# Precision 3590

## Technical Guidebook

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DELL Technologies

## Notes, cautions, and warnings

**NOTE:** A NOTE indicates important information that helps you make better use of your product.

**CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

**WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

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# 1

# Views of Precision 3590

## Right

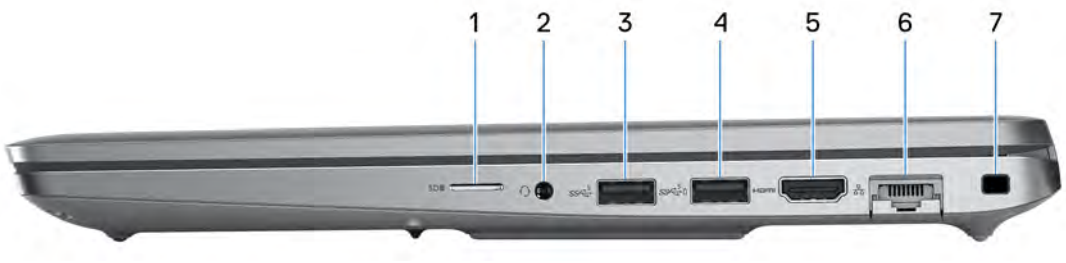


**Figure 1. Right view**

1. **microSD-card slot**

   Reads from and writes to the microSD-card.

2. **Universal audio jack**

   Connect headphones or a headset (headphone and microphone combo).

3. **USB 3.2 Gen 1 port**

   Connect devices such as external storage devices and printers. It provides data transfer speeds up to 5 Gbps.

4. **USB 3.2 Gen 1 port with PowerShare**

   Connect devices such as external storage devices and printers.

   It provides data transfer speeds up to 5 Gbps. PowerShare enables you to charge your USB devices even when your computer is turned off.

   **NOTE:** If the charge on your computer's battery is less than 10 percent, you must connect the power adapter to charge your computer, and USB devices connected to the PowerShare port.

   **NOTE:** If a USB device is connected to the PowerShare port before the computer is turned off or in hibernate state, you must disconnect and connect it again to enable charging.

   **NOTE:** Certain USB devices may not charge when the computer is turned off or in a sleep state. In such cases, turn on the computer to charge the device.

5. **HDMI 2.1 TMDS port**

   Connect to a TV, external display, or another HDMI-in enabled device. Provides video and audio output.

6. **Network port**

   Connect an Ethernet (RJ45) cable from a router or a broadband modem for network or Internet access, with a transfer rate of 10/100/1000 Mbps.

7. **Security-cable slot (wedge-shaped)**

   Connect a security cable to prevent unauthorized movement of your computer.

# Left

**Figure 2. Left view**

1. **Thunderbolt 4.0 with DisplayPort Alt Mode/USB Type-C/USB4/Power Delivery**

   Supports USB4, DisplayPort 1.4, Thunderbolt 4 and also enables you to connect to an external display using a display adapter. Provides data transfer rates of up to 40 Gbps for USB4 and Thunderbolt 4.

   **NOTE:** You can connect a Dell Docking Station to one of the Thunderbolt 4 ports. For more information, search in the Knowledge Base Resource at www.dell.com/support.

   **NOTE:** A USB Type-C to DisplayPort adapter (sold separately) is required to connect a DisplayPort device.

   **NOTE:** USB4 is backward compatible with USB 3.2, USB 2.0, and Thunderbolt 3.

   **NOTE:** Thunderbolt 4 supports two 4K displays or one 8K display.

2. **Thunderbolt 4.0 with DisplayPort Alt Mode/USB Type-C/USB4/Power Delivery**

   Supports USB4, DisplayPort 1.4, Thunderbolt 4 and also enables you to connect to an external display using a display adapter. Provides data transfer rates of up to 40 Gbps for USB4 and Thunderbolt 4.

   **NOTE:** You can connect a Dell Docking Station to one of the Thunderbolt 4 ports. For more information, search in the Knowledge Base Resource at www.dell.com/support.

   **NOTE:** A USB Type-C to DisplayPort adapter (sold separately) is required to connect a DisplayPort device.

   **NOTE:** USB4 is backward compatible with USB 3.2, USB 2.0, and Thunderbolt 3.

   **NOTE:** Thunderbolt 4 supports two 4K displays or one 8K display.

3. **Battery-status light**

   Battery-status light indicates the battery-charge status.

   - White-Battery is charging.
   - Solid yellow-Battery charge is low.
   - Blinking yellow-Battery charge is critical.
   - Off—Battery is fully charged.

4. **Smart-card reader slot (optional)**

   Using smart card provides authentication in corporate networks.

# Top

**Figure 3. Image: Top view**

1. **Power button with optional fingerprint reader**

   Press to turn on the computer if it is turned off, in sleep state, or in hibernate state.

   When the computer is turned on, press the power button to put the computer into sleep state; press and hold the power button for 10 s to force shut-down the computer.

   If the power button has a fingerprint reader, place your finger on the power button steadily to log in.

   **NOTE:** You can customize the power-button behavior in Windows.

2. **Keyboard**

   Use the keyboard to input characters and functions into your computer.

3. **Fingerprint reader (optional)**

   Press your finger on the fingerprint reader to log in to your computer. The fingerprint reader enables your computer to recognize your fingerprints as a password.

   **NOTE:** Configure the fingerprint reader to register your fingerprint and enable access.

4. **NFC or Contactless smart card reader (optional)**

   NFC or Contactless smart card reader provides contactless access of cards in corporate networks.

5. **Touchpad**

   Move your finger on the touchpad to move the mouse pointer. Tap to left-click and two fingers tap to right-click.

# Front

**Figure 4. Image: Front view**

1. **Left microphone**

   Provides digital sound input for audio recording and voice calls.

2. **Infrared emitter (optional)**

   The infrared emitter emits infrared light, which enables the infrared camera to sense and track motion.

3. **Infrared camera (optional)**

   Enhances security when paired with Windows Hello face authentication.

4. **Camera shutter**

   Slide the privacy shutter to the left to access the camera lens.

5. **Camera**

   A camera enables you to video chat, capture photos, and record videos.

6. **Camera-status light**

   Turns on when the camera is in use.

7. **Ambient-light sensor (optional)**

   The sensor detects the ambient light and automatically adjusts the display brightness.

8. **Right microphone**

   Provides digital sound input for audio recording and voice calls.

# Back

**Figure 5. Image: Back view**

1. **Nano-SIM card slot (optional)**

   Insert a nano-SIM card to connect to a mobile broadband network.

   **NOTE:** Availability of the nano-SIM card slot depends on the region and configuration ordered.

# Bottom

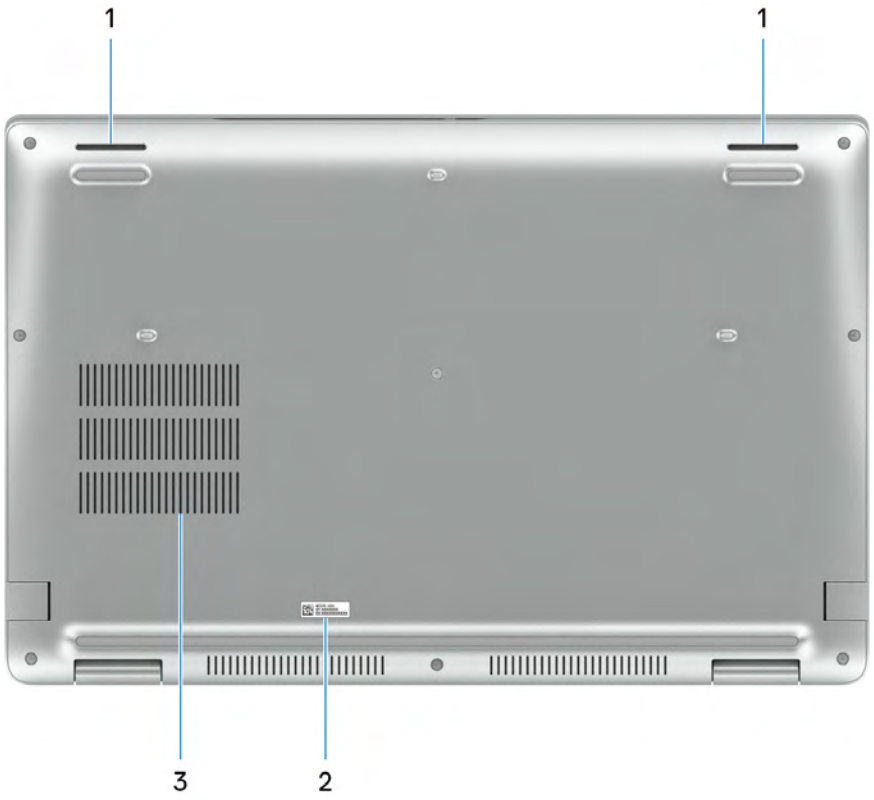


**Figure 6. Image: Bottom view**

1. **Speakers**

   Provide audio output.

2. **Service Tag label**

   The Service Tag is a unique alphanumeric identifier that enables Dell service technicians to identify the hardware components in your computer and access warranty information.

3. **Air vents**

Air vents provide ventilation for your computer. Clogged air vents can cause overheating and can affect your computer's performance and potentially cause hardware issues. Keep the air vents clear of obstructions and clean them regularly to prevent the build-up of dust and dirt. For more information about cleaning air vents, search for articles in the Knowledge Base Resource at www.dell.com/support.

# Service Tag

The service tag is a unique alphanumeric identifier that allows Dell service technicians to identify the hardware components in your computer and access warranty information.

