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</table>
Summary of Changes

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

October 9, 2019 - Version 549

Additions in this update

► New product(s)
  ThinkPad E14 models announced October 2019
  ThinkPad E15 models announced October 2019
  ThinkPad T490 Secure Access / Healthcare Edition separated from ThinkPad T490

► Others
  ThinkPad E490s - Spec updated
  ThinkPad T490 - Spec updated
  ThinkPad T495s - 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► Withdrawn product(s)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>
<tbody>
<tr>
<td>m3-7Y30</td>
<td>2</td>
<td>4</td>
<td>1.0 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 615</td>
</tr>
<tr>
<td>E5-7Y54</td>
<td>2</td>
<td>4</td>
<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Celeron N4100</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>2.4 GHz</td>
<td>4MB</td>
<td>DDR-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Pentium Silver N5000</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td>DDR-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
</tbody>
</table>

## Graphics

| Processor | 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

| Memory Type | 4GB or 8GB / 1866MHz LPDDR3 or 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>11.6&quot; HD (1366x768)</td>
<td>TN Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>400:1 or 500:1</td>
<td>45%</td>
<td>90°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.6&quot; HD (1366x768)</td>
<td>IPS Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 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, 16Gbps |

## Optical

| None |

## Ethernet

| Realtek RTL8111GUS Gigabit Network Connection |

## WLAN + Bluetooth™

<table>
<thead>
<tr>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card</td>
</tr>
<tr>
<td>• Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card (US only)</td>
</tr>
</tbody>
</table>

## WWAN

| None |

## Dimensions

| Weight: Starting at 2.99 lb / 1.36 kg |

## 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

| Power-on password, supervisor password, security keyhole |

## Security chip

| None |

## Fingerprint reader

| None |

## NFC

| None |

## Battery

| Integrated Li-ion 42Wh battery |

## Operating system

<table>
<thead>
<tr>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Windows® 10 Home 64</td>
</tr>
<tr>
<td>• Windows 10 Pro 64</td>
</tr>
<tr>
<td>• Windows 10 Pro in S mode</td>
</tr>
<tr>
<td>• No OS</td>
</tr>
</tbody>
</table>

## Limited warranty

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

## 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
### Processor AMD PRO A-Series APUs

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

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

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

### Chipset
- AMD SoC (System on Chip) platform
- Memory: 16GB max / 1866MHz DDR4, one DDR4 SO-DIMM socket

### Display
- **Some:** 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
- **Some:** 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 12.5" (317.5mm) FHD Active Protection System™
- On-cell touch, supports 10-finger gesture (FHD only, US only)
- **Some:** 16GB max / 1866MHz DDR4, one DDR4 SO-DIMM socket

### Optical
- None

### Storage
- System has one HDD slot or one M.2 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. xxxGB SSD)
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

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

### DIMENSIONS AND WEIGHT

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<tr>
<th>Dimensions/Weight</th>
<th>Models</th>
<th>No + 3-cell</th>
<th>3-cell + 3-cell</th>
<th>3 + 6-cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>WX/DX/H</td>
<td>12.03&quot; x 8.21&quot; x 0.80&quot;; 305.5mm x 208.5mm x 20.3mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>2.79 lb / 1.27 kg</td>
<td>2.98 lb / 1.36 kg</td>
<td>3.33 lb / 1.52 kg</td>
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</tr>
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</table>

### Case color/Case material
- Black / Glass-Fiber Reinforced Plastic

### Note:
The specifications above may not be available in all regions.
# ThinkPad A285 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>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 PRO 2300U</td>
<td>4</td>
<td>4</td>
<td>2.0 GHz</td>
<td>3.4 GHz</td>
<td>2MB L2/4MB L3 DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 PRO 2500U</td>
<td>8</td>
<td>8</td>
<td>2.0 GHz</td>
<td>3.6 GHz</td>
<td></td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 PRO 2700U</td>
<td>8</td>
<td>8</td>
<td>2.2 GHz</td>
<td>3.8 GHz</td>
<td></td>
<td>Radeon Vega 10 Graphics</td>
</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 Memory

