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Legal Information | 105 |
Summary of Changes

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

August 7, 2019 - Version 546

Additions in this update

► New product(s)
  ThinkPad P43s announced July 2019
  ThinkPad P53 announced July 2019

► Others
  None

Withdrawals in this update

► Withdrawn product(s)
  None
<table>
<thead>
<tr>
<th>Processor</th>
<th>7th Generation Intel® Core™ m / i5 Processor, Intel Celeron® processor, or Intel Pentium® Silver processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>m3-7Y30</td>
<td>2</td>
</tr>
<tr>
<td>i5-7Y54</td>
<td>2</td>
</tr>
<tr>
<td>Celeron N4100</td>
<td>4</td>
</tr>
<tr>
<td>Pentium Silver N5000</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graphics</th>
<th>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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset Memory</td>
<td>Intel SoC (System on Chip) platform 4GB or 8GB / 1866MHz LPDDR3 or 2400MHz DDR4 / soldered to systemboard, no sockets</td>
</tr>
</tbody>
</table>

| 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 |

| 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) |

| WWAN | None |

| Dimensions | WxDxH: 11.81" x 8.27" x 0.86"; 300mm x 210mm x 21.9mm |
| Weight | Starting at 2.99 lb (1.36 kg) |
| Case color | Black |
| Case material | Display cover: PC/ABS+GF; Bottom: PC/ABS plastic |
| Media reader | MicroSD card reader |
| Ports | Two USB 3.1 Gen 1, one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole |

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

| Camera | HD720p camera, fixed focus |
| Audio support | HD Audio, Realtek® ALC3287 codec, stereo speakers, 2W x 2, Dolby® Audio™, monaural digital microphone, combo audio/microphone jack |
| Keyboard | 6-row, spill-resistant, multimedia Fn keys |
| Touchpad | Buttonless Mylar surface touchpad below keyboard, multi-touch |
| Security | Power-on password, supervisor password, security keyhole |
| Security chip | Discrete TPM 2.0, TCG Certified |
| Fingerprint reader None |
| NFC | None |

| Battery | Integrated Li-ion 42Wh battery |
| Max battery life | MobileMark® 2014: 13.9 hr |

* 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® 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™ 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 Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRO A10-8730B</td>
<td>4</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.3 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R5 Graphics</td>
</tr>
<tr>
<td>PRO A12-8830B</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon R7 Graphics</td>
</tr>
<tr>
<td>PRO A10-9700B</td>
<td>2</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 A12-9800B</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon R7 Graphics</td>
</tr>
</tbody>
</table>

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

**Graphics**

AMD Radeon R5 or R7 Graphics in processor only; supports external 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® RTL8111EPV Gigabit Ethernet connection

**WLAN**

RealtekRTL8822BE, Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card

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

**WWAN (optional)**

One of the following, configurable by model:

- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)
- For non-WWAN model, it means the model is NOT WWAN upgradable

**SIM card (optional)**

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

**Dimensions & Weight**

<table>
<thead>
<tr>
<th>Models</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>No + 3-cell</td>
<td>2.79 lb</td>
</tr>
<tr>
<td>3-cell + 3-cell</td>
<td>2.98 lb</td>
</tr>
<tr>
<td>3 + 6-cell</td>
<td>3.33 lb</td>
</tr>
</tbody>
</table>

**Case color**

Black

**Case material**

Glass-Fiber Reinforced Plastic

**Camera (optional)**

HD720p resolution, fixed focus

**Audio support**

HD Audio, Realtek ALC3268 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone 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

dTPM 1.2: discrete TPM 1.2, TCG Certified
dTPM 2.0: discrete TPM 2.0, TCG Certified

**Fingerprint reader**

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

**Internal battery**

Integrated Li-ion or Li-Polymer 3-cell (23Wh)

**External battery**

Li-ion 3-cell (23Wh) or 6-cell (48Wh)

**Max battery life**

<table>
<thead>
<tr>
<th>Models</th>
<th>Max battery life</th>
</tr>
</thead>
<tbody>
<tr>
<td>No + 3-cell</td>
<td>5.05 hr</td>
</tr>
<tr>
<td>3-cell + 3-cell</td>
<td>10.1 hr</td>
</tr>
<tr>
<td>3-cell + 6-cell 48Wh</td>
<td>15.6 hr</td>
</tr>
</tbody>
</table>

**AC adapter**

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

**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 Product Recovery

ThinkVantage System Update

Adobe® Reader

Microsoft® Office preloaded:

dTPM 1.2:

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

Microsoft Office preloaded:

dTPM 1.2:

purchase a product key to activate

McAfee LiveSafe™ (30-day trial)

Lenovo Companion

Lenovo Setting

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-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

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

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

Lenovo
April 2019
## ThinkPad A285 Platform Specifications

### Processor

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

### Graphics

AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports four independent displays:

- Max resolution: 5120x2880 at 60Hz (USB Type-C); 4096x2160 at 60Hz (HDMI)

### Chipset Memory

AMD SoC (System on Chip) platform

- 8GB or 16GB / 2400MHz DDR4, soldered to systemboard, no sockets

### Display

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

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

### Storage

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

### Optical

- None

### Ethernet

Gigabit Ethernet connection

via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

### WLAN

Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card

### Bluetooth™

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"; 307.7mm x 208.8mm x 17.4mm

WxDxH (FHD non-touch):
12.11" x 8.26" x 0.70"; 307.7mm x 209.8mm x 17.8mm

### Weight

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

### Case color

Black

### Case material

- Display cover: Carbon Fiber (FHD non-touch model) or PPS (HD & FHD multi-touch model)
- Bottom: Magnesium/Aluminum

Note: The specifications above may not be available in all regions.
## 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>
</tr>
</thead>
<tbody>
<tr>
<td>PRO A10-8730B</td>
<td>4</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.3 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon™ R5 Graphics</td>
</tr>
<tr>
<td>PRO A12-8830B</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon R7 Graphics</td>
</tr>
<tr>
<td>PRO A10-9700B</td>
<td>4</td>
<td>4</td>
<td>2.5 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>4</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>2MB</td>
<td>DDR4-1866</td>
<td>AMD Radeon R7 Graphics</td>
</tr>
</tbody>
</table>

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

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

### Memory
- 32GB max / 1866MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display
- 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: 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

### Optical Drive
- None

### Ethernet
- Realtek® RTL8111EPV Gigabit Ethernet connection

### WLAN
- Realtek RTL8822BE, Wi-Fi 2xx 802.11ac + BT 4.1, 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)

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

### Dimensions/Weight
<table>
<thead>
<tr>
<th>Models</th>
<th>WxDxH: 13.25&quot; x 9.15&quot; x 0.79&quot;; 336.6mm x 232.5mm x 19.95mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium</td>
<td>3.65 lb / 1.65 kg, 4.35 lb / 1.85 kg</td>
</tr>
<tr>
<td>PPS</td>
<td>3.65 lb / 1.65 kg, 4.35 lb / 1.85 kg</td>
</tr>
</tbody>
</table>

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

### Camera (optional)
- HD720p resolution, fixed focus

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

### Smart card reader
- Optional: Smart card reader

### Media reader
- 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I
- Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), Dock connector

### Monitor cable
- UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad

### Security
- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: dTPM 1.2: discrete TPM 1.2, TCG Certified, dTPM 2.0: discrete TPM 2.0, TCG Certified

### Security chip
- dTPM 1.2: discrete TPM 1.2, TCG Certified
- dTPM 2.0: discrete TPM 2.0, TCG Certified

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

### NFC
- None

### Internal battery
- Optional: Integrated Li-Polymer 3-cell (24Wh)

### External battery
- Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh)

### Max battery life (MobileMark® 2014)
- Models: 3-cell 3 + 3-cell 6-cell 48Wh 3 + 6-cell 48Wh
- Max battery life: 5.13 hr 10.26 hr 10.26 hr 15.4 hr

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

### Preload
- Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 through downgrade rights in Windows 10
- Lenovo Solution Center
- Lenovo PowerManage
- ThinkVantage System Update
- ThinkVantage Product Recovery
- McAfee® LiveSafe™ (30-day trial)

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

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

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

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

Lenovo
April 2019
<table>
<thead>
<tr>
<th>Processor</th>
<th>AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>Ryzen 3 PRO 2300U</td>
<td>4</td>
</tr>
<tr>
<td>Ryzen 5 PRO 2500U</td>
<td>8</td>
</tr>
<tr>
<td>Ryzen 7 PRO 2700U</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graphics</th>
<th>AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor only; supports external display via HDMI or USB Type-C; supports four independent displays; Max resolution: 5120x2880@60Hz (USB Type-C); 4906x2160@60Hz (HDMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset Memory</td>
<td>AMD SoC (System on Chip) platform; 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
</tr>
<tr>
<td>Display</td>
<td>Some: 14.0&quot; (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio; Some: 14.0&quot; (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle</td>
</tr>
<tr>
<td>Multi-touch (opt)</td>
<td>On-cell touch, supports 10-finger gesture (FHD only)</td>
</tr>
<tr>
<td>Storage</td>
<td>System has one HDD slot or one M.2 2280 slot exclusively for storage; Some: SSD / SATA 6.0Gb/s, 2.5&quot; wide, 7mm high, Active Protection System™; 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</td>
</tr>
<tr>
<td>Optical</td>
<td>* Installed M.2 SSD is PCIe 3.0 x 4 but runs at PCIe 3.0 x 2 due to M.2 SSD adapter limitation</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Realtek® RTL8111GUL Gigabit Ethernet connection</td>
</tr>
<tr>
<td>WLAN Bluetooth™</td>
<td>Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</td>
</tr>
<tr>
<td>WWAN (optional)</td>
<td>Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card</td>
</tr>
<tr>
<td>SIM card (opt)</td>
<td>Nano-SIM card slot, optional Verizon LTE (US) SIM card</td>
</tr>
<tr>
<td>Dimensions Weight</td>
<td>WxDxH: 13.25&quot; x 9.15&quot; x 0.79&quot;, 336.6mm x 232.5mm x 19.95mm</td>
</tr>
<tr>
<td>Models</td>
<td>24Wh or 24Wh + 24Wh, 48Wh, 72Wh, or 24Wh + 48Wh / 24Wh + 72Wh</td>
</tr>
<tr>
<td>Magnesium</td>
<td>3.49 lb / 1.58 kg</td>
</tr>
<tr>
<td>PPS</td>
<td>3.63 lb / 1.65 kg</td>
</tr>
<tr>
<td>Optional: Touch style match on chip fingerprint reader on the keyboard bezel NFC</td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td>Integrated Li-ion 24Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery</td>
</tr>
<tr>
<td>Max battery life (MobileMark® 2014)</td>
<td>Max battery life: 5.37 hr, 10.76 hr, 16.4 hr, 10.76 hr, 16.4 hr, 22.15 hr</td>
</tr>
<tr>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>Preload</td>
<td>Windows® 10 Home 64 or Windows 10 Pro 64</td>
</tr>
<tr>
<td>Limited warranty</td>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>- 1-year depot repair service</td>
<td></td>
</tr>
<tr>
<td>- 3-year/1-year battery depot repair service</td>
<td></td>
</tr>
<tr>
<td>- 3-year/1-year battery limited onsite service</td>
<td></td>
</tr>
<tr>
<td>MIL-Spec test</td>
<td>MIL-STD-810G military testing</td>
</tr>
<tr>
<td>Environment</td>
<td>EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Processor</th>
<th>7th Generation Intel® Core™ i3 / i5 Processor (i3-7130U is NOT available in US and EMEA) or 8th Generation Intel Core i3 / i5 / i7 Processor</th>
<th>Dimensions</th>
<th>Aluminum (WxDxH): 12.96&quot; x 9.53&quot; x 0.78&quot;</th>
<th>329mm x 242mm x 19.9mm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td><strong># of Cores</strong></td>
<td><strong># of Threads</strong></td>
<td><strong>Base Frequency</strong></td>
<td><strong>Max Turbo Frequency</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graphics</th>
<th>Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB DDR5 memory, supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @ 60Hz</th>
<th>Camera</th>
<th>HD720p camera, fixed focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chipset + Memory</td>
<td>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</td>
<td>Audio support</td>
<td>HD Audio, Synaptic® CX11852 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack</td>
</tr>
<tr>
<td>Display</td>
<td>Some: 14.0&quot; (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio  Some: 14.0&quot; (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio</td>
<td>Security</td>
<td>Power-on password, hard disk password, supervisor password, security keyhole Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified</td>
</tr>
<tr>
<td>Multi-touch</td>
<td>None</td>
<td>Security chip (opt)</td>
<td>None</td>
</tr>
<tr>
<td>Storage</td>
<td>Up to 2 drives (one M.2 SSD and one HDD)  Some: HDD / SATA 6.0Gb/s, 2.5&quot; wide, removable, upgradable, Active Protection System™  Some: M.2 SSD / PCIe NVMe</td>
<td>Preload (optional) Windows® 10 Home 64 or Windows 10 Pro 64</td>
<td></td>
</tr>
<tr>
<td>Optane™ memory</td>
<td>Optional: Intel Optane memory, PCIe NVMe, PCle 3.0 x 2</td>
<td>Battery</td>
<td>Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>Optical</td>
<td>None</td>
<td>Max battery life</td>
<td>MobileMark® 2014: 13.51 hr</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Gigabit Ethernet Connection, Realtek® 88111GUS</td>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>WLAN + Bluetooth™</td>
<td>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</td>
<td>Limited warranty</td>
<td>1-year depot repair service</td>
</tr>
<tr>
<td>WWAN</td>
<td>None</td>
<td>Mil-Spec test</td>
<td>MIL-STD-810G military testing</td>
</tr>
<tr>
<td>SIM card</td>
<td>None</td>
<td>Environment</td>
<td>EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</td>
</tr>
</tbody>
</table>

Note: The specifications above may not be available in all regions.
## ThinkPad E485 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 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>4</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

<table>
<thead>
<tr>
<th>AMD SoC (System on Chip) platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
</tr>
</tbody>
</table>

### Memory

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

### Display

- **Max resolution**: 1920x1080 (HDMI) 60Hz
- **Multi-touch**: Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16.9 aspect ratio, 400:1 contrast ratio
  - Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16.9 aspect ratio, 400:1 contrast ratio

### Storage

- **Up to 2 drives (one M.2 SSD and one HDD)**
- **Optical**: Some: M.2 SSD / PCIe NVMe
  - None

### Optical

- **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
  - None

### WWAN

- **SIM card**: None

### Dimensions

- **Aluminum (Wx Dx H)**: 12.96" x 9.53" x 0.78", 329mm x 242mm x 19.9mm
- **Weight**: Starting at 3.87 lb / 1.75kg
- **PC/ABS (Wx Dx H)**: 12.96" x 9.53" x 0.86", 329mm x 242mm x 21.9mm

### Case color

- **Black

### Case material

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

### Smart card reader

- **None

### Media reader

- **Smart card reader**: None
- **Media reader**: None

### Ports

- **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

### Security

- **Security chip**: Discrete TPM 2.0, TCG Certified
- **Security chip**: None
- **Fingerprint reader**: None
- **NFC**: None
- **Battery**: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- **Max battery life**: MobileMark® 2014: 9.37 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
- **Mi-Spec test**: None

### Camera

- **Camera**: HD720p camera, fixed focus

### Audio support

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

### Keyboard

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

### Security

- **Security**: Power-on password, hard disk password, supervisor password, security keyhole
- **Security**: None
- **Security chip**: None
- **Security chip**: None

### Battery

- **Max battery life**: MobileMark® 2014: 9.37 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
- **Mi-Spec test**: None

### Hardware

- **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>1.6 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-24000</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>4.1 GHz</td>
<td>6MB</td>
<td>DDR4-24000</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>6MB</td>
<td>DDR4-24000</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- 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” 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>
<tr>
<td>14.0” HD (1366x768)</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>
</tbody>
</table>

### Storage

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

### Networking

- Gigabit Ethernet Connection, Realtek 8111GUS
- 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

### Audio

- Stereo speakers, 1.5W x 2, Dolby/® Advanced Audio / dual array microphone, headphone / microphone combo jack
- HD Audio, Synaptic® CX11880 codec / microSD card reader
- None

### Power

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 13 hr

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Integrated model: discrete TPM 2.0, TCG Certified
  - Discrete model: firmware TPM 2.0 integrated in chipset
- System Mgt: None
- Fingerprint reader: Optional: Touch style fingerprint reader on the palm rest
- NFC: None
- Battery: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 13 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™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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

**Processor**

8th Generation Intel® Core™ i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</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>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 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

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

**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**

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

**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**

None

**SIM card**

None

**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**

None

**Battery**

Integrated Li-ion 42Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

**Max battery life**

MobileMark® 2014: 11.5 hr

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

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

Lenovo July 2019
## ThinkPad E495 Platform Specifications

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 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 Memory**
- AMD SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

**Display**
- Size / Resolution: 14.0" HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch
- 14.0" FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch
- Multi-touch: None

**Storage**
- Up to two drives (one M.2 SSD and one HDD)
  - HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
  - M.2 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**
- 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 / 1.75 kg

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

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

**Security chip**
- Fingerprint reader: 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

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

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

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

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Note: The specifications above may not be available in all regions.
ThinkPad E580 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>i3-7020U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i3-7130U</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>i5-7260U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

8th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

Optical memory

Optane™

Storage

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

Optane™ memory

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

Optical

None

Ethernet

Gigabit Ethernet Connection, Realtek R8111GUS

Environment

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

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

Lenovo
June 2019
## ThinkPad E585 Platform Specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 2200U</td>
<td>WxDxH: 14.53&quot; x 9.92&quot; x 0.79&quot;</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>
<td>2MB L2 / 4MB L3</td>
<td></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>Radeon Vega 8 Graphics</td>
<td>2MB L2 / 4MB L3</td>
<td>Radeon RX Vega 10 Graphics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ryzen 7 2700U</td>
<td>4</td>
<td>8</td>
<td>2.2 GHz</td>
<td>3.8 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>Radeon RX Vega 10 Graphics</td>
<td>2MB L2 / 4MB L3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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
- 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
- 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

### Security
- Security chip
- Security chip
- Security chip
- None

### Battery
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 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
- None

### 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>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 or AMD Radeon RX 550X Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 4096x2304@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

### Display
- 15.6" HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 Non-touch
- 15.6" FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch

### Storage
- Up to two drives (one M.2 SSD and one HDD):
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

### Optane™ memory
- Optional: 16GB Optane Memory, PCIe NVMe, PCIe 3.0 x 2

### Ethernet
- Gigabit Ethernet Connection, Realtek 8111GUS

### 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

### Security
- Security chip (Integrated model): discrete TPM 2.0, TCG Certified
- System Mgt: firmware TPM 2.0 integrated in chipset
- Fingerprint reader: Optional: Touch style fingerprint reader on the palm rest

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

### Security chip
- Security chip (Integrated model): discrete TPM 2.0, TCG Certified
- System Mgt: firmware TPM 2.0 integrated in chipset
- 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

### 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

### Lenovospecifications
- MII Spec test: MIL-STD-810G military testing
- Environment: EPEAT Silver, ENERGY STAR® 7.1; RoHS-compliant

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

#### Processor
<table>
<thead>
<tr>
<th>Number</th>
<th>Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 3200U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>1MB L2/4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 3 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2/4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>8</td>
<td>16</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
<table>
<thead>
<tr>
<th>Size / Resolution</th>
<th>15.6&quot; HD (1366x768)</th>
<th>15.6&quot; FHD (1920x1080)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brightness / Anti-glare</td>
<td>Anti-glare</td>
<td>Anti-glare</td>
</tr>
<tr>
<td>Brightness / Brightness</td>
<td>220 nits</td>
<td>250 nits</td>
</tr>
<tr>
<td>Brightness / Brightness</td>
<td>16:9</td>
<td>16:9</td>
</tr>
<tr>
<td>Brightness / Brightness</td>
<td>400:1</td>
<td>600:1</td>
</tr>
<tr>
<td>Brightness / Brightness</td>
<td>90°</td>
<td>170°</td>
</tr>
<tr>
<td>Brightness / Brightness</td>
<td>Non-touch</td>
<td>Non-touch</td>
</tr>
</tbody>
</table>

#### Multi-touch
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

#### 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
Gigabit Ethernet Connection, Realtek R8111GUS

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

#### WLAN + Bluetooth™

#### WWAN
None

#### SIM card
None

#### Camera
HD720p camera, fixed focus
HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

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

#### Fingerprint reader
None

#### Security chip
None

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

#### Preload
Windows® 10 Home 64 or Windows 10 Pro 64

#### Warranty
1-year depot repair service

### Additional Information
- Dimensions: WxDxH: 14.53" x 9.92" x 0.78"; Weight: Starting at 4.7 lb / 2.1kg
- Case color: Black; Case material: Display cover: Aluminum; Bottom: PC/ABS plastic
- 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
- Display: 6-row, spill-resistant, multimedia Fn keys
- Multi-touch: 6-row, spill-resistant, multimedia Fn keys
- Security: Power-on password, hard disk password, supervisor password, security keyhole
- Fingerprint reader: None
- Battery: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Preload: Windows® 10 Home 64 or Windows 10 Pro 64
- Warranty: 1-year depot repair service

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

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 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>i3-7130U</td>
<td>4</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>4</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>
</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
- Memory: 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

### Multi-touch (opt)

- on-cell touch, supports 10-finger gestures

### Storage

- Options: 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)

### WLAN + Bluetooth

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

### WWAN

- None

### SIM card

- None

---

### Note:

The specifications above may not be available in all regions.

---

### 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>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>8MB</td>
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<td>i5-8365U</td>
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<td>4.1 GHz</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
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<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- **Size**: 13.3" HD (1366x768), 13.3" FHD (1920x1080)Anti-glare Anti-glare
- **Type**: Anti-glare IPS
- **Brightness**: 250 nits
- **Aspect Ratio**: 16:9
- **Contrast Ratio**: 700:1 (non-touch) 800:1 (multi-touch)
- **Viewing Angle**: 170°
- **Multi-touch (opt)**: On-cell touch, supports 10-finger gesture (FHD only)

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

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

### WWAN

- None

### SIM card

- None

### Dimensions

- Width: 12.67" x 8.83" x 0.74"; 321.8mm x 224.2mm x 18.8mm
- Weight: Starting at 3.22 lb / 1.46 kg

### Case color

- Black or Silver

### Case material

- Display cover: Aluminum
- Bottom: GFRP

### Accessories

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

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology
- 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: 14.61 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
  - 3-year/1-yr battery limited onsite service

### Mil-Spec test

- MIL-STD-810G military testing

### Limited warranty

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

### Limited warranty

- MobileMark® 2014: 14.61 hr
- Battery life varies significantly with settings, usage, & other factors

### Environmental

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

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

Lenovo
July 2019
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>3-6006U</td>
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<td>3MB</td>
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<td>Intel HD Graphics 610</td>
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<tr>
<td>5-6200U</td>
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<td>5-6300U</td>
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<td>3.0 GHz</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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</table>

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

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

* i7 processor is NOT available in EMEA

### Graphics

- Intel HD Graphics 610 or 620 in processor only, or Intel HD Graphics 620 in processor and AMD Radeon™ R5 M430, 2GB memory; supports external analog monitor via VGA and digital monitor via Mini DisplayPort; supports three independent displays; Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)

### Chipset

- Intel SoC (System on Chip) platform
- 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, 500:1 contrast ratio, 170° viewing angle
- 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

- None

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - 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
  - * Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS

### Bluetooth

- 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

### Weight

<table>
<thead>
<tr>
<th>Models</th>
<th>3-cell</th>
<th>6-cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated model</td>
<td>4.13 lb / 1.87 kg</td>
<td>4.45 lb / 2.02 kg</td>
</tr>
<tr>
<td>Discrete model</td>
<td>4.16 lb / 1.89 kg</td>
<td>4.48 lb / 2.03 kg</td>
</tr>
</tbody>
</table>

### Dimensions

- **WXxDYxH:** 13.35" x 9.25" x 0.94"; 339mm x 235mm x 23.9mm

### Battery

- Li-ion 3-cell (24Wh) or 6-cell (48Wh or 72Wh)

### Preload

- **Some:** Windows 10 Pro 64
- **Some:** Lenovo Solution Center
- **Some:** Lenovo PowerEngage
- **Some:** ThinkVantage System Update
- **Some:** Adobe® Reader®
- **Some:** Microsoft® Office preloaded;
- **Some:** purchase a product key to activate
- **Some:** McAfee® LiveSafe® (30-day trial)

### 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 limited onsite service

### MIL-Spec test

- MIL-STD-810G military testing

### Environment

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

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

Lenovo September 2018
## ThinkPad L480 Platform Specifications

<table>
<thead>
<tr>
<th>Processor</th>
<th>7th Generation Intel® Core™ i3 / i5 Processor or</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>3-7130U</td>
<td>2</td>
</tr>
<tr>
<td>5-7200U</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8th Generation Intel Core i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
</tr>
<tr>
<td>3-8130U</td>
</tr>
<tr>
<td>5-8520U</td>
</tr>
<tr>
<td>7-8550U</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 in processor and AMD Radeon 530, 2GB DDR5 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 |

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

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

| 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 |

| 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: |

| WWAN (optional) | One of the following, configurable by model: |

<table>
<thead>
<tr>
<th>Chipset</th>
<th>Intel 7th Generation Intel® Core™ or Processor or Processor Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-7130U</td>
<td>2</td>
</tr>
<tr>
<td>5-7200U</td>
<td>4</td>
</tr>
</tbody>
</table>

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

### Note:
The specifications above may not be available in all regions.
## ThinkPad L490 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>
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<td>2</td>
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<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 610</td>
</tr>
<tr>
<td>3-8145U</td>
<td>4</td>
<td>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>5-8265U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
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<td>7-8665U</td>
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<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graphics
- Intel UHD Graphics 610 or 620 in processor 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>14.0” HD</td>
<td>(1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>45% / 90°</td>
<td>45% / 170°</td>
<td></td>
</tr>
<tr>
<td>14.0” FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700 / 170°</td>
<td>45% / 170°</td>
<td></td>
</tr>
</tbody>
</table>

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

### Storage
- HDD / SATA 6 GB/s; 2.5" wide, 7mm high, Active Protection System.
- SSD / SATA 6 GB/s; 2.5" wide, 7mm high.
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4.
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2.
- Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation.

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

### Optical
- Non-vPro model: Intel Ethernet Connection 21x9-V (Jacksonville)
- vPro model: Intel Ethernet Connection 219-LM (Jacksonville)

### WLNA + Bluetooth (opt)
- One of the following, configurable by model:
  - RealtekRTL8822BE, 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 Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0.

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

### SIM card
- None.

### Note:
The specifications above may not be available in all regions.
### ThinkPad 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>Graphics</th>
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</thead>
<tbody>
<tr>
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<td>Intel HD Graphics 520</td>
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<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>5-6200U</td>
<td>2</td>
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<td>2.3 GHz</td>
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<td>4</td>
<td>2.4 GHz</td>
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<td>3MB</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
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</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
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<th>Max Turbo Frequency</th>
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<tr>
<td>Cel 3965U</td>
<td>1</td>
<td>2</td>
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<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
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<td>2.4 GHz</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
</tbody>
</table>

* "i7" processor is NOT available in EMEA

#### 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-EMEA), M.2 card (EMEA only)

#### SIM card (optional)

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

#### Dimensions

- WxDxH: 14.84” x 10.04” x 1.44”
- Weight: Starting at 5.25 lb / 2.38 kg

#### Case color

- Black

#### Case material

- PC/ABS plastic

#### Graphics

- Intel HD Graphics 520, 610, or 620 in processor only; supports external analog monitor via VGA and digital monitor via Mini DisplayPort

#### Chipset

- Intel SoC (System on Chip) platform

#### Memory

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

#### Display

- Some: 15.6” (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 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™ (APM), MS2 SSD, PCle NVMe, 3.0 x 2, 16GB/s
- Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

#### Optical (optional)

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

#### Ethernet

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

#### WLAN

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

#### Bluetooth™

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

#### Keyboard

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

#### Security

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

#### Security chip

- Discrete TPM 2.0, TCG Certified

#### Security

- Intel vPro Technology

#### Fingerprint reader

- Optional: Swipe style fingerprint reader on the palm rest

#### NFC

- None

#### Battery

- 6-cell (48Wh)

#### Max battery life

- MobileMark®: 14.8 hr

#### AC adapter

- 45W slim tip AC adapter

#### Preload

- Windows™ 7 Professional 64 preinstalled
- Some: Windows 10 Home 64
- Some: Windows 10 Pro 64
- Lenovo Companion
- Lenovo Setting
- 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
  - 3-year/1-yr battery limited onsite service

#### Mil-Spec test

- MIL-STD-810G military testing

#### Environment

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

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

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**Lenovo** September 2018
ThinkPad L580 Platform Specifications

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>2</td>
<td>2.27 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>i3-7130U</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>
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<tr>
<td>i5-7200U</td>
<td>4</td>
<td>8</td>
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<td>Intel HD Graphics 620</td>
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<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>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

8th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8310U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</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>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

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

Chipset Memory Intel SoC (System on Chip) platform

Chipset MEMORY

Display

<table>
<thead>
<tr>
<th>Multi-touch</th>
<th>None</th>
</tr>
</thead>
</table>

Storage

| Storage | None |

Option™ memory

Optical

Ethernet

WLAN + Bluetooth™ (optional)

One of the following, configurable by model:

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

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

<table>
<thead>
<tr>
<th>Number</th>
<th>Core</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>4305U</td>
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<td>2</td>
<td>2.2 GHz</td>
<td>4MB</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 610</td>
</tr>
<tr>
<td>8145U</td>
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<td>4</td>
<td>2.1 GHz</td>
<td>4MB</td>
<td></td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>6MB</td>
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<td>8365U</td>
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<tr>
<td>8565U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

### Display

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

### 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 + Bluetooth™ (optional)
- One of the following, configurable by model:
  - Realtek® RTL8822BE, 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 Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

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

### SIM card
- None

### Media reader
- MicroSD card reader

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

### Memory
- 64GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

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

### Bluetooth
- (optional)

### 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 + Bluetooth™ (optional)
- One of the following, configurable by model:
  - Realtek® RTL8822BE, 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 Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

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

### SIM card
- None

### Media reader
- MicroSD card reader

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

### Memory
- 64GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

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

### Bluetooth
- (optional)

### 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 + Bluetooth™ (optional)
- One of the following, configurable by model:
  - Realtek® RTL8822BE, 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 Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

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

### SIM card
- None

### dimensions

### Weight
- Starting at 4.48 lb / 2.0 kg

### Case color
- Black

### Case material
- PC/ABS plastic

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

---

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

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8400H</td>
<td>4</td>
<td>2.5 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-8750H</td>
<td>4</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-8850H</td>
<td>6</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>12</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</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™;
- supports four independent displays:
  - Max resolution: 5120x2880 (Thunderbolt); 4096x2160 @ 60 Hz (HDMI)

### Chipset

- Mobile Intel CM246 Chipset

### Memory

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

### Display

- **Some**: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 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)

### Optane™ memory

- Optional

### RAID (optional)

- Optional

### Ethernet

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

### WLAN

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

### WWAN

- None

### 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)
- **Multi-touch model**: starting at 4.06 lb (1.8 kg)

### Case color

- Black

### Case material

- **Display cover**: CFRP/GFGRP hybrid;
- **Bottom**: Aluminum alloy

### Smart card reader

- Optional: Smart card reader

### Media reader

- None

### Ports

- SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card
- Two USB 3.1 Gen 1 (one Always On), two USB Type-C / Thunderbolt 3 (with the function of Power Delivery and DP), HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, SD card reader, security keyhole

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

### Monitor cable

- 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

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

### Security

- Security chip
- vPro (optional)
- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology

### Security chip

- Fingerprints reader
- Touch style match on chip fingerprint reader on the keyboard bezel
- Color calibration
- NFC

- **Battery**: Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- **Max battery life** (MobileMark 2014)
  - Discrete mode: 7.36 hr; Hybrid mode: 13.87 hr
  - * Battery life varies significantly with settings, usage, & other factors
- **Preload**: One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro 64 for Workstations
- **Limited warranty**: One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### MIL-Spec test

- MIL-STD-810G military testing

### Environment

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

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

Lenovo

July 2019
## ThinkPad P1 (2nd Gen) Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.9 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9850H</td>
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<td>E-2276M</td>
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<td>4.7 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 in processor only or
- NVIDIA Quadro T1000 or T2000 Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt®;
supports four independent displays;
Max resolution: 4096x2160@60Hz (Thunderbolt); 4096x2160@60Hz (HDMI)

### Chipset

- Mobile Intel CM246 Chipset
- Mobile Intel CM246 Chipset

### Memory

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

### Display

<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>
<th>Multi-touch (opt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72% NTSC</td>
<td>170°</td>
<td>Capacitive-type multi-touch, supports 10-finger gesture (UHD OLED only), anti-reflection (AR), anti-smudge (AS) coating</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72% NTSC</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100% Adobe</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>OLED</td>
<td>AR, AS</td>
<td>SDR 400nit HDR 500nit (Peak)</td>
<td>16:9</td>
<td>1000000:1</td>
<td>100% DCI-P3</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

### Pen

Supports pen accessory, please see the accessory compatibility for details

### Storage

Up to two 2.5 SSD
M.2 2280 SSD / PCIe NVMe 3.0 x 4

### RAID (optional)

RAID 0/1 support
Optical

### Ethernet

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

### WLAN

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

### Bluetooth

Intel

### WWAN

None

### SIM card

None

### Battery

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

### Max battery life

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

### AC adapter

135W slim tip AC adapter

### Preload

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

### Limited warranty

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

### Mil-Spec test

MIL-STD-810G military testing

### Environment

EPEAT Silver; ENERGY STAR® 7.1; 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>7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

Graphics

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

Chipset

Intel SoC (System on Chip) platform

Memory

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

Storage

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

Optical

None

Ethernet

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

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

WLAN

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

Bluetooth™

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

WWAN (optional)

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

SIM card (opt)

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

Multi-touch (opt)

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

Stylus support

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

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 / 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, LED backlight

Security

Preload Windows

- 10 Home 64 or Windows 10 Pro 64

Battery

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

Max battery life

- MobileMark® 2014: 14.7 hr

AC adapter

65W USB Type-C AC adapter

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

Discrete TPM 2.0, TCG Certified

Near Field Communication

Lenovo NFC (optional)

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 battery limited onsite service

Mil-Spec test

MIL-STD-810G military testing

Environment

EPEAT Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo

July 2019
## ThinkPad P51 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>i7-6620HQ</td>
<td>4</td>
<td>8</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 530</td>
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<tr>
<td>E3-1505M v5</td>
<td>4</td>
<td>8</td>
<td>2.8 GHz</td>
<td>3.7 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 530</td>
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<tr>
<td>i7-7700HQ</td>
<td>4</td>
<td>8</td>
<td>2.8 GHz</td>
<td>3.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel HD Graphics 630</td>
</tr>
<tr>
<td>E3-1535M v6</td>
<td>4</td>
<td>8</td>
<td>3.0 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel HD Graphics 630</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

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

### Display

- **Some**: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 1400:1 contrast ratio, 100% gamut, 170° viewing angle
- **Some**: 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 120° viewing angle

### Multi-touch (optional)

- **Pen**
- **Pro**, active pen for multi-touch display

### Storage

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

### Raid (optional)

- RAID 0/1 support

### 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:
  - 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 8260ac / 8265ac 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)

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

### SIM card (optional)

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

### Weight

- **Non-touch**: 5.6 lb / 2.55kg
- **Multi-touch**: 6.2 lb / 2.82kg

### Case color

- Black
- Display cover: Glass-Fiber Reinforced Plastic
- Bottom: Magnesium/Aluminum

### Smart card reader

- **ExpressCard**: One slot (ExpressCard/34)

### Media reader

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

### Ports

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

### Camera (optional)

- HD720p resolution, fixed focus

### Audio support

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

### Security

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

### Fingerprint reader

- Touch style match on chip fingerprint reader on the palm rest
- Optional: Pantone color calibrator by X-Rite color calibration sensor in palm rest

### Battery

- **Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh)**
- **Max battery life**
  - **Model**: 4-cell / 6-cell
  - Hybrid Graphics: 6.5 hr / 8.9 hr

### Preload

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

### Limited warranty

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

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

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

---

**Dimensions**: WxDxH:
- 14.86" x 9.93" x 0.96-1.16": 377.4mm x 252.3mm x 24.5-29.4mm
- 14.86" x 9.93" x 1.02-1.21": 377.4mm x 252.3mm x 25.8-30.7mm

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

Lenovo
September 2018
**ThinkPad P52 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>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i9-8950HK</td>
<td>6</td>
<td>12</td>
<td>2.9 GHz</td>
<td>4.8 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics P630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>12</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

**Graphics**

Intel UHD Graphics 630 or P630 in processor and NVIDIA Quadro P1000 (4GB memory), P2000 (4GB memory), or P3200 (6GB memory, VR ready); supports external digital monitor via HDMI, Mini DisplayPort, or Thunderbolt; supports four independent displays; Max resolution: 3840x2160@60Hz (DisplayPort via Mini DisplayPort cable); 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)

**Chipset**

Mobile Intel CM246 Chipset

**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

**Storage**

Up to 3 drives (two M.2 SSD and one HDD)

Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 160° viewing angle

Some: 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch

**Multi-touch (opt)**

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

**Pen**

Supports pen accessory, please see the accessory compatibility for details

**Chipset**

Mobile Intel CM246 Chipset

**Memory**

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

**Storage**

Up to 3 drives (two M.2 SSD and one HDD)

Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

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

**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)

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

**WLAN**

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

**Bluetooth™**

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

**WWAN (optional)**

Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (Fibocom L590-GL), M.2 card

**SIM card (opt)**

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

**Product Specifications Reference (PSREF)**

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

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

**Dimensions**

WxDxH: 14.86" x 9.93" x 0.96-1.16"; 377.4mm x 252.3mm x 24.5-29.4mm

**Weight**

14.86" x 9.93" x 1.02-1.21"; 377.4mm x 252.3mm x 25.8-30.7mm

**Smart card reader**

Optional: Smart card reader

**Media reader**

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

**Ports**

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

**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

**UltraNav™**

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

**Keyboard**

3-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad

**Security chip**

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

**Fingerprint reader**

Touch style match on chip fingerprint reader on the palm rest

**Color calibration**

None

**Near Field Communication**

None

**Battery**

Li-ion 90Wh battery

**Max battery life**

Discrete mode: 6.1 hr; Hybrid mode: 8.9 hr

**AC adapter**

170W slim tip AC adapter

**Preload**

One of the following, configurable by model:

- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro for Workstations

**Limited warranty**

One of the following, configurable by model:

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

**Mil-Spec test**

MIL-STD-810G military testing

**Environment**

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

* Windows 10 Pro 64 for Workstations

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

Lenovo

July 2019
ThinkPad P52s Platform Specifications

**Processor**
- 8th Generation Intel® Core™ i5 / i7 Processor
  - **Number**: 8th Generation Intel® Core™ i5 / i7
  - **# of Cores**: 4
  - **Base Frequency**: 4.0 GHz
  - **Turbo Frequency**: 4.0 GHz
  - **Cache**: 8MB
  - **Memory**: DDR4-2400
  - **Graphics**: Intel UHD Graphics 620

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

**Storage**
- System has one HDD slot or one M.2 2280 slot exclusively for storage
- **Some**: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- **Some**: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. 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
  - * Intel 8265ac card supports BT 4.2 but is limited to BT 4.1 by Windows OS

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

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

**Dimensions**
- **WxDxH**: 14.40" x 9.95" x 0.79-0.80"
- **Weight starting at**: 4.39 lb / 1.99 kg
- **Max battery life**:
  - 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

**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
  - IR camera and HD720p camera, fixed focus

**Audio support**
- HD Audio, Realtek ALC2687 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
- 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
- Intel vPro Technology

**Fingerprint reader**
- Optional: Touch style match on chip fingerprint reader on the palm rest
- Anti-spoofing technology

**Battery**
- Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery
- * Battery life varies significantly with settings, usage, & other factors

**AC adapter**
- 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

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

**Environment**
- EPEAT® Silver; ENERGY STAR® 6.1; RoHS-compliant

Lenovo
July 2019
**ThinkPad P53 Platform Specifications**

**Product Specifications Reference (PSREF)**

<table>
<thead>
<tr>
<th>Processor 9th Generation Intel® Core™ i5 / i7 / i9 Processor or Intel Xeon® E Processor</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>Wx DxH (non-touch): 14.86” x 9.93” x 0.96-1.16”</td>
</tr>
<tr>
<td># of Cores</td>
<td>377.4mm x 252.3mm x 24.5-29.4mm</td>
</tr>
<tr>
<td># of Threads</td>
<td>Wx DxH (multi-touch): 14.86” x 9.93” x 1.02-1.21”</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>377.4mm x 252.3mm x 28.5-30.7mm</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td></td>
</tr>
<tr>
<td>Cache</td>
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<tr>
<td>Memory Types</td>
<td></td>
</tr>
<tr>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td></td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

- Mobile Intel CM246 Chipset
- DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6”</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>15.6”</td>
<td>FHD (1920x1080)</td>
<td>HDR 400, Dolby Vision™</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72%</td>
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<tr>
<td>15.6”</td>
<td>UHD (3840x2160)</td>
<td>HDR 400, Dolby Vision</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
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<tr>
<td>15.6”</td>
<td>UHD (3840x2160)</td>
<td>HDR 500 True Black, Dolby Vision, Multi-touch</td>
<td>OLED</td>
<td>AR, AS</td>
<td>350 (peak 400 nits)</td>
<td>16:9</td>
<td>10000:1</td>
<td>100% DCI-P3</td>
</tr>
</tbody>
</table>

**Pen**

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

**Optane™ memory (optional)**

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

**RAID (optional)**

- RAID 0/1/5 support

**Ethernet**

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

**WLAN (optional)**

- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

**Bluetooth® (optional)**

- 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 WAN upgradable

**SIM card (optional)**

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

**Camera (optional)**

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - 1080p camera and HD720p camera with ThinkShutter camera privacy, fixed focus

**Audio support**

- HD Audio, Synaptic®
- Dolby Atmos
- Dual array far-field microphone, headphone / microphone combo jack, Dolby Atmos® sound system

**Security**

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

**Fingerprint reader**

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

**Color calibration**

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

**Battery**

- Integrated Li-ion 90Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Battery life varies significantly with settings, usage, & other factors
- Battery life: 8 hr; Hybrid mode: 13 hr

**AC adapter**

- 170W or 230W slim tip AC adapter

**Preload**

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

**Limited warranty**

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

**Environment**

- MIL-STD-810G military testing
- EPEAT Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo
July 2019
**ThinkPad P53s Platform Specifications**

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
</tr>
<tr>
<td># of Cores</td>
<td>8</td>
</tr>
<tr>
<td># of Threads</td>
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<tr>
<td>Base Frequency</td>
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<tr>
<td>Max Turbo Frequency</td>
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</tr>
<tr>
<td>Cache</td>
<td>8MB</td>
</tr>
<tr>
<td>Memory Types</td>
<td>DDR4-2400</td>
</tr>
<tr>
<td>Processor Graphics</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset Memory**

- Intel SoC (System on Chip) platform,
- 48GB max / 2400MHz DDR4, dual-channel capable,
- 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket

**Display**

- Size: 15.6" UHD (3840x2160)
- Resolution: 3840x2160
- Type: IPS
- Brightness: Anti-glare
- 250 nits
- Aspect Ratio: 16:9
- Contrast Ratio: 700:1
- Color Gamut: 45%
- Viewing Angle: 170°

**Multi-touch (opt)**

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

**Storage**

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

**Optical**

- None

**Ethernet**

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

**WLAN**

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

**WWAN (optional)**

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

**SIM card (opt)**

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

**Dimensions**

- WxDxH: 14.40" x 9.76" x 0.75";
- 365.8mm x 248mm x 19.1mm

**Weight**

- Starting at 3.87 lb / 1.75 kg

**Case color**

- Black

**Case material**

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

**Smart card reader**

- Optional: Smart card reader

**Media reader**

- MicroSD card reader

**Ports**

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

**Monitor cable (optional)**

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

**Camera (optional)**

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

**Audio support**

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

**Security chip**

- Security chip
- Security chip
- Security chip
- Security chip

**System Mgt (opt)**

- Intel vPro Technology
- Intel vPro Technology
- Intel vPro Technology

**Battery**

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

**AC adapter**

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

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

Lenovo

July 2019
<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i7 Processor or Intel Xeon® E Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>7-8750H</td>
<td>6</td>
</tr>
<tr>
<td>7-8850H</td>
<td>12</td>
</tr>
<tr>
<td>E-2176M</td>
<td>2.7 GHz</td>
</tr>
<tr>
<td>E-2186M</td>
<td>2.9 GHz</td>
</tr>
</tbody>
</table>

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

**Chipset**
- Mobile Intel CM246 Chipset

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

**Display**
- Some: 17.3" (439mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 72% gamut, 170° viewing angle
- Some: 17.3" (439mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% Adobe CG, 170° viewing angle

**Multi-touch Pen**
- None
- 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

**Optical**
- None

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

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

**WWAN**
- None

**SIM card**
- None

**Note:** The specifications above may not be available in all regions.
### ThinkPad T470 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>i5-6200U</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>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

#### 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

- Intel SoC (System on Chip) platform
- Intel XMM 8290 3G+4G LTE Cat 6, Wi-Fi 802.11ac, Bluetooth 4.2, Wi-Fi 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

#### 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
- On-cell touch, supports 10-finger gesture (FHD IPS panel with PPS cover 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 / S on 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 8260, 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
- * Bluetooth 4.1ac 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, Qualcom Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
  - Integrated Mobile Broadband 4G LTE,

#### SIM card (optional)

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

---

**Dimensions**

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight (lb/kg)</th>
<th>Dimensions (WxDxH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-cell</td>
<td>3.63/1.65</td>
<td>13.25” x 9.15” x 0.79”</td>
</tr>
<tr>
<td>6-cell</td>
<td>4.35/1.95</td>
<td>336.6mm x 232.5mm x 19.95mm</td>
</tr>
</tbody>
</table>

**Media reader**

- 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I
- Three USB 3.1 Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DP), HDMI 1.4b, Ethernet (RJ-45), Dock connector

**Smart card reader**

- Optional: Smart card reader

**Audio support**

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

**Security**

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

**Internal battery**

- Optional: Integrated Li-Polymer 3-cell (24Wh)
- Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh or 72Wh)

**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

**Limited warranty**

- 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 T470s 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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</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
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### or 7th Generation Intel Core i5 / i7 Processor

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<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
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<th>Processor Graphics</th>
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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 Lenovo 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.
- 20GB or 24GB max / 2400MHz DDR4, dual-channel capable.
- 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket.
- System clocked down for processors with lower memory controller.

### Display

#### Some:
- 14.0" (355mm) FHD (1920x1080), anti-glare, backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle.

#### Some:
- 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle.

### Multi-touch (opt)

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

### Storage

- One of the following, configurable by model:
  - M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
  - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32GB/s (e.g. xxxGB SSD M.2 PCIe NVMe)
  - None

### Optical

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

### WLAN

- One of the following, configurable by model (WiGig is mutually exclusive with WWAN):
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

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

### WWAN (optional)

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

### WWAN (optional)

- One of the following, configurable by model (mutually exclusive with WWAN):
  - 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

### Ports

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

### Smart card reader

- Optional: Smart card reader

### Media reader

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

### WiGig dock (opt)

- Optional: WiGig dock, mutually exclusive with WWAN

### Monitor cable (opt)

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

### Camera

- 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

### 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: Intel vPro Technology
- Fingerprint reader: Optional: Touch style match on chip fingerprint reader on the palm rest
- NFC: Optional

### Internal battery

- Front Li-Polymer 3-cell (23Wh) and rear Li-ion 3-cell (26Wh), both Integrated
- Internal battery charge: MobileMark® 2014: up to 10.5 hr

### Battery life

- Max battery life: 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 preinstalled
- Lenovo Companion
- Lenovo Setting
- Lenovo Mobile Setup
- Microsoft Office preload: 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
- ALT 22015 Standard for Commercial Laptops
- ULTRASONIC HI-LEVEL VIBRATION TEST
- VIBRATION TEST
- MIL-STD-810G Method 514.5
- EPEAT Gold (US only)
- ENERGY STAR® 6.1
- RoHS-compliant

---

Lenovo
April 2019
ThinkPad T480 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>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### or 8th Generation Intel Core i3 / i5 / i7 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>Processor Graphics</th>
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</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>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>5-8250U</td>
<td>2</td>
<td>4</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>
<tr>
<td>7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and NVIDIA GeForce MX150, 2GB GDDR5 memory (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

### 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.

Some: 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.

### 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 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

### 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 BT 4.2 but is limited to BT 4.2 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™ 7662 (Fibocom L830-EB), M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A
- Integrated Mobile Broadband 4G LTE-A

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

### SIM card (opt)

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

### Case color

Black

### Display cover

Magnesium Hybrid or PPS:

- Bottom: Glass-Fiber Reinforced Plastic

### Smart card reader

Optional: Smart card reader

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

### 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

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

### Monitor (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
- HD Audio, Realtek® ALC3297 codec / stereo speakers, 2W x 2, Dolby® Audio® Premium / dual array microphone, headphone / microphone combo jack

### Audio support

- IR camera and HD720p camera, fixed focus
- HD Audio, Realtek® ALC3297 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™

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

### Security

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

### Security chip

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

### Security chip vpro (optional)

Discrete TPM 2.0, TCG Certified

### Intel vPro Technology

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)

- 6.6 hr
- 13.2 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/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

### Mil-Spec test

MIL-STD-810G military testing

### Environment

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

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

Lenovo
May 2019
### Processor Specifications

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7th Generation Intel® Core™ i5 Processor</td>
<td></td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>8th Generation Intel® Core™ i5 / i7 Processor</td>
<td></td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics Specifications

- 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)

### Chipset Memory

- 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

- 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
- 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)
- 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

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

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</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>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>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>i7-8665U</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

- Intel UHD Graphics 620 in processor 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
- *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation*

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
<th>Multi-touch (opt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; HD</td>
<td>(1366x768) TN</td>
<td>Anti-glare</td>
<td>220 nits</td>
<td>16.9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
<td>On-cell touch, supports 10-finger gesture (FHD only)</td>
</tr>
<tr>
<td>14.0&quot; FHD</td>
<td>(1920x1080)*</td>
<td>IPS</td>
<td>250 nits</td>
<td>16.9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD</td>
<td>(1920x1080)*</td>
<td>IPS</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>400 nits</td>
<td>16.9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; WQHD</td>
<td>(2560x1440)*</td>
<td>IPS Glossy</td>
<td>500 nits</td>
<td>16.9</td>
<td>1500:1</td>
<td>100%</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

**Storage**

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

**Optical**

- None

**Ethernet**

**WLAN (optional)**

| Bluetooth (opt) | Bluetooth 5.0, wireless, integrated in Wi-Fi + Bluetooth combo adapter |

**WWAN (optional)**

- Only non-WWAN and WWAN upgradeable are available on 20Q9 / 20QH models

**SIM card (opt)**

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

**Dimensions**

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

**Weight**

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

**Case color**

- Black

**Display cover:**

- Anti-glare surface

**Keyboard cover:**

- PC/ABS + Magnesium alloy with ISO 2216 compliant anti-microbial surface treatment for 20Q9 / 20QH models

**Monitor cable (optional)**

- 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
- None

**Camera (optional)**

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

**Audio support**

- HD Audio, Realtek® ALC2387 code / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack

**Operating System**

- Windows® 10 Home 64 or Windows 10 Pro

**Security**

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

**Smart card reader**

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

**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 model), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

**Camera**

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

**Operating System**

- Windows® 10 Home 64 or Windows 10 Pro

**Security chip**

- System Mgt (opt): Intel vPro Technology
- Fingerprint reader (optional): Touch style match on chip fingerprint reader or FIPS 201 fingerprint reader on palm rest
- NFC (optional): NFC module or NFC support via RFID reader
- Battery: Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: MobileMark® 2014: 11.16 hr

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

**WWAN (optional)**

- Only non-WWAN and WWAN upgradeable are available on 20Q9 / 20QH models

**SIM card (opt)**

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

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

**Lenovo**

July 2019
ThinkPad T490s Platform Specifications

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

- **Processor Number:**
  - Intel Core i5-8265U
  - Intel Core i5-8365U
  - Intel Core i7-8565U

- **Base Frequency:**
  - 1.6 GHz

- **Max Turbo Frequency:**
  - 3.9 GHz

- **Max Turbo Frequency (Multi-core):**
  - 8MB

- **Cache:**
  - DDR4-2400

- **Processor Graphics:**
  - Intel UHD Graphics 620

Graphics
- Intel UHD Graphics 620 in processor;
- supports external digital monitor via HDMI or Thunderbolt;
- supports three independent displays;

Chipset
- Intel SoC (System on Chip) platform

Memory
- 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to system board, no sockets

Display
- 14.0" FHD (1920x1080)
  - IPS Anti-glare
  - 250 nits (non-touch)
  - 300 nits (multi-touch)

- 14.0" FHD (1920x1080)
  - Low Power
  - IPS Anti-glare
  - 400 nits

- 14.0" FHD (1920x1080)
  - ThinkPad Privacy Guard
  - IPS Anti-glare
  - 400 nits

- 14.0" WQHD (2560x1440)
  - HDR, Dolby Vision
  - IPS Glossy

- 14.0" WQHD (2560x1440)
  - ThinkPad Privacy Guard
  - IPS Glossy

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
- M.2 2280, PCIe NVMe 3.0 x 4

Optical
- None

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

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

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

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

Dimensions
- **Weight:**
  - Black with FHD: 3.29 lb / 1.49 kg
  - Black with FHD Low Power: 3.39 lb / 1.54 kg

Media reader
- MicroSD card reader
- Media reader

Ports
- Two USB 3.1 Gen 1 (Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one US 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), microphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

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
- Stereo speakers, 1W x 2, Dolby Audio Premium / dual array far-field microphone, headphone / microphone combo jack

Keyboard
- 6-row, spill-resistant, multimedia Fn key, optional LED backlight

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

Security chip
- Discrete TPM 2.0, TCG Certified

System Mgt (optional)
- Intel vPro Technology

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

NFC (optional)
- Near Field Communication

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

Max battery life
- MobileMark 2014: 20 hr
- Battery life varies significantly with settings, usage, & other factors

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

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

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

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

Note: The specifications above may not be available in all regions.
### ThinkPad T495 Platform Specifications

#### Processor

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

#### Graphics

- AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI; supports four independent displays;
- Max resolution: 5120x2880@60Hz (USB-C); 4906x2160@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
- Installed memory is actually 2933MHz but run at 2400MHz due to AMD limitation

#### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; 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>14.0&quot; FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits (non-touch) 300 nits (multi-touch)</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080) Low Power</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
</tbody>
</table>

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

#### Storage

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

#### Optical

- None

#### Ethernet

- Realtek® RTL8111 Gigabit Ethernet connection

#### WLAN

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

#### WWAN (optional)

- One of the following, configurable by model:
  - Wireless WAN integrator
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - Nano-SIM card slot, optional Verizon LTE (US) SIM card

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

#### Case color

- Black

#### Case material

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

#### Smart card reader

- Optional: Smart card reader

#### Media reader

- MicroSD card reader
- Media reader:
  - One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

#### Monitor cable

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

#### Bundled Accy

- None

#### Environment

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

#### Dimensions

<table>
<thead>
<tr>
<th>WxDxH</th>
<th>12.95&quot; x 8.94&quot; x 0.70&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
<td>HD</td>
</tr>
<tr>
<td>Weight</td>
<td>3.46 lb / 1.57 kg</td>
</tr>
</tbody>
</table>

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

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### Lenovo

July 2019
### ThinkPad T495s Platform Specifications

#### Processor
- **AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics**
  - **Processor Number**
    - **Ryzen 5 Pro 3500U**: 4 8 2.1 GHz 3.7 GHz 2MB L2 / 4MB L3 DDR4-2400 Radeon Vega 8 Graphics
    - **Ryzen 7 Pro 3700U**: 4 8 2.3 GHz 4.0 GHz 2MB L2 / 4MB L3 DDR4-2400 Radeon Vega 10 Graphics

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

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

#### Display
- **Size**, **Resolution**, **Type**, **Surface**, **Brightness**, **Aspect Ratio**, **Contrast Ratio**, **Color Gamut**, **Viewing Angle**
  - 14.0" FHD (1920x1080) IPS Anti-glare: 250 nits (non-touch) 300 nits (multi-touch) 16.9 700:1 45% 170°
  - 14.0" FHD (1920x1080) Low Power IPS Anti-glare: 400 nits 16.9 800:1 72% 170°
  - 14.0" FHD (1920x1080) ThinkPad Privacy Guard IPS Anti-glare: 400 nits 16.9 1000:1 72% 170°

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

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

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

#### WLAN (optional)
- 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
- **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 Case material
- Black
  - **Display cover**: CFRP Hybrid
  - **Bottom**: Magnesium/Aluminum

### Smart card reader
- Optional: Smart card reader

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

### Monitor cable (optional)
- Bundled Accy

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

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

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

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

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

#### Max battery life
- MobileMark® 2014: 16.4 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
- MIL-STD-810G military testing

#### Environment
- EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant
ThinkPad T580 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>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or **8th Generation Intel Core i5 / i7 Processor**

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

**Graphics**

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

**Chipset**

Intel SoC (System on Chip) platform

* System clocks down for processors with lower memory controller

**Display**

* Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 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

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

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

**Ethos + Bluetooth™**

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

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

**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:

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

**SIM card (opt)**

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

**Dimensions**

WxDxH: 14.40” x 9.95” x 0.79-0.80”

**Weight**

Integrated model: starting at 4.29 lb / 1.95 kg

Discrete model: starting at 4.39 lb / 1.99 kg

**Case color**

Black

**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

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

**Monitor cable** (optional)

Lenovo HDMI to VGA Monitor Adapter

**Camera** (optional)

One of the following, configurable by model:

* HD720p camera with ThinkShutter camera privacy, fixed focus

**Audio support**

HD Audio, Realtek® ALC2987 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

**Security chip**

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

Discrete TPM 2.0, TCG Certified

**Security chip vPro (optional)**

Intel vPro Technology

**Fingerprint reader**

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

**Battery**

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

**Max battery life (MobileMark® 2014)**


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

**MI-Spec test**

MIL-STD-810G military testing

**Environment**

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

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

Lenovo

July 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>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>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</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>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

Graphics

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

Chipset

Intel SoC (System on Chip) platform

Memory

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

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

Display

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

Multi-touch (opt)

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

Storage

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

Optical

None

Ethernet

Non-vPro model: Intel Ethernet Connection 1219-V (Jacksonville)
vPro model: Intel Ethernet Connection 1219-LM (Jacksonville)

WLAN (optional)

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

Bluetooth

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

WWAN (optional)

- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card

SIM card

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

Dimensions

WxDxH: 14.40” x 9.76” x 0.75”; 365.8mm x 248mm x 19.1mm

Weight

FHD model: 3.87 lb / 1.75 kg; UHD model: 3.86 lb / 1.75 kg

Case color

Black

Case material

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

Smart card reader

Optional: Smart 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

(opt) USB-C to VGA: Lenovo USB-C to VGA Adapter (NOT available in EMEA) USB-C to DP: Lenovo USB-C to DisplayPort Adapter (NOT available in EMEA)

Bundled Accy

None

Camera

One of the following, configurable by model:

Audio support

- 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, numeric keypad, optional LED backlight

Security

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

Security chip

Discrete TPM 2.0, TCG Certified

System Mng (opt)

Intel vPro Technology

Fingerprint reader

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

Battery

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

Mi-Spec test

MIL-STD-810G military testing

Environment

EPEAT Silver; ENERGY STAR 7.1; RoHS-compliant

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

Lenovo

July 2019
## ThinkPad X1 Carbon (5th 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>i5-6200U</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>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 7th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 520</td>
</tr>
<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 520</td>
</tr>
<tr>
<td>i7-7500U</td>
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<td>LPDDR3-1866</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
- Supports external digital monitor via HDMI or USB Type-C
- Supports three independent displays

### Display

- 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS
- 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Multi-touch

- None

### Storage

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

### Optical

- None

### Ethernet

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)
- Supports external digital monitor via HDMI or USB Type-C
- Supports three independent displays

### WLAN

- One of the following, configurable by model (WiGig can coexist with WWAN):
  - Intel Dual Band Wireless-AC 8260, Wi-Fi
  - Intel Dual Band Wireless-AC 8265, Wi-Fi
  - Intel Tri-Band Wireless-AC 18265, WiGig
- 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)

- Integrated Mobile Broadband 4G LTE-A, Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EMT7455)
- Micro-SIM card slot, opt Verizon LTE (US) or Lenovo™ Connect (EMEA) SIM card

### SIM card (optional)

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

### Dimensions

- Wx Dx H: 12.74" x 8.55" x 0.63"; 323.5mm x 217.1mm x 15.95mm
- Starting at 2.49 lb / 1.13 kg

### Weight

- Black or Silver (silver is NOT available in EMEA)
- Case material: CFRP/GFRP hybrid; Bottom: magnesium alloy hybrid

### Security

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

### Fingerprint reader

- Touch style match on chip fingerprint reader on the palm rest
- Optional: ThinkPad Ethernet Extension Cable

### Battery

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

### AC adapter

- RapidCharge
- Charge to 100%: 1.0 hr
- Charge to 80%: 0.7 hr

### Preload

- Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
- Lenovo Solution Center
- Lenovo PowerEngage
- McAfee LiveSafe™ (30-day trial)

### Warranty

- 3-year/1-yr battery limited onsite service
- Lenovo’s 1-yr on-site repair service
- Lenovo’s 1-yr on-site repair service
- Lenovo’s 1-yr on-site repair service

### Mil-Spec test

- MIL-STD-810G military testing

### EPEAT

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

---

Lenovo
April 2019
ThinkPad X1 Carbon (6th Gen) Platform Specifications

Product Specifications Reference (PSREF)

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

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<th>Number</th>
<th># of Cores</th>
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<tr>
<td>i5-8350U</td>
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<td>7-8550U</td>
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<td>7-8650U</td>
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<td>8MB</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 @ 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

### 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

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

### WLAN + Bluetooth™

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

### WWAN (optional)

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

### SIM card (opt)

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

### Dimensions

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

### Weight

- Starting at 2.49 lb / 1.13 kg

### Case color

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

### Case material

- Display cover: CFRP/SFFRP hybrid; Bottom: magnesium alloy / PPS hybrid

### Smart card reader

- None

### Media reader

- MicroSD card reader, supports UHS-II

### Ports

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

### Monitor cable

- (optional)

### Bundled Accy

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

### Camera (optional)

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

### Audio support

- HD Audio, Realtek ALC2386 codec / stereo speakers, 1W x 2, Dolby Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos™ via headphones

### Keyboard

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

### UltraNav™

- 6-button pointing device and buttonless Glass surface multi-touch touchpad

### Security

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

### Security chip

- vPro Technology

### Finger print reader

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

### NFC (optional)

- Near Field Communication

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

### Max battery life

- [MobileMark® 2014: 19.3 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
  - 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

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>
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</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
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<td>6MB</td>
<td>LPDDR3-2133</td>
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<td>i5-8365U</td>
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<td>4.1 GHz</td>
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<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
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<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)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Surface Brightness</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
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</thead>
<tbody>
<tr>
<td>14.0” FHD (1920x1080) Multi-touch</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
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<tr>
<td>14.0” 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>
</tr>
<tr>
<td>14.0” FHD (1920x1080) ThinkPad Privacy Guard</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
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<tr>
<td>14.0” UHD (3840x2160) HDR 400, Dolby Vision®</td>
<td>IPS Glossy</td>
<td>500 nits</td>
<td>16:9</td>
<td>1400:1</td>
<td>90%</td>
</tr>
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</table>