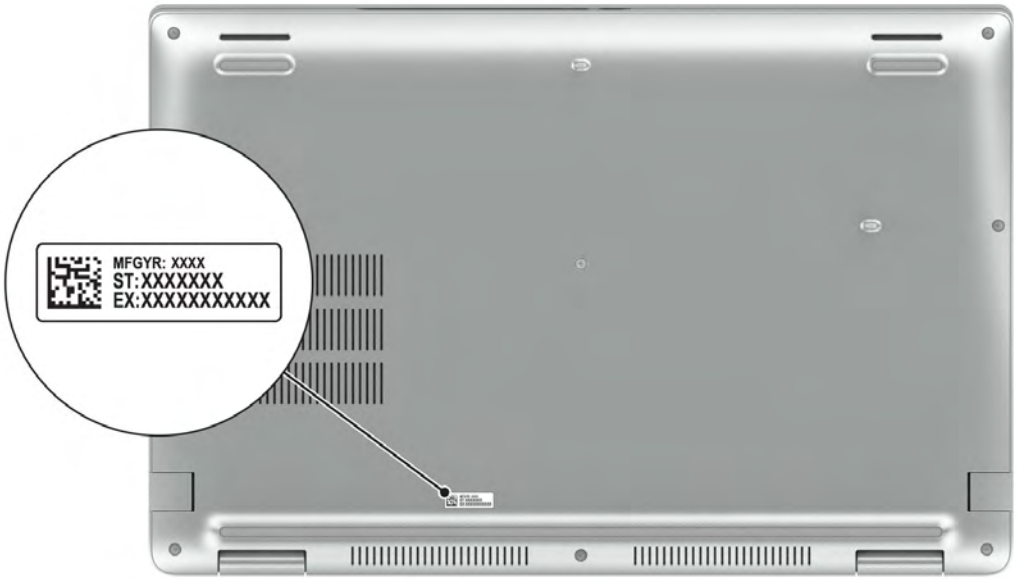


**Figure 7. Image: Service Tag location**

# Battery charge and status light

The following table lists the battery charge and status light behavior of your Precision 3590.

**Table 1. Battery charge and status light behavior**

| Power Source | LED Behavior | System Power State | Battery Charge Level |
|---|---|---|---|
| AC Adapter | Off | S0 - S5 | Fully Charged |
| AC Adapter | Solid White | S0 - S5 | < Fully Charged |
| Battery | Off | S0 - S5 | 11-100% |
| Battery | Solid Amber (590+/-3 nm) | S0 - S5 | < 10% |

- S0 (ON) - System is turned on.
- S4 (Hibernate) - The system consumes the least power compared to all other sleep states. The system is almost at an OFF state, except for a trickle power. The context data is written to a hard drive.
- S5 (OFF) - The system is in a shutdown state.

2

# Specifications of Precision 3590

## Dimensions and weight

The following table lists the height, width, depth, and weight of your Precision 3590.

**Table 2. Dimensions and weight**

| Description | Values |
|---|---|
| Height: | |
| Front height | 20.80 mm (0.82 in.) |
| Rear height | 22.80 mm (0.90 in.) |
| Width | 357.80 mm (14.09 in.) |
| Depth | 233.30 mm (9.19 in.) |
| Weight<br>**NOTE:** The weight of your computer depends on the configuration that is ordered and manufacturing variability. | 1.62 kg (3.58 lb) - minimum |

## Processor

The following table lists the details of the processors that are supported for your Precision 3590.

### Table 3. Processor

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Processor type | Intel Core Ultra 5 125U vPro Essentials | Intel Core Ultra 7 155U vPro Essentials | Intel Core Ultra 5 125H vPro Essentials |
| Processor wattage | 15 W | 15 W | 28 W |
| Processor total core count | 12 | 12 | 14 |
| Performance-cores | 2 | 2 | 4 |
| Efficient-cores | • E-cores: 8<br>• LPE-cores: 2 | • E-cores: 8<br>• LPE-cores: 2 | • E-cores: 8<br>• LPE-cores: 2 |
| Processor total thread counts<br>**NOTE:** Intel Hyper-Threading Technology is only available on Performance-cores. | 14 | 14 | 18 |
| Processor speed | Up to 4.30 GHz | Up to 4.80 GHz | Up to 4.50 GHz |
| Performance-cores frequency | | | |
| Processor base frequency | 1.30 GHz | 1.70 GHz | 1.20 GHz |
| Maximum turbo frequency | 4.30 GHz | 4.80 GHz | 4.50 GHz |
| Efficient-cores frequency | | | |
| Processor base frequency | 800 MHz | 1.20 | 700 MHz |
| Maximum turbo frequency | 3.60 GHz | 3.80 GHz | 3.60 GHz |
| Processor cache | 12 MB | 12 MB | 18 MB |
| Integrated graphics | Intel Graphics | Intel Graphics | Intel Graphics or Intel Arc Graphics |

### Table 4. Processor

| Description | Option four | Option five | Option six |
|---|---|---|---|
| Processor type | Intel Core Ultra 5 135H vPro Enterprise | Intel Core Ultra 7 155H vPro Essentials | Intel Core Ultra 7 165H vPro Enterprise |
| Processor wattage | 28 W | 28 W | 28 W |
| Processor total core count | 14 | 16 | 16 |
| Performance-cores | 4 | 6 | 6 |
| Efficient-cores | • E-cores: 8<br>• LPE-cores: 2 | • E-cores: 8<br>• LPE-cores: 2 | • E-cores: 8<br>• LPE-cores: 2 |
| Processor total thread counts<br>**NOTE:** Intel Hyper-Threading Technology is only available on Performance-cores. | 18 | 22 | 22 |
| Processor speed | Up to 4.60 GHz | Up to 4.80 GHz | Up to 5 GHz |
| Performance-cores frequency | | | |
| Processor base frequency | 1.70 GHz | 1.40 GHz | 1.40 GHz |
| Maximum turbo frequency | 4.60 GHz | 4.80 GHz | 5 GHz |
| Efficient-cores frequency | | | |
| Processor base frequency | 1.20 GHz | 900 MHz | 900 MHz |
| Maximum turbo frequency | 3.60 GHz | 3.80 GHz | 3.80 GHz |
| Processor cache | 18 MB | 24 MB | 24 MB |
| Integrated graphics | Intel Graphics or Intel Arc Graphics | Intel Graphics or Intel Arc Graphics | Intel Graphics or Intel Arc Graphics |

# Chipset

The following table lists the details of the chipset that is supported for your Precision 3590.

### Table 5. Chipset

| Description | Values |
|---|---|
| Chipset | Integrated in the processor |
| Processor | Intel Core Ultra 5/7 |
| DRAM bus width | 64-bit |
| Flash EPROM | 64 MB |
| PCIe bus | Up to Gen4 |

# Operating system

Your Precision 3590 supports the following operating systems:

- Windows 11 Home
- Windows 11 Pro
- Ubuntu Linux 22.04 LTS

# Memory

The following table lists the memory specifications of your Precision 3590.

### Table 6. Memory specifications

| Description | Values |
|---|---|
| Memory slots | Two-SODIMM slots |
| Memory type | DDR5 |
| Memory speed | 5600 MT/s |
| Maximum memory configuration | 64 GB |
| Minimum memory configuration | 8 GB |
| Memory size per slot | 8 GB, 16 GB, or 32 GB |
| Memory configurations supported | • 1 x 8 GB, DDR5, 5600 MT/s, single-channel<br>• 1 x 16 GB, DDR5, 5600 MT/s, single-channel<br>• 2 x 8 GB, DDR5, 5600 MT/s, dual-channel<br>• 2 x 16 GB, DDR5, 5600 MT/s, dual-channel<br>• 1 x 32 GB, DDR5, 5600 MT/s, single-channel<br>• 2 x 32 GB, DDR5, 5600 MT/s, dual-channel |

# External ports

The following table lists the external ports of your Precision 3590.

### Table 7. External ports

| Description | Values |
|---|---|
| Network port | One RJ45 port |
| USB ports | • One USB 3.2 Gen 1 port<br>• One USB 3.2 Gen 1 port with PowerShare<br>• Two Thunderbolt 4 ports with Power Delivery and DisplayPort<br>**NOTE:** You can connect a Dell Docking Station to this port. For more information, search in the Knowledge Base Resource at www.dell.com/support. |
| Audio port | One Universal audio port |
| Video port | One HDMI 2.1 TMDS port |
| Media-card reader | One microSD-card slot |

### Table 7. External ports (continued)

| Description | Values |
|---|---|
| Power-adapter port | USB Type-C power input |
| Security-cable slot | One wedge-shaped lock slot |
| SIM-card slot | nano-SIM card slot (optional) |

# Internal slots

The following table lists the internal slots of your Precision 3590.

### Table 8. Internal slots

| Description | Values |
|---|---|
| M.2 | • One M.2 2230 slot for WiFi and Bluetooth combo card<br>• One M.2 2230 or 2280 slot for solid state drive<br>• One M.2 2230 slot for solid-state drive<br>• One M.2 3042 slot for WWAN card<br>**NOTE:** To learn more about the features of different types of M.2 cards, search in the Knowledge Base Resource at www.dell.com/support. |

# Ethernet

The following table lists the wired Ethernet Local Area Network (LAN) specifications of your Precision 3590.

### Table 9. Ethernet specifications

| Description | Values |
|---|---|
| Model number | Intel I219-LM 10/100/Gb (1000BASE-T) for vPRO configurations |
| Transfer rate | 10/100/1000 Mbps |

# Wireless module

The following table lists the Wireless Local Area Network (WLAN) modules that are supported on your Precision 3590.

### Table 10. Wireless module specifications

| Description | Option one | Option two |
|---|---|---|
| Model number | Realtek RTL8852BE | Intel AX211 |
| Transfer rate | Up to 1201 Mbps | Up to 2400 Mbps |
| Frequency bands supported | 2.4 GHz/5 GHz | 2.4 GHz/5 GHz/6 GHz |
| Wireless standards | • WiFi 802.11a/b/g<br>• Wi-Fi 4 (WiFi 802.11n)<br>• Wi-Fi 5 (WiFi 802.11ac)<br>• Wi-Fi 6 (WiFi 802.11ax) | • WiFi 802.11a/b/g<br>• Wi-Fi 4 (WiFi 802.11n)<br>• Wi-Fi 5 (WiFi 802.11ac) |

### Table 10. Wireless module specifications (continued)

| Description | Option one | Option two |
|---|---|---|
| | | • Wi-Fi 6E (WiFi 802.11ax)<br>**NOTE:** Wi-Fi 6 is supported in regions where Wi-Fi 6E is unavailable. |
| Encryption | • 64-bit/128-bit WEP<br>• AES-CCMP<br>• TKIP | • 64-bit/128-bit WEP<br>• AES-CCMP<br>• TKIP |
| Bluetooth wireless card | Bluetooth 5.3 | Bluetooth 5.3 |
| | **NOTE:** The version of the Bluetooth wireless card may vary depending on the operating system that is installed on your computer. | |

# WWAN module

The following table lists the Wireless Wide Area Network (WWAN) module supported on your Precision 3590.