- AMD SoC (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

## Multi-touch (opt)

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

## Storage

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

## Optical

- None

## Ethernet

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

## WLAN

- Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo module adapter

## WWAN (optional)

- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7390 (Fibocom L850-GL), M.2 card
- * For non-WWAN model, it means the model is NOT WWAN upgradable

## SIM card (opt)

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

## Dimensions

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

## Weight

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

## Case color

- Black

## Case material

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

## Security

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

## Security chip

- System Mgt
- DASH Management

## Fingerprint reader

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

## Battery

- Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

## Max battery life

- MobileMark® 2014: 10.55 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
ThinkPad A475 Platform Specifications

Product Specifications Reference (PSREF)

Processor AMD PRO A-Series APUs

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

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

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

Chipset AMD SoC (System on Chip) platform

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

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

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

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

Optical

Ethernet Realtek® RTL8111EPV Gigabit Ethernet connection

WLAN Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card

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

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

SIM card (opt) One of the following, configurable by model:
- For non-WWAN model, it means the model is NOT WWAN upgradable

Camera (optional) HD720p resolution, fixed focus

Audio support HD Audio, Realetek 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

Security chip dTPM 2.0, discrete TPM 2.0, TCG Certified

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

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

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

Max battery life (MobileMark® 2014) Max battery life
- 5.13 hr
- 10.26 hr
- 10.26 hr
- 15.4 hr

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:
- Windows® 7 Professional 64 preinstalled
- through downgrade rights in Windows 10 Pro 64
- Windows 10 Home 64
- Windows 10 Pro 64

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

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 A485 Platform Specifications

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

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

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

### Display
- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400.1 contrast ratio
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

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

### Storage
- System has one HDD slot or one M.2 SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4
- Some: 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, in WWAN slot as 2nd Storage, mutually exclusive with WWAN
- Integrated M.2 SSD is PCIe 3.0 x 4 but runs at PCIe 3.0 x 2 due to M.2 SSD adapter limitation

### Memory
- 250 nits, 16:9 aspect ratio, 400:1 contrast ratio, supports four independent displays.
- Max resolution: 2666MHz but run at 2400MHz due to AMD limitation

### Optical
- None

### Ethernet
- Realtek® RTL8111GUL Gigabit Ethernet connection

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

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

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

### Dimensions
- Weight: 3.49 lb / 1.58 kg; 3.92 lb / 1.78 kg
- PPS: 24Wh or 24Wh + 24Wh, 48Wh, 72Wh, or 24Wh + 48Wh + 72Wh

### Case color
- Black

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

Note: The specifications above may not be available in all regions.
## ThinkPad E14 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</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 Intel UHD Graphics</td>
<td></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></td>
<td></td>
</tr>
<tr>
<td>i7-10510U</td>
<td>6</td>
<td>12</td>
<td>1.1 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td></td>
<td></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
- 14.0" FHD (1920x1080) TN Anti-glare 220 nits 16:9 400:1 90°
- 14.0" FHD (1920x1080) IPS Anti-glare 250 nits 16:9 700:1 170°

### Storage
- Up to two drives (one M.2 SSD and one HDD)
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 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 RTL8111GUS

### 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

### Case Material
- Dimensions: 12.80" x 9.13" x 0.70"; 325mm x 232mm x 17.9mm
  - Weight: 3.49 lb / 1.59 kg

### Case Color
- Black or silver

### Case Material
- Display cover: Aluminum or PC/ABS plastic
  - Bottom: Aluminum or PC/ABS plastic

### Smart card reader
- None

### Media reader
- None

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

### Audio support
- HD Audio, Synaptic CX11880 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

### UltraNav
- TrackPoint pointing device and buttonless Mylar surface multi-touch touchpad

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

### System Mgt
- None

### Fingerprints reader
- Optional: Touch style fingerprint reader on power button

### NFC
- None

### Battery
- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

### Max battery life
- MobileMark 2014: 12.8 hr

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

### Operating system (optional)
- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro in S mode
- No OS

### Limited warranty (optional)
- 1-year mail-in repair service
- 1-year depot repair service
- 1-year depot with 2-year planar 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>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>i7-10510U</td>
<td>6</td>
<td>12</td>
<td>1.3 GHz</td>
<td>4.7 GHz</td>
<td>12MB</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</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
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</thead>
<tbody>
<tr>
<td>15.6&quot; FHD</td>
<td>(1920x1080)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>220 nits</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</td>
<td>Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>170°</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 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 R8111GUS

