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<td>ThinkPad Legal Information</td>
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Summary of Changes

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

October 30, 2019 - Version 550

Additions in this update

► **New product(s)**
  ThinkPad L13 models announced October 2019
  ThinkPad L13 Yoga models announced October 2019

► **Others**
  ThinkPad L490 - Spec updated
  ThinkPad L590 - Spec updated
  ThinkPad X1 Carbon (7th Gen) - Spec updated
  ThinkPad X1 Yoga (4th Gen) - Spec updated

Withdrawals in this update

► **Withdrawn product(s)**
  None
## ThinkPad 11e (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>Burst Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
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<tr>
<td>m3-7Y30</td>
<td>2</td>
<td>4</td>
<td>1.0 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 615</td>
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<td>E3-7Y54</td>
<td>4</td>
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<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 600</td>
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<tr>
<td>Celeron N4100</td>
<td>4</td>
<td>4</td>
<td>1.1 GHz</td>
<td>2.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 605</td>
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<tr>
<td>Pentium Silver N5000</td>
<td>2</td>
<td>4</td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 605</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- Size: 11.6" HD (1366x768)
- Type: TN
- Brightness: 250 nits
- Aspect Ratio: 16:9
- Contrast Ratio: 400:1 or 500:1
- Color Gamut: 45% 90°

### Multi-touch (opt)

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

### Storage

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

### Optical

- None

### Ethernet

- Realtek RTL8111GUS Gigabit Network Connection

### WLAN + Bluetooth™

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

### WWAN

- None

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- Size: 11.6" HD (1366x768)
- Type: IPS
- Brightness: 250 nits
- Aspect Ratio: 16:9
- Contrast Ratio: 800:1
- Color Gamut: 45% 170°

### Multi-touch (opt)

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

### Storage

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

### Optical

- None

### Ethernet

- Realtek RTL8111GUS Gigabit Network Connection

### WLAN + Bluetooth™

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

### WWAN

- None

### Dimensions

- WxDxH: 11.81" x 8.27" x 0.86"; 300mm x 210mm x 21.9mm

### Weight

- Starting at 2.99 lb / 1.36 kg

### Case color

- Black

### Case material

- Display cover: PC/ABS+GF; Bottom: PC/ABS plastic

### Smart card reader

- None

### Media reader

- MicroSD card reader

### Ports

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

### Camera

- HD720p camera, fixed focus

### Audio support

- HD Audio, Realtek ALC3287 codec, stereo speakers, 2W x 2, Dolby Audio™, mono digital microphone, combo audio/microphone jack

### Keyboard

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

### Touchpad

- Buttonless Mylar surface touchpad below keyboard, multi-touch

### Security chip

- Power-on password, supervisor password, security keyhole

### Security chip

- Discrete TPM 2.0, TCG Certified

### Battery

- Integrated Li-ion 42Wh battery
- MobileMark® 2014: 13.9 hr

### AC adapter

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

### Operating system (optional)

- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro in S mode
  - No OS

### Limited warranty

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

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

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

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

Lenovo
August 2019
ThinkPad A275 Platform Specifications

<table>
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<th>Processor AMD PRO A-Series APUs</th>
<th>Smart card reader</th>
<th>Optional: Smart card reader</th>
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<td></td>
<td>Media reader</td>
<td>4-in-1 reader (MMC, SD, SDHC, SDXC)</td>
</tr>
<tr>
<td></td>
<td>Ports</td>
<td>Two USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45)</td>
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<tr>
<td></td>
<td>Monitor cable</td>
<td>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter</td>
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<td></td>
<td></td>
<td>** USB-C to GVA: Lenovo USB-C to GVA Adapter</td>
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<td>** USB-C to DP: Lenovo USB-C to DisplayPort Adapter</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Graphics</th>
<th>Camera (optional)</th>
<th>HD720p resolution, fixed focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>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)</td>
<td>Audio support</td>
<td>HD Audio, Realktek ALC3268 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chipset</th>
<th>Keyboard</th>
<th>6-row, spill-resistant, multimedia Fn keys, optional LED backlight</th>
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</thead>
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<tr>
<td>AMD SoC (System on Chip) platform</td>
<td>UltraNav™</td>
<td>TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
<th>Security</th>
<th>Power-on password, hard disk password, supervisor password, security keyhole</th>
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</thead>
<tbody>
<tr>
<td>Some: 12.5&quot; (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio</td>
<td>Security chip</td>
<td>dTPM 1.2: discrete TPM 1.2, TCG Certified dTPM 2.0: discrete TPM 2.0, TCG Certified</td>
</tr>
<tr>
<td>Some: 12.5&quot; (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle</td>
<td>Fingerprint reader</td>
<td>Optional: Touch style match on chip fingerprint reader on the palm rest</td>
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<tr>
<td>Multi-touch (opt)</td>
<td>Operating system</td>
<td>One of the following, configurable by model:</td>
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<tr>
<td>On-cell touch, supports 10-finger gesture (FHD only, US only)</td>
<td>* Windows 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>AC adapter</td>
<td>45W slim tip AC adapter or 45W USB Type-C AC adapter</td>
</tr>
<tr>
<td>System has one HDD slot or one M.2 slot exclusively for storage. Some: HDD / SATA 6.0Gb/s, 2.5&quot; wide, 7mm high, Active Protection System™ Some: SSD / SATA 6.0Gb/s, 2.5&quot; wide, 7mm high (e.g. xxxGB SSD) Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s</td>
<td>AC adapter</td>
<td>Optional: Integrated Li-ion or Li-Polymer 3-cell (23Wh) Li-ion 3-cell (23Wh) or 6-cell (48Wh)</td>
</tr>
<tr>
<td>Optical</td>
<td>Max battery life</td>
<td>Battery life varies significantly with settings, usage, &amp; other factors</td>
</tr>
<tr>
<td>None</td>
<td>Max battery life</td>
<td>5.05 hr 10.1 hr 15.6 hr</td>
</tr>
</tbody>
</table>

| Ethernet | Internal battery | Optional: Integrated Li-ion or Li-Polymer 3-cell (23Wh) Li-ion 3-cell (23Wh) or 6-cell (48Wh) |
| Realtek® RTL8111EPV Gigabit Ethernet connection | External battery | Li-ion 3-cell (23Wh) or 6-cell (48Wh) |

| WLAN | Operating system | One of the following, configurable by model: |
| Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card | * Windows 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 |
| Bluetooth (optional) | AC adapter | 45W slim tip AC adapter or 45W USB Type-C AC adapter |
| Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter | AC adapter | Optional: Integrated Li-ion or Li-Polymer 3-cell (23Wh) Li-ion 3-cell (23Wh) or 6-cell (48Wh) |

| WWAN (optional) | Limited warranty | One of the following, configurable by model: |
| * Wireless WAN upgradable | * Battery life varies significantly with settings, usage, & other factors | |
| Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455) | * 1-year depot repair service | |

| SIM card (optional) | Mil-Spec test | MIL-STD-810G military testing |
|                    | Environment   | EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant |

| Dimensions Weight | Lenovo       | August 2019 |
| WxDxH: 12.03" x 8.21" x 0.80"; 305.5mm x 208.5mm x 20.3mm | Models | No + 3-cell 3-cell + 3-cell 3 + 6-cell |
|                   | Weight       | 2.79 lb / 1.27 kg 2.98 lb / 1.36 kg 3.33 lb / 1.52 kg | |
| Case color        | Case material | Black | Glass-Fiber Reinforced Plastic |
| Note: The specifications above may not be available in all regions. |
### ThinkPad A285 Platform Specifications

#### Processor

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

#### Graphics

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

#### Chipset

- AMD 86C (System on Chip) platform
- 8GB or 16GB / 2400MHz DDR4, soldered to systemboard, no sockets

#### 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, 800:1 contrast ratio, 170° viewing angle
- On-cell touch, supports 10-finger gesture (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

#### Optical

- None

#### Ethernet

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

#### 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 slot

#### Dimensions

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

#### 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**
- AMD PRO A-Series APUs
  - Processor Number
    - PRO A10-8730B
    - PRO A12-8830B
    - PRO A10-9700B
    - PRO A12-9800B

  **Specifications Reference (PSREF)**
  - Lenovo August 2019

- 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

- Multi-touch (opt)
- Camera (optional)

- 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

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

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

- Ports
  - HDMI 1.4b, Ethernet (RJ-45), Dock connector

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

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

- SIM card (opt)
  - For non-WWAN model, it means the model is NOT WWAN upgradable
  - Micro-SIM card slot, opt Verizon LTE (US) SIM card

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

**Weight**
- Models 3-cell or 3 + 3-cell: 6-cell or 3 + 6-cell
- Magnesium 3.49 lb / 1.58 kg; 3.92 lb / 1.78 kg

**Case color**
- Black

**Case material**
- Display cover: Magnesium Hybrid or PPS (Magnesium Hybrid for US only)

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

**Note:** The specifications above may not be available in all regions.
## ThinkPad A485 Platform Specifications

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

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

| Chipset | AMD SoC (System on Chip) platform |
| Memory  | 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * Installed DIMMs are actually 2666MHz but run at 2400MHz due to AMD imitation |

| Display | Some: 14.0” (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio |
|         | Some: 14.5” (353mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle |

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

| Storage | System has one HDD slot or one M.2 2280 slot exclusively for storage |
|         | Some: SSD / SATA 6.0Gb/s, 2.5” 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 |

| Optical | None |

| Ethernet | Realtek® RTL8111GUL Gigabit Ethernet connection |

| WLAN | Realtek® RTL8822BE, 2.4GHz 802.11ac + Bluetooth 4.1, M.2 card |

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

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Models</td>
</tr>
<tr>
<td></td>
<td>24Wh or 24Wh + 24Wh</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>
</tbody>
</table>

| Case color | Black |
| Case material | Display cover: Magnesium Hybrid or PPS; Bottom: Glass-Fiber Reinforced Plastic |

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

---

**Lenovo May 2019**

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<table>
<thead>
<tr>
<th>Processor</th>
<th>AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics</th>
</tr>
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<tbody>
<tr>
<td>Number</td>
<td># of Cores</td>
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<td>PRO 2500U</td>
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<tr>
<td>Ryzen 7</td>
<td>PRO 2700U</td>
</tr>
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</table>

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

| Chipset | AMD SoC (System on Chip) platform |
| Memory  | 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * Installed DIMMs are actually 2666MHz but run at 2400MHz due to AMD imitation |

| Display | Some: 14.0” (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio |
|         | Some: 14.5” (353mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle |

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

| Storage | System has one HDD slot or one M.2 2280 slot exclusively for storage |
|         | Some: SSD / SATA 6.0Gb/s, 2.5” 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 |

| Optical | None |

| Ethernet | Realtek® RTL8111GUL Gigabit Ethernet connection |

| WLAN | Realtek® RTL8822BE, 2.4GHz 802.11ac + Bluetooth 4.1, M.2 card |

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

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Models</td>
</tr>
<tr>
<td></td>
<td>24Wh or 24Wh + 24Wh</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>
</tbody>
</table>

| Case color | Black |
| Case material | Display cover: Magnesium Hybrid or PPS; Bottom: Glass-Fiber Reinforced Plastic |

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

### Media reader
- 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I
- 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, 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 cable
- HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter
- USB-C to DP: Lenovo USB-C to DisplayPort Adapter

### Bundled Accy
- 4-in-1 reader, multimedia Fn keys, optional LED backlight

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

### Audio support
- 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
- Discrete TPM 2.0, TCG Certified
- DASH Management

### Fingerprint reader
- Optional: Touch style match on chip fingerprint reader on the keyboard bezel
- None

### Battery
- Integrated Li-ion 24Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery
- None

### Max battery life (MobileMark® 2014)
- Models: 24Wh, 48Wh, 72Wh, 24Wh + 24Wh, 24Wh + 48Wh, 24Wh + 72Wh
- Max battery life: 5.37 hr, 10.76 hr, 16.4 hr, 10.76 hr, 16.4 hr, 22.15 hr * Battery life varies significantly with settings, usage, & other factors

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

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

### Limited warranty
- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-yr battery depot repair service
  - 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 May 2019**
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>8 MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i7-10510U</td>
<td>6</td>
<td>12</td>
<td>1.8 GHz</td>
<td>4.9 GHz</td>
<td>8 MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
</tbody>
</table>

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

### Graphics

- Intel UHD Graphics in processor only or Intel UHD Graphics in processor and AMD Radeon RX 640 Graphics, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 3840x2160@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

- 16GB max / 2666MHz DDR4, one DDR4 SO-DIMM socket

### 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>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; FHD</td>
<td>1920x1080</td>
<td>TN Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
<td></td>
</tr>
</tbody>
</table>

### Storage

- Up to two drives (one M.2 SSD and one HDD)
  - M.2 2280 SSD / 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
  - 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

- Gigabit Ethernet Connection, Realtek 8111OUS

### WLAN + Bluetooth™

- One of the following, configurable by model:
  - Realtek® RTL8822CE, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
  - Intel® Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0, M.2 card

### WWAN

- None

### SIM card

- None

### Media reader

- None

### Ports

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

### Monitor cable

- UltraNav™

### Security

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

### Security chip

- Integrated model: discrete TPM 2.0, TCG Certified

### System Mgt

- None

### Fingerprint reader

- Optional: Touch style match on chip fingerprint reader on power button

### NFC

- None

### Battery

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

### Max battery life

- 12.8 hr

### AC adapter

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

### Operating system

- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro in S mode
  - No OS

### Limited warranty

- 1-year mail-in repair service
- 1-year depot repair service
- 1-year depot with 2-year system board repair service

### Mil-Spec test

- MIL-STD-810G military testing (by the end of Dec. 2019)

### Environment

- EPEAT Silver; ENERGY STAR 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.
## ThinkPad E15 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-10110U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>4.1 GHz</td>
<td>4MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>6MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i7-10510U</td>
<td>6</td>
<td>12</td>
<td>1.8 GHz</td>
<td>4.9 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics in processor only or
- AMD Radeon RX 640 Graphics, 2GB GDDR5 memory;
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 3840x2160@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

- 16GB max / 2666MHz DDR4, one DDR4 SO-DIMM socket

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Surface Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot; FHD</td>
<td>(1920x1080)</td>
<td>TN Anti-glare</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
</tr>
<tr>
<td>15.6&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS Anti-glare</td>
<td>16:9</td>
<td>700:1</td>
<td>170°</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 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4
- 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 Drive

None

### Ethernet

Gigabit Ethernet Connection, Realtek 8811GUS

### WLAN + Bluetooth™

One of the following, configurable by model:
- Realtek® RTL8822CE, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0, M.2 card

### WWAN

None

### SIM card

None

### Audio

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

### Camera

HD720p camera with optional ThinkShutter camera privacy, fixed focus

### 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 Management

None

### Finger Print Reader

Optional: Touch style match on chip 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 AC adapter

### AC adapter

45W or 65W USB Type-C AC adapter

### Operating System

- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro in S mode

### Limited Warranty

- 1-year mail-in repair service
- 1-year depot repair service
- 1-year depot with 2-year system board repair service

### MIL-SPEC test

MIL-STD-810G military testing (by the end of Jan. 2020)

### Environment

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

---

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

### Processor

**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**

<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>i5-7200U</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>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>

### Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @ 60Hz

### Chipset

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

### Display

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

### Multi-touch

- None

### Storage

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

### Optane™ memory

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

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- 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 BT 4.2 but is limited to BT 4.1 by Windows OS

### WWAN

| SIM card | None |

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

---

**Dimensions**

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

**Weight**

- Starting at 3.87 lb / 1.75kg

**Case color**

- Black or silver

**Case material**

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

**Smart card reader**

- None

**Media reader**

- MicroSD card reader

**Ports**

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

**Camera**

- HD 720p camera, fixed focus

**Audio support**

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

**Keyboard**

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

**Fingerprint reader**

- Optional: Touch style fingerprint reader on the palm rest

**Security**

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

**Battery**

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

**Max battery life**

- MobileMark® 2014: 13.51 hr
  - *Battery life varies significantly with settings, usage, & other factors

**AC adapter**

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

**Operating system**

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

**Limited warranty**

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

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

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

---

August 2019
## Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8154U</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>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Graphics

- Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon RX 550X Graphics, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display.
- Max resolution: 4096x2304 @ 60Hz (USB Type-C); 4096x2160 @ 24Hz (HDMI)

## Chipset Memory

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

## Display

<table>
<thead>
<tr>
<th>Size / Resolution</th>
<th>Surface</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
<th>Multi-touch</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; HD (1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>220 nits 16:9</td>
<td>400:1</td>
<td>90°</td>
<td>Non-touch</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>250 nits 16:9</td>
<td>600:1</td>
<td>170°</td>
<td>Non-touch</td>
<td></td>
</tr>
</tbody>
</table>

## Multi-touch

- None

## Storage

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

## Optical

- None

## Ethernet

- Gigabit Ethernet Connection, Realtek RTL8111GUS

## WLAN + Bluetooth™

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

## WWAN SIM card

- None

## Processor Specifications Reference (PSREF)

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

## Notes

- Limited warranty: One of the following, configurable by model:
  - 1-year mail-in repair service
  - 1-year depot repair service
- MIL-Spec test: MIL-STD-810G military testing
- Environment: EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant
- August 2019

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

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>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
- Intel UHD Graphics 620 in processor and supports external digital monitor via HDMI or USB Type-C
- Supports three independent displays

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

#### Display

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

#### Storage
- One of the following, configurable by model:
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
  - M.2 2280 SSD & PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation

#### Optical
- Ethernet: Gigabit Ethernet Connection, Realtek 8111GUS
- Wi-Fi: 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

#### Battery
- Integrated Li-ion 42Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W 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

#### 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.
<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>2.6 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

**Display**
- Size / Resolution: 14.0” HD (1366x768), 14.0” FHD (1920x1080)
- Brightness: Anti-glare TN 220 nits, Anti-glare IPS 250 nits
- Aspect Ratio: 16:9
- Viewing Angle: 90° 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, RealtekRTL8111GUS

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

**WWAN**
- None

**SIM card**
- None

**Battery**
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- Max battery life: 11 hr

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

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

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

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

Note: The specifications above may not be available in all regions.
## ThinkPad E580 Platform Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-7020U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>5-7200U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 620</td>
<td></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</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>5-8550U</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>
<td></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>
<td></td>
</tr>
</tbody>
</table>

**Memory**

- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- System clocks down for processors with lower memory controller

**Chipset**

- Intel SoC (System on Chip) platform
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display,转变280x280
- Max resolution: 1920x1080 (HDMI)@60Hz

**Graphics**

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel Xe Graphics. 1920x1080 Max resolution: 1920x1080 (HDMI)@60Hz
- Supports external digital monitor via HDMI or USB Type-C.
- Supports dual independent display.
- Mixed resolution: 1920x1080 (HDMI)@60Hz

**Multi-touch**

- None

**Optane™ memory**

- Optional: Intel Optane memory, PCIe NVMe

**Optical**

- None

**Ethernet**

- Gigabit Ethernet Connection, Realtek R8111GUS
- WiFi: 802.11ac + Bluetooth 4.1, 2x2, MobileMark 2014: 12.23 hr, 45W or 65W AC adapter

**WLAN**

- 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

**Security**

- Power-on password, Hard disk password, supervisor password, security keyhole
- Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified
- Security chip (opt) vPro
- Security chip (opt): Intel vPro

**Camera**

- HD720p camera, fixed focus
- HD Audio, Synchronic CX11852 codec / stereo speakers, 2W x 2, Dolby
- Ultrasonic fingerprint reader with 65W AC adapter

**Audio support**

- HD Audio, Synchronic CX11852 codec
- Stereo speakers, 2W x 2, Dolby
- 5.1 Audio, Dolby

**Memory**

- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- System clocks down for processors with lower memory controller

**Processor**

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

**WLAN**

- Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card
- Intel 3165ac supports BT 4.2 but is limited to BT 4.1 by Windows OS

**Bluetooth**

- One of the following, configurable by model:
  - Realtek RTL8822CE
  - Realtek RTL8822BE

**Battery**

- Integrated Lithium-Ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter

**Max battery life**

- MobileMark 2014: 12.23 hr
- *Battery life varies significantly with settings, usage, & other factors

**AC adapter**

- 45W or 65W AC adapter

**Operating system**

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

**Limited warranty**

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

**Environment**

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

---

Note: The specifications above may not be available in all regions.
## ThinkPad E590 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor 8th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor Number</strong></td>
<td><strong>WxHxT</strong></td>
</tr>
<tr>
<td>i3-8145U</td>
<td>14.53” x 9.94” x 0.78”</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>369mm x 252.5mm x 19.9mm</td>
</tr>
<tr>
<td>i7-8565U</td>
<td></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 GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display.

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

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

- **Surface**
  - Anti-glare

- **Type**
  - TN

- **Brightness**
  - 220 nits

- **Aspect Ratio**
  - 16:9

- **Contrast Ratio**
  - 400:1

- **Viewing Angle**
  - 90°

- **Multi-touch**
  - Non-touch

### Storage

- Up to two drives (one M.2 SSD and one HDD)
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2 due to M.2 SSD adapter limitation

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

### Optane™ memory

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

### 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

### Chipset

- One of the following, configurable by model:
  - Intel SoC (System on Chip) platform

### Operating system

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

### Limited warranty

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

### Environment

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

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

**Lenovo**

**August 2019**
## ThinkPad E595 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: 3840×2160@60Hz (USB Type-C); 3840×2160@30Hz (HDMI)

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

**Display**  
**Size / Resolution**  
- 15.6" HD (1366x768)  
- 15.6" FHD (1920x1080)
  
**Surface**  
- Anti-glare
  
**Type**  
- TN
  
**Brightness**  
- 220 nits
  
**Aspect Ratio**  
- 16:9
  
**Contrast Ratio**  
- 400:1
  
**Viewing Angle**  
- 90°
  
**Multi-touch**  
- Non-touch

**Storage**  
Up to two drives (one M.2 SSD and one HDD)
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4

**Optical**  
Gigabit Ethernet Connection, Realtek R8111GUS

**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

**Camera**  
HD720p camera, fixed focus

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

**Keyboard**  
6-row, spill-resistant, multimedia Fn keys

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

**Security chip**  
Fingerprint reader: None

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

**Discrete TPM 2.0, TCG Certified**  
NFC: None

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

**Max battery life**  
MobileMark® 2014: 10.3 hr

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

**Operating system**  
Optional: Windows® 10 Home 64 or Windows 10 Pro 64

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

**Mil-Spec test**  
Work in progress

**Environment**  
EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant
### 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>i3-10110U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>4.1 GHz</td>
<td>4MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i7-10510U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.9 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
</tbody>
</table>

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

### Graphics

Intel UHD Graphics 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

4GB, 8GB, or 16GB / 2666MHz DDR4 / soldered to systemboard, no sockets

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Surface</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot; HD</td>
<td>(1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>250 nits</td>
<td>16:9</td>
<td>500:1</td>
<td>90°</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>(1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch (opt)

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

### Storage

One of the following, configurable by model:
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- 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 Lenovo USB-C to Ethernet Adapter

### WLAN + Bluetooth™

One of the following, configurable by model:
- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0, M.2 card

### WWAN

SIM card None

### Dimensions

WxDxH: 12.26" x 8.62" x 0.69"; 311.5mm x 219mm x 17.6mm

### Weight

Starting at 3.06 lb / 1.38 kg

### Case color

Black or Silver

### Case material

Display cover: Aluminum

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

Lenovo October 2019
ThinkPad L380 Platform Specifications

Product Specifications Reference (PSREF)

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

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
<td></td>
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<tr>
<td>3-7020U</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>3-7130U</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-7200U</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>2.2 GHz</td>
<td>3.3 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
<td></td>
</tr>
<tr>
<td>3-8250U</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>
<td></td>
</tr>
<tr>
<td>3-8350U</td>
<td>4</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-8550U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

Display 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 (optional) on-cell touch, supports 10-finger gesture

Storage One of the following, configurable by model: • M.2 SSD / SATA 6.0Gb/s (e.g. 800GB SSD M.2) • M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. 800GB SSD M.2 PCIe NVMe)

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

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

WWAN SIM card None None

Dimensions WxDxH: 12.67” x 8.83” x 0.74”; 321.88mm x 224.22mm x 18.8mm

Weight Starting at 3.22 lb / 1.46 kg

Case color Black or Silver

Case material Display cover: Aluminum Bottom: GFRP

Smart card reader None

Media reader MicroSD card reader

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

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

Bundled Accy Optional: ThinkPad Ethernet Extension Cable

Camera HD720p camera, fixed focus

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

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

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

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

Fingerprint reader Intel vPro Technology Optional: Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology

NFC (optional) Near Field Communication

Battery Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter Max battery life MobileMark® 2014: 16.1 hr

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

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

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

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

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

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

<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Number # of Cores # of Threads Base Frequency Max Turbo Frequency Cache Memory Types Processor Graphics</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4 8 1.6 GHz 4.1 GHz 6MB</td>
</tr>
<tr>
<td>i5-8665U</td>
<td>4 8 1.8 GHz 4.6 GHz 8MB</td>
</tr>
<tr>
<td>i3-8145U</td>
<td>2 4 2.1 GHz 3.9 GHz 4MB</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 2966MHz but run at 2400MHz due to Intel limitation |

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

| Multi-touch (opt) | On-cell touch, supports 10-finger gesture (FHD only) |
| Multi-touch (opt) | Touchable trackpad supports 10-finger gesture (FHD only) |