### Table 11. WWAN module specifications

| Description | Option one | Option two |
|---|---|---|
| Model number | Qualcomm Snapdragon SDX12 Advanced (DW5825e), CAT 12 | Qualcomm Snapdragon X62 Global 5G Modem (DW5932e) |
| Form factor | M.2 3042 Key-B | M.2 3042 Key-B |
| Host interface | USB 3.0/2.0 | PCIe Gen3 |
| Network standard | LTE FDD/TDD, WCDMA/HSPA+, GNSS/ Beidou, GPS/GLONASS/Beidou/Galileo | NR FR1 (Sub6) FDD/TDD, LTE FDD/ TDD, WCDMA/HSPA+, GPS/GLONASS/ Galileo/Beidou |
| Transfer data rate | • Up to 600 Mbps DL (CAT 12)<br>• Up to 150 Mbps UL | • 5G NR: DL 3.5 Gbps/ UL 900 Mbps<br>• LTE: DL 1.6 Gbps (CAT19)/ UL 211 Mbps (CAT18)<br>• UMTS: DL DC-HSPA+ Rel8:42 Mbps / UL 5.76 Mbps |
| Operating frequency bands | • LTE (B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B38, B39, B40, B41, B42, B43, B48, B66, B71)<br>• HSPA+ (1,2,4,5,6,8,19) | • NR (n1, n2, n3, n5, n7, n8, n20, n25, n28, n30, n38, n40, n41, n48, n66, n71, n77, n78, n79)<br>• LTE (B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71*)<br>• WCDMA/HSPA+ (1, 2, 4, 5, 8)<br>*Modem hardware supports but currently disabled |
| Power supply | DC 3.135 V to 4.40 V, Typical 3.30 V | DC 3.135 V to 3.63 V, Typical 3.3 V |
| SIM card | Supported through external SIM slot | Supported through external SIM slot |
| eSIM with dual SIM (DSSA) | Supported | Supported |

### Table 11. WWAN module specifications (continued)

| Description | Option one | Option two |
|---|---|---|
| | **NOTE:** The availability of eSIM functionality embedded on the module is dependent on the region and specific carrier requirements. | **NOTE:** The availability of eSIM functionality embedded on the module is dependent on the region and specific carrier requirements. |
| Antenna diversity | Supported | Supported |
| Radio On/Off | Supported | Supported |
| Wake on wireless | Supported | Supported |
| Temperature | • Normal operating temperature: -10°C to +55°C<br>• Extended Operating temperature: -30°C to +75°C | • Normal operating temperature: -10°C to +55°C<br>• Extended Operating temperature: -30°C to +75°C<br>• Storage temperature: -40°C to +85° |
| Antenna connector | • WWAN main antenna x 1<br>• WWAN diversity antenna x 1 | • WWAN main antenna x 1<br>• WWAN diversity antenna x 1<br>• 4x4 MIMO antenna x 2 |
| **NOTE:** For instructions on how to find your computer's International Mobile Equipment Identity (IMEI) number, search in the Knowledge Base Resource at www.dell.com/support. | | |

# Audio

The following table lists the audio specifications of your Precision 3590.

### Table 12. Audio specifications

| Description | | Values |
|---|---|---|
| Audio controller | | Realtek Waves, MaxxAudio 13.0 |
| Stereo conversion | | Supported |
| Internal audio interface | | High definition audio interface |
| External audio interface | | Universal Audio Jack/HDMI 2.1 TMDS port |
| Number of speakers | | 2 |
| Internal-speaker amplifier | | Not supported |
| External volume controls | | Keyboard shortcut controls |
| Speaker output: | | |
| | Average speaker output | 2 W |
| | Peak speaker output | 2 W |
| Subwoofer output | | Not supported |
| Microphone | | Digital-array microphones in camera assembly |

# Storage

This section lists the storage options on your Precision 3590.

Your Precision 3590 supports one of the following storage configurations:

- One M.2 2230 or 2280 solid state drive
- One M.2 2230 solid state drive

### Table 13. Storage specifications

| Storage type | Interface type | Capacity |
|---|---|---|
| M.2 2230 or 2280 solid state drive | PCIe Gen4 NVMe, up to 64 Gbps | Up to 2 TB |
| M.2 2230 solid state drive | PCIe Gen4 NVMe, up to 64 Gbps | Up to 1 TB |

# Keyboard

The following table lists the keyboard specifications of your Precision 3590.

### Table 14. Keyboard specifications

| Description | Values |
|---|---|
| Keyboard type | • Standard backlit AI hotkey keyboard<br>• Standard non-backlit AI hotkey keyboard<br>**NOTE:** Copilot in Windows is available only in approved markets. |
| Keyboard layout | QWERTY |
| Number of keys | • English US, English International, English UK, Canada (Bilingual), Arabic, Chinese (Traditional), French (Canadian), Greek, Hebrew, Korean, Russian, Thai, Ukrainian: 99 keys<br>• Bulgarian, English UK, French (Canadian), Spanish (Latin America), Brazilian, Belgian, Czech/Slovak (MUI), Danish, Estonian, French (European), German, Hungarian, Italian, Nordic (MUI), Norwegian, Portugese Iberian, Slovenian, Spanish (Castilian), Spanish (Latin America), Swedish/Finnish, Swiss/European (MUI), Turkish, Turkish (F): 100 keys<br>• Japanese - 103 keys |
| Keyboard size | X=18.05 mm key pitch<br>Y=18.05 mm key pitch |
| Keyboard shortcuts | Some keys on your keyboard have two symbols on them. These keys can be used to type alternate characters or to perform secondary functions. To type the alternate character, press Shift and the desired key. To perform secondary functions, press Fn and the desired key.<br>**NOTE:** You can define the primary behavior of the function keys (F1–F12) changing **Function Key Behavior** in BIOS setup program.<br>For more information, see Keyboard function keys. |

# Keyboard function keys

The **F1**-**F12** keys at the top of the keyboard are function keys. By default, these keys are used to perform specific functions defined by the software application in use.

### Table 15. List of keyboard shortcuts

| Key | Primary behavior |
|---|---|
| F1 | Mute audio |
| F2 | Decrease volume |
| F3 | Increase volume |
| F4 | Mute microphone |
| F5 | Keyboard backlight<br>**NOTE:** Toggle to cycle the keyboard backlight status through off, low-backlight, and high-backlight. |
| F6 | Decrease brightness |
| F7 | Increase brightness |
| F8 | Switch to external display |
| F10 | Print Screen |
| F11 | Home |
| F12 | End |
| Copilot | Launch Copilot in Windows<br>**NOTE:** If Copilot in Windows is not available on your computer, the CoPilot key launches Windows Search. For more information about Copilot in Windows, search in the Knowledge Base Resource at www.dell.com/support. |

You can run the secondary tasks that are indicated by the symbols on the function keys by pressing the function key with **fn**, for example, **fn** and **F1**. See the table below for the list of secondary tasks and the key combinations to run them.

**NOTE:** Keyboard characters may differ depending on the keyboard language configuration. Keys that are used for tasks remain the same, regardless of the keyboard language.

**NOTE:** You can define the primary behavior of function keys in the **Function Key Behavior** menu of the BIOS setup program.

### Table 16. Secondary tasks of keyboard keys

| Key combination for task | What the task does |
|---|---|
| **fn** and **F1** | Operating system and application-specific F1 behavior |
| **fn** and **F2** | Operating system and application-specific F2 behavior |
| **fn** and **F3** | Operating system and application-specific F3 behavior |
| **fn** and **F4** | Operating system and application-specific F4 behavior |
| **fn** and **F5** | Operating system and application-specific F5 behavior |
| **fn** and **F6** | Operating system and application-specific F6 behavior |
| **fn** and **F7** | Operating system and application-specific F7 behavior |
| **fn** and **F8** | Operating system and application-specific F8 behavior |
| **fn** and **F9** | Operating system and application-specific F9 behavior |
| **fn** and **F10** | Operating system and application-specific F10 behavior |

### Table 16. Secondary tasks of keyboard keys (continued)

| Key combination for task | What the task does |
|---|---|
| **fn** and **F11** | Operating system and application-specific F11 behavior |
| **fn** and **F12** | Operating system and application-specific F12 behavior |

## Keys with alternate characters

There are other keys on your keyboard with alternate characters. The symbols that are shown at the bottom of these keys are the main characters that are displayed when the key is pressed; the symbols that are shown at the top of these keys are displayed when the key is pressed with the shift key. For example, if you press **2**, **2** is displayed; if you press **Shift** and **2**, **@** is displayed.

# Camera

The following table lists the camera specifications of your Precision 3590.

### Table 17. Camera specifications

| Description | | Values |
|---|---|---|
| Number of cameras | | One |
| Camera type | | • FHD RGB camera<br>• FHD RGB+IR camera<br>• FHD RGB+IR camera with Ambient Light Sensor, Express Sign-In with Presence Detection and Intelligent Privacy |
| Camera location | | Front camera |
| Camera sensor type | | CMOS sensor technology |
| Camera resolution: | | |
| | Still image | 2.07 megapixel |
| | Video | 1920 x 1080 (FHD) at 30 fps |
| Infrared camera resolution: | | |
| | Still image | 0.23 megapixels |
| | Video | 640 x 360 at 30 fps |
| Diagonal viewing angle: | | |
| | Camera | 80 degrees |
| | Infrared camera | 86.60 degrees |

# Touchpad

The following table lists the touchpad specifications of your Precision 3590.

### Table 18. Touchpad specifications

| Description | | Values |
|---|---|---|
| Touchpad resolution: | | >300 DPI |
| Touchpad dimensions: | | |
| | Horizontal | 115 mm (4.52 in.) |
| | Vertical | 67 mm (2.64 in.) |
| Touchpad gestures | | For more information about touchpad gestures are available on:<br>• Windows, see the Microsoft Knowledge Base article at support.microsoft.com.<br>• Ubuntu, see ubuntu.com/support. |

# Power adapter

The following table lists the power adapter specifications of your Precision 3590.

