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Summary of Changes

This section describes the technical changes made in this edition.
This edition might also include minor corrections and editorial changes which are not identified.

August 28, 2019 - Version 547

Additions in this update

► New product(s)
  ThinkPad P73 announced August 2019

► Others
  None

Withdrawals in this update

► Withdrawn product(s)
  None
### ThinkPad 11e (5th Gen) Platform Specifications

**Product Specifications Reference (PSREF)**

**Processor**
- 7th Generation Intel® Core™ m / i5 Processor, Intel Celeron® processor, or Intel Pentium® Silver processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Burst Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>m3-7Y30</td>
<td>2</td>
<td>4</td>
<td>1.0 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 615</td>
</tr>
<tr>
<td>i5-7Y54</td>
<td>4</td>
<td></td>
<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Celeron N4100</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>2.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Pentium Silver N5000</td>
<td></td>
<td></td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 605</td>
</tr>
</tbody>
</table>

**Graphics**
- Intel HD Graphics 615, Intel UHD Graphics 600 or 605 in processor, supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 3840x2160 @ 60Hz (USB Type-C); 4096x2160 @ 30Hz (HDMI)
- Intel HD Graphics 615, Intel HD Graphics 606, Intel HD Graphics 610, or Intel HD Graphics 620 in processor, supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 3840x2160 @ 60Hz (USB Type-C); 4096x2160 @ 30Hz (HDMI)
- Intel HD Graphics 615, Intel HD Graphics 606, Intel HD Graphics 610, or Intel HD Graphics 620 in processor, supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 3840x2160 @ 60Hz (USB Type-C); 4096x2160 @ 30Hz (HDMI)

**Chipset**
- Intel SoC (System on Chip) platform

**Memory**
- 4GB or 8GB / 1866MHz LPDDR3 or 2400MHz DDR4 / soldered to systemboard, no sockets

**Display**
- 11.6" HD (1366x768) TN Anti-glare 250 nits 16:9 400:1 or 500:1 45% 90°
- 11.6" HD (1366x768) IPS Anti-glare 250 nits 16:9 800:1 45% 170°

**Multi-touch** (opt)
- Capacitive-type multi-touch, supports 10-finger gesture (HD IPS only)

**Storage**
- eMMC flash memory on board or M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

**Optical**
- None

**Ethernet**
- Realtek RTL8111GUS Gigabit Network Connection

**WLAN + Bluetooth™**
- One of the following, configurable by model:
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
  - Intel Wireless-Ac 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card (US only)

**WWAN**
- None

###dimensions
- WxDxH: 11.81" x 8.27" x 0.86"; 300mm x 210mm x 21.9mm
- Weight: Starting at 2.99 lb / 1.36 kg
- Case color: Black
- Case material: Display cover: PC/ABS+GF; Bottom: PC/ABS plastic
- Smart card reader: None
- Media reader: MicroSD card reader
- Ports: Two USB 3.1 Gen 1, one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole
- Camera: HD720p camera, fixed focus
- Audio support: HD Audio, Realtek ALC3287 codec, stereo speakers, 2W x 2, Dolby Audio™, mono digital microphone, combo audio/microphone jack
- Keyboard: 6-row, spill-resistant, multimedia Fn keys
- Touchpad: Buttonless Mylar surface touchpad below keyboard, multi-touch
- Security chip: Power-on password, supervisor password, security keyhole
- System Mgt: Discrete TPM 2.0, TCG Certified
- Fingerprint reader: None
- NFC: None
- Battery: Integrated Li-ion 42Wh battery
- Max battery life: MobileMark® 2014: 13.9 hr
- AC adapter: 45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter
- Operating system (optional):
  - One of the following, configurable by model:
    - Windows® 10 Home 64
    - Windows 10 Pro 64
    - Windows 10 Pro in S mode
    - No OS
- Limited warranty:
  - One of the following, configurable by model:
    - 1-year depot repair service
    - 3-year/1-yr battery depot repair service
- Mil-Spec test: MIL-STD-810G military testing
- Environment: EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant

Note: The specifications above may not be available in all regions.

 Lenovo
August 2019
### ThinkPad A275 Platform Specifications

**Processor**: AMD PRO A-Series APUs

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRO A10-8730B</td>
<td>4</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.3 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R5 Graphics</td>
</tr>
<tr>
<td>PRO A12-8830B</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
<tr>
<td>PRO A10-9700B</td>
<td>4</td>
<td>4</td>
<td>2.25 GHz</td>
<td>3.4 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
<tr>
<td>PRO A12-9800B</td>
<td>4</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
</tbody>
</table>

* Windows 7 is only supported by PRO A10-8730B and PRO A12-8830B

**Graphics**: AMD Radeon R5 or R7 Graphics in processor only; supports external monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2160@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

**Chipset**: AMD SoC (System on Chip) platform

**Memory**: 16GB max / 1866MHz DDR4, one DDR4 SO-DIMM socket

**Display**: Some: 12.5” (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
Some: 12.5” (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 100:1 contrast ratio, 170° viewing angle

**Multi-touch (opt)**: On-cell touch, supports 10-finger gesture (FHD only, US only)

**Storage**: System has one HDD slot or one M.2 slot exclusively for storage.
Some: HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
Some: SSD / SATA 6.0Gb/s, 2.5” wide, 7mm high (e.g. 120GB SSD)
Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

**Optical**: None

**Ethernet**: Realtek® RTL8111EPV Gigabit Ethernet connection

**WLAN**: Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card
Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

**WWAN (optional)**: One of the following, configurable by model:
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)
* For non-WWAN model, it means the model is NOT WWAN upgradable

**SIM card (opt)**: Micro-SIM card slot, opt Verizon LTE (US) SIM card

**Dimensions**: WxH: 12.03” x 8.21” x 0.80”; 305.5mm x 208.5mm x 20.3mm

<table>
<thead>
<tr>
<th>Weight Models</th>
<th>No + 3-cell</th>
<th>3-cell + 3-cell</th>
<th>3 cell + 6-cell 48Wh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>2.79 lb / 1.27 kg</td>
<td>2.98 lb / 1.36 kg</td>
<td>3.33 lb / 1.52 kg</td>
</tr>
</tbody>
</table>

**Case color**: Black
**Case material**: Glass-Fiber Reinforced Plastic

**Note**: The specifications above may not be available in all regions.
### ThinkPad A285 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 PRO 2300U</td>
<td>4</td>
<td>4</td>
<td>2.0 GHz</td>
<td>3.4 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 PRO 2500U</td>
<td>8</td>
<td>4</td>
<td>2.0 GHz</td>
<td>3.6 GHz</td>
<td></td>
<td>Radeon Vega 8 Graphics</td>
<td></td>
</tr>
<tr>
<td>Ryzen 7 PRO 2700U</td>
<td>8</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.8 GHz</td>
<td></td>
<td>Radeon Vega 10 Graphics</td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics
- AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor only;
- supports four independent displays;
- Max resolution: 3120x2880@60Hz (USB Type-C); 3096x2160@60Hz (HDMI)

#### Chipset
- AMD SoC (System on Chip) platform
- 8GB or 16GB / 2400MHz DDR4, soldered to systemboard, no sockets

#### Display
- 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle

#### Storage
- One of the following, configurable by model:
  - M.2 SSD / SATA 6.0Gb/s
  - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

#### Optical
- None

#### Ethernet
- Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

#### WLAN
- RTL8822BE, Wi-Fi 2x2:802.11ac + Bluetooth 4.2, M.2 card
- Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo adapter

#### WWAN (optional)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380, M.2 card
  - * For non-WWAN model, it means the model is NOT WWAN upgradable

#### SIM card (optional)
- Nano-SIM card slot, in the combo slot with microSD card reader, optional Verizon LTE (US) SIM card

#### Dimensions
- WxDxH (HD & FHD multi-touch): 12.11" * 8.26" * 0.69"; 307.7mm x 209.8mm x 17.4mm
- WxDxH (FHD non-touch): 12.11" * 8.26" * 0.70"; 307.7mm x 209.8mm x 17.8mm

#### Weight
- FHD non-touch model: 2.48 lb / 1.13 kg
- HD non-touch model: 2.78 lb / 1.26 kg
- FHD multi-touch model: 2.79 lb / 1.27 kg

#### Case color
- Black

#### Case material
- Carbon Fiber (FHD non-touch model) or PPS (HD & FHD multi-touch model)

### Additional Features

- **Smart card reader**: Optional; Smart card reader
- **Media reader**: MicroSD card reader, in the combo slot with nano-SIM card
- **Ports**: One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, combo slot of nano-SIM card (WWAN models) and microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole
- **Monitor cable**: Optional; ThinkPad Ethernet Extension Adapter Gen 2
- **Camera (optional)**: One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera, fixed focus
- **Audio support**: HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack
- **Keyboard**: 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- **Security**: Multitouch touchpad
- **Battery**: Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- **Max battery life**: MobileMark 2014: 10.55 hr
- **AC adapter**: 45W or 65W USB Type-C AC adapter
- **Operating system**: Windows® 10 Home 64 or Windows 10 Pro 64

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**Note:** The specifications above may not be available in all regions.

*Lenovo April 2019*
Processor AMD PRO A-Series APUs

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
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<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
</tbody>
</table>

* Windows 7 is only supported by PRO A10-8730B and PRO A12-8830B

Graphics AMD Radeon R5 or R7 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2160@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

Chipset AMD SoC (System on Chip) platform
Memory 32GB max / 1866MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

Display
- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

Multi-touch (opt) On-cell touch, supports 10-finger gesture (FHD only, US only)

Storage System has one HDD slot or one M.2 2280 slot exclusively for storage
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4 x 4 but run at PCIe 3.0 x 2 due to M.2 SSD adapter limitation

Optical
- AMD SoC (System on Chip) platform
- Supports multiple optical drive options
- Supports various optical drive models with USB Type-C connections

Ethernet Realtek® RTL8111EPV Gigabit Ethernet connection
WLAN Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
Bluetooth™ Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

WWAN (optional) One of the following, configurable by model:
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A
- Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)

SIM card (opt) Micro-SIM card slot, opt Verizon LTE (US) SIM card

Camera (optional) HD720p resolution, fixed focus
Audio support HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack

Security
- Power-on password, hard disk password, supervisor password, security keyhole
- dTPM 2.0: discrete TPM 2.0, TCG Certified
- dTPM 2.0: discrete TPM 2.0, TCG Certified

Fingerprint reader Optional: Touch style match on chip fingerprint reader on the keyboard bezel

Storage
- Internal battery: Optional: Integrated Li-Polymer 3-cell (24Wh)
- External battery: Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh)

Battery life
- Max battery life (MobileMark® 2014)
  - Models
    - 3-cell
    - 3-cell
    - 3-cell
    - 6-cell
    - 6-cell
    - 3 + 6-cell

Dimensions WxDxH: 13.25” x 9.15” x 0.79”. 336.6mm x 232.5mm x 19.95mm

Weight
- Models
  - 3-cell or 3-cell
  - 6-cell or 6-cell
- Magnesium
  - 3.49 lb / 1.65 kg
  - 3.92 lb / 1.78 kg
- PPS
  - 3.63 lb / 1.65 kg
  - 4.35 lb / 1.85 kg

Case color Black
Case material Display cover: Magnesium Hybrid or PPS (Magnesium Hybrid for US only); Bottom: Glass-Fiber Reinforced Plastic

WWAN (optional) One of the following, configurable by model:
- One-year depot repair service
- Three-year/1-year battery depot repair service
- Three-year/1-year battery limited onsite service

Wi-Fi Support
- Integrated Wi-Fi 11ac + BT4.1

Environment EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

Note: The specifications above may not be available in all regions.

Lenovo August 2019
## ThinkPad A485 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3</td>
<td>PRO 2300U</td>
<td>4</td>
<td>8</td>
<td>2.0 GHz</td>
<td>3.4 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
</tr>
<tr>
<td>Ryzen 5</td>
<td>PRO 2500U</td>
<td>8</td>
<td>16</td>
<td>2.0 GHz</td>
<td>3.6 GHz</td>
<td>4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7</td>
<td>PRO 2700U</td>
<td>8</td>
<td>16</td>
<td>2.2 GHz</td>
<td>3.8 GHz</td>
<td>8MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 10 Graphics</td>
</tr>
</tbody>
</table>

### Graphics

- AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor only;
- supports external digital monitor via HDMI or USB Type-C;
- supports four independent displays;
- Max resolution: 5120x2880@60Hz (USB Type-C); 4096x2160@60Hz (HDMI)

### Chipset

- AMD SoC (System on Chip) platform
- Memory: 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display

- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

### Multi-touch (opt)

- On-cell touch, supports 10-finger gesture (FHD only)

### Storage

- System has one HDD slot or one M.2 SSD slot exclusively for storage
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4
- Some: 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2

### Optical

- Installed M.2 SSD is PCIe 3.0 x 4 but run at PCIe 3.0 x 2 due to M.2 SSD adapter limitation

### Ethernet

- Realtek®RTL8111GUL Gigabit Ethernet connection

### WLAN

- Bluetooth™: Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card

### WWAN (optional)

- Integrated Mobile Broadband 4G LTE-A
- Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- * For non-WWAN model, it means the model is NOT WWAN upgradable

### SIM card (opt)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Dimensions

- Weight: 3.49 lb / 1.58 kg / 3.92 lb / 1.78 kg
- Magnesium: 3.63 lb / 1.65 kg / 4.08 lb / 1.85 kg
- PPS: 3.63 lb / 1.65 kg / 4.08 lb / 1.85 kg

### Case color

- Black

### Case material

- Display cover: Magnesium Hybrid or PPS
- Bottom: Glass-Fiber Reinforced Plastic

Note: The specifications above may not be available in all regions.
## ThinkPad E480 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7200U</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7250U</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB DDR5 memory;
- supports external digital monitor via HDMI or USB Type-C;
- supports dual independent display;
- Max resolution: 1920x1080 (HDMI)@60Hz

### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- * System clocks down for processors with lower memory controller

### Display

- **Some:** 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- **Some:** 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio

### Storage

- Up to 2 drives (one M.2 SSD and one HDD)
- **Some:** HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradeable, Active Protection System™
- **Some:** M.2 SSD / PCIe NVMe

### Optane™ memory

- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- • Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
- • Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- • Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card
- • Intel 3165ac card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN

- None

### Memory

- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- * System clocks down for processors with lower memory controller

### Display

- **Some:** 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- **Some:** 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio

### Security

- Battery: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life: MobileMark® 2014: 13.51 hr
- AC adapter: 45W or 65W USB Type-C AC adapter