### 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

### SIM card

None

### Weight

Starting at 4.3 lb / 1.9 kg

### Case color

Black or silver

### Case material

Display cover: Aluminum; Bottom: PC/ABS plastic

### Operating system

Windows® 10 Home

### Media reader

None

### Ports

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

### Monitor cable

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

### Keyboard

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

### 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 fingerprint reader on the palm rest

### Battery

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

### AC adapter

45W or 65W USB Type-C AC adapter

### Environment

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

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

<table>
<thead>
<tr>
<th>Processor</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, 3.1 GHz</td>
<td>3.7 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</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>i5-85 Plus</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 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.
- 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.
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio.

### Multi-touch

None

### Storage

Up to 2 drives (one M.2 SSD and one HDD).
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable.
- Active Protection System™
- Some: M.2 SSD / PCIe NVMe.
- Optane™ memory Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2.

### Optane™ memory

Optional:

### Ethernet

Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- Realtek RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
- Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card
- Intel 3165ac card supports BT 4.2 but is limited to BT 4.1 by Windows OS

### WWAN

SIM card: None

### 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.

### Multi-touch

None

### Storage

Up to 2 drives (one M.2 SSD and one HDD).
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable, Active Protection System™
- Some: M.2 SSD / PCIe NVMe
- Optane™ memory Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

### Ethernet

Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- Realtek RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
- Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
- Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card
- Intel 3165ac card supports 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.
## ThinkPad E490 Platform Specifications

### Product Specifications Reference (PSREF)

| Processor 8th Generation Intel® Core™ i3 / i5 / i7 Processor | 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  
Starting at 3.87 lb / 1.75 kg  
Note: The specifications above may not be available in all regions. Lenovo |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
<td># of Threads</td>
</tr>
</tbody>
</table>
3-8145U | 2 | 4 | 2.1 GHz | 3.9 GHz | 4MB | DDR4-2400 | Intel UHD Graphics 620  
5-8265U | 4 | 8 | 1.6 GHz | 3.9 GHz | 8MB |  
7-8565U | 4 | 8 | 1.8 GHz | 4.6 GHz | 8MB |  |
| 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 Intel SoC (System on Chip) platform  
Memory 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets  
* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation  
Display Size / Resolution  
14.0” HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch  
14.0” FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch  
Multi-touch None  
Storage Up to two drives (one M.2 SSD and one HDD)  
• HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™  
• M.2 2280 SSD / SATA 6.0Gb/s  
• M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2  
Optane™ memory Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2  
Optical None  
Ethernet Gigabit Ethernet Connection, Realtek 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  
Media reader None  
Ports One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole  
* Depending on many factors, actual data transfer speed may be lower than theoretical speed  
Monitor cable None  
Camera HD720p camera, fixed focus  
Audio support HD Audio, Synaptic CX11880 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack  
Keyboard 6-row, spill-resistant, multimedia Fn keys, optional LED backlight  
System Mgt  
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  
Battery Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter  
Max battery life MobileMark® 2014: 13 hr  
AC adapter 45W or 65W USB Type-C AC adapter  
Operating system Optional: Windows® 10 Home 64 or Windows 10 Pro 64  
Limited warranty One of the following, configurable by model:  
• 1-year mail-in repair service  
• 1-year depot repair service  
Mil-Spec test MIL-STD-810G military testing  
Environmental EPEAT® Silver; ENERGY STAR® 7.1; RoHS-compliant  
| Processor Number | # of Cores | # of Threads | Base Frequency | Max Turbo Frequency | Cache | Memory Types | Processor Graphics |  
3-8145U | 2 | 4 | 2.1 GHz | 3.9 GHz | 4MB | DDR4-2400 | Intel UHD Graphics 620  
5-8265U | 4 | 8 | 1.6 GHz | 3.9 GHz | 8MB |  
7-8565U | 4 | 8 | 1.8 GHz | 4.6 GHz | 8MB |  |