### Table 19. Power adapter specifications

| Description | | Option one | Option two | Option three |
|---|---|---|---|---|
| Type | | 65 W adapter, USB-C | 100 W adapter, USB-C | 130 W adapter, USB-C |
| Power-adapter dimensions: | | | | |
| | Height | 27.94 mm (1.10 in.) | 26.41 mm (1.04 in.) | 22.09 mm (0.87 in.) |
| | Width | 51.05 mm (2.01 in.) | 59.94 mm (2.36 in.) | 66.04 mm (2.60 in.) |
| | Depth | 112.01 mm (4.41 in.) | 121.92 mm (4.80 in.) | 143 mm (5.63 in.) |
| Input voltage | | 100 VAC-240 VAC | 100 VAC-240 VAC | 100 VAC-240 VAC |
| Input frequency | | 50 Hz-60 Hz | 50 Hz-60 Hz | 50 Hz-60 Hz |
| Input current (maximum) | | 1.70 A | 1.70 A | 1.80 A |
| Output current (continuous) | | • 20 V/3.25 A (continuous)<br>• 15 V/3 A (continuous)<br>• 9 V/3 A (continuous)<br>• 5 V/3 A (continuous) | • 20 V/5 A (continuous)<br>• 15 V/3 A (continuous)<br>• 9 V/3 A (continuous)<br>• 5 V/3 A (continuous) | • 20 V/6.50 A (continuous)<br>• 5 V/1 A (continuous) |
| Rated output voltage | | • 20 VDC<br>• 15 VDC<br>• 9 VDC<br>• 5 VDC | • 20 VDC<br>• 15 VDC<br>• 9 VDC<br>• 5 VDC | • 20 VDC<br>• 5 VDC |
| Temperature range: | | | | |
| | Operating | 0°C to 40°C (32°F to 104°F) | 0°C to 40°C (32°F to 104°F) | 0°C to 40°C (32°F to 104°F) |

### Table 19. Power adapter specifications (continued)

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Storage | -20°C to 70°C (-4°F to 158°F) | -40°C to 70°C (-4°F to 158°F) | -40°C to 70°C (-4°F to 158°F) |

**CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.**

# Battery

The following table lists the battery specifications of your Precision 3590.

### Table 20. Battery specifications

| Description | | Option one | Option two | Option three | Option four |
|---|---|---|---|---|---|
| Battery type | | 3 cell, 42 Wh, ExpressCharge, ExpressCharge Boost | 3 cell, 42 Wh, Long Cycle Life, ExpressCharge | 3 cell, 54 Wh, ExpressCharge, ExpressCharge Boost | 3 cell, 54 Wh, Long Cycle Life, ExpessCharge |
| Battery voltage | | 11.40 VDC | 11.40 VDC | 11.40 VDC | 11.40 VDC |
| Battery weight (minimum) | | 0.19 kg (0.41 lb) | 0.19 kg (0.41 lb) | 0.22 kg (0.48 lb) | 0.22 kg (0.48 lb) |
| Battery dimensions: | | | | | |
| | Height | 5.73 mm (0.22 in.) | 5.73 mm (0.22 in.) | 5.73 mm (0.22 in.) | 5.73 mm (0.22 in.) |
| | Width | 263 mm (10.35 in.) | 263 mm (10.35 in.) | 263 mm (10.35 in.) | 263 mm (10.35 in.) |
| | Depth | 68.90 mm (2.71 in.) | 68.90 mm (2.71 in.) | 68.90 mm (2.71 in.) | 68.90 mm (2.71 in.) |
| Temperature range: | | | | | |
| | Operating | • Charge: 0°C to 45°C (32°F to 113°F)<br>• Discharge: 0°C to 70°C (32°F to 158°F) | • Charge: 0°C to 45°C (32°F to 113°F)<br>• Discharge: 0°C to 70°C (32°F to 158°F) | • Charge: 0°C to 45°C (32°F to 113°F)<br>• Discharge: 0°C to 70°C (32°F to 158°F) | • Charge: 0°C to 45°C (32°F to 113°F)<br>• Discharge: 0°C to 70°C (32°F to 158°F) |
| | Storage | -20°C to 65°C (-4°F to 149°F) | -20°C to 65°C (-4°F to 149°F) | -20°C to 65°C (-4°F to 149°F) | -20°C to 65°C (-4°F to 149°F) |
| Battery operating time | | Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions. | Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions. | Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions. | Varies depending on operating conditions and can significantly reduce under certain power-intensive conditions. |
| Battery charging time (approximate)<br>**NOTE:** Control the charging time, duration, start and end time, and so on using the Dell Power Manager application. For more information about Dell Power Manager, | | **Express Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours. | **Express Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours. | **Express Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours. | **Express Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours. |

### Table 20. Battery specifications (continued)

| Description | Option one | Option two | Option three | Option four |
|---|---|---|---|---|
| search in the Knowledge Base Resource at www.dell.com/support. | • 16°C to 45°C normal express charge.<br>• 46°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours.<br>**Standard Charge/ Predominately AC User Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours.<br>• 16°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours.<br>**Express Charge Boost Charge Method (Fast Charge for Initial 35%):**<br>• 16°C to 45°C target charge time from 0% to 35% RSOC is 20 minutes for Accelerated Charge. | • 16°C to 45°C normal express charge.<br>• 46°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours.<br>**Standard Charge/ Predominately AC User Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours.<br>• 16°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours. | • 16°C to 45°C normal express charge.<br>• 46°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours.<br>**Standard Charge/ Predominately AC User Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours.<br>• 16°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours.<br>**Express Charge Boost Charge Method (Fast Charge for Initial 35%):**<br>• 16°C to 45°C target charge time from 0% to 35% RSOC is 20 minutes for Accelerated Charge. | • 16°C to 45°C normal express charge.<br>• 46°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours.<br>**Standard Charge/ Predominately AC User Charge Method:**<br>• 0°C to 15°C maximum allowable charge time from 0% to 100% RSOC is 4 hours.<br>• 16°C to 50°C maximum allowable charge time from 0% to 100% RSOC is 3 hours. |
| Coin-cell battery | CR2032 | CR2032 | CR2032 | CR2032 |

**CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.**

**CAUTION: Dell recommends that you charge the battery regularly for optimal power consumption. If your battery charge is completely depleted, connect the power adapter, turn on your computer, and then restart your computer to reduce the power consumption.**

# Display

The following table lists the display specifications of your Precision 3590.

### Table 21. Display specifications

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Display type | 15.6-inch Full High Definition (FHD) | 15.6-inch Full High Definition (FHD) | 15.6-inch Full High Definition (FHD), ComfortView Plus |

### Table 21. Display specifications (continued)

| Description | | Option one | Option two | Option three |
|---|---|---|---|---|
| | | | | Low Blue Light, Battery Saving |
| Touch options | | No | Yes | No |
| Display-panel technology | | In-Plane Switching (IPS) | In-Plane Switching (IPS) | In-Plane Switching (IPS) |
| Display-panel dimensions (active area): | | | | |
| | Height | 193.60 mm (7.62 in.) | 193.60 mm (7.62 in.) | 193.60 mm (7.62 in.) |
| | Width | 344.20 mm (13.55 in.) | 344.20 mm (13.55 in.) | 344.20 mm (13.55 in.) |
| | Diagonal | 396 mm (15.60 in.) | 396 mm (15.60 in.) | 396 mm (15.60 in.) |
| Display-panel native resolution | | 1920 x 1080 | 1920 x 1080 | 1920 x 1080 |
| Luminance (typical) | | 250 nits | 250 nits | 400 nits |
| Megapixels | | 2.07 | 2.07 | 2.07 |
| Color gamut | | 45% NTSC | 45% NTSC | 100% sRGB |
| Pixels Per Inch (PPI) | | 141 | 141 | 141 |
| Contrast ratio (typical) | | 700:1 | 700:1 | 800:1 |
| Response time (maximum) | | 35 millisecond | 35 millisecond | 35 millisecond |
| Refresh rate | | 60 Hz | 60 Hz | 60 Hz |
| Horizontal view angle | | +/- 80 degrees | +/- 80 degrees | +/- 80 degrees |
| Vertical view angle | | +/- 80 degrees | +/- 80 degrees | +/- 80 degrees |
| Pixel pitch | | 0.179 x 0.179 mm | 0.179 x 0.179 mm | 0.179 x 0.179 mm |
| Power consumption (maximum) | | 4.60 W | 4.60 W | 4.50 W |
| Anti-glare vs glossy finish | | Anti-glare | Anti-glare | Anti-glare |

# Fingerprint reader (optional)

The following table lists the specifications of the optional fingerprint-reader of your Precision 3590.

### Table 22. Fingerprint reader specifications

| Description | Values |
|---|---|
| Fingerprint-reader sensor technology | Capacitive |
| Fingerprint-reader sensor resolution | 500 dpi |
| Fingerprint-reader sensor pixel size | 108 x 88 |

# Sensor

The following table lists the sensor of your Precision 3590.

### Table 23. Sensor

| Sensor support |
|---|
| Ambient light sensor |
| Accelerometer in the base: ST Micro LIS2DW12TR |
| Accelerometer in the hinge-up (Upsell config with Emza/ALS/IR camera): ST Micro LNG2DMTR |

# GPU—Integrated

The following table lists the specifications of the integrated Graphics Processing Unit (GPU) supported by your Precision 3590.

### Table 24. GPU—Integrated

| Controller | Memory size | Processor |
|---|---|---|
| Intel Arc Graphics | Shared system memory | For Intel Core H processors and requires 128-bit (dual-channel) memory with minimum of 16 GB memory |
| Intel Graphics | Shared system memory | Intel Core Ultra 5/7 |

# GPU—Discrete

The following table lists the specifications of the discrete Graphics Processing Unit (GPU) supported by your Precision 3590.

### Table 25. GPU—Discrete

| Controller | Memory size | Memory type |
|---|---|---|
| NVIDIA RTX 500 Ada Generation | 4 GB | GDDR6 |

# External display support

The following table lists the external display support for your Precision 3590.

### Table 26. External display support

| Graphics card | Supported external displays with laptop display enabled | Supported external displays with laptop display disabled |
|---|---|---|
| Intel Arc Graphics | 3 | 4 |
| Intel Graphics | 3 | 4 |

**NOTE:** For more information about external display support, see the External Display Connection Guide on www.dell.com/support.

# Hardware security

The following table lists the hardware security of your Precision 3590.

### Table 27. Hardware security

| Hardware security |
|---|
| Trusted Platform Module (TPM) 2.0 discrete |
| FIPS 140-2 certification for TPM |
| TCG Certification for TPM (Trusted Computing Group) |
| Finger Print Reader in Power Button available with and without ControlVault 3 Plus |
| ControlVault 3 Plus Advanced Authentication with FIPS 140-3 Level 3 Certification |
| Contacted Smart Card and ControlVault 3 Plus |
| Contactless Smart Card, NFC, and ControlVault 3 Plus |
| SED SSD NVMe, SSD, and hard drive (Opal and non-Opal) per SDL |
| FIPS 201 Full Scan FPR and ControlVault 3 Plus |

# Smart-card reader

## Contactless smart-card reader

This section lists the contactless smart-card reader specifications of your Precision 3590. This module is only available in computers shipped with Smart-card readers.