### Operating system

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - • 1-year mail-in repair service
  - • 1-year depot repair service

### MIL-Spec test

- MIL-STD-810G military testing

### Environmental

- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
## ThinkPad E490 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 620 in processor only
- Intel UHD Graphics 620 in processor and AMD Radeon RX 550X Graphics, 2GB DDR5 memory
- supports external digital monitor via HDMI or USB Type-C
- supports dual independent display
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Memory

- 8GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display

- 14.0” FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch
- 14.0” FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch

### Multi-touch

- None

### Storage

- Up to two drives (one M.2 SSD and one HDD)
  - HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

### Optical

- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card

### WWAN

- None

### SIM card

- None

### Smart card reader

- None

### Media reader

- None

### Ports

- One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack
- microSD card reader, security keyhole

### Monitor cable

- None

### Camera

- HD720p camera, fixed focus

### Audio support

- HD Audio, Synaptic® CX11880 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

### Keyboard

- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad

### UltraNav™

- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip
  - Integrated model: discrete TPM 2.0, TCG Certified
  - Discrete model: firmware TPM 2.0 integrated in chipset
- System Mgt
  - None
- Fingerprint reader
  - Optional: Touch style fingerprint reader on the palm rest
- NFC
  - None
- Battery
  - Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life
  - MobileMark® 2014: 13 hr
  - Battery life varies significantly with settings, usage, & other factors
  - 45W or 65W USB Type-C AC adapter

### Operating system

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year mail-in repair service
  - 1-year depot repair service

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

- EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant

### Note:
The specifications above may not be available in all regions.
### ThinkPad E490s Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>1</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.5 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics

- Intel UHD Graphics 620 in processor only or AMD Radeon RX 540X Graphics, 2GB DDR5 memory.
- Supports external digital monitor via HDMI or USB Type-C.
- Supports three independent displays.
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

#### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation*

#### Display

<table>
<thead>
<tr>
<th>Size / Resolution</th>
<th>Surface Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
<th>Multi-touch</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>Anti-glare TN</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
<td>Non-touch</td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>Anti-glare IPS</td>
<td>250 nits</td>
<td>16:9</td>
<td>600:1</td>
<td>170°</td>
<td>Non-touch</td>
</tr>
</tbody>
</table>

#### Storage

- One of the following, configurable by model:
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- None

#### Optical

- None

#### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

#### WLAN + Bluetooth™

- One of the following, configurable by model:
  - Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card

#### WWAN

- None

#### SIM card

- None

#### Battery

- Integrated Li-ion 42Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life: MobileMark 2014: 11.5 hr
- AC adapter: 45W or 65W USB Type-C AC adapter
- *Battery life varies significantly with settings, usage, & other factors

#### Operating system

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

#### Limited warranty

- 1-year depot repair service

#### Mil-Spec test

- MIL-STD-810G military testing

#### Environment

- EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.

Lenovo
August 2019
### ThinkPad E495 Platform Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 3200U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>1MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 3 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon RX Vega 10 Graphics</td>
</tr>
</tbody>
</table>

**Graphics**

- AMD Radeon Vega 3, Vega 8, or RX Vega 10 Graphics in processor;
- Supports external digital monitor via HDMI or USB Type-C;
- Supports dual independent display;
- Max resolution: 3840x2160@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)

**Chipset**

- AMD SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

**Memory**

- *Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation*

**Display**

- **Size / Resolution**: 14.0" HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch
- **Size / Resolution**: 14.0" FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch

**Multi-touch**

- None

**Storage**

- Up to two drives (one M.2 SSD and one HDD)
  - HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4

**Optical**

- None

**Ethernet**

- Gigabit Ethernet Connection, Realtek R8111GUS

**WLAN + Bluetooth™**

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card

**WWAN**

- None

**SIM card**

- None

**Camera**

- HD720p camera, fixed focus

**Audio support**

- HD Audio, Synaptic® CX11880 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

**Keyboard**

- UltraNav™ 6-row, spill-resistant, multimedia Fn keys
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad

**Security**

- Security chip
- Power-on password, hard disk password, supervisor password, security keyhole
- Fingerprint reader
- None
- None

**Battery**

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- 2014: 11 hr
- *Battery life varies significantly with settings, usage, & other factors

**Operating system**

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

- 1-year depot repair service

**Environment**

- EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant

**Note:** The specifications above may not be available in all regions.

Lenovo
August 2019
## ThinkPad E580 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-7020U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics
- Intel HD Graphics 620
- Intel UHD Graphics 620

### Chipset
- Intel SoC (System on Chip) platform

### Memory
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display
- Some: 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio

### Multi-touch
- None

### Storage
- Up to 2 drives (one M.2 SSD and one HDD)

### Optane™ memory
- Optional: Intel Optane memory, PCIe NVMe

### Optical
- None

### Ethernet
- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™
- One of the following, configurable by model:
  - Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
  - Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
  - Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card

### WWAN
- None

### SIM card
- None

### Dimensions
- WxDxH: 14.53" x 9.92" x 0.78"; 369mm x 252mm x 19.95mm

### Weight
- Starting at 4.7 lb / 2.1kg

### Case material
- Display cover: Aluminum; Bottom: PC/ABS plastic

### Camera
- HD720p camera, fixed focus

### Audio support
- HD Audio, Synaptic® CX11852 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

### Security
- Power-on password, hard disk password, supervisor password, security keyhole
- Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified

### Security chip (opt)
- Optional: TrackPoint® pointing device and buttonless Mylar surface multi-touch tabletop

### Battery
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 12.23 hr

### AC adapter
- 45W or 65W USB Type-C AC adapter

### Operating system
- One of the following, configurable by model:
  - Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty
- One-year depot repair service
- One-year mail-in repair service
- One-year depot repair service

### Mil-Spec test
- MIL-STD-810G military testing

### Environment
- EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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**Note:** The specifications above may not be available in all regions.

**Lenovo**

**August 2019**
## ThinkPad E590 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

Intel UHD Graphics 620 in processor only or AMD Radeon RX 550X Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 4096x2304 at 60Hz (USB Type-C); 4096x2160 at 24Hz (HDMI)

### Chipset

Intel SoC (System on Chip) platform

### Memory

32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display

- **Size / Resolution**
  - 15.6" HD (1366x768)
  - 15.6" FHD (1920x1080)

- **Surface**
  - Anti-glare

- **Type**
  - TN

- **Brightness**
  - 220 nits

- **Aspect Ratio**
  - 16:9

- **Contrast Ratio**
  - 400:1

- **Viewing Angle**
  - 90°

- **Multi-touch**
  - None

### Multi-touch

None

### Storage

Up to two drives (one M.2 SSD and one HDD):
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- M.2 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

### Optane™ memory

Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

### Optical

None

### Ethernet

Gigabit Ethernet Connection, Realtek RTL8111GUS

### WLAN + Bluetooth™

One of the following, configurable by model:
- Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card

### WWAN

None

### SIM card

None

### Security

- **Security chip**
  - Integrated model: discrete TPM 2.0, TCG Certified
  - Discrete model: firmware TPM 2.0 integrated in chip

### System Mgt

None

### Fingerprint reader

Optional: Touch style fingerprint reader on the palm rest

### NFC

None

### Security chip

Power-on password, hard disk password, supervisor password, security keyhole

### Security chip

Integrated model: discrete TPM 2.0, firmware TPM 2.0 integrated in chip

### Battery

Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

### Max battery life

MobileMark® 2014: 11 hr

### AC adapter

45W or 65W USB Type-C AC adapter

### Operating system

Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- 1-year mail-in repair service
- 1-year depot repair service

### Environmental

EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

## Specifications

- **Dimensions**: 14.53" x 9.94" x 0.78";
- **Weight**: Starting at 4.68 lb / 2.12 kg
- **Display**: 15.6" F HD (1920x1080) Anti-glare IPS 250 nits 16:9 170° Non-touch
- **Audio support**: HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
- **Camera**: HD720p camera, fixed focus
- **Keyboard**: UltraNav™ 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight
- **Fingerprint reader**: Touch style fingerprint reader on the palm rest
- **Security chip**: Power-on password, hard disk password, supervisor password, security keyhole
- **Battery**: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- **Max battery life**: MobileMark® 2014: 11 hr
- **AC adapter**: 45W or 65W USB Type-C AC adapter
- **Operating system**: Optional: Windows® 10 Home 64 or Windows 10 Pro 64
- **Limited warranty**: 1-year mail-in repair service
- **Environmental**: EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

---

Note: The specifications above may not be available in all regions.
## ThinkPad E595 Platform Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 3200U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>1MB L2 / 4MB L3</td>
<td>Radeon Vega 3 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>Radeon RX Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>Radeon RX Vega 10 Graphics</td>
</tr>
</tbody>
</table>

**Graphics**

AMD Radeon Vega 3, Vega 8, or RX Vega 10 Graphics in processor;
supports external digital monitor via HDMI or USB Type-C;
supports dual independent display;
Max resolution: 3840x2160@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)

**Chipset**

AMD SoC (System on Chip) platform

**Memory**

32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
* Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation

**Display**

<table>
<thead>
<tr>
<th>Size / Resolution</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
<th>Multi-touch</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot; HD</td>
<td>Anti-glare</td>
<td>160 nits</td>
<td>500:1</td>
<td>100°</td>
<td>Non-touch</td>
</tr>
<tr>
<td>15.6&quot; FHD</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>600:1</td>
<td>170°</td>
<td>Non-touch</td>
</tr>
</tbody>
</table>

**Optical**

- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4

**Ethernet**

Gigabit Ethernet Connection, Realtek R8111GUS

**WLAN + Bluetooth™**

- Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card

**WWAN**

None

**Battery**

Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

**Max battery life**

MobileMark® 2014: 10.3 hr

**Operating system**

Optional: Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

One of the following, configurable by model:
- 1-year mail-in repair service
- 1-year depot repair service

**Environment**

EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.
### ThinkPad L380 Platform Specifications

**Product Specifications Reference (PSREF)**

<p>| Processor | Intel® Celeron® Processor, 7th Generation Intel Core™ i3 / i5 Processor or | Intel HD Graphics 610 | Dimensions | WxDxH: 12.67&quot; x 8.83&quot; x 0.74&quot;; 321.8mm x 224.2mm x 18.8mm |</p>
<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
<th>Weight</th>
<th>Starting at 3.22 lb / 1.46 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>2.1 GHz</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i3-7020U</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>3.4 GHz</td>
<td>3MB</td>
<td>Intel HD Graphics 620</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i3-7130U</td>
<td>4</td>
<td>8</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i3-7200U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
<th>Monitor cable (optional)</th>
<th>MicroSD card reader</th>
<th>Media reader</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-8550U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Graphics**

- Intel HD Graphics 610, 620 or Intel UHD Graphics 620 in processor; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

**Chipset Memory**

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- *System clocks down for processors with lower memory controller*

**Display**

- 13.3" (338mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 500:1 contrast ratio
- 1000:1 contrast ratio
- 170° viewing angle
- Some:
  - 13.3" (338mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Multi-touch (opt)**

- On-cell touch, supports 10-finger gesture

**Storage**

- M.2 SSD / SATA 6.0Gb/s (e.g. xxxxGB SSD M.2)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxxGB SSD M.2 PCIe NVMe)

**Optical**

- None

**Ethernet**

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via optional ThinkPad Ethernet Extension Cable

**WLAN + Bluetooth™**

- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- *Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS*

**WWAN**

- None

**SIM card**

- None

**Audio**

- Stereo speakers, 2W x 2, Dolby® Audio™
- Dual array microphone, headphone / microphone combo jack

**Keyboard**

- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch

**Security chip**

- Power-on password, hard disk password, supervisor password, security keyhole
- Intel vPro Technology
- Fingerprint reader
- Optional: Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology

**Battery**

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life
  - MobileMark® 2014: 16.1 hr
  - *Battery life varies significantly with settings, usage, & other factors*

**AC adapter**

- 45W or 65W USB Type-C AC adapter

**Operating system**

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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Note: The specifications above may not be available in all regions.
## ThinkPad L390 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
</tr>
<tr>
<td>i5-8565U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
</tr>
</tbody>
</table>

**Graphics**

Intel UHD Graphics 620 in processor; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304 @ 60Hz (USB Type-C); 4096x2160 @ 30Hz (HDMI)

**Chipset**

Intel SoC (System on Chip) platform

**Memory**

32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot; HD</td>
<td>(1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>250 nits</td>
<td>16:9</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>(1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>250 nits</td>
<td>16:9</td>
</tr>
</tbody>
</table>

**Multitouch (opt)**

On-cell touch, supports 10-finger gesture (FHD only)

### Storage

One of the following, configurable by model:
- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- Intel Optane Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

### Optical

None

### Ethernet

Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via optional ThinkPad Ethernet Extension Cable or Lenovo USB-C to Ethernet Adapter

### WLAN

Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN

None

### SIM card

None

### Dimensions

WxDxH: 12.67" x 8.83" x 0.74"; 321.88mm x 224.22mm x 18.8mm

### Weight

Starting at 3.22 lb / 1.46 kg

### Case color

Black or Silver

### Case material

Display cover: Aluminum

### Smart card reader

None

### Media reader

MicroSD card reader

### Ports

Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, headphone / microphone combo jack, microSD card reader, security keyhole

### Monitor cable

(optional)

* Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Bundled Accessories

(optional)

USB-C to USB-C Cable 2m:

Lenovo USB-C to USB-C Cable 2m

### Camera

HD720p camera, fixed focus

### Audio support

HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio™ Premium / dual array microphone, headphone / microphone combo jack

### Keyboard

6-row, spill-resistant, multimedia Fn keys, optional LED backlight

### Security

Power-on password, hard disk password, supervisor password, security keyhole

### System Mgt (opt)

Intel vPro Technology

### System reader

Optional: Touch style fingerprint reader on the palm rest

### Battery

Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

### Max battery life

MobileMark 2014: 14.61 hr

### AC adapter

* Battery life varies significantly with settings, usage, & other factors

### AC adapter

Optional: 45W or 65W USB Type-C AC adapter

### Operating system

Windows 10 Home 64 or Windows 10 Pro 64

### Limited warranty

One of the following, configurable by model:
- 1-year depot repair service
- 1-year depot with 2-year planar repair service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

### Mil-Spec test

MIL-STD-810G military testing

### Environment

EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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Note: The specifications above may not be available in all regions.
ThinkPad L470 Platform Specifications