### Multi-touch (opt)

- Capacitive-type multi-touch, supports 10-finger gesture (FHD only), anti-reflection (AR), anti-smudge coating

### Storage

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

### 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

- 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:
  - 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 (opt)

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

### Camera (optional)

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

### Audio support

- 6-row, spill-resistant, multimedia Fn keys, LED backlight
- 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
- Intel vPro Technology
- Fingerprint reader touch style match on chip fingerprint reader on the palm rest
- NFC (optional) *

### Battery

- Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 18.3 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

- MIL-STD-810G military testing

### Environment

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

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

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**Lenovo**  
July 2019
<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>i5-8300H</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>i5-8400H</td>
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<td>Intel UHD Graphics 630</td>
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<td>Intel UHD Graphics 630</td>
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<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

**Graphics**
- Intel UHD Graphics 630 in processor and NVIDIA® GeForce® GTX 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)

**Chipset**
- Mobile Intel CM246 Chipset

**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)

**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 / 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
- RAID 0/1 support
- None
- Optical

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

**WLAN**
- Intel Wireless-AC 9560, Wi-Fi 2.4 GHz 802.11ac + Bluetooth 5.0, M.2 card

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

**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: CFRP/GFRP 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, SD card reader, security keyhole

**Monitor cable**
- (optional)
- Bundled Accy: USB-C to DP: Lenovo USB-C to DisplayPort Adapter
- 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
  - HD Audio, Realtek® ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone

**Audio support**
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter
- HD Audio, Realtek® ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone

**Security chip**
- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified

**Fingerprint reader**
- Touch style match on chip fingerprint reader on the keyboard bezel

**Battery**
- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: Discrete mode: 9.5 hr; Hybrid mode: 14.9 hr
- *Battery life varies significantly with settings, usage, & other factors

**AC adapter**
- 135W slim tip 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

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

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

Lenovo
July 2019
## ThinkPad X1 Extreme (2nd Gen) Platform Specifications

### Processor

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<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>
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<td>2.4 GHz</td>
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</table>

### Graphics

- Intel UHD Graphics 630 in processor and NVIDIA GeForce GTX 1650 Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt
- Supports four independent displays: Max resolution: 4096x2160 (Thunderbolt); 4096x2160@60Hz (HDMI)

### Chipset

- Mobile Intel CM246 Chipset
- 64GB max / 2666MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets

### Display

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

### Multi-touch (opt)

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

### Pen

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

### Storage

- Up to two M.2 SSD
- M.2 2280 SSD / PCIe NVMe 3.0 x 4
- 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

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

### WWAN

- SIM card: None

### Battery

- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1 hr) or MobileMark® 2014: 14 hr
- Max battery life varies significantly with settings, usage, & other factors
- AC adapter: 135W slim tip 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 Silver; ENERGY STAR® 7.1; RoHS-compliant

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

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Lenovo
July 2019
ThinkPad X270 Platform Specifications

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-6006U</td>
<td>2</td>
<td>4</td>
<td>2.0 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>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>
</tr>
<tr>
<td>i5-6200U</td>
<td>2</td>
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<td>2.3 GHz</td>
<td>3.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i5-6300U</td>
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<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 7th Generation Intel® Core™ 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>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<td>i7-7500U</td>
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<td>Intel HD Graphics 620</td>
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<tr>
<td>i7-7600U</td>
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<td>2.6 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

Weight

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

WLAN

- Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ax + BT4.1
- Intel Tri-Band Wireless-AC 18265, WiGig 0.11ax + Wi-Fi 2x2 802.11ac + BT4.1 (US only)
- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter

WWAN

<table>
<thead>
<tr>
<th>WWAN (optional)</th>
<th>One of the following, configurable by model (mutually exclusive with WiGig):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wireless WAN upgradable</td>
</tr>
<tr>
<td></td>
<td>Integrated Mobile Broadband 4G LTE-A, Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)</td>
</tr>
<tr>
<td></td>
<td>Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU) (EMEA only)</td>
</tr>
</tbody>
</table>

SIM card

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

Graphics

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

Chipset Memory

- Intel SoC (System on Chip) platform
- 16GB max / 2400MHz DDR4, one DDR4 SO-DIMM socket
- *System clocks down for processors with lower memory controller

Display

- 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
- 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

Multi-touch (optional)

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

Storage

- System has one HDD slot or one M.2 2280 slot exclusively for storage
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)
- Some: 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
- Supports three independent displays;
- Max resolution: 4096x2160@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

Optical

- None

Ethernet

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

WLAN

- 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 802.11ax + BT4.1
- Intel Tri-Band Wireless-AC 18265, WiGig 0.11ax + Wi-Fi 2x2 802.11ac + BT4.1 (US only)

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

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

SIM card

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

Dimensions

| WxDxH: | 12.03" x 8.21" x 0.80"; 305.5mm x 208.5mm x 20.3mm |

Security

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

Camera

- 720p resolution, fixed focus
- Field of View: 80°

Audio support

- HD Audio, Realtek ALC3268 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack

Preload

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

AC adapter

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

Environmental

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

Lenovo

April 2019
### ThinkPad X280 Platform Specifications

**Product Specifications Reference (PSREF)**

#### Processor
- 7th Generation Intel® Core™ i3 / i5 Processor
  - i3-7130U is NOT available in US and EMEA; i5-7200U is NOT available in US

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 8th Generation Intel® Core™ 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>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8350U</td>
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<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

#### Chipset Memory
- Intel SoC (System on Chip) platform
- 4GB, 8GB, or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
- *4GB memory is NOT available in US and EMEA
- *System clocks down for processors with lower memory controller

#### Display
- Some: 12.5” (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 12.5” (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- On-cell touch, supports 10-finger gesture (FHD only)
- *FHD non-touch model is NOT available in US

#### Storage
- One of the following, configurable by model:
  - M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
  - M.2 SSD / PCiE NVMe, PCiE 3.0 x 4, 32GB/s (e.g. xxxGB SSD M.2 PCiE NVMe)
- *Optane™ memory available
- None

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

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

#### WWAN (optional)
- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (MEAM 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, in the combo slot with microSD card reader, optional Verizon LTE (US) SIM card

#### Case color
- Display cover: Carbon Fiber (FHD non-touch model) or Glass Fiber (HD & FHD multi-touch model);
- Bottom: Magnesium/Aluminum

#### Smart card reader
- Optional: Smart card reader

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

#### Ports
- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet 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
- *Depending on many factors, actual data transfer speed may be lower than theoretical speed

#### Monitor cable (optional)
- One of the following, configurable by model:
  - HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter
  - USB-C to VGA: Lenovo USB-C to VGA Adapter
  - USB-C to DP: Lenovo USB-C to DisplayPort Adapter
  - Bundled Accy

#### Security chip
- Intel vPro Technology

#### 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-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 April 2019*
# ThinkPad X390 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>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>
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<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<td>i5-8365U</td>
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<td>8</td>
<td>1.6 GHz</td>
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<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8565U</td>
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<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>
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<td>Z-8565U</td>
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<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset Memory

Intel SoC (System on Chip) platform; 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets; *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation.*

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot; HD</td>
<td>(1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>500:1</td>
<td>45%</td>
<td>90°</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>800:1 (no-touch)</td>
<td>700:1 (multi-touch)</td>
<td>72%</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>(1920x1080)</td>
<td>ThinkPad Privacy Guard</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>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
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

### Optical

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

### WLAN (optional)

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

### Bluetooth™

One of the following, configurable by model:
- 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*

### Memory

16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets

### WWAN

Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)

### Whitepaper

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

### Graphics

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

### Security

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

### Media reader

- MicroSD card reader, in the combo slot with nano-SIM card
- One of the following, configurable by model:
  - Two USB 3.1 Type-C Gen 1 (one Always On)
  - Two 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

### Case material

Black Display cover: Carbon Fiber (FHD non-touch only) or PPS; Bottom: Magnesium/Aluminum

### Keyboard

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

### TrackPoint

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

### System Mgt (opt)

- Lenovo USB-C to DisplayPort Adapter
- *Optional:
  - Touch style match on chip fingerprint reader on the palm rest
  - Near Field Communication

### battery

**Battery**

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

### Environment

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

---

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

Lenovo

July 2019
### ThinkPad X395 Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor
<table>
<thead>
<tr>
<th>AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor Number</strong></td>
</tr>
<tr>
<td>Ryzen 3 Pro 3300U</td>
</tr>
<tr>
<td>Ryzen 5 Pro 3500U</td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</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
- 8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets

### Memory
- Installed memory is actually 2866MHz but run at 2400MHz due to AMD limitation

### Display
<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot; HD (1366x768)</td>
<td>TN Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>300:1</td>
<td>45%</td>
<td>90°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.3&quot; FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.3&quot; FHD (1920x1080)</td>
<td>ThinkPad Privacy Guard</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>178°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

### Storage
- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4

### Optical
- None

### Ethernet
- Native Realtek® RTL8153 Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

### WLAN (optional)
| Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 |
| Bluetooth® 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter |

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradeable
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card

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

### Camera (optional)
- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus

### 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

### Optical drive
- None

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

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

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

### 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

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

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

**Lenovo**

**July 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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