### Table 28. Contactless smart-card reader specifications

| Title | Description | Dell ControlVault 3 Plus Contactless smart-card reader with NFC |
|---|---|---|
| Felica Card Support | Reader and software capable of supporting Felica contactless cards | Yes |
| Prox (Proximity) (125kHz) Card support | Reader and software capable of supporting Prox /Proximity/125 kHz contactless cards | No |
| ISO 14443 Type A Card Support | Reader and software capable of supporting ISO 14443 Type A contactless cards | Yes |
| ISO 14443 Type B Card Support | Reader and software capable of supporting ISO 14443 Type B contactless cards | Yes |
| ISO/IEC 21481 | Reader and software capable of supporting ISO/IEC 21481 compliant contactless cards and tokens | Yes |
| ISO/IEC 18092 | Reader and software capable of supporting ISO/IEC 21481 compliant contactless cards and tokens | Yes |
| ISO 15693 Card Support | Reader and software capable of supporting ISO15693 contactless cards | Yes |
| NFC Tag Support | Supports reading and processing of NFC compliant tag information | Yes |

### Table 28. Contactless smart-card reader specifications (continued)

| Title | Description | Dell ControlVault 3 Plus Contactless smart-card reader with NFC |
|---|---|---|
| NFC Reader Mode | Support for NFC Forum Defined Reader mode | Yes |
| NFC Writer Mode | Support for NFC Forum Defined Writer mode | Yes |
| NFC Peer-to-Peer Mode | Support for NFC Forum Defined Peer to Peer mode | Yes |
| NFC Proximity OS Interface | Enumerates NFP (Near Field Proximity) device for operating system to utilize | Yes |
| PC/SC operating system interface | Personal Computer/Smart Card specification for integration of hardware readers into personal computer environments | Yes |
| CCID driver compliance | Common driver support for Integrated Circuit Card Interface Device for operating system level drivers | Yes |
| Dell ControlVault support | The device connects to Dell ControlVault for usage and processing | Yes |

**NOTE:** 125 Khz proximity cards are not supported.

### Table 29. Supported cards

| Manufacturer | Card |
|---|---|
| HID | jCOP readertest3 A card (14443a) |
| | 1430 1L |
| | DESFire D8H |
| | DESFIRE 4K Standard - 1450NGGNN |
| | iClass 16K/16 - 2002PGGMN |
| | iClass SR 16K/16 - 2002HPGGMN |
| | iCLASS 2K tag |
| | iCLASS GP - 2003 PGGMN |
| | iClass Clamshell - 2080PMSMV |
| | iClass Prox 16K/16 - 2022BGGMNN |
| | Mifare M1P 1430 NGGNN |
| | iclass Prox 2020BGGMNM |
| | DesFire D8P 1456CSGMN |
| | iCLASS MIFARE Px GM49Y 2623BNPGGBNAB |
| | iCLASS MIFARE Px 8M1L |
| | iClass SEOS JW 5006PGGMN |
| | Crescendo iCLASS Px G8H |
| | iCLASS Seos IY |
| | SEOS JMC4 J1Y 5806VNG1NNN4 |
| | SEOS Key FOB 5266PNNA |

### Table 29. Supported cards (continued)

| Manufacturer | Card |
|---|---|
| | SEOS Clamshell 5656PMSAV |
| | SEOS + Prox 5106RGGMNN |
| | SEOS + DESFire 5906PNG1ANN7 |
| | SEOS iClass 5006PGGMN7 |
| | Seos Essential + Prox 551PPGGANN |
| | iCLASS 2K 2000PGGMN |
| | iCLASS 2K 3000PGGMN |
| | MIFARE DESFire 3700CPGGAN |
| | iCLASS DP |
| | DESFire 1Y |
| NXP/Mifare | Mifare DESFire 8K White PVC card |
| | Mifare Classic 1K White PVC card |
| | NXP Mifare Classic S50 ISO card |
| | Mifare DESFire 2K |
| | Mifare Plus S 2K/4K |
| | Mifare Plus X 4K |
| G&D | idOnDemand - SCE3.2 144K |
| | SCE6.0 FIPS 80K Dual + 1K Mifare |
| | SCE6.0 nonFIPS 80K Dual + 1K Mifare |
| | SCE6.0 FIPS 144K Dual + 1K Mifare |
| | SCE6.0 nonFIPS 144K Dual + 1K Mifare |
| | SCE7.0 FIPS 144K |
| Oberthur | idOnDemand - OCS5.2 80K |
| | ID-One Cosmo 64 RSA D V5.4 T = 0 card |
| | ID-One Cosmo 128K V5.5 card |
| Gemalto | TOP DL GX4 144K card |
| Sony | Felica RC-S962 |
| | Felica RC-S965 |
| | Felica RC-S966 |
| PIVKey | C910 PKI |
| NIST | PIV1 |
| IDENTIV | PIV programmed cards |
| | uTrust |
| Transport cards | Oyster (London) MIFARE DESFire |
| | T-Money (Korea) |
| | Octopus Card (Hong Kong) |
| | SUICA (Japan) |

### Table 30. Qualified NFC tags

| NFC tag | Supported |
|---|---|
| Tap and do - NFC Forum Type 1 Tag - Topaz 512 (BCM920203) | Yes |
| Tap and do - NFC Forum Type 1 Tag - Topaz 512 (BCM20203T512) | Yes |
| Tap and do - NFC Forum Type 1 Tag - Topaz (BCM20203T96) | Yes |
| Tap and do - NFC Forum Type 2 Tag - Mifare UltraLight | Yes |
| Tap and do - NFC Forum Type 2 Tag - Mifare UltraLight C | Yes |
| Tap and do - NFC Forum Type 2 Tag - NTAG203 | Yes |
| Tap and do - NFC Forum Type 3 Tag - FeliCa Lite RC-S965 | Yes |
| Tap and do - NFC Forum Type 3 Tag - FeliCa RC-S962 | Yes |
| Tap and do - NFC Forum Type 4 Tag - Mifare DESFire EV1Card 2K | Yes |
| Tap and do - NFC Forum Type 4 Tag - Mifare DESFire EV1Card 4K | Yes |
| Tap and do - NFC Forum Type 4 Tag - Mifare DESFire EV1Card 8K | Yes |
| Tap and do - ISO 15693 - Tag-it Plus | Yes |
| HID I-code ISO card | Yes |

## Contacted smart-card reader

The following table lists the contacted smart-card reader specifications of your Precision 3590.

### Table 31. Contacted smart-card reader specifications

| Title | Description | Dell ControlVault 3 Plus Contacted smart-card reader |
|---|---|---|
| ISO 7816-3 Class A Card Support | Reader capable of reading 5 V powered smart card | Yes |
| ISO 7816-3 Class B Card Support | Reader capable of reading 3 V powered smart card | Yes |
| ISO 7816-3 Class C Card support | Reader capable of reading 1.8 V powered smart card | Yes |
| T = 0 support | Cards support character level transmission | Yes |
| T = 1 support | Cards support block level transmission | Yes |
| EMVCo Certified | Formally certified based on EMVCo smart card standards | Yes |
| PC/SC operating system interface | Personal Computer/Smart Card specification for integration of hardware readers into personal computer environments | Yes |
| CCID driver compliance | Common driver support for Integrated Circuit Card Interface Device for operating system level drivers | Yes |

### Table 31. Contacted smart-card reader specifications (continued)

| Title | Description | Dell ControlVault 3 Plus Contacted smart-card reader |
|---|---|---|
| Windows Certified | Certified by the Windows Hardware Certification program | Yes |
| FIPS 201 (PIV/HSPD-12) Compliant | Device compliant with FIPS 201/PIV/ HSPD-12 requirements | Yes |
| ISO 7816-1 Compliant | Specification for the physical characteristics of integrated circuit cards with contacts | Yes |
| ISO 7816-2 Compliant | Specification for the dimensions and location of the contacts | Yes |
| ISO 7816-3 Compliant | Specification for electrical interface and transmission protocols | Yes |
| ISO 7816-4 Compliant | Specification for organization, security and commands for interchange | Yes |
| Dell ControlVault support | Device connects to Dell ControlVault for usage and processing | Yes |

# Operating and storage environment

This table lists the operating and storage specifications of your Precision 3590.

**Airborne contaminant level:** G1 as defined by ISA-S71.04-1985

### Table 32. Computer environment

| Description | Operating | Storage |
|---|---|---|
| Temperature range | 0°C to 35°C (32°F to 95°F) | -40°C to 65°C (-40°F to 149°F) |
| Relative humidity (maximum) | 10% to 90% (non-condensing) | 0% to 95% (non-condensing) |
| Vibration (maximum)* | 0.66 GRMS | 1.30 GRMS |
| Shock (maximum) | 110 G† | 160 G† |
| Altitude range | -15.2 m to 3048 m (-49.87 ft to 10,000 ft) | -15.2 m to 10,668 m (-49.87 ft to 35,000 ft) |
| **CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.** | | |

* Measured using a random vibration spectrum that simulates the user environment.

† Measured using a 2 ms half-sine pulse.

# Dell support policy

For information about Dell support policy, search in the Knowledge Base Resource at www.dell.com/support.

# ComfortView Plus

**WARNING: Prolonged exposure to blue light from the display may lead to long-term effects such as eye strain, eye fatigue, or damage to the eyes.**

Blue light is a color in the light spectrum which has a short wavelength and high energy. Chronic exposure to blue light, particularly from digital sources, may disrupt sleep patterns and cause long-term effects such as eye strain, eye fatigue, or damage to the eyes.

The display on this computer is designed to minimize blue light and complies with TÜV Rheinland's requirement for low blue light displays.

Low blue light mode is enabled at the factory, so no further configuration is necessary.

To reduce the risk of eye strain, it is also recommended that you:

- Position the display at a comfortable viewing distance between 20 and 28 inches (50 cm and 70 cm) from your eyes.
- Blink frequently to moisten your eyes, wet your eyes with water, or apply suitable eye drops.
- Look away from your display, and gaze at a distant object at 20 ft (609.60 cm) away for at least 20 seconds during each break.
- Take an extended break for 20 minutes every two hours.

# Using the privacy shutter

1. Slide the privacy shutter to the left to access the camera lens.
2. Slide the privacy shutter to the right to cover the camera lens.

**Figure 8. Camera shutter**

# Dell Optimizer

This section provides the Dell Optimizer specifications of your Precision 3590.

On Precision 3590 with Dell Optimizer, the following features are supported:

- **ExpressConnect**—Automatically joins the access point with the strongest signal, and directs bandwidth to conferencing applications when in use.
- **ExpressSign-in**—The Intel Context Sensing Technology's proximity sensor detects your presence to instantly wake up the computer and login using the IR camera and Windows Hello feature. Windows locks when you walk away.
- **ExpressResponse**—Prioritizes the most important applications. Applications open faster and perform better.
- **ExpressCharge**—Extends the battery runtime and improves battery performance by adapting to your patterns.
- **Intelligent Audio**—Collaborate like you're in the same room. Intelligent Audio enhances your audio quality and reduces background noises, so you can hear and be heard, creating a better conference experience for all.