<table>
<thead>
<tr>
<th>Storage</th>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• M.2 2280 SSD / SATA 6.0Gb/s</td>
<td></td>
</tr>
<tr>
<td>• M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</td>
<td></td>
</tr>
<tr>
<td>• M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</td>
<td></td>
</tr>
<tr>
<td>• Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</td>
<td></td>
</tr>
</tbody>
</table>

| 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 |

| Bluetooth™ | None |
| WWAN | SIM card None |

<table>
<thead>
<tr>
<th>Weight</th>
<th>Dimensions WxDxH: 12.67&quot; x 8.83&quot; x 0.74&quot;; 321.8mm x 224.2mm x 18.8mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.22 lb / 1.46 kg</td>
<td></td>
</tr>
</tbody>
</table>

| Case color | Black or Silver Case material Display cover: Aluminum Bottom: FRP |

| Mil-Spec test | MIL-STD-810G military testing |
| Environment | EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant |

| Operating system | Optional: Windows 10 Home 64 or Windows 10 Pro 64 |

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

| System Mgt (opt) | Intel vPro Technology |
| Fingerprint reader | Optional: Touch style fingerprint reader on the palm rest |
| NFC (optional) | Near Field Communication |

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

| Max battery life | MobileMark® 2014: 14.61 hr |

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

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

| Accessories (optional) | Bundled |
| Media reader | None |
| Monitor cable (optional) | MicroSD card reader |
| Ports | Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, headphone / microphone combo jack, microSD card reader, security keyhole |
| Monitor | HDMI to DisplayPort Adapter: Lenovo USB-C to DisplayPort Adapter |
| Monitor | USB-C to VGA Adapter: Lenovo USB-C to VGA Adapter |
| Monitor | Lenovo USB-C to VGA plus Power Adapter |
| Monitor | USB-C to HDMI Adapter: Lenovo USB-C to HDMI Adapter |
| Monitor | USB-C to HDMI plus Power Adapter: Lenovo USB-C to HDMI Plus Power Adapter |
| Monitor | USB-C to Ethernet Adapter: Lenovo USB-C to Ethernet Adapter |
| Monitor | USB-C to USB-A Adapter: Lenovo USB-C to USB-A Adapter |
| Monitor | USB-C to USB-C Cable 2m: Lenovo USB-C to USB-C Cable 2m |

| Camera | HD720p camera, fixed focus |
| Camera | HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio Premium / dual array microphone, headphone / microphone combo jack |

| Audio support | TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch |
| Audio support | None |

| Keyboard | 6-row, spill-resistant, multimedia Fn keys, optional LED backlight |
| Keyboard | UltraNav™ | trackpoint® pointing device and buttonless Mylar surface touchpad, multi-touch |
| Keyboard | Optional: Intel vPro Technology |
| Keyboard | Discrete TPM 2.0, TCG Certified |

| System Mgt (opt) | Intel vPro Technology |
| Fingerprint reader | Optional: Touch style fingerprint reader on the palm rest |
| NFC (optional) | Near Field Communication |

| Battery | Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter |
| Max battery life | MobileMark® 2014: 14.61 hr |

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

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

| Lenovo |
| August 2019 |
### ThinkPad L480 Platform Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7020U</td>
<td>2</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</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>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>

**8th 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>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
<td>2</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8550U</td>
<td>2</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and 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: 1920x1080 @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
- *i3-7130U is NOT available in US and EMEA*

**Display**

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

**Multi-touch (optional)**

- UltraNav™: Touch style match on chip fingerprint reader on the keyboard bezel, anti-spoofing technology
- Keyboard: TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
- Security: Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Discrete TPM 2.0, TCG Certified
- Fingerpint reader: Optional: Touch style match on chip fingerprint reader on the keyboard bezel, anti-spoofing technology
- NFC (optional): Near Field Communication
- Battery: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- MAX battery life: MobileMark® 2014: 12.2 hr
- Battery life varies significantly with settings, usage, & other factors
- AC adapter: 45W or 65W USB Type-C AC adapter

**WLAN + Bluetooth (optional)**

- Optional: Bluetooth 4.2, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- Intel 8265ac card supports B74.2 but is limited to B74.1 by Windows OS

**Environment**

- MIL-Spec test: MIL-STD-810G military testing
- EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

**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>
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</thead>
<tbody>
<tr>
<td>Cel 4305U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 610</td>
</tr>
<tr>
<td>3-8145U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-8365U</td>
<td>4</td>
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<td>1.6 GHz</td>
<td>4.1 GHz</td>
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<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

### Display
- On-cell touch, supports 10-finger gesture (FHD only)
- 14.0” HD (1366x768) TN Anti-glare 220 nits 16:9 500:1 45% 90°
- 14.0” FHD (1920x1080) IPS Anti-glare 250 nits 16:9 800:1 45% 170°

### Multi-touch (opt)
- UltraNav™ 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- One of the following, configurable by model:
  - TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad

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

### Optane™ memory
- Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation

### 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
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- One of the following, configurable by model:
  - WLAN - Bluetooth™: Intel Wireless-AC 9260
  - WWAN (optional): None

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

### SIM card
- None

### Media reader
- MicroSD card reader

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

### Security chip
- Fingerprint reader Optional: Touch style fingerprint reader on the palm rest
- NFC (optional): 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
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

### Keyboard
- Security system Mgt (opt) Discrete TPM 2.0, TCG Certified
- Fingerprint reader Optional: Touch style fingerprint reader on the palm rest
- NFC (optional): None

### Battery
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- AC adapter MobileMark® 2014: 12 hr
- Max battery life *Battery life varies significantly with settings, usage, & other factors
- Battery life may vary significantly with settings, usage, & other factors

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

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

### 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 L570 Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
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### Intel Celeron Processor or 7th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
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<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>Cel 3965U</td>
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<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<td>Intel HD Graphics 620</td>
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</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform
- 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)
- Supports three independent displays;
- Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)
- Supports three independent displays;
- Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)

### 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 contrast ratio
- Some: 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio, 100° viewing angle

### Multi-touch

- None

### Storage

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

### Optical (optional)

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

### Ethernet

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

### WLAN

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

### WWAN (optional)

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

### SIM card (optional)

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

### Dimensions

- WxDxH: 14.84” x 10.04” x 1.08-1.21”
- 377mm x 255mm x 27.6-30.85mm
- Starting at 5.25 lb / 2.38 kg

### Weight

- Starting at 5.25 lb / 2.38 kg

### Case color

- Black

### Case material

- PC/ABS plastic

### Environment

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

### Security

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

### Operating system

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

### Limited warranty

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

### MIL-Spec test

- MIL-STD-810G military testing

### ExpressCard (optional)

- One slot (ExpressCard/34)

### Smart card reader

- Optional: Smart card reader

### Media reader

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

### Ports

- Four USB 3.1 Gen 1 (USB 3.0, one Always On), VGA, Mini DisplayPort, Ethernet (RJ-45), Dock connector

### Monitor cable

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

### Camera (optional)

- HD720p resolution, fixed focus

### Audio support

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

### Keyboard

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

### UltraNav™

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

### Battery

- Li-ion 6-cell (48Wh)
- 3-year/1-yr battery depot repair service

### Max battery life

- MobileMark® 2014: 14.8 hr
- Battery life varies significantly with settings, usage, & other factors

### AC adapter

- 45W slim tip AC adapter

### Dimensions

- Starting at 5.25 lb / 2.38 kg

### Operating system

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

### Security

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

### Operating system

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

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1-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 September 2018

Note: The specifications above may not be available in all regions.
### ThinkPad L580 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>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>
</tr>
<tr>
<td>3-7100U</td>
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<td>4</td>
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<td>3-7130U</td>
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<td>5-7200U</td>
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<tr>
<td>5-7300U</td>
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<td>2.6 GHz</td>
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<td>3MB</td>
<td>DDR4-2400</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>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
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<td>DDR4-2400</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>
</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 display via HDMI or USB Type-C;
- supports three independent displays;
- supports external digital monitor via HDMI or DisplayPort, HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphones / 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

#### Chipset

- Intel SoC (System on Chip) platform
- Supports three independent displays
- Supports external display via HDMI or USB Type-C
- Supports external digital monitor via HDMI or DisplayPort
- Supports three independent displays
- Supports external digital monitor via HDMI or DisplayPort

#### Display

- **Some:** 15.6" (396mm) HD (1366x768), Anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
- **Some:** 15.6" (396mm) FHD (1920x1080), Anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle

#### Multi-touch

- None

#### Storage

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

#### Optical

- None

#### Ethernet

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

#### WLAN + Bluetooth™ (optional)

- One of the following, configurable by model:
  - Realtek™ RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card

#### WWAN (optional)

- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE-A
  - Intel XMM™ 7660 (Fibocom L850-GL), M.2 card (EMEA only)

#### Memory

- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- Intel SoC (System on Chip) platform
- Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

#### Chipset

- Intel UHD Graphics 620

#### Camera

- 1.3 Megapixel HD 720p camera, fixed focus

#### Audio

- HD Audio, Realtek ALC2272 codec / stereo speakers, 2W x 2, Dolby Audio™ / dual array microphone, headphone / microphone combo jack

#### Security

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

#### Security chip

- Discrete TPM 2.0, TCG Certified

#### Fingerprint reader

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

#### NFC

- Optional: Near Field Communication

#### Battery

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

#### Max battery life

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

#### AC adapter

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

#### Operating system

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

#### Limited warranty

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

#### Environment

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

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

August 2019
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</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
- 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>
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<td>Anti-glare</td>
<td>220 nits</td>
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<td>500:1</td>
<td>45%</td>
<td>90°</td>
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<tr>
<td>15.6&quot; FHD</td>
<td>1920x1080</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>45%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch

- None

### Storage

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

### Optane™ memory

- None

### Optical

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

### Ethernet

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card (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 WWAN model, it means the model is NOT WWAN upgradable

### SIM card

- None

### Security

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

### Security chip

- Discrete TPM 2.0, TCG Certified

### 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 AC adapter

### AC adapter

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

### 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.

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**Product Specifications Reference (PSREF)**

 Lenovo

October 2019
### ThinkPad P1 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
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<td>9MB</td>
<td>DDR3/4</td>
<td>Intel UHD Graphics P630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR3/4</td>
<td>Intel UHD Graphics P630</td>
</tr>
</tbody>
</table>

#### Graphics

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

#### Chipset

- Mobile Intel CM246 Chipset

#### Memory

- Mobile DDR4 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), LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)  

#### Multi-touch (opt)

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

#### Storage

- Up to 2 drives (two M.2 SSD)

#### RAID (optional)

- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s
- RAID 0/1 support
- None

#### Optical

None

#### Ethernet

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

#### WLAN

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

#### WWAN

- None

#### Dimensions

- WxHxW (non-touch): 14.24" x 9.67" x 0.72"; 361.8mm x 245.7mm x 18.94mm
- WxHxW (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

### Note

The specifications above may not be available in all regions.

Lenovo

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

**ProductSpecificationsReference (PSREF) September 2019**

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.9 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.6 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i9-9880H</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.8 GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics P630</td>
</tr>
<tr>
<td>E-2276M</td>
<td>6</td>
<td>12</td>
<td>2.8 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

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

**Display**

<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;</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>(3840x2160)</td>
<td>IPS</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100% Adobe</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>(3840x2160)</td>
<td>OLED</td>
<td>500 nits</td>
<td>16:9</td>
<td>100000:1</td>
<td>100% DCI-P3</td>
<td>170°</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**

<table>
<thead>
<tr>
<th>RAID</th>
<th>Serial ATA/600</th>
<th>M.2 2280 SSD / PCIe NVMe 3.0 x 4</th>
<th>M.2 2280 SSD / PCIe NVMe 3.0 x 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Optical**

- None

**Ethernet**

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

- None

**SIM card**

- None

**Battery**

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

**Max battery life**

- MobileMark: 2014: 13.8 hr
- 10 Home 64
- 10 Pro 64
- Windows 10 Pro for Workstations

**AC adapter**

- 135W slim tip AC adapter

**Operating system**

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

**Limited warranty**

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

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

- EPEAT Silver; ENERGY STAR 7.1; RoHS-compliant

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

LENovo September 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>8-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8865U</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8 MB</td>
<td></td>
<td></td>
<td></td>
<td></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
- *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>
<th>Multi-touch (opt)</th>
<th>Pen</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits (non-touch) 300 nits (multi-touch)</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>ThinkPad Privacy Guard</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>WQHD (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>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Storage

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

### Optical

None

### Ethernet

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

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

### WLAN Bluetooth™

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

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

### WWAN (optional)

One of the following, configurable by model:

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

### SIM card (optional)

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

### Security

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

### Operating System

Windows 10 Home 64 or Windows 10 Pro 64

### Limited warranty

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

### MIL-Spec test

- MIL-STD-810G military testing

### Environment

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

### Note

The specifications above may not be available in all regions.