Processor 6th Generation Intel® Core™ i3 / i5 / i7 Processor or

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-6006U</td>
<td>2</td>
<td>4</td>
<td>2.0 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>3-6100U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz 2.8 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz 3.0 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
</tbody>
</table>

Intel Celeron® Processor or 7th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>3-7100U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz 3.1 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz 3.5 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>7-7500U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz 3.5 GHz</td>
<td>4MB</td>
<td></td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz 3.9 GHz</td>
<td>4MB</td>
<td></td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

* i7 processor NOT available in EMEA

Graphics Intel HD Graphics 610 or 620 in processor only, or Intel HD Graphics 620 in processor and AMD Radeon™ RX 540, 2GB memory; supports external analog monitor via VGA and digital monitor via Mini DisplayPort; supports three independent displays; Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)

Chipset Intel SoC (System on Chip) platform

Memory 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

Display

- Some: 14.0" (350mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
- Some: 14.0" (350mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

Multi-touch None

Storage

- System has one HDD slot or one M.2 2280 slot exclusively for storage
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm or 9.5mm high, Active Protection System™
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

Optical None

Ethernet Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)

WLAN One of the following, configurable by model:
- Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

Bluetooth™ Intel SoC (System on Chip) platform

Product Specifications Reference (PSREF)

WWAN (optional) One of the following, configurable by model:
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)

SIM card (opt) Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card

Dimensions WxDxH: 13.35" x 9.25" x 0.94"; 339mm x 235mm x 23.9mm

Weight

- Models
- 3-cell
- 6-cell
- Integrated model
- 4.13 lb / 1.87 kg
- 4.45 lb / 2.02 kg
- Discrete model
- 4.16 lb / 1.89 kg
- 4.48 lb / 2.03 kg

Camera (optional) HD720p resolution, fixed focus

Audio support HD Audio, Realtek ALC3268 codec / stereo speakers, 1W x 2 / dual array microphone, combo audio/microphone jack

Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Intel vPro Technology

Camera UltraNav™ 6-row, spill-resistant, multimedia Fn keys

Security chip Intel vPro Technology

Fingerprint reader Intel vPro Technology

Smart card reader Optional: Smart card reader

Media reader 4-in-1 reader (MMC, SD, SDHC, SDXC)

Ports

- Three USB 3.1 Gen 1 (USB 3.0, one Always On), VGA, Mini DisplayPort, Ethernet (RJ-45), Dock connector
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

Battery

- Max battery life (MobileMark® 2014)
- Li-ion 3-cell (24Wh) or 6-cell (48Wh or 72Wh)

AC adapter

- 45W or 65W slim tip AC adapter

Operating system One of the following, configurable by model:
- Windows® 7 Professional 64 preinstalled
- Windows 10 Home 64
- Windows 10 Pro 64

Limited warranty One of the following, configurable by model:
- 1-year depot repair service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

Mil-Spec test MIL-STD-810G military testing

Environment EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

Note: The specifications above may not be available in all regions.
## ThinkPad L480 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7020U</td>
<td>2</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<td>i3-7130U</td>
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<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i5-7200U</td>
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<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or AMD Radeon 530, 2GB GDDRS memory (discrete models are NOT available in EMEA);
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

### Display
- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle on-cell touch, supports 10-finger gesture (FHD only)

### Optical
- None

### Ethernet
- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN + Bluetooth
- One of the following, configurable by model:
  - Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- * Intel 8265ac card supports B74.2 but is limited to B74.1 by Windows OS

### WWAN (optional)
- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7626 (Fibocom L850-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- * For non-WWAN model, it means the model is NOT WWAN upgradable

### SIM card (opt)
- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Dimensions
- WxDxH: 13.19" x 9.25" x 0.89"; 335mm x 235mm x 22.5mm

### Weight
- Starting at 3.71 lb / 1.68 kg

### Case color
- Black

### Case material
- PC/ABS plastic

### Media reader
- Optional: Smart card reader

### Smart card reader
- Media reader: MicroSD card reader

### Ports
- Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

### Monitor cable
- Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Camera (optional)
- One of the following, configurable by model:
  - HD720p camera, fixed focus
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack

### Audio support
- Power-on password, hard disk password, supervisor password, security keyhole

### Security chip
- Security chip: Discrete TPM 2.0, TCG Certified

### Fingerprint reader
- Fingerprint reader: Optional: Touch style match on chip fingerprint reader on the keyboard bezel, anti-spoofing technology

### NFC (optional)
- Near Field Communication

### Battery
- MobileMark 2014: 12.2 hr
- Battery life varies significantly with settings, usage, & other factors

### AC adapter
- 45W or 65W USB Type-C AC adapter

### Operating system
- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty
- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### MIL-Spec test
- MIL-STD-810G military testing

### Environment
- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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Note: The specifications above may not be available in all regions.

Lenovo
August 2019
### ThinkPad L490 Platform Specifications

| Processor Intel® Celeron® Processor or 8th Generation Intel Core® i3 / i5 / i7 Processor |
|---|---|
| Processor Number | # of Cores | # of Threads | Base Frequency | Max Turbo Frequency | Cache | Memory Types | Processor Graphics |
| Cel 4305U | 2 | 2 | 2.2 GHz | - | 2MB | DDR4-2133 | Intel UHD Graphics 610 |
| 3-8145U | 2 | 4 | 2.1 GHz | 3.9 GHz | 4MB | DDR4-2400 | Intel UHD Graphics 620 |
| 5-8265U | 4 | 8 | 1.6 GHz | 3.9 GHz | 8MB | Intel UHD Graphics 620 |
| 5-8365U | 4 | 8 | 1.6 GHz | 4.1 GHz | 8MB | Intel UHD Graphics 620 |
| 7-8565U | 4 | 8 | 1.6 GHz | 4.6 GHz | 8MB | Intel UHD Graphics 620 |
| 7-8665U | 4 | 8 | 1.9 GHz | 4.8 GHz | 8MB | Intel UHD Graphics 620 |

### Graphics
- Intel UHD Graphics 610 or 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon 535, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset Memory
- Intel SoC (System on Chip) platform
- 64GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- *Installed memory is actually 2866MHz but run at 2133MHz or 2400MHz due to Intel limitation

### Display
- 14.0” HD (1366x768) TN Anti-glare 220 nits 16:9 45% 90°
- 14.0” FHD (1920x1080) IPS Anti-glare 250 nits 16:9 700:1 45% 170°

### Multi-touch (opt)
- On-cell touch, supports 10-finger gesture (FHD only)

### Storage
- HDD / SATA 6 Gb/s, 2.5” wide, 7mm high, Active Protection System™
- SSD / SATA 6 Gb/s, 2.5” wide, 7mm high
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- *Installed memory is actually 2866MHz but run at 2133MHz or 2400MHz due to Intel limitation

### Optane™ Memory
- On optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2
- None

### Ethernet
- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)
- LTE WWAN + Bluetooth™ (optional)
- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradeable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non-WWAN model, it means the model is NOT WWAN upgradeable

### SIM card
- None

### Chipset
- Intel® SoC (System on Chip) platform
- Intel Ethernet Connection I219-LM (Jacksonville)
- Intel Ethernet Connection I219-V (Jacksonville)

### Media reader
- MicroSD card reader

### Ports
- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet ( RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole
- *Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Chipset
- Intel® SoC (System on Chip) platform
- Intel Ethernet Connection I219-LM (Jacksonville)
- Intel Ethernet Connection I219-V (Jacksonville)

### Batteries
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life MobileMark® 2014: 12 hr
- *Battery life varies significantly with settings, usage, & other factors

### AC adapter
- 45W or 65W USB Type-C AC adapter
- MobileMark® 2014: 12 hr

### Software
- Windows 10 Home 64 or Windows 10 Pro 64
- Windows 10 (optional): Lenovo USB-C to VGA Monitor Adapter

### Bundle
- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - 1080p camera with ThinkShutter camera privacy, fixed focus
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

### Audio support
- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - 1080p camera with ThinkShutter camera privacy, fixed focus
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

### Security chip
- Discrete TPM 2.0, TCG Certified
- Power-on password, hard disk password, supervisor password, security keyhole

### Fingerprint reader
- Optional: Touch style match on chip fingerprint reader on the palm rest

### NFC (optional)
- Near Field Communication

### Battery
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life MobileMark® 2014: 12 hr

### AC adapter
- 45W or 65W USB Type-C AC adapter
- *Battery life varies significantly with settings, usage, & other factors

### Limited warranty
- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service

### Mil-Spec test
- MIL-STD-810G military testing

### Operating system
- Windows 10 Home 64 or Windows 10 Pro 64

### Note: The specifications above may not be available in all regions.
### ThinkPad L570 Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor or 7th Generation Intel Core i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>3.6 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i5-6300U</td>
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<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

Intel Celeron Processor or 7th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor or 7th Generation Intel Core i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>4</td>
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<td>-</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
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<tr>
<td>3-7100U</td>
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<td>-</td>
<td>-</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>5-7200U</td>
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<td>4</td>
<td>2.5 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>5-7300U</td>
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<td>4</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
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<td>7-7500U</td>
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<td>Intel HD Graphics 620</td>
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<tr>
<td>7-7600U</td>
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<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

* i7 processor is NOT available in EMEA

### Graphics

- Intel HD Graphics 520, 610, or 620 in processor only; supports external analog monitor via VGA and digital monitor via Mini DisplayPort; supports three independent displays; Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

- DDR4 max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- Certain models support Intel i3 memory upgrade to 16GB DDR4

### Display

- Some: 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio
- Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio
- Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio, 160° viewing angle

### Multi-touch

- None

### Storage

- Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16GB/s
- Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

### Optical (optional)

- DVD-ROM or DVD burner, 9mm high, fixed, not removable, tray-in

### Ethernet

- Non-vPro model: Intel Ethernet Connection i219-V (Jacksonville)
- vPro model: Intel Ethernet Connection i219-LM (Jacksonville)

### WLAN

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card (US only)
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### Bluetooth™

- * Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE-A
  - Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
  - Integrated Mobile Broadband 4G LTE
  - Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)

### SIM card (optional)

- Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card

### Dimensions

- WxDxH: 14.84" x 10.04" x 0.88-1.21"; 377mm x 255mm x 27.6-30.85mm

### Weight

- Starting at 5.25 lb / 2.38 kg

### Camera (optional)

- HD720p resolution, fixed focus

### Audio support

- HD Audio, Realtek® ALC3245 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack

### Operating system

- One of the following, configurable by model:
  - Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
  - Windows 10 Home 64
  - Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified

### Security chip

- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified

### Power-on password

- Haswell E3 platform and higher

### Multi-touch pointing device

- ALC3245 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack

### Battery

- Lithium 6-cell (48Wh)
- Max battery life: MobileMark® 2014: 14.8 hr
- * Battery life varies significantly with settings, usage, & other factors

### AC adapter

- 45W slim tip AC adapter

### Operating system

- One of the following, configurable by model:
  - Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
  - Windows 10 Home 64
  - Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

### Mi-Spec test

- MIL-STD-810G military testing

### Environment

- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
**ThinkPad L580 Platform Specifications**

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
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<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
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<td>8</td>
<td>1.6 GHz</td>
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<td>6MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *i3-7130U is NOT available in US and EMEA*

**Graphics**

Intel HD Graphics 610, 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon 530, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304 @ 60Hz (USB Type-C); 4096x2160 @ 30Hz (HDMI)

**Chipset Memory**

Intel SoC (System on Chip) platform 32GB max / 2400MT/s DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

* System clocks down for processors with lower memory controller

**Display**

Some: 15.6” (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio

Some: 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle

**Multi-touch**

None

**Storage**

System has one HDD slot or one M.2 2280 slot exclusively for storage

Some: HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™ Some: SSD / SATA 6.0Gb/s, 2.5” wide, 7mm high (e.g. xxxGB SSD)

Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

Some: 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

**Optical**

None

**Ethernet**

Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

**WLAN + Bluetooth**

One of the following, configurable by model:

- Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card

* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

**WWAN (optional)**

One of the following, configurable by model:

- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7662 (Fibocom L830-EB), M.2 card (E9/EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

* For non-WWAN model, it means the model is NOT WWAN upgradable

**SIM card (opt)**

Nano-SIM card slot, optional Verizon LTE (US) SIM card

**Dimensions**

Weight: 14.82” x 10.02” x 0.90”; 376.5mm x 254.5mm x 22.95mm

Starting at 4.46 lb / 2 kg

**Case color**

Black

**Case material**

PC/ABS plastic

**ExpressCard Smart card reader**

None

**Media reader**

Optional: Smart card reader

**Ports**

Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headset / microphone combo jack, optional smart card reader, side docking connector, security keyhole

* Depending on many factors, actual data transfer speed may be lower than theoretical speed

**Camera (optional)**

HD720p camera, fixed focus

**Audio support**

HD Audio, Realtek ALC2387 codec / stereo speakers, 2W x 2, Dolby Audio™ / dual array microphone, headphone / microphone combo jack

**Keyboard**

6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight

**TrackPoint** pointing device and buttonless Mylar surface multi-touch touchpad

**Monitor cable (optional)**

USB-C to VGA: Lenovo USB-C to VGA Adapter

**Camera (optional)**

HD720p camera, fixed focus

**Audio support**

HD Audio, Realtek ALC2387 codec / stereo speakers, 2W x 2, Dolby Audio™ / dual array microphone, headphone / microphone combo jack

**Keyboard**

6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight

**TrackPoint** pointing device and buttonless Mylar surface multi-touch touchpad

**Security chip vPro (optional)**

Discrete TPM 2.0, TCG Certified

**Fingerprint reader (optional)**

Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology

**NFC (optional)**

Near Field Communication

**Battery**

Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

**Max battery life**

* Battery life varies significantly with usage, & other factors

**AC adapter**

45W or 65W USB Type-C AC adapter

**Operating system**

Optional: Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

One of the following, configurable by model:

- 1-year depot repair service
- 3-year/1-year battery depot repair service
- 3-year/1-year battery limited onsite service

**Environment**

EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

Note: The specifications above may not be available in all regions.