For more information about configuring and using these features, see *Dell Optimizer User Guide*.

# 3

# Engineering specifications

## Ethernet

### Intel Ethernet Connection i219-LM

The following table lists the i219-LM specifications.

**Table 33. Intel Ethernet Connection i219-LM specifications**

| Feature | Values |
|---|---|
| External connector type | RJ45 |
| Data rate | 10/100/1000 Mbps |
| **Controller Details** | |
| Controller bus architecture | PCI Express base specification revision 1.1 |
| Integrated memory | Yes |
| Data transfer mode | Yes (Bus-Master DMA) |
| Power consumption (Full operation per data rate connection speed) | 542 mW (Max) |
| Power consumption (Standby operation) | 76 mW (Max) |
| IEEE standards compliance | 802.3 |
| Hardware certifications | N/A |
| Boot ROM support | EEPROM (Located in SPI) |
| **Network Transfer Mode** | |
| Network transfer rate | 10 Mb (full/half-duplex) |
| 10BASE-T (full-duplex) 20 Mbps | 100 Mb (full/half-duplex) |
| 100BASE-TX (half-duplex) 100 Mbps | 1000 Mb (full-duplex) |
| **Environmental** | |
| Operating temperature range | 0°C–85°C (32°F–185°F) |
| Operating humidity | 20% to 80% (non condensing) |
| Operating system driver Support | • Windows (x64)<br>• Ubuntu<br>• Neokylin |
| Manageability | • Wakeup On LAN<br>• PXE 2.1 |
| Management capabilities alerting | Optional Intel Standard Manageability (must be made at time of purchase). |

This term does not connote an actual operating speed of 1 Gb/sec. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

# Intel Ethernet Connection i219-V

The following table lists the i219-V specifications.

### Table 34. Intel Ethernet Connection i219-V specifications

| Feature | Values |
|---|---|
| External connector type | RJ45 |
| Data rate | 10/100/1000 Mbps |
| **Controller Details** | |
| Controller bus architecture | PCI Express base specification revision 1.1 |
| Integrated memory | Yes |
| Data transfer mode | Yes (Bus-Master DMA) |
| Power consumption (Full operation per data rate connection speed) | 542 mW (Max) |
| Power consumption (Standby operation) | 76 mW (Max) |
| IEEE standards compliance | 802.3 |
| Hardware certifications | N/A |
| Boot ROM support | EEPROM (Located in SPI) |
| **Network Transfer Mode** | |
| Network transfer rate | 10 Mb (full/half-duplex) |
| 10BASE-T (full-duplex) 20 Mbps | 100 Mb (full/half-duplex) |
| 100BASE-TX (half-duplex) 100 Mbps | 1000 Mb (full-duplex) |
| **Environmental** | |
| Operating temperature range | 0°C–85°C (32°F–185°F) |
| Operating humidity | 20% to 80% (non-condensing) |
| Operating system driver Support | • Windows (x64)<br>• Ubuntu<br>• Neokylin |
| Manageability | • Wakeup On LAN<br>• PXE 2.1 |
| Management capabilities alerting | Optional Intel Standard Manageability (must be made at time of purchase). |

This term does not connote an actual operating speed of 1 Gb/sec. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

# Wireless module

## Realtek RTL8852BE, 2x2, Wi-Fi 6 (Wi-Fi 802.11 a/b/g/n/ac/ax), Bluetooth 5.3 wireless card

The following table lists the Realtek RTL8852BE specifications.

### Table 35. Realtek RTL8852BE specifications

| Description | Value |
|---|---|
| Host interface | • PCIe for Wi-Fi<br>• USB for Bluetooth |
| Network standard | IEEE 802.11a/b/g/n/ac/ax, MU-MIMO |
| Wi-Fi Alliance certifications | Wi-Fi CERTIFIED* a/b/g/n/ac/ax, WMM*, WPA, WPA2*, WPA3*, and Wi-Fi Direct (Microsoft Windows* only) |
| Operating frequency bands | • 2.4 GHz<br>• 5 GHz |
| Data rate | • 2.4 GHz 40M: Up to 574 Mbps<br>• 5 GHz 80M: Up to 1201 Mbps |
| Power consumption | Optimized power modes (sleep states) reduce power consumption during periods of inactivity |
| Authentication | • WPA* and WPA2* Personal and Enterprise<br>• WPA3* Personal and Enterprise |
| Client utility | Native Wi-Fi and Bluetooth Microsoft UI support |
| Software support | • Microsoft WHQL certified for Windows<br>• Linux |
| Radio On/Off | Supported |
| Roaming | Support seamless roaming between access points |
| Wake on wireless | Supported |
| Wireless display | Native Miracast support by Windows |
| Wireless PAN standard | • Dual Mode Bluetooth 5.3<br>• BLE |
| Bluetooth data rates | Up to 3 Mbps |
| Bluetooth operating frequency bands | 2.4 GHz |
| Bluetooth profiles supported | Support for Microsoft Inbox Bluetooth profiles in Windows |
| Bluetooth data encryption | 128-bit encryption |
| Operating temperature | 0°C to + 70°C |
| Storage temperature | -40°C to +85°C |
| **NOTE:** *Other names and brands may be claimed as the property of others. | |

# Intel AX211, 2x2 MIMO, 2400 Mbps, 2.4/5/6 GHz, Wi-Fi 6E (WiFi 802.11ax), Bluetooth 5.3 wireless card

The following table lists the Intel AX211 specifications.

**NOTE:** Wi-Fi 6 is supported in regions where Wi-Fi 6E is unavailable.

### Table 36. Intel AX211 specifications

| Description | Value |
|---|---|
| Host interface | CNVio |
| Network standard | IEEE 802.11a/b/g/n/ac/ax, 160 MHz channel use, MU-MIMO, new 6 GHz band |
| Wi-Fi Alliance certifications | Wi-Fi CERTIFIED* 6, Wi-Fi CERTIFIED* a/b/g/n/ac, WMM*, WMM*-Power Save, WPA2*, WPA3*, WPS*, PMF* ,Wi-Fi Direct*, Wi-Fi Agile Multiband* |
| Operating frequency bands | • 2.4 GHz<br>• 5 GHz<br>• 6 GHz |
| Data rate | • 2.4 GHz 40M: Up to 574 Mbps<br>• 5/6 GHz 80M: Up to 1.2 Gbps<br>• 5/6 GHz 160M: Up to 2.4 Gbps |
| Power consumption | Optimized power modes (sleep states) reduce power consumption during periods of inactivity |
| Security methods | • WPA2 Personal and Enterprise<br>• WPA3 |
| Authentication protocols | • 802.1X EAP-TLS<br>• EAP-TTLS/MSCHAPv2<br>• PEAPv0 -MSCHAPv2 (EAP-SIM, EAP-AKA, EAP-AKA) |
| Encryption | • 64-bit and 128-bit WEP<br>• TKIP<br>• 128-bit AES-CCMP<br>• 256-bit AES-GCMP |
| Product safety | • UL<br>• C-UL<br>• CB (IEC60950-1) |
| Management capabilities alerting | Support for Intel AMT |
| Government compliance | • FIPS 140-2<br>• FISMA |
| Client utility | Intel PRO/Set wireless software v22 and later |
| Antenna diversity | Supported |
| Radio On/Off | Supported |
| Roaming | Support seamless roaming between access points |
| Wake on wireless | Supported |
| Wireless display | Native Miracast support by Windows |
| Wireless PAN standard | • Dual Mode Bluetooth 5.3<br>• BLE |

### Table 36. Intel AX211 specifications (continued)

| Description | Value |
|---|---|
| Bluetooth data rates | Up to 3 Mbps |
| Bluetooth operating frequency bands | 2.4 GHz |
| Bluetooth profiles supported | Support for Microsoft Inbox Bluetooth profiles in Windows |
| Bluetooth data encryption | 128-bit encryption |
| Bluetooth output power | Power class 1 |
| Operating temperature | 0°C to +50°C (Full performance at shield temperatures up to 80°C) |
| Storage temperature | -40°C to +70°C |
| Humidity | Up to 90% RH non-condensing (at temperatures of 25°C to 35°C) |
| **NOTE:** *Other names and brands may be claimed as the property of others. | |

# WWAN module

## Qualcomm Snapdragon SDX12 Global LTE-Advanced (DW5825e)

The following table lists specifications of the Qualcomm Snapdragon SDX12 Global LTE-Advanced (DW5825e) WWAN module.

### Table 37. Qualcomm Snapdragon SDX12 Global LTE-Advanced (DW5825e) specifications

| Description | Value |
|---|---|
| Form factor | M.2 3042 Key-B |
| Host interface | USB 3.0/2.0 |
| Network standard | • LTE FDD/TDD<br>• WCDMA/HSPA+<br>• GPS/GLONASS/Beidou/Galileo |
| Transfer rate | • Up to 600 Mbps DL (CAT6)<br>• Up to 150 Mbps UL |
| Operating frequency bands | • LTE (B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B38, B39, B40, B41, B42, B43, B48, B66, B71)<br>• HSPA+ (1,2,4,5,6,8,19) |
| Power supply | DC 3.135 V to 4.4 V, Typical 3.3 V |
| SIM card | Supported through external SIM-card slot |
| eSIM with Dual SIM (DSSA) | Supported<br>**NOTE:** The availability of eSIM functionality embedded on the module is dependent on the region and specific carrier requirements. |
| Antenna diversity | Supported |
| Radio On/Off | Supported |
| Wake on wireless | Supported |
| Normal operating temperature | -10°C to +55°C |

### Table 37. Qualcomm Snapdragon SDX12 Global LTE-Advanced (DW5825e) specifications (continued)

| Description | Value |
|---|---|
| Extended operating temperature | -30°C to +75°C |
| Antenna connector | • WWAN Main Antenna x 1<br>• WWAN Diversity Antenna x 1 |

## Qualcomm Snapdragon X62 Global 5G Modem (DW5932e)

The following table lists specifications of the Qualcomm Snapdragon X62 Global 5G Modem (DW5932e) WWAN module.