Lenovo October 2019
# ThinkPad P51 Platform Specifications

**Product Specifications Reference (PSREF)**

<table>
<thead>
<tr>
<th>Processor 6th or 7th Generation Intel® Core™ i7 Processor or Intel Xeon® Processor E3 v5 or v6 Family</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor</strong></td>
</tr>
<tr>
<td>Number</td>
</tr>
<tr>
<td>17-6620HQ</td>
</tr>
<tr>
<td>E3-1505M v6</td>
</tr>
<tr>
<td>17-7700HQ</td>
</tr>
<tr>
<td>17-7820HQ</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some: 15.6&quot; (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 170° viewing angle</td>
</tr>
<tr>
<td>Some: 15.6&quot; (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 4000:1 contrast ratio, 170° viewing angle</td>
</tr>
<tr>
<td>ThinkPad Pen Pro, active pen for multi-touch display</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multi-touch (opt) Pen (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ThinkPad Pen Pro, active pen for multi-touch display</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 3 drives (two M.2 SSD and one HDD)</td>
</tr>
<tr>
<td>Some: HDD / SATA 6.0Gb/s, 2.5&quot; wide, 7mm high, Active Protection System™</td>
</tr>
<tr>
<td>Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s</td>
</tr>
<tr>
<td>RAID 0/1 support</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>• Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</td>
</tr>
<tr>
<td>• Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bluetooth™</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
</tr>
</tbody>
</table>

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

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

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

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
</tr>
<tr>
<td>Non-touch</td>
</tr>
<tr>
<td>Multi-touch</td>
</tr>
</tbody>
</table>

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

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

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

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

<table>
<thead>
<tr>
<th>Dropping protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four USB 3.1 Gen 1 (USB 3.0, one Always On), USB Type-C / Thunderbolt 3, Mini DisplayPort 1.2a, HDMI 1.4b, Ethernet (RJ-45), Dock connector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Camera (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD720p resolution, fixed focus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audio support</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack</td>
</tr>
</tbody>
</table>

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

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

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

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

<table>
<thead>
<tr>
<th>Max battery life10 (MobileMark® 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Discrete Graphics</td>
</tr>
<tr>
<td>Hybrid Graphics</td>
</tr>
</tbody>
</table>

AC adapter |

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

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

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

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.

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>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>9-8950HK</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 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>12</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

- Mobile Intel CM246 Chipset

**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

**Display**

- **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)

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

**Storage**

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

**Optane™ memory**

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

**RAID (optional)**

- **RAID 0/1/0 support**

**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 (optional)**

- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L950-GL), M.2 card

**SIM card (opt)**

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

**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 |

**Case color**

- Non-touch model: starting at 5.4 lb / 2.45kg
- Multi-touch model: starting at 6.4 lb / 2.9kg

**Case material**

- Glass-Fiber Reinforced Plastic
- Magnesium/Aluminum

**Smart card reader**

- Optional: Smart card reader

**Media reader**

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

**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, numeric keypad, LED backlight
- 3-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad

**Fingerprint reader**

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

**Color calibration**

- None

**NFC (optional)**

- Near Field Communication

**Battery**

- Swappable Li-ion 90Wh battery

**Max battery life**

- (MobileMark® 2014) 6.1 hr; Hybrid mode: 8.9 hr
- *Battery life varies significantly with settings, usage, & other factors

**AC adapter**

- 170W slim tip AC adapter

**Operating system**

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

**Limited warranty**

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

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

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

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

*Lenovo August 2019*
**ThinkPad P52s Platform Specifications**

**Processor**
- **8th Generation Intel® Core™ i5 / i7 Processor**
- **Processor Number**
  - i5-8350U
  - i7-8550U
  - i7-8650U
- **# of Cores**
  - 4
  - 8
- **Base Frequency**
  - 1.7 GHz
  - 1.6 GHz
  - 1.9 GHz
- **Max Turbo Frequency**
  - 3.6 GHz
  - 4.0 GHz
  - 4.2 GHz
- **Cache**
  - 6MB
  - 8MB
- **Memory Types**
  - DDR4-2400
- **Processor 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
  - 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**
- **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

**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™
  - 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
  - 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

**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 BT4.2 but is limited to BT4.1 by Windows OS

**WWAN (optional)**
- **One of the following, configurable by model:**
  - Wireless WAN upgradeable
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7862 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7860 (Fibocom L830-GL), M.2 card
- **For non-WWAN model, it means the model is NOT WWAN upgradable

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

**Dimensions**
- **Width x Depth x Height:** 14.40” x 9.95” x 0.79-0.80”
- **Weight:** starting at 4.39 lb / 1.99 kg

**Battery**
- **Optional integrated Li-ion 32Wh battery and swappable Li-ion 24Wh, 48Wh, or 72Wh battery

**Max battery life**
- **(MobileMark® 2014)**
  - **Models:**
    - 48Wh
    - 72Wh
    - 32Wh + 24Wh
    - 32Wh + 48Wh
    - 32Wh + 72Wh
  - **Max battery life:**
    - 12.2 hr
    - 18.5 hr
    - 13.5 hr
    - 20.1 hr
    - 26.3 hr

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

**Operating system**
- Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**
- **One of the following, configurable by model:**
  - 1-year depot repair service
  - 1-year depot with 2-year system board repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service
  - 3-year (including battery) limited 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
August 2019
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.6 GHz</td>
<td>12MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i9-9880H</td>
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<td>16</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>E-2278M</td>
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<td>12</td>
<td>2.8 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<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), RTX 3000 (8GB GDDR6, VR ready), RTX 4000 (8GB GDDR6, VR ready), or RTX 5000 (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 Memory

Mobile Intel CM246 Chipset

<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>IPS</td>
<td>UltraVision™ HDR</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>15.6”</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
<td>170°</td>
</tr>
<tr>
<td>15.6”</td>
<td>UHD (3840x2160)</td>
<td>OLED</td>
<td>Anti-reflection</td>
<td>SDR 400nit, HDR 500nit (peak)</td>
<td>16:9</td>
<td>100000:1</td>
<td>100% DCL-P3</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Display

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

Supports pen accessory, please see the accessory compatibility for details

### Storage

Up to 3 drives (3x M.2 SSD or 1x HDD + 2x M.2 SSD)

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

* HDD is only available for T1000 and T2000 graphics model

### Optane™ memory

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

### RAID (optional)

RAID 0/1/5 support

### Optical

Optical: None

### Ethernet

Non-vPro model: Intel Ethernet Connection 2129-V (Jacksonville)
vPro model: Intel Ethernet Connection 2129-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 WWAN upgradable

### SIM card (optional)

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

### Dimensions

WxDxH (non-touch): 14.86” x 9.93” x 0.96-1.16”;

WxDxH (multi-touch): 14.86” x 9.93” x 1.02-1.21”;

377.4mm x 252.3mm x 24.5-29.4mm

### Weight

Non-touch model: starting at 5.51 lb / 2.5 kg;

Multi-touch model: starting at 6.4 lb / 2.9 kg

### Case color

Black

### Case material

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

### Smart card reader

Optional: Smart card reader

### ExpressCard

None

### Media reader

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

### Ports

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

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

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

### Monitor cable (optional)

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

### Bundled Accy

None

### Camera (optional)

One of the following, configurable by model:

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

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

### Audio support

UltraNav™

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

### Security

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

Security chip

Discrete TPM 2.0, TCG Certified

Fingerprint reader

Intel vPro Technology

Optical recognition

Near Field Communication

### Battery

Integrated Li-ion 90Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

Max battery life

Discrete mode: 8 hr; Hybrid mode: 13 hr

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

### AC adapter

170W or 230W slim tip AC adapter

### Operating system

One of the following, configurable by model:

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

### Limited warranty

One of the following, configurable by model:

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

### Mil-Spec test

MIL-STD-810G military testing

### Environment

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

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

Lenovo

October 2019
## ThinkPad P53s Platform Specifications

### Processor
- **8th Generation Intel® Core™ i7 Processor**
- **Processor Number**
  - 7-8655U
  - 7-8665U
- **# of Cores**
  - 4
- **# of Threads**
  - 8
- **Base Frequency**
  - 1.6 GHz
- **Max Turbo Frequency**
  - 4.6 GHz
- **Cache**
  - 8MB
- **Memory Types**
  - DDR4-2400
- **Processor Graphics**
  - Intel UHD Graphics 620

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

### Display
- **Size**
  - 15.6" FHD (1920x1080) IPS
  - 15.6" UHD (3840x2160) Dolby Vision™ HDR
- **Brightness**
  - 250 nits
  - 500 nits
- **Viewing Angle**
  - 16:9
  - 16:9

### Multi-touch (opt) Pen
- On-cell touch, supports 10-finger gesture (FHD only)
- None

### 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
- None

### Optical
- None

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

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

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

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

### Dimensions
- WxDxH: 14.40" x 9.76" 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

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

### 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)

### 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 /
  - Audio support: stereo speakers, 2W x 2, Dolby® Audio™ Premium /

### Security chip
- Security chip
- Security chip
- Intel vPro Technology
- Intel Security chip
- System Mgl (opt)
- Security chip

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

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

### Operating system
- Windows® 10 Home 64 or Windows 10 Pro 64
- Limited warranty: One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year/1yr battery depot repair service
  - 3-year/1yr 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.
### Processor

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<td>E-2186M</td>
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<td>12</td>
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<td>13MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 or P630 in processor and NVIDIA Quadro 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

### 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

### Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- M.2 SSD / PCle NVMe, PCIe 3.0 x 4, 32Gb/s

### Optane™ memory

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

### Ethernet

- Non-vPro model: Intel Ethernet Connectioni219-V (Jacksonville)
- vPro model: Intel Ethernet Connectioni219-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

- SIM card None

### Operating system

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

### Limited warranty

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

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

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

Note: The specifications above may not be available in all regions.
ThinkPad P73 Platform Specifications
Product Specifications Reference (PSREF)

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i9-9880H</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.8 GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2278M</td>
<td>6</td>
<td>12</td>
<td>2.8 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

Graphics

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

Chipset

- Mobile Intel CM246 Chipset
- Mobile Intel X790 Chipset
- Mobile Intel X791 Chipset

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>17.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>300 nits</td>
<td>9:16</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>17.3&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

Multi-touch Pen

- None

Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- Intel Optane memory, PCIe NVMe, PCIe 3.0 x 4

Optane™ memory

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

RAID (optional)

- RAID 0/1 support

Optical

- None

Ethernet

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

WLAN

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

WWAN

- None

SIM card

- None

Dimensions

- XxYxH: 16.38" x 11.06" x 1.02-1.22"; 416mm x 281mm x 25.9-31mm

Weight

- Starting at 7.5 lb (3.4kg)

Case color

- Black

Case material

- Display cover: GFRP + PPS;
- Bottom: Magnesium/Aluminum

Smart card reader

- Optional: Smart card reader

ExpressCard

- None

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

Monitor cable

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

Bundled Accy

- None

Camera (optional)

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

Audio support

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

Keyboard

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

Security

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

Security chip

- vPro (optional)
- 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)
- X-Rite Pantone factory color calibration (UHD model only)

NFC (optional)

- Near Field Communication

Battery

- Integrated Li-ion 99Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark® 2014: 17.2 hr
- * Battery life varies significantly with settings, usage, & other factors

AC adapter

- 170W or 230W slim tip AC adapter

Operating system

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

Limited warranty

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

Mil-Spec test

- MIL-STD-810G military testing

Environment

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

Note: The specifications above may not be available in all regions.
### ThinkPad T470 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>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i7-6500U</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7500U</td>
<td>4</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>

**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

**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)

**Power**

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

**Storage**

- System has one HDD slot or one M.2 2280 slot exclusively for storage
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxG5 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

**Display**

- *14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- *14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio
- *11.6" (294mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Networking**

- Intel Ethernet Connection I219-V (Jacksonville)
- Intel Wireless-AC 9260, 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, Wi-Fi 802.11ac + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Intel WWAN 8260, WWAN 8265, WWAN 9265, WWAN 9465, WWAN 18265, WWAN 8860, WWAN 9860, WWAN 9965

**WLAN**

- One of the following, configurable by model (WiGig can coexist with WWAN):
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, Wi-Fi 802.11ac + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel i7-6500U, Wi-Fi 802.11ac + BT4.1, M.2 card

**Bluetooth**

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

**Audio**

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

**Camera**

- *IR & 720p: IR camera and HD720p camera (mutually exclusive with WiGig)

**Optical**

- None

**Computer Interface**

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

**Battery life**

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

**Security**

- Power-on password, hard disk password, supervisor password, security keyhole
- Intel® vPro Technology
- FCC (optional)
- Touch fingerprint reader on the keyboard bezel
- Near Field Communication

**External battery**

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

**Operating system**

- One of the following, configurable by model:
  - Windows® 7 Professional 64 preinstalled
  - Windows® 8 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
  - Windows® 10 Home 64
  - Windows® 10 Pro 64

**AC adapter**

- *50W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter

**Warranty**

- Limited warranty:
  - 3-year/1-yr battery limited onsite service

**Environmental**

- MIL-STD-810G military testing
- EPEAT® Gold (US); ENERGY STAR® 6.1; RoHS-compliant

*Note: The specifications above may not be available in all regions.*
## 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>
</tr>
</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
</tbody>
</table>

or 7th Generation Intel Core / 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>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>
<tr>
<td>7-7500U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

Intel HD Graphics 520 or 620 in processor;
supports external digital monitor via HDMI or USB Type-C;
supports three independent displays:
Max resolution: 4096x2304x60Hz (USB Type-C); 4096x2160x24Hz (HDMI)

### Chipset

Intel SoC (System on Chip) platform
- 20GB or 24GB max / 2400MHz DDR4, dual-channel capable,
- 4GB or 8GB memory soldered to system board, one DDR4 SO-DIMM socket

### Display

<table>
<thead>
<tr>
<th>Type</th>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some</td>
<td>14.0&quot; (355mm) FHD (1920x1080)</td>
<td>anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle</td>
</tr>
<tr>
<td>Some</td>
<td>14.0&quot; (355mm) WQHD (2560x1440)</td>
<td>anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle</td>
</tr>
</tbody>
</table>

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

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

### Bluetooth

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

### WWAN (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 (MEAA) SIM card

### Ports

- Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 / Thunderbolt 3 (w/ the function of Power Delivery and DP), HDMI 1.4b, Ethernet (RJ-45), Dock connector
- * Depending on many factors, actual data transfer may be lower than theoretical speed

### Monitor cable (optional)

ThinkPad WiGig dock, mutually exclusive with WWAN

### WiGig dock (opt)

HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

### 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

### Specifications Reference

ThinkPad T470s Platform Specifications

Lenovo
April 2019
ThinkPad T480 Platform Specifications

Product Specifications Reference (PSREF)

Processor

<table>
<thead>
<tr>
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<th># of Cores</th>
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<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2</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>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</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>i7-8550U</td>
<td>8</td>
<td>1.8 GHz</td>
<td>3.2 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8650U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

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 (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;
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

Optical

None

Ethernet

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

WLAN + Bluetooth™

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

WWAN (optional)

One of the following, configurable by model (mutually exclusive with Intel Optane memory):
* Wireless WAN upgrade
* Integrated Mobile Broadband 4G LTE, Intel XMM™ 6360 (Fibocom L850-GL), M.2 card (EMEA only)
* Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

SIM card (optional)

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

Dimensions

<table>
<thead>
<tr>
<th>Weight</th>
<th>WxDxH: 13.25” x 9.15” x 0.79”; 336.8mm x 232.5mm x 19.95mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
<td>24Wh or 24Wh + 24Wh</td>
</tr>
<tr>
<td>Integrated Magnesium</td>
<td>3.49 lb / 1.58 kg</td>
</tr>
<tr>
<td>Integrated PPS</td>
<td>3.63 lb / 1.65 kg</td>
</tr>
<tr>
<td>Discrete Magnesium</td>
<td>3.53 lb / 1.60 kg</td>
</tr>
<tr>
<td>Discrete PPS</td>
<td>3.68 lb / 1.67 kg</td>
</tr>
</tbody>
</table>

Case color

Black

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

Smart card reader

Optional: Smart card reader

Media reader

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

WLAN + Bluetooth™

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 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
* HD camera and HD720p camera, fixed focus

Audio support

HD Audio, Realtek® ALC297 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

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

Security

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

Smart card reader

Microsoft Mark™ (2014)

Fingerprint reader

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

NFC (optional)

Near Field Communication

Battery

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

Max battery life

(MobileMark® 2014)

Models 24Wh 48Wh 72Wh 24Wh + 24Wh 48Wh + 48Wh 72Wh + 24Wh + 48Wh + 72Wh

Integrated model 7.2 hr 14.4 hr 21.8 hr 14.4 hr 21.8 hr 29.0 hr

Discrete model 6.6 hr 13.2 hr 19.8 hr 13.6 hr 19.8 hr 26.4 hr

AC adapter

45W or 65W USB Type-C AC adapter

Operating system

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

Limited warranty

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

Mil-Spec test

MIL-STD-810G military testing

Environment

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

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

Lenovo

August 2019
### ThinkPad T480s 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>4</td>
<td>8</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

or 8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
<td>2</td>
<td>4</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>i5-8250U</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>1</td>
<td>2</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 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

* System clocks down for processors with lower memory controller

**Display**

* Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle, supports ThinkPad Privacy Guard on some models

* Some: 14.0" (355mm) 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, 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

**Optical**

None

**Ethernet**

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

**WLAN + Bluetooth**

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

**WWAN (optional)**

One of the following, configurable by model:

* Wireless WAN upgradable
* Integrated Mobile Broadband 4G LTE, Intel XMM™ 7365 (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

**Weight**

Starting at 2.9 lb / 1.32 kg

**Case color**

Black or Silver

**Case material**

Display cover: CFRP Hybrid; Bottom: Magnesium

**Dimensions**

WxDxH: 13.03" x 8.93" x 0.73"; 331mm x 226.8mm x 18.45mm

**Battery**

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

**Max battery life**

MobileMark® 2014: 15.6 hr

**AC adapter**

45W or 65W USB Type-C AC adapter

**Operating system**

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

**Limited warranty**

One of the following, configurable by model:

* 1-year depot repair service
* 1-year depot with 2-year system board repair service
* 3-year/1-yr battery depot repair service
* 3-year/1-yr battery limited onsite service

**Mit-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.
ThinkPad T490 Platform Specifications

Product Specifications Reference (PSREF)

Processor

<table>
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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>
<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>1.9 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

or 10th Generation Intel i5 / i7 Processor (NOT available in EMEA)

<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>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-10510U</td>
<td>7</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

Graphics

Intel UHD Graphics 620 or Intel UHD Graphics in processor only or Intel UHD Graphics 620 or Intel UHD Graphics 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 for 48GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket

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

Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>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&quot;</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>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&quot;</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</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&quot;</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>ThinkPad Privacy Guard</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>170&quot;</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>WQHD (2560x1440)</td>
<td>IPS</td>
<td>Glossy</td>
<td>500 nits</td>
<td>16:9</td>
<td>1500:1</td>
<td>100% Adobe 170&quot;</td>
<td></td>
</tr>
</tbody>
</table>

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

Storage

- M.2 2280 SSD / SATA 6.0Gb/s (NOT available in EMEA)
- 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
- None

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:
- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0 (AX201 for 10th Gen processor only)

WWAN (optional)

One of the following, configurable by model:
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MMIMO 4x4, M.2 card
- For non-WWAN model, it means the model is NOT WWAN upgradable

SIM card (optional)

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

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
- Intel vPro Technology
- Fingerprint reader Optional: Touch style match on chip fingerprint reader on the palm rest
- Near Field Communication
- MobileMark 2014: 16.11 hr
- MobileMark 2014: 16.11 hr
- MobileMark 2014: 16.11 hr
- 45W, 65W, or 65W slim USB-C AC adapter

Audio support

- Premium / Audio
- HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W 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
- SecurityChip System Mgt (optional)
- Intel vPro Technology
- Fingerprint reader Optional: Touch style match on chip fingerprint reader on the palm rest
- Near Field Communication
- MobileMark 2014: 16.11 hr
- MobileMark 2014: 16.11 hr
- MobileMark 2014: 16.11 hr
- 45W, 65W, or 65W slim USB-C AC adapter

Battery

Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter

Max battery life

- MobileMark 2014: 16.11 hr
- MobileMark 2014: 16.11 hr
- MobileMark 2014: 16.11 hr
- 45W, 65W, or 65W slim USB-C AC adapter

Preload

One of the following, configurable by model:
- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro in S mode
- No OS

Limitation

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

Mil-Spec test

MIL-STD-810G military testing

Environment

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

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

September 2019
### Processor

- **8th Generation Intel® Core™ 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>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>1.7 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8665U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

### Graphics

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

### Chipset

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

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits (non-touch) / 300 nits (multi-touch)</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080) Low Power</td>
<td>IPS Anti-glare</td>
<td>400 nits (multi-touch)</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot; ThinkPad Privacy Guard</td>
<td>IPS Anti-glare</td>
<td>400 nits (multi-touch)</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot; WQHD (2560x1440) HDR, Dolby Vision™</td>
<td>IPS Glossy</td>
<td>500 nits (multi-touch)</td>
<td>16:9</td>
<td>1500:1</td>
<td>100%</td>
<td>Adobe 170°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN + 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 upgradeable
  - Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - For non- WWAN model, it means the model is NOT WWAN upgradeable

### SIM card (optional)

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

### Dimensions

- WxDxH (black with FHD / Privacy Guard): 12.95" x 8.90" x 0.66"; 329.0mm x 226.15mm x 16.7mm
- WxDxH (black with FHD Low Power / WQHD): 12.94" x 8.99" x 0.63"; 328.8mm x 225.8mm x 16.1mm
- WxDxH (silver): 12.96" x 8.92" x 0.68"; 329.15mm x 226.45mm x 17.2mm

### Weight

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

### Case color

- Black
- Silver

### Case material

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

### Display cover

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

### Bundled Accy

- One of the following, configurable by model:
  - Lenovo USB-C to DisplayPort Adapter
  - Optional: ThinkPad Ethernet Extension Adapter Gen 2

### Media reader

- MicroSD card reader

### Ports

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

### Camera

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

### Audio support

- 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

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip
- System Mgl (optional)
- Intel vPro Technology
- Near Field Communication

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- Battery life varies significantly with settings, usage, & other factors
- MobileMark® 2014: 20 hr
- AC adapter
- 45W, 65W, or 65W slim USB-C AC adapter

### Operating system

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

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 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; 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>
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<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 5 Pro 3500U</td>
<td>5</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 5 Pro 3700U</td>
<td>8</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 10 Graphics</td>
</tr>
</tbody>
</table>

## Graphics

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

## Chipset

- AMD SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable,
- 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket
- 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</td>
<td>1366x768</td>
<td>TN</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</td>
<td>1920x1080</td>
<td>IPS</td>
<td>250 nits (non-touch)</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot; FHD</td>
<td>1920x1080 Low Power</td>
<td>IPS</td>
<td>400 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
</tbody>
</table>

## Multi-touch (opt)

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

## Storage

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

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

## WWAN (optional)

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

## Case color

- Black

## Case material

- Display cover: PS S/50% GF;
- Bottom: PA/50% GF

## Dimensions

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

## Smart card reader

- Optional: Smart card reader

## Media reader

- Ports: MicroSD card reader
- Monitor cable (optional)
  - USB-C to VGA: Lenovo USB-C to VGA Adapter
  - USB-C to DP: Lenovo USB-C to DisplayPort Adapter

## Bundled Accy

- One of the following, configurable by model:
  - Power adapter: 65W USB Type-C AC adapter
  - Battery: Integrated Li-Ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

## 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

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

## Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Discrete TPM 2.0, TCG Certified
- System Mgt: DASH Management
- Fingerprint reader: Optional: Touch style match on chip fingerprint reader on the palm rest
- Battery: Integrated Li-Ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

## AC adapter

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

## Operating system

- Windows® 10 Home 64 or Windows 10 Pro 64

## Environment

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

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

Lenovo
July 2019
## ThinkPad T495s Platform Specifications

### Processor

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

### Graphics

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

### Chipset

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

### Display

<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; FHD</td>
<td>(1920x1080)</td>
<td>IPS Anti-giare</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</td>
<td>(1920x1080)</td>
<td>IPS Anti-giare</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot; FHD</td>
<td>(1920x1080)</td>
<td>ThinkPad Privacy Guard</td>
<td>IPS Anti-giare</td>
<td>16.9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Storage

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

### Optical

- None

### Ethernet

- Realtek® RTL8111EPV Gigabit Ethernet connection

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

### SIM card (optional)

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

### 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

- Case color: Black
- Case material: Display cover: CFRP Hybrid; Bottom: Magnesium/Aluminum

### Smart card reader

- Optional: Smart card reader

### Media reader

- MicroSD card reader

### Ports

- One of the following, configurable by model:
  - 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

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- DASH Management
- Security chip
- System Mgt
- 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 AC adapter
- MobileMark® 2014: 16.4 hr
- *Battery life varies significantly with settings, usage, & other factors
- AC adapter: 45W or 65W USB Type-C AC adapter

### Operating system

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

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 3-year 1-year battery 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
October 2019

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*Processor AMD Ryzen PRO Mobile Processors with Radeon Vega Graphics

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*Chipset AMD SoC (System on Chip) platform

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*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)

---

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

---

*Storage M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4

---

*Optical None

---

*Ethernet Realtek® RTL8111EPV Gigabit Ethernet connection

---

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

---

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

---

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

---

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

---

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

---

*Max battery life MobileMark® 2014: 16.4 hr

---

*Operating system Windows® 10 Home 64 or Windows 10 Pro 64

---

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

---

*Environment EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant
ThinkPad T580 Platform Specifications

Processor

7th Generation Intel® Core™ i5 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>3.9 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8550U</td>
<td>2</td>
<td>4</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>2</td>
<td>4</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 Memory

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

Display

Some: 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

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

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

Storage

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

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

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

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

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

Optane™ memory

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

Optical

None

Ethernet

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

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

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

WWAN + Bluetooth™

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

* WWAN

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

- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom L830-GL), M.2 card
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L830-GL), M.2 card
- For non-WWAN model, it means the model is NOT WWAN upgradable

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

Dimensions

WxDxH: 14.40” x 9.95” x 0.79-0.80”; 365.8mm x 252.8mm x 19.95-20.2mm

Weight

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

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

Monitor cable (optional)

One of the following, configurable by model:

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

Fingerprint reader

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

Security chip

Intel vPro Technology

Operating system

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

AC adapter

45W or 65W USB Type-C AC adapter

Battery

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

Max battery life (MobileMark® 2014)

Some:

- Models 24Wh 48Wh 72Wh 32Wh + 24Wh 32Wh + 48Wh 32Wh + 72Wh
- Max battery life: 5.8 hr 12.5 hr 18.1 hr 13.8 hr 20.3 hr 26.1 hr

Note: Battery life varies significantly with settings, usage, & other factors

Environmental

EPEAT Silver; ENERGY STAR® 6.1; RoHS-compliant

Lenovo
August 2019
## ThinkPad T590 Platform Specifications

### Processor
- **Processor Number**
  - i5-8265U: 4 cores, 8 threads, 1.6 GHz, 3.9 GHz, 6 MB Cache
  - i5-8385U: 4 cores, 8 threads, 1.6 GHz, 4.1 GHz, 6 MB Cache
  - i7-8565U: 4 cores, 8 threads, 1.8 GHz, 4.6 GHz, 8 MB Cache
  - i7-8665U: 4 cores, 8 threads, 1.9 GHz, 4.8 GHz, 8 MB Cache
- **Graphics**
  - Intel UHD Graphics 620

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

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

### Display
- **Size**
  - 15.6" FHD (1920x1080)
  - 15.6" UHD (3840x2160)
- **Resolution**
  - IPS Anti-glare: 250 nits, 16:9, 700:1, 45% NTSC, 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-L (Jacksonville)

### WLAN (optional)
- **Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0**

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

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

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

### 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 2**
  - (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 (NOT available in EMEA)
  - **USB-C to DP:** Lenovo USB-C to DisplayPort Adapter (NOT available in EMEA)

### Bundled Accessory
- **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 ALC2397 codec / stereo speakers, 2W 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**
- **Security chip**
  - Discrete TPM 2.0, TCG Certified
- **System Mgt (opt)**
  - Intel vPro Technology
- **Fingerprint reader**
  - 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 AC adapter
- **Max battery life**
  - MobileMark® 2014: 14.98 hr (9.5 hr for UHD model with discrete graphics)

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

### Limited warranty
- **One of the following, configurable by model:**
  - 1-year depot repair service
  - 1-year depot with 2-year system board repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

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

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

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

Lenovo
August 2019
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-10110U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>4.1 GHz</td>
<td>4MB</td>
<td>DDR4-2666</td>
<td>Intel UHD</td>
</tr>
<tr>
<td>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>6MB</td>
<td>DDR4-2666</td>
<td>Intel UHD</td>
</tr>
</tbody>
</table>

### Graphics
- Intel UHD Graphics in processor only; supports external digital display 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

### Display
- 13.3" (337.8mm) FHD (1920x1080), LED backlight, IPS, Glossy, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, Color Gamut 72%, 170° viewing angle, capacitive-type multi-touch
- supports 10-finger gesture
- Yoga hinge, 360 degree
- ThinkPad Pen Pro, active pen for multi-touch display, on-board rechargeable

### Storage
- One of the following, configurable by model:
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 4

### Optical
- None

### Ethernet
- Gigabit Ethernet via USB-C to Ethernet Adapter Dongle or Mechanical Dock

### WLAN + Bluetooth™
- One of the following, configurable by model:
  - Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- One of the following, configurable by model:
  - Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0, M.2 card

### WWAN
- None

### Dimensions
- WxDxH: 12.26" x 8.62" x 0.69"; 311.5mm x 219mm x 17.6mm
- Starting at 3.17lb / 1.43kg

### Case color
- Black or silver

### Case Material
- GFRP (Glass Fiber Reinforced Polymer)
- Magnesium + Aluminum
- GFIP (Glass Fiber Reinforced Polymer)

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

### Media reader
- MicroSD card reader
- Two USB 3.1 Type-A Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and Display Port), HDMI 1.4b, microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole

### Monitor cable (optional)
- USB-C to VGA: Lenovo USB-C to VGA Adapter
- USB-C to HDMI: Lenovo USB-C to HDMI Adapter

### Bundled Accy (optional)
- USB-C to DP: Lenovo USB-C to DisplayPort Adapter
- USB-C to RJ45: Lenovo USB-C to Ethernet Adapter
- USB-C to USB-A: Lenovo USB-C to USB-A Adapter
- USB-C to USB-C Cable 2M

### 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
  - World facing camera, 5MP resolution, auto focus (Fingerprint model only)
- HD Audio, Synaptics® CX11880-11Z / stereo speakers, 2W x 2, Dolby Audio™ Premium / dual array microphone, headphone / microphone combo jack

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

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

### Security chip
- None

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

### Battery
- Integrated Li-ion 46Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 12.23 hrs
- * Battery life varies significantly with settings, usage, & other factors

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

### Light sensor
- None

### Gyroscope
- Yes

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

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

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

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

---

**Lenovo**

October 2019
## ThinkPad L380 Yoga Platform Specifications

Product Specifications Reference (PSREF)

<table>
<thead>
<tr>
<th>Processor</th>
<th>7th Generation Intel® Core™ i3 / i5 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>3-7020U / 8-7200U</td>
</tr>
<tr>
<td># of Cores</td>
<td>2 / 4</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>2.3 GHz / 2.5 GHz</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>3.1 GHz / 3.4 GHz</td>
</tr>
<tr>
<td>Cache</td>
<td>3MB</td>
</tr>
<tr>
<td>Memory Types</td>
<td>DDR4-2133</td>
</tr>
<tr>
<td>Graphics</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>3-8130U / 5-8550U / 5-8250U</td>
</tr>
<tr>
<td># of Cores</td>
<td>2 / 4</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>1.6 GHz / 1.8 GHz</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>3.6 GHz / 4.0 GHz</td>
</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 HD Graphics 620 or Intel UHD Graphics 620 in processor;
- Supports external digital monitor via HDMI or USB Type-C;
- Supports three independent displays;
- Max resolution: 4096x2160@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)

### Chipset
- Intel SoC (System on Chip) platform
- Two DDR4 SO-DIMM sockets
- * System clocks down for processors with lower memory controller

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

### Display
- 13.3" (338mm) FHD (1920x1080), glossy, LED backlight, IPS, 300 nits
- 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- Yoga hinge, 360 degree
- Yoga hinge, support 10-finger gesture
- Yoga hinge, supports multi-touch, AR (anti-reflection)
- Yoga hinge, supports AR (anti-reflection)

### 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

### Optane Memory
- None

### Ethernet
- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LS (vPro)
- Via optional ThinkPad Ethernet Extension Cable Gen 2

### WLAN + Bluetooth™
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, 1.2 M.2 card
- * Wireless card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN
- None

### SIM card
- None

### Processor
<table>
<thead>
<tr>
<th>Number</th>
<th>Processor</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i3-7020U</td>
<td>2</td>
<td>2.3 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-8550U</td>
<td>4</td>
<td>1.8 GHz</td>
<td>3.7 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Smart card reader
- None

### Media reader
- MicroSD card reader

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

### Monitor cable
- Optional
- 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

### Camera
- 720p: World facing: Rear camera, 5MP resolution, auto focus
- IR & 720p: Rear camera, 720p, IR camera and HD720p camera, fixed focus
- World facing: Rear camera, 5MP resolution, auto focus

### Audio support
- HD Audio, Realtek ALC3287 codec, Dolby® Advance / stereo speakers, 2W x 2 / dual array microphone, headphone / microphone combo jack

### Keyboard
- 6-row, 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
- Security chip
- System Mgt (opt)
- Intel vPro Technology
- Fingerprint reader Optional: Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology

### NFC (optional)
- Near Field Communication (mutually exclusive with smart card reader)

### Battery
- Integrated Li-Ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- With 65W USB Type-C AC adapter
- MobileMark® 2014: 12.85 hrs
- * 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
  - 1-year depot with 2-year system board 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; ENERGY STAR® 6.1; RoHS-compliant

**Dimensions**
- WxDxH: 12.67" x 8.82" x 0.74"; 322mm x 224.2mm x 18.8mm

**Weight**
- Starting at 3.44 lb / 1.56 kg

**Case color**
- Black or Silver

**Case material**
- Display cover: Aluminum
- Bottom: GFRP

**Lenovo**
March 2019
<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>3-8145U</td>
</tr>
<tr>
<td># of Cores</td>
<td>2</td>
</tr>
<tr>
<td># of Threads</td>
<td>4</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>2.1 GHz</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>3.9 GHz</td>
</tr>
<tr>
<td>Cache</td>
<td>4MB</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>

<table>
<thead>
<tr>
<th>Graphics</th>
<th>Intel UHD Graphics 620 in processor;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>supports external digital monitor via HDMI or USB Type-C;</td>
</tr>
<tr>
<td></td>
<td>supports three independent displays;</td>
</tr>
<tr>
<td></td>
<td>Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Display</th>
<th>13.3&quot; (338mm) FHD (1920x1080), glossy, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 80:1 contrast ratio, 72% gamut, 170° viewing angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-touch</td>
<td>Capacitive-type multi-touch, AR (anti-reflection), supports 10-finger gesture</td>
</tr>
<tr>
<td>Hinge</td>
<td>Yoga hinge, 360 degree</td>
</tr>
<tr>
<td>Multi-mode Pen</td>
<td>ThinkPad Pen Pro, active pen for multi-touch display, on-board garage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• M.2 SSD / SATA 6.0Gb/s</td>
</tr>
<tr>
<td></td>
<td>• M.2 (2242) SSD / PCIe NVMe, PCIe 3.0 x 2</td>
</tr>
<tr>
<td></td>
<td>• M.2 (2280) SSD / PCIe NVMe, PCIe 3.0 x 4</td>
</tr>
<tr>
<td></td>
<td>• Intel Optane Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optane™ Memory</th>
<th>Optional: Intel Optane Memory H10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethernet</th>
<th>Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>via optional ThinkPad Ethernet Extension Cable or Lenovo USB-C to Ethernet Adapter</td>
</tr>
</tbody>
</table>

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

| WWAN               | None                                                |

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>WxDxH: 12.67&quot; x 8.82&quot; x 0.74&quot;; 321.8mm x 224.2mm x 18.8mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Starting at 3.44 lbs / 1.56 kg</td>
</tr>
<tr>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>Case material</td>
<td>Display cover: Magnesium / Aluminum Bottom: GFRP</td>
</tr>
</tbody>
</table>

**Processor Specifications Reference (PSREF)**

**Product Specifications Reference (PSREF)**

**Lenovo**

**July 2019**
ThinkPad X1 Yoga (3rd Gen) Platform Specifications

Processor
7th Generation Intel® Core™ i5 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7300U</td>
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<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
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</table>

8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
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<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
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<td></td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-8650U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></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: 5120x2880@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

Chipset
Intel SoC (System on Chip) platform

Display
14.0" (355mm) FHD (1920x1080), LED backlight, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle, IPS
Some: 14.0" (355mm) QHD (2560x1440), LED backlight, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle, IPS
Some: 14.0" (355mm) HDR QHD (2560x1440) with Dolby Vision™;
LED backlight, 500 nits, 16:9 aspect ratio, 1500:1 contrast ratio, 100% gamut, 170° viewing angle, IPS

Multi-touch
Capacitive-type multi-touch, AR (anti-reflection), AS (anti-smudge), supports 10-finger gesture, reduces overall display brightness by 10%

Hinge
Yoga hinge, 360 degree

Convert-mode
Laptop, tent, stand, and tablet

Pen (optional)
ThinkPad Pen Pro, active pen for multi-touch display, on-board rechargeable

Storage
Some: M.2 SSD / SATA 6.0Gb/s (e.g. xxxG SSD)
Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxG SSD PCIe NVMe)

Optical
None

Ethernet
Native Intel Ethernet Connection WGI219-LM (vPro) via optional ThinkPad Ethernet Extension Cable

WLAN
Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo adapter

WWAN (optional)
Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7390 (Fibocom L850-GL), M.2 card

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

Dimensions
WxDxH: 13.11" x 9.02" x 0.67"; 333mm x 229mm x 17.05mm

Weight
Starting at 3.08 lb / 1.4kg

Case color
Black or silver

Case material
Display cover: Carbon-Fiber and Glass-Fiber hybrid; Bottom: magnesium-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 (Power Delivery, DisplayPort, Data transfer), HDMI 1.4, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, microSD card reader

WiGig dock
None

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

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

Audio support
HD Audio, Realtek ALC3286 codec, Dolby Audio™ Premium / stereo speakers, 1W x 2 / .16" Noise-cancelling Dual Array Far Field, headphone / microphone combo jack

Keyboard
6-row wave keyboard (rise & fall), spill-resistant, multimedia Fk keys, LED backlight

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

Security
Discrete TPM 2.0 TCG Certified

System Mgmt (optional)
Intel vPro Technology

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

Battery
Integrated Li-Ion 54Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

Max battery life
MobileMark® 2014: 15.4 hrs

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

Light sensor
Ambient Light Sensor

G-sensor
3D accelerometer

Gyroscope
3D gyrometer

GPS
GPS function is integrated into WWAN module

Preload
Windows™ 10 Pro 64

Limited warranty
One of the following, configurable by model:

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

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

Lenovo
July 2019
## ThinkPad X1 Yoga (4th Gen) 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>4.1 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8665U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i5-10210U</td>
<td>6</td>
<td>1.6 GHz</td>
<td>4.9 GHz</td>
<td>8MB</td>
<td></td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i5-10510U</td>
<td>6</td>
<td>3.0 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td></td>
<td></td>
</tr>
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</table>

### Graphics

- Intel UHD Graphics 620 or Intel UHD Graphics in processor.
- Supports external digital monitor via HDMI or USB Type-C.
- Supports three independent displays.
- Max resolution: 5120x2880@60Hz (USB Type-C); 4096x2160@24Hz (HDMI).
- Supports external digital monitor via HDMI or USB Type-C.

### Chipset

- Intel SoC (System on Chip) platform.
- Max battery life: 18.1 hrs.
- Battery life varies significantly with settings, usage, & other factors.

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0</td>
<td>FHD (1920x1080) Low Power</td>
<td>IPS Glossy</td>
<td>380 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0</td>
<td>FHD (1920x1080) ThinkPad Privacy Guard</td>
<td>IPS Glossy</td>
<td>380 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0</td>
<td>UHD (3840x2160) Dolby Vision™ HDR4095</td>
<td>IPS Glossy</td>
<td>470 nits</td>
<td>16:9</td>
<td>1400:1</td>
<td>90%</td>
<td>170°</td>
</tr>
</tbody>
</table>

### Multi-touch

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

### Hinge

- Yoga hinge, 360 degree.

### Convert-mode Pen

- Laptop, tent, stand, and tablet.
- TrackPoint® pointing device and buttonless Glass surface multi-touch touchpad.

### 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 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 I2199-LM (vPro) or I2199-V (Non-vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2.

### 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)

- One of the following, configurable by model:

### SIM card (optional)

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

### 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® ALC1012L codec, Dolby® Audio™ Atmos / 4 array 360-degree far-field microphones, headphones / microphone combo jack.

### Security

- Power-on password, supervisor password, system management password, hard disk password.
- Discrete TPM 2.0 TCG Certified.

### Security chip

- Optional: Intel vPro Technology.

### Fingerprint reader

- Touch style match on chip fingerprint reader on the palm rest.
- Optional: Near Field Communication.

### Battery

- Integrated Li-Ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter.
- MobileMark® 2014: 18.1 hrs.

### AC adapter

- 45W USB Type-C, 65W USB Type-C or 65W Slim USB Type-C AC adapter.

### G-sensor

- 3D accelerometer.

### Gyroscope

- 3D gyrometer.

### GPS

- GPS function is integrated into WWAN module.

### Preload

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

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service.
  - 1-year depot with 2-year system board service.
  - 3-year/1-yr battery depot repair service.

### Mil-Spec test

- MIL-STD-810G military testing.

### Environment

- EPEAT® Gold; ENERGY STAR® 7.1; RoHS-compliant.

---

**Dimensions:**
- WxDxH (Privacy Guard): 12.71" x 8.58" x 0.63"; 323mm x 218mm x 15.95mm
- WxDxH (Other model): 12.71" x 8.58" x 0.61"; 323mm x 218mm x 15.5mm

**Weight:**
- Privacy Guard model: starting at 3.24lb / 1.47kg
- Other model: starting at 2.99lb / 1.36kg

**Smart card reader:** None

**Media reader:** None

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

**Monitor cable:**
- Optional: Lenovo HDMI to VGA Monitor Adapter.
- Optional: ThinkPad Ethernet Extension Adapter Gen 2.

---

**Lenovo**

**October 2019**
## ThinkPad X380 Yoga Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</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>
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<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>1.8 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 UHD Graphics 620 in processor only;
- 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;
- 8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
- * System clocks down for processors with lower memory controller

### Display

- 13.3" (337.8mm) FHD (1920x1080), LED backlight, IPS
- 300 nits, 16:9 aspect ratio, 178° viewing angle

### Multi-touch

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

### Hinge

- Yoga hinge, 360 degree

### Convert-mode

- Laptop, tent, stand, yoga and tablet
- ThinkPad Pen Pro, active pen for multi-touch display, on-board rechargeable

### Storage

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

### Optical

- None
- None

### Ethernet

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

### WLAN

- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)

- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE, Fibocom LB30-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

### Dimensions

- WxDxH: 12.34" x 8.75" x 0.72";
- 313.5mm x 222.2mm x 18.2mm

### Weight

- Starting at 3.17 lb / 1.43kg

### Case color

- Black or silver

### Case Material

- Carbon-Fiber Hybrid

### Bluetooth

- [Registered Trademark]

### WLAN

- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WiGig dock

- Monitor cable (optional)

### Security

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

### Security chip

- System Mgt (opt) Intel vPro Technology

### Fingerprint reader

- Optional: Touch style match on chip fingerprint reader on the palm rest
- NFC (optional)
- Near Field Communication (mutually exclusive with smart card reader)

### Battery

- Li-Ion 51Wh battery
- Max battery life
  - MobileMark® 2014: 13.6 hrs
  - * Battery life varies significantly with settings, usage, & other factors
- AC adapter
  - 45W or 65W AC adapter (slim tip), 45W or 65W USB Type-C AC adapter

### Light sensor

- Ambient Light Sensor
- 3D accelerometer and 3D magnetometer
- 3D compass

### Gyroscope

- 3D gyrometer

### Preload

- Some: Windows® 10 Pro 64
- Limited warranty
  - One of the following, configurable by model:
    - 1-year depot repair service
    - 1-year depot with 2-year system board service
    - 3-year/1-yr battery depot repair service

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

- EPEAT™ Gold; ENERGY STAR®; RoHS-compliant

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Lenovo

March 2019
**ThinkPad X390 Yoga Platform Specifications**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.8 GHz</td>
<td>6MB</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>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<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;
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)

### Chipset

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

### Display

- 13.3" (337.8mm) FHD (1920x1080), LED backlight, IPS, Glossy, 220 nits, 16:9 aspect ratio, 800:1 contrast ratio, Color Gamut 72%, 170° viewing angle, capacitive-type multi-touch, AR (anti-reflection), AS (anti-smudge), supports 10-finger gesture

### Multi-touch

- Yoga hinge, 360 degree

### Hinge

- Convert-mode Pen: Laptop, tent, stand and tablet
- ThinkPad Pen Pro, active pen for multi-touch display, on-board rechargeable

### 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

### Optane™ memory

- Optional: Intel Optane Memory H10
- 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

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

### Bluetooth™

- One of the following, configurable by model:
  - Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter
  - *For non-WWAN model, it means the model is NOT WWAN upgradeable

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

### Dimensions

- WxDxH: 12.22" x 8.62" x 0.63"; 310.4mm x 219mm x 15.95mm

### Weight

- Starting at 2.85 lb / 1.29kg

### Case color

- Black or silver (Silver is not available in EMEA)

### Case Material

- Display cover: Carbon-Fiber Hybrid
- Bottom: Carbon-Fiber Hybrid

### 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 Display Port), 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, head phone / microphone combo jack, optional smart card reader, side docking connector, security keyhole

### Monitor cable (optional)

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

### Bundled Accy

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

### Camera

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

### Audio support

- Headphone / microphone combo jack

### Keyboard

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

### Security

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

### Security chip

- Discrete TPM 2.0 TCG Certified

### System Mgt (opt)

- Intel vPro Technology

### Fingerprint reader

- One of the following, configurable by model:
  - Trackpoint fingerprint reader on the palm rest
  - NFC (optional)
  - Near Field Communication

### Battery

- Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- with 65W USB Type-C AC adapter
- MobileMark® 2014: 14.5 hrs
- *Battery life varies significantly with settings, usage, & other factors*

### Max battery life

- 14.5 hrs

### AC adapter

- 45W USB Type-C, 65W USB Type-C or 65W Slim 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
  - 1-year depot with 2-year system board service
  - 3-year/1-year battery 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
## ThinkPad Yoga 11e (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>Burst Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>m3-7Y30</td>
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<td>4</td>
<td>1.0 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 615</td>
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<tr>
<td>5Y754</td>
<td>2</td>
<td>4</td>
<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cel N4100</td>
<td>4</td>
<td>1</td>
<td>1.1 GHz</td>
<td>2.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Pen N5000</td>
<td>4</td>
<td>1</td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 605</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle, Corning® Gorilla® Glass
- Capacitive-type multi-touch, supports 10 fingers
- Yoga hinge, 360 degree Convertible mode
- Optional: ThinkPad Pen Pro, optional: ThinkPad Pen Pro, batteries required, on-board garage

### Storage

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

### Optical

- None

### Ethernet

- Realtek RTL8111GUS-CG Gigabit Network Connection

### WLAN

- Realtek RTL8111GUS-CG Gigabit Network Connection
- 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
  - Bluetooth wireless, integrated in Wi-Fi + Bluetooth combo adapter

### Bluetooth™

- None

### Dimensions

<table>
<thead>
<tr>
<th>WxDxH:</th>
<th>11.81&quot; x 8.27&quot; x 0.89&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>From 3.4 lb / 1.54kg</td>
</tr>
<tr>
<td>Case color:</td>
<td>Black</td>
</tr>
<tr>
<td>Display cover:</td>
<td>PC/ABS+GF</td>
</tr>
<tr>
<td>Bottom:</td>
<td>PC/ABS plastic</td>
</tr>
</tbody>
</table>

### Camera

- One of the following, configurable by model:
  - HD720p resolution, low light sensitive, fixed focus
  - World facing: Rear camera, 5MP resolution, auto focus
- HD Audio, Realtek® ALC3287 codec Dolby Audio™ / stereo speakers, 2W x 2 / monaural microphone, headphone / microphone combo jack

### Control buttons

- Two buttons click pad below keyboard, multi-touch

### Audio support

- 6-row, multimedia Fn keys
- Two buttons click pad below keyboard, multi-touch

### Battery

- Integrated Li-Ion 42Wh battery
- Max battery life: MobileMark® 2014: 12 hrs

### AC adapter

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

### Preload

- Some: Windows® 10 Home 64
- Some: Windows 10 Pro 64

### Limited warranty

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

### Mil-Spec test

- MIL-STD-810G military testing
## ThinkPad X1 Carbon (6th 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>5th Generation Intel® Core™ i5 Processor</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>6th Generation Intel® Core™ i5 Processor</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7th Generation Intel® Core™ i5 Processor</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th Generation Intel® Core™ i5 Processor</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Memory

- 8GB or 16GB / 2133MHz LPDDR3 / soldered to system board, no sockets
- Intel SoC (System on Chip) platform
- 6th Generation Intel® Core™ i5 Processor
- 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
- 8GB or 16GB / 2133MHz LPDDR3 / soldered to system board, no sockets
- System clocks down for processors with lower memory controller

### Display

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

### Storage

- M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32GB/s (e.g. xxxGB SSD M.2 PCIe NVMe)
- None

### Optical

- Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2
- None
- WLAN + Bluetooth™
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)

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

### Chipset

- One of the following, configurable by model:
  - Intel I219-V (Non-vPro) or I219-LM (vPro)
  - Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor; supports three independent displays;
- Max resolution: 5120x2880@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

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

### Camera (optional)

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - 1/2.7” 8-megapixel fixed-focus camera with ThinkShutter camera privacy

### Audio support

- HD Audio, Realtek ALC3286 codec / stereo speakers, 1W x 2, Dolby Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos™ via headphones

### Keyboard

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

### Security chip

- Power-on password, hard disk password, supervisor password, keyhole
- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified
- Biometric authentication
- Anti-spoofing technology

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- MobileMark® 2014: 19.3 hr
- Near Field Communication

### Operating system

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

### Limited warranty

- One of the following, configurable by model:
  - 1-year depot repair service
  - 1-year depot with 2-year system board 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
August 2019
ThinkPad X1 Carbon (7th Gen) Platform Specifications

Product Specifications Reference (PSREF)

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>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>LPDDR3-2133</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>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

or 10th Generation Intel Core i5 / i7 Processor (NOT available in EMEA)

<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>5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-10510U</td>
<td>6</td>
<td>12</td>
<td>1.1 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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 L960-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

Dimensions
- WxDxH (Privacy Guard): 12.72" x 8.54" x 0.61"; 323mm x 217mm x 15.4mm
- WxDxH (other model): 12.72" x 8.54" x 0.59"; 323mm x 217mm x 14.95mm

Weight
- Privacy Guard model: starting at 2.66 lb / 1.21 kg
- Other model: starting at 2.4 lb / 1.09 kg

Case color
Black paint or black weave

Case material
Display cover: Carbon Fiber; Bottom: magnesium alloy

Smart card reader
None

Media reader
None

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

Monitor cable
Optional: Lenovo HDMI to VGA Monitor Adapter

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
- 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
- HD Audio, Realtek ALC3286 codec / Dolby Audio
- TrackPoint® pointing device and buttonless glass surface multi-touch touchpad

