsoft Surface UEFI Manager assemblies on devices that won't be managed with SEMM, you can configure Microsoft Surface UEFI Manager as a dependency of the SEMM Configuration Manager scripts. This scenario is covered in the [Deploy SEMM Configuration Manager Scripts](#) section later in this article.

Create or modify the SEMM Configuration Manager scripts

After the required assemblies have been installed on the devices, the process of enrolling the devices in SEMM and configuring Surface UEFI is done with PowerShell scripts and deployed as a script application with Configuration Manager. These scripts can be modified to fit the needs of your organization and environment. For example, you can create multiple configurations for managed Surface devices in different departments or roles. You can download samples of the scripts for SEMM and Configuration Manager from the link in the [Prerequisites](#) section at the beginning of this article.

There are two primary scripts you'll need in order to perform a SEMM deployment with Configuration Manager:

- **ConfigureSEMM.ps1** – Use this script to create configuration packages for your Surface devices with your desired Surface UEFI settings to apply the specified settings to a Surface device, to enroll the device in SEMM, and to set a registry key used to identify the enrollment of the device in SEMM.
- **ResetSEMM.ps1** – Use this script to reset SEMM on a Surface device, which unenrolls it from SEMM and removes the control over Surface UEFI settings.

The sample scripts include examples of how to set Surface UEFI settings and how to control permissions to those settings. These settings can be modified to secure Surface UEFI and set Surface UEFI settings according to the needs of your environment. The following sections of this article explain the ConfigureSEMM.ps1 script and explore the modifications you need to make to the script to fit your requirements.

Note

The SEMM Configuration Manager scripts and the exported SEMM certificate file (.pfx) should be placed in the same folder with no other files before they are added to Configuration Manager.

Manage USB ports on supported devices

With USB port functionality enabled by default on Surface devices, many devices with Surface UEFI allow admins to disable connectivity to USB ports. For example, you may wish to prevent users from copying data from USB thumb drives or external hard disks.

How you manage USB port functionality varies across Surface devices. Recently released devices—Surface Pro 8, Surface Go 3, and Surface Laptop Studio—allow you to use PowerShell to granularly manage the functionality of USB-C ports and disable USB-A. See [Table 1](#) below for a reference of available settings across Surface devices.

For USB-A ports supporting USB2 and USB3, you can disable the USB data protocol from the USB controller to prevent all functionality.

Managing USB-C ports with their support for DisplayPort and USB Power Delivery provides more options beyond disabling all functionality. For example, you can prevent data connectivity to stop users from copying data from USB storage but retain the ability to extend displays and charge the device via a USB-C dock.

Beginning with Surface Pro 8, Surface Laptop Studio, and Surface Go 3, both of these options are now available via the SEMM PowerShell scripts.

To manage USB ports:

1. Go to [Surface Tools for IT](#) and download **SEMM_PowerShell.zip**.
2. Open **ConfigureSEMM.ps1** and modify as appropriate.
3. To disable both USB-A and USB-C ports: For **UsbPortSettingType**, enable the following setting: **UsbPortHwDisabled**.

Additional options for USB-C ports:

1. Run **ConfigureSEMM.ps1** and modify as appropriate.
2. To turn off data only and continue to use USB-C ports for power and display functionality, enable the following mode: **Mode 1 – Data Disabled**.
3. To turn off data, power, and display functionality, enable the following mode: **Mode 2 – Fully Disabled**.

Table 1. USB port management options for Surface devices

Device	USB-A options	USB-C options	Settings	SEMM IDs
Surface Laptop	Enable or disable data	N/A: No USB-C port on device	USBPortEnabled (default)	370-379
Surface Laptop 2				
Surface Pro				
Surface Pro 4			USBPortHWDisabled	
Surface Pro 6				
Surface Studio				
Surface Studio 2				
Surface Laptop SE	Enable or disable data	Enabled data, display out, and power delivery	USBPortEnabled (default)	370-379
Surface Pro 7				
Surface Pro 7+		Disabled data, display out, and power delivery	USBPortHWDisabled	
Surface Pro 9 5G				
Surface Go				
Surface Go 2				
Surface Laptop Go				
Surface Laptop Go 2				
Surface Laptop 3 (Intel only)				
>Surface Laptop 4 (Intel only)				
Surface Laptop 5 (Intel only)				
Surface Studio 2+				
Surface Pro 8	N/A: No USB-A port on device	Enabled data, display-out, and power delivery	UsbPortEnabled (default)	380-389
Surface Pro 9				
Surface Laptop Studio		Disabled data but enabled display-out and power delivery	UsbPortDataDisabled UsbPortHwDisabled	
Surface Laptop 5				
Surface Studio 2+				
Surface Go 3		Disabled data, display-out, and power delivery		
Surface Book 2 and later	Base USB ports are always enabled	Base USB ports are always enabled	n/a	

Device	USB-A options	USB-C options	Settings	SEMM IDs
Surface Book with Performance Base Surface Book	Base USB ports are always enabled	N/A: No USB-C port on device	n/a	

The following sections of this article explain the ConfigureSEMM.ps1 script and explore the modifications you need to make to the script to fit your requirements.

Specify certificate and package names

The first region of the script that you need to modify is the portion that specifies and loads the SEMM certificate, and also indicates SurfaceUEFIManager version, and the names for the SEMM configuration package and SEMM reset package. The certificate name and SurfaceUEFIManager version are specified on lines 56 through 73 in the ConfigureSEMM.ps1 script.

PowerShell

```

56 $WorkingDirPath = split-path -parent $MyInvocation.MyCommand.Definition
57 $packageRoot = "$WorkingDirPath\Config"
58 $certName = "FabrikamSEMMSample.pfx"
59 $D11Version = "2.26.136.0"
60
61 $certNameOnly = [System.IO.Path]::GetFileNameWithoutExtension($certName)
62 $ProvisioningPackage = $certNameOnly + "ProvisioningPackage.pkg"
63 $ResetPackage = $certNameOnly + "ResetPackage.pkg"
64
65 if (-not (Test-Path $packageRoot)) { New-Item -ItemType Directory -Force -Path $packageRoot }
66 Copy-Item "$WorkingDirPath\$certName" $packageRoot
67
68 $privateOwnerKey = Join-Path -Path $packageRoot -ChildPath $certName
69 $ownerPackageName = Join-Path -Path $packageRoot -ChildPath
$ProvisioningPackage
70 $resetPackageName = Join-Path -Path $packageRoot -ChildPath
$ResetPackage
71
72 # If your PFX file requires a password then it can be set here,
otherwise use a blank string.
73 $password = "1234"
```

Replace the **FabrikamSEMMSample.pfx** value for the **\$certName** variable with the name of your SEMM Certificate file on line 58. The script creates a working directory (named

Config) in the folder where your scripts are located, and then copies the certificate file to this working directory.

Owner package and reset package will also be created in the Config directory and hold the configuration for Surface UEFI settings and permissions generated by the script.

On line 73, replace the value of the \$password variable, from 1234 to the password for your certificate file. If a password isn't required, delete the 1234 text.

ⓘ Note

The last two characters of the certificate thumbprint are required to enroll a device in SEMM. This script will display these digits to the user, which allows the user or technician to record these digits before the system reboots to enroll the device in SEMM. The script uses the following code, found on lines 150-155, to accomplish this.

PowerShell

```
150 # Device owners will need the last two characters of the thumbprint to
      accept SEMM ownership.
151 # For convenience we get the thumbprint here and present to the user.
152 $pw = ConvertTo-SecureString $password -AsPlainText -Force
153 $certPrint = New-Object
System.Security.Cryptography.X509Certificates.X509Certificate2
154 $certPrint.Import($privateOwnerKey, $pw,
[System.Security.Cryptography.X509Certificates.X509KeyStorageFlags]::Default
KeySet)
155 Write-Host "Thumbprint =" $certPrint.Thumbprint
```

Administrators with access to the certificate file (.pfx) can read the thumbprint at any time by opening the .pfx file in CertMgr. To view the thumbprint with CertMgr, follow this process:

1. Right-click the .pfx file, and then select **Open**.
2. Expand the folder in the navigation pane.
3. Select **Certificates**.
4. Right-click your certificate in the main pane, and then select **Open**.
5. Select the **Details** tab.
6. **All or Properties Only** must be selected in the **Show** drop-down menu.
7. Select the field **Thumbprint**.

ⓘ Note

The SEMM certificate name and password must also be entered in this section of the ResetSEMM.ps1 script to enable Configuration Manager to remove SEMM from the device with the uninstall action.

Configure permissions

The first region of the script where you'll specify the configuration for Surface UEFI is the **Configure Permissions** region. This region begins at line 210 in the sample script with the comment **# Configure Permissions** and continues to line 247. The following code fragment first sets permissions to all Surface UEFI settings so that they may be modified by SEMM only, then adds explicit permissions to allow the local user to modify the Surface UEFI password, TPM, and front and rear cameras.

PowerShell

```
210 # Configure Permissions
211 foreach ($uefiV2 IN $surfaceDevices.Values) {
212 if ($uefiV2.SurfaceUefiFamily -eq $Device.Model) {
213 Write-Host "Configuring permissions"
214 Write-Host $Device.Model
215 Write-Host "====="
216
217 # Here we define which "identities" will be allowed to modify which
218 #     PermissionSignerOwner = The primary SEMM enterprise owner identity
219 #     PermissionLocal = The user when booting to the UEFI pre-boot GUI
220 #     PermissionSignerUser, PermissionSignerUser1, PermissionSignerUser2 =
221 #         Additional user identities created so that the signer owner
222 #         can delegate permission control for some settings.
223 $ownerOnly = [Microsoft.Surface.IUefiSetting]::PermissionSignerOwner
224 $ownerAndLocalUser =
([Microsoft.Surface.IUefiSetting]::PermissionSignerOwner -bor
[Microsoft.Surface.IUefiSetting]::PermissionLocal)
225
226 # Make all permissions owner only by default
227 foreach ($setting IN $uefiV2.Settings.Values) {
228 $setting.ConfiguredPermissionFlags = $ownerOnly
229 }
230
231 # Allow the local user to change their own password
232 $uefiV2.SettingsById[501].ConfiguredPermissionFlags = $ownerAndLocalUser
233
234 Write-Host ""
235
236 # Create a unique package name based on family and LSV.
237 # We will choose a name that can be parsed by later scripts.
238 $packageName = $uefiV2.SurfaceUefiFamily + "Permissions" + $lsv +
".pkg"
239 $fullPackageName = Join-Path -Path $packageRoot -ChildPath $packageName
```

```

240
241 # Build and sign the Permission package then save it to a file.
242 $permissionPackageStream =
$uefiV2.BuildAndSignPermissionPackage($privateOwnerKey, $password, "", ,
$null, $lsv)
243 $permissionPackage = New-Object System.IO.Filestream($fullPackageName,
[System.IO.FileMode]::CreateNew, [System.IO.FileAccess]::Write)
244 $permissionPackageStream.CopyTo($permissionPackage)
245 $permissionPackage.Close()
246 }
247 }
```

Each `$uefiV2` variable identifies a Surface UEFI setting by setting name or ID, and then configures the permissions to one of the following values:

- `$ownerOnly` – Permission to modify this setting is granted only to SEMM.
- `$ownerAndLocalUser` – Permission to modify this setting is granted to a local user booting to Surface UEFI, as well as to SEMM.

You can find information about the available settings names and IDs for Surface UEFI in the [Settings Names and IDs](#) section of this article.

Configure settings

The second region of the script where you'll specify the configuration for Surface UEFI is the **Configure Settings** region of the `ConfigureSEMM.ps1` script, which configures whether each setting is enabled or disabled. The sample script includes instructions to set all settings to their default values. The script then provides explicit instructions to disable IPv6 for PXE Boot and to leave the Surface UEFI Administrator password unchanged. You can find this region beginning with the `# Configure Settings` comment at line 291 through line 335 in the sample script. The region appears as follows.

PowerShell

```

291 # Configure Settings
292 foreach ($uefiV2 IN $surfaceDevices.Values) {
293 if ($uefiV2.SurfaceUefiFamily -eq $Device.Model) {
294 Write-Host "Configuring settings"
295 Write-Host $Device.Model
296 Write-Host "====="
297
298 # In this demo, we will start by setting every setting to the default
factory setting.
299 # You may want to start by doing this in your scripts
300 # so that every setting gets set to a known state.
301 foreach ($setting IN $uefiV2.Settings.Values) {
302 $setting.ConfiguredValue = $setting.DefaultValue
303 }
```

```

304
305 $EnabledValue = "Enabled"
306 $DisabledValue = "Disabled"
307
308 # If you want to set something to a different value from the default,
309 # here are examples of how to accomplish this.
310 # This disables IPv6 PXE boot by name:
311 $uefiV2.Settings["IPv6 for PXE Boot"].ConfiguredValue = $DisabledValue
312
313 # This disables IPv6 PXE Boot by ID:
314 $uefiV2.SettingsById[400].ConfiguredValue = $DisabledValue
315
316 Write-Host ""
317
318 # If you want to leave the setting unmodified, set it to $null
319 # PowerShell has issues setting things to $null so
ClearConfiguredValue()
320 # is supplied to do this explicitly.
321 # Here is an example of leaving the UEFI administrator password as-is,
322 # even after we initially set it to factory default above.
323 $uefiV2.SettingsById[501].ClearConfiguredValue()
324
325 # Create a unique package name based on family and LSV.
326 # We will choose a name that can be parsed by later scripts.
327 $packageName = $uefiV2.SurfaceUefiFamily + "^Settings^" + $lsv + ".pkg"
328 $fullPackageName = Join-Path -Path $packageRoot -ChildPath $packageName
329
330 # Build and sign the Settings package then save it to a file.
331 $settingsPackageStream =
$uefiV2.BuildAndSignSecuredSettingsPackage($privateOwnerKey, $password, "", $null, $lsv)
332 $settingsPackage = New-Object System.IO.Filestream($fullPackageName,
[System.IO.FileMode]::CreateNew, [System.IO FileAccess]::Write)
333 $settingsPackageStream.CopyTo($settingsPackage)
334 $settingsPackage.Close()
335 }

```

Like the permissions set in the **Configure Permissions** section of the script, the configuration of each Surface UEFI setting is performed by defining the **\$uefiV2** variable. For each line defining the **\$uefiV2** variable, a Surface UEFI setting is identified by setting name or ID and the configured value is set to **Enabled** or **Disabled**.

If you don't want to alter the configuration of a Surface UEFI setting, for example to ensure that the Surface UEFI administrator password isn't cleared by the action of resetting all Surface UEFI settings to their default, you can use **ClearConfiguredValue()** to enforce that this setting won't be altered. In the sample script, this is used on line 323 to prevent the clearing of the Surface UEFI Administrator password, identified in the sample script by its setting ID, **501**.

You can find information about the available settings names and IDs for Surface UEFI in the [Settings Names and IDs](#) section later in this article.

Settings registry key

To identify enrolled systems for Configuration Manager, the ConfigureSEMM.ps1 script writes registry keys that can be used to identify enrolled systems as having been installed with the SEMM configuration script. These keys can be found at the following location.

```
HKLM\SOFTWARE\Microsoft\Surface\SEMM
```

The following code fragment, found on lines 380-477, is used to write these registry keys.

PowerShell

```
380 # For Endpoint Configuration Manager or other management solutions that
wishes to know what version is applied, tattoo the LSV and current Date Time
(in UTC) to the registry:
381 $UTCDate = (Get-Date).ToUniversalTime().ToString()
382 $certIssuer = $certPrint.Issuer
383 $certSubject = $certPrint.Subject
384
385 $SurfaceRegKey = "HKLM:\SOFTWARE\Microsoft\Surface\SEMM"
386 New-RegKey $SurfaceRegKey
387 $LSVRegValue = Get-ItemProperty $SurfaceRegKey LSV -ErrorAction
SilentlyContinue
388 $DateTimeRegValue = Get-ItemProperty $SurfaceRegKey LastConfiguredUTC -
ErrorAction SilentlyContinue
389 $OwnershipSessionIdRegValue = Get-ItemProperty $SurfaceRegKey
OwnershipSessionId -ErrorAction SilentlyContinue
390 $PermissionSessionIdRegValue = Get-ItemProperty $SurfaceRegKey
PermissionSessionId -ErrorAction SilentlyContinue
391 $SettingsSessionIdRegValue = Get-ItemProperty $SurfaceRegKey
SettingsSessionId -ErrorAction SilentlyContinue
392 $IsResetRegValue = Get-ItemProperty $SurfaceRegKey IsReset -ErrorAction
SilentlyContinue
393 $certUsedRegValue = Get-ItemProperty $SurfaceRegKey CertName -
ErrorAction SilentlyContinue
394 $certIssuerRegValue = Get-ItemProperty $SurfaceRegKey CertIssuer -
ErrorAction SilentlyContinue
395 $certSubjectRegValue = Get-ItemProperty $SurfaceRegKey CertSubject -
ErrorAction SilentlyContinue
396
397
398 If ($LSVRegValue -eq $null)
399 {
400     New-ItemProperty -Path $SurfaceRegKey -Name LSV -PropertyType DWORD
-Value $lsv | Out-Null
```

```
401 }
402 Else
403 {
404     Set-ItemProperty -Path $SurfaceRegKey -Name LSV -Value $lsv
405 }
406
407 If ($DateTimeRegValue -eq $null)
408 {
409     New-ItemProperty -Path $SurfaceRegKey -Name LastConfiguredUTC -
410     PropertyType String -Value $UTCDate | Out-Null
411 }
412 Else
413 {
414     Set-ItemProperty -Path $SurfaceRegKey -Name LastConfiguredUTC -Value
415     $UTCDate
416 }
417
418 If ($OwnershipSessionIdRegValue -eq $null)
419 {
420     New-ItemProperty -Path $SurfaceRegKey -Name OwnershipSessionId -
421     PropertyType String -Value $ownerSessionIdValue | Out-Null
422 }
423 Else
424 {
425     Set-ItemProperty -Path $SurfaceRegKey -Name OwnershipSessionId -
426     Value $ownerSessionIdValue
427 }
428
429 If ($PermissionSessionIdRegValue -eq $null)
430 {
431     New-ItemProperty -Path $SurfaceRegKey -Name PermissionSessionId -
432     PropertyType String -Value $permissionSessionIdValue | Out-Null
433 }
434 Else
435 {
436     Set-ItemProperty -Path $SurfaceRegKey -Name PermissionSessionId -
437     Value $permissionSessionIdValue
438 }
439 Else
440 {
441     Set-ItemProperty -Path $SurfaceRegKey -Name SettingsSessionId -Value
442     $settingsSessionIdValue
443 }
444 Else
445 {
446     New-ItemProperty -Path $SurfaceRegKey -Name IsReset -PropertyType
447     DWORD -Value 0 | Out-Null
448 }
```

```

447 Else
448 {
449     Set-ItemProperty -Path $SurfaceRegKey -Name IsReset -Value 0
450 }
451
452 If ($certUsedRegValue -eq $null)
453 {
454     New-ItemProperty -Path $SurfaceRegKey -Name CertName -PropertyType
String -Value $certName | Out-Null
455 }
456 Else
457 {
458     Set-ItemProperty -Path $SurfaceRegKey -Name CertName -Value
$certName
459 }
460
461 If ($certIssuerRegValue -eq $null)
462 {
463     New-ItemProperty -Path $SurfaceRegKey -Name CertIssuer -PropertyType
String -Value $certIssuer | Out-Null
464 }
465 Else
466 {
467     Set-ItemProperty -Path $SurfaceRegKey -Name CertIssuer -Value
$certIssuer
468 }
469
470 If ($certSubjectRegValue -eq $null)
471 {
472     New-ItemProperty -Path $SurfaceRegKey -Name CertSubject -
PropertyType String -Value $certSubject | Out-Null
473 }
474 Else
475 {
476     Set-ItemProperty -Path $SurfaceRegKey -Name CertSubject -Value
$certSubject
477 }

```

Settings names and IDs

To configure Surface UEFI settings or permissions for Surface UEFI settings, you must refer to each setting by either its setting name or setting ID. With each new update for Surface UEFI, new settings may be added. Running ShowSettingsOptions.ps1 script (from SEMM_Powershell.zip in [Surface Tools for IT](#)) provides details of available settings. The computer where ShowSettingsOptions.ps1 is run must have Microsoft Surface UEFI Manager installed, but the script doesn't require a Surface device.

Deploy SEMM Configuration Manager scripts

After your scripts are prepared to configure and enable SEMM on the client device, the next step is to add these scripts as an application in Configuration Manager. Before you open Configuration Manager, ensure that the following files are in a shared folder that doesn't include other files:

- ConfigureSEMM.ps1
- ResetSEMM.ps1
- Your SEMM certificate (for example SEMMCertificate.pfx)

The SEMM Configuration Manager scripts are added to Configuration Manager as a script application. The command to install SEMM with ConfigureSEMM.ps1 is as follows.

```
Powershell.exe -file ".\ConfigureSEMM.ps1"
```

The command to uninstall SEMM with ResetSEMM.ps1 is as follows.

```
Powershell.exe -file ".\ResetSEMM.ps1"
```

To add the SEMM Configuration Manager scripts to Configuration Manager as an application, use the following process:

1. Start the Create Application Wizard using Step 1 through Step 5 from the [Deploy Microsoft Surface UEFI Manager](#) section earlier in this article.
2. Proceed through The Create Application Wizard as follows:
 - **General** – Select **Manually specify the application information**, and then select **Next**.
 - **General Information** – Enter a name for the application (for example SEMM) and any other information you want such as publisher, version, or comments on this page. Select **Next** to proceed.
 - **Application Catalog** – The fields on this page can be left with their default values. Select **Next**.
 - **Deployment Types** – Select **Add** to start the Create Deployment Type Wizard.
 - Proceed through the steps of the Create Deployment Type Wizard, as follows:
 - **General** – Select **Script Installer** from the **Type** drop-down menu. The **Manually specify the deployment type information** option will automatically be selected. Select **Next** to proceed.
 - **General Information** – Enter a name for the deployment type (for example SEMM Configuration Scripts), and then select **Next** to continue.

- **Content** – Select **Browse** next to the **Content Location** field, and then select the folder where your SEMM Configuration Manager scripts are located. In the **Installation Program** field, type the [installation command](#) found earlier in this article. In the **Uninstall Program** field, enter the [uninstallation command](#) found earlier in this article (shown in Figure 2). Select **Next** to move to the next page.

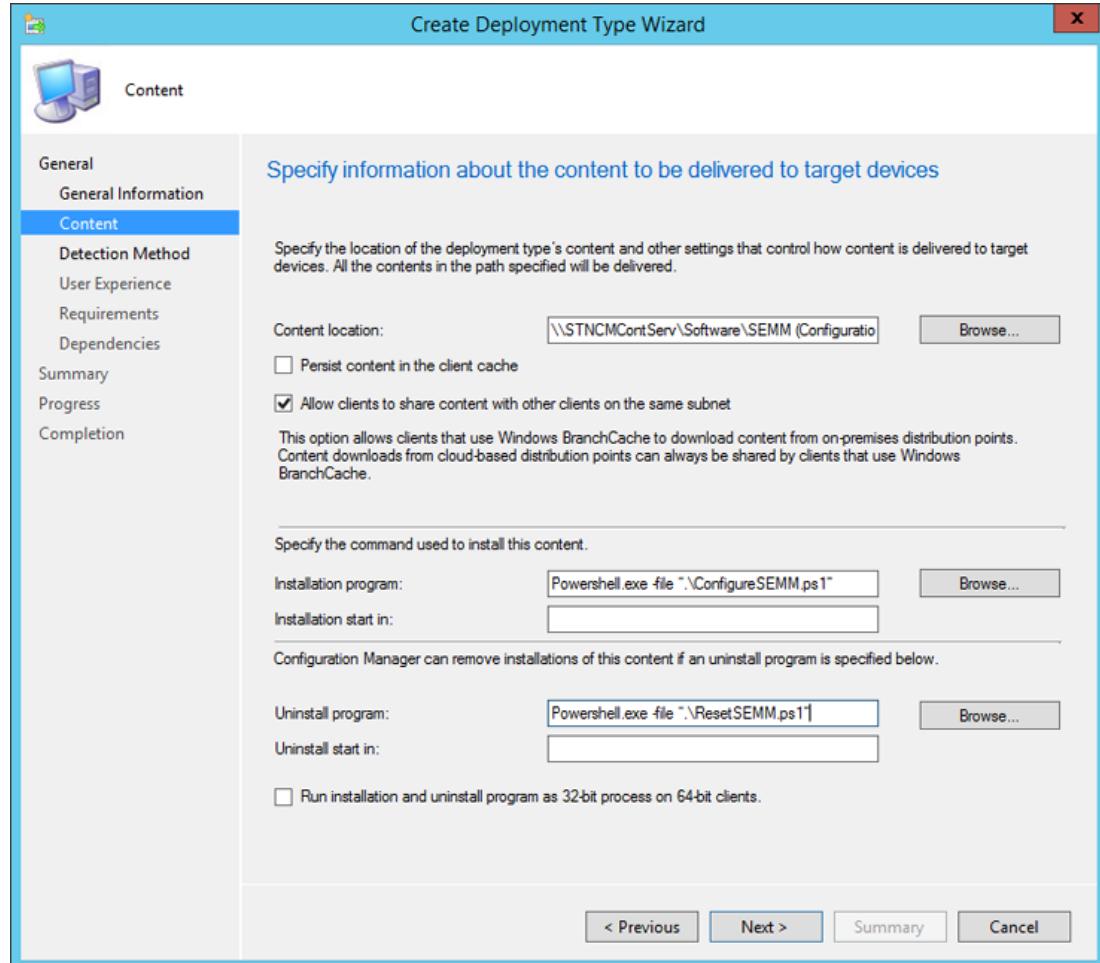


Figure 2. Set the SEMM Configuration Manager scripts as the install and uninstall commands

- **Detection Method** – Select **Add Clause** to add the SEMM Configuration Manager script registry key detection rule. The **Detection Rule** window is displayed, as shown in Figure 3. Use the following settings:
 - Select **Registry** from the **Setting Type** drop-down menu.
 - Select **HKEY_LOCAL_MACHINE** from the **Hive** drop-down menu.
 - Enter **SOFTWARE\Microsoft\Surface\SEMM** in the **Key** field.
 - Enter **CertName** in the **Value** field.
 - Select **String** from the **Data Type** drop-down menu.
 - Select the **This registry setting must satisfy the following rule to indicate the presence of this application** button.

- Enter the name of the certificate you entered in line 58 of the script in the **Value** field.
- Select **OK** to close the **Detection Rule** window.

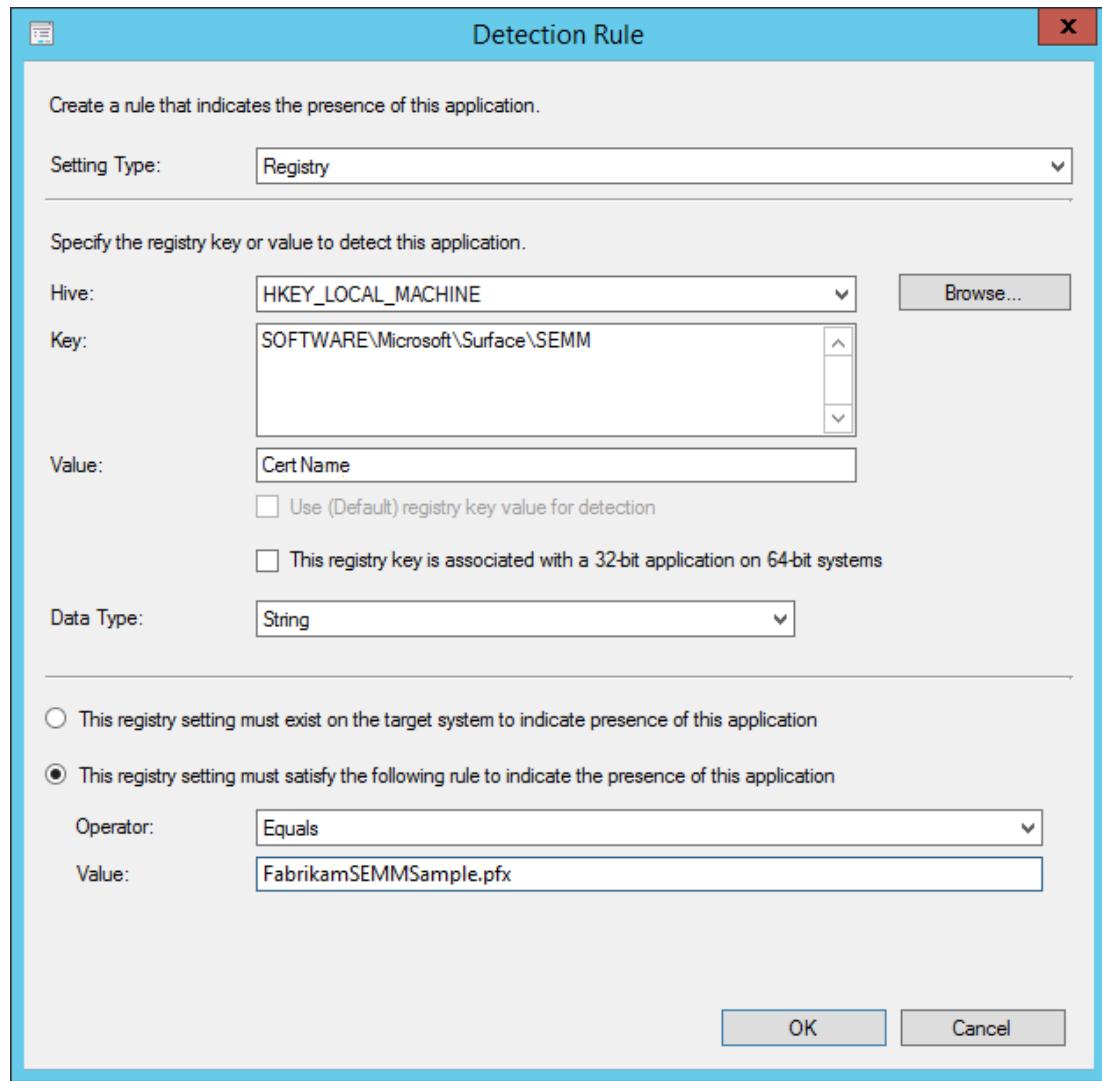


Figure 3. Use a registry key to identify devices enrolled in SEMM

- Select **Next** to proceed to the next page.
- **User Experience** – Select **Install for system** from the **Installation Behavior** drop-down menu. If you want your users to record and enter the certificate thumbprint themselves, leave the logon requirement set to **Only when a user is logged on**. If you want your administrators to enter the thumbprint for users and the users don't need to see the thumbprint, select **Whether or not a user is logged on** from the **Logon Requirement** drop-down menu.
- **Requirements** – The ConfigureSEMM.ps1 script automatically verifies that the device is a Surface device before attempting to enable SEMM. However, if you intend to deploy this script application to a collection with devices other than those to be managed with SEMM, you could add

requirements here to ensure this application would run only on Surface devices or devices you intend to manage with SEMM. Select **Next** to continue.

- **Dependencies** – Select **Add** to open the **Add Dependency** window.
 - Select **Add** to open the **Specify Required Application** window.
 - Enter a name for the SEMM dependencies in the **Dependency Group Name** field (for example, *SEMM Assemblies*).
 - Select **Microsoft Surface UEFI Manager** from the list of **Available Applications** and the MSI deployment type, and then select **OK** to close the **Specify Required Application** window.
 - Keep the **Auto Install** check box selected if you want Microsoft Surface UEFI Manager installed automatically on devices when you attempt to enable SEMM with the Configuration Manager scripts. Select **OK** to close the **Add Dependency** window.
 - Select **Next** to proceed.
- **Summary** – The information you've entered throughout the Create Deployment Type wizard is displayed on this page. Select **Next** to confirm your selections.
- **Progress** – A progress bar and status as the deployment type is added for the SEMM script application is displayed on this page.
- **Completion** – Confirmation of the deployment type creation is displayed when the process is complete. Select **Close** to finish the Create Deployment Type Wizard.
- **Summary** – The information that you entered throughout the Create Application Wizard is displayed. Select **Next** to create the application.
- **Progress** – A progress bar and status as the application is added to the Software Library is displayed on this page.
- **Completion** – Confirmation of the successful application creation is displayed when the application creation process is complete. Select **Close** to finish the Create Application Wizard.

After the script application is available in the Software Library of Configuration Manager, you can distribute and deploy SEMM using the scripts you prepared to devices or collections. If you've configured the Microsoft Surface UEFI Manager assemblies as a

dependency that will be automatically installed, you can deploy SEMM in a single step. If you haven't configured the assemblies as a dependency, they must be installed on the devices you intend to manage before you enable SEMM.

When you deploy SEMM using this script application and with a configuration that is visible to the end user, the PowerShell script starts and the thumbprint for the certificate will be displayed by the PowerShell window. You can have your users record this thumbprint and enter it when prompted by Surface UEFI after the device reboots.

Alternatively, you can configure the application installation to reboot automatically and to install invisibly to the user. In this scenario, a technician is required to enter the thumbprint on each device as it reboots. Any technician with access to the certificate file can read the thumbprint by viewing the certificate with CertMgr. Instructions for viewing the thumbprint with CertMgr are in the [Create or modify the SEMM Configuration Manager scripts](#) section of this article.

Removal of SEMM from a device deployed with Configuration Manager using these scripts is as easy as uninstalling the application with Configuration Manager. This action starts the ResetSEMM.ps1 script and properly unenrolls the device with the same certificate file that was used during the deployment of SEMM.

Note

Microsoft Surface recommends that you create reset packages only when you need to unenroll a device. These reset packages are typically valid for only one device, identified by its serial number. You can, however, create a universal reset package that would work for any device enrolled in SEMM with this certificate.

We strongly recommend that you protect your universal reset package as carefully as the certificate you used to enroll devices in SEMM. Please remember that, just like the certificate itself, this universal reset package can be used to unenroll any of your organization's Surface devices from SEMM.

When you install a reset package, the Lowest Supported Value (LSV) is reset to a value of 1. You can reenroll a device by using an existing configuration package. The device will prompt for the certificate thumbprint before ownership is taken.

For this reason, the reenrollment of a device in SEMM would require a new package to be created and installed on that device. Because this action is a new enrollment and not a change in configuration on a device already enrolled in SEMM, the device will prompt for the certificate thumbprint before ownership is taken.

Surface Diagnostic Toolkit for Business

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

If your Surface isn't working properly, the Microsoft Surface Diagnostic Toolkit (SDT) for Business can help you or your administrator find and solve problems. SDT for business lets you quickly investigate, troubleshoot, and resolve hardware, software, and firmware issues with Surface devices — across your network.

ⓘ Note

Surface Diagnostic Toolkit for Business is built for commercial devices. If your device is a personal device and not managed by your work or school run the [Surface Diagnostic Toolkit](#) instead.

Specifically, SDT for Business enables you to:

- [Customize the package.](#)
- [Run the app using commands.](#)
- [Run multiple hardware tests to troubleshoot issues.](#)
- [Generate logs for analyzing issues.](#)
- [Obtain detailed report comparing device vs optimal configuration.](#)

Primary scenarios and download resources

To run Surface Diagnostic Toolkit for Business, download the components listed in the following table.

Mode	Primary scenarios	Download	Learn more
Desktop mode	Assist users in running SDT on their Surface devices to troubleshoot issues. Create a custom package to deploy on one or more Surface devices allowing users to select specific logs to collect and analyze.	SDT distributable MSI package: Microsoft Surface Diagnostic Toolkit for Business Installer Surface Tools for IT	Use Surface Diagnostic Toolkit in desktop mode

Mode	Primary scenarios	Download	Learn more
Command line	<p>Directly troubleshoot Surface devices remotely without user interaction, using standard tools such as Configuration Manager. It includes the following commands:</p> <ul style="list-style-type: none"> -DataCollector collects all log files -bpa runs health diagnostics using Best Practice Analyzer. -windowsupdate checks Windows Update for missing firmware or driver updates. -warranty checks warranty information. 	SDT console app: Microsoft Surface Diagnostics App Console Surface Tools for IT ↗	Run command-line app console with Surface Diagnostic Toolkit for Business

Supported devices

SDT for Business is supported on Surface 3 and later devices (except for devices configured in S mode):

- Surface Book - all generations
- Surface Laptop Studio
- Surface Go - all generations
- Surface Laptop - all generations
- Surface Laptop Go - all generations
- Surface Pro 3 and later
- Surface Pro X - all generations
- Surface Studio - all generations
- Surface 3 LTE
- Surface 3

Installing Surface Diagnostic Toolkit for Business

To create an SDT package that you can distribute to users in your organization:

1. Sign in to your Surface device using the Administrator account.
2. Download SDT Windows Installer Package (.msi) from the [Surface Tools for IT download page ↗](#).
 - For Intel/AMD devices, download:
[Surface_Diagnostic_Toolkit_for_Business_v2.168.139.0.msi](#).

- For ARM devices, download:

[Surface_Diagnostic_Toolkit_for_Business_v2.168.139.0_x86.msi](#).

3. Copy the .msi file to a preferred location on your Surface device, such as Desktop. The SDT setup wizard appears, as shown in figure 1. Click **Next**.

 **Note**

If the setup wizard does not appear, ensure that you are signed into the Administrator account on your computer.

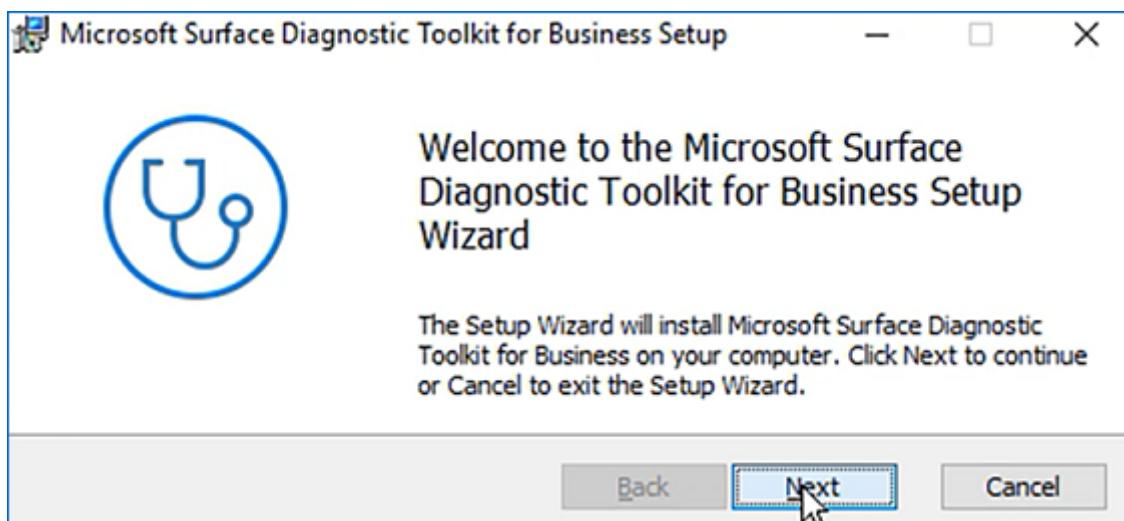
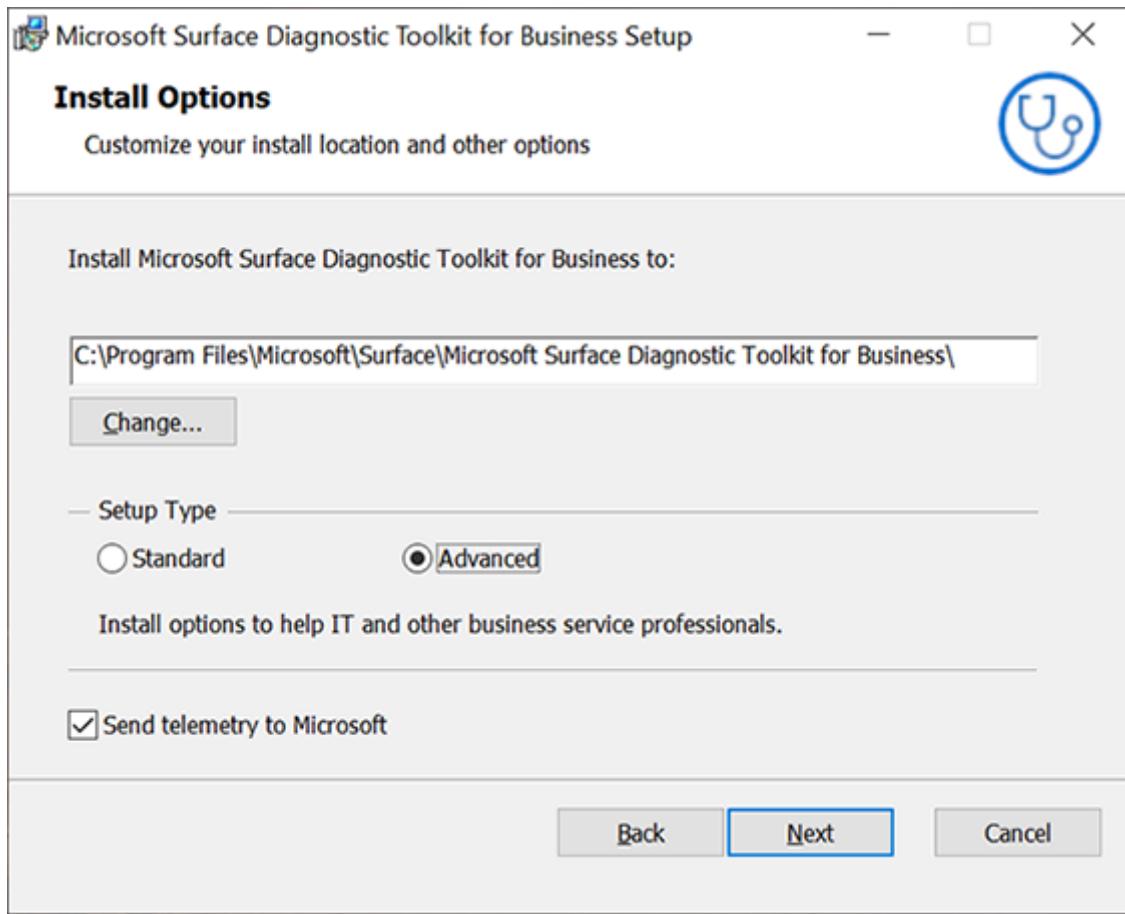


Figure 1. Surface Diagnostic Toolkit setup wizard

4. When the SDT setup wizard appears, click **Next**, accept the End User License Agreement (EULA).
5. On the Install Options screen, change the default install location if desired.
6. Under Setup Type, select **Advanced**.

 **Note**

The standard option allows users to run the diagnostic tool directly on their Surface device provided they are signed into their device using an Administrator account.



7. Click **Next** and then click **Install**.

Installing using the command line

If desired, you can install SDT at a command prompt and set a custom flag to install the tool in admin mode. SDT contains the following install option flags:

- `SENDFILE` sends telemetry data to Microsoft. The flag accepts `0` for disabled or `1` for enabled. The default value is `1` to send telemetry.
- `ADMINMODE` configures the tool to be installed in admin mode. The flag accepts `0` for client mode or `1` for IT Administrator mode. The default value is `0`.

To install SDT from the command line

1. Open a command prompt and enter:

Console

```
msiexec.exe /i <the path of installer> ADMINMODE=1.
```

Example:

Console

```
C:\Users\Administrator>
msiexec.exe/I"C:\Users\Administrator\Desktop\Microsoft_Surface_Diagnostic_Toolkit_for_Business_Installer.msi" ADMINMODE=1
```

Locating SDT on your Surface device

Both SDT and the SDT app console are installed at `C:\Program Files\Microsoft\Surface\Microsoft Surface Diagnostic Toolkit for Business.`

In addition to the .exe file, SDT installs a JSON file and an admin.dll file (modules\admin.dll), as shown in figure 2.

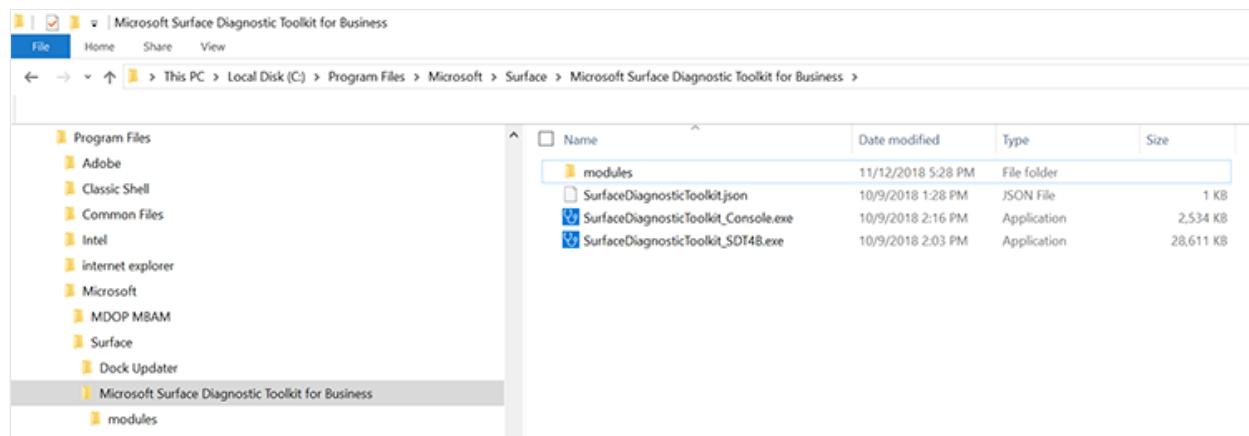


Figure 2. Files installed by SDT

Preparing the SDT package for distribution

Creating a custom package allows you to target the tool to specific known issues.

1. Click Start > Run, enter Surface and then click Surface Diagnostic Toolkit for Business.
2. When the tool opens, click Create Custom Package, as shown in figure 3.

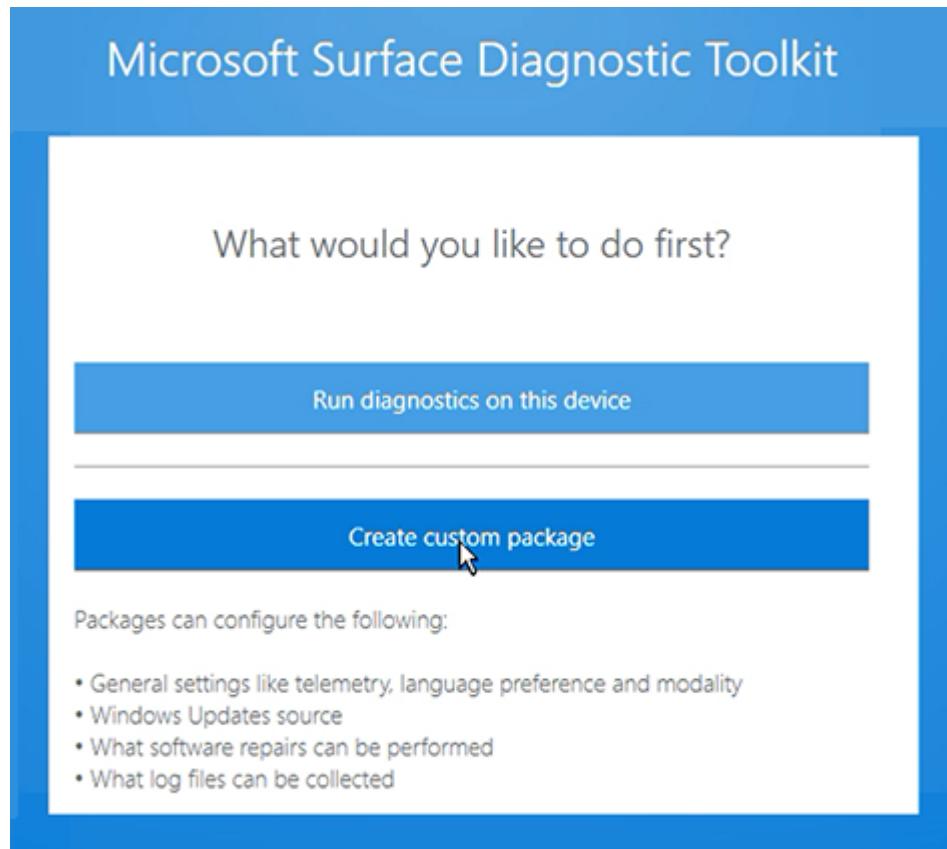


Figure 3. Create custom package

Language and telemetry settings

When creating a package, you can select language settings or opt out of sending telemetry information to Microsoft. By default, SDT sends telemetry to Microsoft that is used to improve the application in accordance with the [Microsoft Privacy Statement](#). If you wish to decline, clear the check box when creating a custom package, as shown below. Or clear the **Send telemetry to Microsoft** check box on the **Install Options** page during SDT Setup.

ⓘ Note

This setting does not affect the minimal telemetry automatically stored on Microsoft servers when running tests and repairs that require an Internet connection, such as Windows Update and Software repair, or providing feedback using the Smile or Frown buttons in the app toolbar.

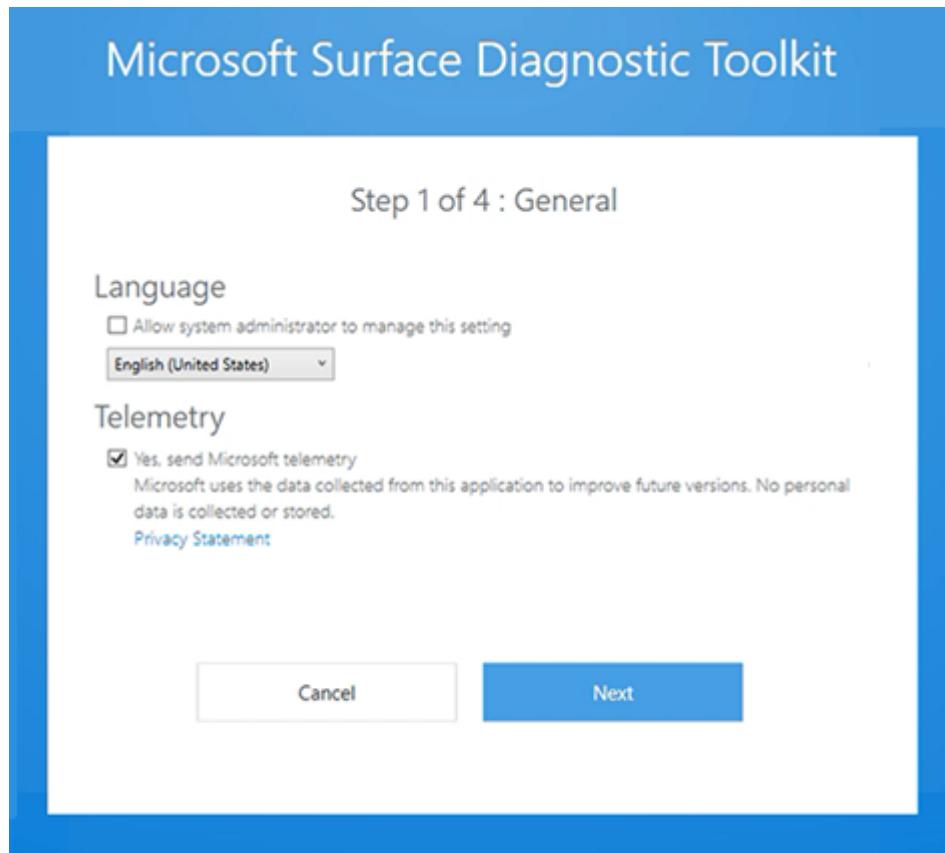


Figure 4. Select language and telemetry settings

Windows Update page

Select the option appropriate for your organization. Most organizations with multiple users will typically select to receive updates via Windows Server Update Services (WSUS), as shown in figure 5. If using local Windows Update packages or WSUS, enter the path as appropriate.

Microsoft Surface Diagnostic Toolkit

Step 2 of 4 : Windows Update

- Use Microsoft's update servers to download and install recommended updates.
- Use local Windows update packages to install recommended updates.

 Require Internet for Local Updates.
- Use Windows Server Update Services(WSUS) to download and install recommended updates
- Skip Windows update

Back

Next

Figure 5. Windows Update option

Software repair page

This allows you to select or remove the option to run software repair updates.

Step 3 of 4 : Software repair

Select software repairs that will be available to a user.

- | | |
|---|---|
| <input checked="" type="checkbox"/> Cleanup Components Store | <input checked="" type="checkbox"/> Reinstall Windows Store Application |
| <input checked="" type="checkbox"/> Repair System File Corruption | <input checked="" type="checkbox"/> Restore System Health |

Back

Next

Figure 6. Software repair option

Collecting logs and saving package page

You can select to run a wide range of logs across applications, drivers, hardware, and the operating system. Click the appropriate area and select from the menu of available logs. You can then save the package to a software distribution point or equivalent location that users can access.

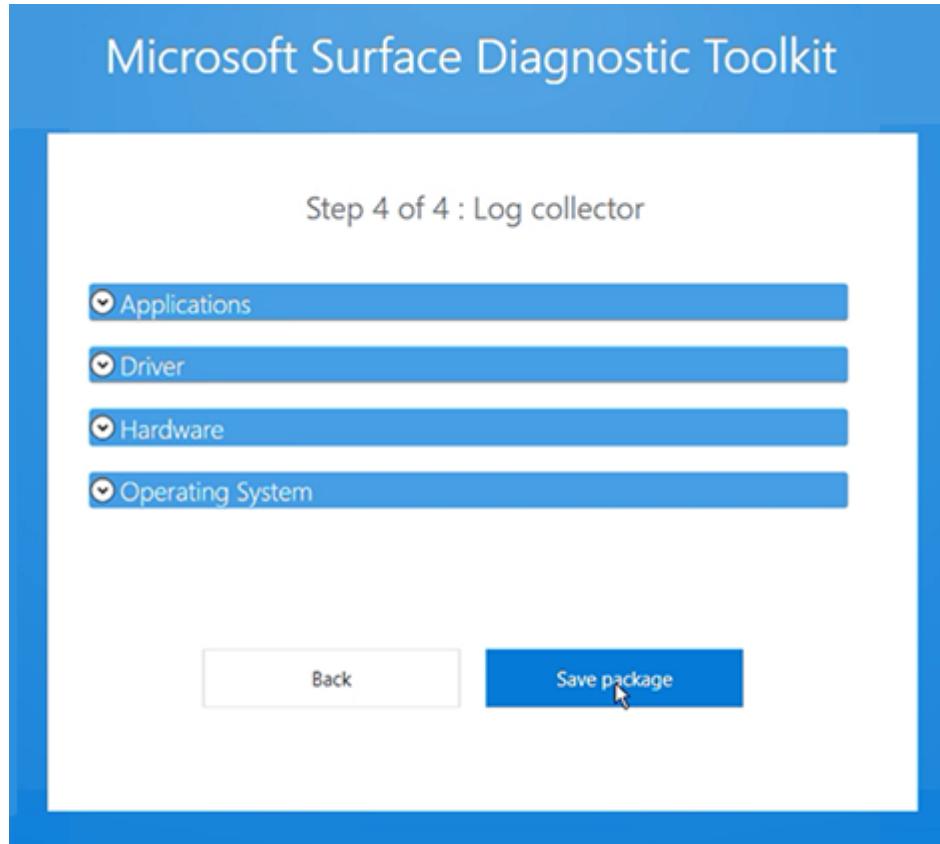


Figure 7. Log option and save package

Next steps

- Use Surface Diagnostic Toolkit for Business in desktop mode
- Run command-line app console with Surface Diagnostic Toolkit for Business

Changes and updates

Version 2.193.139.0

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Surface Pro 9
- Surface Laptop 5
- Surface Studio 2+

Version 2.168.139.0

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Surface Pro 8
- Surface Laptop Studio
- Surface Go 3

Version 2.131.139.0

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Surface Pro 7+
- Seamless support experience on Surface Pro X
- Security improvements
- Inclusive user experience improvements

Version 2.124.139.0

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Seamless integrated support
- Save all test results
- Check if the image is custom created
- Include warnings from device manager
- Dock firmware version
- Flag drives as potential failures in storage test
- Remove store link

Version 2.121.139

Release date: July 31 2020

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Seamless support experience
- Bug fixes

Version 2.94.139.0

Release date: May 11, 2020

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Ability to skip Windows Update to perform hardware check.
- Ability to receive notifications for about the latest version update
- Surface Go 2
- Surface Book 3
- Show progress indicator

Version 2.43.139.0

Release date: October 21, 2019

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Surface Pro 7
- Surface Laptop 3

Version 2.42.139.0

Release date: September 24, 2019

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Ability to download hardware reports.
- Ability to contact Microsoft Support directly from the tool.

Version 2.41.139.0

Release date: June 24, 2019

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Driver version information included in logs and report.
- Ability to provide feedback about the app.

Version 2.36.139.0

Release date: April 26, 2019

This version of Surface Diagnostic Toolkit for Business adds support for the following:

- Advanced Setup option to unlock admin capabilities through the installer UI, without requiring command line configuration.
- Accessibility improvements.
- Surface brightness control settings included in logs.
- External monitor compatibility support link in report generator.

Use Surface Diagnostic Toolkit for Business in desktop mode

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

This topic explains how to use the Surface Diagnostic Toolkit (SDT) to help users in your organization run the tool to identify and diagnose issues with their Surface device as well as submit Support requests directly from the tool.

Successfully running SDT can quickly determine if a reported issue is caused by failed hardware or user error. For a list of supported Surface devices in SDT, refer to [Deploy Surface Diagnostic Toolkit for Business](#).

1. Direct the user to install [the SDT package](#)) from a software distribution point or network share. After it is installed, you're ready to guide the user through a series of tests.
2. Begin at the home page, which allows users to enter a description of the issue, and click **Continue**, as shown in figure 1.

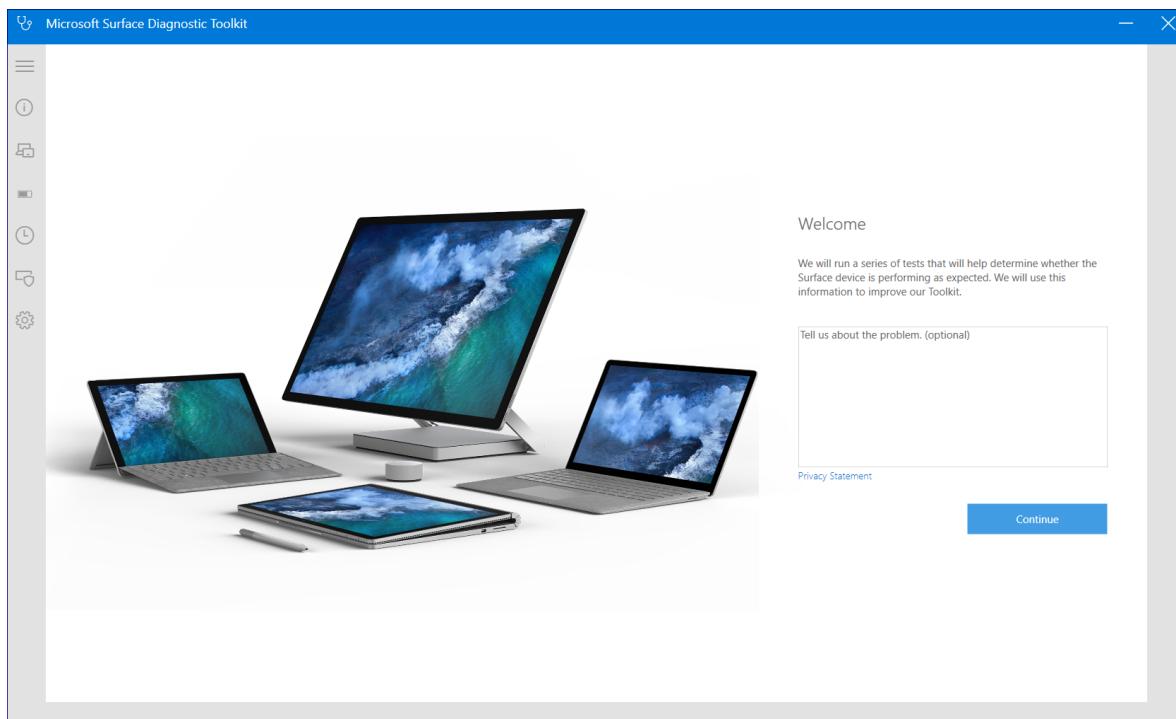


Figure 1. SDT in desktop mode

3. When SDT indicates the device has the latest updates, click **Continue** to advance to the catalog of available tests, as shown in figure 2.

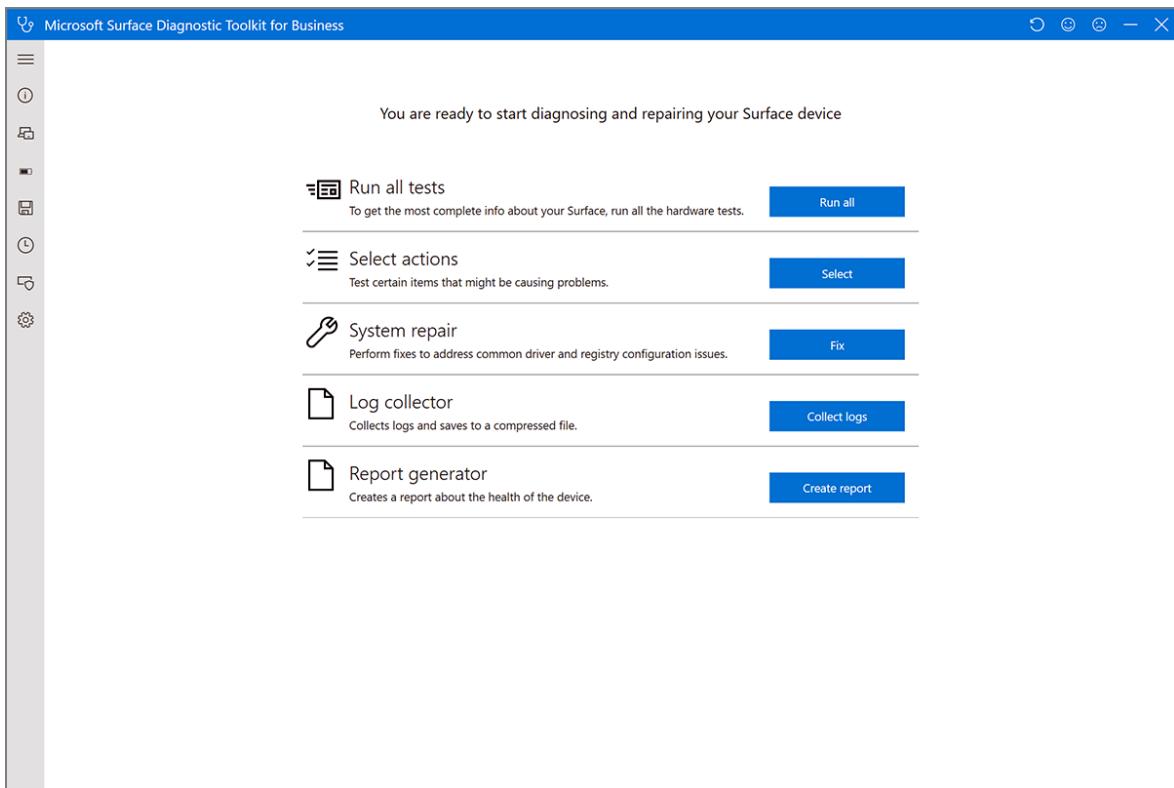


Figure 2. Select from SDT options

4. You can choose to run all the diagnostic tests. Or, if you already suspect a particular issue such as a faulty display or a power supply problem, click **Select** to choose from the available tests and click **Run Selected**, as shown in figure 3. See the following table for details of each test.

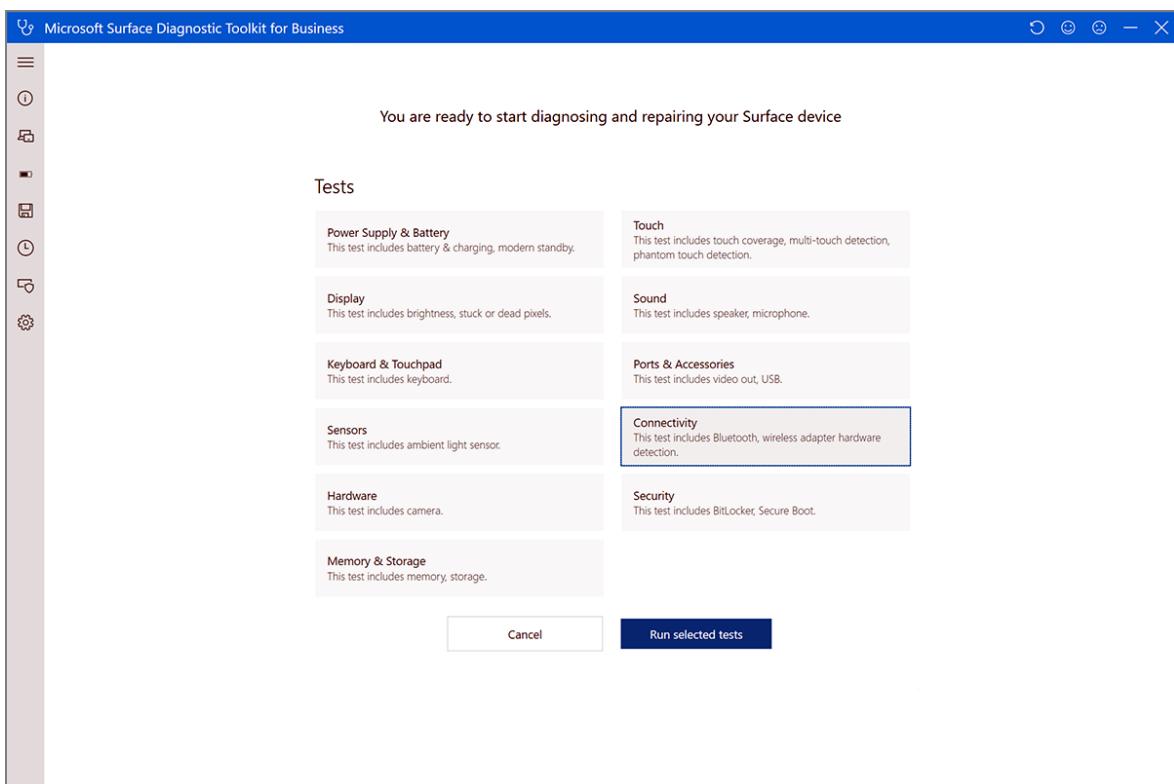


Figure 3. Select hardware tests

Hardware test	Description
---------------	-------------

Hardware test	Description
Power Supply and Battery	Checks Power supply is functioning optimally
Display and Sound	Checks brightness, stuck or dead pixels, speaker and microphone functioning
Ports and Accessories	Checks accessories, screen attach and USB functioning
Connectivity	Checks Bluetooth, wireless and LTE connectivity
Security	Checks security related issues
Touch	Checks touch related issues
Keyboard and touch	Checks integrated keyboard connection and type cover
Sensors	Checks functioning of different sensors in the device
Hardware	Checks issues with different hardware components such as graphics card and camera

5. When all tests have finished, the tool asks you to confirm if your issue is fixed.

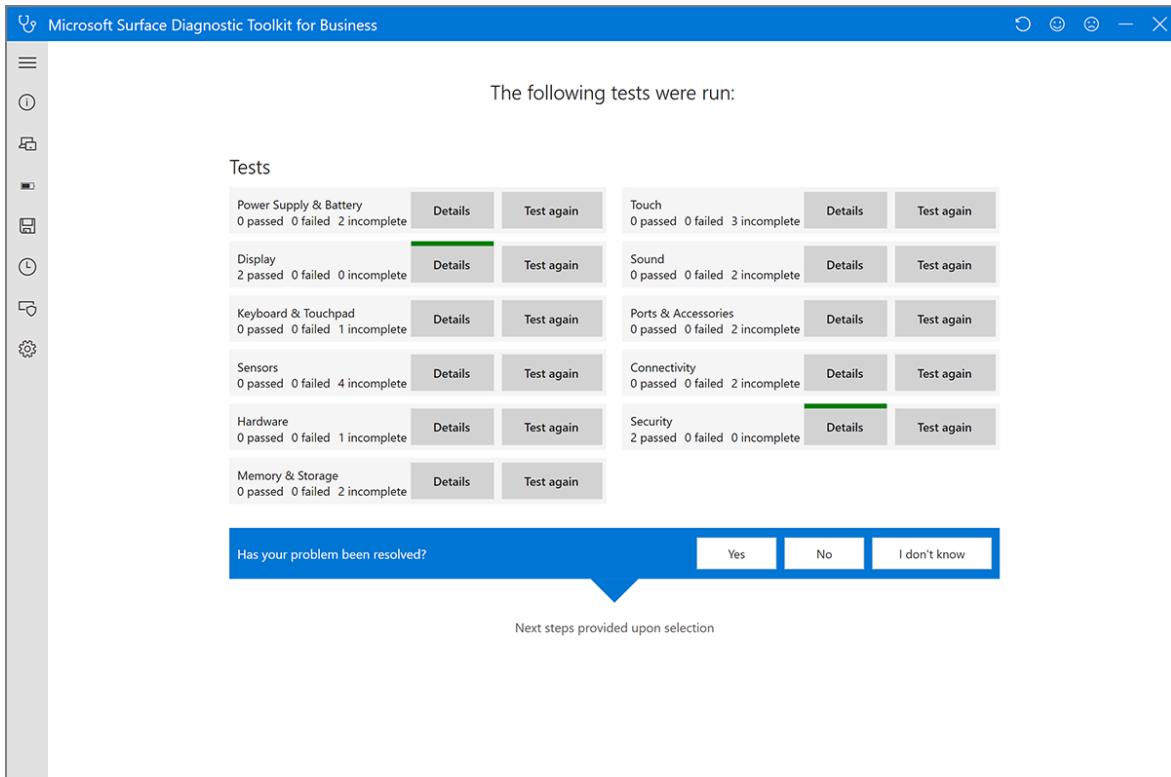


Figure 3a. Has your problem been resolved?

6. If the issue isn't resolved or you don't know, you can submit a Support ticket by selecting **Contact us to Get help now.**

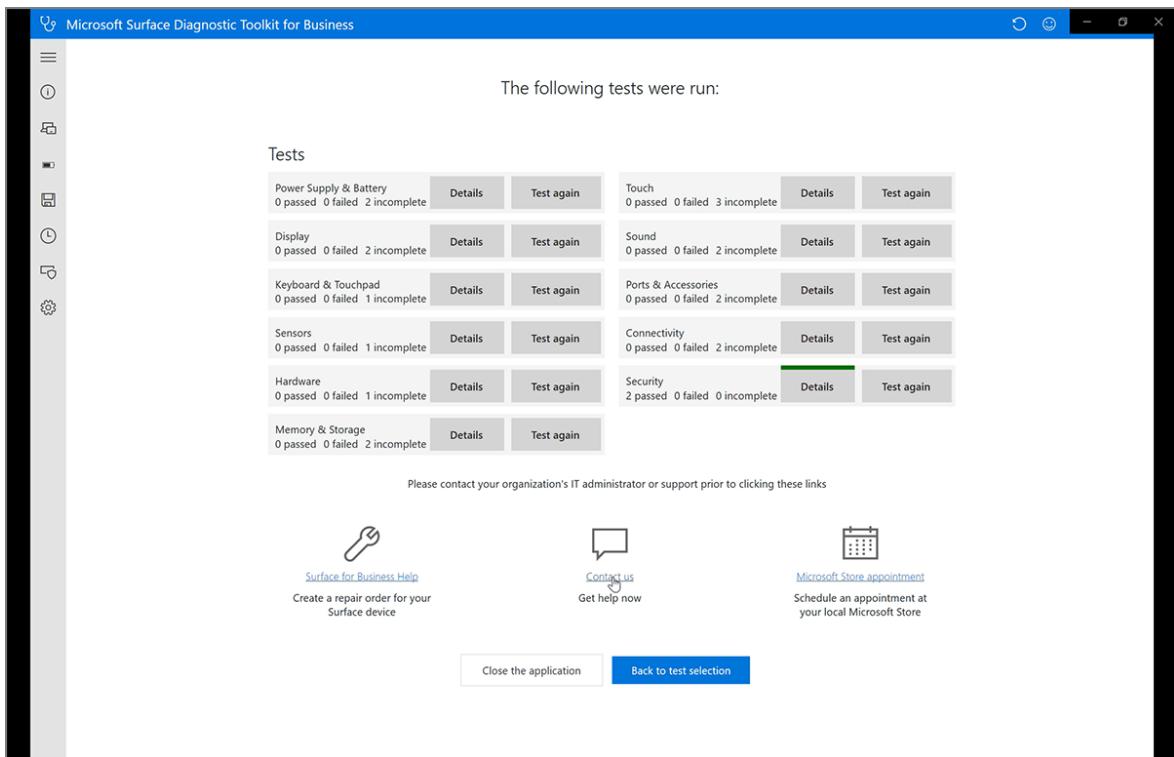


Figure 3b. Submit a Support ticket

Running multiple hardware tests to troubleshoot issues

SDT is designed as an interactive tool that runs a series of tests. For each test, SDT provides instructions summarizing the nature of the test and what users should expect or look for in order for the test to be successful. For example, to diagnose if the display brightness is working properly, SDT starts at zero and increases the brightness to 100 percent, asking users to confirm—by answering **Yes** or **No**—that brightness is functioning as expected, as shown in figure 4.

For each test, if functionality does not work as expected and the user clicks **No**, SDT generates a report of the possible causes and ways to troubleshoot it.

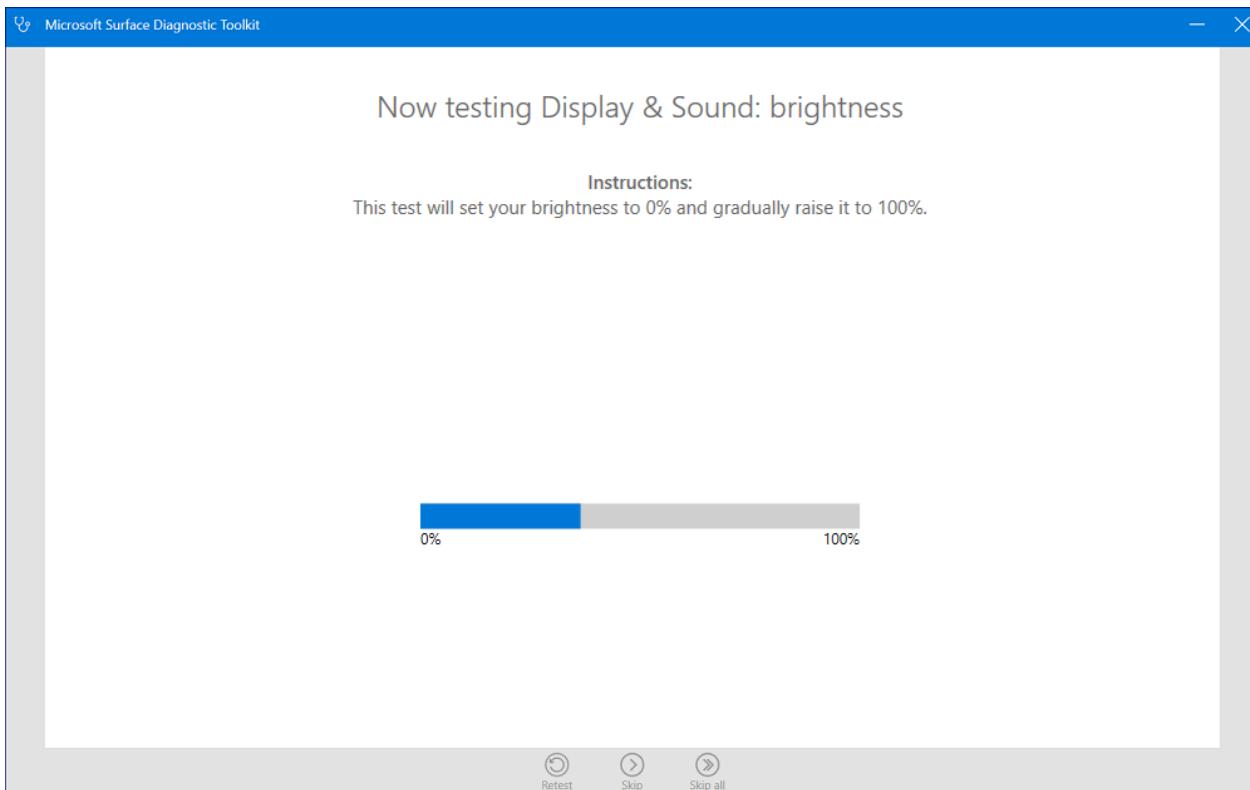


Figure 4. Running hardware diagnostics

1. If the brightness successfully adjusts from 0-100 percent as expected, direct the user to click **Yes** and then click **Continue**.
2. If the brightness fails to adjust from 0-100 percent as expected, direct the user to click **No** and then click **Continue**.
3. Guide users through remaining tests as appropriate. When finished, SDT automatically provides a high-level summary of the report, including the possible causes of any hardware issues along with guidance for resolution.

Repairing applications

SDT enables you to diagnose and repair applications that may be causing issues, as shown in figure 5.

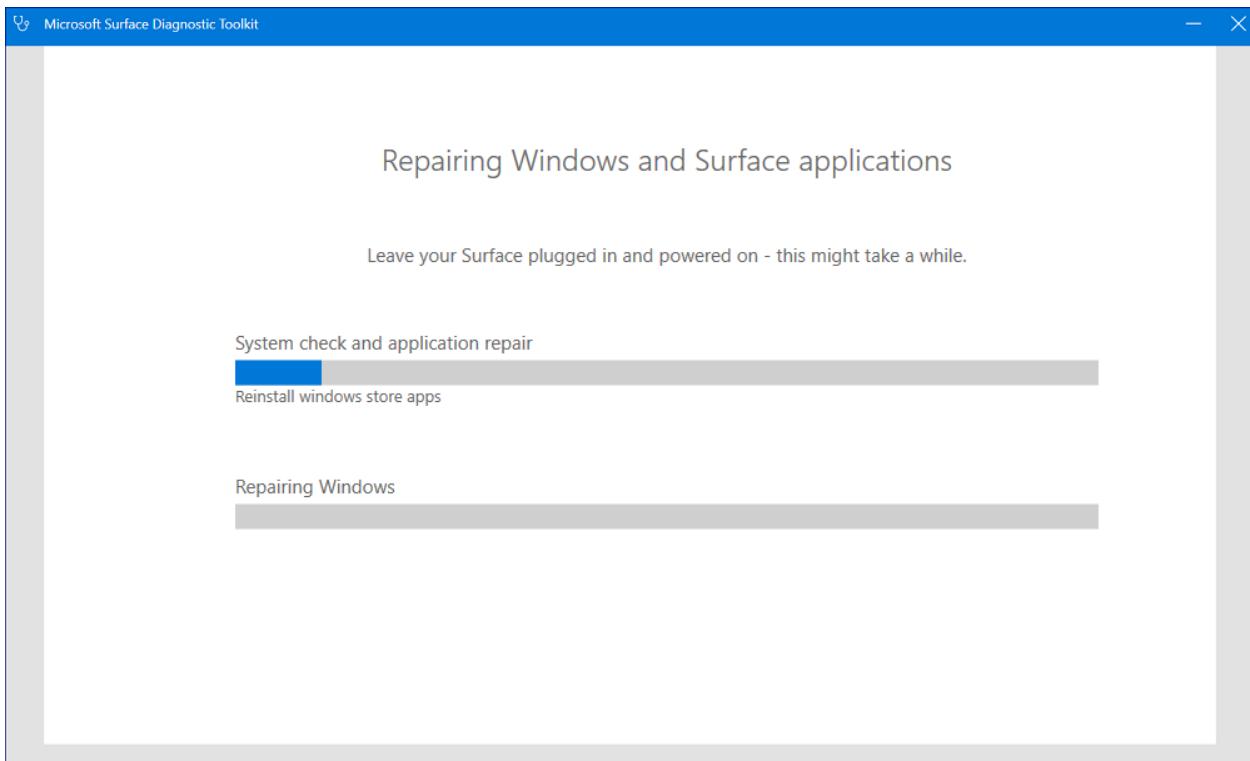


Figure 5. Running repairs

Generating logs for analyzing issues

SDT provides extensive log-enabled diagnosis support across applications, drivers, hardware, and operating system issues, as shown in figure 6.

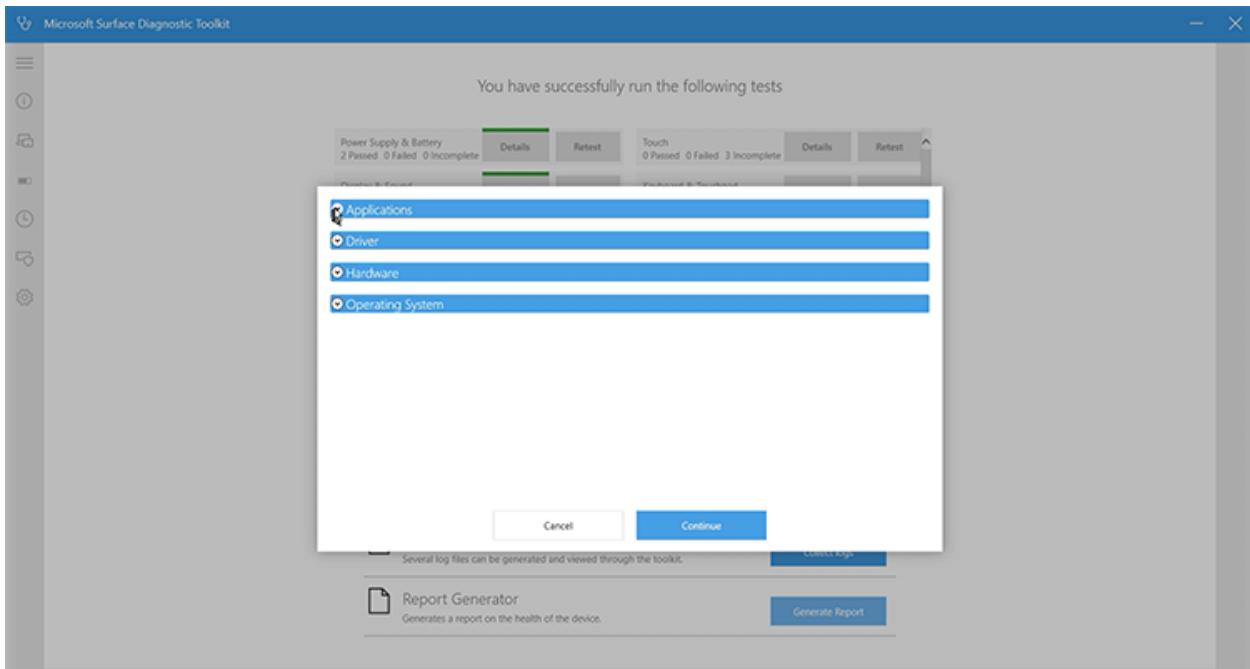


Figure 6. Generating logs

Generating detailed report comparing device vs. optimal configuration

Based on the logs, SDT generates a report for software- and firmware-based issues that you can save to a preferred location.

Related topics

- [Run command-line app console with Surface Diagnostic Toolkit for Business](#)

Run command-line app console with Surface Diagnostic Toolkit for Business

Article • 01/26/2023 • Applies to: Windows 10, Windows 11

Running the Surface Diagnostic Toolkit (SDT) at a command prompt requires downloading the SDT app console. After it's installed, you can run SDT at a command prompt via the Windows command console (cmd.exe) or using Windows PowerShell, including PowerShell Integrated Scripting Environment (ISE), which provides support for autocompletion of commands, copy/paste, and other features. For a list of supported Surface devices in SDT, refer to [Deploy Surface Diagnostic Toolkit for Business](#).

ⓘ Note

To run SDT using commands, you must be signed in to the Administrator account or signed in to an account that is a member of the Administrator group on your Surface device.

Running SDT app console

1. Download and install SDT app console from the [Surface Tools for IT download page](#).

- For Intel/AMD devices, download:
[Microsoft.Surface.Diagnostics.App.Console.v2.168.139.0.exe](#)
- For ARM devices, download:
[Microsoft.Surface.Diagnostics.App.Console.v2.168.139.0_x86.exe](#)

2. Use the Windows command prompt (cmd.exe) or Windows PowerShell to:

- Collect all log files
- Run health diagnostics using Best Practice Analyzer
- Check update for missing firmware or driver updates

ⓘ Note

In this release, the SDT app console supports single commands only. Running multiple command line options requires running the console exe separately for each command.

By default, output files are saved in the same location as the console app. Refer to the following table for a complete list of commands.

Command	Notes
-DataCollector "output file"	Collects system details into a zip file. "output file" is the file path to create system details zip file. Example: <code>Microsoft.Surface.Diagnostics.App.Console.exe -DataCollector SDT_DataCollection.zip</code>
-bpa "output file"	Checks several settings and health indicators in the device. "output file" is the file path to create the HTML report. Example: <code>Microsoft.Surface.Diagnostics.App.Console.exe -bpa BPA.html</code>
-windowsupdate	Checks Windows Update online servers for missing firmware and/or driver updates. Example: <code>Microsoft.Surface.Diagnostics.App.Console.exe -windowsupdate</code>
-warranty "output file"	Checks warranty information on the device (valid or invalid). The optional "output file" is the file path to create the xml file. Example: <code>Microsoft.Surface.Diagnostics.App.Console.exe -warranty "warranty.xml"</code>

ⓘ Note

To run the SDT app console remotely on target devices, you can use a configuration management tool such as Microsoft Endpoint Configuration Manager. Alternatively, you can create a .zip file containing the console app and appropriate console commands and deploy per your organization's software distribution processes.

Running Best Practice Analyzer

You can run BPA tests across key components such as BitLocker, Secure Boot, and Trusted Platform Module (TPM) and then output the results to a shareable file. The tool generates a series of tables with color-coded headings and condition descriptors along with guidance about how to approach resolving the issue.

- Green indicates the component is running in an optimal condition (optimal).

- Orange indicates the component is not running in an optimal condition (not optimal).
- Red indicates the component is in an abnormal state.

Sample BPA results output

BitLocker	
Description:	Checks if BitLocker is enabled on the system drive.
Value:	Protection On
Condition:	Optimal
Guidance:	It is highly recommended to enable BitLocker to protect your data.

Secure Boot	
Description:	Checks if Secure Boot is enabled.
Value:	True
Condition:	Optimal
Guidance:	It is highly recommended to enable Secure Boot to protect your PC.

Trusted Platform Module	
Description:	Ensures that the TPM is functional.
Value:	True
Condition:	Optimal
Guidance:	Without a functional TPM, security-based functions such as BitLocker may not work properly.

Connected Standby	
Description:	Checks if Connected Standby is enabled.
Value:	True
Condition:	Optimal
Guidance:	Connected Standby allows a Surface device to receive updates and notifications while not being used. For best experience, Connected Standby should be enabled.

Bluetooth

Description: Checks if Bluetooth is enabled.

Value: Enabled

Condition: Optimal

Guidance:

Debug Mode

Description: Checks if the operating system is in Debug mode.

Value: Normal

Condition: Optimal

Guidance: The debug boot option enables or disables kernel debugging of the Windows operating system. Enabling this option can cause system instability and can prevent DRM (digital rights management) protected media from playing.

Test Signing

Description: Checks if Test Signing is enabled.

Value: Normal

Condition: Optimal

Guidance: Test Signing is a Windows startup setting that should only be used to test pre-release drivers.

Active Power Plan

Description: Checks that the correct power plan is active.

Value: Balanced

Condition: Optimal

Guidance: It is highly recommended to use the "Balanced" power plan to maximize productivity and battery life.

Windows Update

Description: Checks if the device is up to date with Windows updates.

Value: Microsoft Silverlight (KB4023307), Definition Update for Windows Defender Antivirus - KB2267602 (Definition 1.279.1433.0)

Condition:	Not Optimal
Guidance:	Updating to the latest windows makes sure you are on the latest firmware and drivers. It is recommended to always keep your device up to date

Free Hard Drive Space	
Description:	Checks for low free hard drive space.
Value:	66%
Condition:	Optimal
Guidance:	For best performance, your hard drive should have at least 10% of its capacity as free space.

Non-Functioning Devices	
Description:	List of non-functioning devices in Device Manager.
Value:	
Condition:	Optimal
Guidance:	Non-functioning devices in Device Manager may cause unpredictable problems with Surface devices such as, but not limited to, no power savings for the respective hardware component.

External Monitor	
Description:	Checks for an external monitor that may have compatibility issues.
Value:	
Condition:	Optimal
Guidance:	Check with the original equipment manufacturer for compatibility with your Surface device.

Microsoft Surface Data Eraser

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Find out how the Microsoft Surface Data Eraser tool can help you securely wipe data from your Surface devices.

[Microsoft Surface Data Eraser](#) is a tool that boots from a USB stick and allows you to perform a secure wipe of all data from a compatible Surface device. A Microsoft Surface Data Eraser USB stick requires only the ability to boot from USB. To learn more about the data wiping capabilities and practices Microsoft uses during the service process for Surface, see [Protecting your data if you send your Surface in for service](#).

Important

Microsoft Surface Data Eraser uses the NVM Express (NVMe) format command to erase data as authorized in [NIST Special Publication 800-88 Revision 1](#).

Compatible Surface devices include:

- Surface Laptop Studio
- Surface Book (all generations)
- Surface Go (all generations)
- Surface Pro X (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)
- Surface Laptop SE
- Surface Studio (all generations)
- Surface Pro 2 and later
- Surface 3
- Windows 10 Pro and Enterprise on Surface Hub 2

Some scenarios where Microsoft Surface Data Eraser can be helpful include:

- Prepare a Surface device to be sent for repair.
- Decommission a Surface device from corporate or organizational use.
- Repurpose a Surface device for a new user.
- Reimage devices containing sensitive data.

How to create a Microsoft Surface Data Eraser USB stick

After the creation tool is installed, follow these steps to create a Microsoft Surface Data Eraser USB stick. Before you begin these steps, ensure that you have a USB 3.0 stick that is 4 GB or larger connected to the computer.

1. Run the DataEraserSetup.msi installation file that you downloaded from the [Microsoft Download Center](#).
2. Select **Build** to begin the Microsoft Surface Data Eraser USB creation process, as shown in Figure 1.

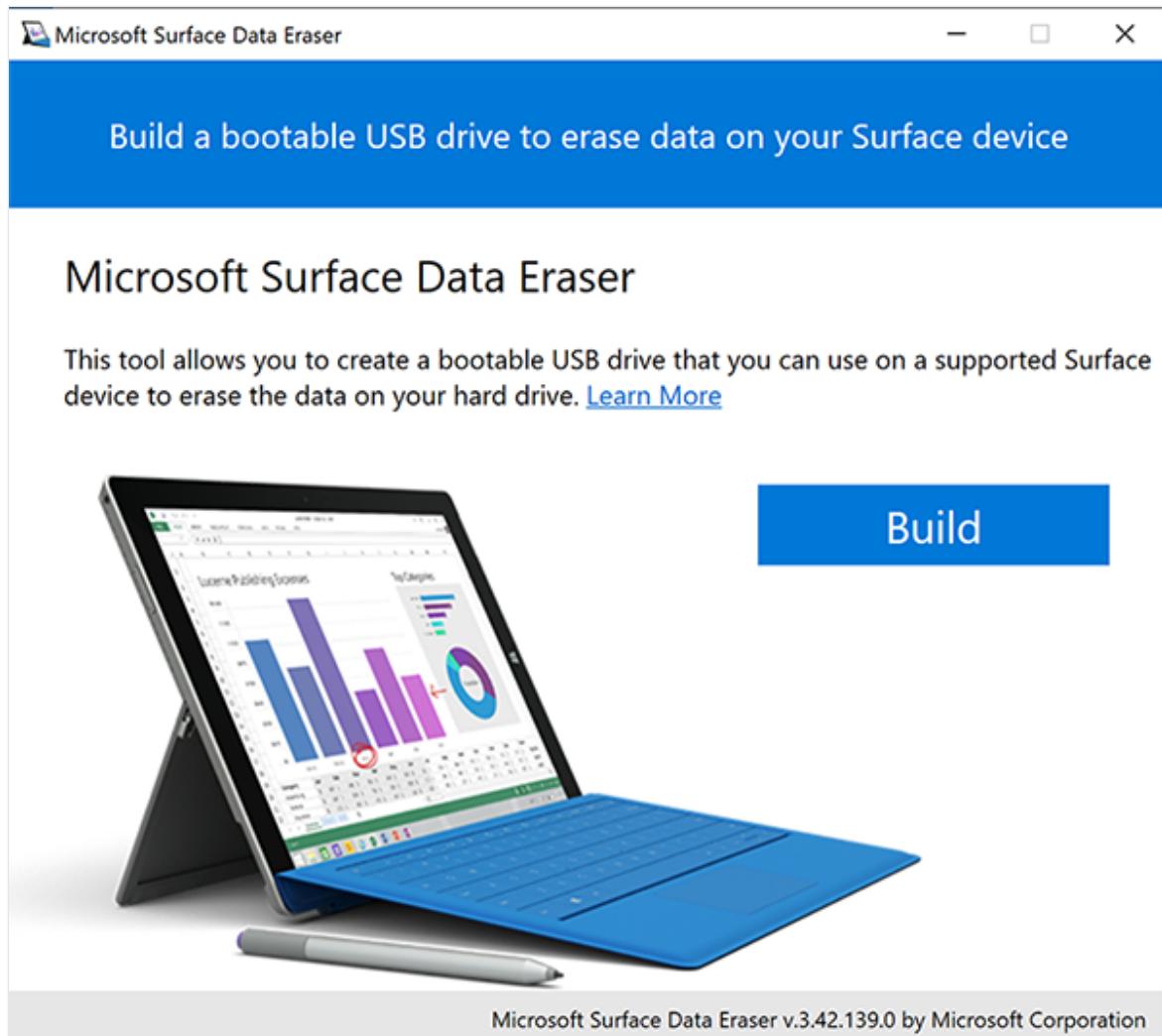


Figure 1. Begin the Microsoft Surface Data Eraser tool

3. Select **Continue** to acknowledge that you have a USB drive of at least 4 GB connected, as shown in Figure 2.

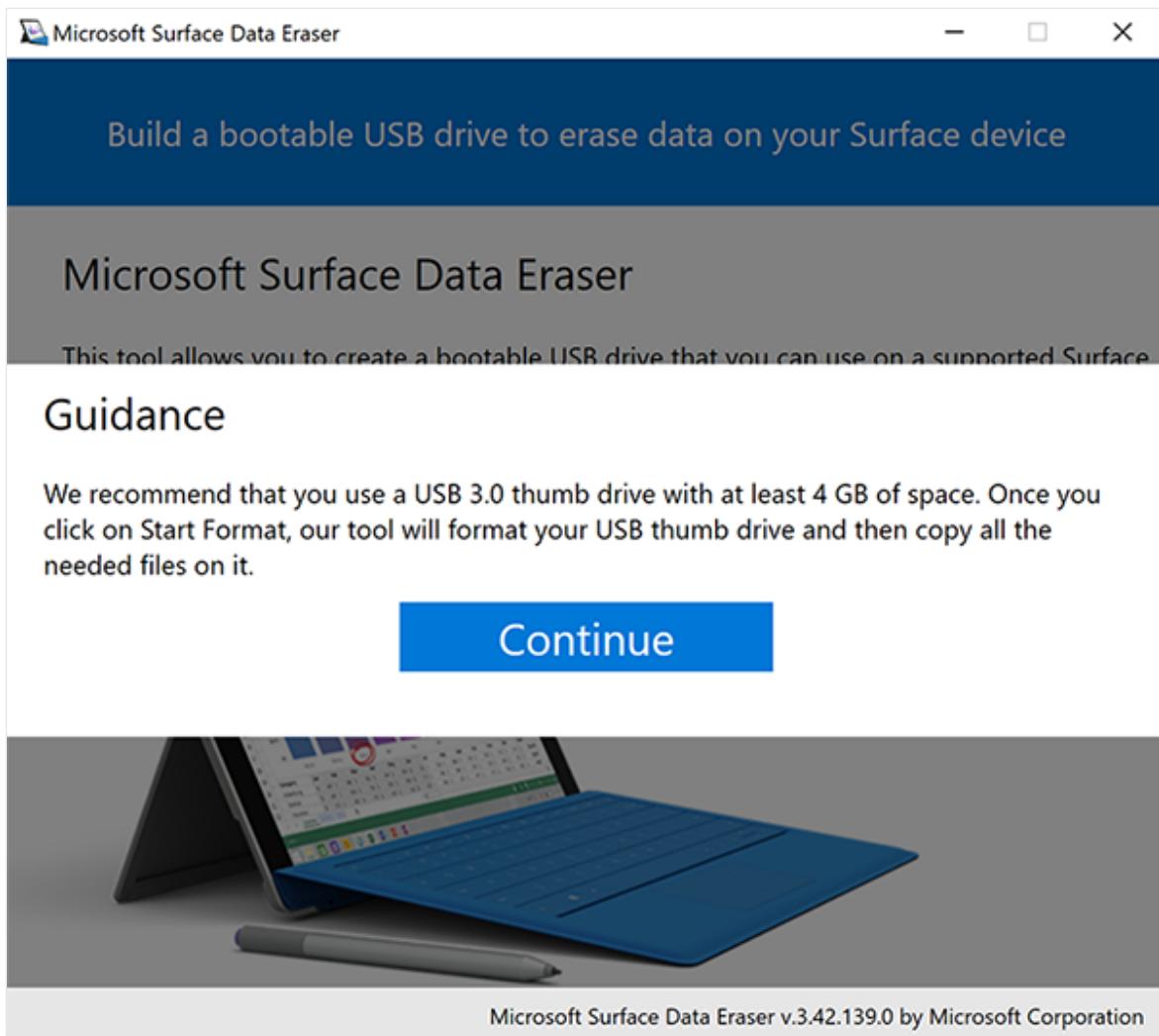
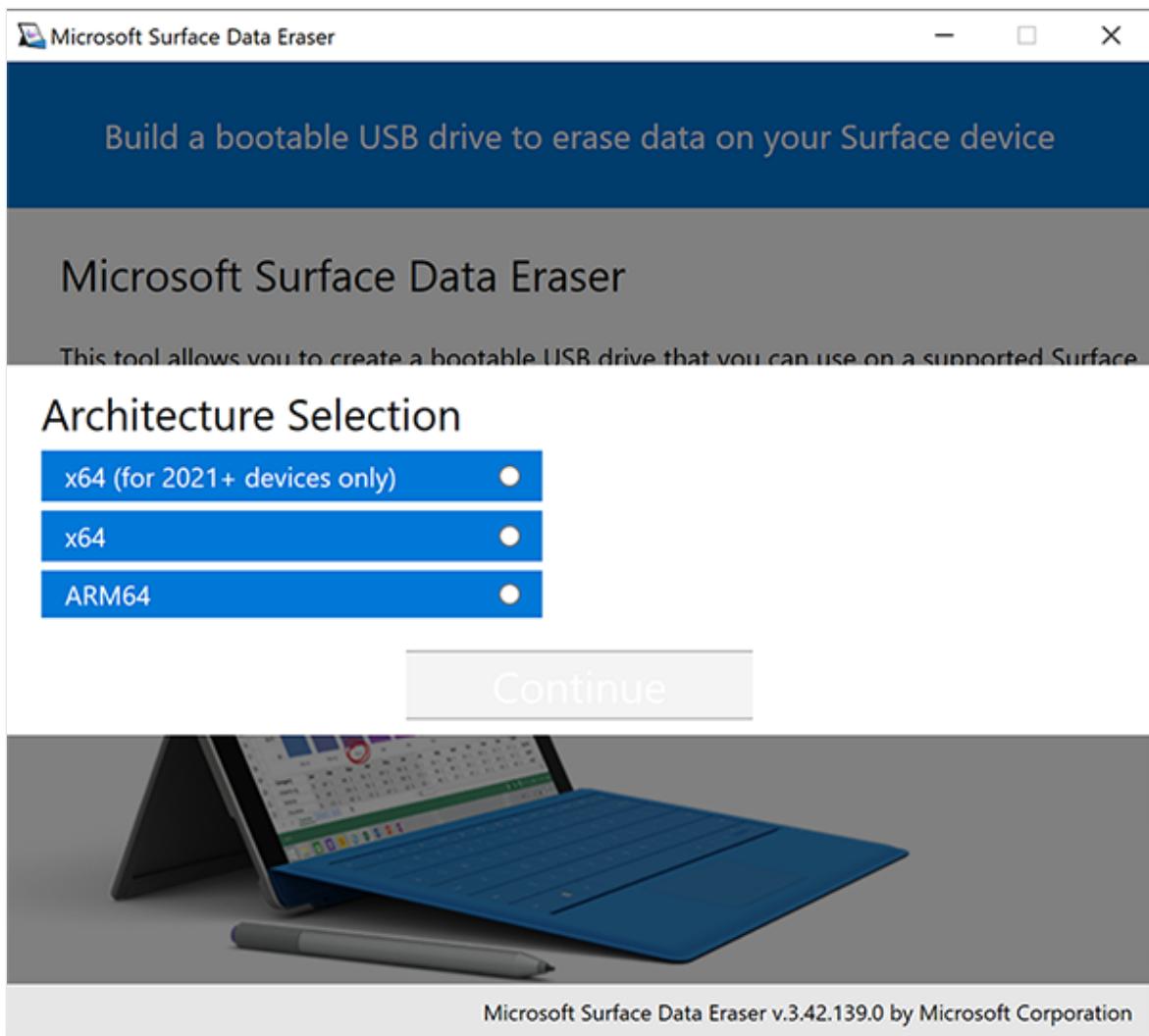


Figure 2. Confirm USB drive of at least 4 GB is connected

4. Choose **x64 (for 2021+ devices only)** for 2021 or newer devices, choose **x64** for 2020 and older devices or **ARM64** for Surface Pro X from the **Architecture Selection** page, as shown Figure-3. Select **Continue**.



5. Select the USB drive of your choice from the **USB Thumb Drive Selection** page as shown in Figure 4, and then select **Start** to begin the USB creation process. The drive you select will be formatted and any existing data on this drive will be lost.

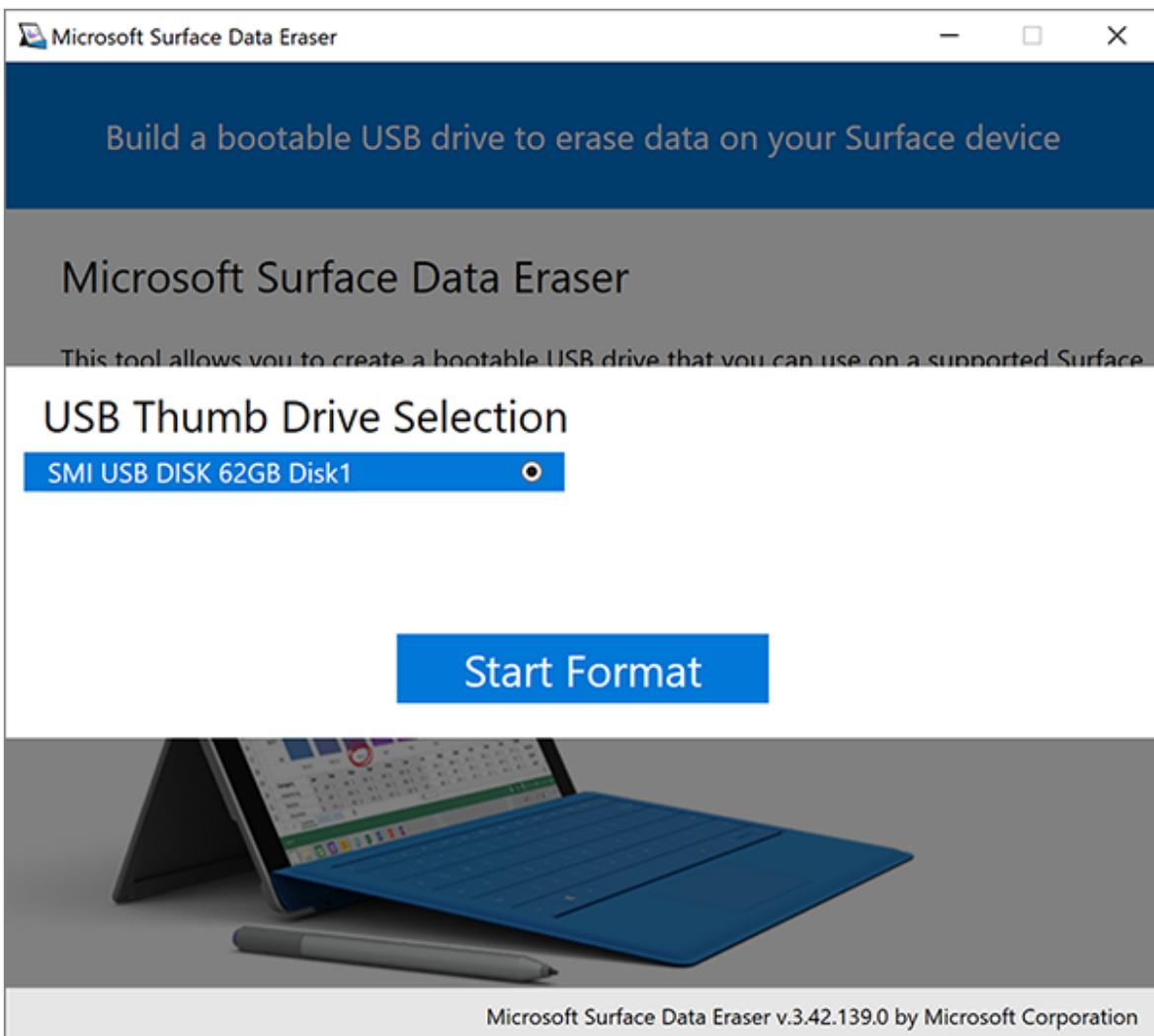


Figure 4. USB thumb drive selection

 **Tip**

If the Start button is disabled, check that your removable drive has a total capacity of at least 4 GB.

6. After the creation process is finished, the USB drive has been formatted and all binaries are copied to the USB drive. Select **Success**.
7. When the **Congratulations** screen is displayed, you can eject and remove the thumb drive. This thumb drive is now ready to be inserted into a Surface device, booted from, and wipe any data on the device. Select **Complete** to finish the USB creation process, as shown in Figure 5.

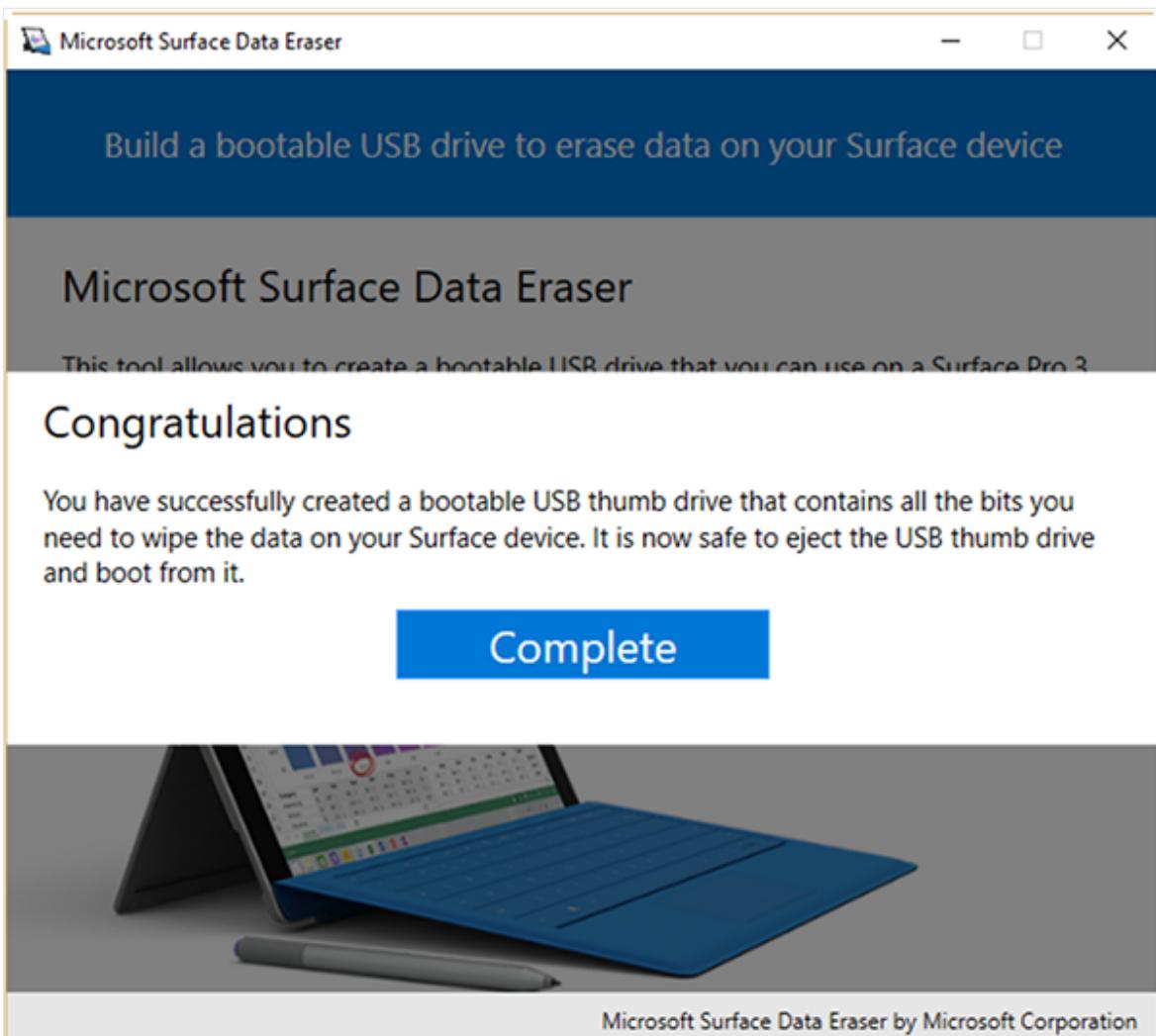


Figure 5. Complete the Microsoft Surface Data Eraser USB creation process

8. Select X to close Microsoft Surface Data Eraser.

How to use a Microsoft Surface Data Eraser USB stick

After you create a Microsoft Surface Data Eraser USB stick, you can boot a supported Surface device from the USB stick by following this procedure:

Note

Surface Data Eraser on Surface Studio and Surface Studio 2 can take up to 6 minutes to boot into WinPE before disk erasure can occur.

1. Insert the bootable Microsoft Surface Data Eraser USB stick into the supported Surface device.
2. Boot your Surface device from the Microsoft Surface Data Eraser USB stick. To boot your device from the USB stick follow these steps:

- a. Turn off your Surface device.
- b. Press and hold the **Volume Down** button.
- c. Press and release the **Power** button.
- d. Release the **Volume Down** button.

 **Tip**

If your device does not boot to USB using these steps, you may need to turn on the **Enable Alternate Boot Sequence** option in Surface UEFI. You can read more about Surface UEFI boot configuration in [Manage Surface UEFI Settings](#).

3. When the Surface device boots, a **SoftwareLicenseTerms** text file is displayed, as shown in Figure 5.

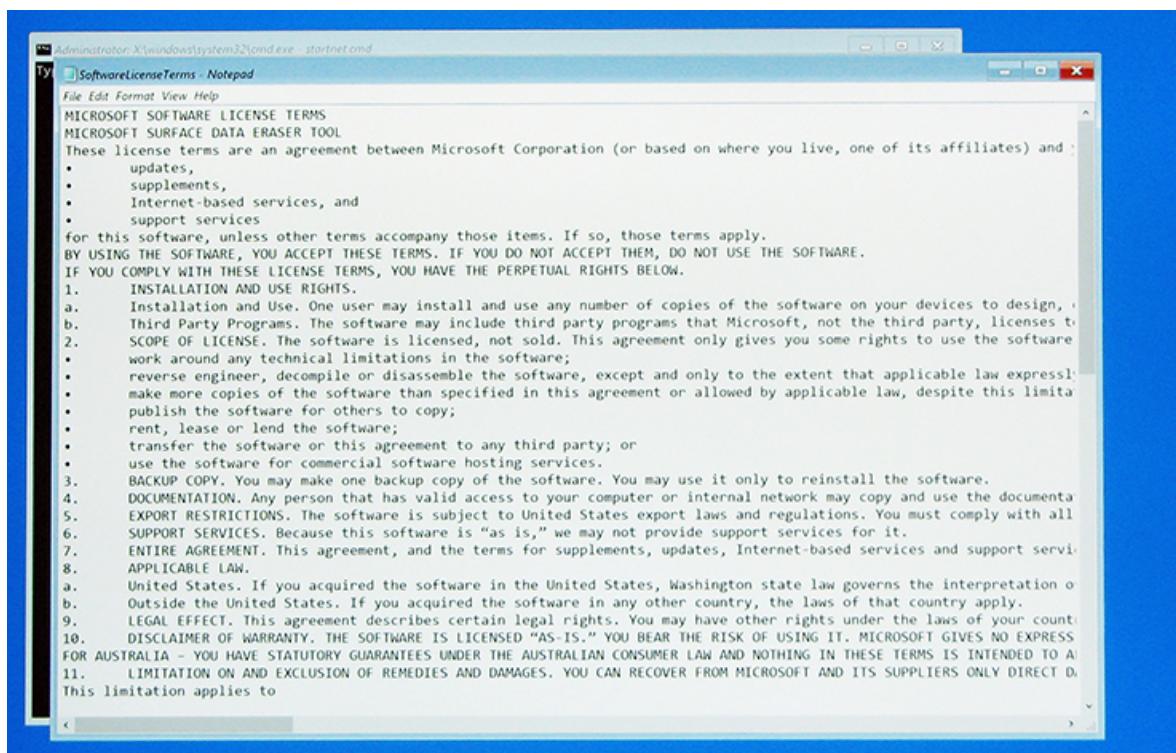


Figure 5. Booting the Microsoft Surface Data Eraser USB stick

4. Read the software license terms, and then close the Notepad file.
5. Accept or decline the software license terms by typing **Accept** or **Decline**. You must accept the license terms to continue.
6. The Microsoft Surface Data Eraser script detects the storage devices that are present in your Surface device and displays the details of the native storage device. To continue, press **Y** (this action runs Microsoft Surface Data Eraser and removes all data from the storage device) or press **N** (this action shuts down the device without removing data).

Caution

The Microsoft Surface Data Eraser tool will delete all data, including Windows operating system files required to boot the device, in a secure and unrecoverable way. To boot a Surface device that has been wiped with Microsoft Surface Data Eraser, you will first need to reinstall the Windows operating system. To remove data from a Surface device without removing the Windows operating system, you can use the **Reset your PC** function. However, this does not prevent your data from being recovered with forensic or data recovery capabilities. See [Recovery options in Windows 10](#) for more information.

```
Type Accept or Decline and press Enter to continue: (Accept|Decline): accept
Surface Data Eraser
is a script implementation
to erase data on Surface device

Data erase tools for the storage drives
are provided by
the Original Equipment Manufacturers of the storage drives

This script identifies
the drive manufacturer on your device
and runs the corresponding
data erase tool.

Checking storage drive make and model...
...
...
NVMe Model=NVMe Storage Device
NVMe Size=000000000000 bytes
Storage Device NVMe detected. Press Y to execute Microsoft Surface Data Eraser or N to
shut device down (Y|N): y
```

Figure 6. Partition to be erased is displayed in Microsoft Surface Data Eraser

7. If you pressed **Y** in step 6, due to the destructive nature of the data erasure process, another dialog box is displayed to confirm your choice.
8. Select **Yes** to continue erasing data on the Surface device.

Tip

When you run Surface Data Eraser on the Surface Data Eraser USB drive, a log file is generated in the **SurfaceDataEraserLogs** folder.

Changes and updates

Microsoft Surface Data Eraser is periodically updated by Microsoft. For information about the changes provided in each new version, see the following notes:

3.48.139.0

Release Date: 21 November 2022

This version of Surface Data Eraser includes bug fixes.

3.46.139.0.

Release Date: 28 October 2022

This version of Surface Data Eraser includes:

- Support for Surface Pro 9, Surface Laptop 5, and Surface Studio 2+.

3.45.139.0

Release Date: 7 June 2022

This version of Surface Data Eraser includes:

- Support for Surface Laptop Go 2.

3.42.139.0

Release Date: 5 October 2021

This version of Surface Data Eraser includes:

- Separate option for 2021 and support for newer devices including Surface Laptop Studio, Surface Pro 8, and Surface Go 3.

3.39.139.0

Release Date: 13 April 2021

This version of Surface Data Eraser includes:

- Support for Surface Laptop 4

2.34.139.0

Release Date: 15 January 2021

This version of Surface Data Eraser:

- Includes bug fixes

3.33.139

Release Date: 9 September 2020

This version of Surface Data Eraser includes bug fixes and adds support for:

- Architecture re-design to reduce the need to update with new product releases
- Notification available for new tool updates
- Customer content additions
- Windows 10 Pro and Enterprise on Surface Hub 2

3.30.139

Release Date: 11 May 2020

This version of Surface Data Eraser adds support for:

- Surface Book 3
- Surface Go 2
- New SSD in Surface Go

3.28.137

Release Date: 11 November 2019

This version of Surface Data Eraser:

- Includes bug fixes

Version 3.21.137

Release Date: 21 October 2019

This version of Surface Data Eraser is compiled for x86 and adds support for the following devices:

- Surface Pro 7, Surface Pro X, and Surface Laptop 3

Version 3.2.78.0

Release Date: 4 December 2018

This version of Surface Data Eraser includes bug fixes

Version 3.2.75.0

Release Date: 12 November 2018

This version of Surface Data Eraser:

- Adds support to Surface Studio 2
- Fixes issues with SD card

Version 3.2.69.0

Release Date: 12 October 2018

This version of Surface Data Eraser adds support for the following devices:

- Surface Pro 6
- Surface Laptop 2

Version 3.2.68.0

This version of Microsoft Surface Data Eraser adds support for Surface Go.

Version 3.2.58.0

This version of Microsoft Surface Data Eraser adds support for the following:

- Extra storage devices (drives) for Surface Pro and Surface Laptop devices

Version 3.2.46.0

This version of Microsoft Surface Data Eraser adds support for Surface Pro with LTE Advanced

Version 3.2.45.0

This version of Microsoft Surface Data Eraser adds support for the following devices:

- Surface Book 2
- Surface Pro 1 TB

ⓘ Note

Surface Data Eraser v3.2.45.0 and above can be used to restore Surface Pro or Surface Laptop devices with the 1TB storage option in the scenario that the device shows two separate 512GB volumes or encounters errors when attempting to deploy or install Windows 10. See [Surface Pro Model 1796](#) and [Surface Laptop 1TB display two drives](#) for more information.

Version 3.2.36.0

This version of Microsoft Surface Data Eraser adds support for the following devices:

- Surface Pro
- Surface Laptop

ⓘ Note

The Microsoft Surface Data Eraser USB drive creation tool is unable to run on Windows 10 S. To wipe a Surface Laptop running Windows 10 S, you must first create the Microsoft Surface Data Eraser USB drive on another computer with Windows 10/11 Pro or Windows 10/11 Enterprise.

Surface Battery Limit setting

Article • 01/13/2023

The Battery Limit option is a Surface UEFI setting that changes how the Surface device battery is charged and may prolong its longevity. This firmware setting (similar to BIOS) is recommended for devices intended to be always connected to power. Examples include devices configured for point of sale, RFID, and related kiosk scenarios. The Battery Limit UEFI setting is built into Surface devices by default including:

- Surface Go and later
- Surface Pro 7 and later
- Surface Laptop 3 and later
- Surface Book 3
- Surface Laptop Studio
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Laptop SE

How it works

When you enable the Battery Limit setting, the battery stops charging when it reaches 50% of maximum charge capacity. If you enable Battery Limit when your device is more than 50% charged, the battery won't resume charging until it drops below 50% of maximum charge.

Enable Battery Limit via one of the following methods:

- [Modify Surface UEFI on an individual device](#)
- [Create a Surface UEFI configuration package for remote deployment to multiple devices](#)

Modify Surface UEFI on an individual device

1. Boot into Surface UEFI: Press **Power + Vol Up** when turning on the device.
2. Choose **Boot configuration > Advanced Options**, and toggle **Enable Battery Limit** to **On**.

The screenshot shows the Surface UEFI configuration interface. On the left, a sidebar lists navigation options: PC information, Security, Devices, Boot configuration (which is selected and highlighted in blue), Date and Time, Management, About, and Exit. The main content area is titled "Configure boot device order". It contains instructions: "To change the order devices are searched for a bootable operating system, drag each boot option to the desired location in the list. Use the checkbox to enable or disable a boot option. Click the trash icon to permanently remove a boot option from the list. Swipe left on a device to boot that device immediately." Below this is a list of boot options with checkboxes and a trash icon: Windows Boot Manager (checked), USB Storage (checked), PXE Network (checked), and Internal Storage (checked). Under "Advanced options", there are five toggle switches: "Enable alternate boot sequence" (On), "Enable IPv6 for PXE Network boot option" (On), "Enable Boot from USB devices" (On), "Enable Boot Configuration Lock" (Off), and "Enable Battery Limit" (Off, which is highlighted with a red border).

💡 Tip

On Surface Go (all generations): Choose **Boot configuration > Kiosk Mode**, and move the slider to the right to set **Battery Limit** to **Enabled**.

Create a Surface UEFI configuration package for remote deployment to multiple devices

If you're an advanced IT admin, you can use [Surface UEFI Configurator](#) to modify Surface UEFI and remotely deploy it to multiple devices via [Surface Enterprise Management Mode \(SEMM\)](#). Alternatively, you can use Surface UEFI Manager PowerShell scripts (SEMM_Powershell.zip) available from [Surface Tools for IT ↗](#).

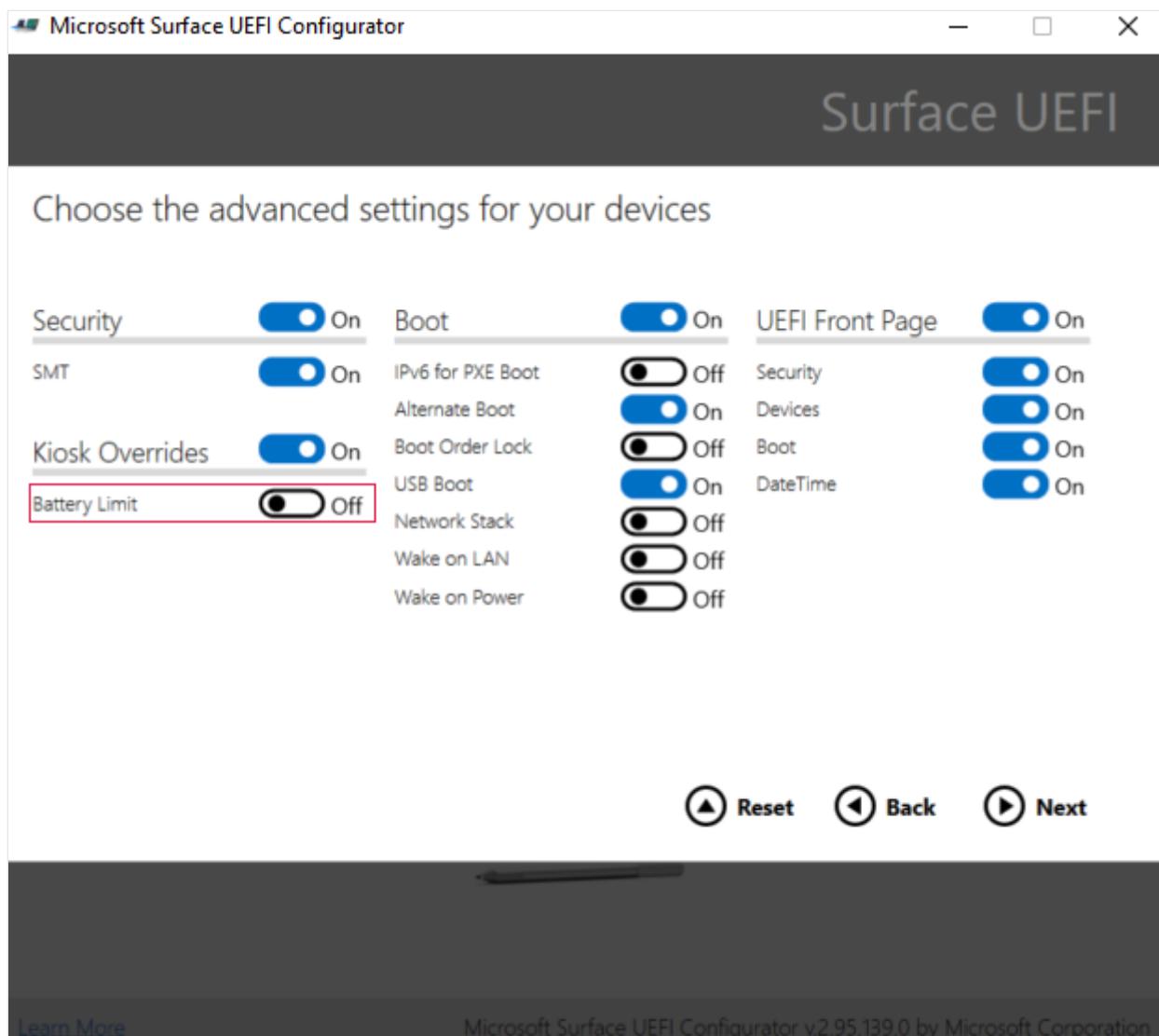
ⓘ Note

To use SEMM, most eligible devices must be commercial SKUs, branded as "Surface for Business." For a complete list of compatible devices, see [Supported devices](#).

Use Microsoft Surface UEFI Configurator

1. Open [UEFI Configurator](#).
2. On the **Advanced Settings** configuration page, toggle the **Kiosk Overrides** setting to **On**.

3. Toggle Battery Limit to On.



Use Surface UEFI Manager PowerShell scripts

The battery limit feature is controlled via the following setting:

`407 = Battery Profile`

Description: Active management scheme for battery usage pattern

Default: 0

Configure setting to 1 to enable Battery Limit.

Learn more

- Enroll and configure Surface devices with SEMM
- Best practice power settings for Surface devices

Surface Brightness Control

Article • 05/08/2023 • Applies to: Windows 10, Windows 11

When deploying Surface devices in point of sale or other "always-on" kiosk scenarios, you can optimize power management using the Surface Brightness Control app. Surface Brightness Control is designed to help reduce thermal load and lower the overall carbon footprint for deployed Surface devices. The tool automatically dims the screen when not in use and includes the following configuration options:

- Period of inactivity before dimming the display.
- Brightness level when dimmed.
- Maximum brightness level when in use.

Download Surface Brightness Control from [Surface Tools for IT](#). Select the file `Surface_Brightness_Control_v1.20.139.0.msi` in the available list.

Supported devices

- Surface Pro 3 and later
- Surface Pro X (all generations)
- Surface 3
- Surface Book (all generations)
- Surface Laptop Studio
- Surface Studio (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)
- Surface Go (all generations)

Run Surface Brightness Control

- Install `Surface_Brightness_Control_v1.20.139.0.msi` on the target device, and Surface Brightness Control begins working immediately.

Configure Surface Brightness Control

You can adjust the default values via the Windows Registry. For more information about using the Windows Registry, refer to the [Registry documentation](#).

1. Run `regedit` from a command prompt to open the Windows Registry Editor.

2. Navigate to

Computer\HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Microsoft\Surface\Surface Brightness Control.

3. Adjust the Registry key values, as described in the following table.

 **Tip**

If you're running an older version of Surface Brightness control, navigate to:

Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Surface\SurfaceBrightness Control\

Registry Setting	Data	Description
BrightnessControlEnabled	Default: 01 Options 01, 00 Type: REG_BINARY	This setting allows you to turn Surface Brightness Control on or off. To disable Surface Brightness Control, set the value to 00. If you don't configure this setting, Surface Brightness Control is on.
BrightnessControlOnPowerEnabled	Default: 00 Options: 01, 00 Type: REG_BINARY	This setting allows you to turn off Surface Brightness Control when the device is directly connected to AC power. To disable Surface Brightness Control when AC power is plugged in, set the value to 00. If you don't configure this setting when plugged into AC power, Surface Brightness Control is off.
AlwaysAllowBrightenEnabled	Default: 01 Options: 01, 00 Type: REG_BINARY	This setting allows Surface Brightness Control to brighten the screen when AC power is connected, even if BrightnessControlOnPowerEnabled is set to 00 (disabled). If you disable this setting and AC power is connected while the screen is dimmed, it will not brighten if BrightControlOnPowerEnabled is also set to 00 (disabled).

Registry Setting	Data	Description
DimmedBrightness	Default: 20 Options Range of 0-100 percent of screen brightness Data Type: Positive integer Type: REG_DWORD	This setting allows you to manage brightness range during periods of inactivity. If you don't configure this setting, the brightness level will drop to 20 percent of full brightness after 30 seconds of inactivity.
FullBrightness	Default: 100 Options Range of 0-100 percent of screen brightness Data Type: Positive integer Type: REG_DWORD	This setting allows you to manage the maximum brightness range for the device. If you don't configure this setting, the maximum brightness range is 100 percent.
InactivityTimeout	Default: 30 seconds Options Any numeric value Data Type: Integer Type: REG_DWORD	This setting allows you to manage the period of inactivity before dimming the device. If you don't configure this setting, the inactivity timeout is 30 seconds.
TelemetryEnabled	Default: 01 Options 01, 00 Type: REG_BINARY	This setting allows you to manage the sharing of app usage information to improve software and provide a better user experience. To disable, set the value to 00. If you don't configure this setting, telemetry information is shared with Microsoft per the Microsoft Privacy Statement .

Changes and updates

Version 1.20.139.0

Release Date: 3 May 2023

This version of Surface Brightness Control adds support for the following:

- New Registry setting: AlwaysAllowBrightenEnabled

Version 1.16.137

Release Date: 22 October 2019

This version of Surface Brightness Control adds support for the following:

-Recompiled for x86, adding support for Surface Pro 7, Surface Pro X, Surface Laptop 3. It includes support for products released after 2019.

Version 1.12.239.0

Release Date: 26 April 2019

This version of Surface Brightness Control adds support for the following:

- Touch delay fixes.

Related topics

- [Battery limit setting](#)

Surface Asset Tag Tool

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface Asset Tag is a command line interface (CLI) utility that allows you to view, assign, and modify an assigned asset tag value for Surface devices.

System requirements

- Surface Pro 3 or later and all newer Surface devices.
- UEFI firmware version 3.9.150.0 or later

Using Surface Asset Tag

To run Surface Asset Tag:

1. On the Surface device, download **Surface Asset Tag.zip** from the [Microsoft Download Center](#), extract the zip file, and save AssetTag.exe in desired folder (in this example, C:\assets).

 Note

For Surface Pro X, use the application named **AssetTag_x86** in the ZIP file.

2. Open a command console as an Administrator and run AssetTag.exe, entering the full path to the tool.
3. Restart Surface.

 Note

After setting the asset tag, a second reboot is required before it appears in WMI.

Asset Tag tool commands

In the following examples, AssetTag.exe is saved in a directory on a local machine (C:\assets).

To get the proposed asset tag, run **AssetTag -g**:

```
Console  
C:\assets\AssetTag.exe -g
```

To clear the proposed asset tag, run **AssetTag -s**:

```
Console  
C:\assets\AssetTag.exe -s
```

To set the proposed asset tag, run **AssetTag -s testassettag12**:

```
C:\assets\AssetTag.exe -s testassettag12
```

Tip

The asset tag value must contain between 1 and 36 characters. Valid characters include A-Z, a-z, 0-9, period (.) and hyphen (-).

Managing asset tags

You can view the existing asset tag in the UEFI settings under Device Information (**Control Panel > Recovery > Advanced Startup > Restart now.**)

The figure below shows the results of running the Asset Tag Tool on Surface Go.

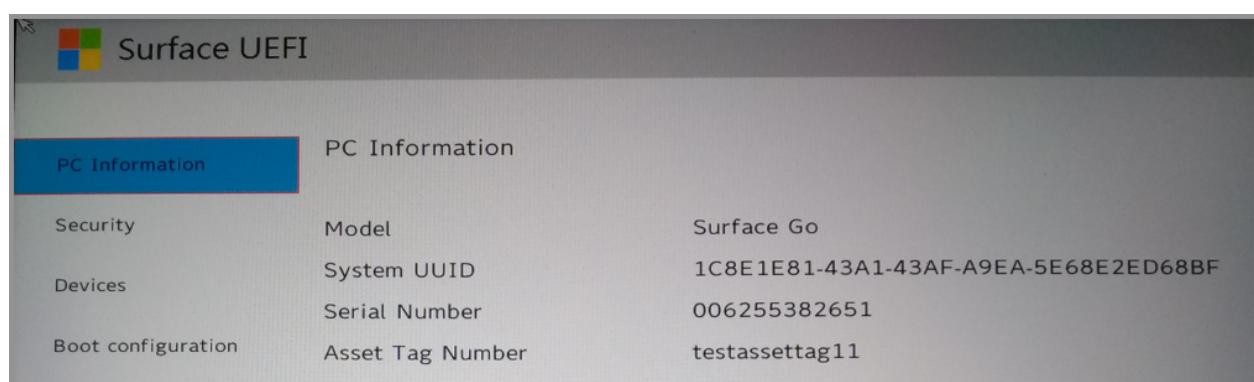


Figure 1. Results of running Surface Asset Tag tool on Surface Go

Alternately, you can use WMI to query the existing asset tag on a device:

```
(Get-WmiObject -query "Select * from Win32_SystemEnclosure")
```

Example

Console

```
C:\Windows\System32> (Get-WmiObject -query "Select * from Win32_SystemEnclosure")
```

Using PowerShell

You can use the script below as a way of getting the proposed value and interpreting any errors.

PowerShell

```
AssetTag -g \> $asset\_tag 2\> $error\_message
$asset\_tag\_return\_code = $LASTEXITCODE
$asset\_tag = $asset\_tag.Trim("\`r`\n")

if ($asset\_tag\_return\_code -eq 0) {
    Write-Output ("Good Tag = " + $asset\_tag)
} else {
    Write-Output (
        "Failure: Code = " + $asset\_tag\_return\_code +
        "Tag = " + $asset\_tag +
        "Message = " + $error\_message)

}
```

Enable PEAP, EAP-FAST, and Cisco LEAP on Surface devices

Article • 01/26/2023 • Applies to: Windows 10, Windows 11

Find out how to enable support for PEAP, EAP-FAST, or Cisco LEAP protocols on your Surface device.

If you use PEAP, EAP-FAST, or Cisco LEAP in your enterprise network, you probably already know that these three wireless authentication protocols are not supported by Surface devices out of the box. Some users may discover this when they attempt to connect to your wireless network; others may discover it when they are unable to gain access to resources inside the network, like file shares and internal sites. For more information, see [Extensible Authentication Protocol](#).

You can add support for each protocol by executing a small MSI package from a USB stick or from a file share. For organizations that want to enable EAP support on their Surface devices, the MSI package format supports deployment with many management and deployment tools, like the Microsoft Deployment Toolkit (MDT) and Microsoft Endpoint Configuration Manager.

Download PEAP, EAP-FAST, or Cisco LEAP installation files

You can download the MSI installation files for PEAP, EAP-FAST, or Cisco LEAP in a single zip archive file from the Microsoft Download Center. To download this file, go to the [Surface Tools for IT](#) page on the Microsoft Download Center, click **Download**, and then select the **Cisco EAP-Supplicant Installer.zip** file.

Deploy PEAP, EAP-FAST, or Cisco LEAP with MDT

If you are already performing a Windows deployment to Surface devices in your organization, it is quick and easy to add the installation files for each protocol to your deployment share and configure automatic installation during deployment. You can even configure a task sequence that updates previously deployed Surface devices to provide support for these protocols using the same process.

To enable support for PEAP, EAP-FAST, or Cisco LEAP on newly deployed Surface devices, follow these steps:

1. Download and extract the installation files for each protocol to separate folders in an easily accessible location.
2. Open the MDT Deployment Workbench and expand your deployment share to the **Applications** folder.
3. Select **New Application** from the **Action** pane.
4. Choose **Application with source files** to copy the MSI files into the Deployment Share.
5. Select the folder you created in step 1 for the desired protocol.
6. Name the folder in the deployment share where the installation files will be stored.
7. Specify the command line to deploy the application:
 - For PEAP use **EAP-PEAP.msi /qn /norestart**.
 - For LEAP use **EAP-LEAP.msi /qn /norestart**.
 - For EAP-FAST use **EAP-FAST.msi /qn /norestart**.
8. Use the default options to complete the New Application Wizard.
9. Repeat steps 3 through 8 for each desired protocol.

After you've performed these steps to import the three MSI packages as applications into MDT, they will be available for selection in the Applications page of the Windows Deployment Wizard. Although in some simple deployment scenarios it might be sufficient to have technicians select each package at the time of deployment, it is not recommended. This practice introduces the possibility that a technician could attempt to apply these packages to computers other than Surface devices, or that a Surface device could be deployed without EAP support due to human error.

To hide these applications from the Install Applications page, select the **Hide this application in the Deployment Wizard** checkbox in the properties of each application. After the applications are hidden, they will not be displayed as optional applications during deployment. To deploy them in your Surface deployment task sequence, they must be explicitly defined for installation through a separate step in the task sequence.

To specify the protocol(s) explicitly, follow these steps:

1. Open your Surface deployment task sequence properties from the MDT Deployment Workbench.
2. On the **Task Sequence** tab, select the **Install Applications** step under **State Restore**. This is typically found between the pre-application and post-application Windows Update steps.
3. Use the **Add** button to create a new **Install Application** step from the **General** category.
4. Select **Install a single application** in the step **Properties** tab.
5. Select the desired EAP protocol from the list.
6. Repeat steps 2 through 5 for each desired protocol.

Deploy PEAP, EAP-FAST, or Cisco LEAP with Configuration Manager

For organizations that manage Surface devices with Configuration Manager, it is even easier to deploy PEAP, EAP-FAST, or Cisco LEAP support to Surface devices. Simply import each MSI file as an application from the Software Library and configure a deployment to your Surface device collection.

For more information on how to deploy applications with Configuration Manager, see [Create and deploy an application with Configuration Manager](#).

Surface Dock 1 Firmware Update

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

This article explains how to use Microsoft Surface Dock 1 Firmware Update to install and manage firmware on the original Surface Dock 1. When installed on your Surface device, it will update Surface Dock 1 devices attached to your Surface device.

ⓘ Note

This article does not apply to **Surface Dock 2**, which receives updates automatically via Windows Update or by using Microsoft Endpoint Configuration Manager or other MSI deployment tools.

This tool supersedes the earlier Microsoft Surface Dock Updater tool, previously available for download as part of Surface Tools for IT. The earlier tool was named Surface_Dock_Updater_vx.xx.xxx.x.msi (where x indicates the version number) and is no longer available for download and should not be used.

ⓘ Important

This article contains technical instructions for IT administrators. If you are a home user, please see [How to update your Surface Dock Firmware](#) on the Microsoft Support site. The instructions at the support site are the same as the general installation steps below, but this article has additional information for monitoring, verifying, and deploying the update to multiple devices on a network.

Supported devices

Surface Dock 1 Firmware Update is supported on the following devices:

- Surface Pro 3 and later
- Surface Pro X (all generations)
- Surface 3
- Surface Book (all generations)
- Surface Laptop Studio
- Surface Studio (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)
- Surface Go (all generations)

Minimum OS requirement

- Windows 10, version 1803 or later

Install Surface Dock 1 Firmware Update

This section describes how to manually install the firmware update on Surface Dock 1.

💡 Tip

Microsoft periodically releases new versions of Surface Dock 1 Firmware Update. The MSI file is not self-updating. If you have deployed the MSI to Surface devices and a new version of the firmware is released, you will need to deploy the new version.

1. Go to [Surface Tools for IT](#) and download and install the .msi file named **Surface_Dock_FwUpdate..**, followed by the appropriate version. If you're running Surface Pro X, download the **.arm64** build. For all other devices, use the **.amd64** build.
 - The update requires a Surface device running Windows 10, version 1803 or later.
 - Installing the MSI file might prompt you to restart Surface. However, restarting is not required to perform the update.

ⓘ Note

All current software, firmware, and drivers for the Surface Dock 2 can be found [here](#)

2. Disconnect your Surface device from the Surface Dock, wait ~5 seconds, and then reconnect. The Surface Dock 1 Firmware Update will update the dock silently in background. The process can take a few minutes to complete and will continue even if interrupted.

Monitor the Surface Dock 1 Firmware Update

This section is optional and provides an overview of how to monitor installation of the firmware update.

To monitor the update:

1. Open Event Viewer, browse to **Windows Logs > Application**, and then under **Actions** in the right-hand pane click **Filter Current Log**, enter **SurfaceDockFwUpdate** next to **Event sources**, and then click **OK**.
2. Type the following command at an elevated command prompt:

```
Console
```

```
Reg query "HKLM\SOFTWARE\Microsoft\Windows  
NT\CurrentVersion\WUDF\Services\SurfaceDockFwUpdate\Parameters"
```

3. Install the update as described in the [next section](#) of this article.
4. Event 2007 with the following text indicates a successful update: **Firmware update finished. hr=0 DriverTelemetry EventCode = 2007**.

If the update is not successful, then event ID 2007 will be displayed as an **Error** event rather than **Information**. Additionally, the version reported in the Windows Registry will not be current.

5. When the update is complete, updated DWORD values will be displayed in the Windows Registry, corresponding to the current version of the tool. See the [Versions reference](#) section in this article for details. For example:

- Component10CurrentFwVersion 0x04ac3970 (78395760)
- Component20CurrentFwVersion 0x04915a70 (76634736)

Tip

If you see "The description for Event ID xxxx from source SurfaceDockFwUpdate cannot be found" in event text, this is expected and can be ignored.

Also see the following sections in this article:

- [How to verify completion of firmware update](#)
 - [Event logging](#)
 - [Troubleshooting tips](#)
 - [Versions reference](#)

Network deployment

You can use Windows Installer commands (Msiexec.exe) to deploy Surface Dock 1 Firmware Update to multiple devices across your network. When using Microsoft Endpoint Configuration Manager or other deployment tool, enter the following syntax to ensure the installation is silent:

- **Msiexec.exe /i <path to msi file> /quiet /norestart**

For example:

Console

```
msiexec /i  
"\\"share\folder\Surface_Dock_FwUpdate_1.42.139_Win10_17134_19.084.31680_0.ms  
i" /quiet /norestart
```

ⓘ Note

A log file is not created by default. In order to create a log file, you will need to append "/lv [path]". *For example: Msiexec.exe /i <path to msi file> /lv %windir%\logs\ SurfaceDockFWI.log"*

For more information, refer to [Command line options](#) documentation.

ⓘ Important

If you want to keep your Surface Dock updated using any other method, refer to [Update your Surface Dock](#) for details.

Intune deployment

You can use Intune to distribute Surface Dock 1 Firmware Update to your devices. First you will need to convert the MSI file to the .intunewin format, as described in the following documentation: [Intune Standalone - Win32 app management](#).

Use the following command:

- **msiexec /i <path to msi file> /quiet /q**

How to verify completion of the firmware update

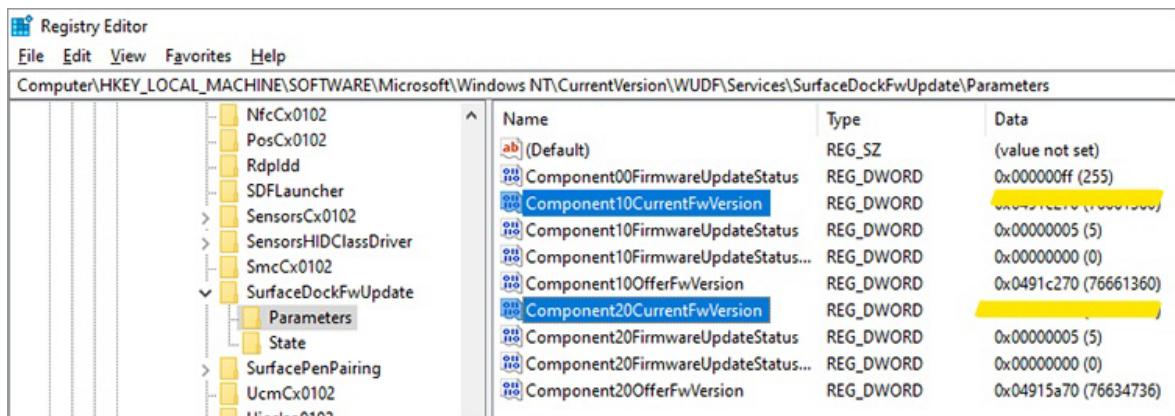
Surface dock firmware consists of two components:

- **Component10**: Micro controller unit (MCU) firmware
- **Component20**: Display port (DP) firmware.

Successful completion of Surface Dock 1 Firmware Update results in new registry key values for these firmware components.

To verify updates

1. Open Regedit and navigate to the following registry path:
 - **HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\WUDF\Services\SurfaceDockFwUpdate\Parameters**
2. Look for the registry keys: **Component10CurrentFwVersion** and **Component20CurrentFwVersion**, which refer to the firmware that is currently on the device.



3. Verify the new registry key values match the updated registry key values listed in the Versions reference at the end of this document. If the values match, the firmware was updated successfully.
4. If unable to verify, review Event logging and Troubleshooting tips in the next section.

Event logging

Table 1. Log files for Surface Dock 1 Firmware Update

Log	Location	Notes
-----	----------	-------

Log	Location	Notes
Surface Dock 1 Firmware Update log	Path needs to be specified (see note)	Earlier versions of this tool wrote events to Applications and Services Logs\Microsoft Surface Dock Updater.
Windows Device Install log	%windir%\inf\setupapi.dev.log	For more information about using Device Install Log, refer to SetupAPI Logging documentation.

Table 2. Event log IDs for Surface Dock 1 Firmware Update

Events are logged in the Application Event Log. Note: Earlier versions of this tool wrote events to Applications and Services Logs\Microsoft Surface Dock Updater.

Event ID	Event type
2001	Dock firmware update has started.
2002	Dock firmware update skipped because dock is known to be up to date.
2003	Dock firmware update failed to get firmware version.
2004	Querying the firmware version.
2005	Dock firmware failed to start update.
2006	Failed to send offer/payload pairs.
2007	Firmware update finished.
2008	BEGIN dock telemetry.
2011	END dock telemetry.

Troubleshooting tips

- Completely disconnect power for Surface dock from the AC power to reset the Surface Dock.
- Disconnect all peripherals except for the Surface Dock.
- Uninstall any current Surface Dock 1 Firmware Update and then install the latest version.
- Ensure that the Surface Dock is disconnected, and then allow enough time for the update to complete as monitored via an LED in the Ethernet port of the dock. Wait until the LED stops blinking before you unplug Surface Dock from power.

- Connect the Surface Dock to a different device to see if it is able to update the dock.

Versions reference

ⓘ Note

The installation file is released with the following naming format:

Surface_Dock_FwUpdate_X.XX.XXX_Win10_XXXXXX_XX.XXX.XXXXXX_X.MSI (ex:
Surface_Dock_FwUpdate_1.42.139_Win10_17134_19.084.31680_0.msi) and installs
by default to C:\Program Files\SurfaceUpdate.

Version 1.53.139.0

Release Date: August 4, 2020

This version of Surface Dock 1 Firmware Update includes bug fixes and support for:

- Updating Surface Dock 1 using Surface Pro X.

Registry key values

The registry values that indicate the status of firmware updates are unchanged from the previous version of this tool:

- Component10CurrentFwVersion updated to **4ac3970**.
- Component20CurrentFwVersion updated to **4a1d570**.

Version 1.42.139

Release Date: September 18 2019

This version, contained in

Surface_Dock_FwUpdate_1.42.139_Win10_17134_19.084.31680_0.MSI, updates firmware
in the background.

Updated registry key values

- Component10CurrentFwVersion updated to **4ac3970**.

- Component20CurrentFwVersion updated to 4a1d570.

It adds support for Surface Pro 7 and Surface Laptop 3.

Legacy versions

Version 2.23.139.0

Release Date: 10 October 2018

This version of Surface Dock Updater adds support for the following:

- Add support for Surface Pro 6
- Add support for Surface Laptop 2

Version 2.22.139.0

Release Date: 26 July 2018

This version of Surface Dock Updater adds support for the following:

- Increase update reliability
- Add support for Surface Go

Version 2.12.136.0

Release Date: 29 January 2018

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock Main Chipset Firmware
- Update for Surface Dock DisplayPort Firmware
- Improved display stability for external displays when used with Surface Book or Surface Book 2

Additionally, installation of this version of Surface Dock Updater on Surface Book devices includes the following:

- Update for Surface Book Base Firmware

- Added support for Surface Dock firmware updates with improvements targeted to Surface Book devices

Version 2.9.136.0

Release date: November 3, 2017

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock DisplayPort Firmware
- Resolves an issue with audio over passive display port adapters

Version 2.1.15.0

Release date: June 19, 2017

This version of Surface Dock Updater adds support for the following:

- Surface Laptop
- Surface Pro

Version 2.1.6.0

Release date: April 7, 2017

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock DisplayPort firmware
- Requires Windows 10

Version 2.0.22.0

Release date: October 21, 2016

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock USB firmware
- Improved reliability of Ethernet, audio, and USB ports

Version 1.0.8.0

Release date: April 26, 2016

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock Main Chipset firmware
- Update for Surface Dock DisplayPort firmware

Manage and deploy Surface driver and firmware updates

Article • 04/19/2023 • Applies to: Windows 10, Windows 11

How you manage Surface driver and firmware updates may vary depending on your environment and organizational requirements. In larger organizations, IT admins typically stage deployments internally and allocate time to test upgrades before rolling them out to user devices.

Note

This article is intended for IT professionals and technical support agents and applies to Surface devices only. If you're looking for help to install Surface updates or firmware on a home device, see [Download drivers and firmware for Surface](#).

While enterprise-grade software distribution solutions continue to evolve, the business rationale for centrally managing updates remains the same: Maintain the security of Surface devices and keep them updated with the latest operating system and feature improvements. This IT practice is essential for sustaining a stable production environment and making sure that users aren't blocked from being productive.

What's in Surface driver and firmware updates

Windows Installer .msi files contain all the required cumulative driver and firmware updates for Surface devices. Update packages may include some or all the following components:

- Wi-Fi and LTE
- Video
- Solid-state drive
- System aggregator module (SAM)
- Battery
- Keyboard controller
- Embedded controller (EC)
- Management engine (ME)
- Unified extensible firmware interface (UEFI)

Download .msi files

This section provides direct links to downloadable packages containing driver and firmware updates for Surface devices.

1. Select Windows 10 or Windows 11 as appropriate.
2. For devices with multiple .msi files, select the .msi file name that matches the Surface model and version of Windows deployed in your organization.

Surface device	Downloadable .msi
Surface Pro	<ul style="list-style-type: none">- Surface Pro 9 with Intel processor ↗- Surface Pro 8 ↗- Surface Pro 7+ and Surface Pro 7+ (LTE) ↗- Surface Pro 7 ↗- Surface Pro 6 ↗- Surface Pro 5 (LTE) ↗- Surface Pro 5 (Wi-Fi) ↗- Surface Pro 4 ↗- Surface Pro 3 ↗- Surface Pro 2 ↗- Surface Pro ↗
Surface Laptop	<ul style="list-style-type: none">- Surface Laptop Go ↗- Surface Laptop Go 2 ↗- Surface Laptop 5 ↗- Surface Laptop 4 with Intel Processor ↗- Surface Laptop 4 with AMD Processor ↗- Surface Laptop 3 with Intel Processor ↗- Surface Laptop 3 with AMD Processor ↗- Surface Laptop 2 ↗- Surface Laptop ↗
Surface Laptop Studio	<ul style="list-style-type: none">- Surface Laptop Studio ↗
Surface Book	<ul style="list-style-type: none">- Surface Book 3 ↗- Surface Book 2 ↗- Surface Book ↗
Surface Go	<ul style="list-style-type: none">- Surface Go 3 ↗- Surface Go 2 ↗- Surface Go (Wi-Fi) ↗- Surface Go (LTE) ↗
Surface Studio	<ul style="list-style-type: none">- Surface Studio 2+ ↗- Surface Studio 2 ↗- Surface Studio ↗

Surface device	Downloadable .msi
Surface 3	<ul style="list-style-type: none"> - Surface 3 (Wi-Fi) - Surface 3 (LTE) - ATT - Surface 3 (LTE) - Verizon - Surface 3 (LTE) - North America Carrier Unlocked - Surface 3 (LTE) - Outside of North America and Y!mobile in Japan
Surface Hub running Windows 10 Pro or Windows 10 Enterprise	<ul style="list-style-type: none"> - Windows 10 Pro and Enterprise OS on Surface Hub 2
Surface Hub running Windows 10 Teams 2020 Update	<ul style="list-style-type: none"> - See Manage Windows updates on Surface Hub
Surface Dock 2	<ul style="list-style-type: none"> - Surface Dock 2

Tip

For earlier devices that include separate files for different Windows versions, select the .msi file name that matches the Surface model and version of Windows. The .msi file name includes the minimum supported Windows build number that's required to install the drivers and firmware. For example, to update a Surface Book 2 that has build 18362 of Windows 10, choose [SurfaceBook2_Win10_18362_19.101.13994.msi](#). For a Surface Book 2 that has build 16299 of Windows 10, choose [SurfaceBook2_Win10_16299_1803509_3.msi](#).

Central update management in commercial environments

Tools for managing devices, including driver and firmware updates, are included in [Microsoft Configuration Manager](#).

Manage updates with Configuration Manager and Intune

Microsoft Intune admin center is the recommended solution for large organizations to manage Surface updates. Configuration Manager allows you to synchronize and deploy Surface firmware and driver updates with the Configuration Manager client. Integration with Intune lets you see all your managed, co-managed, and partner-managed devices in one place. The Microsoft Surface Management Portal is a centralized place in the

Microsoft Intune admin center where you can self-serve, manage, and monitor your organization's Intune-managed Surface devices at scale.

For more information, see the following resources:

- [Manage Surface driver updates in Configuration Manager](#)
- [Deploy applications with Configuration Manager](#)
- [Overview of Microsoft Surface Management Portal](#)
- [Configuration Manager documentation](#)
- [Intune documentation](#)

Manage updates with Microsoft Deployment Toolkit

The Microsoft Deployment Toolkit (MDT) is a free tool for automating Windows deployment. It uses the task sequence engine from Configuration Manager, and can also install drivers and software updates during the deployment.

For more information, see the following resources:

- [Prepare for deployment with MDT](#)
- [MDT documentation](#)

Windows PE and Surface firmware and drivers

Configuration Manager and MDT both use the Windows Preinstallation Environment (Windows PE) during the deployment process. Windows PE supports only a limited set of basic drivers such as network adapters and storage controllers. Drivers for Windows components that aren't part of Windows PE might produce errors. You can prevent such errors by configuring the deployment process to use only the required drivers during the Windows PE phase.

Supported devices

Downloadable .msi files are available for Surface Pro 2 and later devices (except Surface Pro X, which runs Windows 10 on ARM processor).

Managing firmware with DFCI

By having Device Firmware Configuration Interface (DFCI) profiles [built into Intune](#), Surface UEFI management extends the modern management stack down to the UEFI hardware level. DFCI supports zero-touch provisioning, eliminates BIOS passwords,

provides control of security settings (including startup options and built-in peripherals), and lays the groundwork for advanced security scenarios in the future. For more information, see the following resources:

- [Manage DFCI on Surface devices](#)
- [Ignite 2019: Announcing remote management of Surface UEFI settings from Intune](#).

Best practices for update deployment processes

To maintain a stable environment, we strongly recommend that you keep parity with the most recent version of Windows 10. For best practice recommendations, see [Prepare servicing strategy for Windows client updates](#).

Surface .msi naming convention

Since August 2019, .msi files are using the following naming convention:

- *ProductWindows releaseWindows build numberVersion numberRevision of version number (typically zero).*

Example

- SurfacePro6_Win10_18362_19.073.44195_0.msi

This file name provides the following information:

- **Product:** SurfacePro6
- **Windows release:** Win10
- **Build:** 18362
- **Version:** 19.073.44195 – Version number shows the date and time that the file was created, as follows:
 - **Year:** 19 (2019)
 - **Month and week:** 073 (third week of July)
 - **Minute of the month:** 44195
- **Revision of version:** 0 (first release of this version)

Legacy Surface .msi naming convention

Legacy .msi files (files that were built before August 2019) followed the same overall naming formula but used a different method to derive the version number.

Example

- SurfacePro6_Win10_16299_1900307_0.msi

This file name provides the following information:

- **Product:** SurfacePro6
- **Windows release:** Win10
- **Build:** 16299
- **Version:** 1900307 – Version number shows the date that the file was created and its position in the release sequence, as follows:
 - **Year:** 19 (2019)
 - **Number of release:** 003 (third release of the year)
 - **Product version number:** 07 (Surface Pro 6 is officially the seventh version of Surface Pro)
- **Revision of version:** 0 (first release of this version)

Learn more

- [Prepare servicing strategy for Windows client updates](#)
- [Manage Surface driver updates in Configuration Manager](#)
- [Deploy applications with Configuration Manager](#)
- [Manage DFCI on Surface devices](#)

Surface driver and firmware lifecycle for Windows-based devices

Article • 03/14/2023 • Applies to: Windows 10, Windows 11

In response to requests from customers for more detailed lifecycle information to help plan and manage hardware and software deployments, Surface is offering more guidance on our driver and firmware updates.

This lifecycle policy covers drivers and firmware releases for Windows-based Surface devices. The lifecycle begins when a device is first released and concludes when Surface ceases publication of drivers and firmware updates on the End of Servicing date. The following sections define the lifecycle policy and End of Servicing dates.

Surface driver and firmware support lifecycle

The Surface Driver and Firmware Lifecycle has two parts:

- The driver and firmware-support period for a device.
- The support provided for OS versions during that period.

Device support period. The device support period defines the period during which Surface will support driver and firmware updates for a device. The Device Support Period starts when a device is released. Surface devices will receive driver and firmware updates for at least 4 years from when the device was first released. In cases where the support duration is longer than 4 years, an updated end of servicing date will be published in advance of the date of last servicing.

OS version support. OS version support defines the operating system versions supported by Surface during the device support period. Surface devices will receive driver and firmware updates for Windows OS versions released in the prior 30 months. Surface won't support Windows OS versions earlier than the OS versions supported at device release. For the minimum supported OS version of your Surface device, see [Surface supported operating systems](#).

Once the device support period is concluded at the End of Servicing Date, devices will continue to receive Windows OS feature and security updates in accordance with the Windows Lifecycle Policy as described on the [Microsoft Lifecycle Policy support page](#).

Surface driver and firmware servicing dates

The following table lists the release date and End of Servicing date for each Surface device with a defined Driver and Firmware Lifecycle policy:

Device	Release Date	End of Servicing Date
Surface RT ¹	October 26, 2012	April 11, 2017
Surface Pro ¹	February 9, 2013	April 11, 2017
Surface 2 ¹	October 22, 2013	April 10, 2018
Surface Pro 2 ¹	October 22, 2013	April 10, 2018
Surface Pro 3	June 20, 2014	November 13, 2021
Surface 3	May 5, 2015	November 13, 2021
Surface Book	October 26, 2015	November 13, 2021
Surface Pro 4	October 26, 2015	November 13, 2021
Surface Book with Performance Base	November 10, 2016	November 13, 2021
Surface Studio (1st gen)	December 15, 2016	November 13, 2021
Surface Laptop (1st gen)	June 14, 2017	November 13, 2021
Surface Pro (5th gen)	June 15, 2017	January 15, 2024
Surface Book 2	November 17, 2017	May 30, 2023
Surface Pro LTE (Model 1807)	December 1, 2017	January 15, 2024
Surface Go	August 2, 2018	August 2, 2022
Surface Studio 2	October 2, 2018	October 2, 2024
Surface Laptop 2	October 16, 2018	December 27, 2022
Surface Pro 6	October 16, 2018	June 30, 2023
Surface Go with LTE Advanced	November 20, 2018	November 20, 2022
Surface Laptop 3	October 22, 2019	July 30, 2024
Surface Pro 7	October 22, 2019	February 28, 2024
Surface Pro X	November 5, 2019	August 10, 2025
Surface Pro X SQ2	October 13, 2020	August 10, 2025
Surface Go 2	May 6, 2020	December 30, 2024

Device	Release Date	End of Servicing Date
Surface Book 3	May 26, 2020	April 1, 2025
Surface Laptop Go	October 13, 2020	October 13, 2024
Surface Laptop Go 2	June 7, 2022	June 7, 2026
Surface Pro 7+	January 15, 2021	January 15, 2025
Surface Laptop 4	April 15, 2021	April 15, 2025
Surface Pro 8	October 5, 2021	October 5, 2025
Surface Laptop Studio	October 5, 2021	October 5, 2025
Surface Go 3	October 5, 2021	October 5, 2025
Surface Pro X Wi-Fi	October 5, 2021	October 5, 2025
Surface Laptop SE	January 11, 2022	January 11, 2026
Surface Pro 9	October 25, 2022	October 25, 2026
Surface Laptop 5	October 25, 2022	October 25, 2026
Surface Studio 2+	October 25, 2022	October 25, 2026

1. Indicates devices with a previously declared end of firmware/driver servicing support date.

Surface Hub driver and firmware support lifecycle

The following table lists the release date and End of Servicing date for each Surface Hub device and Hub accessory with a defined Driver and Firmware Lifecycle policy:

Surface Hub device	Release Date	End of Servicing Date
Surface Hub 55	June 1, 2015	November 30, 2022
Surface Hub 84	June 1, 2015	November 30, 2022
Surface Hub 2S	April 17, 2019	February 7, 2026
Surface Hub 2S 85"	January 11, 2021	February 7, 2026

Learn more

- Surface device compatibility with Windows 10 Long-Term Servicing Channel (LTSC)
- Surface Warranty and Support Plans ↗.

Manage Surface driver updates in Configuration Manager

Article • 01/26/2023 • Applies to: Windows 10, Windows 11

Summary

Starting in [Microsoft System Center Configuration Manager version 1710](#), you can synchronize and deploy Microsoft Surface firmware and driver updates directly through the Configuration Manager client. The process resembles deploying regular updates. However, some additional configurations are required to get the Surface driver updates into your catalog.

Prerequisites

To manage Surface driver updates, the following prerequisites must be met:

- You must use Configuration Manager version 1710 or a later version.
- All Software Update Points (SUPs) must run Windows Server 2016 or a later version. Otherwise, Configuration Manager ignores this setting and Surface drivers won't be synchronized.

Note

If your environment doesn't meet the prerequisites, refer to the [alternative methods](#) to deploy Surface driver and firmware updates in the [FAQ](#) section.

Useful log files

The following logs are especially useful when you manage Surface driver updates.

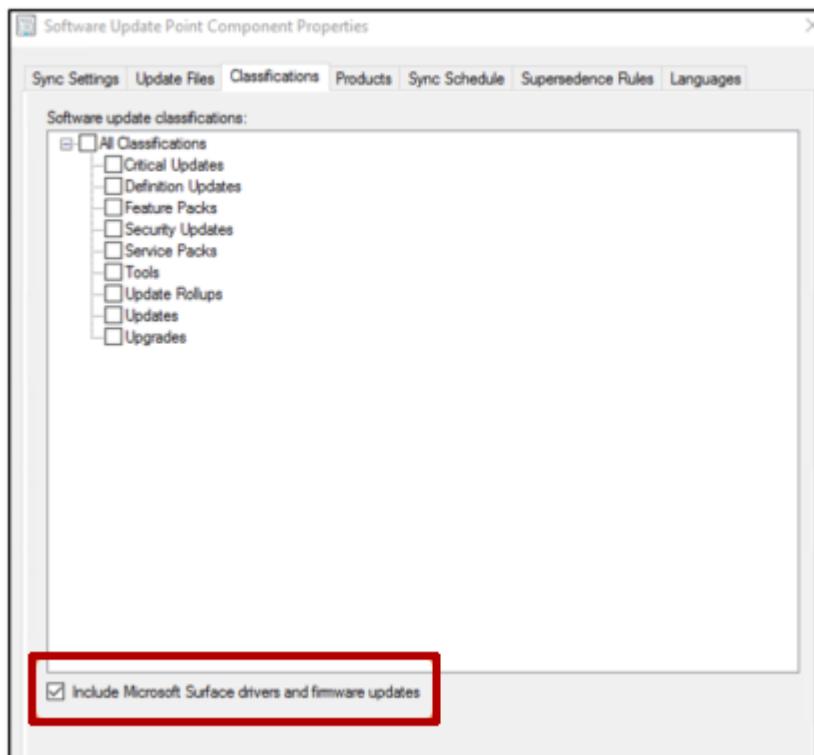
Log name	Description
WCM.log	Records details about the software update point configuration and connections to the WSUS server for subscribed update categories, classifications, and languages.
WsyncMgr.log	Records details about the software updates sync process.

These logs are located on the site server that manages the SUP, or on the SUP itself if it's installed directly on a site server. For a complete list of Configuration Manager logs, see [Log files in System Center Configuration Manager](#).

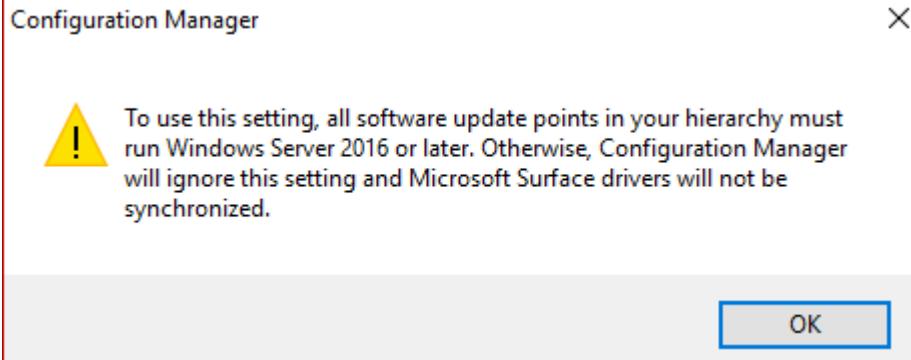
Enabling Surface driver updates management

To enable Surface driver updates management in Configuration Manager, follow these steps:

1. In the Configuration Manager console, go to **Administration > Overview > Site Configuration > Sites**.
2. Select the site that contains the top-level SUP server for your environment.
3. On the ribbon, select **Configure Site Components**, and then select **Software Update Point**. Or, right-click the site, and then select **Configure Site Components > Software Update Point**.
4. On the **Classifications** tab, select the **Include Microsoft Surface drivers and firmware updates** check box.



5. When you're prompted by the following warning message, select **OK**.



6. On the Products tab, select the products that you want to update, and then select OK.

Tip

Most Surface drivers belong to multiple Windows 10 or Windows 11 product groups. You may not have to select all the products that are listed here. To help reduce the number of products that populate your Update Catalog, we recommend that you select only the products that are required by your environment for synchronization.

Verifying the configuration

To verify that the SUP is configured correctly, follow these steps:

1. Open WsyncMgr.log, and then look for the following entry:

```
Console

Surface Drivers can be supported in this hierarchy since all SUPs are
on Windows Server 2016, WCM SCF property Sync Catalog Drivers is set.

Sync Catalog Drivers SCF value is set to : 1
```

If either of the following entries is logged in WsyncMgr.log, recheck step 4 in the previous section:

```
Console

Sync Surface Drivers option is not set

Sync Catalog Drivers SCF value is set to : 0
```

2. Open WCM.log, and then look for an entry that resembles the following:

```

Setting new configuration state to 4 (WSUS_CONFIG_SUBSCRIPTION_PENDING)~
Attempting connection to local WSUS server
Successfully connected to local WSUS server
Subscribed Update Categories <?xml version="1.0" ?>~~<Categories>~~<Category Id="Product:05eebf61-148b-43cf-80d..>
Configuration successful. Will wait for 1 minute for any subscription or proxy changes~
Setting new configuration state to 2 (WSUS_CONFIG_SUCCESS)~
Waiting for changes for 25 minutes

```

This entry is an XML element that lists every product group and classification that's currently synchronized by your SUP server. For example, you might see an entry that resembles the following:

XML

```

<Categories>
    <Category Id="Product:05eebf61-148b-43cf-80da-1c99ab0b8699"><!
        [CDATA[Windows 10 and later drivers]]></Category>
    <Category Id="Product:06da2f0c-7937-4e28-b46c-a37317eade73"><!
        [CDATA[Windows 10 Creators Update and Later Upgrade & Servicing
        Drivers]]></Category>
    <Category Id="Product:c1006636-eab4-4b0b-b1b0-d50282c0377e"><!
        [CDATA[Windows 10 S and Later Servicing Drivers]]></Category>
</Categories>

```

If you can't find the products that you selected in step 6 in the previous section, double-check whether the SUP settings are saved.

You can also wait until the next synchronization finishes, and then check whether the Surface driver and firmware updates are listed in Software Updates in the Configuration Manager console. For example, the console might display the following information.

The screenshot shows the Configuration Manager Software Library interface. On the left, the 'Software Library' navigation pane is visible with various categories like Overview, Application Management, Software Updates, Deployment Packages, etc. The 'Software Updates' category is expanded, and 'All Software Updates' is selected. On the right, a search results grid titled 'All Software Updates Search Results - 56 items shown' is displayed. A search term 'Surface' is entered in the search bar. The results list includes numerous Surface-related updates, such as Microsoft driver updates for Surface Type Cover Integration, Surface UEFI, Surface Firmware, Surface HIDClass, and Surface System updates, all dated between March 2017 and October 2017.