### Table 38. Qualcomm Snapdragon X62 Global 5G Modem (DW5932e) specifications

| Description | Value |
|---|---|
| Form factor | M.2 3042 Key-B |
| Host interface | PCIe Gen3 |
| Network standard | • NR FR1 (Sub6) FDD/TDD<br>• LTE FDD/TDD<br>• WCDMA/HSPA+<br>• GPS/GLONASS/Beidou/Galileo |
| Transfer rate | • 5G NR: DL 3.5 Gbps/UL 900 Mbps<br>• LTE: DL 1.6 Gbps (CAT19)/UL 211 Mbps (CAT18)<br>• UMTS: DL DC-HSPA+ Rel8:42 Mbps/UL 5.76 Mbps |
| Operating frequency bands | • NR (n1, n2, n3, n5, n7, n8, n12, n13, n14, 18, n20, n25, n26, n28, n30, n38, n40, n41, n48, n53, n66, n70, n71, n75, n76, n77, n78, n79)<br>• LTE (B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71)<br>• WCDMA/HSPA+ (1, 2, 4, 5, 8) |
| Power supply | DC 3.135 V to 3.63 V, Typical 3.3 V |
| SIM card | Supported through external SIM-card slot |
| eSIM with Dual SIM (DSSA) | Supported<br>**NOTE:** The availability of eSIM functionality embedded on the module is dependent on the region and specific carrier requirements. |
| Antenna diversity | Supported |
| Radio On/Off | Supported |
| Wake on wireless | Supported |
| Normal operating temperature | -30°C to +70°C |
| Extended operating temperature | -40°C to +85°C |
| Storage temperature | -40°C to +85°C |
| Antenna connector | • WWAN Main Antenna x 1<br>• WWAN Diversity Antenna x 1<br>• 4x4 MIMO Antenna x 2 |

# GPU—Integrated

## Intel Arc Graphics

The following table lists the Intel Arc Graphics specifications.

### Table 39. Intel Arc Graphics specifications

| | |
|---|---|
| Bus type | Integrated graphics<br>**NOTE:** Intel Arc Graphics uses the computers memory as video memory. |
| Memory type | Shared with system memory |
| Graphics level | i5/i7 |
| Memory interface | 64 Gbps, Unified Memory Architecture |
| Estimated maximum power consumption (TDP) | 28 W (H-series), included in the CPU power |
| Overlay planes | Yes |
| Operating systems graphics/ video API support | DirectX 12 Ultimate, OpenGL 4.6 |
| Maximum color depth | 10 bits |
| Maximum vertical refresh rate | Up to 120 Hz<br>**NOTE:** The refresh rate depends on the resolution. |
| External ports | HDMI 2.1 port, DisplayPort 2.1 over USB Type-C |
| Multiple display support | Up to 4 displays including laptop display |

## Intel Graphics

The following table lists the Intel Graphics specifications.

### Table 40. Intel Graphics specifications

| | |
|---|---|
| Bus type | Integrated graphics<br>**NOTE:** Intel Graphics uses the computers memory as video memory. |
| Memory type | Shared with system memory |
| Graphics level | i5/i7 |
| Memory interface | 64 Gbps, Unified Memory Architecture |
| Estimated maximum power consumption (TDP) | 15 W (U-series) included in the CPU power |
| Overlay planes | Yes |
| Operating systems graphics/ video API support | DirectX 12 Ultimate, OpenGL 4.6 |
| Maximum color depth | 10 bits |
| Maximum vertical refresh rate | Up to 120 Hz<br>**NOTE:** The refresh rate depends on the resolution. |
| External ports | HDMI 2.1 port, DisplayPort 2.1 over USB Type-C |
| Multiple display support | Up to 4 displays including laptop display |

# GPU—Discrete

## NVIDIA RTX 500 ADA Generation, 4 GB, GDDR6, GB5B-128

The following table lists the NVIDIA RTX 500 ADA Generation specifications.

### Table 41. NVIDIA RTX 500 ADA Generation specifications

| Feature | Values |
|---|---|
| GPU | NVIDIA RTX 500 ADA Generation Laptop GPU |
| Cores | CUDA cores 2048 |
| Memory bandwidth | 112 Gbps |
| Memory type | GDDR6 |
| Memory size | 4 GB |
| Memory interface | 64-bit |
| Memory configuration | 2 x 8 GB (2CH x 256M x 16, 16 Gbps) |
| GPU package | GB5B-128 |
| TDP | • GPU - 26.3 W<br>• Memory - 7.2 W |
| TGP | 35 W |
| GPU base clock | 1485 MHz |
| GPU boost clock | 2025 MHz |
| Vram clock | 8001 MHz |
| PCIe | Gen 4 x 8 |
| Features | Dynamic boost |
| Concurrency | 55 W - 20W CPU + 35W GPU |

# Video port and resolution matrix

The following table lists the Video port and resolution matrix of your Precision 3590.

### Table 42. Video port and resolution matrix

| Port type | USB Type-C Thunderbolt 4 with DisplayPort 1.4 | HDMI 2.0 port |
|---|---|---|
| Maximum resolution—single display | 7680 x 4320 at 60 Hz | 4096 x 2160 at 60 Hz |
| Maximum resolution—dual MST | Two 4096 x 2304 at 60 Hz | Not applicable |
| Maximum resolution—triple MST | Three 4096 x 2304 at 60 Hz | Not applicable |

# Storage

## 256 GB, M.2 2230, TLC PCIe NVMe Gen4

The following table lists the M.2 2230, 256 GB SSD specifications.

### Table 43. 256 GB SSD specifications

| Description | Values |
|---|---|
| Capacity | 256 GB |
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 30 mm (1.18 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTTF | 1.4M hours |
| Logical blocks | 500,118,192 |
| **Power source** | |
| Power consumption (reference only) | • Idle: 5 mW (PS4)<br>• Active: 4 W |
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

## 512 GB, M.2 2230, TLC PCIe NVMe Gen4, SSD

The following table lists the M.2 2230, 512 GB SSD specifications.

### Table 44. 512 GB SSD specifications

| Description | Values |
|---|---|
| Capacity | 512 GB |
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 30 mm (1.18 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTTF | 1.4M hours |
| Logical blocks | 1,000,215,216 |
| **Power source** | |

### Table 44. 512 GB SSD specifications (continued)

| Description | Values |
|---|---|
| Power consumption (reference only) | • Idle: 5 mW (PS4)<br>• Active: 4 W |
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

## 1 TB, M.2 2230, TLC PCIe NVMe Gen4, SSD

The following table lists the M.2 2230, 1 TB SSD specifications.

### Table 45. 1 TB SSD specifications

| Description | Values |
|---|---|
| Capacity | 1 TB |
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 30 mm (1.18 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTBF | 1.4M hours |
| Logical blocks | 2,000,409,264 |
| **Power source** | |
| Power consumption (reference only) | • Idle: 5 mW (PS4)<br>• Active: 4 W |
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

# 512 GB, M.2 2230, TLC PCIe NVMe Gen4, SED SSD (Opal certified)

The following table lists the M.2 2230, 1 TB SSD specifications.

### Table 46. 512 SED SSD specifications

| Description | Values |
|---|---|
| Capacity | 512 GB |
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 30 mm (1.18 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTBF | 1.4M hours |
| Logical blocks | 1,000,215,216 |
| **Power source** | |
| Power consumption (reference only) | • Idle: 5 mW (PS4)<br>• Active: 4 W |
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

# 512 GB, M.2 2280, TLC PCIe NVMe Gen4, SSD

The following table lists the M.2 2280, 512 GB SSD specifications.

### Table 47. 512 GB SSD specifications

| Description | Values |
|---|---|
| Capacity | 512 GB |
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 80 mm (3.15 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTBF | 1.4M hours |
| Logical blocks | 1,000,215,216 |
| **Power source** | |
| Power consumption (reference only) | • Idle: 5 mW (PS4 - L1.2)<br>• Active: 5 W |

### Table 47. 512 GB SSD specifications (continued)

| Description | Values |
|---|---|
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

## 1 TB, M.2 2280, TLC PCIe NVMe Gen4, SSD

The following table lists the M.2 2280, 1 TB SSD specifications.

### Table 48. 1 TB SSD specifications

| Description | Values |
|---|---|
| Capacity | 1 TB |
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 80 mm (3.15 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTBF | 1.4M hours |
| Logical blocks | 2,000,409,264 |
| **Power source** | |
| Power consumption (reference only) | • Idle: 5 mW (PS4 - L1.2)<br>• Active: 5 W |
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

## 2 TB, M.2 2280, TLC PCIe NVMe Gen4, SSD

The following table lists the M.2 2280, 2024 GB SSD specifications.

### Table 49. 2 TB SSD specifications

| Description | Values |
|---|---|
| Capacity | 2 TB |

### Table 49. 2 TB SSD specifications (continued)

| Description | Values |
|---|---|
| Height (approximate) | 2.38 mm (0.09 in.) |
| Width (approximate) | 22 mm (0.87 in.) |
| Depth (approximate) | 80 mm (3.15 in.) |
| Interface type | PCIe Gen4 |
| Speed (maximum) | 64 Gb/s (up to four lanes) |
| MTBF | 1.4M hours |
| Logical blocks | 4,000,797,360 |
| **Power source** | |
| Power consumption (reference only) | • Idle: 5 mW (PS4 - L1.2)<br>• Active: 5 W |
| **Environmental operating conditions (non-condensing)** | |
| Temperature range | 0°C to 70°C |
| Relative humidity range | 10% to 90% |
| Op shock | 1500G |
| **Environmental nonoperating conditions (non-condensing)** | |
| Temperature range | -40°C to 70°C |
| Relative humidity range | 5% to 95% |

# Power adapter

The following table lists the power adapter specifications of your Precision 3590.