Keyboard
- 6-row, spill-resistant, multimedia Fn keys, LED backlight
- UltraNav™
- 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
- Optional: Near Field Communication

Battery
- Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- MobileMark® 2014: 18.3 hr
- Battery life varies significantly with settings, usage, & other factors

Max battery life
- 65W AC adapter
- 45W, 65W, or 65W slim USB-C AC adapter

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

Limited warranty
- 1-year depot repair service
- 2-year system board 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; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.
<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>Base Frequency</td>
</tr>
<tr>
<td>i5-8300H</td>
<td>2.3 GHz</td>
</tr>
<tr>
<td>i5-8400H</td>
<td>2.5 GHz</td>
</tr>
<tr>
<td>i5-8550H</td>
<td>2.7 GHz</td>
</tr>
</tbody>
</table>

| Graphics | Intel UHD Graphics 630 in processor and NVIDIA® GeForce® GTX 1050 Ti, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI) |

<table>
<thead>
<tr>
<th>Chipset</th>
<th>Mobile Intel CM246 Chipset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>64GB max / 2666MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
<th>Some: 15.6&quot; (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 100:1 contrast ratio, 72% gamut, 170° viewing angle. Some: 15.6&quot; (396mm) HDR UHD (3840x2160) with Dolby Vision™, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-touch (opt)</td>
<td>Capacitive-type multi-touch, supports 10-finger gesture (4K only)</td>
</tr>
<tr>
<td>Pen</td>
<td>Supports pen accessory, please see the accessory compatibility for details</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
<th>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) RAID 0/1 support None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>RAID (optional)</th>
<th>None</th>
</tr>
</thead>
</table>

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

| Ethernet | 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 |

| WLAN | None |

| Bluetooth™ | None |

| WWAN | None |

| SIM card | None |

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>WxDxH (non-touch): 14.24&quot; x 9.67&quot; x 0.72&quot;; WxDxH (multi-touch): 14.24&quot; x 9.67&quot; x 0.74&quot;; 361.8mm x 245.7mm x 18.4mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Non-touch: starting at 3.76 lb / 1.7 kg; Multi-touch: starting at 4.06 lb / 1.8 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case color</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case material</td>
<td>Display cover: CFRP/GFRP hybrid; Bottom: Aluminum alloy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smart card reader</th>
<th>Optional: Smart card reader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media reader</td>
<td>SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card</td>
</tr>
<tr>
<td>Ports</td>
<td>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</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitor cable (optional)</th>
<th>USB-C to DP™. Lenovo USB-C to DisplayPort Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bundled Accy</td>
<td>Optional: ThinkPad Ethernet Extension Cable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Camera (optional)</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio support</td>
<td>• HD720p camera with ThinkShutter camera privacy, fixed focus • 180° camera and HD720p camera, fixed focus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security chip</th>
<th>Power-on password, hard disk password, supervisor password, security keyhole</th>
</tr>
</thead>
<tbody>
<tr>
<td>vPro (optional)</td>
<td>Discrete TPM 2.0, TCG Certified</td>
</tr>
<tr>
<td>Fingerprint reader</td>
<td>Intel vPro Technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Battery</th>
<th>Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max battery life</td>
<td>Discrete mode: 9.5 hr; Hybrid mode: 14.9 hr</td>
</tr>
<tr>
<td>AC adapter</td>
<td>135W slim tip AC adapter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Windows® 10 Home 64 or Windows 10 Pro 64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited warranty</td>
<td>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</td>
</tr>
</tbody>
</table>

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

Note: The specifications above may not be available in all regions.
ThinkPad X1 Extreme (2nd Gen) Platform Specifications

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-9300H</td>
<td>4</td>
<td>8</td>
<td>2.4 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>-</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i5-9400H</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.8 GHz</td>
<td>8MB</td>
<td>-</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9750H / i9-9880H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>5.0 GHz</td>
<td>12MB</td>
<td>-</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.6 GHz</td>
<td>12MB</td>
<td>-</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

Graphics

Intel UHD Graphics 630 in processor and NVIDIA®️ GeForce®️ GTX 1650, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™️; supports four independent displays; Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI)

Chipset

Mobile Intel CM246 Chipset

Memory

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

Display

- 15.6” FHD (1920x1080): IPS Anti-glare 300 nits 16:9 700:1 72% SDR 170°
- 15.6” UHD (3840x2160): Dolby Vision HDR IPS Anti-glare 500 nits 16:9 1200:1 72% NTSC 170°
- 15.6” UHD (3840x2160): Dolby Vision HDR, Multi-touch: OLED Anti-reflection 400 nit; HDR 600nit (peak) 16:9 100000:1 100% DCI-P3 170°

Multi-touch (optional)

- Capacitive-type multi-touch, supports 10-touch gesture (UHD OLED only), anti-reflection (AR), anti-smudge (AS) coating
- Supports pen accessory, please see the accessory compatibility for details

Pen

Security

- TrackPoint®️ pointing device and buttonless glass surface multi-touch touchpad
- 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 keyboard bezel
- Color calibration: Optional: X-Rite Pantone factory color calibration (UHD model only)

Battery

- Integrated Li-ion 80WWh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 135W slim tip AC adapter

Environment

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

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

Lenovo
September 2019
### Processor Specifications

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>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>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>3.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7100U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</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 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>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-7500U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset Memory

- Intel SoC (System on Chip) platform
  - 16GB max / 2400MHz DDR4, one DDR4 SO-DIMM socket
  - DDR4-2133 Intel HD Graphics

### 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, 300° 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
- 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

### Multi-touch (opt)

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

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

- One of the following, configurable by model (WiGig is mutually exclusive with WWAN):
  - Intel® RLT8822BE, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1

### Bluetooth™

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

### WWAN (optional)

- One of the following, configurable by model (mutually exclusive with WiGig):
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE-A
  - Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)
  - Integrated Mobile Broadband 4G LTE
    - Intel XMM™ 7160 (Fibocom LB31-EAU) (EMEA only)
  - ThinkPad X270 WiGig dock, mutually exclusive with WWAN (US only)
  - Intel Ethernet Connection I219-LM (Jacksonville)
  - Intel Ethernet Connection I219-V (Jacksonville)
  - Intel® RLT8822BE, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1

### SIM card (opt)

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

### Dimensions

- WxHxD: 12.03" x 8.21" x 0.80"; 305.5mm x 208.5mm x 20.3mm

### Weight

- Models: No + 3-cell 3-cell + 3-cell 3 + 6-cell
  - 2.79 lb / 1.27 kg 2.98 lb / 1.36 kg 3.33 lb / 1.52 kg

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology
- Touch style match on chip fingerprint reader on the palm rest
- Near Field Communication

### AC adapter

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

### Operating system

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

### Limited warranty

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

### Environment

- MIL-Spec test MIL-STD-810G military testing
- EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.7 GHz</td>
<td>3MB</td>
<td>DDR4-2133 Intel HD Graphics 620</td>
<td></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 Intel HD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>i3-7300U</td>
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</tr>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>3.4 GHz</td>
<td>3MB</td>
<td>DDR4-2133 Intel HD Graphics 620</td>
<td></td>
</tr>
</tbody>
</table>

**or 8th Generation Intel Core i3 / i5 / i7 Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Turbo Frequency</th>
<th>Cache</th>
<th>Memory</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>1.8 GHz</td>
<td>2.9 GHz</td>
<td>3MB</td>
<td>DDR4-2400 Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>2.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400 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>2.7 GHz</td>
<td>6MB</td>
<td>DDR4-2400 Intel UHD Graphics 620</td>
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<tr>
<td>i5-8355U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>2.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400 Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>2.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400 Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>i7-8566U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>2.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400 Intel UHD Graphics 620</td>
<td></td>
</tr>
</tbody>
</table>

### Graphics
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor;
- supports external digital monitor via HDMI or USB-C;
- supports three independent displays;
- Max resolution: 4096x2304 (USB Type-C), 4096x2160 (HDMI);
- Max display resolution: 3840x2160 (optional);
- Three independent displays supported;
- One of the following, configurable by model:
  - Intel UHD Graphics 620
  - Intel HD Graphics 620

### Chipset
- Intel SoC (System on Chip) platform
- 4GB, 8GB, or 16GB DDR4 soldered to system board, 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

### Optical
- 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)

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

Note: The specifications above may not be available in all regions.
**ThinkPad X390 Platform Specifications**

**Product Specifications Reference (PSREF)**

**Processor**

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>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>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>i5-8365U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>DDR4-3700</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-3700</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8665U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-3700</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**or 10th Generation Intel Core i5 / i7 Processor (NOT available in EMEA)**

<table>
<thead>
<tr>
<th>Processor</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>i5-10210U</td>
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<td>6MB</td>
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<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-10510U</td>
<td>4</td>
<td>1.8 GHz</td>
<td>4.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

Intel UHD Graphics 620 or Intel UHD Graphics 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**

Intel SoC (System on Chip) platform

Memory

4GB, 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets

* 32GB memory for 10th Gen processor only

* 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</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>1920x1080</td>
<td>IPS</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**

None

**Ethernet**

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

**WLAN (optional)**

One of the following, configurable by model:

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

**Bluetooth™**

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

**WWAN (optional)**

One of the following, configurable by model:

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

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

**Memory**

4GB, 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets

* 32GB memory for 10th Gen processor only

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

**Chipset**

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

**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>
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<td>TN</td>
<td>Anti-glare</td>
<td>250 nits</td>
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<td>500:1</td>
<td>45%</td>
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<tr>
<td>13.3&quot; FHD</td>
<td>1920x1080</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
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<td>72%</td>
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<tr>
<td>13.3&quot; FHD</td>
<td>1920x1080</td>
<td>IPS</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**

None

**Ethernet**

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

**WLAN (optional)**

One of the following, configurable by model:

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

**Bluetooth™**

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

**WWAN (optional)**

One of the following, configurable by model:

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

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

**Media reader**

Optional: Smart card reader

**Ports**

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

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

**Monitor cable (optional)**

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

**Bundled Accy**

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 with ThinkShutter camera privacy, fixed focus
- HD Audio, Realtek® ALC3287 codec / stereo speakers, 1W x 2. Dolby® Audio® Premium / dual array far-field microphone, headphone / microphone combo jack

**Audio support**

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

**Security**

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

**Fingerprint reader**

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

**Battery**

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

**Max battery life**

8.5 hours

**Operating system**

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

**Limited warranty**

One of the following, configurable by model:

- 1-year depot repair service
- 1-year depot with 2-year system board repair service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

**Environment**

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

**Lenovo**

October 2019
### ThinkPad X395 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 Pro 3300U</td>
<td>4</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.5 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 Pro 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td></td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td></td>
<td>Radeon Vega 10 Graphics</td>
</tr>
</tbody>
</table>

#### Graphics

- AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor; supports external display 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
- AMD Ryzen PRO Mobile Processors with Radeon Vega Graphics

#### Display

- Size: 13.3" HD (1366x768)
- Resolution: TN Anti-glare 250 nits
- Aspect Ratio: 16:9
- Contrast Ratio: 300:1
- Color Gamut: 45%
- Viewing Angle: 90°

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

#### Memory

- DDR4-2400

#### Graphics

- AMD Radeon Vega 6 Graphics
- AMD Radeon Vega 8 Graphics
- AMD Radeon Vega 10 Graphics

#### Case material

- Display cover: PPS/GF
- Bottom: Magnesium/Aluminum

#### Smart card reader

- Optional: Smart card reader

#### Media reader

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

#### Bundled Accy

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

#### 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: Discrete TPM 2.0, TCG Certified
- System Mgt: DASH Management
- Fingerprint reader: Optional: Touch style match on chip fingerprint reader on the palm rest
- NFC: None

#### Battery

- Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Operating system: Windows 10 Home 64 or Windows 10 Pro 64

#### Limited warranty

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

#### Mil-Spec test

- MIL-STD-810G military testing

#### 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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Limited warranty: Support unrelated to a warranty issue may be subject to additional charges.

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- **Carry-in or Mail-in Service**: Parts and labor repair coverage where the customer is responsible for shipping (including packaging) or delivery to authorized warranty provider or repair center.
- **Depot or Courier Service**: Parts and labor repair coverage where shipping (including packaging) or delivery to the repair center is paid for by Lenovo.
- **Expedited Depot**: Parts and labor coverage with expedited turnaround. Shipping (including packaging) or delivery to the repair center is paid for by Lenovo.
- **Onsite / In-home Service**: Parts and labor repair coverage where labor is provided onsite at your place of business.

If Lenovo determines your product problem is covered by the product warranty and cannot be resolved over the telephone, a technician will be dispatched to arrive onsite, typically the next day.


Visit [www.lenovo.com/warranty](http://www.lenovo.com/warranty) for Lenovo Warranty Services terms and conditions for complete details and restrictions.

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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Lenovo 1009 Think Place Morrisville, NC 27560 U.S.A.