Icon	Title
[Icon]	Microsoft driver update for Surface Type Cover Integration
[Icon]	Microsoft driver update for Surface Type Cover Integration
[Icon]	Microsoft driver update for Surface UEFI
[Icon]	Surface - Firmware - 12/6/2017 12:00:00 AM - 108.1926.769.0
[Icon]	Surface - Firmware - 12/6/2017 12:00:00 AM - 91.1926.768.0
[Icon]	Surface - Firmware - 9/11/2017 12:00:00 AM - 11.7.4.3330
[Icon]	Surface - Firmware - 9/14/2017 12:00:00 AM - 5.62.3126.2
[Icon]	Surface - Firmware - 9/14/2017 12:00:00 AM - 90.1837.256.0
[Icon]	Surface - HIDClass - 3/22/2017 12:00:00 AM - 1.0.2.0
[Icon]	Surface - HIDClass - 3/23/2017 12:00:00 AM - 2.0.305.1
[Icon]	Surface - HIDClass - 3/3/2017 12:00:00 AM - 1.0.173.1
[Icon]	Surface - HIDClass - 3/31/2017 12:00:00 AM - 2.0.226.1
[Icon]	Surface - System - 10/31/2017 12:00:00 AM - 2.27.136.0
[Icon]	Surface - System - 5/8/2017 12:00:00 AM - 1.0.8.0

Manual synchronization

If you don't want to wait until the next synchronization, follow these steps to start a synchronization:

1. In the Configuration Manager console, go to **Software Library > Overview > Software Updates > All Software Updates**.
2. On the ribbon, select **Synchronize Software Updates**. Or, right-click **All Software Update**, and then select **Synchronize Software Update**.
3. Monitor the synchronization progress by looking for the following entries in WsyncMgr.log:

```
Console

Surface Drivers can be supported in this hierarchy since all SUPs are
on Windows Server 2016, WCM SCF property Sync Catalog Drivers is set.

sync: SMS synchronizing categories
sync: SMS synchronizing categories, processed 0 out of 311 items (0%)
sync: SMS synchronizing categories, processed 311 out of 311 items
(100%)
sync: SMS synchronizing categories, processed 311 out of 311 items
(100%)
sync: SMS synchronizing updates

Synchronizing update 7eaa0148-c42b-45fd-a1ab-012c82972de6 - Microsoft
driver update for Surface Type Cover Integration
Synchronizing update 2dcb07f8-37ec-41ef-8cd5-030bf24dc1d8 - Surface
driver update for Surface Pen Pairing
Synchronizing update 63067414-ae52-422b-b3d1-0382a4d6519a - Surface
driver update for Surface UEFI
Synchronizing update 8e4e3a41-a784-4dd7-9a42-041f43ddb775 - Surface
driver update for Surface Integration
Synchronizing update 7f8baee8-419f-47e2-918a-045a15a188e7 - Microsoft
driver update for Surface DTX
Synchronizing update aed66e05-719b-48cd-a0e7-059e50f67fdc - Microsoft
driver update for Surface Base Firmware Update
Synchronizing update 8ffe1526-6e66-43cc-86e3-05ad92a24e3a - Surface
driver update for Surface UEFI
Synchronizing update 74102899-0a49-48cf-97e6-05bde18a27ff - Microsoft
driver update for Surface UEFI
```

Deploying Surface firmware and driver updates

You can deploy Surface firmware and driver updates in the same manner as you deploy other updates.

For more information about deployment, see [System Center 2012 Configuration Manager–Part7: Software Updates \(Deploy\)](#).

Frequently asked questions (FAQ)

After I follow the steps in this article, my Surface drivers are still not synchronized. Why?

If you synchronize from an upstream Windows Server Update Services (WSUS) server, instead of Microsoft Update, make sure that the upstream WSUS server is configured to support and synchronize Surface driver updates. All downstream servers are limited to updates that are present in the upstream WSUS server database.

There are more than 68,000 updates that are classified as drivers in WSUS. To prevent non-Surface related drivers from synchronizing to Configuration Manager, Microsoft filters driver synchronization against an allow list. After the new allow list is published and incorporated into Configuration Manager, the new drivers are added to the console following the next synchronization. Microsoft aims to get the Surface drivers added to the allow list each month in alignment with monthly update releases to make them available for synchronization to Configuration Manager.

If your Configuration Manager environment is offline, a new allow list is imported every time that you import [servicing updates](#) to Configuration Manager. You will also have to import a [new WSUS catalog](#) that contains the drivers before the updates are displayed in the Configuration Manager console. Because a standalone WSUS environment contains more drivers than a Configuration Manager SUP, we recommend that you establish a Configuration Manager environment that has online capabilities, and that you configure it to synchronize Surface drivers. This provides a smaller WSUS export that closely resembles the offline environment.

If your Configuration Manager environment is online and able to detect new updates, you will receive updates to the list automatically. If you don't see the expected drivers, please review the WCM.log and WsyncMgr.log files for any synchronization failures.

My Configuration Manager environment is offline. Can I manually import Surface drivers into WSUS?

No. Even if the update is imported into WSUS, the update won't be imported into the Configuration Manager console for deployment if it isn't listed in the allow list. You must use the [Service Connection Tool](#) to import servicing updates to Configuration Manager to update the allow list.

What alternative methods do I have to deploy Surface driver and firmware updates?

For information about how to deploy Surface driver and firmware updates through alternative channels, see [Manage Surface driver and firmware updates](#). If you want to download the .msi or .exe file, and then deploy through traditional software deployment channels, see [Keeping Surface Firmware Updated with Configuration Manager](#).

Additional Information

For more information about Surface driver and firmware updates, see the following articles:

- [Manage Surface driver and firmware updates](#)
- [Considerations for Surface and System Center Configuration Manager](#)

Manage Surface UEFI settings

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface PC devices are designed to utilize a unique Unified Extensible Firmware Interface (UEFI) engineered by Microsoft specifically for these devices. Surface UEFI settings provide the ability to enable or disable built-in devices and components, protect UEFI settings from being changed, and adjust the Surface device boot settings.

Supported products

UEFI management is supported on the following:

- Surface Pro 4, Surface Pro (5th Gen), Surface Pro 6, Surface Pro 7, Surface Pro 7+ (commercial SKUs only), Surface Pro 8 (commercial SKUs only), Surface Pro 9 & Surface Pro 9 with 5G (commercial SKUs only), Surface Pro X
- Surface Laptop (1st Gen), Surface Laptop 2, Surface Laptop 3 (Intel processors only), Surface Laptop Go, Surface Laptop 4 (commercial SKUs only), Surface Laptop 5 (commercial SKUs only), Surface Laptop SE, Surface Laptop Go 2 (commercial SKUs only)
- Surface Studio (1st Gen), Surface Studio 2, Surface Studio 2+
- Surface Book (all generations)
- Surface Laptop Studio (commercial SKUs only)
- Surface Go, Surface Go 2¹, Surface Go 3 (commercial SKUs only)

Tip

Commercial SKUs (aka Surface for Business) run Windows 10 Pro/Enterprise or Windows 11 Pro/Enterprise; consumer SKUs run Windows 10/Windows 11 Home. In UEFI, commercial SKUs are the only models to feature the **Devices page** and **Management page**. To learn more, see [View your system info](#).

Support for cloud-based management

With Device Firmware Configuration Interface (DFCI) profiles built into Microsoft Intune (now available in public preview), Surface UEFI management extends the modern management stack down to the UEFI hardware level. DFCI supports zero-touch provisioning, eliminates BIOS passwords, provides control of security settings -- including boot options and built-in peripherals -- and lays the groundwork for advanced security scenarios in the future.

DFCI is currently available for Surface Studio 2+, Surface Pro 9, Surface Pro 9 with 5G, Surface Laptop 5, Surface Laptop 4, Surface Laptop 3, Surface Laptop Studio, Surface Book 3, Surface Laptop SE, Surface Laptop Go 2, Surface Laptop Go, Surface Pro 8, Surface Pro 7+, Surface Pro 7, Surface Pro X, and Surface Go 3. For more information, refer to [Manage DFCI on Surface devices](#).

Open Surface UEFI menu

To adjust UEFI settings during system startup:

1. Shut down your Surface and wait about 10 seconds to make sure it's off.
2. Press and hold the **Volume-up** button and - at the same time - press and release the **Power** button.
3. As the Microsoft or Surface logo appears on your screen, continue to hold the **Volume-up** button until the UEFI screen appears.

UEFI PC information page

The PC information page includes detailed information about your Surface device:

- **Model** – Your Surface device's model will be displayed here, such as Surface Book 2 or Surface Pro 7. The exact configuration of your device is not shown (such as processor, disk size, or memory size).
- **UUID** – This Universally Unique Identification number is specific to your device and is used to identify the device during deployment or management.
- **Serial Number** – This number identifies this specific Surface device for asset tagging and support scenarios.
- **Asset Tag** – The asset tag is assigned to the Surface device with the [Asset Tag Tool](#).

You will also find detailed information about the firmware of your Surface device. Surface devices have several internal components that each run different versions of firmware. The firmware version of each of the following devices is displayed on the **PC information page** (as shown in Figure 1):

- System UEFI
- SAM Controller
- Intel Management Engine
- System Embedded Controller

- Touch Firmware

The screenshot shows the 'PC information' section of the Surface UEFI interface. On the left, a sidebar lists navigation options: Security, Devices, Boot configuration, Management, About, and Exit. The 'Security' option is highlighted. The main content area is titled 'PC information' and displays the following details:

Model	Surface Laptop 4
System UUID	00000000-0000-0000-0000-000000000000
Serial Number	000000000000
Asset tag	None
Firmware	
SAM Controller	00.000.00
SMF Controller	0.0.00
KIP Controller	00.0.000
PD Controller	0.00.000
Track Pad Firmware	00.0.000
Touch Firmware	0.000.000.0
System UEFI	0.00.000
Tcon Firmware	0.00.000.000.0.00
Nuvoton TPM Firmware	0.0.0.00

Figure 1. System information and firmware version information

You can find up-to-date information about the latest firmware version for your Surface device in the [Surface Update History](#) for your device.

UEFI Security page

The screenshot shows the 'Security' page of the Surface UEFI interface. The left sidebar includes options: PC information, Security (highlighted), Devices, Boot configuration, Management, About, and Exit. The main content area includes the following sections:

- UEFI password**: A note stating "Set up a password to restrict access to the Surface UEFI settings. Users will be required to enter the password to make changes to these settings when the password is set." with a "Add or Change" button.
- Secure Boot**: A note "Secure Boot is Enabled with Microsoft Only Key Configuration" with a "Change configuration" button.
- Trusted Platform Module (TPM)**: A setting "Enable TPM" with a toggle switch set to "On".
- Simultaneous Multithreading (SMT)**: A setting "Enable SMT" with a toggle switch set to "On".

Figure 2. Configure Surface UEFI security settings

The Security page allows you to set a password to protect UEFI settings. This password must be entered when you boot the Surface device to UEFI. The password can contain the following characters (as shown in Figure 3):

- Uppercase letters: A-Z
- Lowercase letters: a-z
- Numbers: 1-0
- Special characters: !@#\$%^&*()?<>{}[]-_+=|.,:;"'

The password must be at least six characters and is case-sensitive.

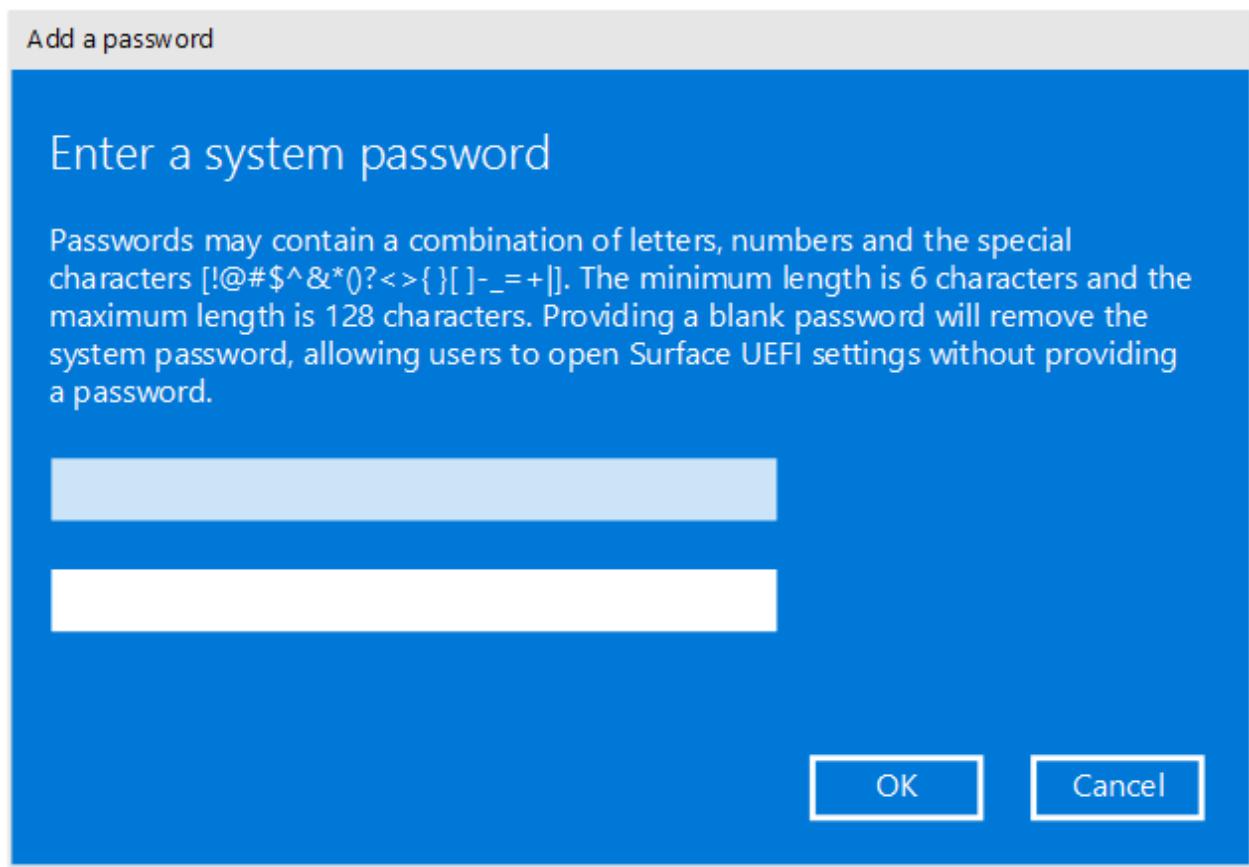


Figure 3. Add a password to protect Surface UEFI settings

On the Security page, you can also change the configuration of Secure Boot on your Surface device. Secure Boot technology prevents unauthorized boot code from booting on your Surface device, which protects against bootkit and rootkit-type malware infections. You can disable Secure Boot to allow your Surface device to boot third-party operating systems or bootable media. You can also configure Secure Boot to work with third-party certificates, as shown in Figure 4. To learn more, see [Secure Boot](#).

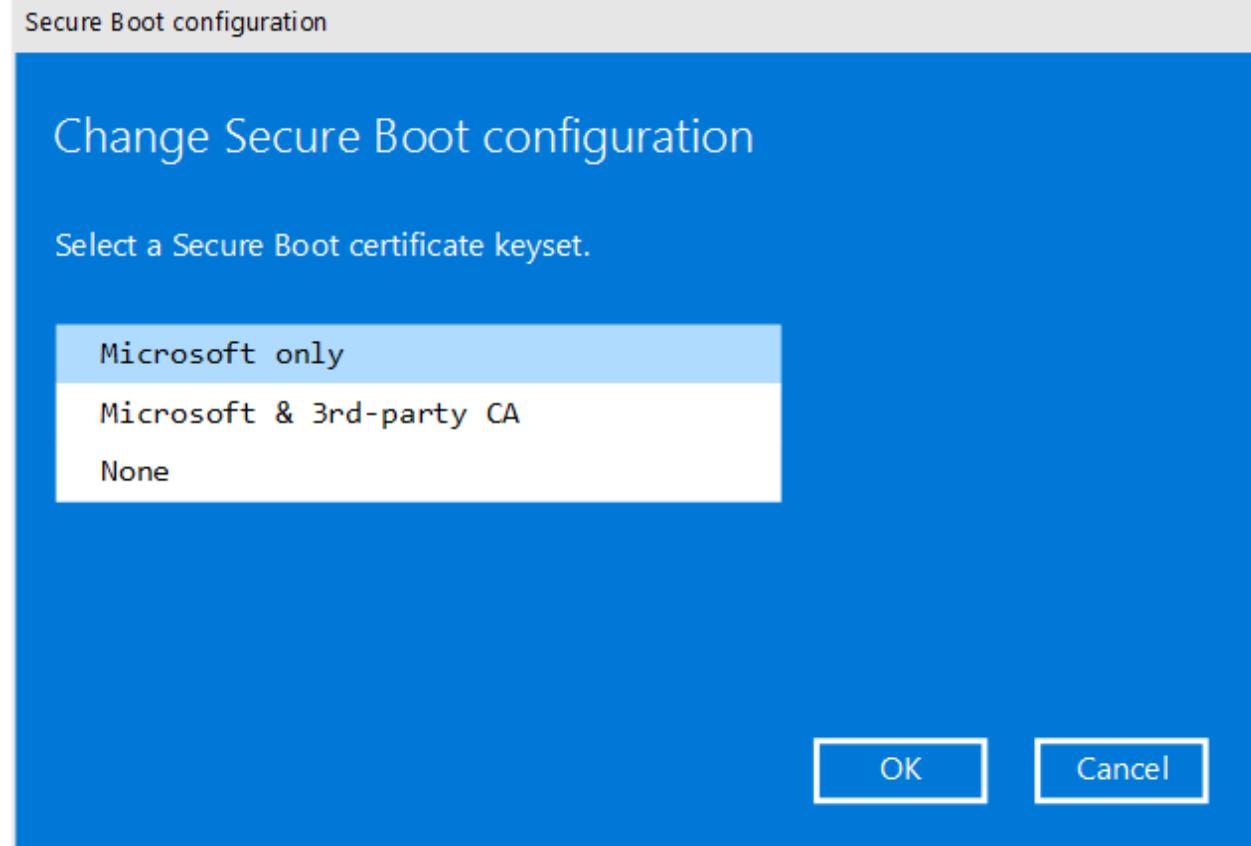


Figure 4. Configure Secure Boot

Depending on your device, you may also be able to see if your TPM is enabled or disabled. If you do not see the **Enable TPM** setting, open tpm.msc in Windows to check the status, as shown in Figure 5. The TPM is used to authenticate encryption for your device's data with BitLocker. To learn more, see [BitLocker overview](#).

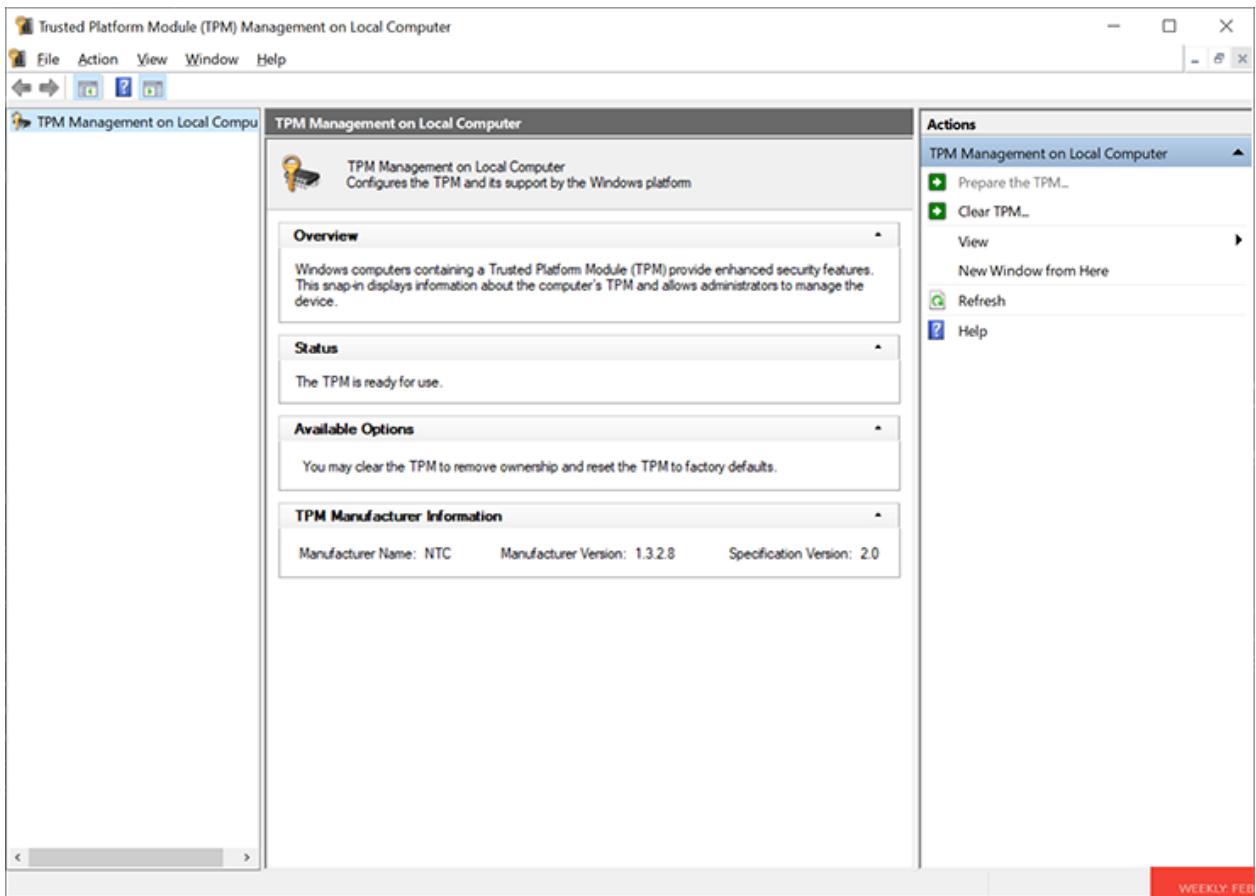


Figure 5. TPM console

UEFI Devices page

The Devices page allows you to enable or disable specific components on eligible devices. Components consist of the following:

- Docking USB port
- MicroSD or SD Card Slot
- Rear Camera
- Front Camera
- Infrared (IR) Camera
- Wi-Fi and Bluetooth
- Onboard Audio (Speakers and Microphone)

Each device is listed with a slider button that you can move to **On** (enabled) or **Off** (disabled) position, as shown in Figure 6.

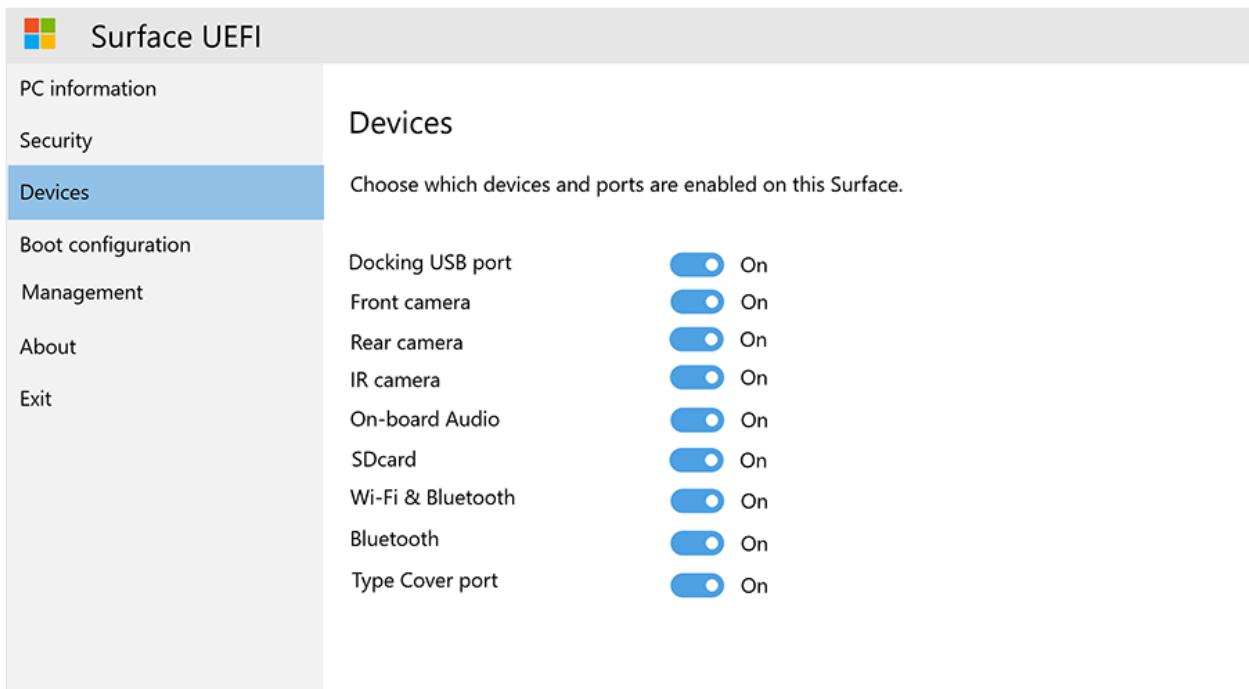


Figure 6. Enable and disable specific devices

UEFI Boot configuration page

The Boot Configuration page allows you to change the order of your boot devices as well as enable or disable the boot of the following devices:

- Windows Boot Manager
- USB Storage
- PXE Network
- Internal Storage

You can boot from a specific device immediately, or swipe left on that device's entry in the list using the touchscreen. You can also boot immediately to a USB device or USB Ethernet adapter when the Surface device is powered off by pressing the **Volume Down** button and the **Power** button simultaneously.

For the specified boot order to take effect, you must set the **Enable Alternate Boot Sequence** option to **On**, as shown in Figure 7.

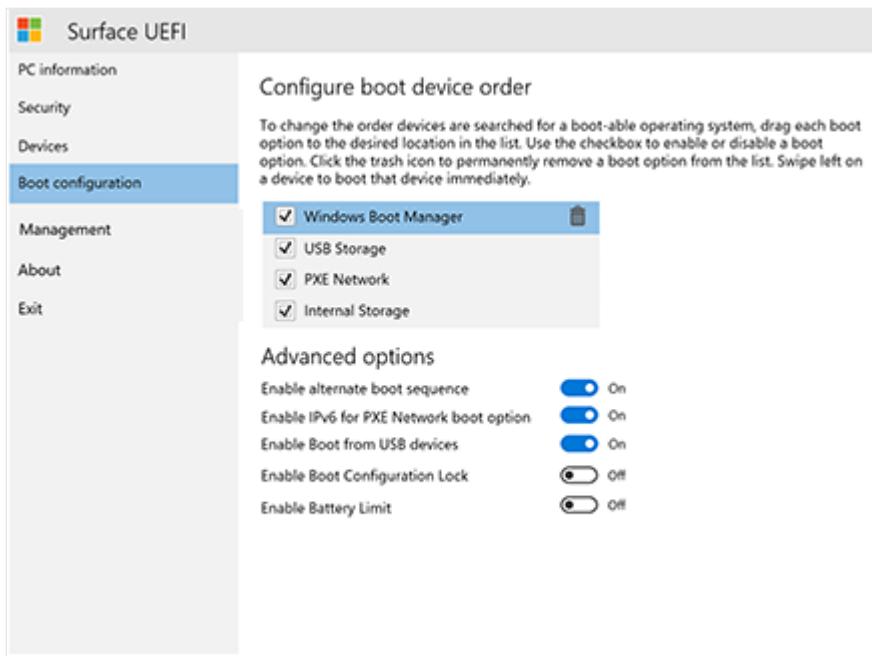


Figure 7. Configure the boot order for your Surface device

You can also turn on and off IPv6 support for PXE with the **Enable IPv6 for PXE Network Boot** option, for example, when performing a Windows deployment using PXE where the PXE server is configured for IPv4 only.

UEFI Management page

The Management page allows you to manage the use of Zero Touch UEFI Management and other features on eligible devices.

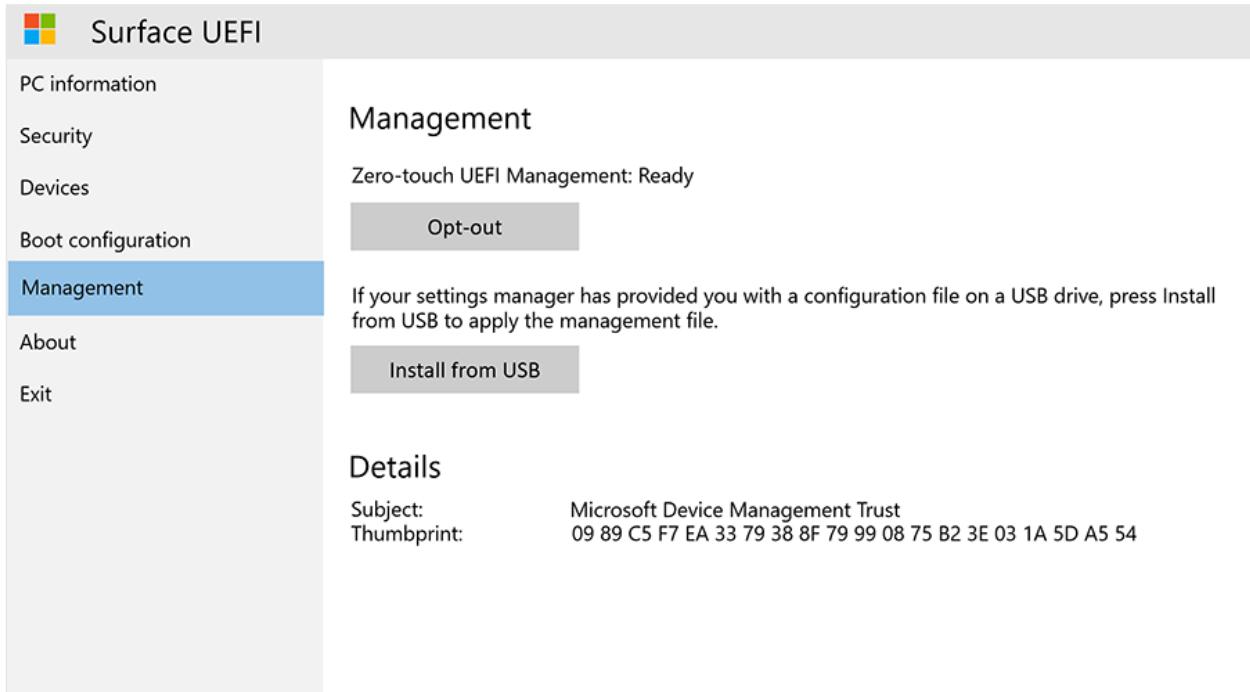


Figure 8. Manage access to Zero Touch UEFI Management and other features

Zero Touch UEFI Management lets you remotely manage UEFI settings using a device profile within Intune called Device Firmware Configuration Interface (DFCI). If you do not configure this setting, the ability to manage eligible devices with DFCI is set to **Ready**. To prevent DFCI, select **Opt-Out**.

UEFI Exit page

Use the **Restart Now** button on the **Exit** page to exit UEFI settings, as shown in Figure 9.

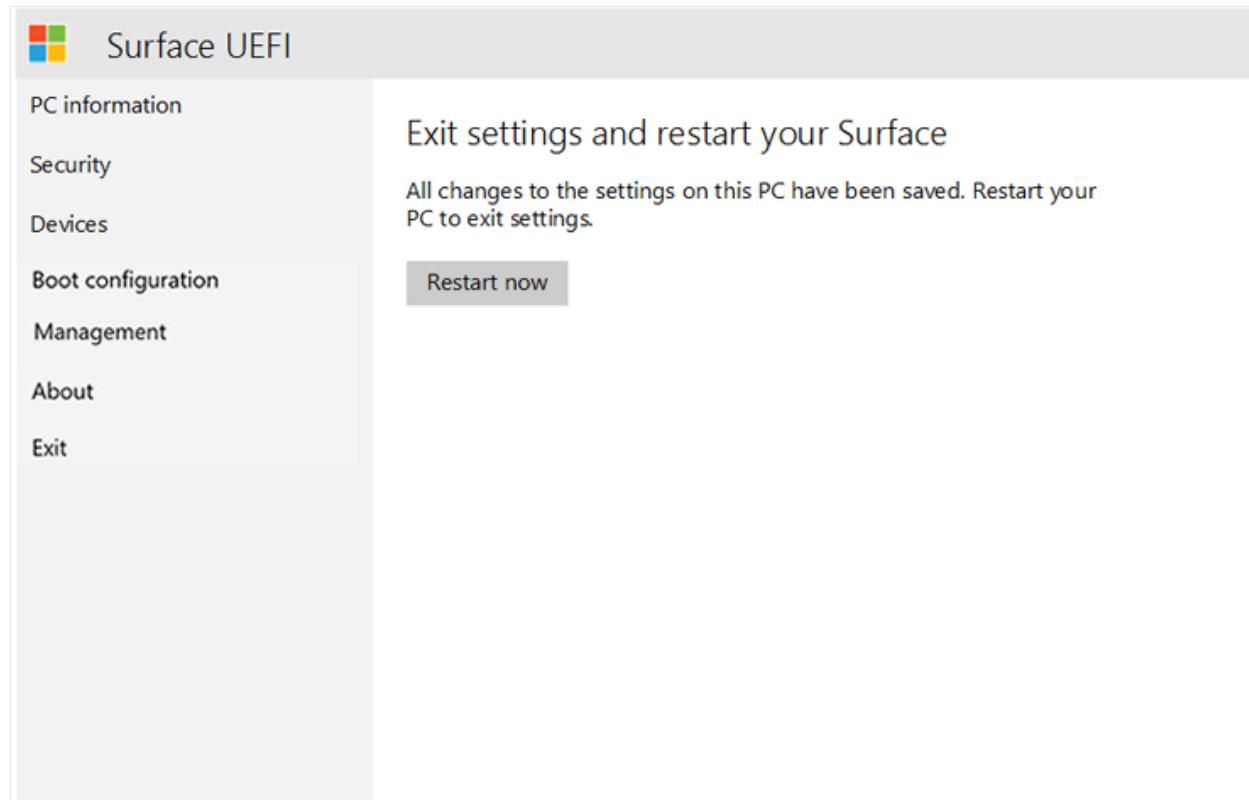


Figure 9. Click **Restart Now** to exit Surface UEFI and restart the device

Surface UEFI boot screens

When you update Surface device firmware using either Windows Update or manual installation, the updates are not applied immediately to the device but during the next reboot cycle. You can learn more about the Surface firmware update process in [Manage and deploy Surface driver and firmware updates](#). The firmware update progress is displayed on a screen with progress bars of different colors to indicate the firmware for each component. Each component's progress bar is shown in Figures 9 through 18.



Figure 10. The Surface UEFI firmware update displays a blue progress bar



Figure 11. The System Embedded Controller firmware update displays a green progress bar



Figure 12. The SAM Controller firmware update displays an orange progress bar



Figure 13. The Intel Management Engine firmware update displays a red progress bar



Figure 14. The Surface touch firmware update displays a gray progress bar

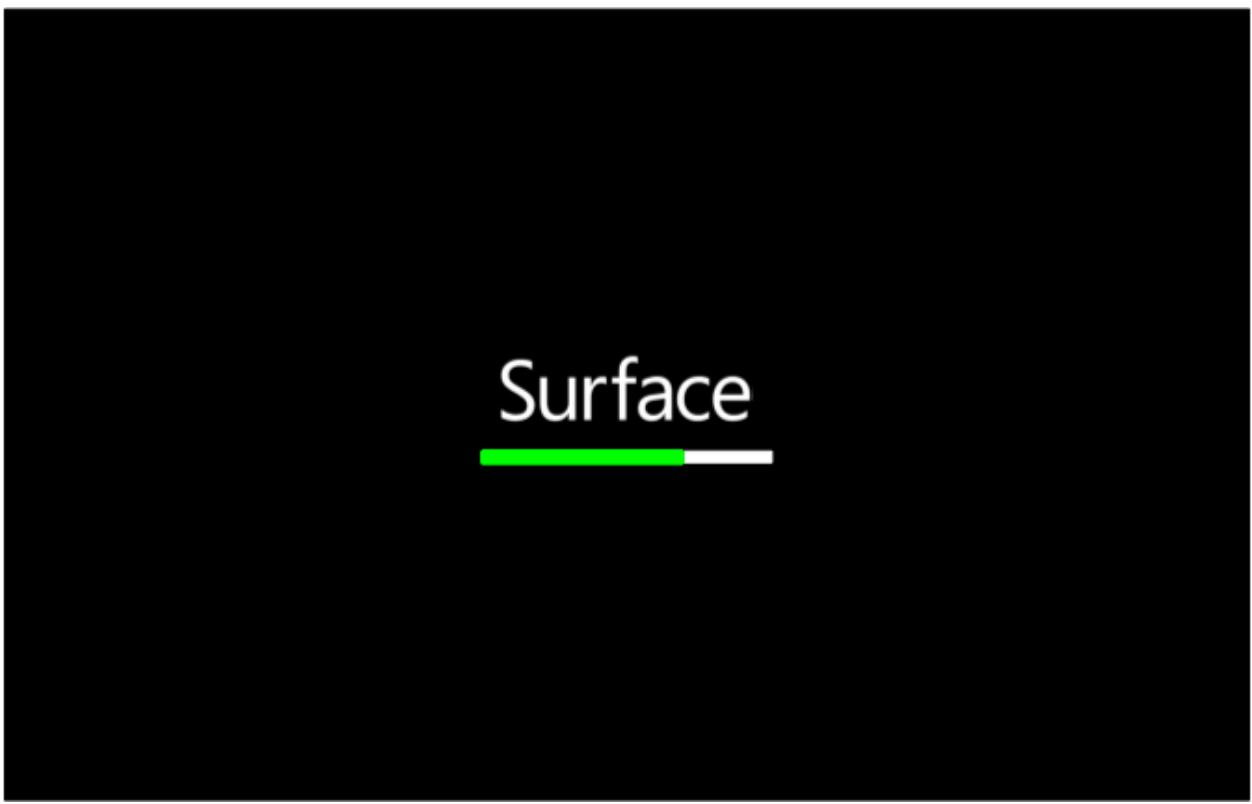


Figure 15. The Surface KIP firmware update displays a light green progress bar



Figure 16 The Surface ISH firmware update displays a light pink progress bar



Figure 17. The Surface Trackpad firmware update displays a pink progress bar

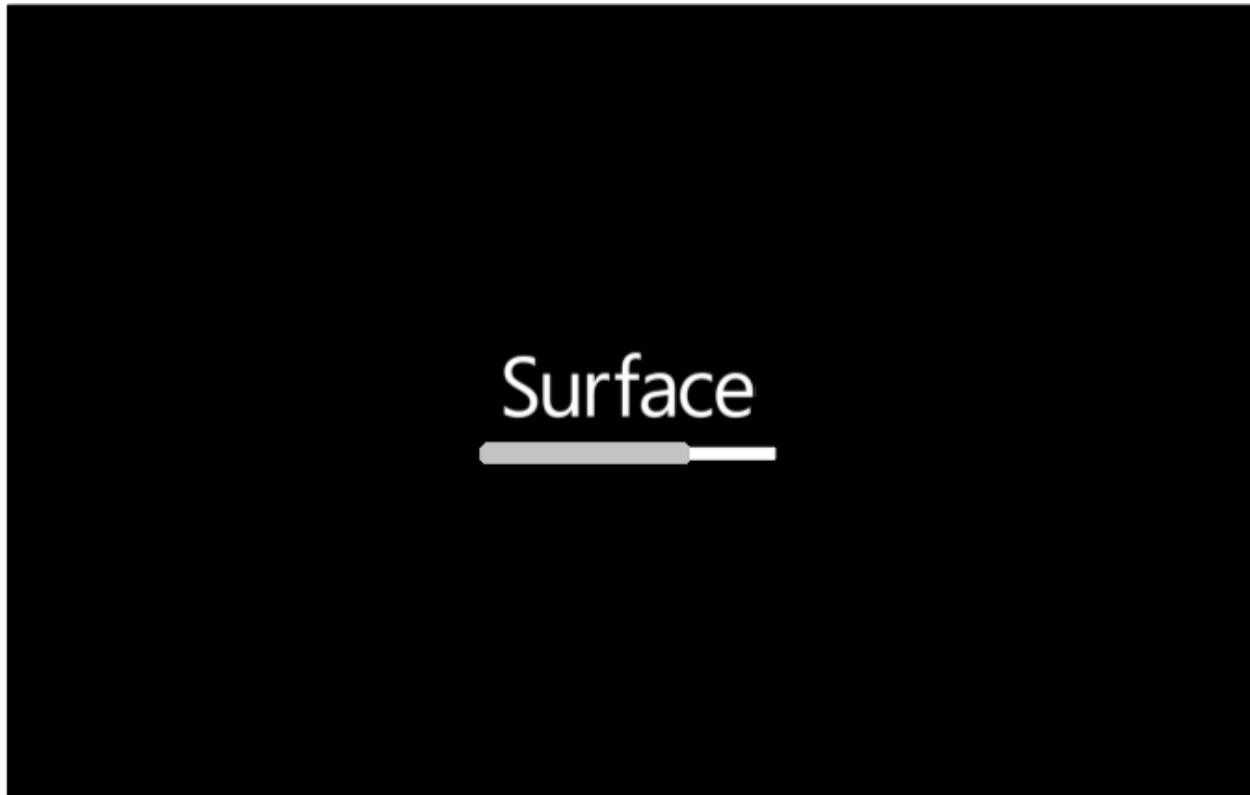


Figure 18. The Surface TCON firmware update displays a light gray progress bar



Figure 19. The Surface TPM firmware update displays a purple progress bar

 **Note**

An additional warning message that indicates Secure Boot is disabled is displayed, as shown in Figure 19.



Figure 20. Surface boot screen that indicates Secure Boot has been disabled in Surface UEFI settings

References

1. Surface Go and Surface Go 2 use a third-party UEFI and do not support DFCI. DFCI is currently available for Surface Studio 2+, Surface Pro 9 & Surface Pro 9 with 5G, Surface Laptop 5, Surface Laptop 4, Surface Laptop 3, Surface Laptop Studio, Surface Book 3, Surface Laptop SE, Surface Laptop Go 2, Surface Laptop Go, Surface Pro 8, Surface Pro 7+, Surface Pro 7, Surface Pro X, and Surface Go 3.

Related topics

- [Intune management of Surface UEFI settings](#)
- [Surface Enterprise Management Mode](#)

Manage DFCI on Surface devices

Article • 04/19/2023 • Applies to: Windows 10, Windows 11

Introduction

With Device Firmware Configuration Interface (DFCI) profiles built into [Microsoft Intune](#), Surface UEFI management extends the modern management stack down to the Unified Extensible Firmware Interface (UEFI) hardware level. DFCI supports zero-touch provisioning, eliminates BIOS passwords, provides control of security settings, including boot options and built-in peripherals, and lays the groundwork for advanced security scenarios in the future. This page lists [all DFCI policy settings](#) on eligible Autopilot-deployed Surface devices.

Designed to be used with software-level mobile device management (MDM), DFCI enables IT admins to remotely disable specific hardware components and prevent end users from accessing them. For example, if you need to protect sensitive information in highly secure areas, you can disable the camera, and if you don't want users booting from USB drives, you can disable that also.

💡 Tip

Support for some DFCI policy settings varies by device. Review the [DFCI policy settings reference](#) on this page and follow [Intune instructions](#) to configure and deploy settings to your devices.

Prerequisites

- Windows 11 or Windows 10 version 1809 (released November 2018)
- Devices must be registered with Windows Autopilot via one of the following methods:
 - [Microsoft Cloud Solution Provider \(CSP\) partner](#)
 - [Directly from Surface](#)

ⓘ Note

Devices manually or self-registered for Autopilot, such as imported from a CSV file, aren't allowed to use DFCI. By design, DFCI management requires external

attestation of the device's commercial acquisition via a Microsoft CSP partner or Surface registration.

DFCI policy settings reference for Surface devices

Eligible devices

- Surface Pro 9 (commercial SKUs only)
- Surface Pro 9 with 5G (commercial SKUs only)
- Surface Pro 8 (commercial SKUs only)
- Surface Pro 7+ (commercial SKUs only)
- Surface Pro 7 (all SKUs)
- Surface Pro X (all SKUs)
- Surface Laptop Studio (commercial SKUs only)
- Surface Laptop 5 (commercial SKUs only)
- Surface Laptop 4 (commercial SKUs only)
- Surface Laptop 3 (Intel processors only)
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Laptop SE
- Surface Book 3
- Surface Go 3 (commercial SKUs only)
- Surface Studio 2+

Note

Surface Pro X doesn't support DFCI settings management for built-in camera, audio, and Wi-Fi/Bluetooth. Some newer settings are only supported on the latest devices.

Table 1. DFCI policy settings reference: Autopilot-deployed Surface devices

DFCI setting	Description	Supported on
UEFI access		

DFCI setting	Description	Supported on
Allow local user to change UEFI (BIOS) settings	<p>This setting lets you manage whether end users can modify UEFI settings on eligible devices.</p> <ul style="list-style-type: none"> - If you select Only not configured settings, local users (also known as end users) may change any UEFI setting <i>except</i> any settings that you've explicitly enabled or disabled via Intune. - If you select None, local users may not change UEFI settings, including settings not shown in the DFCI profile. 	All eligible devices
Security settings		
Simultaneous multithreading	<p>This setting lets you manage whether simultaneous multithreading (SMT) support is enabled on eligible devices. SMT supports Intel hyperthreading technology, which provides two logical processors for each physical core.</p> <ul style="list-style-type: none"> - If you enable this setting, SMT is turned on in the UEFI layer. - If you disable this setting, SMT is turned off in the UEFI layer. - If you don't configure this setting, SMT is enabled. 	All eligible devices
Cameras		
Cameras	<p>This setting lets you manage whether the built-in camera can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, all built-in cameras are allowed. Peripherals, like USB cameras, aren't affected. - If you disable this setting, all built-in cameras are disabled. Peripherals, like USB cameras, aren't affected. - If you don't configure this setting, all built-in cameras are enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Front Camera	<p>This setting lets you manage whether the Front camera can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, the Front camera is allowed. Peripherals, like USB cameras, aren't affected. - If you disable this setting, the Front camera is disabled. Peripherals, like USB cameras, aren't affected. - If you don't configure this setting, the Front camera is enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.

DFCI setting	Description	Supported on
Rear Camera	<p>This setting lets you manage whether the Rear camera can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, the Rear camera is allowed. Peripherals, like USB cameras, aren't affected. - If you disable this setting, the Rear camera is disabled. Peripherals, like USB cameras, aren't affected. - If you don't configure this setting, the Rear camera is allowed. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Infrared (IR) Camera	<p>This setting lets you manage whether the Infrared camera can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, the Infrared camera is allowed. Peripherals, like USB cameras, aren't affected. - If you disable this setting, the Infrared camera is disabled. Peripherals, like USB cameras, aren't affected. - If you don't configure this setting, the Infrared camera is allowed. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Microphones and speakers		
Microphones and speakers	<p>This setting lets you manage whether on-board audio can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, all built-in microphones and speakers are allowed. Peripherals, like USB devices, aren't affected. - If you disable this setting, all built-in microphones and speakers are disabled. Peripherals, like USB devices, aren't affected. - If you don't configure this setting, microphones and speakers are enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Microphones	<p>This setting lets you manage whether the built-in microphone can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, all built-in microphones are enabled. Peripherals, like USB devices, aren't affected. - If you disable this setting, all built-in microphones are disabled. Peripherals, like USB devices, aren't affected. - If you don't configure this setting, microphones are enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Radios		

DFCI setting	Description	Supported on
Radios (Bluetooth, Wi-Fi, NFC, etc.)	<p>This setting lets you manage whether built-in Bluetooth, Wi-Fi, or 5G wireless can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, all built-in radios are allowed. Peripherals, like USB devices, aren't affected. - If you disable this setting, all built-in radios are disabled. Peripherals, like USB devices, aren't affected. - If you don't configure this setting, all built-in radios are enabled. <p>TIP: Configure the category setting Radios (Bluetooth, Wi-Fi, NFC, etc.) or the granular settings Bluetooth, Wi-Fi. If you configure all the settings, these settings can cause a conflict. For more information, go to DFCI profile overview: Conflicts.</p> <p>CAUTION: The Disable setting should only be used on devices with a wired Ethernet connection.</p>	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on all other eligible devices.
Bluetooth	<p>This setting lets you manage whether built-in Bluetooth can function on eligible devices.</p> <ul style="list-style-type: none"> - If you enable this setting, Bluetooth is enabled. - If you disable this setting, Bluetooth is disabled. - If you don't configure this setting, Bluetooth is enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
WWAN	<p>This setting lets you manage whether built-in WWAN (5G wireless) can function on eligible devices</p> <ul style="list-style-type: none"> - If you enable this setting, WWAN is enabled. - If you disable this setting, WWAN is disabled. - If you don't configure this setting, WWAN is enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Wi-Fi	<p>This setting lets you manage whether built-in Wi-Fi can function on eligible devices</p> <ul style="list-style-type: none"> - If you enable this setting, Wi-Fi is enabled. - If you disable this setting, Wi-Fi is disabled. - If you don't configure this setting, Wi-Fi is enabled. 	<ul style="list-style-type: none"> - Not supported on Surface Pro X. - Supported on Surface Pro 9 with 5G and all other eligible devices.
Boot options		

DFCI setting	Description	Supported on
Boot from external media (USB, SD)	<p>This setting lets you manage whether eligible devices can be booted from external media.</p> <ul style="list-style-type: none"> - If you enable this setting, end users can boot the device from USB flash drives or other non-hard drive storage technologies. - If you disable this setting, end users can't boot the device from USB flash drives or other non-hard drive storage technologies. - If you don't configure this setting, end users can boot the device from USB flash drives or other non-hard drive storage technologies. 	All eligible devices
Ports		
USB type A	<p>This setting lets you manage how devices can utilize USB-A connections.</p> <ul style="list-style-type: none"> - If you enable this setting, USB-A data connections can function on eligible devices. - If you disable this setting, USB-A data connections can't function on eligible devices. - If you don't configure this setting, USB-A data connections can function on all devices. <p>CAUTION: If you disable both Boot from external media and USB type A—and the device becomes unbootable for any reason—you won't be able to recover the device without replacing the SSD. You'll be unable to boot from external media and perform a PXE boot or DFCI refresh from the network.</p>	Supported only on Surface Laptop Go 2 and later (devices released after 1 June, 2022).
Wake settings		
Wake on LAN	<p>This setting lets you manage whether eligible devices can be remotely started from Modern Standby or Hibernate.</p> <ul style="list-style-type: none"> - If you enable this setting, eligible devices can be configured to remotely Wake on LAN. - If you disable this setting, eligible devices can't be configured to remotely wake on LAN. - If you don't configure this setting, eligible devices can be configured to remotely wake on LAN. 	Supported only on Surface Laptop Go 2 and later (devices released after 1 June, 2022).

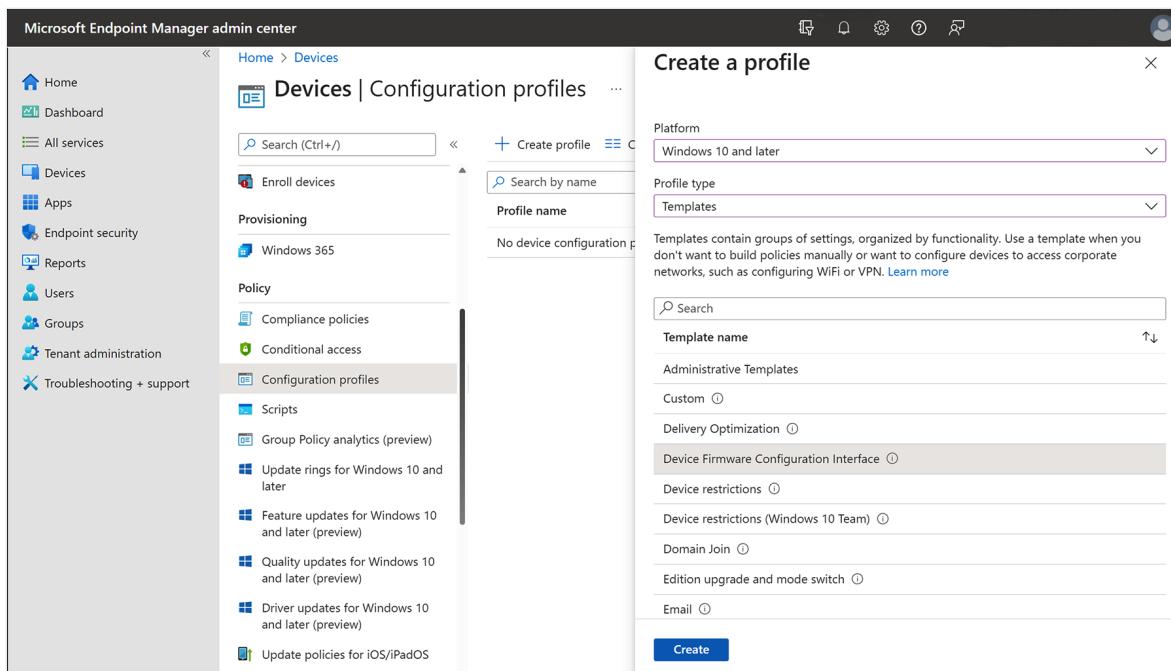
DFCI setting	Description	Supported on
Wake on power	<p>This setting lets you manage whether eligible devices can be automatically started from hibernation or powered-off states when connected to power.</p> <ul style="list-style-type: none"> - If you enable this setting, eligible Surface devices can be configured to automatically start when connected to power - If you disable this setting, eligible Surface devices can't be configured to automatically start when connected to power. - If you don't configure this setting, eligible Surface devices can't be configured to automatically start when reconnected to power. 	Supported only on Surface Laptop Go 2 and later (devices released after 1 June, 2022).

ⓘ Note

DFCI in Intune includes settings that don't currently apply to Surface devices: CPU and IO virtualization, Disable Boot from network adapters, Windows Platform Binary Table (WPBT), NFC, and SD card.

Get started

1. Sign in to your tenant at endpoint.microsoft.com.
2. In the Microsoft Intune admin center, select **Devices > Configuration profiles > Create profile**.
3. Under Platform, select **Windows 10 and later**.
4. Under Profile type, select **Templates > Device Firmware Configuration Interface** and then select **Create**.



5. See [Use DFCI profiles on Windows devices in Microsoft Intune](#) for complete instructions, including:

- Create your Azure AD security groups
- Create the profiles
- Assign the profiles and reboot
- Update existing DFCI settings
- Reuse, retire, or recover the device

Prevent users from changing UEFI settings

For many customers, the ability to block users from changing UEFI settings is critically important and a primary reason to use DFCI. As listed above in Table 1, this functionality is managed via the setting **Allow local user to change UEFI settings**. If you don't edit or configure this setting, the local user can change any UEFI setting not managed by Intune. Therefore, it's highly recommended to set **Allow local user to change UEFI settings** to **None**.

The screenshot shows the Microsoft Endpoint Manager admin center interface. On the left, there's a navigation sidebar with options like Home, Dashboard, All services, Devices, Apps, Endpoint security, Reports, Users, Groups, Tenant administration, and Troubleshooting + support. The main content area is titled "Device Firmware Configuration Interface" and "Windows 10 and later". It has tabs for Basics, Configuration settings (which is selected), Assignments, Applicability Rules, and Review + create. Under "Configuration settings", there's a section for "UEFI access" with a note about managing hardware components built into the device. A dropdown menu for "Allow local user to alter UEFI settings" is open, showing options: "Only not configured settings" (selected), "Only not configured settings", and "None". Below this are sections for Security settings, Cameras, Microphones and speakers, Radios, and Boot options. At the bottom are "Previous" and "Next" buttons.

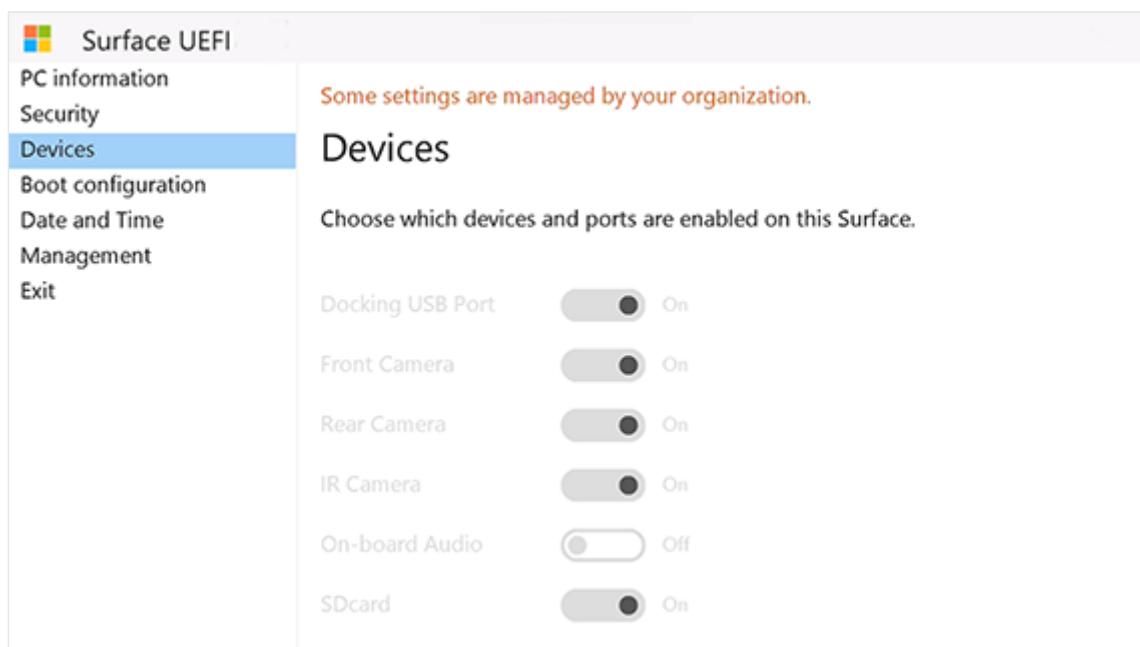
Verify UEFI settings on DFCI-managed devices

In a test environment, you can verify settings in the Surface UEFI interface.

1. Open Surface UEFI:

- Press and hold the **volume-up button** on your Surface and, at the same time, press and release the **power button**.
- When you see the Surface logo, release the volume-up button. The UEFI menu will display within a few seconds.

2. Select **Devices**. The UEFI menu will reflect configured settings, as shown in the following figure.



Note:

- The settings are grayed out (inactive) because **Allow local user to change UEFI setting** is set to **None**.
- On-board Audio is set to off because the **Microphones and speakers** policy is set to **Disabled**.

Remove DFCI policy settings

When you create a DFCI profile, all configured settings will remain in effect across all devices within the profile's scope of management. You can only remove DFCI policy settings by editing the DFCI profile directly. If the original DFCI profile has been deleted, create a new profile and edit the appropriate settings.

Removing DFCI management

To remove DFCI management and return device to factory new state:

1. Retire the device from Intune:
 - a. In Endpoint Manager at endpoint.microsoft.com, choose **Devices > All Devices**.
 - b. Select the device you want to retire, then choose **Retire/Wipe**. To learn more, see [Remove devices by using wipe, retire, or manually unenrolling the device](#).
2. Delete the Autopilot registration from Intune:
 - a. Choose **Device enrollment > Windows enrollment > Devices**.
 - b. Under Windows Autopilot devices, choose the devices you want to delete, then choose **Delete**.
3. Connect the device to wired internet with a Surface-branded ethernet adapter.
Restart the device and open the UEFI menu (press and hold the volume-up button while also pressing and releasing the power button).
4. Select **Management > Configure > Refresh from Network**, and then choose **Opt-out**.

To manage the device with Intune but without DFCI management, self-register it to Autopilot and enroll it in Intune. DFCI won't be applied to self-registered devices.

Learn more

- [DFCI Management | Microsoft Docs](#)
- [Use DFCI profiles on Windows devices in Microsoft Intune](#)
- [DFCI settings for Windows 10/11 in Microsoft Intune](#)
- [Windows Autopilot ↗](#)

- Windows Autopilot and Surface devices
- Ignite 2019: Announcing remote management of Surface UEFI settings from Intune ↗

Advanced UEFI security features for Surface Pro 3

Article • 01/26/2023

This article describes how to install and configure the v3.11.760.0 UEFI update to enable additional security options for Surface Pro 3 devices.

To address more granular control over the security of Surface devices, the v3.11.760.0 UEFI update provides additional security options that allow you to disable specific hardware devices or to prevent starting from those devices. After the UEFI update is installed on a device, you can configure it manually or automatically by running a script.

Manually install the UEFI update

Before you can configure the advanced security features of your Surface device, you must first install the v3.11.760.0 UEFI update. This update is installed automatically if you receive your updates from Windows Update. For more information about how to configure Windows to update automatically by using Windows Update, see [How to configure and use Automatic Updates in Windows](#).

To update the UEFI on Surface Pro 3, you can download and install the Surface UEFI updates as part of the Surface Pro 3 Firmware and Driver Pack. These firmware and driver packs are available from the [Surface Pro 3 page](#) on the Microsoft Download Center. You can find out more about the firmware and driver packs at [Download drivers and firmware for Surface](#). The firmware and driver packs are available as both self-contained Windows Installer (.msi) and archive (.zip) formats. You can find out more about these two formats and how you can use them to update your drivers at [Manage and deploy Surface driver and firmware updates](#).

Manually configure additional security settings

Note

To enter firmware setup on a Surface device, begin with the device powered off, press and hold the **Volume Up** button, then press and release the **Power** button, then release the **Volume Up** button after the device has begun to boot.

After the v3.11.760.0 UEFI update is installed on a Surface device, an additional UEFI menu named **Advanced Device Security** becomes available. If you click this menu, the following options are displayed:

Option	Description	Available settings (default listed in bold)
Network Boot	Enables or disables the ability of your Surface device to boot from the network (also known as PXE boot).	Enabled , Not Bootable
Side USB	Enables or disables the USB port on the side of the Surface device. Additionally, the USB port can be enabled, but not allow booting.	Enabled , Not Bootable, Disabled
Docking Port	Enables or disables the ports on the Surface docking station. Additionally, the docking port can be enabled, but block booting from any USB or Ethernet port in the docking station.	Enabled , Not Bootable, Disabled
Front Camera	Enables or disables the camera on the front of the Surface device.	Enabled , Disabled
Rear Camera	Enables or disables the camera on the rear of the Surface device.	Enabled , Disabled
On Board Audio	Enables or disables audio on the Surface device.	Enabled , Disabled
microSD	Enables or disables the microSD slot on the Surface device.	Enabled , Disabled
WiFi	Enables or disables the built-in Wi-Fi transceiver in the Surface device. This also disables Bluetooth.	Enabled , Disabled
Bluetooth	Enables or disables the built-in Bluetooth transceiver in the Surface device.	Enabled , Disabled

Automate additional security settings

As an IT professional with administrative privileges, you can automate the configuration of UEFI settings by leveraging [Surface Pro 3 Firmware Tools \(476 KB\)](#) available from the Microsoft Download Center. These tools install a .NET assembly that can be called from any custom application or script.

Prerequisites

- The sample scripts below leverage the previously mentioned extension and therefore assume that the tool has been installed on the device being managed.
- The scripts must be run with administrative privilege.
- The Windows PowerShell command [Set-ExecutionPolicy Unrestricted](#) must be called prior to running sample scripts if they are not digitally signed.

Sample scripts

Note

The UEFI password used in the sample scripts below is presented in clear text. We strongly recommend saving the scripts in a protected location and running them in a controlled environment.

Show all configurable options:

PowerShell

```
# Load the extension
[System.Reflection.Assembly]::Load("SurfaceUefiManager,
Version=1.0.5483.22783, Culture=neutral, PublicKeyToken=20606f4b5276c705")

# Get the collection of all configurable settings
$uefiOptions = [Microsoft.Surface.FirmwareOption]::All()

foreach ($uefiOption in $uefiOptions)
{
    Write-Host "Name:" $uefiOption.Name
    Write-Host " Description =" $uefiOption.Description
    Write-Host " Current Value =" $uefiOption.CurrentValue
    Write-Host " Default Value =" $uefiOption.DefaultValue
    Write-Host " Proposed Value =" $uefiOption.ProposedValue

    # This gives usage and validation information
    Write-Host " Allowed Values =" $uefiOption.FriendlyRegEx
    Write-Host " Regular Expression =" $uefiOption.RegEx

    Write-Host
}
```

Set or change UEFI password:

PowerShell

```
# Load the extension
[System.Reflection.Assembly]::Load("SurfaceUefiManager,
Version=1.0.5483.22783, Culture=neutral, PublicKeyToken=20606f4b5276c705")
```

```

# Must supply UEFI administrator Password if set
# If it is not currently set this is ignored
[Microsoft.Surface.FirmwareOption]::Unlock("1234")

$Password = [Microsoft.Surface.FirmwareOption]::Find("Password")

# Set New value to 12345
$Password.ProposedValue = "12345"

```

Check status of proposed changes:

PowerShell

```

# Load the extension
[System.Reflection.Assembly]::Load("SurfaceUefiManager,
Version=1.0.5483.22783, Culture=neutral, PublicKeyToken=20606f4b5276c705")

# Check update status
$updateStatus = [Microsoft.Surface.FirmwareOption]::UpdateStatus
$updateIteration = [Microsoft.Surface.FirmwareOption]::UpdateIteration
Write-Host "Last Update Status =" $updateStatus
Write-Host "Last Update Iteration =" $updateIteration

# Get the individual results for the last proposed update
# If the device has never had an update attempt this will be an empty list
$details = [Microsoft.Surface.FirmwareOption]::UpdateStatusDetails
Write-Host $details.Count "Settings were proposed"
if ($details.Count -gt 0)
{
    Write-Host "Result Details"
    foreach ($detail in $details.GetEnumerator())
    {
        Write-Host " " $detail.Key "=" $detail.Value
    }
}

```

Revert UEFI to default values:

PowerShell

```

# Load the extension
[System.Reflection.Assembly]::Load("SurfaceUefiManager,
Version=1.0.5483.22783, Culture=neutral, PublicKeyToken=20606f4b5276c705")

# Must supply UEFI administrator Password if set
# If it is not currently set this is ignored
[Microsoft.Surface.FirmwareOption]::Unlock("1234")

# Get the collection of all configurable settings
$uefiOptions = [Microsoft.Surface.FirmwareOption]::All()

# Reset all options to the factory default

```

```
foreach ($uefiOption in $uefiOptions)
{
    $uefiOption.ProposedValue = $uefiOption.DefaultValue
}
```

Status code interpretation

- 00 - The proposed update was a success
- 02 - One of the proposed values had an invalid value
- 03 - There was a proposed value set that was not recognized
- 0F - The unlock password did not match currently set password

What's new in Surface Thunderbolt 4 Dock

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

As the latest generation Surface dock, [Surface Thunderbolt™ 4 Dock](#) [↗] delivers ultra-high speed data transfer, built-in enterprise management and security ¹ and the versatility to connect your most important peripherals.

- **High-speed USB4®/Thunderbolt 4 on USB-C® ports.** Plug in one cable to power your device, connect two 4K monitors at up to 60 Hz², and transfer data and files at up to 40 Gbps.
- **The charging power you need for your devices and accessories.** Connect and power your laptop with up to 96 watts of power passthrough and extra charging power for your phone and accessories.³
- **More inclusive design with recycled materials.** Quickly access ports with raised tactile indicators for greater accessibility. The lightest Surface dock and PSU enclosures (excluding the AC cable) are attributed to 20% ocean-bound plastic.⁴ The packaging is ~99% recyclable in OECD countries and free of single-use plastics. The lightest Surface dock comes with 20% ocean-bound plastic and 99% recyclable packaging that's free of single-use plastics.⁵





Simple management and security from anywhere

Surface Thunderbolt 4 Dock helps improve IT efficiency and reduce overhead and support costs through optimization for Microsoft software.

- **Surface Enterprise Management Mode (SEMM) for Dock.** Designed to easily lock down the ports of your dock in mission-critical environments and restrict functionality to specific devices, enabling organizations to simplify and secure IT management. For more information, see [Secure Surface Dock ports with Surface Enterprise Management Mode](#).
- **Firmware update through Windows Update.** Seamlessly keep your dock up to date with automatic updates or downloadable update driver and firmware packs.
- **MAC Address Passthrough.**⁶ Maintain device network identity from one dock to another for ease of management in shared workspaces or dock environments.
- **Wake on LAN from Modern Standby.** IT admins can remotely wake up devices connected to Surface Thunderbolt 4 Dock and automatically perform management tasks.
- **Windows Management Instrumentation (WMI) support.** IT admins can remotely monitor and manage the latest firmware, policy settings, and related data across Surface Thunderbolt 4 Dock devices. For more information, see [Manage Surface Dock with WMI](#).
- **Centralized support & warranty service.** IT admins can get direct support via the [Surface Management Portal](#) or [Microsoft Hardware Support Portal](#) ↗.

General system requirements

Surface Thunderbolt 4 Dock is optimized for devices with a USB4/ Thunderbolt 4 port, including the following Surface devices:

- Surface Laptop 5
- Surface Laptop Studio
- Surface Pro 8
- Surface Pro 9 (Intel/Wi-Fi)

 **Note**

Thunderbolt 4 connection supports two 4K external displays at up to 60 Hz (when supported by device and display).

Surface Thunderbolt 4 Dock is compatible with the following Surface devices with USB-C ports:

- Surface Pro 9 with 5G
- Surface Pro 7+
- Surface Pro 7
- Surface Pro X
- Surface Laptop 4
- Surface Laptop 3
- Surface Laptop Go 2
- Surface Laptop Go
- Surface Go 3
- Surface Go 2
- Surface Book 3
- Surface Studio 2+ (no charging)

 **Note**

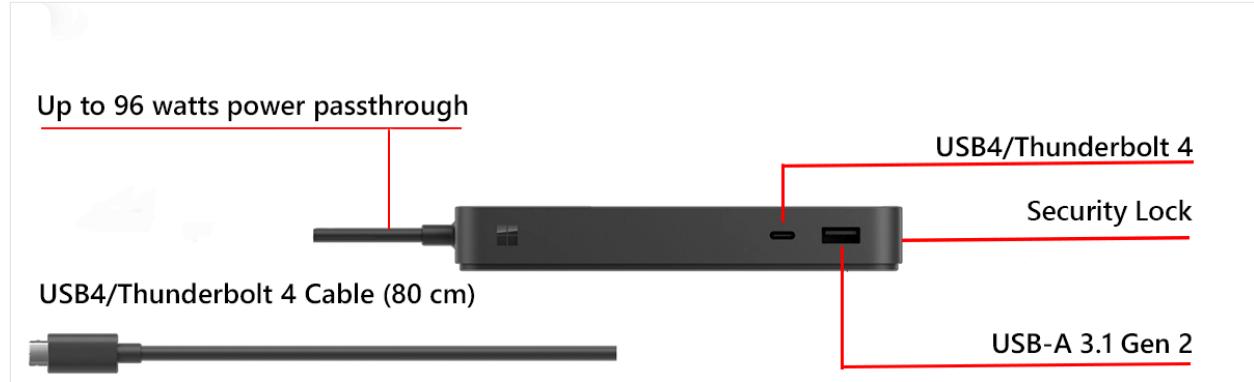
USB-C connection supports one 4K external display at up to 60 Hz (when supported by device and display). Or you can daisy chain more monitors, as described in the section on this page: [Connect multiple monitors to devices without USB4/Thunderbolt 4](#).

 **Tip**

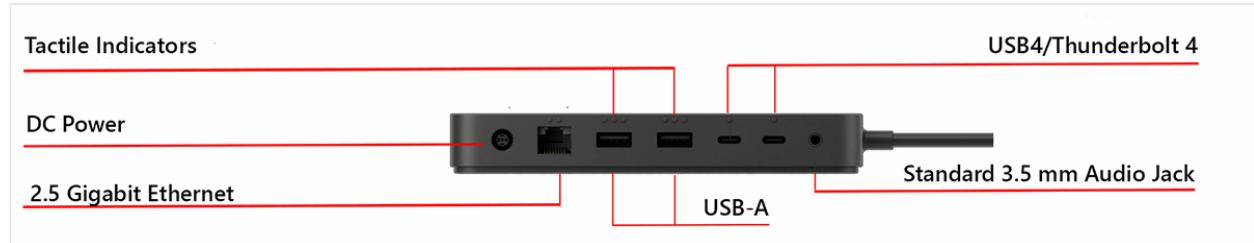
You can use Surface Thunderbolt 4 Dock with any host PC with USB4/ Thunderbolt 4. Full support for enterprise management and security features is exclusive to

Surface devices. Automatic firmware updates via Windows Update only work on Windows-based PCs.

Components



Front facing view



Rear facing view

USB

- One front-facing USB-A (USB 3.1 Gen 2, 7.5 W)
- One front-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W)
- Two rear-facing USB-A (USB 3.1 Gen 2, 7.5 W)
- Two rear-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W)

Ethernet

- 2.5-gigabit Ethernet port.

External Power supply

- 165-W power supply and up to 96-W passthrough to connected PC. Supports 100V-240V.

Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock

Optimize port access, save desk space and use enhanced security capabilities with the [Cable Matters Mount](#),[↗] purpose-built for Surface Thunderbolt 4 Dock and Designed for Surface certified.

- Facilitates single-handed interaction with Microsoft Surface Thunderbolt 4 Dock
- Improves port access through stabilization
- Saves desk space through cable management
- Integrates easily with locking devices for extra security



Compare Surface Docks

Feature	Surface Thunderbolt 4 Dock	Surface Dock 2	Surface Dock
Surface Connect	No	Yes	Yes
Optimal host devices	Surface Laptop 5, Surface Pro 9, Surface Pro 8, Surface Laptop Studio	Surface Pro 9 with 5G, Surface Laptop 4, Surface Laptop Go 2, Surface Go 3	Surface Go, Surface Laptop 2, Surface Laptop 3, Surface Pro 7+

Feature	Surface Thunderbolt 4 Dock	Surface Dock 2	Surface Dock
USB-A	One front-facing USB-A (USB 3.1 Gen 2, 7.5 W)	Two rear-facing USB 3.2 Gen 2 (7.5-W power)	Two front-facing USB 3.1 Gen 1
	Two rear-facing USB-A (USB 3.1 Gen 2, 7.5 W)		Two rear-facing USB 3.1 Gen 1
Mini Display port	None	None	Two rear facing (DP1.2)
USB-C	One front-facing USB-C (USB 4 Thunderbolt 4, video display enabled, 15 W)	Two front-facing USB 3.2 Gen 2 (15-W power)	None
	Two rear-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W)	Two rear-facing USB 3.2 Gen 2 (DP1.4a) (7.5-W power)	
3.5 mm Audio in/out	Yes	Yes	Yes
Ethernet	Yes 2.5 gigabit	Yes 1 gigabit	Yes, 1 gigabit
DC power in	Yes	Yes	Yes
Kensington lock	Yes	Yes	Yes
Cable length	80 cm	80 cm	65 cm
Host power	96 W	120 W	60 W
USB load power	67.5 W	60 W	30 W
USB bit rate	Up to 32 Gbps ⁶	Up to 10 Gbps	Up to 5 Gbps
Monitor support	2 x 4K @ 60 Hz or 1 x 4K @ 60 Hz	2 x 4K @ 60 Hz or 1 x 4K @120 Hz	2 x 4K @ 30 Hz, or 1 x 4K @ 60 Hz
Wake-on-LAN from Modern Standby	Yes	Yes	Yes

Feature	Surface Thunderbolt 4 Dock	Surface Dock 2	Surface Dock
Wake-on-LAN from S4/S5 sleep modes	No	Yes	No
Network PXE boot	Yes	Yes	Yes
SEMM host access control	Yes	Yes	No
SEMM port access control ⁷	Yes	Yes	No
Servicing support	Windows Update, Surface App, or MSI	Windows Update or MSI	MSI

Connect multiple monitors to devices without USB4/Thunderbolt 4

You can daisy chain up to eight monitors by connecting a series of display devices using a wired connection from monitor to monitor in a series, rather than connecting each monitor directly to Surface Thunderbolt 4 Dock.

To daisy chain monitors, you need two or more monitors that support at least **DisplayPort 1.2** and **Multi-Stream Transport (MST)**. Displays that function as a middle link in the chain must include **DisplayPort** output ports and input ports. You also need a video or graphics card (GPU) on your PC that supports **DisplayPort 1.2** and **MST**.

Note

Resolution and refresh rate is reduced when daisy chaining two or more monitors.

To connect your PC to multiple monitors using DisplayPort MST:

1. Connect your PC to the **DisplayPort-In** connection on the first monitor.
2. Connect the **DisplayPort-Out** connection on the first monitor to the **DisplayPort-In** connection on the second monitor. To daisy chain more than two monitors, follow

a similar sequence: The first monitor connects to the second, the second monitor connects to the third, and so on.

3. Use the On-Screen Display (OSD) menu, to enable **DisplayPort 1.2** on your monitor. To learn more, refer to the user manual of your monitor.

Place an order

- [Surface Thunderbolt 4 Dock ↗](#)
- [Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock ↗](#)

Appendix: Surface Dock Thunderbolt 4 tech specs

Feature	Description
Compatibility	<p>Designed for devices with USB-C with USB 4®/Thunderbolt 4 port:</p> <ul style="list-style-type: none">Surface Laptop 5Surface Laptop StudioSurface Pro 8Surface Pro 9 (Intel/Wi-Fi) <p>Thunderbolt 4 connection supports two 4K external displays at up to 60 Hz (when supported by device and display)</p> <p>Compatible with devices with USB-C ports:</p> <ul style="list-style-type: none">Surface Pro 9 with 5GSurface Pro 7+Surface Pro 7Surface Pro XSurface Laptop 4Surface Laptop 3Surface Laptop Go 2Surface Laptop GoSurface Go 3Surface Go 2Surface Book 3Surface Studio 2+ (no charging)
	<p>USB-C connection supports one 4K external display at up to 60 Hz (when supported by device and display)⁸</p>
Dimensions	5.91" x 2.95"x 0.84" (150 mm x 75 mm x 21.3 mm)
Weight	0.9 lb. (410 g)

Feature	Description
Connections	165 W power supply (up to 96 W passthrough) USB4/Thunderbolt 4 Cable with LED charging indicator (80 cm) 1 front-facing USB-A (USB 3.1 Gen 2, 7.5 W) 1 front-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15W) 2 rear-facing USB-A (USB 3.1 Gen 2, 7.5 W) 2 rear-facing USB-C (USB4/Thunderbolt 4, video display enabled, 15 W) 1 Ethernet (2.5Gbit/s) 3.5 mm audio jack Security lock support (Kensington compatible) Screw nut for desk mounts Compatible with Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock ⁹
What's in the box	Microsoft Surface Thunderbolt 4 Dock 165 W Power Supply
Manageability	For supported host devices: Surface Enterprise Management Mode for Dock ¹⁰ Media Access Control (MAC) address emulation Firmware update through Windows Update and Surface app Wake on LAN from Modern Standby
Accessibility	Tactile indicators for port identification
Materials	Microsoft Surface Thunderbolt 4 Dock and PSU enclosures (excluding AC cable) are attributed to 20% ocean-bound plastic ¹¹
Warranty ¹²	1-year limited warranty

Learn more

- Simple management & security with our latest Surface Dock[↗]
- Secure Surface Dock ports with Surface Enterprise Management Mode
- Manage Surface Docks with WMI
- Wake On LAN with Surface Thunderbolt 4 Dock
- Surface Thunderbolt 4 Dock Firmware and Drivers[↗]

References

1. Surface Enterprise Management Mode for Dock and MAC address passthrough are available on select host devices and supported operating systems.
2. When supported by device and display.
3. USB-C port doesn't charge your Surface device or any device that requires more than 15 W.

4. Ocean-bound plastic is plastic waste recovered from oceans and waterways, cleaned, and processed into recycled plastic resin pellets. These recycled pellets are blended in with virgin plastic during the manufacturing process.
5. In OECD countries, Microsoft operates recycling programs either independently or through third parties covering Microsoft Devices. In addition, check local recycling programs for availability.
6. Requires device with USB4/Thunderbolt 4 port.
7. Software license required for some features. Sold separately.
8. 4K @ 60 Hz via USB-C requires High Bit Rate 3 (HBR3) support on both display and host computer.
9. Learn more at [Cable Matters Desk Mount for Microsoft Surface Thunderbolt 4 Dock ↗](#).
10. Surface Enterprise Management Mode for Dock and MAC address passthrough are available on select host devices and supported operating systems.
11. Ocean-bound plastic is plastic waste recovered from oceans and waterways, cleaned, and processed into recycled plastic resin pellets. These recycled pellets are blended in with virgin plastic during the manufacturing process.
12. Microsoft's Limited Warranty is in addition to your consumer law rights.

Manage Surface Docks with WMI

Article • 04/06/2023 • Applies to: Windows 10, Windows 11

Windows Management Instrumentation (WMI) support provides a rich set of diagnostic information enabling IT admins to remotely monitor and manage the latest firmware, policy state, and related data for Surface Dock 2 and Surface Thunderbolt 4 Dock devices. You can use WMI with Windows PowerShell, System Center Operations Manager, and other tools. For more information about WMI, see [Working with WMI](#).

Enable WMI support

Surface Thunderbolt 4 Dock

Go to [Surface Thunderbolt 4 Dock Firmware and Drivers](#) and download the appropriate package:

SurfaceDock_WmiInstanceProvider_Win10_Win11_19041_23.021.21048.0_x64.msi

- Surface Pro (fifth generation and later)
- Surface Book (second generation and later)
- Surface Go (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)

SurfaceDock_WmiInstanceProvider_Win10_Win11_19041_23.021.21048.0_arm64.msi

- Surface Pro 9 with 5G
- Surface Pro X

Surface Dock 2

Go to [Surface Dock 2 Firmware and Drivers](#) and download the appropriate package:

SurfaceDock2_WmiInstanceProvider_Win10_17763_20.072.32423.0_x64.msi

- Surface Pro (fifth generation and later)
- Surface Book (second generation and later)
- Surface Go (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)

- Surface Pro 9 with 5G
- Surface Pro X

Using WMI with Surface Dock

The following instructions apply to Surface Dock 2 and Surface Thunderbolt 4 Dock.

1. To enumerate all dock component instances:

```
PowerShell  
Get-CimInstance -Namespace "root/Surface" -Class "SurfaceDockComponent"
```

2. To access WMI Class Property descriptions, open a command prompt and enter WMI commands where **Property** is one of the properties listed in Table 1.

```
PowerShell  
Get-CimClass -Namespace "root/Surface" -Class  
"SurfaceDockComponent").CimClassProperties["<Property>"]
```

- **Example:** To access the description for the **Version** Common Information Model (CIM) property, enter the following:

```
PowerShell  
(Get-CimClass -Namespace "root/Surface" -Class  
"SurfaceDockComponent").CimClassProperties["Version"].Qualifiers["Descrip  
tion"].Value
```

Table 1. Surface Dock WMI reference

Property	Type	Expected Value(s)	Description
----------	------	-------------------	-------------

Property	Type	Expected Value(s)	Description
ComponentName	String	<p>Surface Thunderbolt 4 Dock</p> <p>"Microcontroller"</p> <p>"Thunderbolt 4 Controller"</p> <p>"USB Hub"</p> <p>"Power Delivery Controller 1"</p> <p>"Power Delivery Controller 2"</p> <p>"Audio Codec"</p> <p>"Ethernet Controller"</p> <p>"DockSerialNumber" (length: 14 - For example, 0V3379X22463GH)</p> <p>Surface Dock 2</p> <p>"Microcontroller"</p> <p>"USB Hub 1"</p> <p>"USB Hub 2"</p> <p>"Display Port Hub"</p> <p>"Power Delivery Controller"</p> <p>"Audio Codec"</p> <p>"Ethernet Controller"</p>	The following property lists the specific name of the device component that the accompanying Common Information Model (CIM) class data corresponds to.
DeviceName	String	<p>"Surface Dock 1"</p> <p>"Surface Dock 2"</p> <p>"Microsoft Surface Thunderbolt 4 Dock"</p>	The following property contains the name of the dock device that the specific device component belongs to.
DockSerialNumber	String	A twelve (12) digit serial number containing only numerical values	The following property records the serial number of the attached dock device. This serial number is the exact same for every component as they belong to the same dock device. For reference, this serial number can be found physically on the underside of the Surface Dock itself.
Id	uint16	0, 1, 2, ..., 65535	The following property is a unique Id that starts from zero (0) and counts up. This variable is used for numbering the enumerated WMI instances.

Property	Type	Expected Value(s)	Description
LastUpdateStatus	String	"Success" "PendingDockReattach" "Failed"	<p>The following property details the last attempted Component Firmware Update (CFU) status for the device component in question. Possible values are: Success, Pending Dock Reattach, and Failed.</p> <ul style="list-style-type: none"> - Success indicates that previously applied new firmware was applied successfully - Pending Dock Reattach indicates there's a new update pending for the device component and the user must detach and reattach the Dock's Surface connector in order to apply the new update. - Failed indicates that a possible legitimate error occurred during the CFU process or the peripheral didn't boot up in the expected version. In the Failed case, this isn't an indication that the device isn't working, but rather something erroneous occurred when trying to update the device. In such case, the previous firmware continues to run.
PolicyState	String	"Enabled" "Disabled"	<p>The following property indicates the current Surface Enterprise Management Mode (SEMM) policy for the device component. Possible values are: Enabled and Disabled.</p> <ul style="list-style-type: none"> - Enabled indicates that the SEMM system has allowed the host device to access and use the device component - Disabled indicates that the SEMM system has disallowed and thereby prevented the host machine from accessing and using the device component.

Property	Type	Expected Value(s)	Description
ProductId	String[]	A list of hex strings, which can each range from "0x0000" to "0xFFFF"	The following property classifies the Product Id (PID) of the device component. It's possible for there to be more than one PID listed. In the case of a USB Hub, for example, both Super Speed (SS) and High Speed (HS) devices are lumped into a singular "Hub." Therefore, two (2) PIDs would be listed within this array.
ProvisionedState	boolean	True or False	The following property describes the Surface Enterprise Management Mode (SEMM) provisioned state of the Surface Dock device. The provisioned state is the exact same for every component as they belong to the same dock device. Possible values are: True or False. A value of true indicates the Surface Dock device is currently managed and thereby, port functionality may be restricted. See the "PolicyState" property field for more information. A value of false indicates the Surface Dock device is currently not managed and has no feature restrictions imposed.
Status	String	"OK" "Disconnected" "Error" "Missing" "DeviceHandleInUse" "Disabled" "NotSupportedByWmi"	The following property describes the state of the Dock's connection to the host machine. Possible values are: OK , Disconnected , Error , Missing , DeviceHandleInUse , Disabled , and NotSupportedByWmi . - OK indicates that the device is successfully connected to the host machine and no problems exist, which would inhibit its functionality. - Disconnected indicates that the Surface connector, which provides the connection for all the device components, is currently not attached to the host machine. - Error indicates a potential issue with the device instance and the device interface has more than likely been labeled with a yellow exclamation point in the Device Manager – check the StatusCode property for more detailed

Property	Type	Expected Value(s)	Description
			<p>information on the type of error that occurred.</p> <ul style="list-style-type: none"> - Missing indicates that the device was expected to have enumerated on the host machine, but for some reason didn't. The StatusCode property will hold the value of 24 to indicate this erroneous situation. - DeviceHandleInUse indicates that another process is currently communicating with the device, which prohibits this Windows Management Instrumentation (WMI) Instance Provider from its communication requests. Try executing your WMI command again! - Disabled indicates that the current Surface Enterprise Management Mode (SEMM) policy has disallowed and thereby prevented the host machine from accessing and using the device component. See the PolicyState property field for more information. - NotSupportedByWmi indicates the connected dock is currently not supported by this WMI Provider. This status appears for the Surface Dock 1, which is currently not supported by this WMI Instance Provider.
StatusCode	uint32	Device Manager Error Code obtained from the CIM_LogicalDevice WMI Class (within <i>cimwin32.mof</i>)	<p>The following property provides the Device Manager error code for the given dock component. A value of zero (0) indicates that the dock component is working correctly; a value greater than zero (0) indicates an issue or a possible error with the dock component. Because the dock component may enumerate with several device interfaces, it's possible there may be other Device Manager error codes. This property field only lists a single error code even if multiple are available. The Device Manager labels the device with a yellow exclamation point only when certain error codes have occurred.</p>

Property	Type	Expected Value(s)	Description
VendorId	String	A hex string that can range from "0x0000" to "0xFFFF"	The following property notes the specific Vendor ID (VID) of the device component.
Version	String	A version string, which has the form as follows: "x.y.z", where x, y, and z are numerical values.	The following property specifies the current version of the firmware, which is currently running on the device component.

Learn more

- [Secure Surface Dock ports with SEMM](#)
- [What's new in Surface Thunderbolt 4 Dock](#)
- [Surface Dock 2 overview](#)
- [Device Manager error codes](#)
- [Working with WMI](#)

Secure Surface Dock ports with Surface Enterprise Management Mode (SEMM)

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

Introduction

Surface Enterprise Management Mode (SEMM) enables IT admins to secure and manage ports on Surface Dock 2 or Surface Thunderbolt 4 Dock by configuring UEFI settings in a Windows Installer configuration package (.msi file) deployed to compatible Surface devices across a corporate environment.

Supported devices

Managing Surface Dock 2 or Surface Thunderbolt 4 Dock with SEMM is available for docks connected to Surface Book 3, Surface Laptop Studio, Surface Laptop 5, Surface Laptop 4, Surface Laptop 3, Surface Laptop Go, Surface Laptop Go 2, Surface Pro 9 & Surface Pro 9 with 5G, Surface Pro 8, Surface Pro 7+, Surface Pro 7, Surface Pro X. These compatible Surface devices are commonly referred to as **host devices**. A package is applied to host devices based on if a host device is **authenticated** or **unauthenticated**. Configured settings reside in the UEFI layer on host devices enabling you—the IT admin—to manage compatible Surface Docks just like any other built-in peripheral such as the camera.

Tip

You can manage Dock ports only when the dock is connected to one of the following compatible devices: Surface Pro 9, Surface Pro 9 with 5G, Surface Studio 2+, Surface Pro 8, Surface Laptop Studio, Surface Book 3, Surface Laptop 5, Surface Laptop 4, Surface Laptop 3, Surface Pro 7+, and Surface Pro 7. Any device that doesn't receive the UEFI Authenticated policy settings is inherently an unauthenticated device.

Scenarios

Restricting Surface Dock 2 or Surface Thunderbolt 4 Dock to authorized persons signed into a corporate host device provides another layer of data protection. This ability to lock down Surface Docks is critical for specific customers in highly secure environments who want the functionality and productivity benefits of the dock while maintaining compliance with strict security protocols. SEMM used with Surface Dock 2 or Surface Thunderbolt 4

Dock is especially useful in open offices and shared spaces especially for customers who want to lock USB ports for security reasons. For a video demo, check out [SEMM for Surface Dock 2](#).

Configuring and deploying UEFI settings for Surface Docks

This section provides step-by-step guidance for the following tasks:

1. Install **Surface UEFI Configurator** from [Surface Tools for IT](#).
2. Create or obtain public key certificates.
3. Create a .msi configuration package.
 - a. Add your certificates.
 - b. Enter the 16-digit RN number for your Surface Dock 2 or Surface Thunderbolt 4 Dock devices.
 - c. Configure UEFI settings.
4. Build and apply the configuration package to targeted Surface devices.

Important

The **Random Number (RN)** is a unique 16-digit hex code identifier which is provisioned at the factory, and printed in small type on the underside of the dock. The RN differs from most serial numbers in that it can't be read electronically. This ensures proof of ownership is primarily established only by reading the RN when physically accessing the device. The RN may also be obtained during the purchase transaction and is recorded in Microsoft inventory systems.

Install SEMM and Surface UEFI Configurator

Install SEMM by running Surface UEFI Configurator:

- For Intel/AMD devices, download: [SurfaceUEFI_Configurator_v2.97.139.0_x64.msi](#)
- For ARM devices, download: [SurfaceUEFI_Configurator_v2.97.139.0_x86.msi](#)

UEFI Configurator is available via a standalone installer and contains everything you need to create and distribute configuration packages for Surface Dock 2 or Surface Thunderbolt 4 Dock.

- Download **Surface UEFI Configurator** from [Surface Tools for IT](#).

Create public key certificates

This section provides specifications for creating the certificates needed to manage ports for Surface Dock 2 or Surface Thunderbolt 4 Dock.

Prerequisites

This article assumes that you either obtain certificates from a third-party provider or you already have expertise in PKI certificate services and know how to create your own. You should be familiar with and follow the general recommendations for creating certificates as described in [Surface Enterprise Management Mode \(SEMM\)](#) documentation, with one exception. The certificates documented on this page require expiration terms of 30 years for the **Dock Certificate Authority**, and 20 years for the **Host Authentication Certificate**.

For more information, see [Certificate Services Architecture](#) documentation and review the appropriate chapters in [Windows Server 2019 Inside Out](#) , or [Windows Server 2008 PKI and Certificate Security](#) available from Microsoft Press.

Root and host certificate requirements

Prior to creating the configuration package, you need to prepare public key certificates that authenticate ownership of Surface Dock 2 or Surface Thunderbolt 4 Dock and facilitate any subsequent changes in ownership during the device lifecycle. The host and provisioning certificates require entering EKU IDs otherwise known as **Client Authentication Enhanced Key Usage (EKU) object identifiers (OIDs)**.

The required EKU values are listed in Table 1 and Table 2.

Table 1. Root and Dock Certificate requirements

Certificate	Algorithm	Description	Expiration	EKU OID
Root Certificate Authority	ECDSA_P384	- Root certificate with 384-bit prime elliptic curve digital signature algorithm (ECDSA) - SHA 256 Key Usage: CERT_DIGITAL_SIGNATURE_KEY_USAGE - CERT_KEY_CERT_SIGN_KEY_USAGE CERT_CRL_SIGN_KEY_USAGE	30 years	N/A

Certificate	Algorithm	Description	Expiration	EKU OID
Dock Certificate Authority	ECC P256 curve	- Host certificate with 256-bit elliptic- curve cryptography (ECC) - SHA 256 Key Usage: CERT_KEY_CERT_SIGN_KEY_USAGE - Path Length Constraint = 0	20 years	1.3.6.1.4.1.311.76.9.21.2 1.3.6.1.4.1.311.76.9.21.3

(!) Note

The dock CA must be exported as a .p7b file.

Provisioning Administration Certificate requirements

Each host device must have the doc CA and two certificates as shown in Table 2.

Table 2. Provisioning administration certificate requirements

Certificate	Algorithm	Description	EKU OID
Host authentication certificate	ECC P256 SHA 256	Proves the identity of the host device.	1.3.6.1.4.1.311.76.9.21.2
Provisioning administration certificate	ECC P256 SHA256	Enables you to change dock ownership and/or policy settings by allowing you to replace the CA that's currently installed on the dock.	1.3.6.1.4.1.311.76.9.21.3 1.3.6.1.4.1.311.76.9.21.4

(!) Note

The host authentication and provisioning certificates must be exported as .pfx files.

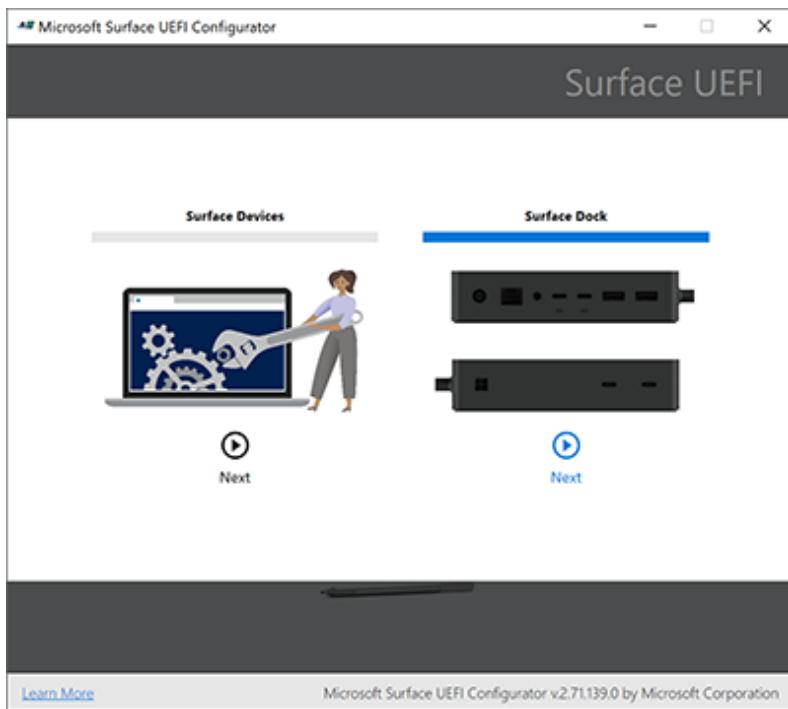
Create configuration package

When you've obtained or created the certificates, you're ready to build the .msi configuration package that will be applied to target Surface devices.

1. Run Surface UEFI Configurator.



2. Select Surface Dock.



3. Enter the appropriate **certificates** on the certificate page. Demo certificates are available from [Surface Tools for IT](#): Download **SEMM_PowerShell.zip** and refer to **CreateSurfaceDock2Certificates.ps1**. Make sure you install **SurfaceDock2_WmiInstanceProvider** before you run the demo scripts.

Surface Dock

Please import your organization's certificate authority and certificate files. Both files are required to proceed.

**Dock Certificate Authority**

Your organizational Certificate Authority File (.p7b) is required

**Host Authentication Certificate**

Your organizational Personal Information Exchange (.pfx) certificate is required

**Provisioning Administration Certificate**

Your organizational Personal Information Exchange (.pfx) certificate is required

Back

Next

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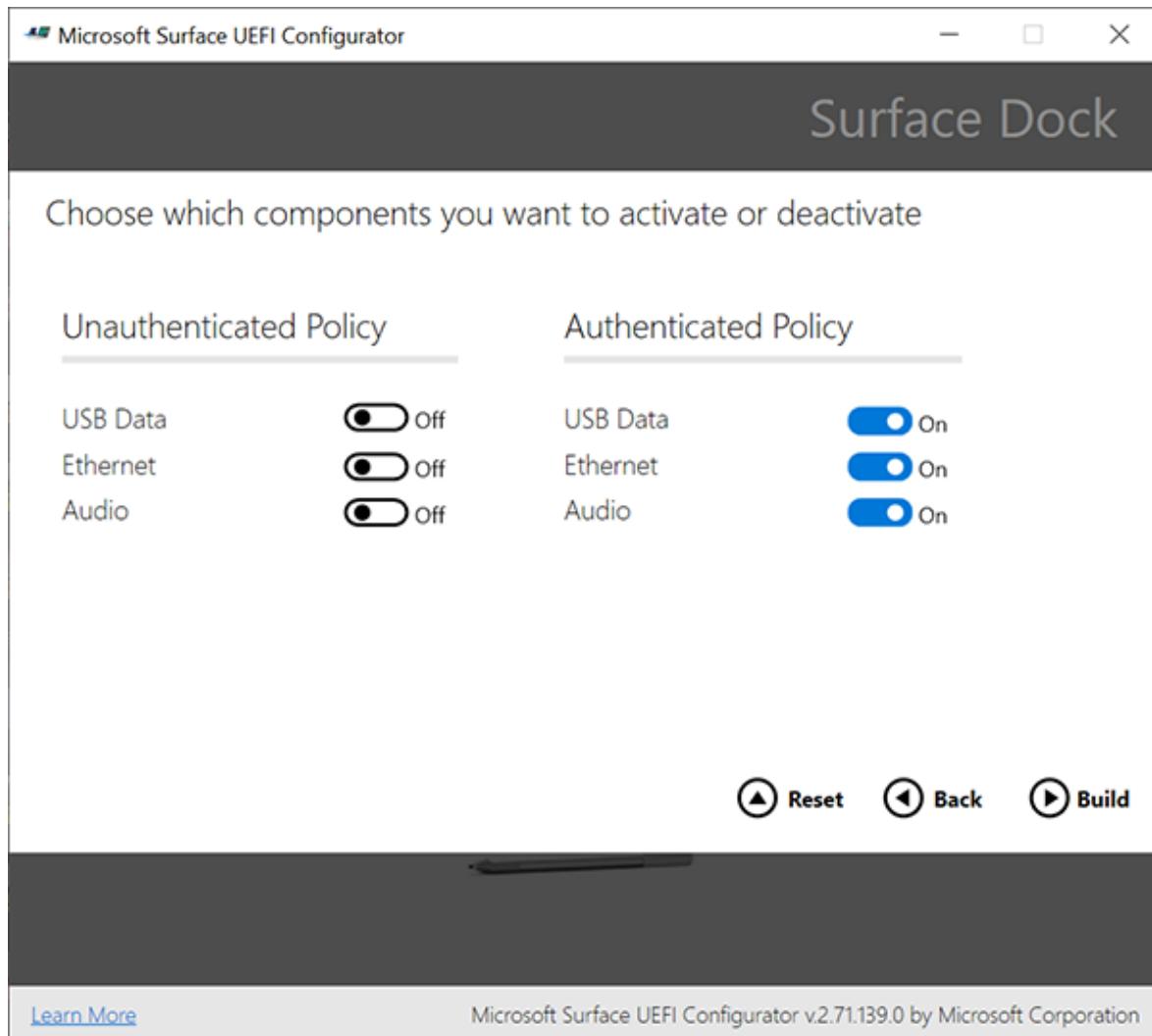
Microsoft Surface UEFI Configurator v.2.71.139.0 by Microsoft Corporation

4. Add appropriate dock RNs to the list.

Tip

When you create a configuration package for multiple Surface Dock 2 or Surface Thunderbolt 4 Dock devices, instead of entering each RN manually, you can use a .csv file that contains a list of RNs.

5. Specify your policy settings for USB data, Ethernet, and Audio ports. UEFI Configurator lets you configure policy settings for authenticated users (Authenticated Policy) and unauthenticated users (Unauthenticated Policy). The following figure shows port access turned on for authenticated users and turned off for unauthenticated users.



- Authenticated user refers to a Surface Device that has the appropriate certificates installed, as configured in the .msi configuration package that you applied to target devices. It applies to any user authenticated user who signs into the device.
- Unauthenticated user refers to any other device.
- Select **Reset** to create a special “Reset” package that will remove any previous configuration package that the dock had accepted.

6. Select **Build** to create the package as specified.

Apply the configuration package to a Surface Dock

1. Take the .msi file that the Surface UEFI Configurator generated and install it on a Surface host device.
2. Connect the host device to Surface Dock 2 or Surface Thunderbolt 4 Dock. When you connect the dock, UEFI policy settings are applied.

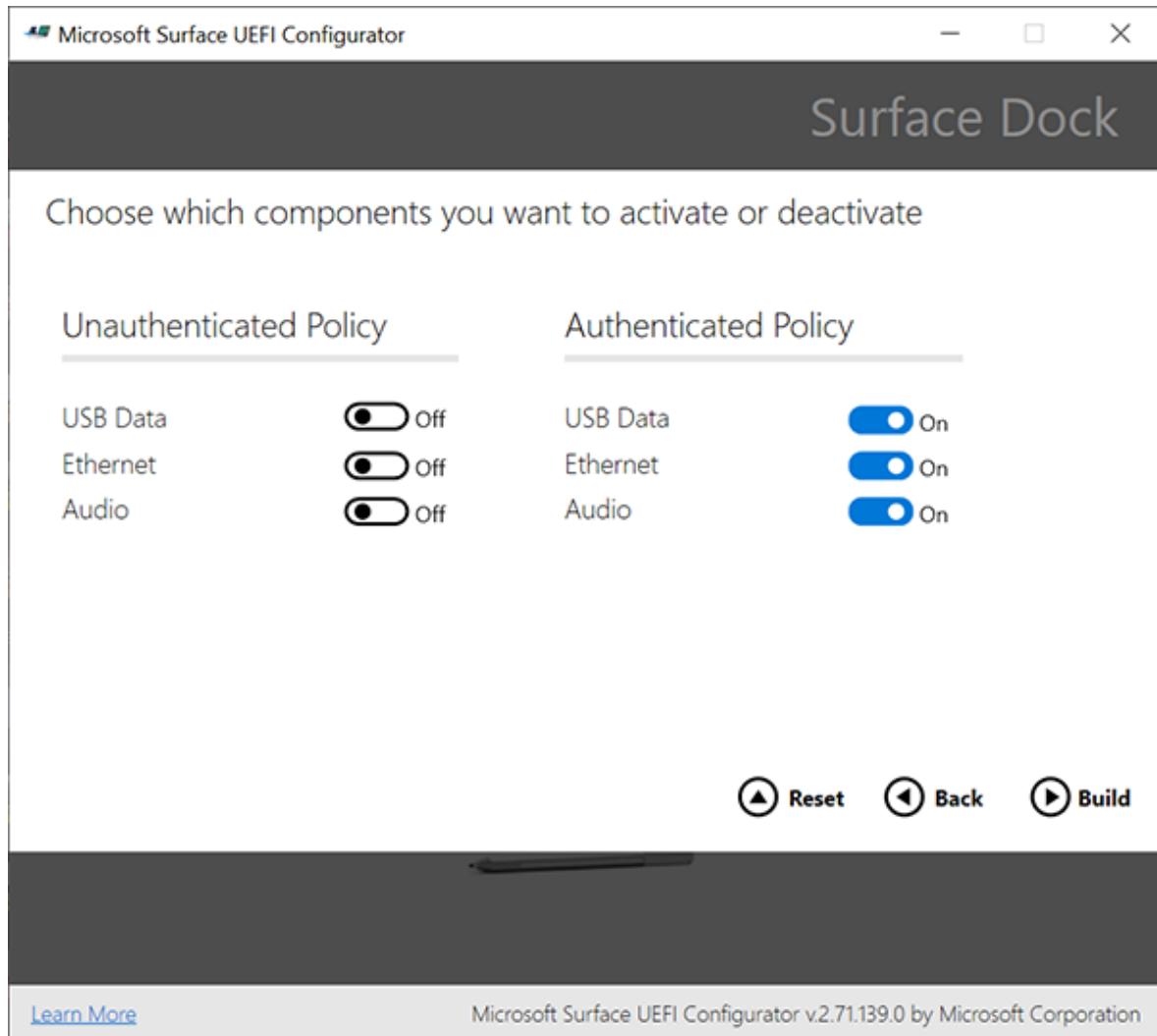
Verify managed state using the Surface App

Once you've applied the configuration package, you can quickly verify the resultant policy state of the dock directly from the Surface App, installed by default on all Surface devices. If Surface App isn't present on the device, you can download and install it from the Microsoft Store.

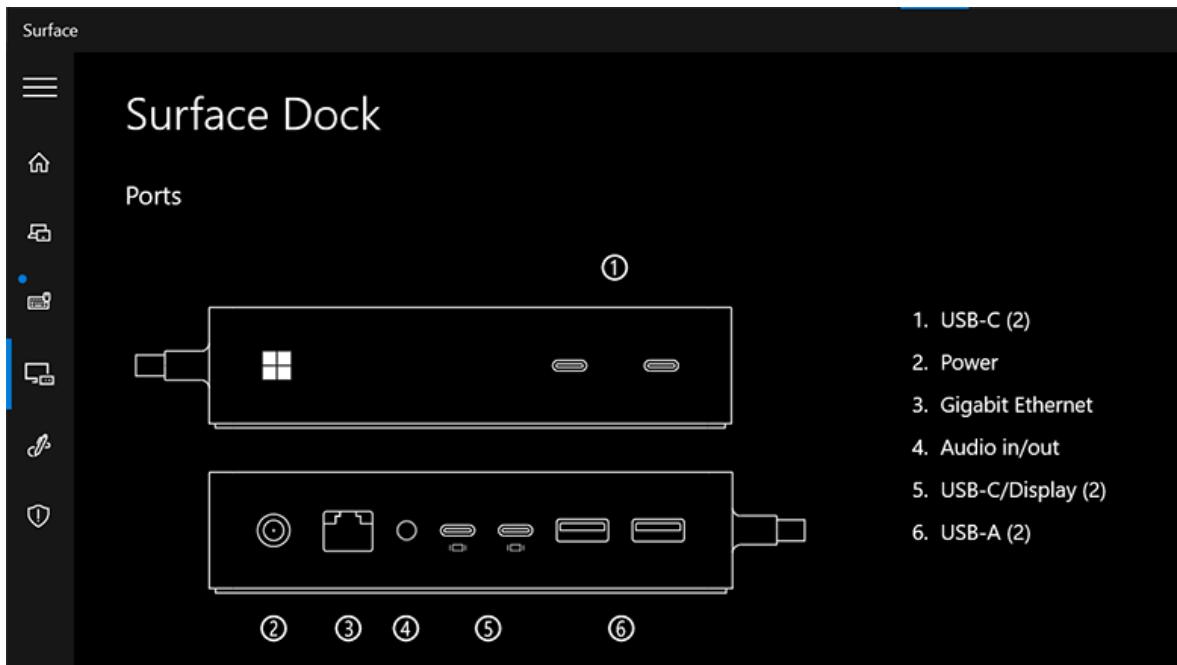
Test scenario

Objective: Configure policy settings to allow port access by authenticated users only.

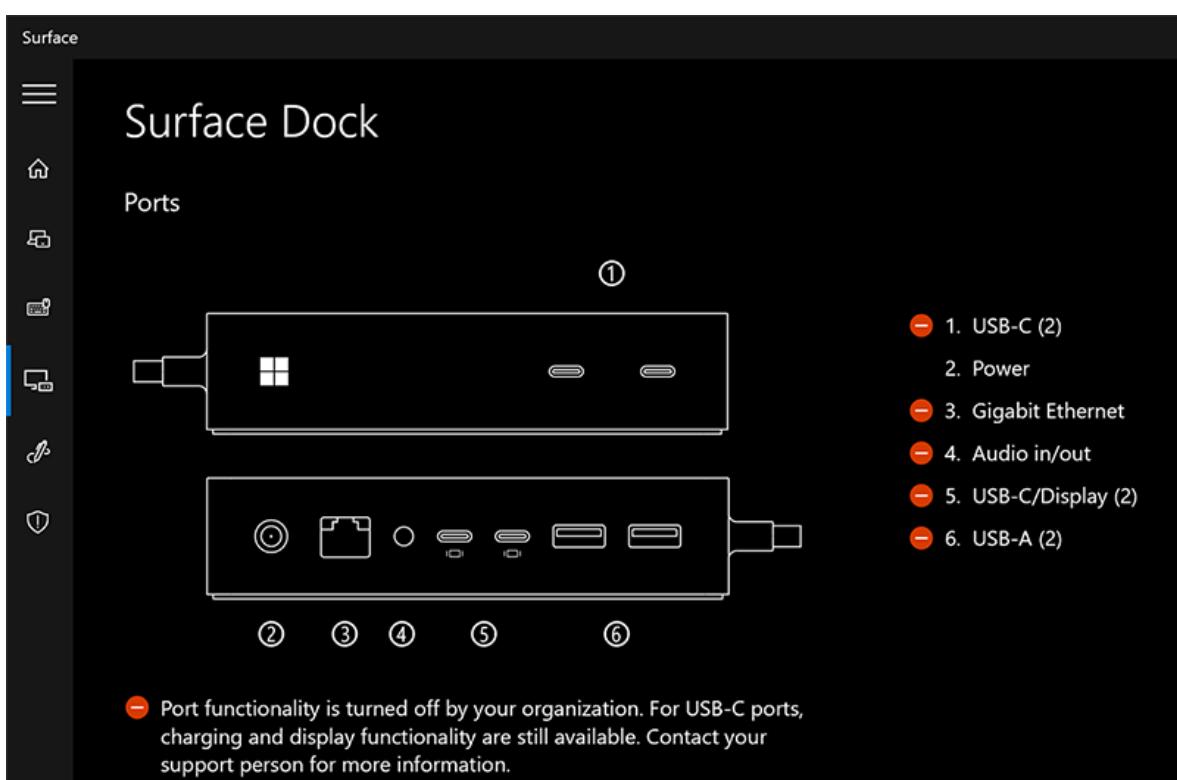
1. Turn on all ports for authenticated users and turn them off for unauthenticated users.



2. Apply the configuration package to your target device and then connect the dock.
3. Open Surface App and select **Surface Dock** to view the resultant policy state of your Surface Dock. If the policy settings are applied, Surface App will indicate that ports are available.



4. Now you need to verify that the policy settings have successfully turned off all ports for unauthenticated users. Connect Surface Dock 2 or Surface Thunderbolt 4 Dock to an unmanaged device; for example, any Surface device outside the scope of management for the configuration package you created.
5. Open **Surface App** and select **Surface Dock**. The resultant policy state will indicate ports are turned off.



Tip

If you want to keep ownership of the device, but allow all users full access, you can make a new package with everything turned on. If you wish to completely remove the restrictions and ownership of the device (make it unmanaged), select **Reset** in Surface UEFI Configurator to create a package to apply to target devices.

Congratulations. You have successfully managed Surface Dock ports on targeted host devices.

Learn more

- [Surface Enterprise Management Mode \(SEMM\) documentation](#)
- [Certificate Services Architecture](#)
- [Windows Server 2019 Inside Out ↗](#)
- [Windows Server 2008 PKI and Certificate Security ↗](#)

Wake On LAN with Surface Thunderbolt™ 4 Dock

Article • 04/07/2023 • Applies to: Windows 10, Windows 11

To keep devices fully up to date, IT admins need to be able to manage devices when they're not in use, typically during nightly maintenance windows. Surface Thunderbolt™ 4 Dock supports Wake on LAN (WOL) enabling admins to remotely wake up Surface devices.

Requirements

- Devices must have a wired connection with Surface Thunderbolt™ 4 Dock and stay connected to AC Power.
- Ensure host devices have installed the latest firmware and drivers, available via Windows Update or the Surface App. For WOL to function, host devices must have a Thunderbolt Ethernet driver.

Tip

You can manually download the appropriate drivers from the [Surface Thunderbolt™ 4 Dock Firmware and Drivers page](#). Choose Arm64 for Surface Pro 9 with 5G, Surface Pro X, or compatible Windows on ARM devices. Choose x64 for all other devices.

Wake up from Modern Standby

Modern Standby starts when the user causes the system to enter sleep, or the device goes to sleep based on the Windows power settings the user has set. For example, the user presses the power button, closes the lid, or selects Sleep from the power button in the Windows Start menu. WOL works by default for Surface devices in Modern Standby mode.

Supported Surface devices

- Surface Laptop 5
- Surface Laptop 4 (Intel processors)
- Surface Laptop 4 (AMD processors)

- Surface Laptop 3 (Intel processors)
- Surface Pro 9 (Intel processors)
- Surface Pro 9 with 5G
- Surface Studio 2+
- Surface Pro 8
- Surface Pro 7+
- Surface Pro 7
- Surface Pro X
- Surface Go (all generations)
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Book 3
- Surface Laptop Studio

Learn more

- [Wake On LAN for Surface devices](#)
- [System Power States](#)

Wake On LAN with Surface Dock 2

Article • 03/16/2023 • Applies to: Windows 10, Windows 11

To keep devices fully up to date, IT admins need to be able to manage devices when they're not in use, typically during nightly maintenance windows. Surface Dock 2 provides the best support for Wake on LAN (WOL) enabling admins to remotely wake up Surface devices and automatically perform management tasks with Microsoft Endpoint Manager or other third party solutions.

Requirements

Devices must have a wired connection with Surface Dock 2 and stay connected to AC Power.



! Note

Waking devices connected to Surface Dock 2 does not require using Surface Enterprise Management Mode (SEMM) or enabling any UEFI policy settings.

Supported Surface devices

- Surface Laptop 5
- Surface Laptop 4 (Intel processors)
- Surface Laptop 4 (AMD processors)
- Surface Laptop 3 (Intel processors)
- Surface Pro 9
- Surface Pro 9 with 5G
- Surface Pro 8
- Surface Pro 7+
- Surface Pro 7

- Surface Pro X
- Surface Go (all generations)
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Book 3
- Surface Laptop Studio
- Surface Studio 2+

Surface Dock 2 provides WOL support for devices in the following power states:

- Connected standby
- Hibernation (S4 power state)
- Shutdown (S5 “soft off” power state)

To learn more about power states, see [System Power States](#).

How it works

When not in use, Surface devices enter an idle, low powered state known as Modern Standby or Connected Standby. Or devices may be in hibernation (S4) or shutdown (S5) power state based on the power settings configured on the device. IT admins can remotely trigger devices using a wake request (magic packet) that contains the Media Access Control (MAC) address of the target Surface device. Many management solutions, such as Microsoft Endpoint Configuration Manager and third-party Microsoft Store apps provide built-in support for WOL.

To enable WOL on devices without Surface Dock 2, see:

- [Wake on LAN for Surface devices](#)

Learn more

- [Surface Dock 2 ↗](#)
- [Wake On LAN for Surface devices](#)
- [System Power States](#)

Surface Dock 2 overview

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

Surface Dock 2, the next-generation Surface dock, lets users connect external monitors and multiple peripherals for a fully modernized desktop experience from a Surface device. Built to maximize efficiency at the office, in a flexible workspace, or at home, Surface Dock 2 features seven ports, including two front-facing USB-C ports, with 15 watts of fast charging power for phones and accessories.

Full device management support

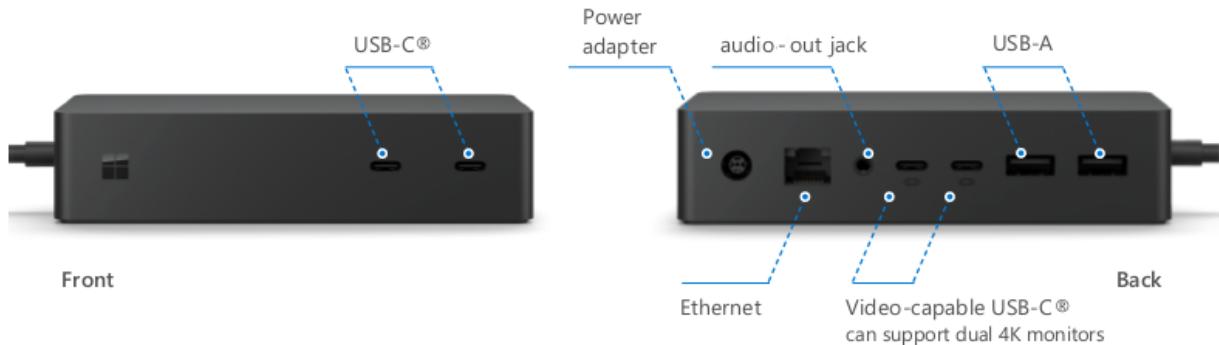
Surface Dock 2 is designed to simplify IT management, enabling admins to automate firmware updates using Windows Update or centralize updates with internal software distribution tools.

- Surface Enterprise Management Mode (SEMM) enables IT admins to secure ports on Surface Dock 2. For more information, see [Secure Surface Dock 2 ports with Surface Enterprise Management Mode](#).
- Windows Management Instrumentation (WMI) support enables IT admins to remotely monitor and manage the latest firmware, policy state, and related data across Surface Dock 2 devices. For more information, see [Manage Surface Dock 2 with WMI](#).
- Centralize updates on your local network using software distribution tools. [Download Surface Dock 2 Firmware and Drivers](#) ↗.

General system requirements

- Windows 10 version 1809 and later. There's no support for Windows 7, Windows 8, or non-Surface host devices. Surface Dock 2 works with the following Surface devices:
 - Surface Pro (5th Gen) and later
 - Surface Laptop (1st Gen) and later
 - Surface Book 2 and later
 - Surface Go and later
 - Surface Laptop Go and later
 - Surface Laptop Studio

Surface Dock 2 Components



USB

- Two front-facing USB-C ports
- Two rear-facing USB-C (gen 2) ports
- Two rear-facing USB-A ports

Video

- Dual 4K@60Hz. Supports up to two displays on the following devices:
 - Surface Laptop Studio
 - Surface Book 3
 - Surface Pro 8
 - Surface Pro 7
 - Surface Pro 7+
 - Surface Pro X
 - Surface Laptop 3
 - Surface Laptop 4
 - Surface Laptop 5
 - Surface Pro 9
 - Surface Pro 9 with 5G
- Dual 4K@30Hz. Supports up to two displays on the following devices:
 - Surface Pro 6
 - Surface Pro (5th Gen)
 - Surface Laptop 2
 - Surface Laptop (1st Gen)
 - Surface Go
 - Surface Go 2
 - Surface Go 3
 - Surface Book 2

Ethernet

- 1-gigabit Ethernet port.

External Power supply

- 199 watts supporting 100V-240V.

Compare Surface Dock

Table 1. Surface Dock and USB-C Travel Hub .

Component	Surface Dock	Surface Dock 2	USB-C Travel Hub
Surface Connect	Yes	Yes	No
USB-A	2 front facing USB 3.1 Gen 1 2 rear facing USB 3.1 Gen 1	2 rear facing USB 3.2 Gen 2 (7.5W power)	1 USB 3.1 Gen 2
Mini Display port	2 rear facing (DP1.2)	None	None
USB-C	None	2 front facing USB 3.2 Gen 2 (15W power) 2 rear facing USB 3.2 Gen 2 (DP1.4a) (7.5W power)	1 USB 3.2 Gen 2
3.5 mm Audio in/out	Yes	Yes	Yes
Ethernet	Yes, 1 gigabit	Yes 1 gigabit	Yes, 1 gigabit
DC power in	Yes	Yes	
Kensington lock	Yes	Yes	
Surface Connect cable length	65 cm	80 cm	20 cm
Surface Connect host power	60 W	120 W	N/A
USB load power	30 W	60 W	
USB bit rate	5 Gbps	10 Gbps	10 Gbps

Component	Surface Dock	Surface Dock 2	USB-C Travel Hub
Monitor support	2 x 4K @30Hz, or 1 x 4K @60 Hz	2 x 4K @60 Hz or 1 x 4K @120Hz	1 x 4K @ 60 Hz
Wake-on-LAN from Connected Standby	Yes	Yes	Yes
Wake-on-LAN from S4/S5 sleep modes	No	Yes	Yes
Network PXE boot	Yes	Yes	Yes
SEMM host access control	No	Yes	No
SEMM port access control ¹	No	Yes	No
Servicing support	MSI	Windows Update or MSI	

1. Software license required for some features. Sold separately.

Streamlined device management

Surface has released streamlined management functionality via Windows Update enabling IT admins to utilize the following enterprise-grade features:

- **Frictionless updates.** Update your docks silently and automatically, with Windows Update or Microsoft Endpoint Configuration Manager (formerly System Center Configuration Manager - SCCM) or other MSI deployment tools.
- **Wake from the network.** Manage and access corporate devices without depending on users to keep their devices powered on. Even when a docked device is in sleep, hibernation, or power off mode, your team can wake from the network for service and management, using Endpoint Configuration Manager or other enterprise management tools.
- **Centralized IT control.** Control who can connect to Surface Dock 2 by turning ports on and off. Restrict which host devices can be used with Surface Dock 2. Limit dock access to a single user or configure docks for access only by specific users in your team or across the entire company.

Next steps

- Secure Surface Dock 2 ports with Surface Enterprise Management Mode ↗
- Surface Enterprise Management Mode

- Best practice power settings for Surface devices

Surface Dock 1 Firmware Update

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

This article explains how to use Microsoft Surface Dock 1 Firmware Update to install and manage firmware on the original Surface Dock 1. When installed on your Surface device, it will update Surface Dock 1 devices attached to your Surface device.

ⓘ Note

This article does not apply to **Surface Dock 2**, which receives updates automatically via Windows Update or by using Microsoft Endpoint Configuration Manager or other MSI deployment tools.

This tool supersedes the earlier Microsoft Surface Dock Updater tool, previously available for download as part of Surface Tools for IT. The earlier tool was named Surface_Dock_Updater_vx.xx.xxx.x.msi (where x indicates the version number) and is no longer available for download and should not be used.

ⓘ Important

This article contains technical instructions for IT administrators. If you are a home user, please see [How to update your Surface Dock Firmware](#) on the Microsoft Support site. The instructions at the support site are the same as the general installation steps below, but this article has additional information for monitoring, verifying, and deploying the update to multiple devices on a network.

Supported devices

Surface Dock 1 Firmware Update is supported on the following devices:

- Surface Pro 3 and later
- Surface Pro X (all generations)
- Surface 3
- Surface Book (all generations)
- Surface Laptop Studio
- Surface Studio (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go (all generations)
- Surface Go (all generations)

Minimum OS requirement

- Windows 10, version 1803 or later

Install Surface Dock 1 Firmware Update

This section describes how to manually install the firmware update on Surface Dock 1.

💡 Tip

Microsoft periodically releases new versions of Surface Dock 1 Firmware Update. The MSI file is not self-updating. If you have deployed the MSI to Surface devices and a new version of the firmware is released, you will need to deploy the new version.

1. Go to [Surface Tools for IT](#) and download and install the .msi file named **Surface_Dock_FwUpdate..**, followed by the appropriate version. If you're running Surface Pro X, download the **.arm64** build. For all other devices, use the **.amd64** build.
 - The update requires a Surface device running Windows 10, version 1803 or later.
 - Installing the MSI file might prompt you to restart Surface. However, restarting is not required to perform the update.

ⓘ Note

All current software, firmware, and drivers for the Surface Dock 2 can be found [here](#)

2. Disconnect your Surface device from the Surface Dock, wait ~5 seconds, and then reconnect. The Surface Dock 1 Firmware Update will update the dock silently in background. The process can take a few minutes to complete and will continue even if interrupted.

Monitor the Surface Dock 1 Firmware Update

This section is optional and provides an overview of how to monitor installation of the firmware update.

To monitor the update:

1. Open Event Viewer, browse to **Windows Logs > Application**, and then under **Actions** in the right-hand pane click **Filter Current Log**, enter **SurfaceDockFwUpdate** next to **Event sources**, and then click **OK**.
2. Type the following command at an elevated command prompt:

Console

```
Reg query "HKLM\SOFTWARE\Microsoft\Windows  
NT\CurrentVersion\WUDF\Services\SurfaceDockFwUpdate\Parameters"
```

3. Install the update as described in the [next section](#) of this article.
4. Event 2007 with the following text indicates a successful update: **Firmware update finished. hr=0 DriverTelemetry EventCode = 2007**.

If the update is not successful, then event ID 2007 will be displayed as an **Error** event rather than **Information**. Additionally, the version reported in the Windows Registry will not be current.

5. When the update is complete, updated DWORD values will be displayed in the Windows Registry, corresponding to the current version of the tool. See the [Versions reference](#) section in this article for details. For example:

- Component10CurrentFwVersion 0x04ac3970 (78395760)
- Component20CurrentFwVersion 0x04915a70 (76634736)

Tip

If you see "The description for Event ID xxxx from source SurfaceDockFwUpdate cannot be found" in event text, this is expected and can be ignored.

Also see the following sections in this article:

- [How to verify completion of firmware update](#)
 - [Event logging](#)
 - [Troubleshooting tips](#)
 - [Versions reference](#)

Network deployment

You can use Windows Installer commands (Msiexec.exe) to deploy Surface Dock 1 Firmware Update to multiple devices across your network. When using Microsoft Endpoint Configuration Manager or other deployment tool, enter the following syntax to ensure the installation is silent:

- **Msiexec.exe /i <path to msi file> /quiet /norestart**

For example:

Console

```
msiexec /i  
"\\share\\folder\\Surface_Dock_FwUpdate_1.42.139_Win10_17134_19.084.31680_0.ms  
i" /quiet /norestart
```

ⓘ Note

A log file is not created by default. In order to create a log file, you will need to append "/lv [path]". *For example: Msiexec.exe /i <path to msi file> /lv %windir%\logs\ SurfaceDockFWI.log"*

For more information, refer to [Command line options](#) documentation.

ⓘ Important

If you want to keep your Surface Dock updated using any other method, refer to [Update your Surface Dock](#) for details.

Intune deployment

You can use Intune to distribute Surface Dock 1 Firmware Update to your devices. First you will need to convert the MSI file to the .intunewin format, as described in the following documentation: [Intune Standalone - Win32 app management](#).

Use the following command:

- **msiexec /i <path to msi file> /quiet /q**

How to verify completion of the firmware update

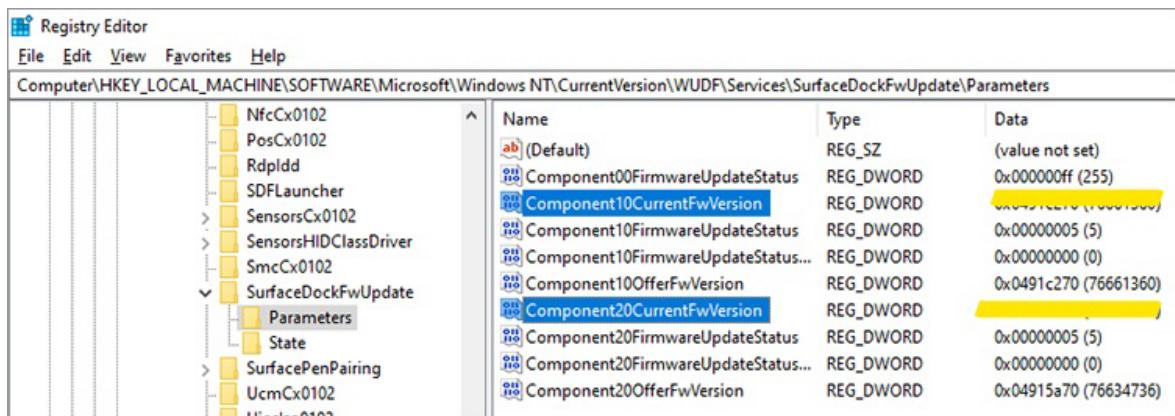
Surface dock firmware consists of two components:

- **Component10**: Micro controller unit (MCU) firmware
- **Component20**: Display port (DP) firmware.

Successful completion of Surface Dock 1 Firmware Update results in new registry key values for these firmware components.

To verify updates

1. Open Regedit and navigate to the following registry path:
 - **HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\WUDF\Services\SurfaceDockFwUpdate\Parameters**
2. Look for the registry keys: **Component10CurrentFwVersion** and **Component20CurrentFwVersion**, which refer to the firmware that is currently on the device.



3. Verify the new registry key values match the updated registry key values listed in the Versions reference at the end of this document. If the values match, the firmware was updated successfully.
4. If unable to verify, review Event logging and Troubleshooting tips in the next section.

Event logging

Table 1. Log files for Surface Dock 1 Firmware Update

Log	Location	Notes
-----	----------	-------

Log	Location	Notes
Surface Dock 1 Firmware Update log	Path needs to be specified (see note)	Earlier versions of this tool wrote events to Applications and Services Logs\Microsoft Surface Dock Updater.
Windows Device Install log	%windir%\inf\setupapi.dev.log	For more information about using Device Install Log, refer to SetupAPI Logging documentation.

Table 2. Event log IDs for Surface Dock 1 Firmware Update

Events are logged in the Application Event Log. Note: Earlier versions of this tool wrote events to Applications and Services Logs\Microsoft Surface Dock Updater.

Event ID	Event type
2001	Dock firmware update has started.
2002	Dock firmware update skipped because dock is known to be up to date.
2003	Dock firmware update failed to get firmware version.
2004	Querying the firmware version.
2005	Dock firmware failed to start update.
2006	Failed to send offer/payload pairs.
2007	Firmware update finished.
2008	BEGIN dock telemetry.
2011	END dock telemetry.

Troubleshooting tips

- Completely disconnect power for Surface dock from the AC power to reset the Surface Dock.
- Disconnect all peripherals except for the Surface Dock.
- Uninstall any current Surface Dock 1 Firmware Update and then install the latest version.
- Ensure that the Surface Dock is disconnected, and then allow enough time for the update to complete as monitored via an LED in the Ethernet port of the dock. Wait until the LED stops blinking before you unplug Surface Dock from power.

- Connect the Surface Dock to a different device to see if it is able to update the dock.

Versions reference

ⓘ Note

The installation file is released with the following naming format:

Surface_Dock_FwUpdate_X.XX.XXX_Win10_XXXXXX_XX.XXX.XXXXXX_X.MSI (ex:
Surface_Dock_FwUpdate_1.42.139_Win10_17134_19.084.31680_0.msi) and installs
by default to C:\Program Files\SurfaceUpdate.

Version 1.53.139.0

Release Date: August 4, 2020

This version of Surface Dock 1 Firmware Update includes bug fixes and support for:

- Updating Surface Dock 1 using Surface Pro X.

Registry key values

The registry values that indicate the status of firmware updates are unchanged from the previous version of this tool:

- Component10CurrentFwVersion updated to **4ac3970**.
- Component20CurrentFwVersion updated to **4a1d570**.

Version 1.42.139

Release Date: September 18 2019

This version, contained in

Surface_Dock_FwUpdate_1.42.139_Win10_17134_19.084.31680_0.MSI, updates firmware
in the background.

Updated registry key values

- Component10CurrentFwVersion updated to **4ac3970**.

- Component20CurrentFwVersion updated to 4a1d570.

It adds support for Surface Pro 7 and Surface Laptop 3.

Legacy versions

Version 2.23.139.0

Release Date: 10 October 2018

This version of Surface Dock Updater adds support for the following:

- Add support for Surface Pro 6
- Add support for Surface Laptop 2

Version 2.22.139.0

Release Date: 26 July 2018

This version of Surface Dock Updater adds support for the following:

- Increase update reliability
- Add support for Surface Go

Version 2.12.136.0

Release Date: 29 January 2018

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock Main Chipset Firmware
- Update for Surface Dock DisplayPort Firmware
- Improved display stability for external displays when used with Surface Book or Surface Book 2

Additionally, installation of this version of Surface Dock Updater on Surface Book devices includes the following:

- Update for Surface Book Base Firmware

- Added support for Surface Dock firmware updates with improvements targeted to Surface Book devices

Version 2.9.136.0

Release date: November 3, 2017

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock DisplayPort Firmware
- Resolves an issue with audio over passive display port adapters

Version 2.1.15.0

Release date: June 19, 2017

This version of Surface Dock Updater adds support for the following:

- Surface Laptop
- Surface Pro

Version 2.1.6.0

Release date: April 7, 2017

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock DisplayPort firmware
- Requires Windows 10

Version 2.0.22.0

Release date: October 21, 2016

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock USB firmware
- Improved reliability of Ethernet, audio, and USB ports

Version 1.0.8.0

Release date: April 26, 2016

This version of Surface Dock Updater adds support for the following:

- Update for Surface Dock Main Chipset firmware
- Update for Surface Dock DisplayPort firmware

Wake On LAN for Surface devices

Article • 04/19/2023 • Applies to: Windows 10, Windows 11

Surface devices are capable of Wake On LAN (WOL) from Modern Standby (also known as Connected Standby). With WOL, IT admins can remotely wake up devices and automatically perform management tasks with Microsoft Intune admin center or third party solutions.

ⓘ Note

To support WOL, Surface devices must be plugged into AC power and use a Surface Ethernet adapter or docking device that is connected to a wired network.

Supported devices

Ethernet adapters with support for WOL:

- Surface Thunderbolt™ 4 Dock
- Surface Dock 2
- Surface Dock
- Microsoft USB-C Travel Hub
- Surface Ethernet adapter
- Surface USB-C to Ethernet and USB 3.0 Adapter
- Surface USB 3.0 Gigabit Ethernet Adapter
- Surface Docking Station for Surface Pro 3
- Docking Station for Surface 3
- Docking Station for Surface Pro 3

Surface devices with support for WOL:

- Surface 3
- Surface Pro 3
- Surface Pro 4
- Surface Pro (fifth gen)
- Surface Pro (fifth gen) with LTE Advanced
- Surface Pro 6
- Surface Pro 7
- Surface Pro 7+
- Surface Pro X
- Surface Pro 8

- Surface Pro 9
- Surface Pro 9 with 5G
- Surface Book (all generations)
- Surface Go (all generations)
- Surface Laptop (all generations)
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Laptop SE
- Surface Laptop Studio
- Surface Studio 2 (see Surface Studio 2 instructions below)
- Surface Studio 2+

Using WOL

When not in use, Surface devices enter an idle, low-powered state known as Modern Standby or Connected Standby. IT admins can remotely trigger devices using a wake request (magic packet) that contains the Media Access Control (MAC) address of the target Surface device. The destination network interface card (NIC) compares the MAC address with its own before waking up the device. If the MAC address in the magic packet wake request doesn't match the MAC address on the destination NIC, the NIC won't wake up the device. To learn more, review [Wake sources documentation](#).

Modern Standby

Modern Standby starts when the user causes the system to enter sleep, or the device goes to sleep based on the Windows power settings the user has set. For example, the user presses the power button, closes the lid, or selects Sleep from the power button in the Windows Start menu. WOL works by default for Surface devices in Modern Standby mode running Windows 10 version 1607 or later. No other IT configuration is required, except for Surface Studio 2.

Surface Studio 2 instructions

To enable WOL on Surface Studio 2, you must use the following procedure:

1. Open Registry Editor ([Start > Search > regedit.exe](#)) and create the following registry keys:

Console

```
; Set CONNECTIVITYINSTANDBY to 1:  
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Power\PowerSetting  
s\F15576E8-98B7-4186-B944-EAFA664402D9]  
"Attributes"=dword:00000001  
; Set EnforceDisconnectedStandby to 0:  
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Power]  
"EnforceDisconnectedStandby"=dword:00000000
```

2. Run the following command

```
powercfg /SETACVALUEINDEX SCHEME_BALANCED SUB_NONE CONNECTIVITYINSTANDBY 1
```

Note

If you upgrade the version of Windows 10 on your Surface Studio 2 (for example, you upgrade from Windows 10 20H2 to 21H1), you will need to follow these instructions again to enable WOL.

To wake from hibernation (S4) or shutdown (S5)

For devices connected to Surface Dock 2, see [Wake on LAN for Surface Dock 2](#)

Learn more

- [Wake on LAN for Surface Thunderbolt 4 Dock](#)
- [Wake On LAN for Surface Dock 2](#)
- [System Power States](#)

Wake On LAN with Surface Thunderbolt™ 4 Dock

Article • 04/07/2023 • Applies to: Windows 10, Windows 11

To keep devices fully up to date, IT admins need to be able to manage devices when they're not in use, typically during nightly maintenance windows. Surface Thunderbolt™ 4 Dock supports Wake on LAN (WOL) enabling admins to remotely wake up Surface devices.

Requirements

- Devices must have a wired connection with Surface Thunderbolt™ 4 Dock and stay connected to AC Power.
- Ensure host devices have installed the latest firmware and drivers, available via Windows Update or the Surface App. For WOL to function, host devices must have a Thunderbolt Ethernet driver.

Tip

You can manually download the appropriate drivers from the [Surface Thunderbolt™ 4 Dock Firmware and Drivers page](#). Choose Arm64 for Surface Pro 9 with 5G, Surface Pro X, or compatible Windows on ARM devices. Choose x64 for all other devices.

Wake up from Modern Standby

Modern Standby starts when the user causes the system to enter sleep, or the device goes to sleep based on the Windows power settings the user has set. For example, the user presses the power button, closes the lid, or selects Sleep from the power button in the Windows Start menu. WOL works by default for Surface devices in Modern Standby mode.

Supported Surface devices

- Surface Laptop 5
- Surface Laptop 4 (Intel processors)
- Surface Laptop 4 (AMD processors)

- Surface Laptop 3 (Intel processors)
- Surface Pro 9 (Intel processors)
- Surface Pro 9 with 5G
- Surface Studio 2+
- Surface Pro 8
- Surface Pro 7+
- Surface Pro 7
- Surface Pro X
- Surface Go (all generations)
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Book 3
- Surface Laptop Studio

Learn more

- [Wake On LAN for Surface devices](#)
- [System Power States](#)

Wake On LAN with Surface Dock 2

Article • 03/16/2023 • Applies to: Windows 10, Windows 11

To keep devices fully up to date, IT admins need to be able to manage devices when they're not in use, typically during nightly maintenance windows. Surface Dock 2 provides the best support for Wake on LAN (WOL) enabling admins to remotely wake up Surface devices and automatically perform management tasks with Microsoft Endpoint Manager or other third party solutions.

Requirements

Devices must have a wired connection with Surface Dock 2 and stay connected to AC Power.



! Note

Waking devices connected to Surface Dock 2 does not require using Surface Enterprise Management Mode (SEMM) or enabling any UEFI policy settings.

Supported Surface devices

- Surface Laptop 5
- Surface Laptop 4 (Intel processors)
- Surface Laptop 4 (AMD processors)
- Surface Laptop 3 (Intel processors)
- Surface Pro 9
- Surface Pro 9 with 5G
- Surface Pro 8
- Surface Pro 7+
- Surface Pro 7

- Surface Pro X
- Surface Go (all generations)
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Book 3
- Surface Laptop Studio
- Surface Studio 2+

Surface Dock 2 provides WOL support for devices in the following power states:

- Connected standby
- Hibernation (S4 power state)
- Shutdown (S5 “soft off” power state)

To learn more about power states, see [System Power States](#).

How it works

When not in use, Surface devices enter an idle, low powered state known as Modern Standby or Connected Standby. Or devices may be in hibernation (S4) or shutdown (S5) power state based on the power settings configured on the device. IT admins can remotely trigger devices using a wake request (magic packet) that contains the Media Access Control (MAC) address of the target Surface device. Many management solutions, such as Microsoft Endpoint Configuration Manager and third-party Microsoft Store apps provide built-in support for WOL.

To enable WOL on devices without Surface Dock 2, see:

- [Wake on LAN for Surface devices](#)

Learn more

- [Surface Dock 2 ↗](#)
- [Wake On LAN for Surface devices](#)
- [System Power States](#)

Wake on Power for Surface devices

Article • 03/16/2023 • Applies to: Windows 10, Windows 11

Surface devices can be powered off while you're away from your desk, or set to hibernate mode to save battery life. To improve the manageability of these devices, Wake on Power enables compatible Surface devices to automatically start when they're reconnected to power. To configure Wake on Power, you can use Surface Enterprise Management Mode (SEMM) either through Surface UEFI Configurator or the UEFI Manager.

The Wake on Power feature is available on the following devices:

- Surface Pro 9 (commercial SKUs only)
- Surface Pro 9 with 5G
- Surface Pro 8 (commercial SKUs only)
- Surface Pro 7+ (commercial SKUs only)
- Surface Pro X (all SKUs)
- Surface Pro 7 (all SKUs)
- Surface Go 3 (commercial SKUs only)
- Surface Laptop Studio (commercial SKUs only)
- Surface Book 3 (all SKUs)
- Surface Laptop 5 (commercial SKUs only)
- Surface Laptop 4 (commercial SKUs only)
- Surface Laptop 3 (all SKUs)
- Surface Laptop Go (all SKUs)
- Surface Laptop Go (commercial SKUs only)
- Surface Studio 2+

Tip

Commercial SKUs (aka Surface for Business) run Windows 10 Pro/Enterprise or Windows 11 Pro/Enterprise; consumer SKUs run Windows 10/Windows 11 Home. To learn more, see [View your system info ↗](#).

Overview and prerequisites

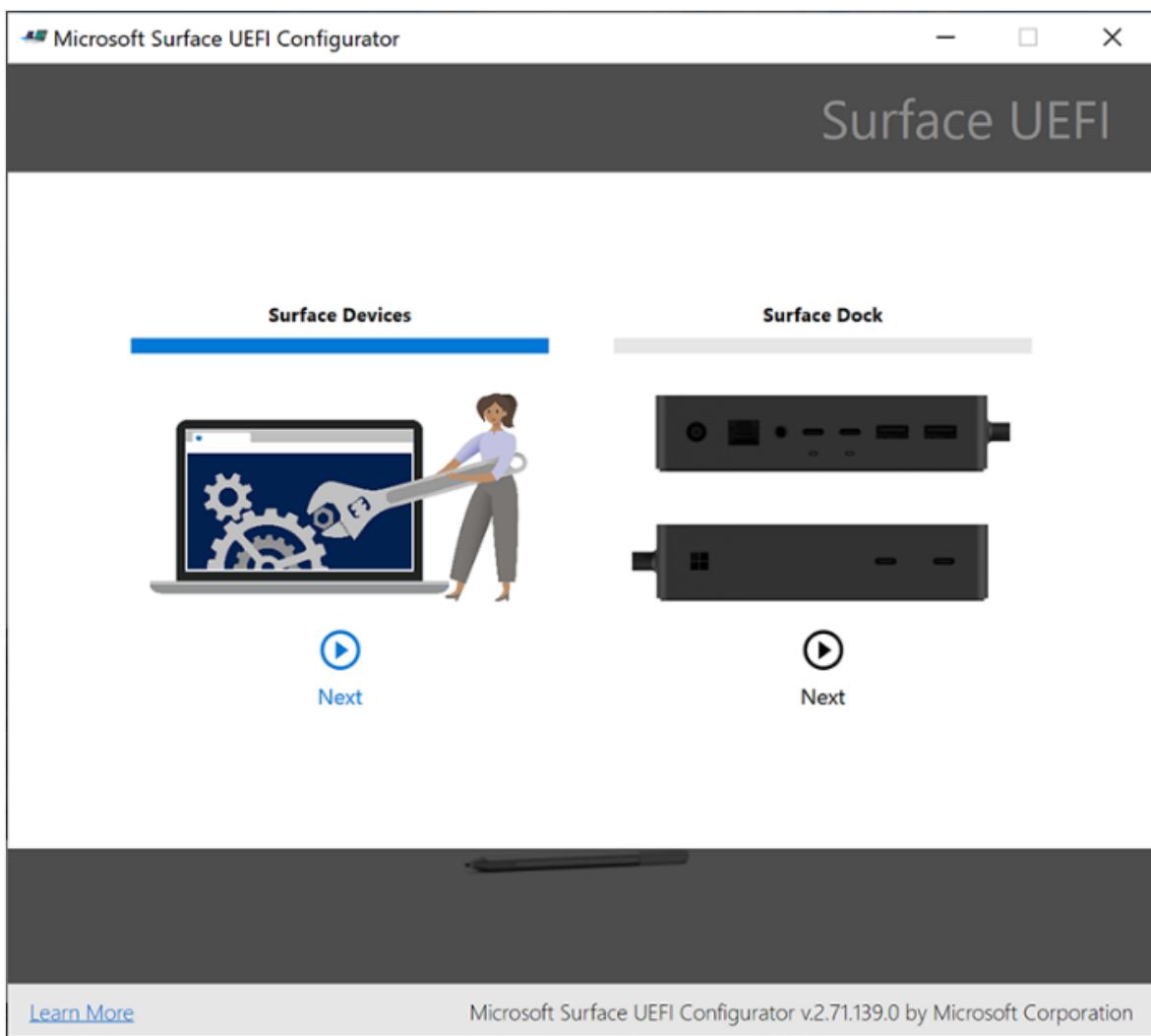
Surface UEFI Configurator lets you save individual UEFI settings in a Windows Installer .msi package for distribution to target devices.

 **Note**

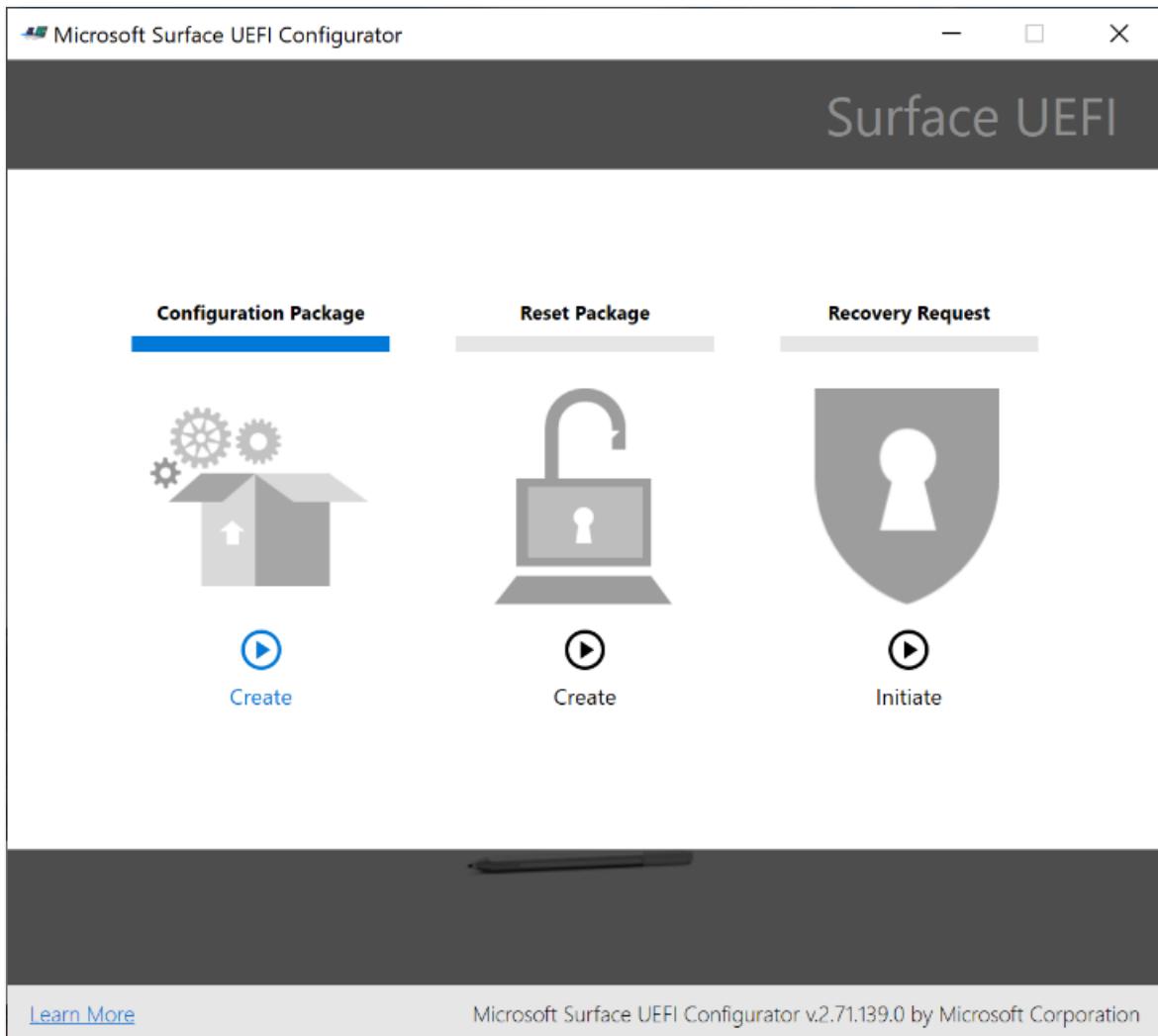
This article assumes that you know how to use SEMM. For more information, see [Surface Enterprise Management Mode \(SEMM\) documentation](#).

To enable Wake on Power

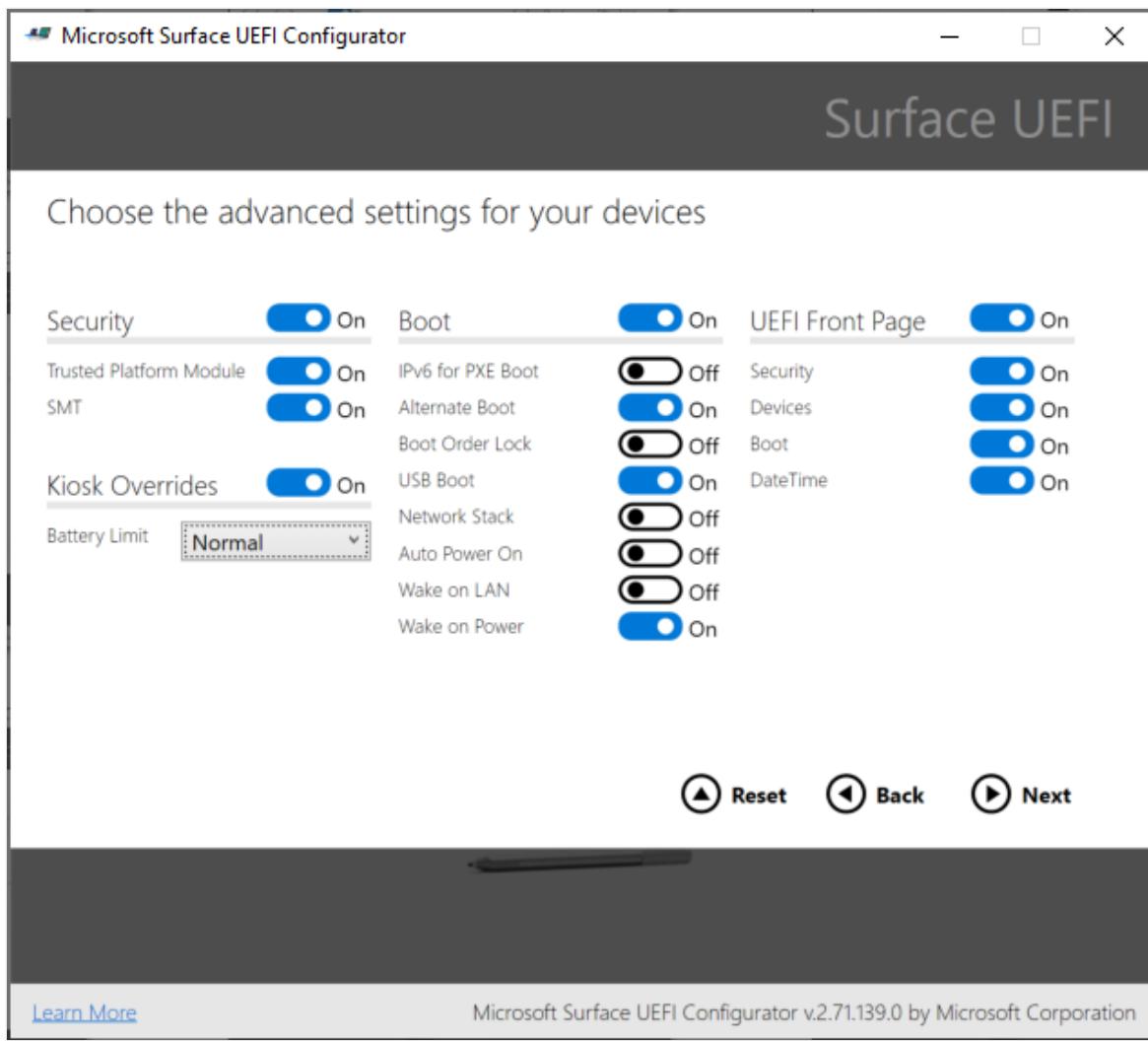
1. Download the latest version of [Surface UEFI Configurator](#).
2. Sign in to your Surface device as an administrator, open **Surface UEFI Configurator**, select **Surface Devices**, and then select **Next**.



3. Select **Start**, and then select **Create** under **Configuration Package**.



4. Select **Certificate Protection**, and add your certificate .pfx file.
5. Enter your password, select **Next**, add **Password Protection**, as appropriate, and then select **Next**.
6. On the **Choose which Surface type you want to target** page, select your target devices as appropriate. For example, select **Surface Pro 7**.
7. On the **Advanced Features** page, select **Wake on Power**, set the feature to **On**, and then select **Next**.



8. On the **Successful** page, select End.

① Note

If this is the first time that you are providing settings to your device, you will be prompted to also provide the last two characters of the certificate thumbprint.

9. Save the .msi package.

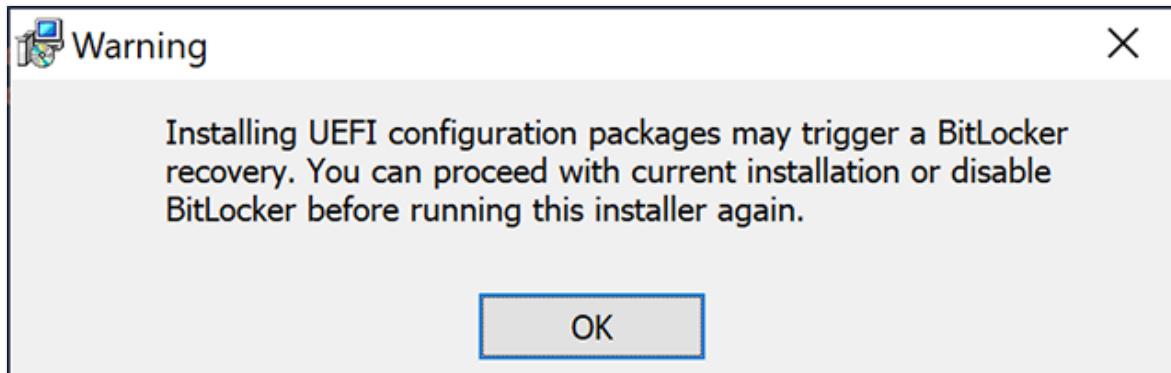
Apply the MSI package

You can apply the MSI package to devices across your network by using software distribution tools such as Microsoft Endpoint Configuration Manager. This procedure includes steps to install the package on your local computer.

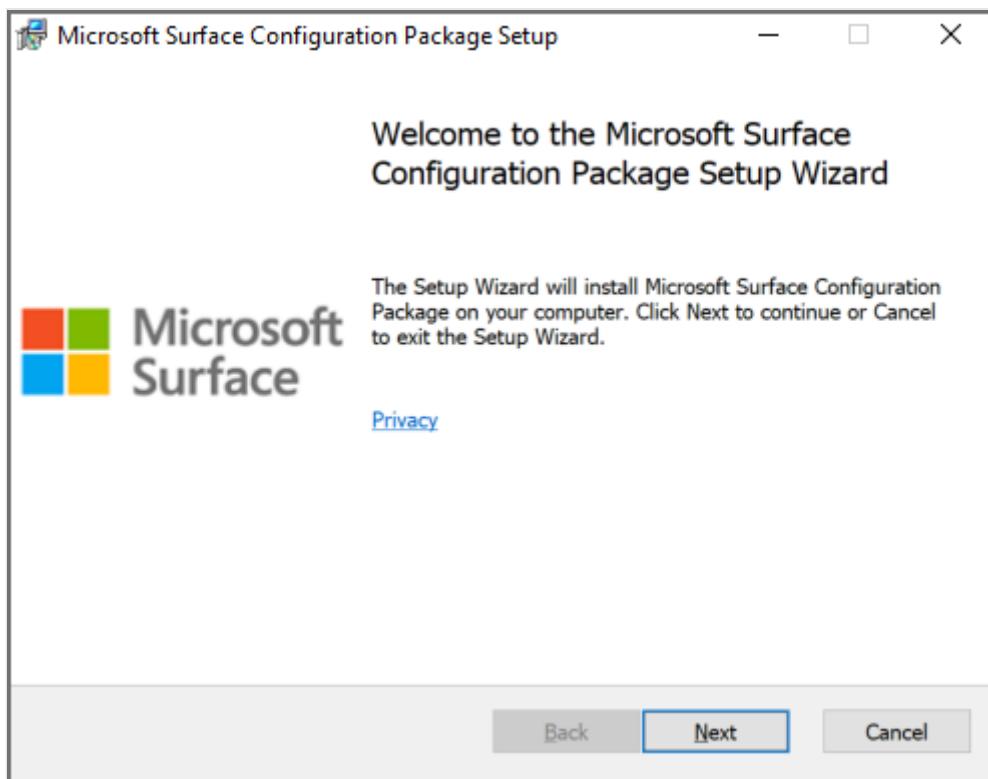
1. At an elevated command prompt, enter the full path of the .msi file to run the .msi package.

C:\SEMM\wake-on-power.msi

2. In the Warning dialog box, select OK or disable BitLocker, as appropriate.



3. On the Welcome page, select Next to run the package and apply the newly configured UEFI setting.



4. Restart your device.

Wake on Power is now configured. To test the settings, turn off your device, disconnect the power, and then reconnect the power. The device should start automatically.

References

For more information, see the following articles.

- Surface Enterprise Management Mode
- Wake on LAN for Surface devices

Still need help? Go to [Microsoft Community](#).

Tested peripherals for new Surface devices

Article • 04/04/2023 • Applies to: Windows 10, Windows 11

Surface engineering has tested various external monitors, docks, cables, and adapters to bring you the best experience on select new Surface devices, starting with Surface Pro 9. See the tables below for tested peripherals across port connections including Surface Connect, USB-C, Display Port, HDMI, and Thunderbolt.

ⓘ Note

The testing results shown here cover popular in-market peripherals but are not intended to be comprehensive. Based on our research, we estimate that customers will have a generally positive experience with these peripherals. Still, many peripherals not shown here may function as expected.

💡 Tip

For the best experience, be sure to get the latest updates. To manage your options and see available updates, select **Start > Settings > Windows Update**.

Surface Pro 9 & Surface Pro 9 with 5G

Tested monitors for Surface Pro 9

USB-C	Display Port	Thunderbolt	HDMI
- ASUS PA247CV	- ASUS PA27A	- ASUS PA27A	- Viewsonic VA2447-MH
- ASUS PA278CV	- ASUS VG279QM	- BenQ PD3220U	
- Dell C2422HE	- Dell U3421WE		
- Dell P2720DC	- HP X24iH		
- Dell P2721Q	- LG 27UL850-W		
- Dell U2720Q	- LG 34GN850-B		
- Dell U3421WE			
- LG 27UL850-W			

Tested monitors for Surface Pro 9 with 5G

USB-C	Display Port	HDMI
- ASUS PA247CV	- ASUS PA247CV	- HP X24iH
- ASUS PA247CV	- ASUS PA27A	- Viewsonic VA2447-MH
- Dell C2422HE	- ASUS VG279QM	
- Dell P2720DC	- BenQ PD3220U	
- Dell P2721Q	- Dell C2422HE	
- Dell U2720Q	- Dell P2720DC	
- Dell U3421WE	- Dell P2721Q	
- LG 27UL850-W	- Dell U2720Q	
	- Dell U3421WE	
	- HP X24iH	
	- LG 27UL850-W	

Tested docks for Surface Pro 9

Surface Connect	USB-C	Thunderbolt
- Surface Dock 1	- Dell WD19DC - Pluggable ULT-CDL	- Surface Thunderbolt 4 Dock - Cal Digit TS3 Thunderbolt Station 3 - Dell WD19TB - Kensington SD5700T Thunderbolt 4 Dock - Lenovo ThinkPad Thunderbolt 3 Dock Gen 2 - Model# DK1841
- Surface Dock 2		

Tested docks for Surface Pro 9 with 5G

Surface Connect	USB-C
- Surface Dock 1	- Surface Thunderbolt 4 Dock
- Surface Dock 2	- Dell WD19DC - Pluggable ULT-CDL

Tested cables for Surface Pro 9

USB-C to USB-C	Thunderbolt to Thunderbolt	Display Port	USB-C to Display Port	HDMI to HDMI

USB-C to USB-C	Thunderbolt to Thunderbolt	Display Port	USB-C to Display Port	HDMI to HDMI
- j5Create USB-C Cable	- Cable Matters 107032-BLK-0.8m - SIIG CB-TB0011-S1	- CableMatters Display Port Cable - Club3D Display Port Cable - Monoprice Display Port Cable	- Designed for Surface: Moshi USB-C to Display Port Cable (99MO084102)	- BlueRigger HDMI Cable

Tested cables for Surface Pro 9 with 5G

USB-C to USB-C	Display Port to Display Port	USB-C to Display Port	HDMI to HDMI
- j5Create USB-C Cable	- CableMatters Display Port Cable - Club3D Display Port Cable - Monoprice Display Port Cable	- Designed for Surface: Moshi USB-C to Display Port Cable (99MO084102)	- BlueRigger HDMI Cable

Tested adapters for Surface Pro 9 & Surface Pro 9 with 5G

USB-C to Display Port	USB-C to HDMI
- Microsoft USB-C to Display Port Adapter - CableMatters USB-C to Display Port Adapter (201086) - Club-3D USB-C to Display Port Adapter (CAC-1507)	- Microsoft USB-C to HDMI Adapter (1857)

Surface Thunderbolt 4 Dock

Surface Thunderbolt 4 Dock has been tested extensively with popular in-market peripherals to bring you the best docking experience. For host device compatibility with Surface Thunderbolt 4 Dock, refer to [What's new in Surface Thunderbolt 4 Dock](#).

Tested monitors for Surface Thunderbolt 4 Dock

 **Note**

We designed Surface Thunderbolt 4 Dock as the optimal dock for Surface devices with USB4®/Thunderbolt™ 4 support. The Thunderbolt 4 connection on a host device supports two 4K external displays at up to 60 Hz (when supported by display).

For devices without USB4/Thunderbolt 4 support, the USB-C connection supports one 4K external display at up to 60 Hz (when supported by display). For more details on which Surface devices have USB4/Thunderbolt 4 support, refer to [What's new in Surface Thunderbolt 4 Dock](#).

Thunderbolt	USB-C	Display Port	HDMI

Thunderbolt	USB-C	Display Port	HDMI
- AOC-U27N3C	- Acer-H277HU	- ACER-XB323QK	- ACER-XB323QK
- Apple-Pro Display XDR 32'	- Acer-XB323QK	- AOC-U27U2D	- AOC-U27U2D
- BenQ-PD3220U	- AOC-U27U2D	- ASUS-MX27U	- ASUS-MX27U
- BenQ-PD2725U	- ASUS-MX27U	- BENQ-PD2725U	- BENQ-PD2725U
- DELL-U4021QW	- DELL-S2718D	- BENQ-PD3220U	- BENQ-PD3220U
- Dell-UP3221Q	- Dell-U2720QM	- DELL-P2415Qb	- DELL-P2415Qb
- LG-32UL950W	- Dell-U2723QE	- DELL-P2715Q	- DELL-P2715Q
- LG-34WK95UW	- Dell-U3223QE	- DELL-S2718D	- DELL-S2716DG
- LG-34WK95U	- Dell-UP2720Q	- DELL-U2414H	- DELL-SE2717H/HK
- LG-27MD5KL	- HP-U28 HDR	- DELL-U2719Dt	- DELL-U2414H
- LG -UltraFine 24MD4KL	- HP-Z27k G3	- DELL-U2720QM	- DELL-U2719Dt
- SAMSUNG-F32TU870VC	- HP-Z32 UHD	- DELL-U2723QE	- DELL-U2723QE
	X1A	- HP-U27	- DELL-UP3221Q
	- Lenovo-ThinkVision-	- HP-U28	- HP-U27
	P44w 10	- HP-Z27k G3	- HP-U28
	- LG-27UL850	- HP-Z32 UHD	- HP-Z27k G3
	- LG-27UP850	- LENOVO-P27h20	- HP-Z32 UHD
	- LG-38WK95C	- LENOVO-ThinkVision	- LENOVO-P27h
	- LG-43UN700	P32u 10	- LENOVO-ThinkVision
	- PHILIPS-PHL 499P9H1193	- LG-27NP850	P32u 10
		- LG-27UL850	- LG-27NP850
		- LG-32UL950-W2	- LG-27UL850
		- PHILIPS-241P6V	- LG-32UL950W
		- PHILIPS-288P6L	- LG-34WK95U
	- SAMSUNG-F32TU870VC	- SAMSUNG-PHL 241P6V	- PHILIPS-PHL 241P6V
	- SAMSUNG-U28E590D	- PHILIPS-PHL 288P6L	- PHILIPS-PHL 288P6L
	- SAMSUNG-U28H750UQC	- SAMSUNG-F32TU870VC	- SAMSUNG-F32TU870VC
	- SAMSUNG-U32J590UQC	- SAMSUNG-U28E590D	- SAMSUNG-U28E590D
	- SAMSUNG-U32R590CWC	- SAMSUNG-U28H750UQC	- SAMSUNG-U28H750UQC
	- VIEWSONIC-VP2780	- SAMSUNG-U32R590CWC	- SAMSUNG-U32R590CWC
		- SHARP-60MY5100A	- SHARP-60MY5100A
		Smart TV	Smart TV
		- SHARP-TV	- SHARP-TV
		- VIEWSONIC-VP2780	- VIEWSONIC-VP2780

Tested adapters for Surface Thunderbolt 4 Dock

USB-C to Display Port	USB-C to HDMI	USB-C to USB-A	USB-C to Micro-B USB
<ul style="list-style-type: none"> - MSFT USB-C to DP Adapter - MSFT USB-C Travel Hub - Moshi USB-C to HDMI Adapter 	<ul style="list-style-type: none"> - MSFT USB-C to HDMI Adapter - MSFT USB-C to HDMI Adapter 	<ul style="list-style-type: none"> - Designed for Surface: : Cable Matters USB-C to USB-A 3.2Gen 1 Adapter 	<ul style="list-style-type: none"> - Designed for Surface: : Cable Matters USB-C to Micro USB 3.1 Gen 2 Cable - 0.3m

Tested cables for Surface Thunderbolt 4 Dock

Thunderbolt4/USB4	USB-C to USB-C	USB-C to DP	USB-C to HDMI
<ul style="list-style-type: none"> - Designed for Surface: Cable Matters USB4 40Gbps Cable 1m - Designed for Surface: Cable Matters USB4 Gen 2 20Gbps Cable - Zikko Thunderbolt 4 Cable (2m) - Zikko Thunderbolt 4 Cable (0.8m) - UGREEN Thunderbolt 4 Cable (2m) - UGREEN Thunderbolt 4 Cable (0.8m) - ULT-unite Thunderbolt 4 Cable (1m) - ULT-unite Thunderbolt 4 Cable (0.8m) - WERO USB4 Cable (1m) - WERO Thunderbolt 4 Cable (1m) 	<ul style="list-style-type: none"> - Belkin Thunderbolt 3 Cable 2m 	<ul style="list-style-type: none"> - Moshi USB-C to DP Cable (99MO084102) - SUGREEN USB-C to DP Cable 	<ul style="list-style-type: none"> - Designed for Surface: : Cable Matters USB-C to HDMI 2.1 Cable - 1.8m - UGREEN USB-C to HDMI Cable

NFC support in Surface Go for Business

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface Go for Business devices are equipped with support for near field communication (NFC), allowing users to take advantage of several common scenarios with the exception of NFC card payments. Applicable scenarios include:

- **Passwordless authentication.** Azure AD supports FIDO2 security keys as an authentication method for signing into operating systems, applications, and services. To learn more, see the following blog post: [More NFC card reading accessories released for Surface Go ↗](#).
- **Proximity-based apps.** Applications that take advantage of proximity and location by using the RFID capability in Surface Go and a proximity sensor in Windows 10 and Windows 11.
- **Consumer apps.** RFID-enabled apps capable of directing consumers to target websites. For example, users can swipe an RFID-enabled prescription container that opens relevant product information.



NFC sensor location on Surface Go for Business

NFC FAQ: Surface Go for Business

Is NFC available on all Surface Go devices?

- NFC is only available on commercial versions of Surface Go: Surface Go for Business, Surface Go 2 for Business, and Surface Go 3 for Business devices.

Does NFC support digital wallet or point of sale payments?

- No. The NFC component doesn't include a secured element, and the interface isn't HID but a simple I2C.

Can NFC be disabled through UEFI or DFCI?

- Yes. Surface Go 3 supports management of NFC via [Surface Enterprise Management Mode \(SEMM\)](#).

Is multifactor authentication on Surface Go for Business compliant with FIDO 2.0 standards?

- Yes, when combined with compliant authentication solutions and servers, such as using AuthenTrend Key Card, Windows Hello and Azure AD.

Can I access and use NFC from the front of the device?

- Yes, but only if the card has an independent power source like AuthenTrend. Passive cards can only be read from the back of the device--at close proximity of approximately 10 mm.

How can I troubleshoot multiple failed read attempts?

- Recall the location of the effective read area on the device.
- Remove any other NFC tags or NFC-enabled cards in the vicinity. Limited NFC support is available for ISO/IEC 14443-A tag types 1 and 2 with antenna diameters between 15 mm to 17 mm.
- We recommend using the Mifare Classic 1 K card type.
- Try keeping your badge in a nylon sleeve rather than a hard plastic case.

Can I use NFC while the device is in a protective case?

- Our Designed for Surface partners have created protective cases with a built-in NFC range extender designed for a variety of industries. These solutions include:
 - [aXtion Pro MPA/NFC](#)
 - [aXtion Extreme MP NFC](#)
 - [aXtion Extreme MP NFC \(ATEX Zone 2\)](#)

Learn more

- [More NFC card reading accessories released for Surface Go](#).
- [Surface Go 3: Lightweight Business Laptop - Microsoft Surface for Business](#)
- [Find and connect with a Surface reseller in your market](#)

- [Springcard](#) ↗ tool for troubleshooting

Optimize video conferencing on Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface devices take advantage of the latest advances in mobile device energy consumption to deliver a streamlined experience optimized across workloads. For most workloads, this provides a great experience. For some workloads using Microsoft Teams or other video conferencing applications, you should follow these recommendations to ensure the best experience.

Surface drivers and firmware

Microsoft regularly releases updates for Surface devices and has released several Surface updates that target video conferencing workloads, including:

- System performance improvements
- Power consumption improvements in camera drivers
- Graphics driver updates
- Power settings optimizations

Get updates to all devices

Ensure your organization has a process for your devices to receive these updates. If you are using Windows Update or [Windows Update for Business](#), you are already receiving the latest Surface updates when they are released. Check for updates using Windows Update and verify the newest Surface updates have been installed. To learn more, see:

- [Surface update history](#)
- [Install Surface and Windows updates](#)

If you are using other options to install Surface drivers and firmware updates, you will need to install the latest Surface updates manually using the published MSI files or install the updates using Configuration Manager. To learn more, see:

- [Download drivers and firmware for Surface](#)
- [Manage and deploy Surface driver and firmware updates](#)
- [How to manage Surface driver updates in Configuration Manager](#)

Graphics driver updates for Microsoft Teams

Newer Surface device models with 10th and 11th generation Intel processors have received graphics driver updates that help with video conferencing workloads. To enable these improvements, make sure you install the following:

- Microsoft Teams version **1.4.00.22472** or later.
- Intel graphics driver **27.20.100.9621** or later.

Power settings optimizations

Surface devices can adjust performance-related power settings by changing the Windows performance power slider position in Windows 10, also known as power mode in Windows 11.

Some Surface devices have received updates that include power setting optimizations for video conferencing workloads based on the power slider position or power mode. However, because Windows 10 and Windows 11 use the **Recommended** power slider position and power mode position for video conferencing workloads, you will need to adjust the power slider to enable these optimizations:

1. Connect to AC power (optimizations won't run when using battery power).
2. Adjust the power slider or power mode position to use **Better Performance** or **Best Performance**.

Learn more

- [Best practice power settings for Surface devices](#)
- [Maximize your Surface battery life ↗](#)

Optimize Wi-Fi connectivity on Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

To stay connected with all-day battery life, Surface devices implement wireless connectivity settings that balance performance and power conservation. Outside of the most demanding mobility workloads, users can maintain sufficient wireless connectivity without modifying default network adapter or related settings. This page highlights key wireless connectivity considerations in mobile scenarios using Surface devices.

Prerequisites

This document assumes you have successfully deployed a wireless network that supports 802.11n (Wi-Fi 4) or later following best practice recommendations from leading equipment vendors.

Configuring access points for optimal roaming capabilities

Suppose you're managing a wireless network that's typically accessed by many different types of client devices. In that case, it's recommended to enable specific protocols on access points (APs) in your WLAN, as described in [Fast Roaming with 802.11k, 802.11v, and 802.11r](#). Surface devices can take advantage of the following wireless protocols:

- **802.11r. "Fast BSS Transition"** accelerates connecting to new wireless access points by reducing the number of frames required before your device can access another AP as you move around with your device. In the new generation of Surface devices released since 2019, end-users may gain access to roaming aggressiveness settings on their device. Although modifying default settings is not recommended, users should be aware of this capability and understand how specific settings can impact their ability to remain connected.
- **802.11k. "Neighbor Reports"** provides devices with information on current conditions at neighboring access points. It can help your Surface device choose the best AP using criteria other than signal strength, such as AP utilization.

Specific Surface devices can also use 802.11v "BSS Transition Management Frames," which functions much like 802.11k in providing information on nearby candidate APs.

These include Surface Pro 8, Surface Pro 7+, Surface Laptop Studio, Surface Go 3, Surface Go 2, Surface Go, Surface Pro 7, Surface Pro X, and Surface Laptop 3.

Managing user settings

You can achieve optimal roaming capabilities through a well-designed network that supports 802.11r and 802.11k across all access points. Ensuring that your network is appropriately configured to provide users with the best wireless experience is the recommended approach versus managing user settings on individual devices.

Recommended user settings and best practices

In certain situations, modifying advanced network adapter settings built into Surface devices may facilitate a more reliable connection. However, keep in mind that an inability to connect to wireless resources is more often due to an access point issue, networking design flaw, or environmental site issue.

Tip

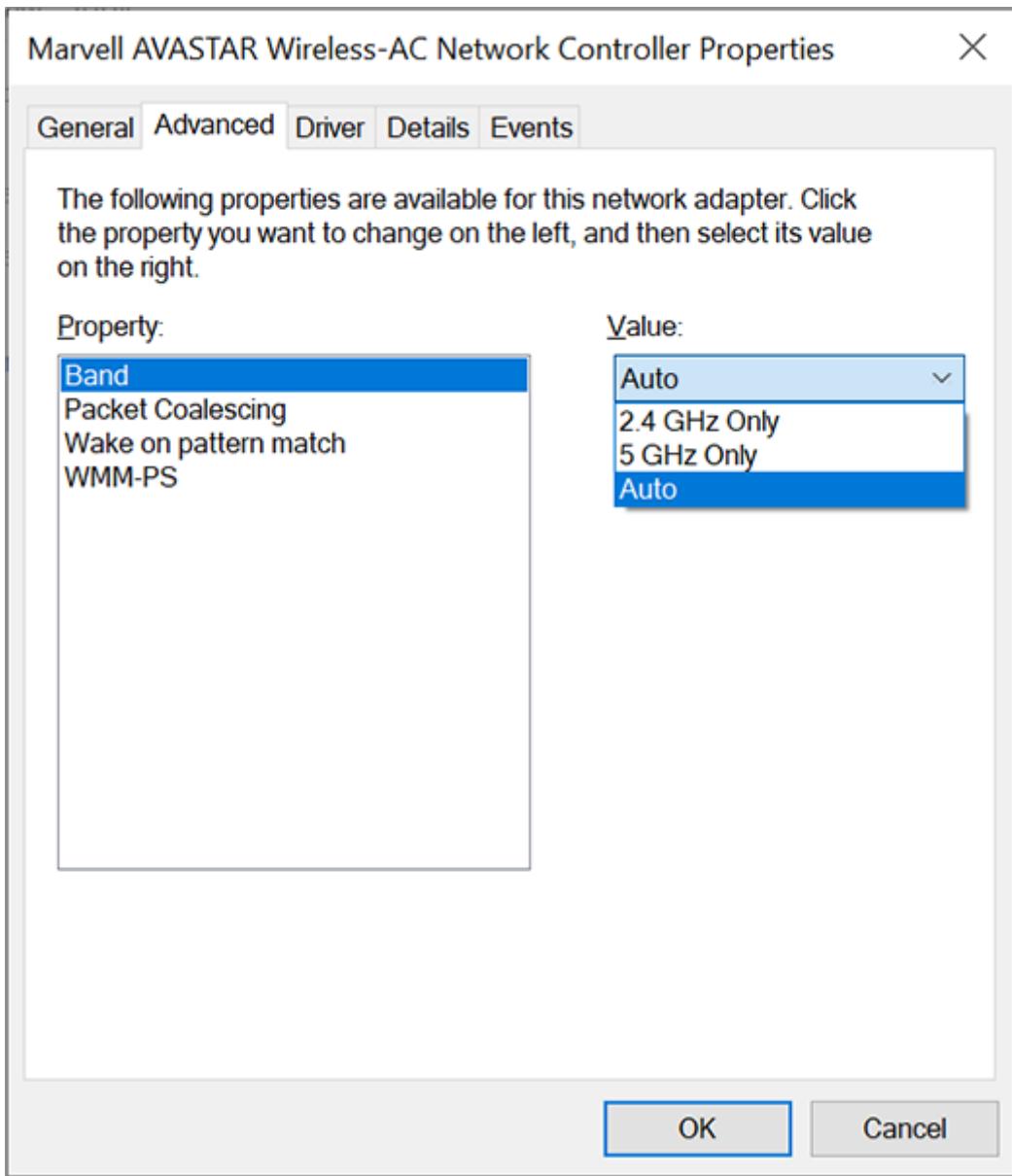
How you hold your Surface Pro or Surface Go can also affect signal strength. If you're experiencing a loss of bandwidth, check that you're not holding the top of the display, where the Wi-Fi radio receiver is located. Although holding the top of the display does not block wireless signals, it can trigger the device driver to initiate changes that reduce connectivity.

Keep default Auto setting for dual bandwidth capability

On most Surface devices, you can configure client network adapter settings to only connect to wireless APs over 5 gigahertz (GHz), only connect over 2.4 GHz, or let the operating system choose the best option (default Auto setting).

To access network adapter settings, go to:

- Start > Control panel > Network and Sharing Center > your Wi-Fi adapter > Properties > Configure > Advanced.



Keep in mind that 2.4 GHz has some advantages over 5 GHz: It extends further and more easily penetrates through walls or other solid objects. Unless you have a clear use case that warrants connecting to 5 GHz, leaving the Band setting in the default state is recommended to avoid possible adverse consequences. For example:

- Many hotspots found in hotels, coffee shops, and airports still only use 2.4 GHz, effectively blocking access to devices if Band is set to 5 GHz Only.
- Since Miracast wireless display connections require the initial handshake to be completed over 2.4 GHz channels, devices won't be able to connect at 5 GHz Only.

ⓘ Note

By default, Surface devices will prefer connecting to 5 GHz if available. However, Surface will first look for a 2.4 GHz connection to preserve power in a low battery state.

You can also toggle the band setting as needed to suit your environment. For example, users living in high-density apartment buildings with multiple Wi-Fi hotspots — amid the presence of consumer devices all broadcasting via 2.4 GHz — will likely benefit by setting their Surface device to connect on 5 GHz only and then revert to Auto when needed.

Roaming aggressiveness settings on Surface devices with Intel adapters

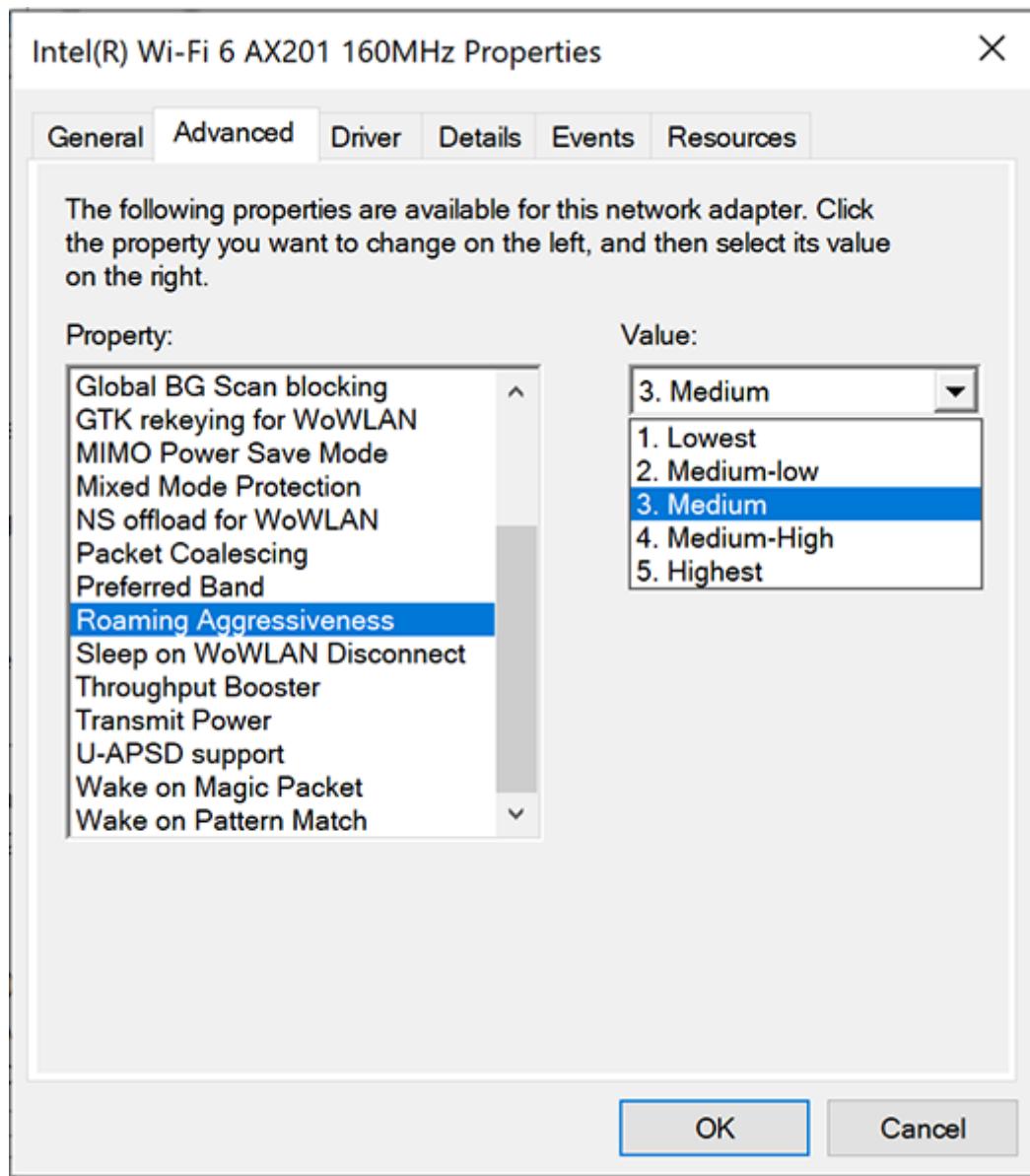
Users may wish to select a signal strength threshold that prompts the device to search for a new access point when the signal drops (roaming aggressiveness). By default, Surface devices with Intel adapters attempt to roam to a new access point if the signal strength drops below **Medium** (72 percent signal strength). Organizations can also implement purpose-built wireless protocols across multiple network access points to facilitate roaming congested network environments, as explained earlier on this page.

While increasing roaming aggressiveness above **Medium** may yield improved connectivity in highly congested office or residential environments, it can result in degraded connectivity when stepping outside of these environments.

Leave the roaming aggressiveness setting in the default state unless you encounter connectivity issues in specific mobile scenarios such as conducting environmental site inspections while maintaining voice and video connectivity during a conference meeting. If you don't notice any improvement, revert to the default Medium state. Note that if you increase roaming aggressiveness, you also accelerate battery power consumption.

To enable roaming aggressiveness on Surface:

1. Go to Start > Device Manager.
2. Under **Network adapters**, select **Intel Wi-Fi 6** and then right-click **Properties**.
3. Select the **Advanced** tab.
4. Select **Roaming Aggressiveness** and choose your preferred value from the drop-down menu.



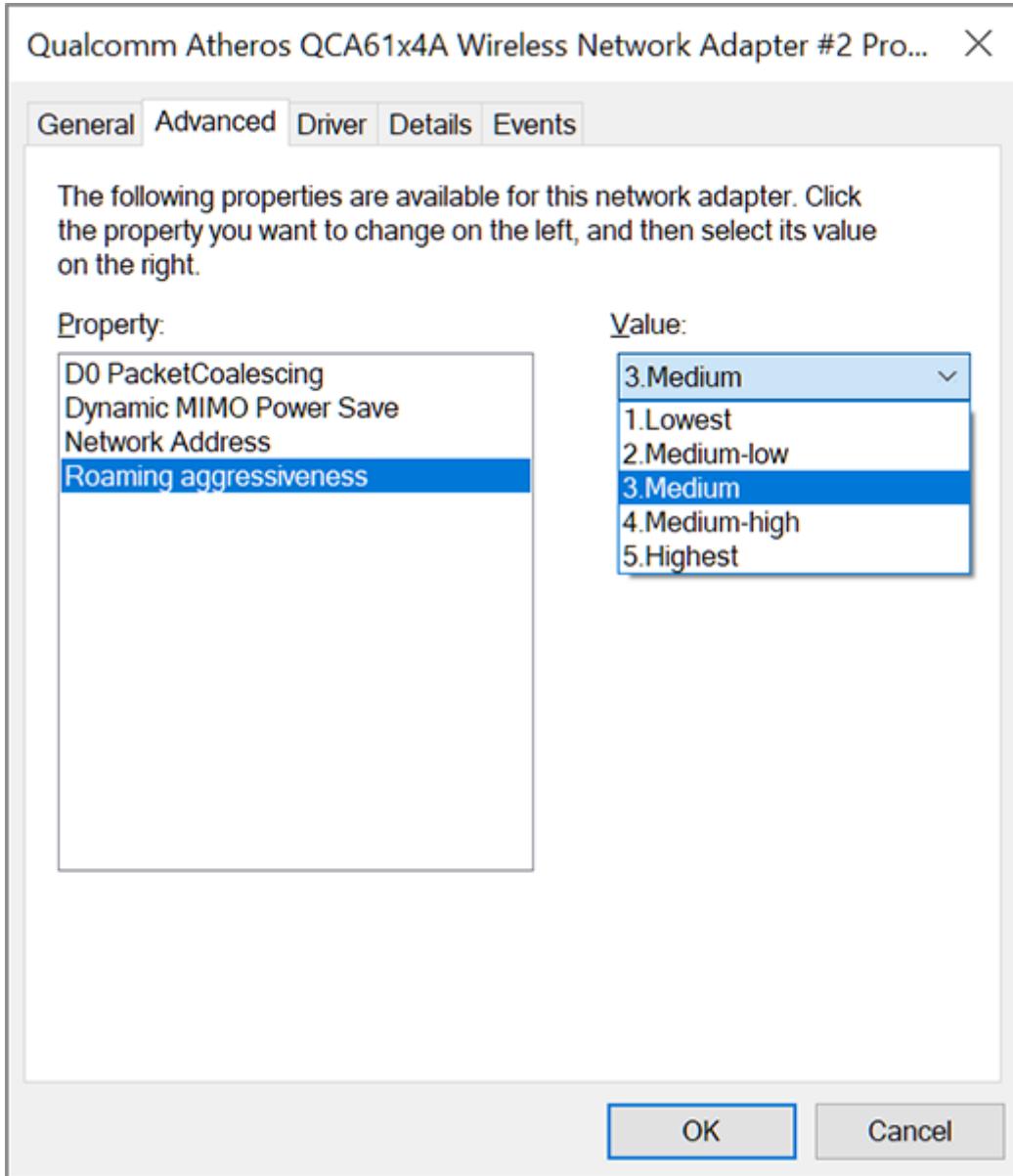
Roaming aggressiveness settings on Surface Go and Surface Pro X

Front-line workers using Surface Go may wish to select a signal strength threshold that prompts the device to search for a new access point when signal strength drops (roaming aggressiveness). By default, Surface devices attempt to roam to a new access point if the signal strength drops below **Medium** (50 percent signal strength). Note that whenever you increase roaming aggressiveness, you accelerate battery power consumption.

Leave the roaming aggressiveness setting in the default state unless you encounter connectivity issues in specific mobile scenarios such as conducting environmental site inspections while maintaining voice and video connectivity during a conference meeting. If you don't notice any improvement revert to the default **Medium** state.

To enable roaming aggressiveness on Surface Go:

1. Go to Start > Control Panel > Network and Internet > Network and Sharing Center.
2. Under Connections, select Wi-Fi and then choose Properties.
3. Select Client for Microsoft Networks and then select Configure
4. Select Advanced > Roaming Aggressiveness and choose your preferred value from the drop-down menu.



Conclusion

Surface devices are designed with default settings for optimal wireless connectivity balanced alongside the need to preserve battery life. The most effective way of enabling reliable connectivity for Surface devices is through a well-designed network that supports 802.11r and 802.11k. Users can adjust network adapter settings or roaming aggressiveness but should only do so in response to specific environmental factors and revert to default state if there's no noticeable improvement.

Best practice power settings for Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Surface devices are designed to take advantage of the latest advances in mobile device energy consumption to deliver a streamlined experience optimized across workloads. Depending on what you're doing, Surface dynamically fine tunes how power flows to individual hardware components, momentarily waking up system components to handle background tasks -- such as an incoming email or network traffic -- before returning to a low power idle state (S0ix).

Summary of recommendations for IT administrators

To ensure Surface devices across your organization fully benefit from Surface power optimization features:

- Install the latest drivers and firmware from Windows Update or the Surface Driver and Firmware MSI. This creates the balanced power plan (aka power profile) by default and configures optimal power settings. For more information, refer to [Manage and deploy Surface driver and firmware updates](#).
- Avoid creating custom power profiles or adjusting advanced power settings not visible in the default UI (**System > Power & sleep**).
- If you must manage the power profile of devices across your network (such as in highly managed organizations), use the powercfg command tool to export the power plan from the factory image of the Surface device and then import it into the provisioning package for your Surface devices.

Tip

You can only export a power plan across the same type of Surface device. For example, you cannot export a power plan from Surface Laptop and import it on Surface Pro. For more information, refer to [Configure power settings](#).

- Exclude Surface devices from any existing power management policy settings.

Background

The way Surface implements power management differs significantly from the earlier OS standard that gradually reduces and turns off power via a series of sleep states; for example, cycling through S1, S2, S3, and so on.

Instead, Surface is imaged with a custom power profile that replaces legacy sleep and energy consumption functionality with modern standby features and dynamic fine tuning. This custom power profile is implemented via the Surface Serial Hub Driver and the system aggregator module (SAM). The SAM chip functions as the Surface device power-policy owner, using algorithms to calculate optimal power requirements. It works in conjunction with Windows power manager to allocate or throttle only the exact amount of power required for hardware components to function. This article applies to all currently supported Surface devices.

Utilizing the custom power profile in Surface

If you go into the power options on a surface device, you'll see that there's a single power plan available. This is the custom power profile. And if you go to the advanced power settings, you'll see a much smaller subset of power options compared to a generic PC running Windows 10 or Windows 11. Unlike generic devices, Surface has firmware and custom components to manage these power options.

Modern Standby

The algorithmically embedded custom power profile enables modern standby connectivity for Surface by maintaining a low power state for instant on/instant off functionality typical of smartphones. S0ix, also known as Deepest Runtime Idle Platform State (DRIPS), is the default power mode for Surface devices. Modern standby has two modes:

- **Connected standby.** The default mode for up-to-the minute delivery of emails, messaging, and cloud-synced data, connected standby keeps Wi-Fi on and maintains network connectivity.
- **Disconnected standby.** An optional mode for extended battery life, disconnected standby delivers the same instant-on experience and saves power by turning off Wi-Fi, Bluetooth, and related network connectivity.

To learn more about modern standby, refer to the [Microsoft Hardware Dev Center](#).

How Surface streamlines the power management experience

Surface integrates the following features designed to help users optimize the power management experience:

- Singular power plan
- Simplified power settings user interface
- Windows performance power slider

Singular power plan

Surface is designed for a streamlined power management experience that eliminates the need to create custom power plans or manually configure power settings. Microsoft streamlines the user experience by delivering a single power plan (balanced) that replaces the multiple power plans from standard Windows builds.

Simplified power settings user interface

Surface provides a simplified UI in accord with best practice power setting recommendations. In general, it's recommended to only adjust settings visible in the default user interface and avoid configuring advanced power settings or Group Policy settings. Using the default screen and sleep timeouts while avoiding maximum brightness levels are the most effective ways for users to maintain extended battery life.

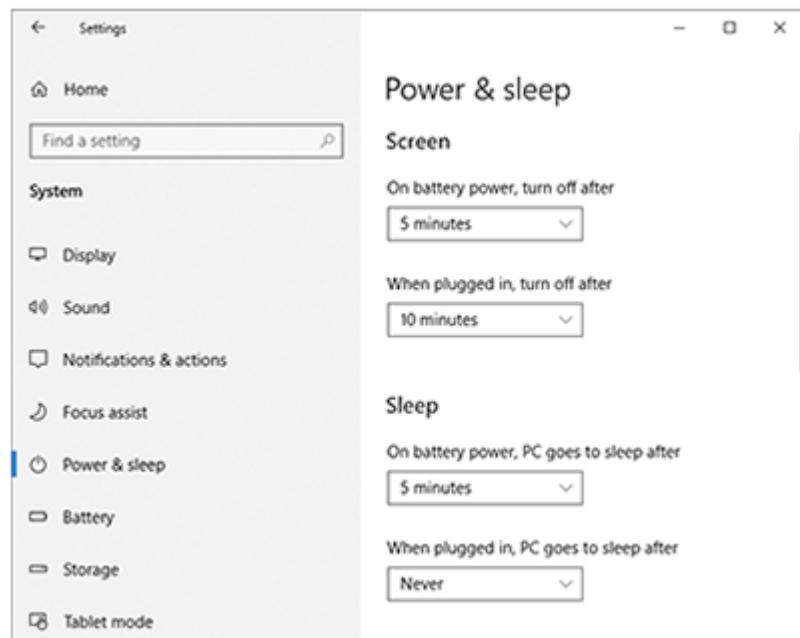


Figure 1. Simplified power and sleep settings

Windows performance power slider

Surface devices running Windows 10 build 1709 and later include a power slider allowing you to prioritize battery life when needed or favor performance if desired. You can access the power slider from the taskbar by clicking on the battery icon. Slide left for longer battery life (battery saver mode) or slide right for faster performance.

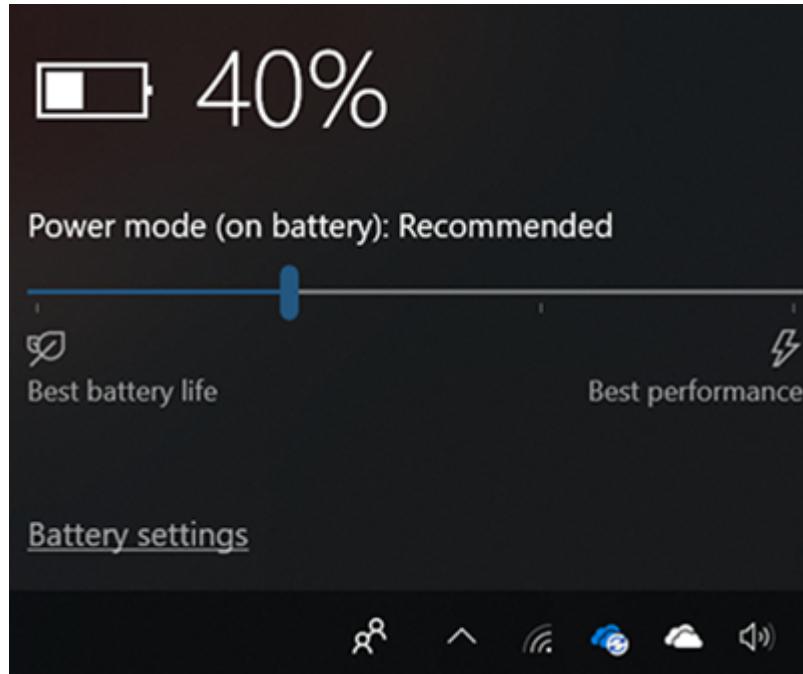


Figure 2. Power slider

Power slider enables four states as described in the following table:

Slider mode	Description
Battery saver	Helps conserve power and prolong battery life when the system is disconnected from a power source. When battery saver is on, some Windows features are disabled, throttled, or behave differently. Screen brightness is also reduced. Battery saver is only available when using battery power (DC). To learn more, see Battery Saver .
Recommended	Delivers longer battery life than the default settings in earlier versions of Windows.
Better Performance	Slightly favors performance over battery life, functioning as the default slider mode.
Best Performance	Favors performance over power for workloads requiring maximum performance and responsiveness, regardless of battery power consumption.

Power slider modes directly control specific hardware components shown in the following table.

Component	Slider functionality
Intel Speed Shift (CPU energy registers) and Energy Performance Preference hint.	Selects the best operating frequency and voltage for optimal performance and power. The Energy Performance Preference (PERFEPP) is a global power efficiency hint to the CPU.
Fan speed (RPM)	Where applicable, adjusts for changing conditions such as keeping fan silent in battery saver slider mode.
Processor package power limits (PL1/PL2).	Requires the CPU to manage its frequency choices to accommodate a running average power limit for both steady state (PL1) and turbo (PL2) workloads.
Processor turbo frequency limits (IA turbo limitations).	Adjusts processor and graphics performance allowing processor cores to run faster or slower than the rated operating frequency.

 **Note**

The power slider is entirely independent of operating system power settings whether configured from Control Panel/ Power Options, Group Policy, or related methods.

To learn more, see:

- [Customize the Windows performance power slider](#)
- [Battery saver.](#)

Best practices for extended battery life

Best practice	Go to	Next steps
Ensure your Surface device is up to date	Windows Update	In the taskbar search box, type Windows Update and select Check for updates.
Choose the best power setting for what you're doing	Power slider	In the taskbar, select the battery icon, then choose Best performance , Best battery life , or somewhere in between.
Conserve battery when it's low	Battery saver	In the taskbar, select the battery icon and click Battery settings . Select Turn battery saver on automatically if my battery falls below and then move the slider further to the right for longer battery life.

Best practice	Go to	Next steps
Configure optimal screen brightness	Battery saver	In the taskbar, select the battery icon and click Battery settings , select Lower screen brightness while in battery saver .
Conserve power whenever you're not plugged in	Battery saver	Select Turn on battery saver status until next charge .
Investigate problems with your power settings.	Power troubleshooter	In the Taskbar search for troubleshoot, select Troubleshoot , and then select Power and follow the instructions.
Check app usage	Your apps	Close apps.
Check your power cord for any damage.	Your power cord	Replace power cord if worn or damaged.

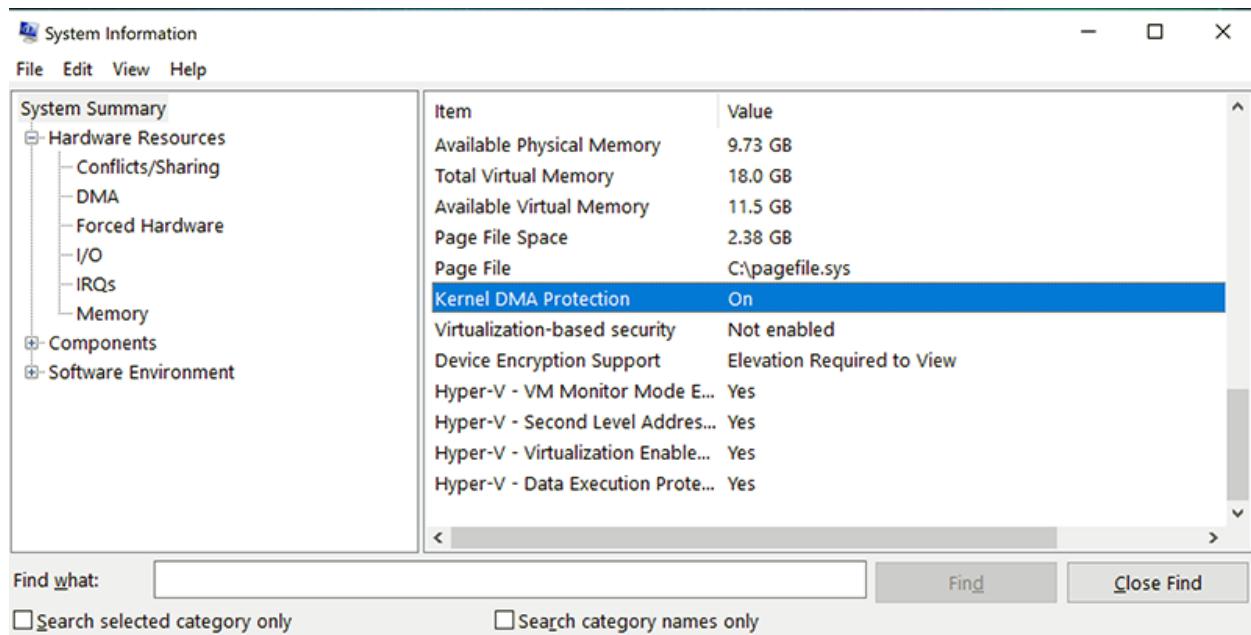
Learn more

- [Modern standby](#)
- [Customize the Windows performance power slider](#)
- [Battery saver](#)
- [Manage and deploy Surface driver and firmware updates](#)

DMA Protection on Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Direct Memory Access (DMA) protection is designed to mitigate potential security vulnerabilities associated with using removable SSDs or external storage devices. Newer Surface devices come with DMA Protection enabled by default. These include Surface Pro 9, Surface Pro 9 with 5G, Surface Pro 8, Surface Laptop Studio, Surface Go 3, Surface Laptop SE, Surface Pro 7+, Surface Pro 7, Surface Laptop 3, Surface Laptop 4, Surface Laptop 5, and Surface Pro X. To check the presence of DMA protection feature on your device, open System Information (Start > msinfo32.exe), as shown in the figure below.



If a Surface removable SSD is tampered with, the device will shutoff power. The resulting reboot causes UEFI to wipe memory, to erase any residual data.

Considerations for Surface and Microsoft Endpoint Configuration Manager

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Fundamentally, management and deployment of Surface devices with Microsoft Endpoint Configuration Manager is the same as the management and deployment of any other PC. Like any other PC, a deployment of Surface devices includes importing drivers, importing a Windows image, preparing a deployment task sequence, and then deploying the task sequence to a collection. After deployment, Surface devices are like any other Windows client; to publish apps, settings, and policies, you use the same process as you would use for any other device.

To learn more, see [Microsoft Endpoint Configuration Manager documentation](#).

Although the deployment and management of Surface devices is fundamentally similar to other PCs, some scenarios may require extra IT tasks, as described below.

Tip

Use the [Current Branch of Microsoft Endpoint Configuration Manager](#) to manage Surface devices.

Update Surface device drivers and firmware

To deploy updates device drivers and firmware using Configuration Manager or Windows Server Update Services (WSUS), see [Manage Surface driver and firmware updates](#).

Surface Ethernet adapters and Configuration Manager deployment

The default mechanism that Configuration Manager uses to identify devices during deployment is the Media Access Control (MAC) address. Because the MAC address is associated with the Ethernet controller, an Ethernet adapter shared among multiple devices will cause Configuration Manager to identify each of the devices as only a single device, resulting in a failed deployment.

To ensure that Surface devices using the same Ethernet adapter are identified as unique devices during deployment, you can instruct Configuration Manager to identify devices using another method. You can specify that Configuration Manager use other identification methods, as documented in [Manage duplicate hardware identifiers](#):

- Add an exclusion for the MAC addresses of Surface Ethernet adapters, which forces Configuration Manager to overlook the MAC address in preference of the System UUID.
- Use a script to identify a newly deployed Surface device by the MAC address of its wireless adapter.

Surface Ethernet Driver

Since 2016, the driver for the Surface Ethernet adapter has been included by default in Windows and requires no another IT configuration. The driver is no longer available for download from the Microsoft Download Center. If you need to deploy earlier versions of Windows 10 Pro, you can download the latest driver from the [Microsoft Update Catalog](#).

Deploy Surface app with Configuration Manager

With the release of Microsoft Store for Business, Surface app is no longer available as a driver and firmware download. Organizations deploying Surface app to managed Surface devices or during deployment via Configuration Manager, must first acquire Surface app through Microsoft Store for Business. To learn more, see [Deploy Surface app with Microsoft Store for Business](#).

Use prestaged media with Surface clients

If your organization uses prestaged media to load deployment resources onto machines prior to deployment with Configuration Manager, you may need to take extra steps. Specifically, a native UEFI environment requires that you create multiple partitions on the boot disk of the system. If you're following along with the [documentation for prestaged media](#), the instructions provide for only single partition boot disks and therefore will fail when applied to Surface devices.

To learn more, see [How to apply Task Sequence Prestaged Media on multi-partitioned disks for BIOS or UEFI PCs in System](#) blog post.

Licensing conflicts with OEM Activation 3.0

Surface devices come preinstalled with a licensed copy of Windows. The license key for this preinstalled copy of Windows is embedded in the firmware of the device with [OEM Activation 3.0](#) (OA 3.0). When you run Windows installation media on a device with an OA 3.0 key, Windows setup automatically reads the license key and uses it to install and activate Windows. In most situations, users don't have to find or enter a license key.

When you reimage a device by using Windows Enterprise, the embedded license key doesn't cause a conflict. This is because the installation media for Windows Enterprise is configured to install only an Enterprise edition of Windows and is incompatible with the license key embedded in the system firmware. If a product key isn't specified--such as when you intend to activate with Key Management Services [KMS] or Active Directory Based Activation--a Generic Volume License Key (GVLK) is used until Windows is activated by one of those technologies.

However, issues may arise when organizations intend to use versions of Windows that are compatible with the firmware embedded key. For example, an organization that wants to install Windows 10 Pro on a device that originally shipped with Windows 10 Home may encounter difficulty when Windows setup automatically reads the Home edition key during installation and installs as Windows 10 Home instead of Windows 10 Pro. To avoid this conflict, use the Ei.cfg or Pid.txt file to explicitly instruct Windows setup to prompt for a product key, or enter a specific product key in the deployment task sequence. For more information, see [Windows Setup Edition Configuration and Product ID Files](#). If you don't have a specific key, you can use the default product keys for Windows. For more information, see [Deploy Windows 10](#).

Apply an asset tag during deployment

With the [Surface Asset tag tool](#), you can identify devices from UEFI even if the operating system fails. To learn more about managing assets with Configuration Manager, see [Introduction to asset intelligence in Configuration Manager](#).

Configure push-button reset

When you deploy Windows to a Surface device, the push-button reset functionality of Windows is configured by default to revert the system back to a state where the environment isn't yet configured. When the reset function is used, the system discards any installed applications and settings. Although in some situations it can be beneficial

to restore the system to a state without applications and settings, in a professional environment, this effectively renders the system unusable to the end user.

Push-button reset can be configured, however, to restore the system configuration to a state where it's ready for use by the end user. Follow the process outlined in [Deploy push-button reset features](#) to customize the push-button reset experience for your devices.

Deploy, manage, and service ARM-based Surface devices

Article • 04/19/2023 • Applies to: Windows 10, Windows 11

Built to handle high-performance commercial requirements, Surface Pro 9 with 5G incorporates the most powerful processors in its class, the Microsoft SQ3 ARM chipset.

Deploy

For the best experience, deploy Surface Pro 9 with 5G or Surface Pro X using Windows Autopilot either with the assistance of a Microsoft Cloud Solution Provider or self-provisioned using Autopilot deployment profiles and related features. For more information, refer to the following:

- [Windows Autopilot and Surface devices](#)
- [Overview of Windows Autopilot](#)

Autopilot deployment has several advantages: It allows you to use the factory-provisioned operating system, streamlined for zero-touch deployment, to include pre-installation of [Microsoft 365 Apps for enterprise](#). Organizations already using modern management, security, and productivity solutions are well-positioned to take advantage of the unique performance features in Surface Pro 9 with 5G and Surface Pro X.

Customers using modernized [line of business apps](#), [Microsoft Store \(UWP\) apps](#), or remote desktop solutions also stand to benefit.

Image-based deployment considerations

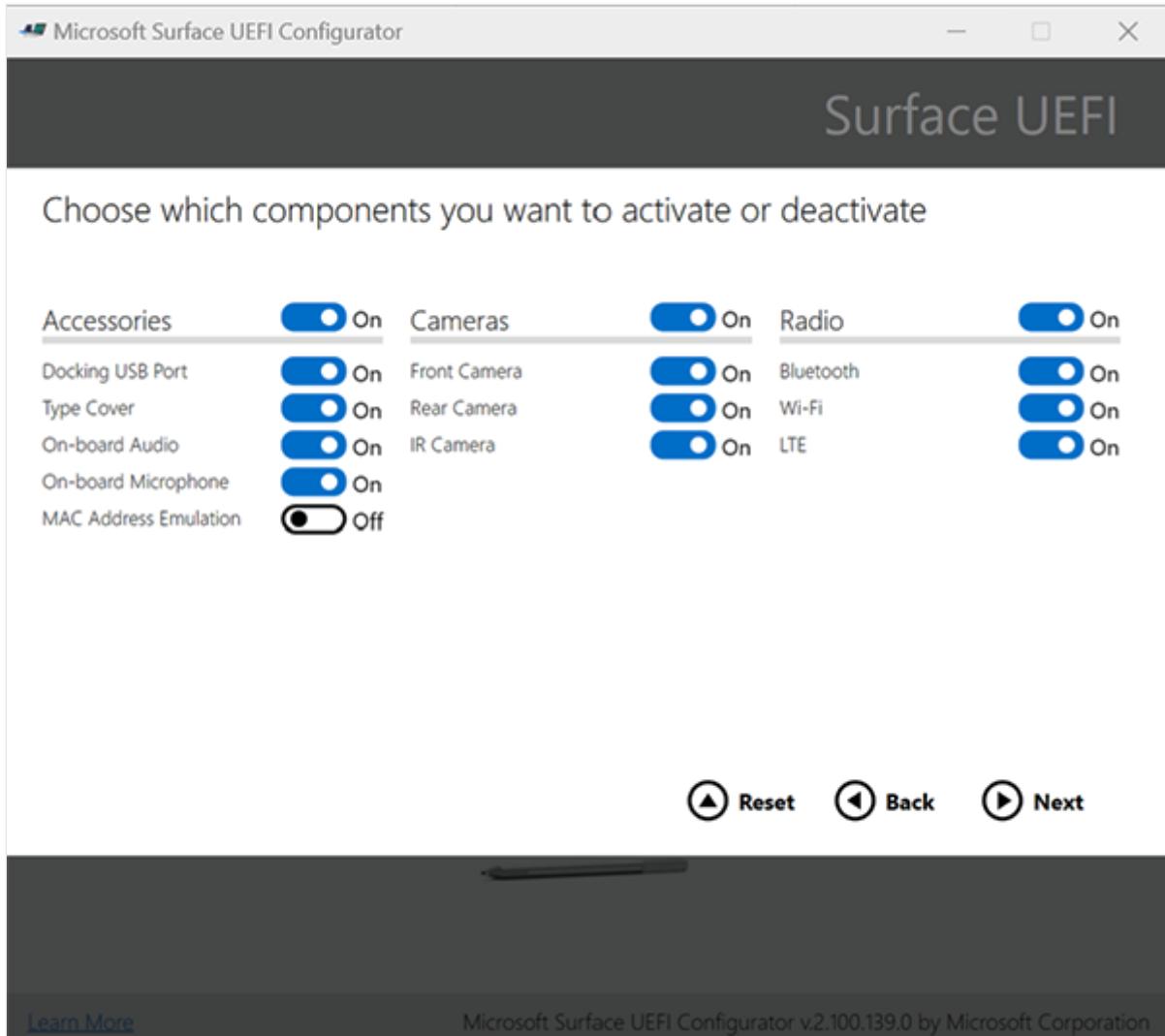
Microsoft Deployment Toolkit (MDT) and Microsoft Endpoint Configuration Manager do not support image-based Operating System Deployment (OSD) for Surface Pro 9 with 5G or Surface Pro X. Customers relying on image-based deployment should consider Surface Pro 9 while evaluating the right time to transition to modern deployment solutions.

Manage firmware with UEFI Configurator and SEMM

Surface Pro 9 with 5G

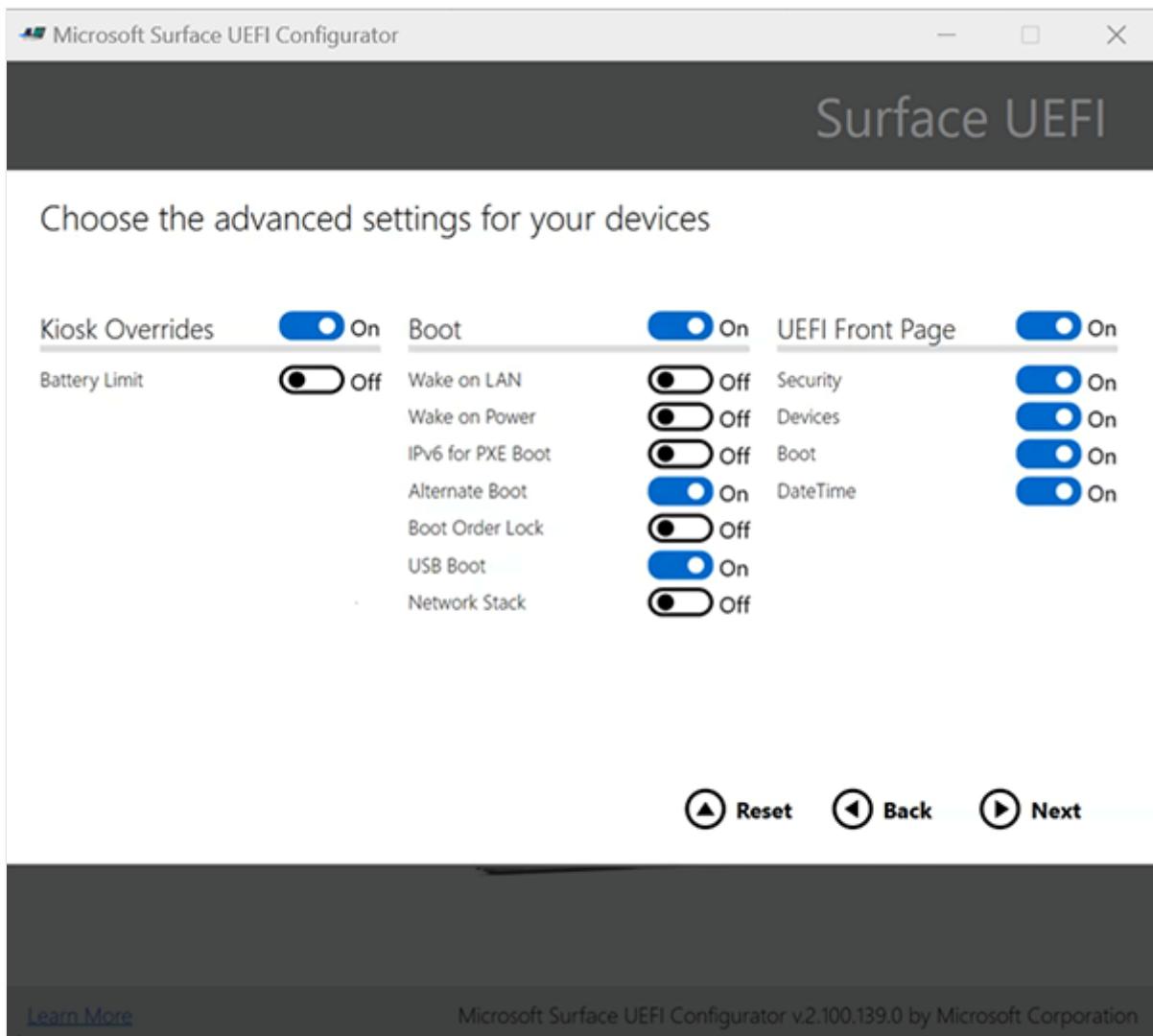
With [Surface Enterprise Management Mode \(SEMM\)](#), you can manage the following hardware components at the firmware level for Surface Pro 9 with 5G devices:

- **Accessories.** Docking USB Port, Type Cover, Onboard Audio, Onboard Microphone, MAC Address Emulation.
- **Cameras.** Front Camera, Rear Camera, IR Camera.
- **Wireless (aka Radio).** Bluetooth, Wi-Fi, LTE (5G) and GNSS.



Advanced settings

- **Kiosk Overrides.** Battery limit.
- **Boot.** Wake on LAN, Wake on Power, IPv6 for PXE boot, Alternate Boot, Boot Order Lock, USB Boot, Network Stack.
- **UEFI Front Page.** Security, Devices, Boot, DateTime



Surface Pro X

With [Surface Enterprise Management Mode \(SEMM\)](#), you can manage the following hardware components at the firmware level for Surface Pro X devices:

- Wake On Power
- IPv6 for PXE boot
- Alternate Boot
- Boot Order Lock
- USB Boot
- PXE Boot
- Battery Limit

To learn more about managing firmware with SEMM, see:

- [Surface Enterprise Management Mode](#)
- [Manage Surface UEFI settings](#)

Microsoft Intune admin center

Manage firmware with Intune and DFCI

With Microsoft Intune and [Device Firmware Configuration Interface \(DFCI\) profiles](#), you can manage hardware components at the firmware level just like any other Surface device. To learn more, see [Manage DFCI on Surface devices](#).

Manage with Azure AD

Microsoft Intune admin center and Intune integrate with Azure Active Directory for identity and access control and provide granular management of enrolled devices. Highlights include faster device login times and a more streamlined catalog of policy settings enabling full device management from the cloud. For example, you can [manage LTE using eSIM profiles](#) to configure data plans and deploy activation codes to multiple devices.

Co-management

Once deployed in Autopilot, you can join devices to Azure AD or Active Directory ([Hybrid Azure AD Join](#)), where you can [manage the devices with Intune](#) or [co-manage them with Endpoint Configuration Manager](#), which will install the 32-bit x86 ConfigMgr client.

Third-party MDM solutions

You may be able to use third-party MDM tools to manage Surface Pro 9 with 5G and Surface Pro X. For details, contact your MDM provider.

Antivirus software

Microsoft Defender will help protect Windows 10 and 11 on ARM-based PCs for the supported lifetime of the device. Some third-party antivirus software cannot be installed on devices running on an ARM-based processor. Collaboration with third-party antivirus software providers is continuing for AV app readiness on ARM-based PCs. Contact your antivirus software provider to understand when their apps will be available.

Service and maintain

ARM-based devices have specific requirements for maintaining the latest drivers and firmware. Surface Pro 9 with 5G and Surface Pro X were designed to use Windows

Update to simplify keeping drivers and firmware up to date for home and small business users. Use the default settings to receive Automatic updates. To verify:

1. Go to Start > Settings > Update & Security > Windows Update > Advanced Options.
2. Under Choose how updates are installed, select Automatic (recommended).

Recommendations for commercial customers

- Use Windows Update or Windows Update for Business to maintain the latest drivers and firmware. For more information, see [Deploy Updates using Windows Update for Business](#).
- For more information about deploying and managing updates on Surface devices, see [Manage and deploy Surface driver and firmware updates](#).
- Note that Windows Server Update Services (WSUS) does not support the delivery of drivers and firmware to Surface Pro 9 with 5G and Surface Pro X.

App compatibility

Most apps run on ARM-based Windows 10 PCs with limited exclusions.

Supported apps

- Most x86 Win32 apps run on Surface Pro 9 with 5G and Surface Pro X.
- Native ARM64 and Microsoft Store UWP apps provide an excellent user experience utilizing the full native speed of the ARM-based processor while optimizing battery life. More Native ARM64 apps are now available including Adobe Photoshop and Adobe Lightroom.
- Apps that use drivers designed for a Windows 10 or Windows 11 PC running on an ARM-based processor.
- x64 emulation for Windows is now generally available in Windows 11.

FastTrack App Assure

The App Assure program is available to commercial customers for their LOB, ISV and Microsoft first-party apps targeting Windows 10 on ARM. If commercial customers encounter an app compatibility issue using Windows 10 on ARM, Microsoft will provide developer resources to troubleshoot and assist with app remediations at no additional cost. To learn more, visit aka.ms/AppAssure.

For more information about running apps on Surface Pro 9 with 5G or Surface Pro X, refer to:

- [Windows on ARM documentation](#)

Virtual Desktops (VDI)

Azure Virtual Desktop enables access to Windows desktops, applications, and data on any computing device or platform, from any location. To learn more, refer to the [Azure Virtual Desktop site](#).

Browsing

Popular browsers run on Surface Pro 9 with 5G and Surface Pro X:

- Inbox Edge, Firefox, Chrome, and Internet Explorer run on Surface Pro 9 with 5G and Surface Pro X.
- Firefox and Microsoft Edge based on Chromium run natively with enhanced performance on ARM-based Windows 10 or Windows 11 PCs.

Installing and using Microsoft Office

- Use Microsoft 365 for the best experience on a Windows 10 or Windows 11 PC on an ARM-based processor.
- Microsoft 365 "click-to-run" installs Outlook, Word, Excel, and PowerPoint optimized to run on a Windows 10 or Windows 11 PC on an ARM-based processor.
- Microsoft Teams runs natively on Surface Pro 9 with 5G and Surface Pro X.
- For "perpetual versions" of Office, such as Office 2021, install the 32-bit version.

VPN

To confirm if a specific third-party VPN supports a Windows 10 or Windows 11 PC on an ARM-based processor, contact the VPN provider.

Feature summary

The following tables show the availability of selected key features on Surface Pro 9 with 5G and Surface Pro X with Windows 10 or Windows 11 on ARM.

Deployment

Feature	Surface Pro X	Surface Pro 9 with 5G	Notes
Windows Autopilot	Yes	Yes	Recommended deployment option
Support for Network Boot (PXE)	No	No	
Windows Configuration Designer	No	No	Not recommended for Surface Pro 9 with 5G or Surface Pro X.
WinPE	No	No	Not recommended for Surface Pro 9 with 5G or Surface Pro X. Microsoft does not provide the necessary .ISO and drivers to support WinPE with Surface Pro 9 with 5G and Surface Pro X.
Operating System Deployment (OSD)	No	No	Not supported on Surface Pro 9 with 5G or Surface Pro X.
MDT	No	No	Not supported on Surface Pro 9 with 5G or Surface Pro X.

Management

Feature	Surface Pro X	Surface Pro 9 with 5G	Notes
Intune	Yes	Yes	
Windows Autopilot	Yes	Yes	
Azure AD (co-management)	Yes	Yes	Ability to join Surface Pro 9 with 5G or Surface Pro X to Azure AD or Active Directory (Hybrid Azure AD Join).
Endpoint Configuration Manager	Yes	Yes	
Power on When AC Restore	Yes	Yes	

Feature	Surface Pro X	Surface Pro 9 with 5G	Notes
Surface Diagnostic Toolkit (SDT) for Business	Yes	Yes	
Surface Asset Tag tool	Yes	Yes	
Surface Enterprise Management Mode (SEMM)	Partial	Yes	Surface Pro 9 with 5G adds UEFI management options
Surface UEFI Configurator	No	Yes	Surface Pro 9 with 5G adds UEFI management options
Surface UEFI Manager	Partial	Yes	Surface Pro 9 with 5G adds UEFI management options

Security

Feature	Surface Pro X	Surface Pro 9 with 5G	Notes
BitLocker	Yes	Yes	
Microsoft Defender	Yes	Yes	
Support for third-party antivirus	See note	See note	Some third-party antivirus software cannot be installed on an ARM-based processor. Contact your antivirus software provider to understand when their apps will be available.
Secure Boot	Yes	Yes	
Windows Information Protection	Yes	Yes	
Surface Data Eraser (SDE)	Yes	Yes	

FAQ

Can I deploy Surface Pro 9 with 5G and Surface Pro X with MDT or Endpoint Configuration Manager?

- The Microsoft Deployment Toolkit (MDT) and Microsoft Endpoint Configuration Manager currently do not support Surface Pro 9 with 5G and Surface Pro X or Surface Pro 9 with 5G for operating system deployment. Customers relying on image-based deployment should consider Surface Pro 8 while evaluating the right time to transition to the cloud.

How can I deploy Surface Pro 9 with 5G or Surface Pro X?

- Deploy Surface Pro 9 with 5G and Surface Pro X or Surface Pro 9 with 5G using Windows Autopilot.

Is a BMR available?

- A BMR is available for Surface Pro X. Refer to [Download a recovery image for your Surface](#). A BMR will be available for Surface Pro 9 5G.

Is Intune required to manage Surface Pro 9 with 5G or Surface Pro X?

- Intune is recommended but not required. Once deployed in Autopilot, you can join Surface Pro 9 with 5G and Surface Pro X devices to Azure AD or Active Directory (Hybrid Azure AD Join), where you will be able to manage the devices with Intune or co-manage them with Endpoint Configuration Manager, which will install the 32-bit x86 ConfigMgr client.

To learn more, see [ARM-based Surface devices FAQ](#).

ARM-based Surface devices FAQ

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Introduction

What are the benefits of an ARM-based Surface device?

Windows 10 and Windows 11 ARM-based PCs, such as Surface Pro X, help you keep working wherever you go. Here are some primary benefits:

- **Always be connected to the internet.** With a cellular data connection, you can be online wherever you get a cellular signal, just like your mobile phone. You can connect to Wi-Fi to save cellular data and keep working when you're at work, home, or by another Wi-Fi network you trust.
- **Battery life that goes beyond all day.** You'll use less power than you would with other PCs, so you can go through a typical work or school day without running out of battery or worrying about finding a power outlet. If you want to use your device for something more fun, you can play videos stored on your device for many hours without charging your battery.
- **Turn on instantly.** When you're not using your device, press the power button as you do on your mobile phone to turn off the screen. When you take out your device and turn it back on, it turns on instantly. Whenever you have a few minutes in between classes, meetings, or other activities, you can get things done without waiting for your device to start.

What is App assure?

Microsoft is committed to ensuring customers have a great compatibility experience with Windows 10 and Windows 11 on ARM64 devices such as the Surface Pro X. We've expanded the App Assure program to support customers who encounter app compatibility challenges by providing engineers to troubleshoot and provide app remediations – all at no extra cost. The service is available to commercial and EDU customers for your LOB, ISV, and Microsoft first-party apps targeting Windows 10 or Windows 11 on ARM64. To learn more, see [App Assure](#).

Windows 11 ARM devices

What limitations should I be aware of when running a Windows 11 ARM-based device?

There are some limitations when you run a Windows 11 ARM-based device:

- **Drivers for hardware, games and apps will only work if designed for a Windows 11 ARM-based device.** For more info, check with the hardware manufacturer or the organization that developed the driver. Drivers are software programs that communicate with hardware devices—they're commonly used for antivirus and antimalware software, printing or PDF software, assistive technologies, CD and DVD utilities, and virtualization software.
- If a driver doesn't work, the app or hardware that relies on it won't work either (at least not entirely). Peripherals and devices only work if the drivers they depend on are built into Windows 11 or if the hardware developer has released Arm64 drivers for the device.
- **Certain games won't work.** Games and apps won't work if they use a version of OpenGL greater than 3.3 or rely on "anti-cheat" drivers that haven't been made for Windows 11 ARM-based PCs. Check with your game publisher to see if a game will work.
- **Apps that customize the Windows experience might have problems.** This includes input method editors (IMEs), assistive technologies, and cloud storage apps. The organization that develops the app determines whether its app will work on a Windows 11 ARM-based device.
- **Some third-party antivirus software can't be installed.** You won't be able to install some third-party antivirus software on a Windows 11 ARM-based PC—unless it's been made or updated for an ARM-based device. However, Windows Security will help keep you safe for the supported lifetime of your Windows 11 device.
- **Windows Fax and Scan isn't available.** This feature isn't available on a Windows 11 ARM-based device.

I want to use Windows programs that aren't in the Microsoft Store. Can I run them on my Windows 11 ARM-based device?

- Yes, you can install Windows apps that aren't available in the Microsoft Store in Windows. Peripherals and devices only work if the drivers they depend on are built into Windows 11 or if the hardware developer has released Arm64 drivers for the device. It's a good idea to check whether the hardware developer has published a version of the driver that runs on a Windows 11 ARM-based device.

I use assistive technology—what should I know before buying a Windows 11 ARM-based device?

- Windows 11 provides [built-in accessibility features](#) that help you do more on your device. You can also find assistive technology apps in the Microsoft Store in Windows, such as the [KNFB Reader](#) and the [Read&Write extension for Microsoft Edge](#)—and we're working to offer more apps soon.
- You can check the Microsoft Store or contact your assistive software vendor to see if your preferred assistive technology apps are available for a Windows 11 ARM-based device.
- You may want to check with the vendor to determine if their app is compatible with a Windows 11 ARM-based device. Not all assistive technology apps work as expected.
- If you use a screen reader, NVDA has updated its app to be compatible with a Windows 11 ARM-based device. For more info, visit the [NV Access website](#).

Windows 10 ARM devices

What limitations should I be aware of when running a Windows 10 ARM-based device?

There are some limitations when you run a Windows 10 ARM-based device:

- **Drivers for hardware, games and apps will only work if designed for a Windows 10 ARM-based device.** For more info, check with the hardware manufacturer or the organization that developed the driver. Drivers are software programs that communicate with hardware devices—they're commonly used for antivirus and antimalware software, printing or PDF software, assistive technologies, CD and DVD utilities, and virtualization software.
- If a driver doesn't work, the app or hardware that relies on it won't work either (at least not entirely). Peripherals and devices only work if the drivers they depend on are built into Windows 10 or if the hardware developer has released Arm64 drivers for the device.
- **64-bit (x64) apps won't work.** You'll need 64-bit (Arm64) apps, 32-bit (Arm32) apps, or 32-bit (x86) apps. You can usually find 32-bit (x86) versions of apps, but some app developers only offer 64-bit (x64) apps.
- **Certain games won't work.** Games and apps won't work if they use a version of OpenGL greater than 1.1 or rely on "anti-cheat" drivers that haven't been made for Windows 10 ARM-based PCs. Check with your game publisher to see if a game will work.

- Apps that customize the Windows experience might have problems. This includes input method editors (IMEs), assistive technologies, and cloud storage apps. The organization that develops the app determines whether their app will work on a Windows 10 ARM-based device.
- Some third-party antivirus software can't be installed. You won't be able to install some third-party antivirus software on a Windows 10 ARM-based device. However, Windows Security will help keep you safe for the supported lifetime of your Windows 10 device.
- Windows Fax and Scan isn't available. This feature isn't available on a Windows 10 ARM-based device.

I want to use Windows programs that aren't in the Microsoft Store. Can I run them on my Windows 10 ARM-based device?

- You can install 32-bit (x86) and 64-bit (Arm64) Windows apps that aren't available in the Microsoft Store in Windows. 64-bit (x64) apps won't run. Peripherals and devices only work if the drivers they depend on are built into Windows 10 or if the hardware developer has released Arm64 drivers for the device. It's a good idea to check whether the hardware developer has published a version of the driver that runs on a Windows 10 ARM-based device.

I use assistive technology—what should I know before buying a Windows 10 ARM-based device?

- Windows 10 provides [built-in accessibility features](#) that help you do more on your device. You can also find assistive technology apps in the Microsoft Store in Windows, such as the [KNFB Reader](#) and the [Read&Write extension for Microsoft Edge](#)—and we're working to offer more apps soon.
- You can check the Microsoft Store or contact your assistive software vendor to see if your preferred assistive technology apps are available for a Windows 10 ARM-based device.
- You may want to check with the vendor to determine if their app is compatible with a Windows 10 ARM-based device. Not all assistive technology apps work as expected.
- If you use a screen reader, NVDA has updated its app to be compatible with a Windows 10 ARM-based device. For more info, visit the [NV Access website](#).

Surface Slim Pen 2 haptics dev notes

Article • 01/03/2023 • Applies to: Windows 11

This page provides implementation notes for app developers who want to extend Windows 11 Ink capabilities of [Surface Slim Pen 2 for Business](#). Customizable haptics features include the following:

- **Inking feedback** that simulates the feel of pens, pencils, and other writing or drawing tools.
- **Interaction feedback** that responds directly to user actions such as hovering over a button, clicking a button, or completing a task with the pen.

If you're customizing an app for Surface Slim Pen 2, refer to the Windows Ink guidelines described in [Pen interactions and haptic feedback](#) and then consult the notes below.

Implementation notes

Surface Slim Pen 2 complies with Windows 11 Ink guidelines with the following exceptions:

- **Interaction waveforms.** As documented in the [Send and stop interaction feedback](#) section, sending an interaction waveform when an inking waveform is being played will temporarily interrupt the inking waveform. However, with the current Slim Pen 2 implementation, the inking waveform might not resume when the interaction waveform stops. Therefore, if still required, the inking waveform needs to be re-enabled after the interaction feedback. There is no need to wait for the interaction feedback to complete.
- **Unsupported features.** As documented in the [Haptic feedback customizations](#) section, the following optional features are not supported on Surface Slim Pen 2: Play Count and Replay Pause Interval. Although these usages appear in the descriptor, they are not currently supported. Therefore, the following functions return an incorrect value: IsPlayCountSupported, IsPlayDurationSupported, IsReplayPauseIntervalSupported.

Learn more

- [Pen interactions and Windows Ink in Windows apps](#)
- [Surface Slim Pen 2 for Business](#)
- [Surface pen features and compatibility](#)

Top support solutions for Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

ⓘ Note

Home users: This article is only intended for use by IT professionals and technical support agents, and applies only to Surface devices. If you're looking for help with a problem with your home device, please see [Surface Devices Help](#).

These are the Microsoft Support solutions for common issues you may experience using Surface devices in an enterprise. If your issue is not listed here, contact [Surface Support for Business and Education customers](#).

Warranty and service

Self-Serve your Surface Service Orders on the Microsoft 365 Hardware Support Portal

The Microsoft 365 Hardware Support Portal provides a centralized solution for commercial customers to look up current warranty and protection plans, create service requests, and track the status of device repairs. Learn more about this service by reading the [walkthrough tutorial](#).

To access the portal, sign in to your M365 Admin Center (active access is required) and then register to use the platform by using this [link](#).

ⓘ Note

This service does not address Surface accessories, Surface Hub, or product safety concerns. The Hardware Support Portal is accessible in the following countries only: Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and USA.

Technical support scenarios

First troubleshooting steps

- [Surface update history](#)
- [Download drivers and firmware for Surface](#)
- [Manage and deploy Surface driver and firmware updates](#)
- [How to manage Surface driver updates in Configuration Manager](#)

Next troubleshooting steps

Click on the relevant support article from the table below and follow the recommended next steps to resolve the issue.

Issue category	Support article
Display and screen issues	What to try if your Surface screen is distorted, is flickering, or has lines running through it Troubleshoot connecting Surface to a second screen Troubleshoot Surface Dock or Surface Docking Station
Performance and Maintenance	Surface won't turn on or start Surface turns on but is stuck on a logo screen Windows doesn't respond or stops working on Surface Surface Go or Surface Go 2 turns on and shows "No Bootable Device"
Power and Battery	Surface battery won't charge or Surface won't run on battery Caring for your Surface battery What to do if your Surface power supply or charger doesn't work Troubleshoot Surface Dock or Surface Docking Station Maximize your Surface battery life Best practice power settings for Surface devices
Sound and Camera	Optimize video conferencing on Surface devices Take photos and videos with Surface Camera doesn't work in Windows
Wi-Fi and Internet	Fix Wi-Fi connection issues in Windows
Keyboard, Touchpad and Input	Troubleshoot your Surface Pen Troubleshoot Surface Type Cover or Keyboard Fix touchpad problems in Windows
Surface Dock issues	Troubleshoot Surface Dock and docking stations Troubleshoot connecting Surface to a second screen Microsoft Surface Dock 1 Firmware Update

Issue category	Support article
Reset device	Creating and using a USB recovery drive for Surface ↗ FAQ: Protecting your data if you send your Surface in for service ↗ Microsoft Surface Data Eraser
Deployment issues	DISK0 not found when you deploy Windows on a Surface device that has 1TB drive configuration ↗ Surface Device that has a 1TB drive configuration shows two drives ↗ System SKU reference

Enterprise (Deploy, Manage, IT Tools)

[Surface devices documentation](#)

[Surface Registration Support for Windows Autopilot](#)

[How do I use the BIOS/UEFI on Surface devices](#) ↗

[How to use Surface UEFI](#) ↗

Safety and Security

[Surface security overview](#)

Device Enroll and Management in Intune

[Surface Management Portal overview](#)

Need more help?

To expedite your support request, make sure to include your device(s) serial number and your shipping address in the Issue Description field. If your issue was not listed or you need more help, contact [Surface Support for Business and Education customers](#).

Contact Surface Support for Business and Education customers

Article • 01/09/2023 • Applies to: Surface, Surface Hub

Before you contact us

Review the [Top Support Solutions for Surface devices](#).

Run the [Surface Diagnostic Toolkit for Business](#) (SDT). The SDT enables IT administrators to quickly investigate, troubleshoot, and resolve hardware, software, and firmware issues with Surface devices.

If you're still having a problem after reviewing the top solutions and running the toolkit, use the tabs below to select a support option.

Online support

Depending on your company's active product subscription(s) and/or paid Support offers, convenient solutions are available to manage your Surface device support requests individually and in bulk. Please follow the link that best fits your company's profile.

You manage your devices with Intune

Built into Intune, the Surface Management Portal provides a centralized solution to self-serve, manage, and monitor Surface devices at scale. [Get support](#).

You have a Microsoft 365 Subscription

The Microsoft 365 Hardware Support Portal provides a self-serve, centralized solution to look up current warranty and protection plans, create service requests, and track the status of device repairs. [Get support](#).

You have a Premier or Unified Support contract

Create, Manage, and track support requests while staying current on Microsoft technologies with access to select self-paced learning paths.

[Learn more](#) or [Get Support ↗](#).

All other business customers

To expedite your service requests, please make sure to include your device(s) serial number(s).

[Get Support ↗](#)

Still need help? Go to [Microsoft Community ↗](#).

Surface hardware environmental test results

Article • 01/04/2023 • Applies to: Windows 10, Windows 11

Surface devices are built to withstand rigorous conditions that help ensure optimal reliability and lower cost of ownership.



The MIL-STD-810 test standards, maintained by the US Department of Defense, help organizations evaluate how devices perform in the field. The testing program outlines multiple test methods across a range of environmental stress conditions. This is designed to test equipment limits in various conditions where it's expected to be used (environment) or transported (shocks). An independent third-party laboratory has tested the Surface devices listed below using recommended test methods.

MIL-STD-810 test results

Operational tests pass if the unit remained operational during the entire test, and non-operational tests pass if a functional verification was performed immediately after the test exposure. Tests were conducted in accordance with the MIL-STD-810 standards effective at the time of product release. The latest Surface devices – Surface Pro 9, Surface Pro 9 with 5G, Surface Laptop 5, and Surface Laptop Go 2 – meet the current standard, MIL-STD-810H. Earlier devices were tested under the previous standard, MIL-STD-810G.

Latest devices



Test	Surface Pro 9	Surface Pro 9 with 5G	Surface Laptop 5
Altitude Operating	Pass	Pass	Pass
Altitude Storage	Pass	Pass	Pass
Bench Handling Shock	Pass	Pass	Pass
Blowing Dust	Pass	Pass	Pass
Blowing Sand	Pass	Pass	Pass
Crash Safety Shock	Pass	Pass	Pass
Explosive Atmosphere	Pass	Pass	Pass
Freeze/Thaw	Pass	Pass	Pass
Functional Shock	Pass	Pass	Pass
High Temperature Operating	Pass	Pass	Pass
High Temperature Storage	Pass	Pass	Pass
Humidity	Pass	Pass	Pass
Low Temperature Operating	Pass	Pass	Pass
Low Temperature Storage	Pass	Pass	Pass
Temperature Shock	Pass	Pass	Pass
Transit Drop	Pass	Pass	Pass
Vibration (Category 24)	Pass	Pass	Pass
Vibration (Category 4)	Pass	Pass	Pass

Earlier devices

Surface Laptop family



Surface Pro family



Test	Surface Pro X SQ2	Surface Pro 8	Surface Pro 7+
Bench Handling	Pass	Pass	Pass
Blowing Dust	Pass	Pass	Pass
Blowing Sand	Pass	Pass	Pass
Crash Safety Shock	Pass	Pass	Pass
Explosive Atmosphere	Pass	Pass	Pass
Freeze/Thaw	Pass	Pass	Pass
Function Shock	Pass	Pass	Pass
High Altitude Operation	Pass	Pass	Pass
High Altitude Storage	Pass	Pass	Pass
High Temperature Operating (Constant)	Pass	Pass	Pass
High Temperature Storage (Constant)	Pass	Pass	Pass
High Temperature Storage (cyclic)	Pass	Pass	Pass
Humidity	Pass	Pass	Pass
Low Temperature Operating	Pass	Pass	Pass
Low Temperature Storage	Pass	Pass	Pass

Test	Surface Pro X SQ2	Surface Pro 8	Surface Pro 7+
Thermal Shock	Pass	Pass	Pass
Transit Drop	Pass	Pass	Pass
Vibration Ground Vehicle	Pass	Pass	Pass
Vibration Minimum Integrity	Pass	Pass	Pass

Surface Book family



Test	Surface Book 3	Surface Book 2
Bench Handling	Pass	Pass
Blowing Dust	Pass	Pass
Blowing Sand	No	No
Crash Safety Shock	Pass	Pass
Explosive Atmosphere	Pass	Pass
Freeze/Thaw	Pass	Pass

Test	Surface Book 3	Surface Book 2
Function Shock	Pass	Pass
High Altitude Operation	Pass	Pass
High Altitude Storage	Pass	Pass
High Temperature Operating (Constant)	Pass	Pass
High Temperature Storage (Constant)	Pass	Pass
High Temperature Storage (cyclic)	Pass	Pass
Humidity	Pass	Pass
Low Temperature Operating	Pass	Pass
Low Temperature Storage	Pass	Pass
Thermal Shock	No	No
Transit Drop	Pass	Pass
Vibration Ground Vehicle	Pass	Pass
Vibration Minimum Integrity	Pass	Pass

Surface Go family



Test	Surface Go 3	Surface Go 2	Surface Go 2 (LTE)
Function Shock	Pass	Pass	Pass

Test	Surface Go 3	Surface Go 2	Surface Go 2 (LTE)
Bench Handling	Pass	Pass	Pass
Blowing Dust	Pass	Pass	Pass
Blowing Sand	Pass	No	Pass
Crash Safety Shock	Pass	Pass	Pass
Explosive Atmosphere	Pass	Pass	Pass
Freeze/Thaw	Pass	Pass	Pass
Function Shock	Pass	Pass	Pass
High Altitude Operation	Pass	Pass	Pass
High Altitude Storage	Pass	Pass	Pass
High Temperature Operating (Constant)	Pass	Pass	Pass
High Temperature Storage (Constant)	Pass	Pass	Pass
High Temperature Storage (cyclic)	Pass	Pass	Pass
Humidity	Pass	Pass	Pass
Low Temperature Operating	Pass	Pass	Pass
Low Temperature Storage	Pass	Pass	Pass
Temperature Shock	n/a	Pass	Pass
Thermal Shock	Pass	Pass	Pass
Transit Drop	Pass	Pass	Pass
Vibration Ground Vehicle	Pass	Pass	Pass
Vibration Minimum Integrity	Pass	Pass	Pass

Surface Duo



Test	Surface Duo 2
Bench Handling	Pass
Blowing Dust	Pass
Blowing Sand	Pass
Crash Safety Shock	Pass
Explosive Atmosphere	Pass
Freeze/Thaw	Pass
Function Shock	Pass
High Altitude Operation	Pass
High Altitude Storage	Pass
High Temperature Operating (Constant)	Pass
High Temperature Storage (Constant)	Pass
High Temperature Storage (cyclic)	Pass
Humidity	Pass
Low Temperature Operating	Pass

Test	Surface Duo 2
Low Temperature Storage	Pass
Thermal Shock	Pass
Transit Drop	Pass
Vibration Ground Vehicle	Pass
Vibration Minimum Integrity	Pass

 **Note**

Lab tests simulate but don't duplicate real-world environmental stresses. A device that passes lab tests may not withstand real-world field conditions.

References

1. MIL-STD-810H results shown for Surface Laptop Go 2. MIL-STD-810G results shown for earlier devices.

Self-serve your Surface warranty & service requests

Article • 04/26/2023 • Applies to: Windows 1, Windows 11

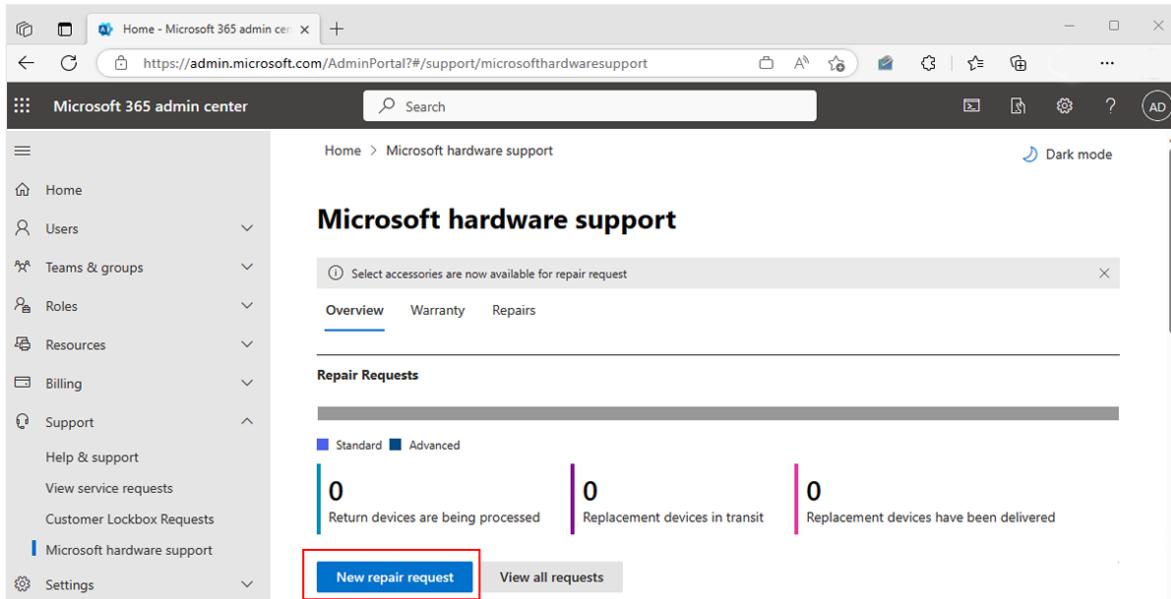
Commercial customers can submit service requests via a self-serve portal:

- [Hardware Support Portal](#)
- [Surface Management Portal](#)

Hardware Support Portal

Microsoft 365 Business customers are eligible to use the Hardware Support Portal to self-serve their Surface devices' service requests within the Microsoft 365 Admin Center.

1. Sign in to the [Microsoft 365 admin center](#) and go to **Show all > Support > Microsoft hardware support**.
2. Select **New repair request**. For eligible devices and regional availability, see [Microsoft in-region repair](#).



The Hardware Support Portal allows you to:

- Add one or multiple devices simultaneously to view current warranty and protection plans.
- Select one or multiple devices to create service requests.
- Track the real-time status of device repairs and transit times.

When you add a Microsoft 365 tenant to the tool, the following Admin roles are granted additional permissions:

Role	Permissions
Microsoft Hardware Warranty Administrator	View all service requests Create/manage device replacement requests Add/edit/delete ship-to address(es) Read-only access to the M365 tenant outside of the Hardware Support Portal
Microsoft Hardware Warranty Specialist	View own service requests Create/manage device replacement requests Read-only access to the M365 tenant outside of the Hardware Support Portal
Global Admin	View service requests Create/manage device replacement requests Add/edit/delete ship-to address(es) Create/manage users and their roles
Service Support Admin	View service requests Create/manage device replacement requests
Billing Admin	View service requests Create/manage device replacement requests Add/edit/delete ship-to address(es)

Gain access to the Hardware Support Portal

To access the portal, customers should first sign in to their M365 Admin Center and then register to use the platform using the following link:

<https://admin.microsoft.com/adminportal/home#/support/microsofthardwaresupport>

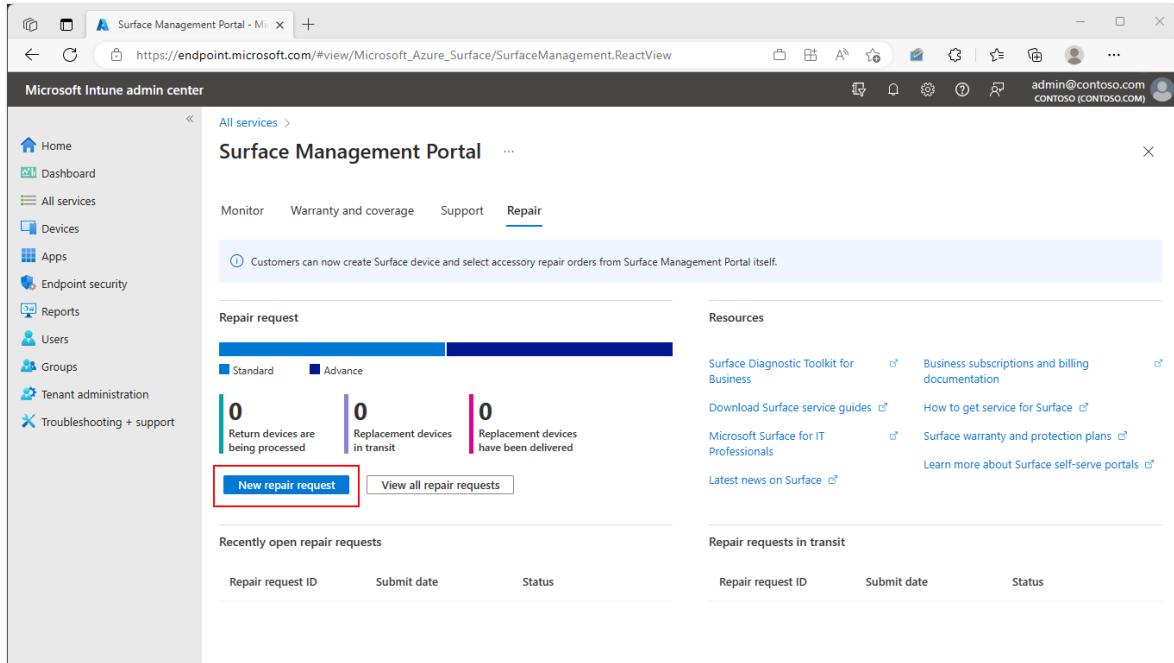
If access has already been granted, this link will directly lead to the portal. Active access to Microsoft 365 Admin Center is required to access the portal.

Surface Management Portal

Commercial customers can use the [Surface Management Portal](#) to self-serve their Surface devices' service requests within the Microsoft Intune admin center.

1. Sign in to the [Microsoft Intune admin center](#) and go to All services > Surface Management Portal.

2. Select **New repair request**. For eligible devices and regional availability, see Microsoft in-region repair.



The screenshot shows the Microsoft Intune admin center with the Surface Management Portal open. The 'Repair' tab is selected. On the left, there's a sidebar with various navigation options like Home, Dashboard, All services, Devices, Apps, Endpoint security, Reports, Users, Groups, Tenant administration, and Troubleshooting + support. The main area has a heading 'Surface Management Portal'. Below it, there are sections for 'Repair request' and 'Resources'. The 'Repair request' section shows three counts: 0 devices being processed, 0 devices in transit, and 0 devices delivered. It includes a 'New repair request' button (which is highlighted with a red box) and a 'View all repair requests' link. The 'Resources' section contains links to Surface Diagnostic Toolkit for Business, Microsoft Surface for IT Professionals, Latest news on Surface, and other documentation like Business subscriptions and billing documentation, How to get service for Surface, Surface warranty and protection plans, and Learn more about Surface self-serve portals. There are also sections for 'Recently open repair requests' and 'Repair requests in transit'.

Learn more

- Watch this [demo video](#).
- Read the [walkthrough tutorial](#).
- Contact your Microsoft representative if you have more questions.

Surface for Business service and repair

Article • 04/26/2023 • Applies to: Windows 10, Windows 11

Built with integrity by design, many Microsoft Surface devices are now easier to repair¹ and maintain, providing commercial customers with greater flexibility while extending the use of devices.

There are several ways commercial customers can obtain service for Surface for Business devices. You can get service directly from Microsoft or use a third party Authorized Service Provider. Or with skilled technicians, you can repair² devices yourself following the applicable [Surface Service Guide](#) or [article](#).

To learn more, see [Surface service options](#).

Surface devices and replaceable components

Microsoft recommends that only technically inclined individuals with the knowledge, experience, and requisite tools perform repairs in accordance with the relevant [Surface Services Guide instructions](#) available on the Microsoft Download Center.

ⓘ Note

Replaceable components have a 1-year Microsoft Limited Hardware Warranty³ and can be purchased from a [Microsoft Authorized Device Reseller](#). Replaceable components are currently **only available for purchase separately**, independent of the warranty status of your device. To order, see [Customer self-serve repair](#).

Device	Replaceable components
Surface Pro 7+	 <ul style="list-style-type: none">- Kickstand- SSD door- Removable solid-state drive (rSSD)

Device	Replaceable components
Surface Pro 8 	<ul style="list-style-type: none"> - Kickstand - SSD Door - Removable solid-state drive (rSSD) - Touch Display Module (Screen)
Surface Pro 9 	<ul style="list-style-type: none"> - Kickstand - Touch Display Module (Screen) - USB-C - Surface Connect - Back cover (aka Bucket) - Speaker & Wi-Fi Modules - Battery - Thermal Module - Camera Front & Rear - Camera Deck - Power & Volume Button - Motherboard - SSD Door - Removable solid-state drive (rSSD)
Surface Pro 9 5G 	<ul style="list-style-type: none"> - Kickstand - USB-C & Audio Jacks - Surface Connect - Back cover ⁴ (aka Bucket) - Speaker - Battery - Thermal Module - Camera Front & Rear - Camera Deck - Screen (Touch Display Module) - Power & Volume Button - Motherboard - SSD Door - Removable solid-state drive (rSSD)

Device	Replaceable components
Surface Laptop 3 	<ul style="list-style-type: none"> - A/B-Cover (Display module) - C-Cover (Keyboard) - Feet & Screws - Removable solid-state drive (rSSD)
Surface Laptop 4 	<ul style="list-style-type: none"> - A/B-Cover (Display module) - C-Cover (Keyboard) - Feet & Screws - Removable solid-state drive (rSSD)
Surface Laptop 5 	<ul style="list-style-type: none"> - Kickstand - A/B-Cover (Display module) - C-Cover (Keyboard) - Feet & Screws - USB-C & Audio Jacks - Surface Connect - Bucket - Speaker & Wi-Fi Modules - Battery - Thermal Module - Motherboard - Removable solid-state drive (rSSD)
Surface Laptop Go 2 	<ul style="list-style-type: none"> - A/B Cover (Display module) - Removable solid-state drive (rSSD) - C-Cover (Keyboard) - Feet - Battery - Fingerprint Reader - Surface Connect

Device	Replaceable components
Surface Laptop Studio 	<ul style="list-style-type: none"> - A/B Cover (Display module) - C- cover (Keyboard) - Charging Port - USB-C & Audio Jacks - Removable solid-state drive (rSSD) - Cosmetic Plate - Keyboard/Trackpad - Feet
Surface Studio 2+ 	<ul style="list-style-type: none"> - Removable solid-state drive (rSSD) - Motherboard - A/B-Cover (Display module) - Thermal Module
Surface Laptop SE 	<ul style="list-style-type: none"> - A/B Cover (Display module) - C-Cover (Keyboard) - Bucket - Feet & Screws - Speaker & Wi-Fi Modules - Motherboard

Surface service guides & related documentation

Downloadable service guides provide step-by-step instructions for servicing specific devices. This documentation is intended for use by skilled technicians and IT professionals.

- [Download service guides ↗](#)
- [Replace the feet on Surface devices ↗](#)

 **Caution**

Opening or repairing your device can present electric shock, device damage, fire and personal injury risks, and other hazards. Use caution if undertaking do-it-yourself repairs. Further, any resulting damage caused will not be covered under Microsoft's Limited Hardware Warranty or purchased protection plan.

Repair videos

Demos from Surface engineering show how to disassemble replaceable components, as documented in Surface service guides.

- [Surface Pro 9 ↗](#)
- [Surface Laptop 5 ↗](#)
- [Surface Studio 2+ ↗](#)
- [Surface Laptop Go 2 ↗](#)
- [Surface Laptop Studio ↗](#)
- [Surface Laptop SE ↗](#)

Support

- [Surface Support for Business and Education customers](#)
- [In-store Support ↗](#)
- [Purchase replaceable Components at our Authorized Resellers ↗](#)

Self help tips & tools

- [Surface Diagnostic Toolkit for Business](#)
- [Top support solutions for Surface devices](#)
- [Microsoft 365 admin center ↗ \(Microsoft Manager Centralized solution\)](#)
- [Preparing Surface devices for service ↗](#)
- [Microsoft Packing and Shipping Instructions ↗](#)
- [Protect data during service ↗](#)

References

1. Repairing your device with a replaceable component does not impact Microsoft's Limited Warranty, however any damage to the device resulting from a repair performed by someone other than Microsoft or an Authorized Service Provider will not be covered under Microsoft's warranty or protection plan.

2. Customer self-repair is only available on Microsoft devices with a removable component per the product's technical specifications. Microsoft recommends that self-repair be performed by technically inclined individuals with the knowledge, experience and required tools while following the applicable [Surface Service Guide](#) or [article](#). Opening or repairing your device can present various risks, such as electric shock, device damage, fire and personal injury risks, and other hazards. Use caution if undertaking do-it-yourself repairs. Further, any resulting damage caused will not be covered under Microsoft's Limited Hardware Warranty or purchased protection plan.
3. Microsoft's Limited Hardware Warranty is in addition to any right you may have under consumer or other laws applicable to you.
4. Back cover (aka bucket) for Surface Pro 9 with 5G is only available in select markets and is currently unavailable in US.

Surface service options

Article • 05/22/2023 • Applies to: Windows 10, Windows 11

Most [newer Surface devices](#) are designed to facilitate the repair or replacement of primary components like the solid-state drive (SSD), keyboard, or display. With the purchase of a new commercial Surface for Business device, you can maximize your investment with services and repair¹ options.

If your Surface stops working, you can take advantage of new options to service, repair, or replace components on your device.

Every commercial device comes with a minimum 1-year Microsoft Limited Hardware warranty. For added peace of mind, Microsoft Protection Plans² offer extended coverage and services that help you with every stage of support you might need for your Surface devices, from deployment to replacement.

Recommended service options for in-warranty devices

If you need to service a device covered by Microsoft's Limited Hardware Warranty³ or a Microsoft Protection Plan, we recommend commercial customers open service requests via a self-serve portal. Or if you want to service devices yourself with [self-serve replaceable components](#), see [Customer self-serve repair](#).

 **Note**

Self-serve replaceable components are currently **only available for purchase separately**, independent of the warranty status of your device.

Surface Management Portal

1. Sign in to the [Microsoft Intune admin center](#) and go to **All services > Surface Management Portal**.
2. Select **Repair > New repair request**. For eligible devices and regional availability, see [Microsoft in-region repair](#).

The screenshot shows the Microsoft Intune admin center with the Surface Management Portal. The 'Repair' tab is selected. A callout bubble indicates that customers can now create Surface device and select accessory repair orders from the Surface Management Portal itself. Below this, the 'Repair request' section displays three metrics: 'Return devices are being processed' (0), 'Replacement devices in transit' (0), and 'Replacement devices have been delivered' (0). A 'New repair request' button is highlighted with a red box. To the right, there's a 'Resources' sidebar with links like 'Surface Diagnostic Toolkit for Business', 'Download Surface service guides', 'Microsoft Surface for IT Professionals', and 'Latest news on Surface'. Below the main area, sections for 'Recently open repair requests' and 'Repair requests in transit' are shown.

Hardware Support Portal

1. Sign in to the [Microsoft 365 admin center](#) and go to **Show all > Support > Microsoft hardware support**.
2. Select **New repair request**. For eligible devices and regional availability, see [Microsoft in-region repair](#).

The screenshot shows the Microsoft 365 admin center with the 'Microsoft hardware support' page. The 'Overview' tab is selected under the 'Repair Requests' section. A callout bubble says 'Select accessories are now available for repair request'. Below, the 'Repair Requests' section shows three metrics: 'Return devices are being processed' (0), 'Replacement devices in transit' (0), and 'Replacement devices have been delivered' (0). A 'New repair request' button is highlighted with a red box. The left sidebar includes categories like Home, Users, Teams & groups, Roles, Resources, Billing, Support (with Help & support, View service requests, Customer Lockbox Requests, and Microsoft hardware support), and Settings.

Tip

If you need to repair a personal (non-commercial) device, sign into your account at [account.microsoft.com/devices](#), choose the device that needs service, and then select **Start order**.

Recommended service options for out-of-warranty devices

For devices that are no longer covered by Microsoft's Limited Warranty³ or Protection Plan, Microsoft offers several options for service or repair.

- **Customer Self Repair.** Self-repair¹ devices using replaceable components available for purchase from [Authorized Device Resellers](#). For instructions on how to submit a parts request, see [Customer self-serve repair](#). Your product may also be eligible for out-of-warranty service for a fee.⁴
- **Microsoft in-region repair.** Submit a repair request via the [Surface Management Portal](#) or [Hardware Support Portal](#), as described on this page. For eligible devices and regional availability, see [Microsoft in-region repair](#).
- **Authorized Service Providers.** Send devices to an Authorized Service Provider (ASP) who performs repairs on Microsoft's behalf. To learn more, see [Surface repair by Microsoft Authorized Service Providers](#).
- **Battery replacement service.** Paid battery replacement service offers are available for: Surface Duo, Surface Laptop 3 (15" & 13.5"), Surface Laptop 4 (15" & 13.5"), Surface Pro 7, Surface Pro 7+, Surface Pro X, Surface Pro 8, Surface Go 2, Surface Go 3, Surface Laptop Go, Surface Book 3, Surface Laptop Studio, Surface Duo 2, and Surface Laptop Go 2. The battery replacement service offers are available worldwide, except China, India, and MEA. **To find battery replacement service costs for your Surface device or accessory, see [How much does out-of-warranty service cost for your Surface device or accessory?](#)**

Learn more

- [Surface Service Guides](#)
- [Replace the feet on Surface devices](#)

References

1. Customer self-repair is only available on Microsoft devices with a removable component per the product's technical specifications. Microsoft recommends that self-repair be performed by technically inclined individuals with the knowledge, experience and required tools while following the applicable [Surface Service Guide](#) or [article](#). Opening or repairing your device can present various risks, such as electric shock, device damage, fire and personal injury risks, and other hazards. Use caution if undertaking do-it-yourself repairs. Further, any resulting

damage caused will not be covered under Microsoft's Limited Hardware Warranty or purchased protection plan.

2. Additional extended coverage for mechanical breakdown and accidental damage from handling is available through the purchase of a Microsoft Protection Plan. If the plan provides mechanical breakdown coverage, coverage begins upon expiration of the manufacturer's original warranty and continues for the remainder of the term shown on the customer's Proof of Purchase. Accidental damage from handling begins immediately upon purchase. Restrictions apply, for all Microsoft Protection Plans, please reference the [terms and conditions](#) for the applicable limitations of liability and exclusions.
3. Microsoft's Limited Warranty is in addition to any right you may have under consumer or other laws applicable to you.
4. Availability of out-of-warranty offers vary by product and country and are subject to change. For more information, see [How much does out-of-warranty service cost for your Surface device or accessory?](#).

Microsoft in region same unit repair

Article • 05/22/2023 • Applies to: Windows 10, Windows 11

Microsoft can repair many commercial Surface devices via in-region repair facilities. If troubleshooting or diagnostics determine that your Surface device needs repair and is eligible for mail-in repair services, you can ship it to Microsoft for repair and return.

ⓘ Note

Allow an average of 6-8 days to receive your replacement device. Times may vary based on location and product availability.

Open service request

To initiate service, open a request via a self-serve portal:

- **Surface Management Portal:** Sign into the [Microsoft Intune admin center](#) and go to All services > Surface Management Portal. Select New repair request.
- **Microsoft Hardware Support Portal:** Sign into the [Microsoft 365 Admin Center](#) and go to Show all > Support > Microsoft hardware support. Select New repair request.

Upon successful repair, Microsoft returns the device to your shipping address. Average turnaround time is 6-12 calendar days depending on your location and supply chain availability.

Devices eligible for repair

The following devices are eligible for same unit repair:

- Surface Laptop 3 – 13" & 15"
- Surface Laptop 4 – 13" & 15"
- Surface Laptop 5 – 13" & 15"
- Surface Pro 7
- Surface Pro 7+ ¹
- Surface Pro 8
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Go 2

- Surface Go 3
- Surface Pro X
- Surface Laptop Studio ¹
- Surface Laptop SE

Availability

Except where noted, same unit repair is available in the following locations:

Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Luxemburg, Malta, Mexico, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, United Kingdom, United States

References

1. Same unit repair of Surface Pro 7+ and Surface Laptop Studio is currently unavailable in United States or Mexico.

Surface repair by Microsoft Authorized Service Providers

Article • 05/22/2023 • Applies to: Windows 10, Windows 11

As part of our commitment to provide great service and support to all our customers, we're building a great network of authorized service providers (ASPs) to help repair and service your Surface devices. ASPs work closely with Microsoft to help resolve issues that may occur with your Microsoft devices. ASPs perform repairs on behalf of Microsoft, have direct access to Microsoft support, and use genuine Microsoft parts.

Global ASP network

The growing ASP network consists of more than 160 locations.

Americas

- [CompuCom ↗](#)
- [Compugen ↗](#)
- [Coreio ↗](#)
- [DXC Technology ↗](#)
- [FedEx ↗](#)
- [Integrated Technology Group \(ITG\) ↗](#)
- [Microserve ↗](#)
- [TD SYNNEX ↗](#)
- [UDT ↗](#)

Europe

- [Carillion ↗](#)
- [Computacenter ↗](#)
- [D4B ↗](#)
- [Econocom ↗](#)
- [Ratiodata ↗](#)
- [Think About It ↗](#)

Asia Pacific

- [ASI solutions ↗](#)

- Comp Now ↗
- Digital China ↗
- Double Rise ↗
- JB Hi-Fi ↗
- Unisys ↗

Customer self-serve repair for Surface devices

Article • 05/22/2023 • Applies to: Windows 10, Windows 11

Technically inclined individuals with the knowledge, skills, and required tools can perform self-serve repairs¹ on eligible Surface devices by following the applicable [Surface Service Guide](#) or article.

Self-repair replaceable components are available for purchase through [device resellers](#). There are no certifications required to repair or service a Surface device. Replaceable components have a 1-year Limited Hardware Warranty.²

Microsoft is partnering with [ifixit.com](#) to offer complete tool kits to repair electronics. Use iFixit's everyday precision tool kit or essential electronics tool kit to repair your computers, tablets, game consoles, and or other electronic gadgets.

Tip

Before proceeding with a service request, download the [Surface Diagnostic Toolkit](#) for automated hardware tests on components, including the power supply, battery, display, and sound.

How to open a self-serve repair request

This section explains how self-repair works for commercial customers.

Note

Self-serve replaceable components are currently **only available for purchase separately**, independent of the warranty status of your device.

Example: Surface Laptop 5: Replace cracked display

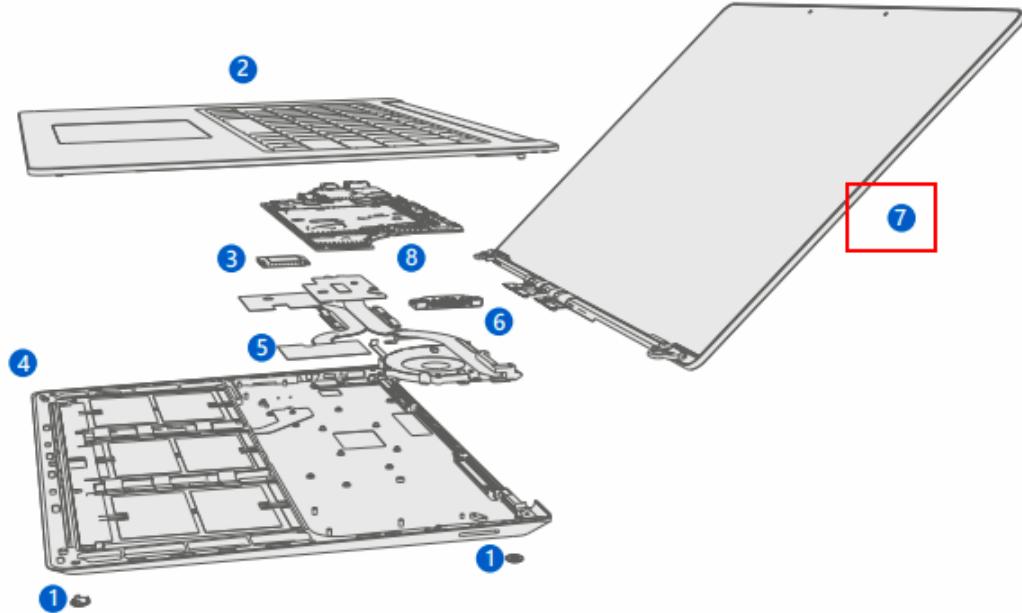
In this scenario, a customer must replace a broken display on their Surface Laptop 5. (Follow the same process for all other part requests for repairable Surface devices.)

1. First, you need to obtain the appropriate part number for the replaceable part and order it from an [authorized device reseller](#). In this example, you would need the

part number that corresponds to the display size and color of the device.

2. Go to [Surface Service Guides](#) and download the **Surface Laptop 5 Service Guide** (available in English, French, Japanese, or Simplified Chinese). The [Surface Service Guides](#) page contains links to all available Service Guides for Surface devices.
3. Go to the Illustrated Parts List and look for the display (7).

Illustrated Service Parts List



4. Look up the part number; specifically, the CRU Part No (customer replaceable unit): in this example, the CRU Part No for a Platinum 15-inch Surface Laptop 5 is **U71-00001**.

Item	Component	ASP / FRU Part No.	CRU Part No.	13.5-inch	15-inch
(7)	Display (AB-Cover)				
	Platinum	U1S-00001	U2I-00001	X	
	Sage	U1S-00003	U2I-00003	X	
	Sandstone	U1S-00004	U2I-00004	X	
	Platinum	U5B-00001	U7I-00001		X
	Black	U5B-00002	U7I-00002		X

Tip

Order self-service parts using the CRU number. Ignore ASP/FRU part numbers. Each Surface Service Guide contains an Illustrated Parts List followed by a table that contains CRU numbers for replaceable parts.

5. Contact an [Authorized Device Reseller](#) and let them know you need a new display for your Surface Laptop 5. Provide the reseller with the CRU part number; in this example, U71-00001.
6. The reseller confirms the part availability and places an order with their Authorized Device Distributor. Parts are shipped to the reseller or directly to you.

Note

Part availability may vary by country and is subject to change due to supply chain constraints, customer demand, and related issues.

Caution

Repairing your device with a replaceable component doesn't affect Microsoft's Limited Warranty; however, any damage to the device resulting from a repair performed by someone other than Microsoft or an Authorized Service Provider won't be covered under Microsoft's warranty or protection plans.

Learn more

- [Surface Service Guides](#)
- [Replace the feet on Surface devices](#)

References

1. Customer self-repair is only available on Microsoft devices with a removable component per the product's technical specifications. Microsoft recommends that self-repair is performed by technically inclined individuals with the knowledge, experience and required tools while following the applicable [Surface Service Guide](#) or [article](#).
2. Microsoft's Limited Hardware Warranty is in addition to any right you may have under consumer or other laws applicable to you.

Next Business Day Service information & coverage areas

Article • 04/04/2023 • Applies to: Surface

Next Business Day is a paid-for service where a replacement Surface device will be delivered to your premises by the next business day (availability in select countries). These services apply after an agent determines a replacement device is required, confirms available inventory, and submits an order for a replacement device by a standard cutoff time, predetermined by Microsoft.

Guidelines

- Overnight delivery is subject to availability of our authorized overnight delivery carriers.
- To guarantee delivery for a replacement device by the next business day, device replacement requests must be completed by the cutoff times listed below.
- For full terms and conditions, refer to [Warranties, extended service plans, and Terms & Conditions for your device ↗](#)

Coverage

For a list of supported post codes, see "Next business day coverage" where applicable below.

- [Australia](#)
- [Austria](#)
- [Belgium](#)
- [Bulgaria](#)
- [Canada](#)
- [Croatia](#)
- [Czech Republic](#)
- [Denmark](#)
- [Estonia](#)
- [Finland](#)
- [France](#)
- [Germany](#)
- [Greece](#)
- [Hong Kong](#)

- Hungary
- India
- Ireland
- Italy
- Japan
- Latvia
- Lithuania
- Luxembourg
- Malaysia
- Malta
- Mexico
- New Zealand
- Norway
- Poland
- Portugal
- Romania
- Singapore
- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- The Netherlands
- United Kingdom
- United States

Australia

- Cutoff Time: 14:30 AET (UTC+11)
- [Next business day coverage ↗](#)

Austria

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Belgium

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Bulgaria

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Canada

- Cutoff Time: 14:00 CST (UTC-6)
- [Next business day coverage ↗](#)

Croatia

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Czech Republic

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Denmark

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Estonia

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Finland

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

France

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Germany

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Greece

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Hong Kong

- Cutoff Time: 16:00 HKT (UTC+8)
- NBD coverage is available in all postal codes in Hong Kong.

Hungary

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

India

- Cutoff Time: 12:00 (UTC+8.5)
- [Next business day coverage ↗](#)

Ireland

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Italy

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Japan

- Cutoff Time: 15:30 JST (UTC+9)
- [Next business day coverage ↗](#)

Latvia

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Lithuania

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Luxembourg

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Malaysia

- Cutoff Time: 2:00 PM MST (UTC +8:00)
- [Next business day coverage ↗](#)

Malta

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Mexico

- Cutoff Time: 10:00 MT (UTC+6)
- [Next business day coverage ↗](#)

New Zealand

- Cutoff Time: 14:00 NZST (UTC+12)
- [Next business day coverage ↗](#)

Norway

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Poland

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Portugal

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Romania

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Singapore

- Cutoff Time: 13:00 SGT (UTC+8)
- NBD coverage is available in all postal codes in this country.

Slovakia

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Slovenia

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

South Africa

- Cutoff Time: 2:00 PM SAST (UTC +2:00)
- [Next business day coverage ↗](#)

South Korea

- Cutoff Time: 2:00 PM KST (UTC +9:00)
- [Next business day coverage ↗](#)

Spain

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Sweden

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Switzerland

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

Taiwan

- Cutoff Time: 1:00 PM NST (UTC +8:00)
- [Next business day coverage ↗](#)

Thailand

- Cutoff Time: 2:00 PM ICT (UTC +7:00)
- [Next business day coverage ↗](#)

The Netherlands

- Cutoff Time: 12:00 CET (UTC+1)
- [Next business day coverage ↗](#)

United Kingdom

- Cutoff Time: 12:00 CET (UTC+1)
- [Next day business coverage ↗](#)

United States

- Cutoff Time: 14:00 CST (UTC-6)
- [Next day business coverage ↗](#)

Best practices for SSD removal from compatible Surface devices

Article • 04/26/2023 •

Applies Surface Laptop Studio, Surface Pro 9, Surface Pro 9 with 5G, Surface Pro 8, Surface Pro 7+,
to: Surface Pro X, Surface Laptop Go, Surface Laptop Go 2, Surface Laptop 3, Surface Laptop 4,
Surface Laptop 5, Surface Studio 2+, Windows 10, Windows 11

ⓘ Note

This article is intended for use by qualified IT technicians in an enterprise organization. It describes the recommended best practices for use by skilled IT technicians in the removal and replacement of SSDs in the following compatible Surface devices:

- Surface Laptop Studio
- Surface Pro 9
- Surface Pro 9 with 5G
- Surface Pro 8
- Surface Pro 7+
- Surface Pro X
- Surface Laptop Go
- Surface Laptop Go 2
- Surface Laptop 3
- Surface Laptop 4
- Surface Laptop 5
- Surface Studio 2+

⊗ Caution

Opening devices and replacing components can present electric shock, device damage, fire, personal injury risks, and other hazards. Always use caution when you undertake such activities. Follow the safety precautions and procedures identified in the [Surface Service Guide](#). We recommend that you get professional assistance if you cannot follow the documented safety precautions and procedures.

Prepare for SSD removal

Install the latest updates

Before you begin, make sure that your version of Windows has the latest updates installed:

1. Go to **Start > Settings > Update & Security**, and select **Check for updates**.
2. Install all available updates.
3. Verify any passwords that are necessary to access the device.

Manage BitLocker

Note

This section includes recommendations for organizations that have enabled BitLocker encryption for hard disks. For more information, see [BitLocker Recovery Guide](#).

If BitLocker encryption is disabled during SSD removal and replacement

If the device can be unencrypted before SSD removal and replacement, follow these steps to turn off BitLocker:

1. In **Settings**, type **BitLocker** and then select **Manage BitLocker**.
2. Select **Turn Off BitLocker**.
3. Power down the device.

If BitLocker encryption is enabled during SSD removal and replacement

If the device is encrypted before SSD removal and replacement, follow these steps to generate a BitLocker recovery key and save it to USB storage:

1. In **Settings**, type **BitLocker**.
2. Select **Manage BitLocker > Generate BitLocker Recovery Key**.
3. Insert a USB drive.
4. Save the recovery key to USB storage.
5. Remove the USB drive.
6. Power down the device.

Remove and replace SSD

1. Remove the SSD by using the instructions for your device included in the applicable [Surface Service Guide](#).
2. Put the original SSD into a new device and connect the new device to a wired internet connection.
3. Power on the new device. The device may go through a firmware update during startup.

After SSD removal and replacement

Manage unencrypted SSDs

If the SSD is unencrypted during the transfer, follow these steps:

1. Go to **Sign-In Options > Password** (represented by the key icon on the left side).
2. Enter the password and sign in pending completion of two-factor authentication (if applicable).
3. After you are fully signed in, go to **Start > Account > Sign out**.
4. Sign back in by using the password and set up Windows Hello and a PIN when you are prompted.
 - If the device was BitLocker-disabled to facilitate SSD removal and replacement, and you want to enable BitLocker after the replacement, go to **BitLocker > Manage BitLocker > Resume BitLocker**.
5. Run the [Microsoft Surface Diagnostic Toolkit for Business](#) (SDT) to verify full device functionality.
6. Check for Windows activation by navigating to **Settings > Activation**. If you see any error messages, select **Troubleshoot**.
7. Check the Office account by opening the **Office App**, navigate to **File > Account** and then check for any error messages.

Managing encrypted SSDs

Note

You will have to have a second device to read the BitLocker Recovery key that was saved on the USB drive.

If the SSD is encrypted during the transfer, follow these steps:

1. Insert the USB drive that contains the BitLocker recovery key into the second device.
2. Open the .txt file that contains the BitLocker recovery key.
3. Manually enter the BitLocker recovery key on the new device that contains the original SSD.
4. After you have successfully entered the BitLocker recovery key, go to **Sign-In Options > Password** (represented by the key icon on the left side).
5. Enter the password and sign in, pending completion of two-factor authentication (if applicable).
6. After you are fully signed in, go to **Start > Account > Sign out**.
7. Sign back in by using the password, and then set up Windows Hello and add a PIN.
8. If the device was BitLocker-disabled to facilitate SSD removal and replacement, and if you want to enable BitLocker after the replacement, go to **Settings > BitLocker > Manage BitLocker > Resume BitLocker**.
9. Run **SDT** to verify full device functionality.
10. To check Windows activation, select **Settings > Activation**. If you see any error messages, select **Troubleshoot**.
11. To check the status of the Office account, open the **Office App**, then go to **File > Account** to check for any error messages.

Learn more

- [Surface Service Guides ↗](#)
- [BitLocker Recovery Guide](#)

Still need help? Go to [Microsoft Community ↗](#).

Advanced Exchange replacement for Surface devices

Article • 01/03/2023 • Applies to: Windows 10, Windows 11

Some commercial Microsoft Surface products and extended protection plans come with Advanced Exchange. If Microsoft determines your device needs to be replaced, you can replace your device with Advanced Exchange. For more information, review [Warranty and Protection Plan Terms & Conditions](#).

How it works

1. Please perform diagnostic testing using the automated [Surface Diagnostic Toolkit for Business](#). You may have the option to have your device replaced.
2. Microsoft immediately ships you a replacement device with a prepaid return shipping label before receiving your original defective product.
3. Return your original defective product to Microsoft within 10 calendar days after you receive the replacement device.
4. If possible, ensure all data is backed up and removed before returning your defective product to Microsoft. To learn more, see [Backup and Restore in Windows](#). Microsoft is not responsible for any loss of data during servicing.
5. Return your original product using the box and prepaid shipping label that comes with your replacement device. If you fail to return your original Surface device within 10 days, you will be assessed Microsoft's retail price of the device plus a shipping & handling fee.

Note

Allow an average of 3-5 days to receive your replacement device. Times may vary based on location and product availability.

Commercial products or scenarios not covered by the Microsoft Limited Hardware Warranty or a Microsoft Extended Protection Plan are not eligible for Advanced Exchange replacement.

Tip

To confirm your coverage status, refer to the [Check Warranty Self-Service Portal](#). For out-of-warranty exchange information and pricing, see [Microsoft's out-of-warranty exchange information](#).

warranty service cost ↗.

Learn more

- [Warranty and Protection Plan Terms & Conditions ↗](#).

Surface Australia On-Site service and repair

Article • 04/19/2023 • Applies to: Windows 10, Windows 11

This service is one of the benefits available under the Microsoft Extended Hardware Service Plan Plus with On-Site ("EHS Plus with On-Site") for eligible Microsoft Surface series devices.¹ This plan is only offered in Australia at this time.

Customer eligibility

EHS Plus with On-Site is a commercial Protection Plan available for purchase by enterprise customers, including educational institutions, through a [Microsoft Authorized Reseller](#).²

Eligible devices (commercial versions only)

- Microsoft Surface Laptop 5 for Business
- Microsoft Surface Pro 9 for Business
- Microsoft Surface Pro 9 with 5G for Business

What is covered

EHS Plus with On-Site covers mechanical breakdown that results in the device no longer being able to perform its intended function caused by workmanship or manufacturing defects.³ Refer to the Terms & Conditions for Extended Hardware Services Plan Plus with On-Site for more information about coverage and exclusions available here: [Warranty and Protection Plan Terms & Conditions](#).

Postal Codes for availability

- [Australian Capital Territory](#)
- [New South Wales](#)
- [Queensland](#)
- [South Australia](#)
- [Tasmania](#)
- [Victoria](#)
- [Western Australia](#)

Note

On-site service is part of the extended EHS Plus On-Site Protection plan you purchased, and the services are provided by a Microsoft vendor and not Microsoft.

On-site may not be available within the first 90 days after the original purchase date of an eligible Microsoft Surface series device. As an alternative, Microsoft may replace your device using [Next Business Day Advanced Exchange](#).

References

1. Some services may be provided by an authorized third-party supplier or service provider working on Microsoft's behalf.
2. In Australia, commercial protection plans must be purchased within forty-five (45) days from the original purchase date of an eligible commercial Microsoft Surface device.
3. Service provider's repair technician may repair the covered Microsoft device, but they do not image devices or re-install customer software or data. Repair technicians will also not ensure Microsoft Autopilot or Intune products are re-enabled on the covered Microsoft device.