Lenovo

August 2019
## ThinkPad L590 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 4305U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 610</td>
</tr>
<tr>
<td>3-8145U</td>
<td>4</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 610 or 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon 535, 2GB GDDR5 memory (discrete models are NOT available in EMEA);
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot; HD</td>
<td>(1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
</tr>
<tr>
<td>15.6&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch

- None

### Storage

- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation

### Optane™ memory

- None

### Optical

- Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### Ethernet

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non-WWAN model, it means the model is NOT WWAN upgradable

### SIM card

- None

### Chipset

- Intel UHD Graphics 620

### Graphics

- Intel UHD Graphics 610 or 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon 535, 2GB GDDR5 memory (discrete models are NOT available in EMEA);
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
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</thead>
<tbody>
<tr>
<td>15.6&quot; HD</td>
<td>(1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
</tr>
<tr>
<td>15.6&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch

- None

### Storage

- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation

### Optane™ memory

- None

### Optical

- Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### Ethernet

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non-WWAN model, it means the model is NOT WWAN upgradable

### SIM card

- None

Note: The specifications above may not be available in all regions.
## ThinkPad P1 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8400H</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>1</td>
<td>1</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 or P630 in processor and NVIDIA Quadro P1000 or P2000, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt; supports four independent displays; Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI)

### Chipset

- Mobile Intel CM246 Chipset

### Memory

- 64GB max / 2666MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, two DDR4 SO-DIMM sockets

### Display

- Some: 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 72% gamut, 170° viewing angle
- Some: 15.6” (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)

### Multi-touch (opt) Pen

- Capacitive-type multi-touch, supports 10-finger gesture (4K only)
- Supports pen accessory, please see the accessory compatibility for details

### Storage

- Up to 2 drives (two M.2 SSD)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

### RAID (optional)

- RAID 0/1 support
- None

### Optical

- None

### Ethernet

- Native Intel Ethernet Connection i219-V (Non-vPro) or i219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Cable

### WLAN Bluetooth™

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN

- None

### Dimensions

- WxHxD (non-touch): 14.24” x 9.67” x 0.72”;
- WxHxD (multi-touch): 14.24” x 9.67” x 0.74”;
- 361.8mm x 245.7mm x 18.4mm
- 361.8mm x 245.7mm x 18.7mm

### Weight

- Non-touch model: starting at 3.76 lb / 1.7 kg;
- Multi-touch model: starting at 4.06 lb / 1.8 kg

### Case color

- Black

### Case material

- Display cover: CFRP/GFRP hybrid;
- Bottom: Aluminum alloy

### Battery

- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life
  - Discrete mode: 7.36 hr;
  - Hybrid mode: 13.87 hr
- (MobileMark 2014) * Battery life varies significantly with settings, usage, & other factors

### Operating system

- One of the following, configurable by model:
  - Windows 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro 64 for Workstations

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 1-year depot with 2-year planar repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### Mil-Spec test

- MIL-STD-810G military testing

### Environmental

- EPEAT Gold (US only);
- ENERGY STAR 6.1;
- RoHS-compliant

### Note:
The specifications above may not be available in all regions.

---

Lenovo
August 2019
ThinkPad P1 (2nd Gen) Platform Specifications

Product Specifications Reference (PSREF)

<table>
<thead>
<tr>
<th>Processor</th>
<th>9th Generation Intel® Core™ i5 / i7 / i9 Processor or Intel Xeon® E Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>15-9400H</td>
<td>4</td>
</tr>
<tr>
<td>17-9750H</td>
<td>6</td>
</tr>
<tr>
<td>17-9850H</td>
<td>6</td>
</tr>
<tr>
<td>9-9880H</td>
<td>8</td>
</tr>
<tr>
<td>E-2276M</td>
<td>6</td>
</tr>
</tbody>
</table>

| Graphics | Intel UHD Graphics 630 in processor only or Intel UHD Graphics 630 or P630 in processor and NVIDIA® Quadro® T1000 or T2000, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt®; supports four independent displays; Max resolution: 5K @ 60Hz (Thunderbolt®); 4K @ 60Hz (HDMI) |

| Chipset Memory | Mobile Intel CM246 Chipset 64GB max / 2666MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, two DDR4 SO-DIMM sockets |

<table>
<thead>
<tr>
<th>Display</th>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72% NTSC</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72% NTSC</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100% Adobe</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>OLED</td>
<td>AR, AS</td>
<td>SDR 400nit, HDR 600nit (peak)</td>
<td>16:9</td>
<td>100000:1</td>
<td>100% DCI-P3</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

| Multi-touch (opt) | Capacitive-type multi-touch, supports 10-finger gesture (UHD OLED only), anti-reflection (AR), anti-smudge (AS) coating |

| Pen | Supports pen accessory, please see the accessory compatibility for details |

<table>
<thead>
<tr>
<th>Storage</th>
<th>Up to two M.2 SSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAID (optional)</td>
<td>RAID 0/1 support</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)) via bundled or optional ThinkPad Ethernet Extension Cable</td>
</tr>
</tbody>
</table>

| WLAN Bluetooth™ | Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter |
| WWAN SIM card | None |

<table>
<thead>
<tr>
<th>Limited warranty</th>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 1-year depot repair service</td>
<td></td>
</tr>
<tr>
<td>- 1-year depot with 2-year planar repair service</td>
<td></td>
</tr>
<tr>
<td>- 3-year/1-yr battery depot repair service</td>
<td></td>
</tr>
<tr>
<td>- 3-year/1-yr battery limited onsite service</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating system</th>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Windows® 10 Home 64</td>
<td></td>
</tr>
<tr>
<td>- Windows 10 Pro 64</td>
<td></td>
</tr>
<tr>
<td>- Windows 10 Pro 64 for Workstations</td>
<td></td>
</tr>
</tbody>
</table>

| AC adapter | 135W slim tip AC adapter |

| Warranty | 1-year limited warranty |

| Mil-Spec test | MIL-STD-810G military testing |

| Environment | EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant |

Note: The specifications above may not be available in all regions.

Lenovo
August 2019
## ThinkPad P43s Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8565U</td>
<td>4</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8665U</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 620 in processor and NVIDIA Quadro P520, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 3840x2160@60Hz (USB-C); 3840x2160@30Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform
- 48GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket
- *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits (non-touch) 300 nits (multi-touch)</td>
<td>16.9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080) Low Power</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>WQHD (2560x1440) Dolby Vision™ HDR</td>
<td>IPS Glossy</td>
<td>500 nits</td>
<td>16.9</td>
<td>1500:1</td>
<td>100% Adobe</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch (opt)

- On-cell touch, supports 10-finger gesture (FHD only)

### Storage

- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

### Optical

- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EEMA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non-WWAN model, it means model is NOT WWAN upgradable

### SIM card (opt)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Memory

- 48GB max / 2400MHz DDR4, dual-channel capable, Intel SoC (System on Chip) platform

### Bluetooth

- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WLAN

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EEMA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non-WWAN model, it means model is NOT WWAN upgradable

### SIM card (opt)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Case material

- Black

### Display cover

- PP / 50% GF

### Weight

- Models
  - FHD: 3.43 lb / 1.55 kg
  - FHD Low Power: 3.28 lb / 1.49 kg
  - WQHD: 3.24 lb / 1.47 kg

### Operating system

- Windows 10 Home 64 or Windows 10 Pro 64

### Warranty

- Limited warranty
  - One of the following, configurable by model:
    - 1-year depot repair service
    - 3-year/1-year battery depot repair service
    - 3-year/1-year battery limited onsite service

### Security

- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified

### Environment

- EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.

Lenovo

August 2019
## ThinkPad P51 Platform Specifications

### Processor
- **6th or 7th Generation Intel® Core™ i7 Processor or Intel Xeon® Processor E3 v5 or v6 Family**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i7-6620HQ</td>
<td>4</td>
<td>8</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
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</tr>
<tr>
<td>E3-1505M v6</td>
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<td>2.8 GHz</td>
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<tr>
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<td>2.8 GHz</td>
<td>3.8 GHz</td>
<td>6MB</td>
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<td>Intel HD Graphics P630</td>
<td></td>
</tr>
<tr>
<td>i7-7820HQ</td>
<td>4</td>
<td>8</td>
<td>2.9 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel HD Graphics P630</td>
<td></td>
</tr>
</tbody>
</table>

### Graphics
- Intel HD Graphics 530, 630, P530, or P630 in processor and NVIDIA Quadro® M1200 or M2200, 4GB memory; supports external digital monitor via HDMI, Mini DisplayPort, or Thunderbolt™; supports four independent displays; Max resolution: 3840x2160@60Hz (DisplayPort via Mini DisplayPort cable): 3840x2160@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)

### Chipset
- Mobile Intel CM238 Chipset
- 64GB max / 2400MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- * System clacks down for processors with lower memory controller

### Display
- **Some:** 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
- **Some:** 15.6” (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 170° viewing angle
- Capacitive-type multi-touch, supports 10-finger gesture, 220 nits (FHD only)
- ThinkPad Pen Pro, active pen for multi-touch display

### Storage
- Up to 3 drives (two M.2 SSD and one HDD)
- Some: HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s
- RAID 0/1 support

### Memory
- Mobile (optional)

### Optical
- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN
- One of the following, configurable by model:
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card

### Bluetooth
- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
  - * Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE-A, Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card

### SIM card (opt)
- Micro-SIM card slot, opt Verizon LTE (US) or Lenovo™ Connect (EMEA) SIM card

### Audio
- ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack

### Security
- Security chip vPro (optional)
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Camera
- HD720p resolution, fixed focus

### Media reader
- 4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card

### Ports
- Four USB 3.1 Gen 1 (USB 3.0, one Always On), USB Type-C / Thunderbolt 3, Mini DisplayPort 1.2a, HDMI 1.4b, Ethernet (RJ-45), Dock connector

### Operating system
- One of the following, configurable by model:
  - Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro 64 for Workstations

### Limited warranty
- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### Mi-Spec test
- MIL-STD-810G military testing

### Environment
- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

**Note:** The specifications above may not be available in all regions.
### ThinkPad P52 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>9-8950HK</td>
<td>6</td>
<td>2.9 GHz</td>
<td>4.8 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

#### Graphics

- Intel UHD Graphics 630 or P630 in processor and NVIDIA Quadro P1000 (4GB memory), P2000 (4GB memory), or P3200 (6GB memory, VR ready);
- supports external digital monitor via HDMI, Mini DisplayPort, or Thunderbolt;
- supports four independent displays;
- Max resolution: 3840x2160@60Hz (DisplayPort via Mini DisplayPort cable); 5120X2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)

#### Chipset

- Mobile Intel CM246 Chipset
- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- * Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation
- * 128GB non-ECC memory for special bid only

#### Display

- Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 160° viewing angle
- Some: 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch
- Capacitive-type multi-touch, supports 10-finger gesture (4K only)

#### Multi-touch (opt)

- Supports pen accessory, please see the accessory compatibility for details

#### Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- Optional memory
- RAID (optional)
- RAID 0/1 support
- Optical

#### Ethernet

- Non-vPro model: Intel Ethernet Connection i219-V (Jacksonville)
- vPro model: Intel Ethernet Connection i219-LM (Jacksonville)

#### WLAN

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

#### WWAN (optional)

- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L890-GL), M.2 card

#### SIM card (opt)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

#### Memory

- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets

#### WWAN

- SIM card
- WWAN (optional)
- 7360 (Fibocom L850-GL), M.2 card

#### Media reader

- 4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card
- Three USB 3.1 Gen 1 (one Always On), two USB Type-C / Thunderbolt 3 (with the function of Power Delivery and DP), Mini DisplayPort 1.4, HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole

#### Security

- Power Delivery only supports power-out for charging peripherals
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

#### Camera

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - Front camera and HD720p camera, fixed focus
- HD Audio, Realtek ALC3286 codec / stereo speakers, 2W x 2, Dolby Audio Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone
- 6-row, spill-resistant, multimedia Fn keys, keypad backlight, 3-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad
- Touch style match on chip fingerprint reader on the palm rest
- None
- Near Field Communication

#### Battery

- Swappable Li-ion 90Wh battery
- Hybrid mode: 8.9 hr
- * Battery life varies significantly with settings, usage, & other factors
- 170W slim tip AC adapter

#### Operating system

- One of the following, configurable by model:
  - Windows* 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro for Workstations

#### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

#### Mil-Spec test

- MIL-STD-810G military testing

#### Environment

- EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant

**Note:** The specifications above may not be available in all regions.

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*Lenovo August 2019*
## Processor 8th Generation Intel® Core™ i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics
- Intel UHD Graphics 620 in processor and NVIDIA Quadro® P500, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

### Chipset Memory
- Intel SoC (System on Chip) platform
- * System clocks down for processors with lower memory controller

### Display
- **Some:** 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 15.6” (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle
- On-cell touch, supports 10-finger gesture (FHD only)

### Storage
- System has one HDD slot or one M.2 2280 slot exclusively for storage
- **Some:** HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- **Some:** 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

### Optane™ memory
- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2
- None

### Ethernet
- **Non-vPro model:** Intel Ethernet Connection I219-V (Jacksonville)
- **vPro model:** Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN + Bluetooth™
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- * Intel 8260ac card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradeable
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
  - * For non-WWAN model, it means the model is NOT WWAN upgradeable

### SIM card (optional)
- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Chipset
- Intel SoC (System on Chip) platform
- * Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)
- * Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

### Storage
- System has one HDD slot or one M.2 2280 slot exclusively for storage
- **Some:** HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- **Some:** SSD / SATA 6.0Gb/s, 2.5” wide, 7mm high (e.g. 3x2GB SSD)
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- **Some:** 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

### Display
- **Some:** 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 15.6” (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle
- On-cell touch, supports 10-finger gesture (FHD only)

### Chipset Memory
- * System clocks down for processors with lower memory controller

### Display
- **Some:** 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 15.6” (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle
- On-cell touch, supports 10-finger gesture (FHD only)

### Storage
- System has one HDD slot or one M.2 2280 slot exclusively for storage
- **Some:** HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- **Some:** SSD / SATA 6.0Gb/s, 2.5” wide, 7mm high (e.g. 3x2GB SSD)
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- **Some:** 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

### Optane™ memory
- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2
- None

### Ethernet
- **Non-vPro model:** Intel Ethernet Connection I219-V (Jacksonville)
- **vPro model:** Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN + Bluetooth™
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- * Intel 8260ac card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradeable
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
  - * For non-WWAN model, it means the model is NOT WWAN upgradeable

### SIM card (optional)
- Nano-SIM card slot, optional Verizon LTE (US) SIM card

---

**Note:** The specifications above may not be available in all regions.
## Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-9400H</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-9750H</td>
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<td>12</td>
<td>6</td>
<td>2.6 GHz</td>
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<tr>
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<td>4.6 GHz</td>
<td>12MB</td>
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<tr>
<td>9-8880H</td>
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<td>E-2278M</td>
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<td>12MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Graphics

- Intel UHD Graphics 630 or P630 in processor and NVIDIA® Quadro® T1000 (4GB GDDR5), T2000 (4GB GDDR5), RTX 3000 (6GB GDDR6, VR ready), RTX 4000 (8GB GDDR6, VR ready), or RTX 5000 (16GB GDDR6, VR ready);
- supports external digital monitor via Mini DisplayPort, or Thunderbolt®;
- supports five independent displays;
- Max resolution: 5K@60Hz (Thunderbolt®), 4K@60Hz (USB-C or HDMI)

## Chipset

Mobile Intel CM246 Chipset

## Memory

128GB max / 2666MHz DDR4 (ECC function supported only on Xeon processor),
- dual-channel capable, four DDR4 SO-DIMM sockets
- one of the following, configurable by model:
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

## Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6” FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>15.6” FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>15.6” UHD</td>
<td>(3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
<td>170°</td>
</tr>
<tr>
<td>15.6” UHD</td>
<td>(3840x2160)</td>
<td>OLED</td>
<td>AR, AS</td>
<td>350 (peak 400 nits)</td>
<td>16:9</td>
<td>10000:1</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

## Pen

Supports pen accessory, please see the accessory compatibility for details.

## Storage

Up to 3 drives
- HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4

## Optane™ memory

Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2 RAID (optional): RAID 0/1/5 support

## RAID (optional)

Optional: None

## Ethernet

Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

## WLAN (optional)

Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0
Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

## WWAN (optional)

One of the following, configurable by model:
- Wireless WAN upgradeable
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M2 card
- For non-WWAN model, it means the model is NOT WWAN upgradeable

## SIM card (optional)

Nano-SIM card slot, optional Verizon LTE (US) SIM card

## Processor 9th Generation Intel® Core™ i5 / i7 / i9 Processor or Intel Xeon® E Processor

<table>
<thead>
<tr>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
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<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
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<td>8</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>9750H</td>
<td>6</td>
<td>12</td>
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<td>4.5 GHz</td>
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<tr>
<td>8880H</td>
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<td>12</td>
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<td>4.8 GHz</td>
<td>16MB</td>
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<td>Intel UHD Graphics P630</td>
</tr>
<tr>
<td>2278M</td>
<td>6</td>
<td>12</td>
<td>2.8 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Smart card reader

Optional: Smart card reader

## Media reader

4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card

## Ports

- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort),
- two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP),
- HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models),
- headphone / microphone combo jack, optional smart card reader,
- 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole

## Audio support

- Power Delivery only supports power-out for charging peripherals
- USB-C Dock is not supported in right-side USB-C port
- Depending on many factors, actual data transfer speed may be lower than theoretical speed

## Monitor cable

(optional)

- HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter
- USB-C to DP: Lenovo USB-C to DisplayPort Adapter

## Bundled Accy

None

## Camera (optional)

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus

## Audio support

- HD Audio, Synaptic®
- Stereo speakers, 2W x 2 / dual array far-field microphone, headphone / microphone combo jack, Dolby Atmos® sound system

## Keyboard

- UltraNav™
- 6-row, spill-resistant, multimedia Fn keys, numeric keypad, LED backlight
- 4-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad

## Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TG Certified

## Security chip

Fingerprint reader
- Touch style match on chip fingerprint reader on the palm rest

## Color calibration

- Optional: X-Rite Pantone factory color calibration (UHD model only)

## NFC (optional)

Near Field Communication

## Battery

Integrated Li-ion 90Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- * Battery life varies significantly with settings, usage, & other factors

## AC adapter

170W or 230W slim tip AC adapter

## Operating system

- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows Pro 64 for Workstations

## Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

## Mil-Spec test

- MIL-STD-810G military testing

- Environmental
  - EPEAT™ Silver: ENERGY STAR® 7.1
  - RoHS-compliant

---

Note: The specifications above may not be available in all regions.
# ThinkPad P53s Platform Specifications

## Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8665U</td>
<td></td>
<td></td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**8th Generation Intel® Core™ i7 Processor**

- Supports external digital monitor via HDMI or USB Type-C;
- Supports three independent displays;
- Max resolution: 3840x2160@60Hz (USB-C); 3840x2160@30Hz (HDMI)

**Note:** The specifications above may not be available in all regions. Lenovo August 2019

## Graphics

- Intel UHD Graphics 620 in processor and NVIDIA Quadro® P520, 2GB GDDR5 memory;
- Supports external digital monitor via HDMI or USB Type-C;
- Supports three independent displays;
- Max resolution: 3840x2160@60Hz (USB-C); 3840x2160@30Hz (HDMI)

## Chipset

- Intel SoC (System on Chip) platform;
- 48GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket;
* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

## Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td></td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>16:9</td>
<td>1200:1</td>
<td>100% Adobe</td>
<td>170°</td>
</tr>
</tbody>
</table>

**Multi-touch (opt) Pen**

- On-cell touch, supports 10-finger gesture (FHD only)

**Storage**

- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

**Optical**

- None

**Ethernet**

- **Non-vPro model:** Intel Ethernet Connection i219-V (Jacksonville)
- **vPro model:** Intel Ethernet Connection i219-LM (Jacksonville)

**WLAN**

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

**WWAN (optional)**

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card

**SIM card (opt)**

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

**Camera (optional)**

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus
  - HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2
  - Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack

**Audio support**

- 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight
- UltraNav™ pointing device and buttonless Mylar surface multi-touch touchpad
- Security chip: Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Discrete TPM 2.0, TCG Certified
- Intel vPro Technology
- Fingerprint reader: Optional: Touch style match on chip fingerprint reader on the palm rest

**Battery**

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) if MobileMark® 2014: 15 hr (FHD model) / 10 hr (UHD model)
- *Battery life varies significantly with settings, usage, & other factors

**Operating system**

- Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

- EPEAT Silver; ENERGY STAR® 7.1; RoHS-compliant

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Note: The specifications above may not be available in all regions.

August 2019
## ThinkPad P72 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>12</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics P630</td>
</tr>
<tr>
<td>E-2186M</td>
<td>6</td>
<td>12</td>
<td>2.9 GHz</td>
<td>4.8 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 or P630 in processor and NVIDIA Quadro P600 (4GB memory), P2000 (4GB memory), P3200 (6GB memory), P4200 (8GB memory), or P5200 (16GB memory);
- supports external digital monitor via HDMI, Mini DisplayPort, or Thunderbolt;
- supports four independent displays;
- Max resolution: 3840x2160@60Hz (DisplayPort via Mini DisplayPort cable);
- 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)

### Chipset

- Mobile Intel CM246 Chipset

### Memory

- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation

### Display

- **Some:** 17.3” (439mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- **Some:** 17.3” (439mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% Adobe CG, 170° viewing angle

### Multi-touch

- None

### Pen

- Supports pen accessory, please see the accessory compatibility for details

### Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- **Some:** HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

### Optane™ memory

- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

### RAID (optional)

- RAID 0/1 support
- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN

- None

### SIM card

- None

### Chipset

- Mobile Intel CM246 Chipset

### Memory

- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation

### Display

- **Some:** 17.3” (439mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- **Some:** 17.3” (439mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% Adobe CG, 170° viewing angle

### Multi-touch

- None

### Pen

- Supports pen accessory, please see the accessory compatibility for details

### Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- **Some:** HDD / SATA 6.0Gb/s, 2.5” wide, 7mm high, Active Protection System™
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

### Optane™ memory

- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

### RAID (optional)

- RAID 0/1 support
- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN

- None

### SIM card

- None

---

**Note:** The specifications above may not be available in all regions.

Lenovo
May 2019
## ThinkPad P73 Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
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<td>2.5 GHz</td>
<td>4.3 GHz</td>
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<tr>
<td>i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.6 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>i9-9880H</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.8 GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2276M</td>
<td>6</td>
<td>12</td>
<td>2.8 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 or P630 in processor and NVIDIA Quadro® P620 (4GB GDDR5), T2000 (4GB GDDR5), RTX 3000 (6GB GDDR6, VR ready), RTX 4000 Max-Q (8GB GDDR6, VR ready), or RTX 5000 Max-Q (16GB GDDR6, VR ready);
- supports external digital monitor via HDMI or Thunderbolt™;
- supports five independent displays;
- Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (USB-C or HDMI)

### Chipset

- Mobile Intel CM246 Chipset;
- Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation

### Memory

128GB max / 2666MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>17.3&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch Pen

- None

### Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4

### Optane™ memory

- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2
- RAIDX (optional): RAIDX 0/1 support

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN

- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN

- None

### SIM card

- None

### Camera

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus

### Audio support

- HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2 / dual array far-field microphone, headphone / microphone combo jack, Dolby Atmos® sound system

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Intel vPro Technology
- Fingerprint reader: Touch style match on chip fingerprint reader on the palm rest
- Color calibration: Optional: X-Rite Pantone factory color calibration (UHD model only)
- NFC: Optional
- Lenovo FingerPrint Sensor

### Battery

- Integrated Li-ion 99Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: 7 hr; Hybrid mode: 10 hr
  - * Battery life varies significantly with settings, usage, & other factors
- 170W or 230W slim tip AC adapter

### Operating system

- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro 64 for Workstations

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

- EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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Note: The specifications above may not be available in all regions.
### ThinkPad T470 Platform Specifications

**Product Specifications Reference (PSREF)**

**ThinkPad T470 Platform Specifications**

#### 6th Generation Intel® Core™ i5 / i7 Processor or

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7500U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

**7th Generation Intel Core i3 / i5 / i7 Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
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<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<td>i7-7500U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

**WWAN (optional)**

- One of the following, configurable by model (WWAN can coexist with WiGig):
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE-A
  - Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
  - Integrated Mobile Broadband 4G LTE
  - Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)
  - Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card

**Dimensions**

- Weight
  - Models: 3-cell or 3-cell 6-cell, 6-cell or 6-cell 6-cell
  - Magnesium: 3.49 lb / 1.58 kg
  - PS: 3.92 lb / 1.78 kg
  - PSS: 4.35 lb / 1.98 kg

**Smartcard reader**

- Optional: Smart card reader

**Media reader**

- 4-in-1 reader: MMC, SD, SDHC, SDXC, supports SD 3.0, UHS-I ports

**Ports**

- Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 / Thunderbolt 3 (w/ the function of Power Delivery and DP), HDMI 1.4b, Ethernet (RJ-45), Dock connector

**WiGig dock (optional)**

- ThinkPad WiGig dock

**Audio support**

- HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack

**Chipset**

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
  - System clocks down for processors with lower memory controller

**Display**

- Intel HD Graphics 520 or 620 in processor only, or Intel HD Graphics 620 in processor and NVIDIA GeForce® 940MX, 2GB 2.5GHz GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304 @60Hz (USB Type-C); 4096x2160 @24Hz (HDMI)

**Optical**

- None

**Ethernet**

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

**WLAN**

- One of the following, configurable by model (WiGig can coexist with WWAN):
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card

**Bluetooth™**

- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
  - * Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS

**Camera**

- Optional: 720p HD resolution, fixed focus IR & 720p IR camera and HD720p camera (mutually exclusive with WiGig)

**Audio support**

- HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack

**Chipset**

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
  - * System clocks down for processors with lower memory controller

**Display**

- Intel HD Graphics 520 or 620 in processor only, or Intel HD Graphics 620 in processor and NVIDIA GeForce® 940MX, 2GB 2.5GHz GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304 @60Hz (USB Type-C); 4096x2160 @24Hz (HDMI)

**Optical**

- None

**Ethernet**

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

**WLAN**

- One of the following, configurable by model (WiGig can coexist with WWAN):
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
    - * Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS

**Note:** The specifications above may not be available in all regions.

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* Figures and models above may not be available in all regions. Lenovo September 2018
### Processor

<table>
<thead>
<tr>
<th>Number</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133 Intel HD Graphics 520</td>
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</tr>
<tr>
<td>i5-6300U</td>
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<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133 Intel HD Graphics 520</td>
<td></td>
</tr>
<tr>
<td>i7-6600U</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133 Intel HD Graphics 620</td>
<td></td>
</tr>
</tbody>
</table>

or 7th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Number</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7200U</td>
<td>2.6 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133 Intel HD Graphics 520</td>
<td></td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
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<td>i7-7500U</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133 Intel HD Graphics 520</td>
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<td>i7-7600U</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133 Intel HD Graphics 520</td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 520 or 620 in processor.
- Supports external digital monitor via HDMI or USB Type-C.
- Supportable displays:
  - Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform
- 2GB or 4GB max / 2400MHz DDR4, dual-channel capable.
- 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket

### Memory

- System clocks down for processors with lower memory controller

### Display

- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
- Some: 13.5mm QWHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle

### Multi-touch (opt)

- On-cell touch, supports 10-finger gesture, 250 nits (FHD only)

### Storage

- One of the following, configurable by model:
  - M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
  - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)

### Optical

- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN

- One of the following, configurable by model (WiGig mutually exclusive with WWAN):
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card

### Bluetooth

- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
  - Intel 8265ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (opt)

- One of the following, configurable by model (mutually exclusive with WiGig):
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE-A, Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
  - Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card

### SIM card (opt)

- None

### Operating system

- One of the following, configurable by model:
  - Windows 7 Professional 64 preinstalled
  - Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### Environment

- MIL-Spec test MIL-STD-810G military testing
- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
### ThinkPad T480 Platform Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WxDxH:</td>
<td>13.25&quot; x 9.15&quot; x 0.79&quot;;</td>
</tr>
<tr>
<td>Models</td>
<td>24Wh or 48Wh + 24Wh</td>
</tr>
<tr>
<td>Integrated Magnesium</td>
<td>3.49 lb / 1.58 kg</td>
</tr>
<tr>
<td>Integrated PPS</td>
<td>3.63 lb / 1.65 kg</td>
</tr>
<tr>
<td>Discrete Magnesium</td>
<td>3.53 lb / 1.60 kg</td>
</tr>
<tr>
<td>Discrete PPS</td>
<td>3.68 lb / 1.67 kg</td>
</tr>
</tbody>
</table>

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Processor Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>7th Generation Intel® Core™ i5 Processor</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>4</td>
<td>7th Generation Intel® Core™ i5 Processor</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 620
- Intel UHD Graphics 620

### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display

- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16.9 aspect ratio, 400:1 contrast ratio.
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle.

### Storage

- System has one HDD slot or one M.2 2280 slot exclusively for storage.
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™.
- Some: M.2 SSD / PCIe NVMe, PCle 3.0 x 4
- Some: 128GB M.2 SSD / PCIe NVMe, PCle 3.0 x 2, in WWAN slot as 2nd Storage, mutually exclusive with WWAN.

### Optical

- Intel Optane memory, PCie NVMe, PCle 3.0 x 2
- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN + Bluetooth™

- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- * Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)

- One of the following, configurable by model (mutually exclusive with Intel Optane memory):
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom LB950-GL), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom LB950-GL), M.2 card

### SIM card (optional)

- * For non-WWAN model, it means the model is NOT WWAN upgradable

### Operating system

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year depot repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

### Environment

- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
ThinkPad T480s Photography

Product Specifications Reference (PSREF)

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### ThinkPad T480s Platform Specifications

**Product Specifications Reference (PSREF)**

<table>
<thead>
<tr>
<th>Processor</th>
<th>7th Generation Intel® Core™ i5 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>7th Generation Intel® Core™ i5 Processor</td>
</tr>
<tr>
<td>Number</td>
<td>i5-7200U</td>
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<td># of Cores</td>
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<td># of Threads</td>
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<td>Base Frequency</td>
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<td>Max Turbo Frequency</td>
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<td>Cache</td>
<td>3MB</td>
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<tr>
<td>Memory Types</td>
<td>DDR4-2133</td>
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<tr>
<td>Processor</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>or 8th Generation Intel Core i5 / i7 Processor</td>
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<tr>
<td>Processor</td>
<td>i5-8250U</td>
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<tr>
<td>Number</td>
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<tr>
<td># of Cores</td>
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<tr>
<td># of Threads</td>
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<tr>
<td>Base Frequency</td>
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<tr>
<td>Max Turbo Frequency</td>
<td>3.4 GHz</td>
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<tr>
<td>Cache</td>
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<tr>
<td>Memory Types</td>
<td>DDR4-2400</td>
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<tr>
<td>Processor</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>Graphics</td>
<td>Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX150, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)</td>
</tr>
<tr>
<td>Chipset Memory</td>
<td>Intel SoC (System on Chip) platform; 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket</td>
</tr>
<tr>
<td>Multi-touch (opt)</td>
<td>On-cell touch, supports 10-finger gesture, 250 nits (FHD only)</td>
</tr>
<tr>
<td>Storage</td>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• M.2 SSD / SATA 6.0Gbps</td>
<td></td>
</tr>
<tr>
<td>• M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gbps</td>
<td></td>
</tr>
<tr>
<td>Optical</td>
<td>None</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)</td>
</tr>
<tr>
<td>Network</td>
<td>Wireless WAN upgradable</td>
</tr>
<tr>
<td>• Integrated Mobile Broadband 4G LTE, Intel XMM™ 7362 (Fibocom L830-EB), M.2 card (EMEA only)</td>
<td></td>
</tr>
<tr>
<td>• Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card</td>
<td></td>
</tr>
<tr>
<td>WWAN (optional)</td>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• Wireless WAN upgradeable</td>
<td></td>
</tr>
<tr>
<td>• Integrated Mobile Broadband 4G LTE, Intel XMM™ 7362 (Fibocom L830-EB), M.2 card (EMEA only)</td>
<td></td>
</tr>
<tr>
<td>• Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card</td>
<td></td>
</tr>
<tr>
<td>SIM card (opt)</td>
<td>Nano-SIM card slot, optional Verizon LTE (US) SIM card</td>
</tr>
<tr>
<td>Battery</td>
<td>Integrated Li-ion 57Wh battery, supports Rapid Charge (0-80% in 60 mins) with 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>Max battery life</td>
<td>MobileMark® 2014: 15.6 hr</td>
</tr>
<tr>
<td>Operating system</td>
<td>Optional: Windows® 10 Home 64 or Windows 10 Pro 64</td>
</tr>
<tr>
<td>Limited warranty</td>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• 1-year depot repair service</td>
<td></td>
</tr>
<tr>
<td>• 1-year depot with 2-year planar repair service</td>
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</tr>
<tr>
<td>• 3-year/1-yr battery depot repair service</td>
<td></td>
</tr>
<tr>
<td>• 3-year/1-yr battery limited onsite service</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The specifications above may not be available in all regions.
ThinkPad T490 Platform Specifications

**Processor**

- **8th Generation Intel® Core™ i5 / i7 Processor**
- **Processor**
  - **Number**
  - **# of Cores**
  - **# of Threads**
  - **Base Frequency**
  - **Max Turbo Frequency**
  - **Cache**
  - **Memory Types**
  - **Processor Graphics**
  - **DDR4-2400**

**Graphics**

- Intel UHD Graphics 620 in processor or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX250, 2GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt; supports three independent displays; Max resolution: 4096x2304 @60Hz (Thunderbolt); 4096x2160 @24Hz (HDMI)

**Chipset**

- Intel SoC (System on Chip) platform

**Memory**

- 4GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket
  - *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation*

**Display**

- **Size**
  - **14.0" FHD (1920x1080)**
  - **14.0" HD (1366x768)**
  - **14.0" WQHD (2560x1440)**

- **Resolution**
  - **1920x1080**
  - **1366x768**
  - **2560x1440**

- **Type**
  - **IPS**

- **Surface**
  - Anti-glare

- **Brightness**
  - **250 nits**

- **Aspect Ratio**
  - **16:9**

- **Contrast Ratio**
  - **700:1**

- **Color Gamut**
  - **100% sRGB**

- **Viewing Angle**
  - **170°**

**Multi-touch (opt)**

- On-cell touch, supports 10-finger gesture (FHD only)

**Storage**

- **M.2 2280 SSD / SATA 6.0Gb/s**
  - **2280 SSD / PCIe x4, M.2 3.0 x 4**
  - **Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4**

**Optical**

- **None**

**Ethernet**

- **Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)**
- **vPro model: Intel Ethernet Connection I219-LM (Jacksonville)**

**WLAN (optional)**

- **Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0**

**WWAN (optional)**

- **One of the following, configurable by model:**
  - **Wireless WAN upgradeable**
  - **Integrated Mobile Broadband 4G LTE, Fibercom L830-EB, M.2 card (EMEA only)**
  - **Integrated Mobile Broadband 4G LTE-A, Fibercom L860-GL, MIMO 4x4, M.2 card**
  - **Integrated Mobile Broadband 4G LTE-A, Fibercom L860-GL, MIMO 4x4, M.2 card**
  - **Only non-WWAN and WWAN upgradeable are available on 2099 / 20QH models**
  - **For non-WWAN model, it means the model is NOT WWAN upgradeable**

**SIM card (opt)**

- **Nano-SIM card slot, optional Verizon LTE (US) SIM card**

**Dimensions**

- **WxDxH:** 12.95" x 8.94" x 0.70"; 329mm x 227mm x 17.9mm

**Weight**

- **Models**
  - **FHD:** 3.37 lb / 1.53 kg
  - **FHD Low Power / WQHD:** 3.23 lb / 1.46 kg

**Dimensions**

- **Weight**
  - **FHD:** 3.37 lb / 1.53 kg
  - **FHD Low Power / WQHD:** 3.23 lb / 1.46 kg

**Case color**

- Black

**Display cover**

- **PS5 / 50% GF**

**Keyboard cover**

- **PC/ABS + Magnesium alloy (with ISO 22166 compliant anti-microbial surface treatment for 20Q9 / 20QH models only)**

**Bottom**

- **PA / 50% GF**

**Smart card reader**

- **Optional: Smart card reader (NOT for 20Q9 / 20QH models)**

**RFID reader**

- **MicroSD card reader**

**Media reader**

- **MicroSD card reader**

**Ports**

- **Two USB 3.1 Gen 1 (with Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PDF and DP),**
  - **HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN model),**
  - **headphone / microphone combo jack, optional smart card reader,**
  - **microSD card reader, side docking connector, security keyhole**

**Monitor cable (optional)**

- **HDMI to VGA:** Lenovo HDMI to VGA Monitor Adapter
  - **USB-C to VGA:** Lenovo USB-C to VGA Adapter
  - **USB-C to HDMI:** Lenovo USB-C to HDMI Adapter
  - **USB-C to DP:** Lenovo USB-C to DisplayPort Adapter

**Bundled Accy**

- **None**

**Camera (optional)**

- **6-row, spill-resistant, multimedia Fn keys, optional LED backlight**

**Audio support**

- **HD720p camera with ThinkShutter camera privacy, fixed focus**
  - **IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus**
  - **HD Audio, Realtek ALC3297 codec / stereo speakers, 2x2, Dolby® Audio® Premium / dual array far-field microphone, headphone / microphone combo jack**

**Keyboard**

- **6-row, spill-resistant, multimedia Fn keys, optional LED backlight**

**UltraNav™**

- **TouchPoint® pointing device and buttonless Mylar surface multi-touch touchpad**

**Security**

- **Power-on password, hard disk password, supervisor password, security keyhole**

**Security chip**

- **Discrete TPM 2.0, TCG Certified**

**System Mgt (opt)**

- **Intel vPro Technology**

**Fingerprint reader**

- **Optional: Touch style match on chip fingerprint reader or FIPS 201 fingerprint reader on palm rest**

**NFC (optional)**

- **NFC module or NFC support via RFID reader**

**Battery**

- **Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)**

**Max battery life**

- **MobileMark® 2014:** 16.11 hr

**AC adapter**

- **45W or 65W USB Type-C AC adapter**

**Operating system**

- **Optional: Windows® 10 Home 64 or Windows 10 Pro 64**

**Limited warranty**

- **One of the following, configurable by model:**
  - **1-year depot repair service**
  - **3-year/1-year battery depot repair service**
  - **3-year/1-year limited onsite service**

**Mil-Spec test**

- **MIL-STD-810G military testing**

**Environment**

- **EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant**

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**Note:** The specifications above may not be available in all regions.

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Lenovo

August 2019
## ThinkPad T490s Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>8th Generation Intel® Core™ i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
</tr>
<tr>
<td>i5-8265U</td>
</tr>
<tr>
<td>i5-8365U</td>
</tr>
<tr>
<td>i7-8565U</td>
</tr>
<tr>
<td>i7-8665U</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 620 in processor;
- Supports external digital monitor via HDMI or Thunderbolt;
- Supports three independent displays;
- Max resolution: 4096x2304@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform
- 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to system board, no sockets

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>700:1</td>
<td>45°</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080) Low Power</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>800:1</td>
<td>72°</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080) ThinkPad Privacy Guard</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>1000:1</td>
<td>72°</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>WQHD (2560x1440) HDR, Dolby Vision™</td>
<td>IPS</td>
<td>Glossy</td>
<td>500 nits</td>
<td>1500:1</td>
<td>100% Adobe</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

### Storage

- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

### Optical

- None

### Ethernet

- Native Intel Ethernet Connection i219-V (Non-vPro) or i219-LM (vPro)
- Via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

### WLAN (optional)

- One of the following, configurable by model:
  - Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - *For non-MMWAN model, it means the model is NOT WWAN upgradable

### SIM card (optional)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WxDxH (black with FHD / Privacy Guard): 12.95&quot; x 8.90&quot; x 0.66&quot;</td>
<td>329.0mm x 226.15mm x 16.7mm</td>
</tr>
<tr>
<td>WxDxH (black with FHD Low Power / WQHD): 12.94&quot; x 8.89&quot; x 0.63&quot;</td>
<td>328.8mm x 225.8mm x 16.1mm</td>
</tr>
<tr>
<td>WxDxH (silver): 12.96&quot; x 8.92&quot; x 0.68&quot;</td>
<td>329.15mm x 226.45mm x 17.2mm</td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>Models</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black with FHD</td>
<td>2.96 lb / 1.35 kg</td>
</tr>
<tr>
<td>Black with FHD Low Power / WQHD / Privacy Guard</td>
<td>2.81 lb / 1.27 kg</td>
</tr>
<tr>
<td>Silver</td>
<td>3.29 lb / 1.49 kg</td>
</tr>
</tbody>
</table>

### Case color

- Black or Silver

### Case material

- Cover: CFRP Hybrid (black) or Aluminum (silver)
- Bottom: Magnesium

### Smart card reader

- Optional: Smart card reader

### Media reader

- MicroSD card reader

### Ports

- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

### Monitor cable (optional)

- *Depending on many factors, actual data transfer speed may be lower than theoretical speed
- HDMI to VGA:
  - Lenovo HDMI to VGA Monitor Adapter
  - Lenovo USB-C to VGA Adapter
- USB-C to DP:
  - Lenovo USB-C to DisplayPort Adapter

### Bundled Aclcy

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

### Camera

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus
  - HD Audio, Realktek ALC3287 codec / stereo speakers, 1W x 2, Dolby Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack

### Audio support

- HD Audio, Realtek ALC3287 codec / stereo speakers, 1W x 2, Dolby Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack

### Keyboard

- UltraNav™: 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Discrete TPM 2.0, TCG Certified
- System Mgt (optional):
  - Intel vPro Technology
- Fingerprint reader: Optional: Touch style match on chip fingerprint reader on the palm rest
- NFC (optional):
  - Near Field Communication

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: MobileMark® 2014: 20 hr
- * Battery life varies significantly with settings, usage, & other factors

### AC adapter

- 45W or 65W USB Type-C AC adapter

### Operating system

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year 1st battery depot repair service
  - 3-year 1st battery limited onsite service

### MI-Spec test

- MIL-STD-810G military testing

### Environment

- EPEAT® Silver, ENERGY STAR® 7.1, RoHS-compliant

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**Note:** The specifications above may not be available in all regions.

**Lenovo August 2019**
### ThinkPad T495 Platform Specifications

**Product Specifications Reference (PSREF)**

**Processor**

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD Ryzen PRO Mobile Processors with Radeon Vega Graphics</td>
<td>4</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.5 GHz</td>
<td>2MB L2</td>
<td>Radeon Vega 6 Graphics</td>
<td></td>
</tr>
<tr>
<td>Ryzen 3 Pro 3300U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2</td>
<td>Radeon Vega 8 Graphics</td>
<td></td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2</td>
<td>Radeon Vega 10 Graphics</td>
<td></td>
</tr>
</tbody>
</table>

**Graphics**

AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI.

**Chipset**

AMD SoC (System on Chip) platform.

**Memory**

32GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket.

| Installed memory | 2666MHz but run at 2400MHz due to AMD limitation |

**Display**

14.0" HD (1366x768) TN Anti-glare 220 nits 16.9 400:1 45% 90°

14.0" FHD (1920x1080) IPS Anti-glare 250 nits (non-touch) 300 nits (multi-touch) 16.9 700:1 45% 170°

14.0" FHD (1920x1080) Low Power IPS Anti-glare 400 nits 16.9 800:1 72% 170°

**Multi-touch (opt)**

On-cell touch, supports 10-finger gesture (FHD only).

**Storage**

- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

**Optical**

None

**Ethernet**

Realtek RTL8111 Gigabit Ethernet connection

**WLAN**

Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

**WWAN (optional)**

One of the following, configurable by model:

- Wireless WAN upgradeable
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Nano-SIM card slot, optional Verizon LTE (US) SIM card

**SIM card (optional)**

- For non-wwan model, it means the model is NOT WWAN upgradeable

**Camera (optional)**

One of the following, configurable by model:

- HD720p camera with ThinkShutter camera privacy, fixed focus
- IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus
- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio™ Premium / dual array far-field microphone, microphone / microphone combo jack

**Keyboard**

6-row, spill-resistant, multimedia Fn keys, optional LED backlight

**Audio support**

HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio™ Premium / dual array far-field microphone, microphone / microphone combo jack

**Camera (optional)**

One of the following, configurable by model:

- HD720p camera with ThinkShutter camera privacy, fixed focus
- IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus

**Security chip**

Discrete TPM 2.0, TCG Certified

**Fingerprint reader**

Optional: Touch style match on chip fingerprint reader on the palm rest

**Battery**

Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

**Operating system**

Windows® 10 Home 64 or Windows 10 Pro 64

**Environmental**

EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant
### ThinkPad T495s Platform Specifications

**Processor AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 5 Pro 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2</td>
<td>4MB L3</td>
<td>Radeon Vega 8</td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2</td>
<td>4MB L3</td>
<td>Radeon Vega 10</td>
</tr>
</tbody>
</table>

**Graphics**

- AMD Radeon Vega 8 or Vega 10 Graphics in processor
- Supports external digital monitor via USB-C or HDMI
- Supports three independent displays
- Max resolution: 4096x2304@60Hz (USB-C); 4096x2160@24Hz (HDMI)

**Chipset Memory**

- AMD SoC (System on Chip) platform
- 8GB or 16GB / 2400MHz DDR4 / soldered to system board, no sockets
- *Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-giare</td>
<td>250 nits (non-touch) 300 nits (multi-touch)</td>
<td>16.9</td>
<td>170:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-giare</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>ThinkPad Privacy Guard</td>
<td>IPS Anti-giare</td>
<td>400 nits</td>
<td>16.9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
</tr>
</tbody>
</table>

**Multi-touch (opt)**

- On-cell touch, supports 10-finger gesture (FHD only)

**Storage Optical**

- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- None

**Ethernet**

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)
- via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

**WLAN (optional) Bluetooth™**

- Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

**WWAN (optional)**

- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- *For non-WWAN model, it means the model is NOT WWAN upgradable

**SIM card (opt)**

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

**Dimensions**

- WxDxH (FHD / Privacy Guard):
  - 12.95" x 8.90" x 0.66": 329.0mm x 226.15mm x 16.7mm
- WxDxH (Low Power):
  - 12.94" x 8.89" x 0.63": 328.8mm x 225.8mm x 16.1mm

**Weight**

- Models | FHD | FHD Low Power | FHD Privacy Guard |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>2.92 lb / 1.33 kg</td>
<td>2.76 lb / 1.25 kg</td>
<td>2.89 lb / 1.31 kg</td>
</tr>
</tbody>
</table>

**Case color Case material**

- Black
- Display cover: CFRP Hybrid
- Bottom: Magnesium/Aluminum

**Smart card reader**

- Optional: Smart card reader
- MicroSD card reader

**Media reader Ports**

- One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole
- *Depending on many factors, actual data transfer speed may be lower than theoretical speed

**Monitor cable (optional)**

- Bundled Accy
- USB-C to VGA: Lenovo USB-C to VGA Adapter
- Optional: ThinkPad Ethernet Extension Adapter Gen 2

**Camera**

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 1W x 2, Dolby Audio Premium / dual array far-field microphone, headphone / microphone combo jack

**Audio support**

- One of the following, configurable by model:
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 1W x 2, Dolby Audio Premium / dual array far-field microphone, headphone / microphone combo jack
- HD Audio, Realtek ALC3287 codec / stereo speakers, 1W x 2, Dolby Audio Premium / dual array far-field microphone, headphone / microphone combo jack

**Keyboard UltraNav™**

- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad

**Security Security chip System Mgt**

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- DASH Management

**Fingerprint reader**

- Optional: Touch style match on chip fingerprint reader on the palm rest

**Battery**

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- *Battery life varies significantly with settings, usage, & other factors

**Operating system**

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service

**Environment**

- EPEAT Silver; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.

Lenovo
August 2019
## Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

## Graphics

Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and NVIDIA GeForce MX150, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

## Chipset

Intel SoC (System on Chip) platform

* System clocks down for processors with lower memory controller

## Display

**Some:** 15.6“ (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16.9 aspect ratio, 100:1 contrast ratio, 170° viewing angle

**Some:** 15.6“ (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle

**Multi-touch (opt)**

On-cell touch, supports 10-finger gesture (FHD only)

## Storage

System has one HDD slot or one M.2 2280 slot exclusively for storage

**Some:** HDD / SATA 6.0Gb/s, 2.5“ wide, 7mm high, Active Protection System™

**Some:** SSD / SATA 6.0Gb/s, 2.5“ wide, 7mm high (e.g. xxxGb SSD)

**Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

**Some:** 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

Optane™ memory Optional:

Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

Optical

None

## Ethernet

Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)

vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

## WWAN (optional)

One of the following, configurable by model:

- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- For non-WWAN model, it means the model is NOT WWAN upgradable

## SIM card (opt)

Nan-o-SIM card slot, optional Verizon LTE (US) SIM card

## Operating system

Optional: Windows® 10 Home 64 or Windows 10 Pro 64

## Limited warranty

One of the following, configurable by model:

- 1-year depot repair service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

## Mil-Spec test

MIL-STD-810G military testing

## Environment

EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant

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Note: The specifications above may not be available in all regions.
**ThinkPad T590 Platform Specifications**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>8-8335U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>8-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>8-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX250, 2GB GDDR5 memory;
- supports external digital monitor via HDMI or Thunderbolt;
- supports three independent displays;
- Max resolution: 4096x2304@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)

### Chipset

| Memory | 4GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket | *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation |

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Storage

- M.2 2280 SSD / SATA 6.0Gbps
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

### Optical

None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)

### WLAN (optional)

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)

- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EAMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- *For non-WWAN model, it means the model is NOT WWAN upgradable

### SIM card

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Ports

- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

### Security

- Security chip: Intel vPro Technology
- Fingerprint reader: Optional
- Touch style match on chip fingerprint reader on the palm rest
- NFC (optional): Near Field Communication

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life: 14.98 hr (9.5 hr for UHD model with discrete graphics)
- AC adapter: 45W or 65W USB Type-C AC adapter

### Operating system

- Optional: Windows 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

- EPEAT™ Silver, ENERGY STAR® 7.1, RoHS-compliant

### Note:
The specifications above may not be available in all regions.

**Product Specifications Reference (PSREF)**

**Dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>WxDxH</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHD model</td>
<td>14.40&quot; x 9.76&quot; x 0.75&quot;</td>
<td>3.87 lb / 1.75 kg</td>
</tr>
<tr>
<td>UHD model</td>
<td>15.00&quot; x 9.76&quot; x 0.75&quot;</td>
<td>3.68 lb / 1.75 kg</td>
</tr>
</tbody>
</table>

**Weight**

- FHD model: 3.25 lb / 1.47 kg
- UHD model: 3.05 lb / 1.38 kg

**Case color**

- Black

**Case material**

- Display cover: PPS / 50% GF
- Bottom: PA / 50% GF

**Smart card reader**

- Optional: Smart card reader

**Media reader**

- MicroSD card reader

**Ports**

- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

**Monitor cable (optional)**

- USB-C to VGA: Lenovo USB-C to VGA Adapter
- USB-C to DP: Lenovo USB-C to DisplayPort Adapter

**Bundled Accy**

- None

**Camera (optional)**

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio® Premium / dual array far-field microphone, headphone / microphone combo jack

**Audio support**

- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio® Premium / dual array far-field microphone, headphone / microphone combo jack

**Keyboard**

- 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight

**Audio**

- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio® Premium / dual array far-field microphone, headphone / microphone combo jack

**Trackpoint**

- 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight

**Processor 8th Generation Intel® Core™ i5 / i7 Processor**

**Processor Number**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
</tr>
<tr>
<td>8-8335U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
</tr>
<tr>
<td>8-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
</tr>
<tr>
<td>8-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
</tr>
</tbody>
</table>

**April 2019**
# ThinkPad X1 Carbon (5th Gen) Platform Specifications

**Processor**
- **6th Generation Intel® Core™ i5 / i7 Processor (EMEA has only i5-6300U and i7-6600U)**
  - **Processor Number**
    - i5-6200U
    - i5-6300U
    - i7-6500U
    - i7-6600U
  - **# of Cores** 2
  - **# of Threads** 4
  - **Base Frequency** 2.3 GHz
  - **Max Turbo Frequency** 2.8 GHz
  - **Cache** 3MB
  - **Memory Types** LPDDR3-1866
  - **Graphics** Intel HD Graphics 520

**Graphics**
- Intel HD Graphics 520 or 620 in processor;
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

**Chipset**
- Intel SoC (System on Chip) platform
- 8GB or 16GB / 1866MHz LPDDR3 / soldered to systemboard, no sockets

**Display**
- **Some:** 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Multi-touch**
- None

**Storage**
- One of the following, configurable by model:
  - M.2 SSD / SATA 6.0Gb/s (e.g. xxxxx SSD M.2)
  - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxxx SSD M.2 PCIe NVMe)

**Optical**
- None

**Ethernet**
- Native Intel Ethernet Connection i219-V (Non-vPro) or i219-LM (vPro)
- via bundled or optional ThinkPad Ethernet Extension Cable

**WLAN**
- One of the following, configurable by model (WiGig can coexist with WWAN):
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Bluetooth 4.1, integrated in Wi-Fi + Bluetooth combo adapter
- * Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS

**Bluetooth™**
- Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)

**WWAN (optional)**
- Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card

**WiGig dock (optional)**
- ThinkPad WiGig dock
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

**Monitor cable (optional)**
- USB-C to VGA: Lenovo HDMI to VGA Monitor Adapter
  - USB-C to DP: Lenovo USB-C to DisplayPort Adapter

**Bundled Accy (optional):**
- Lenovo Ethernet Extension Cable
- Lenovo USB-C to DisplayPort Adapter
- Lenovo USB-C to HDMI Adapter
- Lenovo USB-C to DisplayPort adapter

**Camera (optional):**
- 720p HD720p resolution, fixed focus
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

**Audio support**
- HD Audio, Conexant® CX11871 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack

**Keyboard**
- 6-row, spill-resistant, multimedia Fn keys, LED backlight
  - TrackPoint® pointing device and buttonless Glass surface multi-touch touchpad

**Security**
- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
  - Intel vPro Technology

**Fingerprint reader**
- Touch style match on chip fingerprint reader on the palm rest
  - Near Field Communication

**Battery**
- Integrated Li-Polymer 3-cell (57Wh) RapidCharge battery
- * Battery life varies significantly with settings, usage, & other factors

**AC adapter RapidCharge**
- 45W USB-C
  - Charge to 80%: Not support
  - Charge to 100%: Not support
- 65W USB-C
  - Charge to 80%: 1.0 hr
  - Charge to 100%: 2.5 hr

**Operating system**
- One of the following, configurable by model:
  - Windows 7 Professional 64 preinstalled
  - Windows 10 Professional 64 preinstalled
  - Windows 10 Home 64
  - Windows 10 Pro

**Limited warranty**
- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

**Environmental**
- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
  - Lenovo Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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Lenovo
April 2019
Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
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<td>i5-8250U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
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<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8350U</td>
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<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chipset

Intel SoC (System on Chip) platform

Memory

8GB or 16GB / 2133MHz LPDDR3 / soldered to systemboard, no sockets

Display

One of the following, configurable by model:
- 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle
- 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle
- 14.0" (355mm) HDR WQHD (2560x1440) with Dolby Vision®, glossy, LED backlight, IPS, 500 nits, 16:9 aspect ratio, 1500:1 contrast ratio, 100% gamut, 170° viewing angle

Multi-touch (opt)

On-cell touch, supports 10-finger gesture (FHD only)

Storage

One of the following, configurable by model:
- M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)

Optane™ memory

None

Ethernet

Native Intel Ethernet Connection I219-V (vPro) or I219-LM (vPro)

WLAN + Bluetooth™

Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card

WWAN (optional)

Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

SIM card (opt)

Nano-SIM card slot, optional Verizon LTE (US) SIM card

Dimensions

WxDxH: 12.74" x 8.55" x 0.63"; 323.5mm x 217.1mm x 15.95mm

Weight

Starting at 2.49 lb / 1.13 kg

Case color

Black or Silver (silver case is NOT available in EMEA)

Case material

Display cover: CFFP/GFRP hybrid; Bottom: magnesium alloy / PPS hybrid

Smart card reader

None

Media reader

MicroSD card reader, supports UHS-II

Ports

Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, microSD card reader, side docking connector, security keyhole

* Depending on many factors, actual data transfer speed may be lower than theoretical speed

Monitor cable (optional)

HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

Bundled Accy (optional)

USB-C to DP: Lenovo USB-C to DisplayPort Adapter

Optional: ThinkPad Ethernet Extension Adapter Gen 2

Camera (optional)

One of the following, configurable by model:
- HD720p camera with ThinkShutter camera privacy, fixed focus
- IR camera and HD720p camera, fixed focus

Audio support

HD Audio, Realtek ALC3286 codec / stereo speakers, 1W x 2, Dolby Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos™ via headphones

Security

Power-on password, hard disk password, supervisor password, security keyhole

Security chip (vPro optional)

Discrete TPM 2.0, TCG Certified

Intel vPro Technology

Fingerprint reader

Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology

NFC (optional)

Near Field Communication

Battery

Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

Max battery life

* Battery life varies significantly with settings, usage, & other factors

AC adapter

MobileMark® 2014: 19.3 hr

Operating system

Optional: Windows® 10 Home 64 or Windows 10 Pro 64

Limited warranty

One of the following, configurable by model:
- 1-year depot repair service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

Military test:

MIL-STD-810G military testing

Environment

EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

Lenovo

August 2019
## ThinkPad X1 Carbon (7th Gen) Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>8</td>
<td></td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
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</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
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<td></td>
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</tr>
<tr>
<td>i7-8665U</td>
<td>8</td>
<td></td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 620 in processor
- Supports external digital monitor via HDMI or USB Type-C / Thunderbolt
- Supports three independent displays
- Max resolution: 4096x2304@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform
- 8GB or 16GB / 2133MHz LPDDR3 / soldered to systemboard, no sockets

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
<td>16.9</td>
<td>700:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
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</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16.9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
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<tr>
<td>14.0&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
<td>16.9</td>
<td>700:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS Glossy</td>
<td>500 nits</td>
<td>16.9</td>
<td>1400:1</td>
<td>90%</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

### Multi-touch (opt)

- Capacitive-type multi-touch, supports 10-finger gesture (FHD only), anti-reflection (AR), anti-smudge coating

### Storage

<table>
<thead>
<tr>
<th>Storage Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.2 2280 SSD / SATA 6.0Gb/s</td>
<td>256 GB</td>
</tr>
<tr>
<td>M.2 2280 SSD / PCIe NVMe 3.0 x 4</td>
<td>512 GB</td>
</tr>
<tr>
<td>M.2 2280, PCIe NVMe 3.0 x 4</td>
<td>1 TB</td>
</tr>
<tr>
<td>M.2 Optane SSD, M.2 2280, PCIe NVMe 3.0 x 2</td>
<td>2 TB</td>
</tr>
</tbody>
</table>

### Optical

- None

### Ethernet

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)
- Via bundled or optional ThinkPad Ethernet Extender Adapter Gen 2
- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WLAN (optional)

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- For non-WWAN model, it means the model is NOT WWAN upgradable

### WWAN (optional)

- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card

### SIM card (opt)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Camera (optional)

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus
- HD Audio, Realtek ALC3286 codec / Dolby Atmos speaker system, 2W x 2, 0.8 x 2 / 4 array far-field microphones, headphone / microphone combo jack

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology
- Fingerprint reader
- Touch style match on chip fingerprint reader on the palm rest
- NFC (optional)

### Battery

- Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark 2014: 18.3 hr

### AC adapter

- 45W or 65W USB Type-C AC adapter
- Optional: 65W USB Type-C AC adapter

### Operating system

- Optional: Windows 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service

### Environment

- EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.
### ThinkPad X1 Extreme Platform Specifications

**Product Specifications Reference (PSREF)**

---

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
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<tbody>
<tr>
<td>i5-8300H</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<td>7-8850H</td>
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<td>2.6 GHz</td>
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<td></td>
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</tr>
</tbody>
</table>

#### Graphics

Intel UHD Graphics 630 in processor and NVIDIA GeForce GTX 1050 Ti, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI)

#### Chipset

Mobile Intel CM246 Chipset

#### Memory

64GB max / 2666MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

#### Display

- **Some:** 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle
- **Some:** 15.6" (396mm) HDR 4K (3840x2160) with Dolby Vision™, anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)

#### Multi-touch (opt)

Capacitive-type multi-touch, supports 10-finger gesture (4K only)

#### Pen

Supports pen accessory, please see the accessory compatibility for details

#### Storage

Up to 2 drives (two M.2 SSD)
- M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32GB/s (e.g. xxxGB SSD M.2 PCIe NVMe)

#### Optane™ memory

None

#### Optical

RAID 0/1 support

#### Ethernet

Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)) via bundled or optional ThinkPad Ethernet Extension Cable

#### WLAN

Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card

#### Bluetooth™

Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

#### WWAN

None

#### Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>(non-touch)</th>
<th>(multi-touch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WxDxH</td>
<td>14.24* x 9.67* x 0.72*</td>
<td>14.24* x 9.67* x 0.74*</td>
</tr>
<tr>
<td>Weight (non-touch)</td>
<td>starting at 3.76 lb / 1.7 kg</td>
<td>361.8mm x 245.7mm x 18.4mm</td>
</tr>
<tr>
<td>Weight (multi-touch)</td>
<td>starting at 4.06 lb / 1.8 kg</td>
<td>361.8mm x 245.7mm x 18.7mm</td>
</tr>
</tbody>
</table>

#### Case color

Black

#### Case material

Display cover: CFRP/GFRP hybrid; Bottom: Aluminum alloy

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**Note:** The specifications above may not be available in all regions.

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**Lenovo**

**August 2019**
**ThinkPad X1 Extreme (2nd Gen) Platform Specifications**

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-9300H</td>
<td>4</td>
<td>8</td>
<td>2.4 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.6 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i9-9880H</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.8 GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

**Graphics**

- Intel UHD Graphics 630 in processor and NVIDIA GeForce GTX 1650, 4GB GDDR5 memory;
- supports external digital monitor via HDMI or Thunderbolt™;
- supports four independent displays;
- Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI)

**Chipset and Memory**

- Mobile Intel CM246 Chipset
- 64GB max / 2666MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>HDR 400, Dolby Vision™</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>1200:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>HDR 400, Dolby Vision™</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>1200:1</td>
<td>100% Adobe</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>HDR 500 True Black, Dolby Vision, Multi-touch</td>
<td>OLED</td>
<td>AR, AS</td>
<td>SDR 400nits, HDR 500nits (peak)</td>
<td>16:9</td>
<td>100000:1</td>
<td>100% DCI-P3</td>
</tr>
</tbody>
</table>

**Multi-touch (opt)**

- Capacitive-type multi-touch, supports 10-finger gesture (UHD OLED only), anti-reflection (AR), anti-smudge (AS) coating

**Pen**

- Supports pen accessory, please see the accessory compatibility for details

**Storage**

- Up to two M.2 SSD
- M.2 2280 SSD / PCIe NVMe 3.0 x 4

**RAID (optional)**

- RAID 0/1 support
- None

**Ethernet**

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)) via bundled or optional ThinkPad Ethernet Extension Cable

**WLAN**

- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0 Wireless
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

**WWAN**

- None
- None

**Battery**

- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

**Max battery life**

- MobileMark® 2014: 14 hr

**AC adapter**

- 135W slim tip AC adapter

**Operating system**

- Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

**Mi-Spec test**

- MIL-STD-810G military testing

**Environmental**

- EPEAT Silver; ENERGY STAR® 7.1; RoHS-compliant

---

Note: The specifications above may not be available in all regions.

August 2019
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-6006U</td>
<td>3</td>
<td>4</td>
<td>2.0 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i3-6100U</td>
<td>3</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6200U</td>
<td>3</td>
<td>4</td>
<td>2.3 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>3</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 7th Generation Intel Core™ / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>i7-7100U</td>
<td>3</td>
<td>4</td>
<td>2.4 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i7-7200U</td>
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<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i7-7300U</td>
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<td>Intel HD Graphics 620</td>
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<td>i7-7500U</td>
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<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 520 or 620 in processor.
- Supports external digital monitor via HDMI or USB Type-C.
- Supports three independent displays.
- Max resolution: 4096x2160@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset Memory

- Intel SoC (System on Chip) platform.
- 16GB max / 2400MHz DDR4, one DDR4 SO-DIMM socket.

### Display

- 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio.
- 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle.
- 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle.
- On-cell touch, supports 10-finger gesture (FHD only).

### Storage

- System has one HDD slot or one M.2 2280 slot exclusively for storage.
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™.
- SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD).
- Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN and WiGig.

### Optical

- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville).
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville).

### WLAN

- One of the following, configurable by model (WiGig is mutually exclusive with WWAN):
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1

### Bluetooth™

- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter.
- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter.

### WWAN (optional)

- One of the following, configurable by model (mutually exclusive with WiGig):
  - Wireless WAN upgradable.
  - Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455).
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom LB31-EA(U) (EMEA only).

### SIM Card (optional)

- Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card.

### Operating System

- Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64.
- Windows 10 Home 64.
- Windows 10 Pro 64.

### Warranty

- Limited warranty
  - One of the following, configurable by model:
    - 3-year/1-yr battery limited onsite service.
    - 1-year depot repair service.
    - 3-year/1-year battery depot repair service.
    - 3-year/1-year battery limited onsite service.

### Security

- Power-on password, hard disk password, supervisor password, security keyhole.

### External Battery

- Li-ion 3-cell (23Wh) or 6-cell (48Wh or 72Wh).

### AC Adapter

- 45W slim tip AC adapter or 45W USB Type-C AC adapter.

### Support

- Lenovo USB-C to DisplayPort Adapter.
- Lenovo USB-C to VGA Adapter.
- Lenovo HDMI to VGA Monitor Adapter.

### Power Consumption

- 6.1; RoHS-compliant.

### Supporting Documents

- Lenovo USB-C to DisplayPort Adapter.
- Lenovo HDMI to VGA Monitor Adapter.
- Lenovo USB-C to VGA Adapter.

### Dimensions

- Weight: 2.79 lb / 1.27 kg.
- Weight: 2.98 lb / 1.36 kg.
- Weight: 3.33 lb / 1.52 kg.

### Accessories

- 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle.
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad.

### Additional Features

- Integrated Li-ion or Li-Polymer 3-cell (23Wh).
- Optional: Integrated Li-ion or Li-Polymer 3-cell (23Wh).

### Environment

- MIL-STD-810G military testing.
- EPEAT® Gold (US only).
- ENERGY STAR® 6.1.
- RoHS-compliant.

### Contact Information

- Lenovo
- August 2019
### ThinkPad X280 Platform Specifications

**Processor**

- 7th Generation Intel® Core™ i3 / i5 Processor
  - *i3-7130U is NOT available in US and EMEA; i5-7200U is NOT available in US*

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

- 8th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>3.5 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Chipset**

- Intel SoC (System on Chip) platform
- 4GB, 8GB, or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
* 4GB memory is NOT available in US and EMEA
* System clocks down for processors with lower memory controller

**Display**

Some: 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
Some: 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Multi-touch (opt)**

- On-cell touch, supports 10-finger gesture (FHD only)
* FHD non-touch model is NOT available in US

**Graphics**

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor;
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 4096x2304 @ 60Hz (USB Type-C); 4096x2016 @ 30Hz (HDMI)

**Chipset**

- Intel SoC (System on Chip) platform
- 4GB, 8GB, or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
* 4GB memory is NOT available in US and EMEA
* System clocks down for processors with lower memory controller

**Display**

Some: 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
Some: 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Multi-touch (opt)**

- On-cell touch, supports 10-finger gesture (FHD only)
* FHD non-touch model is NOT available in US

**Storage**

- One of the following, configurable by model:
  - M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
  - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32GB/s (e.g. xxxGB SSD M.2 PCIe NVMe)

**Optane™ memory**

- None

**Optical**

- None

**Ethernet**

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)
- via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

**WLAN + Bluetooth™**

- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

**WWAN (optional)**

- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
* For non-WWAN model, it means the model is NOT WWAN upgradable

**SIM card (opt)**

- Nano-SIM card slot, in the combo slot with microSD card reader, optional Verizon LTE (US) SIM card

**Camera (optional)**

- One of the following, configurable by model:
- HD720p camera with ThinkShutter camera privacy, fixed focus
- IR camera and HD720p camera, fixed focus
- HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack

**Audio support**

- HD Audio, Realtek® ALC3287 codec
- Stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack

**Security**

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology
- Near Field Communication

**Battery**

- Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

**Max battery life**

- *Battery life varies significantly with settings, usage, & other factors
- 16.6 hr

**AC adapter**

- 45W or 65W USB Type-C AC adapter

**Operating system**

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

**Note:** The specifications above may not be available in all regions.

**Lenovo April 2019**
### ThinkPad X390 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
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<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<td>i5-8365U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
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<td>i7-8565U</td>
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<td>i7-8656U</td>
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<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics

- **Intel UHD Graphics 620** in processor: supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)

#### Chipset Memory

- Intel SoC (System on Chip) platform
- 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to system board, no sockets
- **Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation.**

#### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot;</td>
<td>HD (1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>500:1</td>
<td>45% 90°</td>
</tr>
<tr>
<td>13.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>800:1 (non-touch) / 700:1 (multi-touch)</td>
<td>72% 170°</td>
</tr>
<tr>
<td>13.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72% 178°</td>
</tr>
</tbody>
</table>

#### Multi-touch (optional)

- On-cell touch, supports 10-finger gesture (FHD only)

#### Storage

- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

#### Optical

- None

#### Ethernet

- Native Intel Ethernet Connection i219-V (vPro) or i219-LM (non-vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

#### WLAN (optional)

- One of the following, configurable by model:
  - Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0
  - Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

#### WWAN (optional)

- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non-WWAN model, "it means the model is NOT WWAN upgradable"

#### Security

- Security chip: Intel vPro Technology
- Security System Mgt (optional): Power-on password, hard disk password, supervisor password, security keyhole

#### Security chip

- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology

#### Battery

- Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 17.6 hr
- *Battery life varies significantly with settings, usage, & other factors

#### Operating system

- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

#### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1yr battery depot repair service
  - 3-year/1yr battery limited onsite service

#### MIL-Spec test

- MIL-STD-810G military testing

#### Environmental

- EPEAT® Silver: ENERGY STAR® 7.1; RoHS-compliant

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**Note:** The specifications above may not be available in all regions.

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*For non-WWAN model, "it means the model is NOT WWAN upgradable"
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
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</tr>
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<tbody>
<tr>
<td>Ryzen 3 Pro 3300U</td>
<td>4</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.5 GHz</td>
<td>2MB L2/4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
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### Graphics

AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI; supports three independent displays; Max resolution: 4096x2304@60Hz (USB-C): 4096x2160@24Hz (HDMI)

### Chipset

AMD SoC (System on Chip) platform

### Memory

8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets

### Display

<table>
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<tr>
<th>Size</th>
<th>Resolution</th>
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<td>Anti-glare</td>
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### Storage

- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4

### Optical

None

### Ethernet

Native Realtek® RTL8153 Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

### WLan (optional)

Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0

### Bluetooth™

Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWan (optional)

One of the following, configurable by model:
- Wireless WAN upgradeable
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Operating System

Windows® 10 Home 64 or Windows 10 Pro 64

### Limited Warranty

One of the following, configurable by model:
- 1-year depot repair service
- 3-year/1-yr battery depot repair service

### Mil-Spec test

MIL-STD-810G military testing

### Environmental

EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

### Processor AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics

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### Storage

- M.2 2280 SSD / SATA 6.0Gb/s
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**Expedited Depot:** Parts and labor coverage with expedited turnaround. Shipping (including packaging) or delivery to the repair center is paid for by Lenovo.

**Onsite / In-home Service:** Parts and labor repair coverage where labor is provided onsite at your place of business.

If Lenovo determines your product problem is covered by the product warranty and cannot be resolved over the telephone, a technician will be dispatched to arrive onsite, typically the next day.


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