Note: The specifications above may not be available in all regions. Lenovo August 2019
## ThinkPad E490s Platform Specifications

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

### Graphics
- Intel UHD Graphics 620 in processor only or
- Intel UHD Graphics 620 in processor and
  - AMD Radeon RX 540X Graphics, 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@24Hz (HDMI)

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

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

### Display
- Size / Resolution: 14.0" FHD (1920x1080) Anti-glare TN 220 nits 16:9 400:1 90°
- Multi-touch: Non-touch

### Storage
- One of the following, configurable by model:
  - M.2 2280 SSD / SATA 6.0Gbps
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

### Optical
- None

### Ethernet
- Gigabit Ethernet Connection, Realtek 8111G/GS

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

### WWAN
- None

### SIM card
- None

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

### 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

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

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**Note:** The specifications above may not be available in all regions.
## ThinkPad E495 Platform Specifications

### Processor

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

### Graphics

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

### Chipset

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

### Memory

- DDR4-2400

### Display

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

### 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 / PCle NVMe, PCIe 3.0 x 2 or PCle 3.0 x 4

### Optical

- None

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

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

### WWAN SIM card

- None

### Camera

- HD720p camera, fixed focus

### Audio support

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

### UltraNav™

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

### Security

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

### Security chip

- Discrete TPM 2.0, TCG Certified

### Security Fingerprint reader

- None

### Battery

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

### Max battery life

- *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

- 1-year depot repair service

### Mil-Spec test

- None

### Environment

- 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 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 UHD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- 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, supports dual independent display;
- Max resolution: 1920x1080 (HDMI)@60Hz;
- Supports external digital monitor via HDMI or USB Type-C;
- Supports external digital monitor via HDMI or USB Type-C;
- Supports external digital monitor via HDMI or USB Type-C;

### Chipset

- Intel SoC (System on Chip) platform
- Supports dual independent display;
- Max resolution: 1920x1080 (HDMI)@60Hz;

### Memory

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

### Display

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

### Multi-touch

- None

### Storage

- Up to 2 drives (one M.2 SSD and one HDD)
- Some: M.2 SSD / PCIe NVMe

### Optical

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

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- One of the following, configurable by model:

#### Optical Devices

- 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
- Case color Black or silver

### Camera

- HD720p camera, fixed focus

### Audio support

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

### Keyboard

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

### Security

- Security chip (opt) vPro
- Security options None

### Fingerprint reader

- Optional: Touch style fingerprint reader on the palm rest

### Battery

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

### 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

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

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

### Graphics

- Intel UHD Graphics 620 in processor only
- AMD Radeon RX 550X Graphics, 2GB 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

- Intel SoC (System on Chip) platform

### Memory

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

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

### Display

<table>
<thead>
<tr>
<th>Size / Resolution</th>
<th>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>15.6” HD (1366x768)</td>
<td>Anti-glare TN</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
<td>Non-touch</td>
</tr>
<tr>
<td>15.6” 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>

### Multi-touch

- None

### Storage

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

### 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

- SIM card: None

### Ports

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

### Security chip

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

### System Mgt

- None

### Security

- None

### Battery

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- MobileMark® 2014: 11 hr

### AC adapter

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

### Operating system

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

### Limited warranty

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

### Environmental specifications

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

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

### Processor

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

### Graphics

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

### Chipset

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

### Memory

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

### 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>15.6&quot; HD (1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
<td>Non-touch</td>
</tr>
<tr>
<td>15.6&quot; FHD (1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>250 nits</td>
<td>16:9</td>
<td>600:1</td>
<td>170°</td>
<td>Non-touch</td>
</tr>
</tbody>
</table>

### Storage

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

### Optical

- None

### Ethernet

- Gigabit Ethernet Connection, Realtek RTL8111GUS

### Operating system

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

### Battery

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

### Environment

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

### Limited warranty

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

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

<table>
<thead>
<tr>
<th>Processor Intel® Celeron® Processor, 7th Generation Intel Core™ i3 / i5 Processor or</th>
<th>Weight</th>
<th>12.67&quot; x 8.83&quot; x 0.74&quot;; 321.89mm x 224.22mm x 18.8mm</th>
<th>321.89mm x 224.22mm x 18.8mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>3965U</td>
<td>2</td>
<td>2MB</td>
</tr>
<tr>
<td>Processor</td>
<td>Intel HD Graphics 610</td>
<td>Smart card reader</td>
<td>None</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>2.6 GHz</td>
<td>Memory</td>
<td>32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>-</td>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>Cache</td>
<td>2MB</td>
<td>Case material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Memory Types</td>
<td>DDR4-2133</td>
<td>Display</td>
<td>LED backlight, 16:9 aspect ratio, 500:1 contrast ratio</td>
</tr>
<tr>
<td>Processor Graphics</td>
<td>Intel HD Graphics 620</td>
<td>Dimensions</td>
<td>WxDxH: 12.67&quot; x 8.83&quot; x 0.74&quot;; 321.89mm x 224.22mm x 18.8mm</td>
</tr>
<tr>
<td>8th Generation Intel Core i5 / i7 Processor</td>
<td>Weight</td>
<td>Starting at 3.22 lb / 1.46 kg</td>
<td></td>
</tr>
<tr>
<td>Processor Number</td>
<td>3-8130U</td>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td># of Cores</td>
<td>2</td>
<td>Case material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>2.2 GHz</td>
<td>Display</td>
<td>LED backlight, 16:9 aspect ratio, 500:1 contrast ratio</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>3.4 GHz</td>
<td>Dimensions</td>
<td>WxDxH: 12.67&quot; x 8.83&quot; x 0.74&quot;; 321.89mm x 224.22mm x 18.8mm</td>
</tr>
<tr>
<td>Cache</td>
<td>4MB</td>
<td>Weight</td>
<td>Starting at 3.22 lb / 1.46 kg</td>
</tr>
<tr>
<td>Memory Types</td>
<td>DDR4-2400</td>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>Processor Graphics</td>
<td>Intel UHD Graphics 620</td>
<td>Display</td>
<td>LED backlight, 16:9 aspect ratio, 500:1 contrast ratio</td>
</tr>
<tr>
<td>Graphics</td>
<td>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)</td>
<td>Weight</td>
<td>Starting at 3.22 lb / 1.46 kg</td>
</tr>
<tr>
<td>Chipset Memory</td>
<td>Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>Display</td>
<td>Some: 13.3&quot; (338mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 500:1 contrast ratio</td>
<td>Max battery life</td>
<td>MobileMark® 2014: 16.1 hr</td>
</tr>
<tr>
<td>Multi-touch (opt)</td>
<td>on-cell touch, supports 10-finger gesture</td>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>Storage</td>
<td>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</td>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>Optical</td>
<td>None</td>
<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>
<tr>
<td>Ethernet</td>
<td>Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via optional ThinkPad Ethernet Extension Cable</td>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>WLAN + Bluetooth®</td>
<td>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</td>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
<tr>
<td>WWAN</td>
<td>None</td>
<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>
<tr>
<td>SIM card</td>
<td>None</td>
<td>AC adapter</td>
<td>45W or 65W USB Type-C AC adapter</td>
</tr>
</tbody>
</table>

### Processor Specifications Reference (PSREF)

Note: The specifications above may not be available in all regions. Lenovo August 2019
## ThinkPad L390 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</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>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>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

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

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

### Display
- 13.3" HD (1366x768) Anti-glare TN 250 nits 16:9 500:1 90°
- 13.3" FHD (1920x1080) Anti-glare IPS 250 nits 16:9 700:1 (non-touch) 800:1 (multi-touch) 170°

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

### Optical
- None

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

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

### WWAN
- None

### SIM card
- None

### Dimensions
- WxDxH: 12.67" x 8.83" x 0.74"; 321.8mm x 224.2mm x 18.8mm

### Weight
- Starting at 3.22 lb / 1.46 kg

### Case color
- Black or Silver

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

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

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

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

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

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

<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>Processor</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</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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</tr>
<tr>
<td>i3-7130U</td>
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<tr>
<td>i5-7200U</td>
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<td>2.5 GHz</td>
<td>3.1 GHz</td>
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<td>DDR4-2133</td>
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<td>i5-7300U</td>
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</tr>
</tbody>
</table>

### 8th Generation Intel Core i3 / i5 / i7 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>Processor</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
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</tr>
<tr>
<td>i5-8250U</td>
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<tr>
<td>i5-8350U</td>
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<td>4</td>
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<td>DDR4-2400</td>
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</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</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>
<td></td>
</tr>
</tbody>
</table>

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

### Graphics

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

### Chipset

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

### 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

### 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 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
  - Intel 8265ac cards support B74.2 but is limited to B74.1 by Windows OS

### WWAN (optional)

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

### SIM card (optional)

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

### Dimensions

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

### Weight

- Starting at 3.71 lb / 1.68 kg

### Case color

- Black

### Case material

- PC/ABS plastic

### Smart card reader

- Optional: Smart card reader

### Media reader

- MicroSD card reader

### Ports

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

### Monitor cable

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

### Camera (optional)

- One of the following, configurable by model:
  - HD720p camera, fixed focus
  - HD Audio, Realtek ALC3287 codec, stereo speakers, 2x2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack

### Audio support

- IR camera and HD720p camera, fixed focus

### Security

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

### Security chip

- vPro (optional) Intel vPro Technology

### FingerPrint reader

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

### NFC (optional)

- Near Field Communication

### Battery

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

### Max battery life

- MobileMark® 2014: 12.2 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.*
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 4305U</td>
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<td>2</td>
<td>2.2 GHz</td>
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<td>5-8145U</td>
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<tr>
<td>7-8565U</td>
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<tr>
<td>7-8665U</td>
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<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

- Intel SoC (System on Chip) platform
- Intel UHD Graphics 610 or 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
- Installed memory is actually 2866MHz but run at 2133MHz or 2400MHz due to Intel limitation

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; HD (1366x768)</td>
<td>TN Anti-Glare</td>
<td>220nits</td>
<td>16:9</td>
<td>400:1</td>
<td>1.45</td>
<td>9°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>IPS Anti-Glare</td>
<td>250nits</td>
<td>16:9</td>
<td>700:1</td>
<td>1.45</td>
<td>170°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Multi-touch (opt)

- On-cell touch, supports 10-finger gesture (FHD only)
- Supports UltraNav touchpad: 6-row, spill-resistant, multimedia Fn keys, optional LED backlight

### Storage

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

### Optane™ memory (opt)

- Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2
- None

### Ethernet

- Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
- vPro model: Intel Ethernet Connection I219-LM (Jacksonville)
- One of the following, configurable by model:
  - Realtek RTL8822BE, WI-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card (NOT available in EMEA)
  - Intel Wireless-AC 9260, WI-Fi 2x2 802.11ac + Bluetooth 5.0
  - Intel Wi-Fi 6 AX200, WI-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)

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

### SIM card

- None

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

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>i3-6006U</td>
<td>2</td>
<td>4</td>
<td>2.0 GHz</td>
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<td>Intel HD Graphics 520</td>
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<tr>
<td>i3-6100U</td>
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<tr>
<td>i5-6200U</td>
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<td>Intel HD Graphics 620</td>
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<tr>
<td>i7-6500U</td>
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<td>2.5 GHz</td>
<td>3.1 GHz</td>
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<td>Intel HD Graphics 620</td>
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<td>Intel HD Graphics 620</td>
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Intel Celeron® Processor or 7th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
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<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

* Processor is NOT available in EMEA.

### Graphics

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

### Chipset Memory

Intel SoC (System on Chip) platform

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

* System clockdown for processors with lower memory controller

### Display

Some: 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio

Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio

Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio, 160° viewing angle

### Multi-touch

None

### Storage

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

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

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

Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

### Optical (optional)

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

### Ethernet

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

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

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

### WWAN (optional)

One of the following, configurable by model:

* Wireless WAN upgradable

* Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card

* Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)

* Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)

* Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)

### 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

Optional: Lenovo Mini-DisplayPort to DisplayPort Monitor Cable (MiniDP to DP)

### 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

### Security

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

Discrete TPM 2.0, TCG Certified

Intel vPro Technology

### Fingerprint reader

Optional: Swipe style fingerprint reader on the palm rest

### NFC

None

### Battery

Li-ion 6-cell (48Wh)

### AC adapter

45W slim tip AC adapter

### Operating system

One of the following, configurable by model:

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

* Windows 10 Home 64

* Windows 10 Pro 64

### Limited warranty

One of the following, configurable by model:

* 3-year/1-yr battery limited onsite service

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

* 3-year/1-yr battery limited onsite service

### Environment

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

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

Lenovo
September 2018
## ThinkPad L580 Platform Specifications

<table>
<thead>
<tr>
<th>Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor</strong></td>
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<tr>
<td><strong>Number</strong></td>
</tr>
<tr>
<td><strong>Base Frequency</strong></td>
</tr>
<tr>
<td><strong>Max Turbo Frequency</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> The specifications above may not be available in all regions. Lenovo August 2019</td>
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<table>
<thead>
<tr>
<th>Memory</th>
</tr>
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<tbody>
<tr>
<td><strong>Memory Types</strong></td>
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<td><strong>Types</strong></td>
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<td><strong>Memory Cache</strong></td>
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<tr>
<th>Graphics</th>
</tr>
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<tbody>
<tr>
<td><strong>Graphics</strong></td>
</tr>
<tr>
<td><strong>Memory</strong></td>
</tr>
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<td><strong>Chipset</strong></td>
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<td><strong>Memory Types</strong></td>
</tr>
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<td><strong>Processor</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>WWAN (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One of the following, configurable by model:</strong></td>
</tr>
<tr>
<td>- Integrated Mobile Broadband 4G LTE-A</td>
</tr>
<tr>
<td>- Intel® XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)</td>
</tr>
<tr>
<td>- Integrated Mobile Broadband 4G LTE-A</td>
</tr>
<tr>
<td>- Intel® XMM™ 7360 (Fibocom L850-GL), M.2 card</td>
</tr>
<tr>
<td><strong>Specifications Reference (PSREF)</strong></td>
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<tr>
<td><strong>Note:</strong> The specifications above may not be available in all regions. Lenovo August 2019</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Chipset</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor Number</strong></td>
</tr>
<tr>
<td><strong>Number</strong></td>
</tr>
<tr>
<td><strong>Number</strong></td>
</tr>
<tr>
<td><strong>Number</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base Frequency</strong></td>
</tr>
<tr>
<td><strong>Max Turbo Frequency</strong></td>
</tr>
<tr>
<td><strong>Base Frequency</strong></td>
</tr>
<tr>
<td><strong>Max Turbo Frequency</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Specifications Reference (PSREF)</strong></td>
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<tr>
<td><strong>Note:</strong> The specifications above may not be available in all regions. Lenovo August 2019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</strong></td>
</tr>
</tbody>
</table>

| Note: The specifications above may not be available in all regions. Lenovo August 2019 |
**ThinkPad L590 Platform Specifications**

**Processor**

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

**Chipset Memory**

- Intel SoC (System on Chip) platform
- 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>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot; HD</td>
<td>(1366x768)</td>
<td>TN</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
</tr>
<tr>
<td>15.6&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
</tbody>
</table>

**Storage**

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

**Optane™ memory**

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

**Ethernet**

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

**WLAN + Bluetooth™ (optional)**

- Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

**WWAN (optional)**

- 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 ron-WWAN model, it means the model is NOT WWAN upgradable