### Table 50. Power adapter specifications

| Description | Option one | Option two | Option three |
|---|---|---|---|
| Type | 65 W adapter, USB-C | 100 W adapter, USB-C | 130 W adapter, USB-C |
| Power-adapter dimensions: | | | |
| Height | 27.94 mm (1.10 in.) | 26.41 mm (1.04 in.) | 22.09 mm (0.87 in.) |
| Width | 51.05 mm (2.01 in.) | 59.94 mm (2.36 in.) | 66.04 mm (2.60 in.) |
| Depth | 112.01 mm (4.41 in.) | 121.92 mm (4.80 in.) | 143 mm (5.63 in.) |
| Input voltage | 100 VAC-240 VAC | 100 VAC-240 VAC | 100 VAC-240 VAC |
| Input frequency | 50 Hz-60 Hz | 50 Hz-60 Hz | 50 Hz-60 Hz |
| Input current (maximum) | 1.70 A | 1.70 A | 1.80 A |
| Output current (continuous) | • 20 V/3.25 A (continuous)<br>• 15 V/3 A (continuous)<br>• 9 V/3 A (continuous)<br>• 5 V/3 A (continuous) | • 20 V/5 A (continuous)<br>• 15 V/3 A (continuous)<br>• 9 V/3 A (continuous)<br>• 5 V/3 A (continuous) | • 20 V/6.50 A (continuous)<br>• 5 V/1 A (continuous) |
| Rated output voltage | • 20 VDC | • 20 VDC | • 20 VDC |

### Table 50. Power adapter specifications (continued)

| Description | | Option one | Option two | Option three |
|---|---|---|---|---|
| | | • 15 VDC<br>• 9 VDC<br>• 5 VDC | • 15 VDC<br>• 9 VDC<br>• 5 VDC | • 5 VDC |
| Temperature range: | | | | |
| | Operating | 0°C to 40°C (32°F to 104°F) | 0°C to 40°C (32°F to 104°F) | 0°C to 40°C (32°F to 104°F) |
| | Storage | -20°C to 70°C (-4°F to 158°F) | -40°C to 70°C (-4°F to 158°F) | -40°C to 70°C (-4°F to 158°F) |
| **CAUTION: Operating and storage temperature ranges may differ among components, so operating or storing the device outside these ranges may impact the performance of specific components.** | | | | |

# Accessories

The following table lists the supported accessories on your Precision 3590.

### Table 51. Accessories

| Accessories |
|---|
| **Audio**:<br>Dell Wireless Headset - WL3024 |
| **Adapters**:<br>Dell 7-in-1 USB-C Multiport Adapter - DA310 |
| **Speakerphone**:<br>Dell Speakerphone - SP3022 |
| **Carrying case**:<br>Dell EcoLoop Pro Backpack - CP5723 |
| **Power bank**:<br>Dell Notebook Power Bank Plus USB C, 65Wh - PW7018LC |
| **Dock**:<br>Dell Thunderbolt 4 Dock - WD22TB4 |
| **Mouse**:<br>Dell Premier Rechargeable Wireless Mouse - MS7421W |
| **Keyboard**:<br>Dell Premier Multi Device Wireless Keyboard and Mouse - KM7321W |
| **Monitor**:<br>• Dell U3423WE<br>• Dell 24 Monitor - P2423D |
| **Webcam**:<br>• Dell Webcam - WB7022<br>• Dell Webcam - WB3023 |

# Security

## Software security

The following table lists the software security details of your Precision 3590.

### Table 52. Software security

| Security options |
|---|
| McAfee Generic Build 30-day Commercial |
| McAfee Generic Build 30-day Commercial JPN |

## Fingerprint reader

The following table lists the fingerprint reader specifications of your Precision 3590.

### Table 53. Fingerprint reader specifications

| Description | Value |
|---|---|
| **Category** | Goodix—GF5288WNC |
| **Sensor technology** | Capacitive sensing |
| **Sensor resolution** | 500 dpi |
| **Sensor pixel size** | 108 x 88 |
| **Dell ControlVault support** | Yes |
| **Dell ControlVault 3.0 support** | Yes |
| **Anti-spoofing** | Yes |
| **Template storage** | Dell ControlVault HW protected and encrypted |
| **Match on chip** | Yes |
| **FIPS 201 certified** | No |

## Dell ControlVault 3.0

The following table lists the Dell ControlVault 3.0 specifications of your Precision 3590.

### Table 54. Dell ControlVault 3.0 specifications

| Title | Description | Dell ControlVault 3.0 |
|---|---|---|
| CPU technology | Not applicable | 1 GHz ARM Cortex A7 |
| RAM | Not applicable | 1 MB |
| ROM | Not applicable | 16 MB |
| TPM included | TPM enumeration included within ControlVault | No |
| Host Interface | Not applicable | USB 2.0 |
| Fingerprint procession on chip | Fingerprint processing occurs within secure boundary of ControlVault | Yes |
| Windows WBF support | Support for Windows biometric framework when Fingerprint reader is attached | Yes |

### Table 54. Dell ControlVault 3.0 specifications (continued)

| Title | Description | Dell ControlVault 3.0 |
|---|---|---|
| FIPS 140-2 level 3 complaint | Device complaint with FIPS 140-2 level 3 requirements | Yes |
| FIPS 140-2 level 3 certified | Device certified with FIPS 140-2 level 3 requirements | Yes |

## Trusted Platform Module

The following table lists the Trusted Platform Module (TPM) of your Precision 3590.

### Table 55. Trusted Platform Module (TPM)

| TPM: ST/ST33 HTPH2X32AHE4 |
|---|
| SPI interface |
| TPM 2.0 |
| FIPs 140-2 certificate |

# Thermal and acoustic improvements

The following table lists the thermal and acoustic improvements of your Precision 3590.

### Table 56. Thermal and acoustic improvements

| Feature | Description |
|---|---|
| New larger single heat pipe | Increase the heat capacity to improve thermal dissipation |
| Better system tuning/setting | Get higher performance and a good user experience |
| Pro-OS enhanced thermal setting (Dynamic PL1) | Optimized boot-up time to balance thermals at start-up |
| Linear fan control | Fan speed ramp more smoothly for better user experience, no more significant acoustic changing |
| DDT SSD setting | Protecting the SSD device in high temperature and worse cases to prevent blue screen of death (BSOD) |
| IEC 60529 ingress protection: IP-54 | • Dust protected<br>• Protected against dripping water |
| Better acoustic experience | Enhance acoustic to 0.6 sone during daily working conditions |

# System management features

Dell commercial systems come with a number of systems management options that are include by default for In-Band management with our Dell Client Command Suite. In-Band management meaning that the Operating System is functional and the device is connected to a network so that it can be managed. The Dell Client Command Suite of tools can be leveraged individually or with a systems management console like SCCM, LANDESK, KACE, etc.

We also offer Out-of-Band management as an option. Out-of-band management is when the system does not have a functional operating system or is turned off and you still want to be able to manage the system in that state.

# Dell Client Command Suite for in-band systems management

**Dell Client Command Suite** is a free toolkit available for download, for all Latitude Rugged tablets at dell.com/support, that automates and streamlines systems management tasks, saving time, money, and resources. It consists of the following modules that can be used independently, or with a variety of systems management consoles such as SCCM.

Dell Client Command Suite's integration with VMware Workspace ONE Powered by AirWatch, now allows customers to manage their Dell client hardware from the cloud, using a single Workspace ONE console.

**Dell Command | Deploy** enables easy operating system (OS) deployment across all major OS deployment methodologies and provides numerous system-specific drivers that have been extracted and reduced to an OS-consumable state.

**Dell Command I Configure** is a graphical user interface (GUI) admin tool for configuring and deploying hardware settings in a pre-OS or post-OS environment, and it operates seamlessly with SCCM and Airwatch and can be self-integrated into LANDesk and KACE. Simply, this is all about the BIOS. Command I Configure allows you to remotely automate and configure over 150+ BIOS settings for a personalized user experience.

**Dell Command I PowerShell Provider** can do the same things as Command I Configure, but with a different method. PowerShell is a scripting language that allows customers to create a customized and dynamic configuration process.

**Dell Command I Monitor** is a Windows Management Instrumentation (WMI) agent that provides IT admins with an extensive inventory of the hardware and health-state data. Admins can also configure hardware remotely by using command line and scripting.

**Dell Command | Update (end-user tool)** is factory-installed and allows admins to individually manage and automatically present and install Dell updates to the BIOS, drivers, and software. Command I Update eliminates the time-consuming hunting and pecking process of update installation.

**Dell Command I Update Catalog** provides searchable metadata that allows the management console to retrieve the latest system-specific updates (driver, firmware or BIOS). The updates are then delivered seamlessly to end-users using the customer's systems management infrastructure that is consuming the catalog (like SCCM).

**Dell Command | vPro Out of Band** console extends hardware management to systems that are offline or have an un-reachable OS (Dell exclusive features).

**Dell Command | Integration Suite for System Center** - This suite integrates all the key components of the Client Command Suite into Microsoft System Center Configuration Manager 2012 and Current Branch versions.

# Out-of-band systems management

Intel Standard Manageability option **must be configured in our factory at the time of purchase, as it is NOT field upgradable.** It offers out-of-band management and DASH compliance (https://registry.dmtf.org/registry/results/field_initiative_name%3A%22DASH%201.0%22).

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# Color, material, and finish

This section details the color, material, and finish (CMF) specifications of your Precision 3590.

## Table 57. CMF specifications

| Description | Value |
|---|---|
| A Cover (Top) | • Carbon Fiber Reinforced Plastic (CFRP) + Bi-Injection Antenna Cover<br>• Titan Gray Satin Waterborne UV Monocoat (WUVM)<br>• 17+/-3 Gloss Units (GU) |
| B Cover (Bezel) | • PC/ABS + Elastomer<br>**NOTE:** PC/ABS: PC/ABS (polycarbonate/ acrylonitrile-butadiene-styrene terpolymer blend) is a thermoplastic alloy of (PC) polycarbonate and (ABS) acrylonitrile-butadiene-styrene.<br>• Apollo, Resin<br>• Bezel: Fine texture, 23 µm, 5+/-1 GU<br>• Bumper: Fine texture, 17 µm, 5+/-1 GU |
| C Cover (Palmrest) | • Plastic (Rustic Pewter Resin)<br>• Titan Gray Satin WUVM<br>• 17+/-3 GU |
| D Cover (Bottom) | • Black CFRP<br>• Titan Gray Satin WUVM<br>• 17+/-3 GU |

**NOTE:** Titan Gray, Cool Gray 9C = RGB 117 120 123 HEX/HTML 75787B CMYK 30 22 17 57

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# Getting help and contacting Dell

## Self-help resources

You can get information and help on Dell products and services using these self-help resources:

**Table 58. Self-help resources**

| Self-help resources | Resource location |
|---|---|
| Information about Dell products and services | www.dell.com |
| Tips | |
| Contact Support | In Windows search, type `Contact Support`, and press Enter. |
| Online help for operating system | www.dell.com/support/windows<br>www.dell.com/support/linux |
| Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals, and documents. | Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at www.dell.com/support.<br>For more information about how to find the Service Tag for your computer, see Locate the Service Tag on your computer. |
| Dell knowledge base articles | 1. Go to www.dell.com/support.<br>2. On the menu bar at the top of the Support page, select **Support** > **Knowledge Base**.<br>3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles. |

## Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see www.dell.com/contactdell.

**NOTE:** Availability varies by country/region and product, and some services may not be available in your country/region.

**NOTE:** If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog.