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<td>ThinkPad T480s Platform Specifications</td>
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</table>
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.

June 26, 2019 - Version 544

Additions in this update

►**New product(s)**
  ThinkPad P53s announced June 2019
  ThinkPad X1 Carbon (7th Gen) announced June 2019

►**Others**
  ThinkPad 11e (5th Gen) - 45W or 65W USB Type-C AC adapter added

Withdrawals in this update

►**Withdrawn product(s)**
  None
### 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</th>
<th>Graphics</th>
</tr>
</thead>
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<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>
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<tr>
<td>i5-7Y54</td>
<td>4</td>
<td>4</td>
<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
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<tr>
<td>Celeron N4100</td>
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<td>4</td>
<td>1.1 GHz</td>
<td>2.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 605</td>
<td></td>
</tr>
<tr>
<td>Pentium Silver N5000</td>
<td>2</td>
<td>4</td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 605</td>
<td></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)

### Chipset

- Intel SoC (System on Chip) platform
- 4GB or 8GB / 1866MHz LPDDR3 or 2400MHz DDR4 / soldered to systemboard, no sockets

### Display

- Some: 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio
- Some: 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, IPS, multi-touch, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle, Capacitive-type multi-touch, supports 10-finger gesture (HD IPS only)

### Multi-touch

- 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

### Optane™ memory

- 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)

### Preload

- 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

### EPEAT

- Silver; ENERGY STAR® 6.1; RoHS-compliant

**Lenovo**

**June 2019**
## ThinkPad A275 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</th>
<th>Graphics</th>
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<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 Ryzen™ R5 Graphics</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 Ryzen R7 Graphics</td>
<td>AMD Radeon R7 Graphics</td>
</tr>
<tr>
<td>PRO A10-9700B</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 Ryzen R7 Graphics</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 Ryzen R7 Graphics</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: 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, 700:1 contrast ratio, 170° viewing angle
- 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. xxxGB SSD)
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

### Optical

- None

### Ethernet

- Realtek® RTL8111EVP 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)

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

### SIM card (optional)

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

### Dimensions

- Weight: 2.79 lb / 1.27 kg; 2.98 lb / 1.36 kg; 3.33 lb / 1.52 kg

### Case material

- Glass-Fiber Reinforced Plastic

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

Lenovo
April 2019
### 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 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></td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 PRO 2700U</td>
<td>8</td>
<td>8</td>
<td>2.2 GHz</td>
<td>3.8 GHz</td>
<td></td>
<td></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
- 8GB or 16GB / 2400MHz DDR4, soldered to system board, no sockets

**Display**

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

**Optical**

- None

**Ethernet**

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

**WLAN**

- Realtek® 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™ 7390 (Fibocom L850-GL), 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" x 8.26" x 0.69"; 307.7 mm x 209.8 mm x 17.4 mm
- WxDxH (FHD non-touch): 12.11" x 8.26" x 0.70"; 307.7 mm x 209.8 mm x 17.8 mm

**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**

- Display cover: Carbon Fiber (FHD non-touch model) or PPS (HD & FHD multi-touch model);
- Bottom: Magnesium/Aluminum
### ThinkPad A475 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>
<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>2</td>
<td>2</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 A12-9800B</td>
<td>2</td>
<td>2</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 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

#### 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
- 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: SSD / 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

#### Optical

- None

#### Ethernet

- Realtek® RTL8111EPV Gigabit Ethernet connection

#### WLAN

- Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

#### WWAN (optional)

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

#### SIM card (optional)

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

#### Dimensions

<table>
<thead>
<tr>
<th>Weight</th>
<th>WxDxH: 13.25” x 9.15” x 0.79”; 336.6mm x 232.5mm x 19.95mm</th>
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</thead>
<tbody>
<tr>
<td>Models</td>
<td>3-cell or 3 + 3-cell</td>
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<tr>
<td>Models</td>
<td>6-cell or 3 + 6-cell</td>
</tr>
<tr>
<td>Magnesium</td>
<td>3.49 lb / 1.58 kg</td>
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<tr>
<td>Magnesium</td>
<td>3.92 lb / 1.78 kg</td>
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<td>3.63 lb / 1.65 kg</td>
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<tr>
<td>PPS</td>
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</tbody>
</table>

#### Case color

- Black

#### Case material

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

#### Preload

- Windows 7 Professional 64 preinstalled
- Windows 10 Pro 64
- Windows 10 Home 64
- Lenovo Solution Center
- Lenovo PowerManage
- ThinkVantage Product Recovery
- ThinkVantage System Update
- Adobe® Reader®
- Microsoft® Office preloaded
- purchase a product key to activate

#### Limited warranty

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

#### Mi-Spec test

- MIL-STD-810G military testing

#### Environment

- Energy Star® 6.1; RoHS-compliant
### ThinkPad A485 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>6</td>
<td>6</td>
<td>2.0 GHz</td>
<td>3.6 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 PRO 2700U</td>
<td>8</td>
<td>8</td>
<td>2.2 GHz</td>
<td>3.8 GHz</td>
<td>2MB L2 / 4MB 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
- *Installed DIMMs are actually 2666MHz but run at 2400MHz due to AMD limitation*

#### 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 2280 slot exclusively for storage
- *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*

#### Optical

- *Active Protection System*

#### Ethernet

- Realtek RTL8111GUL Gigabit Ethernet connection

#### WLAN

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

#### 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 (optional)

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

#### Dimensions

- **Width x Depth x Height:** 13.25” x 9.15” x 0.79”
- 336.6mm x 232.5mm x 19.95mm

#### Weight

- **Models:** 24Wh or 24Wh + 24Wh
- **48Wh, 72Wh, or 24Wh + 48Wh + 72Wh**
- **Magnesium:** 3.49 lb / 1.61 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

### Product Specifications Reference (PSREF)

<table>
<thead>
<tr>
<th>Processor</th>
<th>7th Generation Intel® Core™ i3 / i5 Processor (i3-7130U is NOT available in US and EMEA) or Processor 8th Generation Intel Core™ i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td><strong># of Cores</strong></td>
</tr>
<tr>
<td>i3-7020U</td>
<td>2</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>2</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>2</td>
</tr>
<tr>
<td>i3-8130U</td>
<td>4</td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
</tr>
</tbody>
</table>

### Graphics

-Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD 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
- Memory: 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

### Multi-touch

- None

### Storage

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

### Optane™ memory

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

### Optical

- None

### Ethernet

- Gigabit Ethernet Connection, Realtek® 88111GUS

### 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
  - * Intel 3165ac card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN

- None

### SIM card

- None

### Dimensions

- Aluminum (WxDxH): 12.96" x 9.53" x 0.78": 329mm x 242mm x 19.9mm
- PC/ABS (WxDxH): 12.96" x 9.53" x 0.83": 329mm x 242mm x 21.9mm

### Weight

- Starting at 3.87 lb / 1.75kg

### Case color

- Black or silver

### Case material

- Display cover: Aluminum or PC/ABS plastic
- Bottom: PC/ABS plastic

### Case reader

- None

### Media reader

- MicroSD card reader

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

### Camera

- HD720p camera, fixed focus

### Audio support

- HD Audio, Synaptics® CX11852 codec / Advanced Audio / 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

### 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

- Optional: Touch style fingerprint reader on the palm rest
- None

### Fingerprint reader

- None

### Preload (optional)

- Windows® 10 Home 64 or Windows 10 Pro 64

### Environment test

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

### Security

- Limited warranty 1-year depot repair service

### MIL-Spec test

- MIL-STD-810G military testing

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

### AC adapter

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

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

Lenovo
June 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 Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 2200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>1MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 3 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 2500U</td>
<td>4</td>
<td>8</td>
<td>2.0 GHz</td>
<td>3.6 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 2700U</td>
<td>6</td>
<td>8</td>
<td>2.2 GHz</td>
<td>3.8 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: 1920x1080 (HDMI)@60Hz

**Chipset**
- AMD SoC (System on Chip) platform
- Supports external digital monitor via HDMI or USB Type-C

**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, 400:1 contrast ratio

**Multi-touch**
- None

**Storage**
- Up to 2 drives (one M.2 SSD and one HDD)
- Active Protection System™
- M.2 SSD / PCIe NVMe

**Optical**
- None

**Ethernet**
- Gigabit Ethernet Connection, Realtek RTL8111GUS

**WLAN + Bluetooth™**
- One of the following, configurable by model:
  - Qualcomm QCNFA435, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
  - 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

**WWAN**
- None

**SIM card**
- None

**Audio**
- HD Audio, Synaptic CX11852 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
- HD720p camera, fixed focus

**Camera**
- HD720p camera, fixed focus

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

**Security**
- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- None

**Battery**
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 45W or 65W USB Type-C AC adapter
- MobileMark® 2014: 9.37 hr
- *Battery life varies significantly with settings, usage, & other factors

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

**Preload (optional)**
- Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**
- 1-year depot repair service

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

Note: The specifications above may not be available in all regions.
### 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></td>
</tr>
<tr>
<td>i7-8565U</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></td>
</tr>
</tbody>
</table>

### Graphics

Intel UHD Graphics 620 in processor only or 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

Inte 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 / 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” HD (1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
</tr>
<tr>
<td>14.0” FHD (1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>250 nits</td>
<td>16:9</td>
<td>600:1</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Optical

Optane™ memory Optional: Intel Optane memory, PCle NVMe, PCle 3.0 x 2

### 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 / PCle NVMe, PCle 3.0 x 2
- M.2 2242 SSD / PCle NVMe, PCle 3.0 x 2

### Optane™ memory

Optional: Intel Optane memory, PCle NVMe, PCle 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

SIM card None

### Security

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

### System Mgt

None

### Security

Fingerprint 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: 13 hr

### AC adapter

45W or 65W USB Type-C AC adapter

### Preload (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™ Bronze; ENERGY STAR® 7.0; RoHS-compliant
## 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>4</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
- 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

### 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 / Resolution</th>
<th>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” 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” 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
- Optane™ memory 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

- SIM card None

### Dimensions

- WxDxH: 12.96” x 9.13” x 0.70”; 329mm x 232mm x 17.9mm

### Weight

- Starting at 3.68 lb / 1.67 kg

### Case color

- Black or silver

### Case material

- Aluminum

### Smart card reader

- None

### Media reader

- MicroSD card reader

### Ports

- One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 2 (with the power of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Camera

- HD720p camera, fixed focus

### Audio support

- HD Audio, Synaptic® CX11880 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
- Security chip Integrated model: discrete TPM 2.0, TCG Certified
- Discrete model: firmware TPM 2.0 integrated in chipset

### System Mgt

- Security chip
- Fingerprint reader
- Touch style fingerprint reader on the palm rest
- NFC

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

### Preload (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™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo

June 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>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>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>4</td>
<td>8</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
  * 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>14.0&quot; HD (1366x768)</td>
<td>Anti-glare TN</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</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>Non-touch</td>
</tr>
</tbody>
</table>

### 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

### Limited warranty

- 1-year depot repair service

### MI-Spec test

- None

### Environment

- EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

Note: The specifications above may not be available in all regions.
### 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>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7020U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
</tr>
</tbody>
</table>

#### Graphics

- Intel HD Graphics 620
- AMD Radeon RX 550 Graphics, 2GB DDR5 memory

#### Memory

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

#### Chipset

- Intel SoC (System on Chip) platform

#### 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

#### Storage

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

#### Optane™ memory

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

#### Optical

- None

#### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

#### Media reader

- MicroSD card reader

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

#### 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

#### Keyboard

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

#### 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

#### Fingerprint reader

- 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

#### AC adapter

- MobileMark® 2014: 12.23 hr
- 45W or 65W USB Type-C AC adapter

#### Environment

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

**Note:** The specifications above may not be available in all regions.
### ThinkPad E585 Platform Specifications

**Processor**
- AMD Ryzen Mobile Processors with Radeon Vega Graphics
- **Processor Number**
  - Ryzen 3 2200U: 2 cores, 4 threads, 2.5 GHz base frequency, 3.4 GHz max frequency, 1MB L2 cache, Radeon Vega 3 Graphics
  - Ryzen 5 2500U: 4 cores, 8 threads, 2.0 GHz base frequency, 3.6 GHz max frequency, 2MB L2/4MB L3 cache, Radeon Vega 8 Graphics
  - Ryzen 7 2700U: 2.2 GHz base frequency, 3.8 GHz max frequency, 2MB L2/4MB L3 cache, Radeon RX Vega 10 Graphics

**Graphics**
- AMD Radeon Vega 3, Vega 8, or RX Vega 10 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @60Hz

**Chipset Memory**
- AMD SoC (System on Chip) platform, 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 (NOT available in EMEA)
- **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)
- **Some:** HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable, Active Protection System™
- **Some:** M.2 SSD / PCIe NVMe
- None

**Optical**
- None

**Ethernet**
- Gigabit Ethernet Connection, Realtek RTL8111GUS

**WLAN + Bluetooth™**
- One of the following, configurable by model:
  - Qualcomm QCNFA435, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
  - 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

**WWAN SIM card**
- None

**Dimensions**
- **WxDxH:** 14.53" x 9.92" x 0.79"; 369mm x 252mm x 19.95mm
- **Weight:** Starting at 4.7 lb / 2.1kg
- **Case color:** Black
- **Case material:** Display cover: Aluminum; Bottom: PC/ABS plastic

**Smart card reader**
- None

**Media reader**
- MicroSD card reader

**Audio support**
- HD720p camera, fixed focus
- HD Audio, Synaptic® CX11852 codec /
  - stereo speakers, 1.5W x 2, Dolby® Advanced Audio /
  - dual array microphone, headset / microphone combo jack

**Camera**
- HD Audio, Synaptic® CX11852 codec /
  - stereo speakers, 1.5W x 2, Dolby® Advanced Audio /
  - dual array microphone, headset / microphone combo jack

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

**Security chip**
- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- 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: 8.63 hr
  - *Battery life varies significantly with settings, usage, & other factors
- AC adapter
  - 45W or 65W USB Type-C AC adapter

**WLAN + Bluetooth™**
- One of the following, configurable by model:
  - Qualcomm QCNFA435, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
  - 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

**WWAN SIM card**
- None

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

---

*Note: The specifications above may not be available in all regions.*
## 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>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>1.8 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
- 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 Memory
- 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
- **Size / Resolution:**
  - 15.6" HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch
  - 15.6" 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)
  - 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
- Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

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

### 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

### Dimensions
- **WxDxH:** 14.53" x 9.94" x 0.78"; 369mm x 252.5mm x 19.9mm
- **Weight:** Starting at 4.68 lb / 2.12 kg

### Case color
- Black or silver

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

### Smart card reader
- None

### Media reader
- MicroSD card reader

### 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
- Bundled Accy None

### Camera
- HD720p camera, fixed focus

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

### Keyboard
- UltraNav™
  - 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight

### Security chip
- Power-on password, hard disk password, supervisor password, security keyhole
- Integrated model: discrete TPM 2.0, TCG Certified
- Discrete model: firmware TPM 2.0 integrated in chipset

### System Mgt
- None

### Fingerprin 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
- MobileMark® 2014: 11 hr

### Max battery life
- *Battery life varies significantly with settings, usage, & other factors

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

### Preload
- (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™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo
June 2019
## 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>Memory Controller</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>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 RX Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>4</td>
<td>8</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

### 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

- **Size / Resolution**
  - 15.6" HD (1366x768)
  - 15.6" FHD (1920x1080)
- **Surface**
  - Anti-glare
- **Type**
  - TN
  - IPS
- **Brightness**
  - 220 nits
  - 250 nits
- **Aspect Ratio**
  - 16:9
- **Viewing Angle**
  - 400:1
  - 600:1
- **Multi-touch**
  - Non-touch

### 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 R8117GS

### 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

###dimensions

- **WxDxH:** 14.53" x 9.92" x 0.78"; 369mm x 252mm x 19.9mm
- **Weight:** Starting at 4.7 lb / 2.1kg
- **Case color:** Black
- **Case material:** Display cover: Aluminum; Bottom: PC/ABS plastic

### Chipset

- **Camera**
  - HD720p camera, fixed focus
- **Audio support**
  - HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
- **Keyboard**
  - UltraNav™
  - 6-row, spill-resistant, multimedia Fn keys
- **Security chip**
  - Power-on password, hard disk password, supervisor password, security keyhole
  - Discrete TPM 2.0, TCG Certified
- **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
  - **AC adapter**
    - 45W or 65W USB Type-C AC adapter
  - **Preload (optional)**
    - Windows® 10 Home 64 or Windows 10 Pro 64
  - **Limited warranty**
    - 1-year depot repair service
  - **NFC**
  - None
  - **Environment**
    - EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

### Notes

- The specifications above may not be available in all regions.
## ThinkPad L380 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>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Celeron Processor, 7th Generation Intel Core™ i3 / i5 Processor</td>
<td>3965U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td></td>
<td>3-7130U</td>
<td>4</td>
<td>4</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>8th Generation Intel Core i5 / i7 Processor</td>
<td>8-850U</td>
<td>4</td>
<td>4</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td></td>
<td>8-8550U</td>
<td>8</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### 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:** 13.3” (338mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 500:1 contrast ratio
- **Some:** 13.3” (338mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle,
- **Some:** 13.3” (338mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle,

### Multi-touch (opt)

- on-cell touch, supports 10-finger gesture

### 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 (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

<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>Graphics</th>
</tr>
</thead>
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<tr>
<td>Intel Celeron Processor, 7th Generation Intel Core™ i3 / i5 Processor</td>
<td>3965U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td></td>
<td>3-7130U</td>
<td>4</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>8th Generation Intel Core i5 / i7 Processor</td>
<td>8-850U</td>
<td>4</td>
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<td>2.2 GHz</td>
<td>3.4 GHz</td>
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<td></td>
<td>8-8550U</td>
<td>8</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Camera

- HD720p camera, fixed focus
- Stereo speakers, 2W x 2, Dolby® Audio™ / stereo speakers, 2W x 2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack

### Security

- 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

### NFC (optional)

- Near Field Communication

### Battery

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 65W USB Type-C AC adapter
- MobileMark® 2014: 16.1 hr
- 45W or 65W USB Type-C AC adapter

### Preload

- 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

### Environmental

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

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># 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>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<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>i5-8565U</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>
</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

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Surface</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot;</td>
<td>HD (1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>250 nits</td>
<td>16:9</td>
<td>500:1</td>
<td>90°</td>
</tr>
<tr>
<td>13.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1 (non-touch)</td>
<td>800:1 (multi-touch)</td>
</tr>
</tbody>
</table>

### Multi-touch (optional)

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

### Optane™ memory

None

### 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"; 321.8mm x 224.2mm x 18.8mm

### Case color

Black or Silver

### Case material

Display cover: Aluminum
Bottom: GFRP

### 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
USBC to VGA: Lenovo USB-C to VGA Adapter
USBC to VGA + Power Adapter: Lenovo USB-C to VGA plus Power Adapter
USBC to HDMI: Lenovo USB-C to HDMI Adapter
USBC to HDMI + Power Adapter: Lenovo USB-C to HDMI plus Power Adapter
USBC to DP: Lenovo USB-C to DisplayPort Adapter
USB-C to RJ45: Lenovo USB-C to Ethernet Adapter
USBC to USB-A: Lenovo USB-C to USB-A Adapter
USBC to USB-C: Lenovo USB-C to USB-C Cable 2M

### Audio support

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

### Security chip

Discrete TPM 2.0, TCG Certified

### System Mgt

None

### Fingerprint 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

54W or 65W USB Type-C AC adapter

### Limitated 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

EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo May 2019
ThinkPad L470 Platform Specifications

**Processor**
- 6th Generation Intel® Core™ i3 / i5 / i7 Processor or
- Processor Number: 3-6006U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.0 GHz
  - Max Turbo Frequency: 3.3 GHz
  - Cache: 3MB
- Processor Number: 3-6100U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.3 GHz
  - Max Turbo Frequency: 3.6 GHz
  - Cache: 3MB
- Processor Number: 5-6200U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.3 GHz
  - Max Turbo Frequency: 3.6 GHz
  - Cache: 3MB
- Processor Number: 5-6300U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.4 GHz
  - Max Turbo Frequency: 3.0 GHz
  - Cache: 3MB

**Intel Celeron® Processor**
- Processor Number: Cel 3965U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.2 GHz
  - Max Turbo Frequency: 3.0 GHz
  - Cache: 2MB

- Processor Number: 3-7100U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.4 GHz
  - Max Turbo Frequency: 3.3 GHz
  - Cache: 3MB
- Processor Number: 5-7200U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.5 GHz
  - Max Turbo Frequency: 3.6 GHz
  - Cache: 3MB
- Processor Number: 5-7300U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.4 GHz
  - Max Turbo Frequency: 3.5 GHz
  - Cache: 3MB
- Processor Number: 7-7500U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.7 GHz
  - Max Turbo Frequency: 3.5 GHz
  - Cache: 4MB
- Processor Number: 7-7600U
  - # of Cores: 2
  - # of Threads: 4
  - Base Frequency: 2.8 GHz
  - Max Turbo Frequency: 3.9 GHz
  - Cache: 4MB

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

**Graphics**
- Intel HD Graphics 5500
- Intel HD Graphics 520
- Intel HD Graphics 610
- Intel HD Graphics 620

**Chipset**
- Intel SoC (System on Chip) platform
- 32GB max / 2133MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

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

**Storage**
- System has one HDD slot or one M.2 2280 slot exclusively for storage
- Some: SSD / Sata 6.0Gbps, 2.5" wide, 7mm or 9.5mm high, Active Protection System™

**Optical**
- None

**Ethernet**
- Intel Ethernet Connection I219-V (Jacksonville)
- 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
  - 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**
- 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**
- Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card

**Dimensions**
- WxDxH: 339mm x 235mm x 23.9mm

**Weight**
- 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**
- HD720p resolution, fixed focus

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

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

**Security**
- Security chip
- vPro (optional)
- Fingerpoint reader
- Optional: Swipe style fingerprint reader on the keyboard bezel

**Battery**
- Li-ion 3-cell (24Wh) or 6-cell (48Wh or 72Wh)
- Max battery life (MobileMark® 2014)
  - Models: 3-cell, 6-cell 48Wh, 6-cell 72Wh
  - Integrated model: 7.24 hr, 14.48 hr, 21.72 hr
  - Discrete model: 6.68 hr, 13.02 hr

**AC adapter**
- 45W or 65W slim tip AC adapter

**Preload**
- Windows® 7 Professional 64 preinstalled
- Lenovo Setting

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

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

Lenovo September 2018
ThinkPad L480 Platform Specifications

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 Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<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>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

8th Generation Intel Core i3 / i5 / i7 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 Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<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>5-8350U</td>
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<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>1.6 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

* 3-7130U is NOT available in US and EMEA

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 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

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

Display

- On-cell touch, supports 10-finger gesture (FHD only)
- System has one HD slot or one M.2 2280 slot exclusively for storage
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm height, Active Protection System™
- SSD / SATA 6.0Gb/s, 2.5" wide, 7mm height (e.g. xxxGB SSD)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, supports three independent displays;
- supports external digital monitor via HDMI or USB Type-C;
- (discrete models are NOT available in EMEA);
- AMD Radeon 530, 2GB GDDR5 memory
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle

Multi-touch (opt)

- Storage
- System has one HD slot or one M.2 2280 slot exclusively for storage
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm height, Active Protection System™
- SSD / SATA 6.0Gb/s, 2.5" wide, 7mm height (e.g. xxxGB SSD)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- 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

- None

Ethernet

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

WLAN + Bluetooth™ (optional)

- 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
- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7680 (Fibocom L850-GL), M.2 card
- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7680 (Fibocom L850-GL), M.2 card
  - For non-WWAN model, it means the model is NOT WWAN upgradable

WWAN (optional)

- Integrated Mobile Broadband 4G LTE
- Intel XMM™ 7625 (Fibocom L830-EB), M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A
- Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- Smart card slot, optional Verizon LTE (US) SIM card

SIM card (opt)

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

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, microSD card reader, side docking connector, security keyhole
- Depending on many factors, actual data transfer speed may be lower than theoretical speed

Security

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

Optical drive

- None

Battery

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

AC adapter

- 45W or 65W USB Type-C AC adapter
- Limited warranty
  - 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™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

April 2019
### Processor

**Intel® Celeron® Processor or 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>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>
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<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>
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<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>
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<td>5-8365U</td>
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<td>1.6 GHz</td>
<td>4.1 GHz</td>
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<td>7-8565U</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Specifications Reference (PSREF)**

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

### 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 2666MHz but run at 2133MHz or 2400MHz due to Intel limitation

**Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2**

### 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; HD (1366x768) TN Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080) IPS Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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

### Optane™ memory

- M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation
- 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)

### WLAN + Bluetooth™ (optional)

- One of the following, configurable by model:
  - Realtek® RTL8829BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card (NOT available in EMEA)
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wireless-AX 22260, 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

### SIM card

- None

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified
- Optional: Touch style fingerprint reader on the palm rest

### Fingerprint reader

- Optional: Touch style 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)
- MobileMark® 2014: 12 hr
- *Battery life varies significantly with settings, usage, & other factors

### AC adapter

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

### Preload

- 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

- None

### Environment

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

Note: The specifications above may not be available in all regions.
## ThinkPad L570 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 or 7th Generation Intel Core i3 / i5 / i7 Processor</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>i3-6006U</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>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>i3-6100U</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>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
<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>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
<td>DDR4-2133</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>
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<td>Intel HD Graphics 520</td>
<td>DDR4-2133</td>
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<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 520</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 520, or 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
- 32GB max / 2400MHz 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, 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)

### 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: 14.84" x 10.04" x 1.08-1.21"; 377mm x 255mm x 27.6-30.85mm

### Weight

- Starting at 5.25 lb / 2.38 kg

### Case color

- Black

### Case material

- PC/ABS plastic

### Power supply

- 45W slim tip AC adapter

### Preload Windows

- Windows 10 Home 64
- Windows 10 Pro 64
- Lenovo Companion
- Lenovo Setting
- Microsoft Office preloaded; purchase a product key to activate
- Lenovo Solution Center
- Lenovo Support
- ThinkVantage System Update
- Windows 7 Professional 64 preinstalled
- ThinkVantage System Update
- Windows 10 Pro 64
- Microsoft Office preloaded; purchase a product key to activate

### TrackPoint

- 6-row, spill-resistant, multimedia Fn keys, numeric keypad

### Security chip

- Intel vPro Technology

### Security

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

### Power-on password

- Discrete TPM 2.0, TC/ C/G Certified

### FingerPrint reader

- Optional: Swipe style fingerprint reader on the palm rest

### Battery

- Li-ion 6-cell (48Wh)

### Max battery life

- MobileMark® 2014: 14.8 hr

### AC adapter

- 45W slim tip AC adapter

### Preload

- Windows 7 Professional 64 preinstalled
- Some: Windows 10 Home 64
- Lenovo Companion
- Lenovo Setting
- Microsoft Office preloaded; purchase a product key to activate

### Warranty

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

---

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

Lenovo
September 2018
## ThinkPad L580 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Number</th>
<th>Processor</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Type</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 610
- Intel HD Graphics 620

### 8th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Number</th>
<th>Processor</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Type</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>1.6 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

### Display

- 15.6" (396mm) HD (1366x768), anti-glare, LED backlight
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS

### 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)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- 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™ (optional)

- 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

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

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th>Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Celeron®</td>
<td>4305U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133 Intel UHD Graphics 610</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400 Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8255U</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></td>
<td>8355U</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></td>
<td>8555U</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></td>
<td>8655U</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>

### WWAN

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

### Graphics

- Intel UHD Graphics 610 or 620 in processor 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 2666MHz but run at 2133MHz or 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>HD (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;</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>
</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

- None

### Ethernet

- One of the following, configurable by model: Lenovo USB-C to DisplayPort Adapter
- Lenovo USB-C to VGA Adapter
- Lenovo USB-C to DP Adapter
- Lenovo USB-C to VGA Monitor Adapter

### Security

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

### Security chip System Mgt (opt)

- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified

### Fingerprint reader

- Optional: Touch style fingerprint reader on the palm rest
- 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
- MobileMark® 2014: 12 hr
- Battery life varies significantly with settings, usage, & other factors

### AC adapter

- MobileMark® 2014: 45W or 65W USB Type-C AC adapter
- MobileMark® 2014: 12 hr
- Battery life varies significantly with settings, usage, & other factors

### Preload

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

### Mi-Spec test

- None

### Environment

- EPEAT™ Bronze; ENERGY STAR® 7.1; RoHS-compliant
# ThinkPad P1 Platform Specifications

## Product Specifications Reference (PSREF)

<table>
<thead>
<tr>
<th>Processor 8th Generation Intel® Core™ i5 / i7 Processor or Intel Xeon® E Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>E-8400H</td>
</tr>
<tr>
<td>T-8750H</td>
</tr>
</tbody>
</table>

## Graphics

Intel UHD Graphics 630 or P630 in processor and NVIDIA® Quadro® P1000 or P2000 Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt®;

## 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

## 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) 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

Optane™ memory

RAID (optional)

RAID 0/1 support

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

SIM card

None

## Dimensions

**WxDxH (non-touch):** 14.24” x 9.67” x 0.72”; 361.8mm x 245.7mm x 18.4mm

**WxDxH (multi-touch):** 14.24” x 9.67” x 0.74”; 361.8mm x 245.7mm x 18.7mm

## Weight

**Non-touch model:** starting at 3.76 lb (1.7 kg); 15.6” (396mm) UHD (3840x2160)

**Multi-touch model:** starting at 4.08 lb (1.8 kg); 15.6” (396mm) UHD (3840x2160)

## 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.

Lenovo

June 2019
ThinkPad P51 Platform Specifications

<table>
<thead>
<tr>
<th>Processor 6th or 7th Generation Intel® Core™ i7 Processor or Intel Xeon® Processor E3 v5 or v6 Family</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor</strong></td>
</tr>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>i7-6820HQ</td>
</tr>
<tr>
<td>E3-1505M v5</td>
</tr>
<tr>
<td>i7-7700HQ</td>
</tr>
<tr>
<td>E3-1535M v6</td>
</tr>
<tr>
<td>E3-1535M v6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>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)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chipset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Intel CM238 Chipset</td>
</tr>
<tr>
<td>4GB max / 2400MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some: 15.6&quot;(396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle</td>
</tr>
<tr>
<td>Some: 15.6&quot;(396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle</td>
</tr>
<tr>
<td>Capacitive-type multi-touch, supports 10-finger gesture, 220 nits (FHD only)</td>
</tr>
<tr>
<td>ThinkPad Pen Pro, active pen for multi-touch display</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 3 drives (two M.2 SSD and one HDD)</td>
</tr>
<tr>
<td>Some: HDD / SATA 6.0Gb/s, 2.5&quot; wide, 7mm high, Active Protection System™</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RAID (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAID 0/1 support</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optical</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethernet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)</td>
</tr>
<tr>
<td>vPro model: Intel Ethernet Connection I219-LM (Jacksonville)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</td>
</tr>
<tr>
<td>• Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</td>
</tr>
<tr>
<td>Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter</td>
</tr>
<tr>
<td>* Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WWAN (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• Wireless WAN upgradable</td>
</tr>
<tr>
<td>• Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIM card (opt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>WxDxH: 14.86&quot; x 9.93&quot; x 0.96-1.16&quot;: 377.4mm x 252.3mm x 24.5-29.4mm</td>
</tr>
<tr>
<td>WxDxH(Touch): 14.86&quot; x 9.93&quot; x 1.02-1.21&quot;: 377.4mm x 252.3mm x 25.8-30.7mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display cover: Glass-Fiber Reinforced Plastic; Bottom: Magnesium/Aluminum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smart card reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional: Smart card reader</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ExpressCard</th>
</tr>
</thead>
<tbody>
<tr>
<td>One slot (ExpressCard/34)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Media reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power-on password, hard disk password, supervisor password, security keyhole</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security chip vPro (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel vPro Technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Finger reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch style match on chip fingerprint reader on the palm rest</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Color calibration NFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional: Pantone® color calibrator by X-Rite® color calibration sensor in palm rest</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max battery life(1) (MobileMark® 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Discrete Graphics</td>
</tr>
<tr>
<td>Hybrid Graphics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AC adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Battery life varies significantly with settings, usage, &amp; other factors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preload</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64</td>
</tr>
<tr>
<td>• Windows® 10 Home 64</td>
</tr>
<tr>
<td>• Windows 10 Pro 64</td>
</tr>
<tr>
<td>• Windows 10 Pro 64 for Workstations</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Mi-Spec test</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL-STD-810G military testing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENERGY STAR® 6.1; RoHS-compliant</td>
</tr>
</tbody>
</table>

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

### Processor
<table>
<thead>
<tr>
<th>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>9-8950K</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>
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<tr>
<td>E-2176M</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

### Memory
- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported 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
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 170° viewing angle, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)
- 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 4000 nits, 16:9 aspect ratio, 1080:1 contrast ratio, 5120x2880@60Hz (Thunderbolt); 4096x2160@60Hz (HDMI)

### Chipset
- Mobile Intel CM246 Chipset

### 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

### Ethernet
- Intel Network Adapter: Intel Ethernet Connection [i219-V] (Jacksonville)
- Non-vPro model: Intel Ethernet Connection [i219-LM] (Jacksonville)
- Intel Ethernet Connection [i219-V] (Jacksonville)

### 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 (optional)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L850-GL), M.2 card

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

### Chipset
- Mobile Intel CM246 Chipset

### Display
- 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: 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

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

### 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 (optional)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L850-GL), M.2 card

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### Chipset
- Mobile Intel CM246 Chipset

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- Capacitive-type multi-touch, supports 10-finger gesture (4K only)

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- 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

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

### 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 (optional)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L850-GL), M.2 card

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

### Chipset
- Mobile Intel CM246 Chipset

### Display
- 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: 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

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

### 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 (optional)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L850-GL), M.2 card

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

### Chipset
- Mobile Intel CM246 Chipset

### Display
- 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: 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

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

### 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 (optional)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L850-GL), M.2 card

### SIM card (optional)
- Nano-SIM card slot, optional Verizon LTE (US) SIM card
ThinkPad P52s Platform Specifications

Product Specifications Reference (PSREF)

Lenovo
May 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>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
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<td>i7-8550U</td>
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<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8650U</td>
<td>6</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

Intel SoC (System on Chip) platform

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

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

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

WWAN (optional)

One of the following, configurable by model:
• Wireless WAN upgradable
• Integrated Mobile Broadband 4G LTE, Intel XMM™ 7660 (Fibocom L850-GL), M.2 card (EMEA only)
• Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7660 (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: 14.40" x 9.95" x 0.79-0.80"; 365.8mm x 252.8mm x 19.95-20.2mm

Weight

starting at 4.39 lb / 1.99 kg

Case color

Black

Case material

Display cover: Glass-Fiber Reinforced Plastic (PPS);
Bottom: Glass-Fiber Reinforced Plastic

Smart card reader

Optional: Smart card reader

Media reader

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

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, 4-in-1 reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole

Monitor cable

(optional)

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

Camera (optional)

One of the following, configurable by model:
• HD720p camera with ThinkShutter camera privacy, fixed focus
• 10 Home 64 or Windows 10 Pro 64

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, numeric keypad, optional LED backlight UltraNav™ 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

Fingerprint reader

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

NFC (optional)

Near Field Communication

Battery

Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery

Max battery life

(50 MobileMark® 2014)

May 2019

Models

48Wh 72Wh 32Wh + 24Wh 32Wh + 48Wh 32Wh + 72Wh

Max battery life

12.2 hr 18.5 hr 13.5 hr 20.1 hr 26.3 hr

AC adapter

Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery

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

Preload

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

Lenovo
### Processor

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<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>
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<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

### 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**

### Chipset

- Mobile Intel CM246 Chipset
- Supporting model: 8th Generation Intel® Core™ i7 Processor or Intel Xeon® E Processor

### Display

- **Base resolution**: 1920x1080 @ 60 Hz (HDMI), 3840x2160 @ 60 Hz (DisplayPort via Mini DisplayPort cable)
- **Max resolution**: 3840X2160@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)
- **Multi-touch**: 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

### Security

- **Power-on password**, hard disk password, supervisor password, security keyhole
- **Discrete TPM 2.0, TCG Certified**
- **Power Delivery only supports power-out for charging peripherals**

### Battery

- **Li-ion 99Wh battery**, supports Rapid Charge (charge up to 80% in 1hr)
- **MobileMark 2014**: 18 hr
- **Battery life varies significantly with settings, usage, & other factors**

### Environment

- **ENERGY STAR® 7.0; RoHS-compliant**
- **Gold (US only)**

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

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**Product Specifications Reference (PSREF)**

**Dimensions**

- WxDxH: 16.38" x 11.06" x 0.96-1.16"; 416mm x 281mm x 24.5-29.4mm

**Weight**

- Starting at 7.5 lb (3.4kg)

**Color**

- Black

**Camera**

- IR camera and HD720p camera, fixed focus

**Audio**

- HD Audio, Realtek ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone

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**Lenovo P72 Power Data Sheet**

*Lenovo May 2019*
**ThinkPad T470 Platform Specifications**

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
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<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tr>
<td>i5-6200U</td>
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<td>4</td>
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<td>Intel HD Graphics 520</td>
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<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
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</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>i5-7200U</td>
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<td>2.9 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

* i7-6500U is not available in EMEA

**Graphics**

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)

**Chipset Memory**

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, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 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: 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 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 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

**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)

**SIM card (opt)**

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

**Dimensions**

WxDxH: 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm

**Weight**

Models:
- 3-cell or 3 + 3-cell
- 6-cell or 3 + 6-cell

Magnesium:
- 3.49 lb / 1.58 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;
Glass-Fiber Reinforced Plastic

**Smart card reader**

Optional: Smart card reader

**Media reader**

4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I

**Ports**

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

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

**WiGig dock (opt)**

ThinkPad WiGig dock

Optional: Lenovo USB-C to VGA Adapter

**Camera (optional)**

720p: HD720p resolution, fixed focus

**Audio support**

HD Audio, Realtek ALC3288 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack

**Keyboard**

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

**Security**

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

**Security chip**

Discrete TPM 2.0, TCG Certified

**vPro (optional)**

ThinkPad vPro Technology

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

**Near Field Communication**

Optional: Integrated NFC (optional)

**Internal battery**

Models:
- 3-cell
- 3 + 3-cell
- 6-cell
- 6-cell 48Wh
- 6-cell 72Wh
- 3 + 6-cell
- 3 + 6-cell 48Wh
- 3 + 6-cell 72Wh

Integrated:
- 6.9 hr
- 13.9 hr
- 15.9 hr
- 20.9 hr
- 20.9 hr
- 27.1 hr

Discrete:
- 6.9 hr
- 13.9 hr
- 14.3 hr
- 21.6 hr
- 21.2 hr
- 28.6 hr

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

**AC adapter**

45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter

**Preload**

Windows® 7 Professional 64 preinstalled

Some: Windows 10 Home 64

Some: Windows 10 Pro 64

- Lenovo Solution Center
- Lenovo PowerEngage
- ThinkVantage Product Recovery
- ThinkVantage System Update
- Adobe® Reader®
- Microsoft® Office preloaded;
- purchase a product key to activate

* 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
- 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

**Publication date**

April 2019
### ThinkPad T470s Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>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>i5-6200U</td>
<td>2</td>
<td>2.3 GHz</td>
<td>2.6 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>2.4 GHz</td>
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<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i7-6600U</td>
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<td>3.6 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
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or 7th Generation Intel Core i5 / i7 Processor

<table>
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<tbody>
<tr>
<td>8-7200U</td>
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<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<td>8-7300U</td>
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<td>3.5 GHz</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>8-7500U</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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or 7th Generation Intel Core i5 / i7 Processor

#### Crime (optional)

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<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: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

#### Chipset

- Intel SoC (System on Chip) platform
- 20GB or 4GB max / 2400MHz DDR4, dual-channel capable, 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket
- *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:** 14.0" (355mm) QHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
- On-cell touch, supports 10-finger gesture, 250 nits (FHD only)

#### Multi-touch (optional)

- Optional:
  - 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket
  - Intel HD Graphics 520 or 620 in processor

#### Storage

- 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 is mutually exclusive with WWAN):
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card

#### Bluetooth™

- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
- *Intel 8265ac / 18265ac card support BT 4.2 but is limited to BT 4.1 by Windows OS

#### WWAN (optional)

- One of the following, configurable by model (mutually exclusive with WiGig):
  - Wireless WAN upgradeable
  - 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 (optional)

- Optimized for global roaming

#### Dimensions

- **WxDxH:** 13.03" x 8.93" x 0.67-0.74"; 331mm x 226.8mm x 16.9-18.8mm

#### Weight

- Starting at 2.9 lb (1.32kg)

#### Case color

- Black or Silver

#### Case material

- Display cover: CFRP Hybrid; Bottom: Magnesium

#### 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), 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, mutually exclusive with WWAN

#### Monitor cable (optional)

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

#### Camera

- **Optional:** HD720p resolution, fixed focus

#### Audio support

- (models without camera are NOT available in EMEA)
- 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
- Fingerprint reader
- *Optional:* Touch style match on chip fingerprint reader on the palm rest

#### Ultranon™

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

#### Keyboard

- Intel vPro Technology
- Security chip
- Fingerpint reader
- *Optional:* Touch style match on chip fingerprint reader on the palm rest

#### Internal battery

- Front Li-Polymer 3-cell (23Wh) and rear Li-ion 3-cell (26Wh), both Integrated
- *Battery life varies significantly with settings, usage, & other factors

#### MobileMark® 2014:

- up to 10.5 hr

#### AC adapter

- 45W slim tip AC adapter, 45W or 65W USB Type-C AC adapter

#### Preload

- Windows® 7 Professional 64 preinstalled
- Some: Windows 10 Home 64
- Some: Windows 10 Pro 64
- Lenovo Companion
- Lenovo Setting
- Lenovo Support
- Microsoft Office preloaded
- produit a purchase a product key to activate

#### 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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**Lenovo**

**April 2019**
ThinkPad T480 Platform Specifications

Processor

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<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>4</td>
<td>8</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>
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or 8th Generation Intel Core i3 / i5 / i7 Processor

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<tr>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
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<td>Intel UHD Graphics 620</td>
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<td>DDR4-2133</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 (discrete graphics is available only on i7 models 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

Intel SoC (System on Chip) platform

Memory

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

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 4

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

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

Optane™ memory 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 +

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):

Integrated Mobile Broadband 4G LTE, Intel XMM™ 7626 (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 (optional)

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

Dimensions

WxDxH: 13.25" x 9.15" x 0.79"; 336.86mm x 232.5mm x 19.95mm

Models

24Wh or 24Wh + 24Wh / 48Wh, 72Wh, or 24Wh + 48Wh / 72Wh

Integrated Magnesium

3.49 lb / 1.6 kg

3.92 lb / 1.78 kg

Integrated PPS

3.63 lb / 1.6 kg

4.08 lb / 1.85 kg

Discrete Magnesium

3.53 lb / 1.6 kg

3.97 lb / 1.80 kg

Discrete PPS

3.68 lb / 1.67 kg

4.12 lb / 1.87 kg

Weight

Category

Black

Case material

Display cover: Magnesium Hybrid or PPS

Bottom: Glass-Fiber Reinforced Plastic

Smart card reader

Optional: Smart card reader

Media reader

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

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, 4-in-1 media reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole

Monitor cable

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

HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

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

Camera (optional)

One of the following, configurable by model:

Audio support

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

Keyboard

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

UltraNav™ pointing device and buttonless Mylar 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

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

NFC (optional)

Near Field Communication

Battery

Optional integrated Li-ion 24Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery

Max battery life

(MobileMark® 2014)

Models

24Wh / 48Wh / 72Wh

24Wh + 24Wh / 48Wh + 24Wh / 48Wh + 72Wh

Integrated model

7.2 hr / 14.4 hr / 21.8 hr

14.4 hr / 21.8 hr / 29.0 hr

Discrete model

6.6 hr / 13.2 hr / 19.8 hr

13.6 hr / 19.8 hr / 26.4 hr

AC adapter

45W or 65W USB Type-C AC adapter

Preload

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

Environment

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

Lenovo May 2019

Note: The specifications above may not be available in all regions.
### ThinkPad T480s Platform Specifications

#### 7th Generation Intel® Core™ i5 Processor

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<th># of Cores</th>
<th># of Threads</th>
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or 8th Generation Intel Core i5 / i7 Processor

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<tr>
<td>5-8250U</td>
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<td>1.6 GHz</td>
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<td>8MB</td>
<td>DDR4-2400</td>
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</tr>
</tbody>
</table>

#### Graphics

- 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)
- 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 three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

#### Chipset

Intel SoC (System on Chip) platform
- 4GB or 8GB memory soldered to systemboard; one DDR4 SO-DIMM socket
- * 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, 170° viewing angle, supports ThinkPad Privacy Guard on some models
- "Some": 14.0" (355mm) QHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° 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
  - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

#### Optane™ Memory

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:
- Wireless WAN upgradable
- 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
- SIM card (opt) Nano-SIM card slot, optional Verizon LTE (US) SIM card

#### Smart card reader

Optional: Smart card reader

#### Media reader

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

#### 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, 4-in-1 reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole

#### Monitor cable

- (optional)

#### Camera

One of the following, configurable by model:
- HD720p camera with ThinkShutter camera privacy, fixed focus
- 1080p HD camera and HD720p camera, fixed focus
- HD Audio, Realtek® ALC3287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack

#### Audio support

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

#### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Secure boot
- Secure boot
- vPro (optional)
- Intel vPro Technology
- Fingerprint reader
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

#### Battery

Integrated Li-ion 57Wh battery, supports Rapid Charge (0-80% in 60 mins) with 65W USB Type-C AC adapter

#### AC adapter

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
  - 3-year/1-yr battery depot repair service
  - 5-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 T490 Platform Specifications

### Processor

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<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
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</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

- Intel SoC (System on Chip) platform

### Memory

- 4GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0” IPS Anti-glare</td>
<td>FHD (1920x1080)</td>
<td>TN</td>
<td>220 nits</td>
<td>16.9</td>
<td>400:1</td>
<td>45% 90°</td>
</tr>
<tr>
<td>14.0” IPS Anti-glare</td>
<td>FHD (1920x1080) Low Power</td>
<td>TN</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72% 170°</td>
</tr>
<tr>
<td>14.0” IPS Anti-glare</td>
<td>FHD (2560x1440) ThinkPad Privacy Guard</td>
<td>IPS</td>
<td>500 nits</td>
<td>16.9</td>
<td>1500:1</td>
<td>100% 170°</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

### Optane™ memory

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

### Optical

- None

### Ethernet

- 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
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 4x4, M.2 card

### SIM card (optional)

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

### Case material

- Black

### Display cover

- 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)
- MobileMark® 2014: 16.11 hr
- * Battery life varies significantly with settings, usage, & other factors

### Preload

- 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™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

### Dimensions

- Weight: FHD - 3.41 lb / 1.55 kg; FHD Low Power / WQHD - 3.23 lb / 1.46 kg

### Case color

- Black

### 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

- 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)

- One of the following, configurable by model:

### Audio support

- 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

### Keyboard

- 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

- Security chip 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

### Note:

- The specifications above may not be available in all regions.

Lenovo
May 2019
### ThinkPad T490s 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>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</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>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>
<tr>
<td>i7-8655U</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>

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

Lenovo May 2019

### Graphics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPU</td>
<td>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)</td>
</tr>
</tbody>
</table>

### Chipset

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SoC (System on Chip) platform</td>
<td>8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to system board, no sockets</td>
</tr>
</tbody>
</table>

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

### Display

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>14.0&quot; FHD (1920x1080) / 14.0&quot; WQHD (2560x1440) / 14.0&quot; IPS Anti-glare (multi-touch)</td>
</tr>
<tr>
<td>Resolution</td>
<td>IPS Anti-glare</td>
</tr>
<tr>
<td>Type</td>
<td>IPS Anti-glare</td>
</tr>
<tr>
<td>Brightness</td>
<td>IPS Anti-glare</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>IPS Anti-glare</td>
</tr>
<tr>
<td>Contrast Ratio</td>
<td>IPS Anti-glare</td>
</tr>
<tr>
<td>Color Gamut</td>
<td>IPS Anti-glare</td>
</tr>
<tr>
<td>Viewing Angle</td>
<td>IPS Anti-glare</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
- None

### Optane® memory

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

### Ethernet

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Ethernet Connection</td>
<td>I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2</td>
</tr>
</tbody>
</table>

### WLAN + Bluetooth™ (optional)

- One of the following, configurable by model:
  - Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wireless-AX 22260, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)

- One of the following, configurable by model:
  - Wireless LAN 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

### SIM card (optional)

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

### Dimensions

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Models Black with FHD / Black with FHD Low Power / Privacy Guard Silver</td>
</tr>
<tr>
<td>Weight</td>
<td>Models Black with FHD / Black with FHD Low Power / Privacy Guard Silver</td>
</tr>
</tbody>
</table>

### Case color

- Black or Silver

### Case material

- Display cover: CFRP Hybrid (black) or Aluminum (silver);
  - Bottom: Magnesium

### Smart card reader

- Optional: Smart card reader

### Media reader

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>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</td>
</tr>
</tbody>
</table>

### Monitor cable (optional)

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

### Audio support

- HD Audio, Realtek ALC3287 codec / Dolby Audio Premium / dual array far-field microphone, headphone / microphone combo jack

### Keyboard

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

### Security

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

### 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

### Warranty

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

### Battery life

- 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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo USB-C to DisplayPort Adapter</td>
<td>Lenovo USB-C to DisplayPort Adapter</td>
</tr>
</tbody>
</table>

### Bundled Accy (optional)

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

### AC adapter

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

### Preload

- Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

### Battery life

- One of the following, configurable by model:
  - Battery life varies significantly with settings, usage, & other factors

### AC adapter

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

### Security

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

### Security chip

- Intel vPro Technology

### Warranty

- Near Field Communication

### Environment

- EPEAT® Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo May 2019
## ThinkPad T495 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 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>
</tr>
<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 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</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 / 4MB 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; supports external digital monitor via USB-C or HDMI; supports four independent displays; Max resolution: 1920x1080@60Hz (USBC); 4096x2160@60Hz (HDMI)

### Chipset

- AMD SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket

### 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”</td>
<td>HD (1366x768)</td>
<td>TN Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
</tr>
<tr>
<td>14.0”</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”</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>
</tbody>
</table>

### 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 2280 SSD / PCIe NVMe, PCIe 3.0 x 2
- 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 upgradable
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - Nano-SIM card slot, optional Verizon LTE (US) SIM card

### SIM card (opt)

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

---

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

Lenovo

May 2019
ThinkPad T495s Platform Specifications

Product Specifications Reference (PSREF)

Processor

- **AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics**
- **Processor Number**
- **# of Cores**
- **# of Threads**
- **Base Frequency**
- **Max Turbo Frequency**
- **Memory Controller**
- **Graphics**

- Ryzen 5 Pro 3500U
  - 4 cores
  - 8 threads
  - 2.1 GHz
  - 3.7 GHz
  - 2MB L2 / 4MB L3
  - DDR4-2400
  - Radeon Vega 8 Graphics

- Ryzen 7 Pro 3700U
  - 4 cores
  - 8 threads
  - 2.3 GHz
  - 4.0 GHz
  - 2MB L2 / 4MB L3
  - DDR4-2400
  - Radeon Vega 10 Graphics

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

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

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

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

Display

- **Size**: 14.0" FHD (1920x1080)
- **Resolution**: 1920 x 1080
- **Type**: IPS
- **Surface**: Anti-glare
- **Brightness**: 250 nits (non-touch), 300 nits (multi-touch)
- **Aspect Ratio**: 16:9
- **Contrast Ratio**: 700:1
- **Color Gamut**: 45%
- **Viewing Angle**: 170°

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)

- **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
- **Weight:**
  - 2.92 lb / 1.33 kg
  - 2.76 lb / 1.25 kg
  - 2.89 lb / 1.31 kg

Case color

- Black
- **Display cover:** CRFP Hybrid
- **Bottom:** Magnesium/Aluminum

Smart card reader

- Optional: Smart card reader
- MicroSD card reader

Media reader

- Ports
  - One of the following, configurable by model:
    - 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),
    - 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

- **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

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

Battery

- **Max battery life**
  - MobileMark® 2014: 16.4 hr
  - *Battery life varies significantly with settings, usage, & other factors
  - 45W or 65W USB Type-C AC adapter

AC adapter

- **Preload**
  - 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

Build quality

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

Environment

- **EPEAT™ Bronze; ENERGY STAR® 7.1; RoHS-compliant
  - Lenovo June 2019

Note: The specifications above may not be available in all regions.
## ThinkPad T580 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Type</th>
<th>Number</th>
<th>Cores</th>
<th>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>7th Generation Intel® Core™ i5 7300U</td>
<td>5-7300U</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>
<tr>
<td>8th Generation Intel® Core™ i5 / i7 Processor</td>
<td>6-8550U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>6MB</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 or Intel HD Graphics 620 in processor or NVIDIA® GeForce® MX150, 2GB GDDR5 memory.

### Memory

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

### Display

15.6" (396mm) 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.

### Optical

None.

### Ethernet

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

### WWAN (optional)

One of the following, configurable by model:
- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom L850-E), M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

### SIM card (optional)

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

### Glass-Fiber Reinforced Plastic

Lenovo May 2019
ThinkPad T590 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>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>5</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>5</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>7</td>
<td>8</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>
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<tr>
<td>7-8665U</td>
<td>7</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 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 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: 4960x2304@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)

**Chipset**

Intel SoC (System on Chip) platform

48GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket

*Installed memory is actually 2866MHz 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>15.6” FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>15.6” UHD</td>
<td>(3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

**Multi-touch (opt)**

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

**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)

**WLAN (optional)**

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

**Bluetooth (optional)**

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, 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**

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

**Weight**

FHD model: 3.87 lb / 1.75 kg; UHD model: 3.68 lb / 1.75 kg

**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, Realtek ALC3287 codec / microphone combo jack, dual array far-field microphone, headphone / microphone combo jack

**Security**

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

**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**

MobileMark® 2014: 14.98 hr (9.5 hr for UHD model with discrete graphics)

**AC adapter**

45W or 65W USB Type-C AC adapter

**Preload**

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™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo
June 2019
## ThinkPad X1 Carbon (5th Gen) Platform Specifications

<table>
<thead>
<tr>
<th>Processor 6th Generation Intel® Core™ i5 / i7 Processor (EMEA has only i5-6300U and i7-6600U)</th>
<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>6th Generation Intel® Core™ i5 / i7 Processor (EMEA has only i5-6300U and i7-6600U)</td>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>7th Generation Intel Core i5 / i7 Processor</td>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>or 7th Generation Intel Core i5 / i7 Processor</td>
<td>i5-7500U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i5-7600U</td>
<td>2</td>
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<td>2.6 GHz</td>
<td>3.6 GHz</td>
<td>4MB</td>
<td></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;
supports three independent displays;
Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

**Chipset**

Intel SoC (System on Chip) platform

**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. 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**

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
- Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS

**Bluetooth™**

Bluetooth 4.1, wireless, integrated in Wi-Fi + Bluetooth combo adapter

**WWAN (optional)**

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

**SIM card (optional)**

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

**Dimensions & Weight**

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

Starting at 2.49 lb / 1.13 kg

**Color**

Black or Silver (silver is NOT available in EMEA)

**Case material**

Display cover: CFRP/GFRP hybrid;
Bottom: magnesium alloy hybrid

**Smart card reader**

None

**Media reader**

MicroSD card reader, supports UHS-II microSD card

**Ports**

Two USB 3.1 Gen 1 (USB 3.0, 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

**WiGig dock (optional)**

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

**Monitor cable (optional)**

ThinkPad WiGig dock

**Audio support**

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

**Security**

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

Discrete TPM 2.0, TCG Certified

Intel vPro Technology

**Battery**

Integrated Li-Polymer 3-cell (57Wh) RapidCharge battery

**Battery life**

MobileMark® 2014: 15.5 hr

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

**AC adapter**

45W USB-C

RapidCharge

**Preload**

Windows®7 Professional 64 preinstalled, through downgrade rights in Windows 10 Pro 64

Some: Windows 10 Home 64

Some: Windows 10 Pro 64

Lenovo Companion

Lenovo Setting

ThinkVantage System Update

ThinkVantage Product Recovery

ThinkVantage System Update

Adobe®

Microsoft® Office preloaded:
- purchase a product key to activate
- McAfee® LiveSafe® (30-day trial)

**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

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>
</tr>
<tr>
<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>
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</tr>
<tr>
<td>7-8550U</td>
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<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></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></td>
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</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>i5-8300U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.5 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td></td>
</tr>
<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>7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
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<tr>
<td>7-8650U</td>
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<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
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</tr>
</tbody>
</table>

### 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: 5120x2880 at 60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

### Chipset

Intel SoC (System on Chip) platform

### Memory

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

* System clocks down for processors with lower memory controller

### 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

### 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)

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

### 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

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

### AC adapter

MobileMark® 2014: 19.3 hr

### Preload

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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**ThinkPad X1 Carbon (6th Gen) Platform Specifications**

**Product Specifications Reference (PSREF)**

Lenovo

April 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>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</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>4.6 GHz</td>
<td>8MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</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)

**Display**

- **Size**: 14.0”
- **Type**: IPS
- **Brightness**: 300 nits
- **Aspect Ratio**: 16:9
- **Color Gamut**: 72% 170°
- **Viewing Angle**: 72% 170°
- **Resolution**: FHD (1920x1080)
- **Anti-glare**: Multi-touch 10-finger gesture (FHD only), anti-reflection (AR), anti-smudge coating

**Chipset**

Intel SoC (System on Chip) platform

**Memory**

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

**Optane memory**

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**

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

**WWAN (optional)**

One of the following, configurable by model:
- 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

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

**SIM card (optional)**

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

**Smart card reader**

None

**Media reader**

None

**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, side docking connector, security keyhole

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

**Audio support**

- 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

**Keyboard**

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

**Touchpad**

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

**Security chip**

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

**Security chip (vPro optional)**

Intel vPro Technology

**Security chip (NFC optional)**

Touch style match on chip fingerprint reader on the palm rest

**Battery**

Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

Max battery life

MobileMark® 2014: 18.3 hr

**AC adapter**

45W or 65W USB Type-C AC adapter

**Preload**

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

**Environment**

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

**Dimensions**

WxDxH: 12.74” x 8.55” x 0.59”; 323.5mm x 217.1mm x 14.9mm

**Weight**

Starting at 2.4 lb / 1.09 kg

**Case color**

Black paint or black weave

**Case material**

Display cover: Carbon Fiber; Bottom: magnesium alloy
**ThinkPad X1 Extreme Platform Specifications**

**Product Specifications Reference (PSREF)**

<table>
<thead>
<tr>
<th>Processor 8th Generation Intel® Core™ i5 / i7 Processor</th>
<th>Graphics Intel UHD Graphics 630 in processor and NVIDIA® GeForce® GTX 1050 Ti Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5120x2880@30Hz (Thunderbolt), 4096x2160@60Hz (HDMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>Base Frequency</td>
</tr>
<tr>
<td>i5-8300H</td>
<td>2.3 GHz</td>
</tr>
<tr>
<td>i5-8400H</td>
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</tr>
<tr>
<td>i7-8750H</td>
<td>2.2 GHz</td>
</tr>
<tr>
<td>i7-8850H</td>
<td>2.6 GHz</td>
</tr>
</tbody>
</table>

**Chipset Memory**

<table>
<thead>
<tr>
<th>Memory</th>
<th>Mobile Intel CM246 Chipset</th>
</tr>
</thead>
</table>

**Display**

| 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)**

| Pen | Capacitive-type multi-touch, supports 10-finger gesture (4K only) |

**Storage**

| 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 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**

| WxDxH (non-touch): 14.24" x 9.67" x 0.72" | 361.8mm x 245.7mm x 18.4mm |
| WxDxH (multi-touch): 14.24" x 9.67" x 0.74" | 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: CFFRP/GFPR hybrid; Bottom: Aluminum alloy |

**Smart card reader**

| Optional: Smart card reader |

**Media reader**

| SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card |

**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 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole |

**Monitor cable (optional)**

| USB-C to DP; Lenovo USB-C to DisplayPort Adapter |

**Bundled Accy**

| Optional: ThinkPad Ethernet Extension Cable |

**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, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone |

**Keyboard**

| UltraNav™ 6-row, spill-resistant, multimedia Fn keys, LED backlight |

**Security**

| Security chip vPro Technology |

**Fingerprint reader**

| Touch style match on chip fingerprint reader on the keyboard bezel |

**Color calibration**

| None |

**NFC**

| None |

**Battery**

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

**Max battery life**

| (MobileMark 2014) 135W slim tip AC adapter |

**AC adapter**

| 10 Home 64 or Windows 10 Pro 64 |

**Preload**

| 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® 7.0; RoHS-compliant |

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

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April 2019
## Processor Specifications

### 6th Generation Intel® Core™ i3 / i5 / i7 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>Graphics</th>
<th>Processor Number</th>
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<tr>
<td>i3-6006U</td>
<td>2</td>
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<td>3MB</td>
<td>DDR4-2133</td>
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<tr>
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<tr>
<td>i5-6200U</td>
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<td>3MB</td>
<td>DDR4-2133</td>
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<td>i5-6300U</td>
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<td>i5-7200U</td>
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<td>4MB</td>
<td>DDR4-2133</td>
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<tr>
<td>i5-7300U</td>
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<td>3.5 GHz</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i7-6600U</td>
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### 7th Generation Intel® Core™ i3 / i5 / i7 Processor

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<thead>
<tr>
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<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Graphics</th>
<th>Processor Number</th>
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<td>DDR4-2133</td>
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<td>i7-7200U</td>
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<td>4MB</td>
<td>DDR4-2133</td>
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<tr>
<td>i5-7300U</td>
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<td>4MB</td>
<td>DDR4-2133</td>
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<td>i5-7700U</td>
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<tr>
<td>i7-7800U</td>
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<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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</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

- Intel SoC (System on Chip) platform
  - 16GB max / 2400MHz DDR4, one DDR4 SO-DIMM socket
  - *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, 500:1 contrast ratio
- Some: 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, IPS, 300 nits, 16.9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- 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 gestures (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)
- M.2 SSD / Pcie NVMe, PCIe 3.0 x 2, 16Gb/s
- 128GB M.2 SSD / Sata 6.0Gb/s, in WWAN slot as 2nd Storage, optionally
  - Internal battery
  - External battery
  - Max battery life
  - Battery life varies significantly with settings, usage, & other factors
  - 6.52 hr
  - 13.04 hr
  - 20.1 hr
  - 26.9 hr

### 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 (WiFi/Gig 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, Wi-Fi 2x2 802.11ac + BT4.1 (US only)
  - 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

### Bluetooth™

- * BT4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)

- One of the following, configurable by model (mutually exclusive with WiFi/Gig):
  - 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 L831-EAU) (EMEA only)

### SIM card (opt)

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

### Processor Details

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th>Frequency</th>
<th>Turbo Frequency</th>
<th>Cache</th>
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<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
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<tr>
<td>i5-6200U</td>
<td>2-4</td>
<td>2.3 GHz</td>
<td>3.8 GHz</td>
<td>3MB</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2-4</td>
<td>2.4 GHz</td>
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<tr>
<td>i7-6600U</td>
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<td>i7-7200U</td>
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<td>4-4</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
</tr>
</tbody>
</table>

### UltraNav™

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

### Security

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

### vPro (optional)

- Intel vPro Technology
- Intel Active Management Technology

### NFC (optional)

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

### Internal Battery

- Optional: Integrated Li-ion or Li-Polymer 3-cell (23Wh)
- Li-ion 3-cell (23Wh) or 6-cell (48Wh or 72Wh)

### External Battery

- Max battery life
- 6.52 hr
- 13.04 hr
- 20.1 hr
- 26.9 hr

### AC Adapter

- *Battery life varies significantly with settings, usage, & other factors
- 45W slim tip AC adapter or 45W USB Type-C AC adapter
- 3-year/1-yr battery limited onsite service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service
- 3-year/1-yr battery limited depot repair service

### Preload

- Windows® 7 Professional 64 preinstalled
- Some: Windows 10 Home 64
- Some: Windows 10 Pro 64
- Lenovo Solution Center
- Lenovo PowerEngage
- ThinkVantage System Update
- ThinkVantage Product Recovery
- ThinkVantage System Update
- Adobe® Reader®
- Microsoft® Office preloaded:
  - purchase a product key to activate
- McAfee® LiveSafe™ (30-day trial)

### 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

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Lenovo

April 2019
### ThinkPad X280 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>2.7 GHz</td>
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<td>Intel HD Graphics 620</td>
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<td>i5-7200U</td>
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<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>4</td>
<td>8</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>

**Chipset**

- Intel SoC (System on Chip) platform
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card

**Display**

- **Multi-touch (opt)**: On-cell touch, supports 10-finger gesture (FHD only)
- **Base Frequency**: 12.5” (317.5mm) HD (1366x768), anti-glare, LED backlight,
  220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- **Max Turbo Frequency**: 12.5” (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS,
  300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Storage**

- **Optane™ memory**:
  - None

**Optical**

- None

**Ethernet**

- Native Intel Ethernet Connection i219-V (Non-vPro) or i219-LM (vPro)
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card

**WLAN + Bluetooth™**

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

**WWAN (optional)**

- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7662 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

**SIM card (opt)**

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

**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: 4096x2160@30Hz (HDMI)

**Smart card reader**

- Optional: Smart card reader

**Media reader**

- MicroSD card reader, in the combo slot with nano-SIM card
  - 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, 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

**Audio support**

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

**Camera**

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

**Battery**

- Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

**Max battery life**

- 6.6 hr

**AC adapter**

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

**Preload**

- 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

**Misc 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>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>Graphics</th>
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<tbody>
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<td>8MB</td>
<td>DDR4-2400</td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics
- Intel UHD Graphics 620 in processor; supports external display monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304 @ 60Hz (Thunderbolt); 4096x2160 @ 24Hz (HDMI)

#### Memory
- 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
- **13.3” HD (1366x768)**
  - TN Anti-glare
  - 250 nits
  - 16:9 Aspect Ratio
  - 500:1 Contrast Ratio
  - 45% Color Gamut
  - 90° Viewing Angle
- **13.3” FHD (1920x1080)**
  - IPS Anti-glare
  - 300 nits
  - 16:9 Aspect Ratio
  - 800:1 Contrast Ratio
  - 72% Color Gamut
  - 170° Viewing Angle
- **13.3” FHD (1920x1080)**
  - ThinkPad Privacy Guard
  - IPS Anti-glare
  - 400 nits
  - 16:9 Aspect Ratio
  - 1000:1 Contrast Ratio
  - 72% Color Gamut
  - 178° Viewing Angle

#### Storage
- M.2 2280 SSD / PPC 3.0 x 4
- M.2 0242 SSD / PPC 3.0 x 2

#### Optane™ Memory
- Optional Intel Optane memory, PPC 3.0 x 2

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

#### WLAN (optional)
- One of the following, configurable by model:
  - Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wireless-AX 22260, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

#### Bluetooth™
- 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

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

#### Chipset
- One of the following, configurable by model:
  - 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, 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

#### Optical Drive
- Optional: Intel Optane memory, PPC NVMe, PCIe 3.0 x 2

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

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

#### Security Chip
- Discrete TPM 2.0, TCG Certified

#### Security
- Intel vPro Technology

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

#### Camera
- Intel RealSense™ D405

#### Security Chip
- Discrete TPM 2.0, TCG Certified

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

#### NFC (optional)
- None

#### Display Port
- One of the following, configurable by model:
  - USB-C to DisplayPort: Lenovo USB-C to DisplayPort Adapter
  - USB-C to VGA: Lenovo USB-C to VGA Adapter
  - USB-C to DP: Lenovo USB-C to DisplayPort Adapter

#### Bundled Accy
- Optional: ThinkPad Ethernet Extension Adapter Gen 2

#### Media Reader
- MicroSD card reader, in the combo slot with nano-SIM card slot

#### Ports
- One of the following, configurable by model:
  - 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, 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: USB-C to DisplayPort: Lenovo USB-C to DisplayPort Adapter

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

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

#### Environment
- EPEAT® Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo
June 2019
ThinkPad X395 Platform Specifications

Product Specifications Reference (PSREF)

Processor

<table>
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<th>Processor Number</th>
<th>Core(s)</th>
<th>Thread(s)</th>
<th>Base Frequency</th>
<th>Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Graphics</th>
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<td>Radeon Vega 6 Graphics</td>
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<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
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<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 / 4MB 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; 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 system board, no sockets

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>13.3&quot;</td>
<td>HD (1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>300:1</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)</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 (opt)

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

Storage

M.2 2280 SSD / SATA 6.0Gb/s

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)

Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0

Built-in Bluetooth

Integrated 802.11ax + Bluetooth 5.0

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

Smart card reader

Optional: Smart card reader

Media reader

One USB 3.1 Type-C, one USB 3.1 Gen 2, two USB 3.1 Type-C, two USB 3.1 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, head phone / microphone combo jack, optional smart card reader, side docking connector, security keyhole

Monitor cable (optional)

Bundled Accy

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

Keyboard

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

Audio support

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

Security

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

Security chip

DASH Management

Fingerprint reader

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

FAN

None

Battery

Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

Max battery life

MobileMark® 2014: 14.5 hr

AC adapter

45W or 65W USB Type-C AC adapter

Preload

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

Environment

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

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

Lenovo

June 2019
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Included software: may differ from its retail version (if available), and may not include user manuals or all program functionality. Software license agreements may apply.

Battery life: Battery life (and recharge times) will vary based on many factors including screen brightness, applications, features, power management, battery conditioning, and other customer preferences.


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