**Dimensions**

<table>
<thead>
<tr>
<th>Weight</th>
<th>376.5mm x 254.5mm x 22.95mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>WxDxH:</td>
<td>14.82&quot; x 10.02&quot; x 0.90&quot;</td>
</tr>
<tr>
<td>Starting at</td>
<td>4.48 lb / 2.0 kg</td>
</tr>
<tr>
<td>Battery</td>
<td>45Wh, 65W, or 65W slim USB-C AC adapter</td>
</tr>
<tr>
<td>Max battery life</td>
<td>12 hr</td>
</tr>
<tr>
<td>AC adapter</td>
<td>MobileMark 2014: 12 hr</td>
</tr>
<tr>
<td>Operating system</td>
<td>Optional: Windows® 10 Home 64 or Windows 10 Pro 64</td>
</tr>
<tr>
<td>Limited warranty</td>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>Safety</td>
<td>One of the following, configurable by model:</td>
</tr>
<tr>
<td>Warranty</td>
<td>- 1-year depot repair service</td>
</tr>
<tr>
<td>Warranty</td>
<td>- 3-year/1-yr battery depot repair service</td>
</tr>
<tr>
<td>Mil-Spec test</td>
<td>MIL-STD-810G military testing</td>
</tr>
<tr>
<td>Environment</td>
<td>EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant</td>
</tr>
</tbody>
</table>

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

### Processor

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

### Graphics

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

### Chipset

Mobile Intel CM246 Chipset

### Memory

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

### Display

- **Some**: 15.6” (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 72% gamut, 170° viewing angle
- **Some**: 15.6” (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)
- Capacitive-type multi-touch, supports 10-finger gesture (4K only)

### Storage

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

### RAID (optional)

- RAID 0/1 support
- None

### Optical

- 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

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

### Weight

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

### Case color

- Black

### Case material

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

### Processor Specifications Reference (PSREF)

Note: The specifications above may not be available in all regions. Lenovo August 2019
ThinkPad P1 (2nd Gen) 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>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>9S-3400H</td>
<td>6</td>
<td>12</td>
<td>2.3 GHz</td>
<td>4.6 GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td></td>
</tr>
<tr>
<td>9S-3400H</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.6 GHz</td>
<td>16MB</td>
<td>DDR4-2666</td>
<td></td>
</tr>
<tr>
<td>E-2276M</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.7 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td></td>
</tr>
</tbody>
</table>

Graphics

- Intel UHD Graphics 630 in processor only or Intel UHD Graphics P630

Chipset

- Mobile Intel CM246 Chipset

Memory

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

Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>30 nits</td>
<td>16:9</td>
<td>72% NTSC</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>30 nits</td>
<td>16:9</td>
<td>72% NTSC</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>30 nits</td>
<td>16:9</td>
<td>72% NTSC</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>OLE</td>
<td>AR, AS</td>
<td>400 nit</td>
<td>16:9</td>
<td>100% Adobe Color</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

Multi-touch (opt)

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

Pen

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

Storage

- Up to two 2.5 SSD

RAID (optional)

- RAID 0/1 support

Optical

- None

Ethernet

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

WLAN

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

WWAN

- None

SIM card

- None

Dimensions

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

Weight

- Non-touch model: starting at 3.75 lb / 1.7 kg
- Multi-touch model: starting at 4.0 lb / 1.81 kg

Case color

- Black paint (FHD model) or black weave (UHD model)

Case material

- Display cover: CFP/R/GRFPR hybrid; Bottom: Aluminum alloy

Smart card reader

- Optional: Smart card reader

Media reader

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

Ports

- Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, SD card reader, security keyhole
  - Power Delivery only supports power-out for charging peripherals
  - Depending on many factors, actual data transfer speed may be lower than theoretical speed

Monitor cable (optional)

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

Bundled Accy (optional)

- ThinkPad Ethernet Extension Cable

Computer (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, Synaptics CX11880 codec / stereo speakers, 2W x 2, Dolby Audio Premium / dual array far-field microphone, headphone / microphone combo jack, Dolby Atmos sound system

Keyboards

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

Security

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

Security chip

- Intel vPro Technology
- Discrete TPM 2.0, TCG Certified

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)
- None

Battery

- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark® 2014: 13.8 hr
- Battery life varies significantly with settings, usage, & other factors

AC adapter

- 135W 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
  - 1-year depot repair with 2-year planar repair service
  - 3-year battery depot repair service
  - 3-year battery limited onsite service

Mil-Spec test

- MIL-STD-810G military testing

Environment

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

Note: The specifications above may not be available in all regions.
## ThinkPad P43s Platform Specifications

### Processor
- **8th Generation Intel® Core™ i7 Processor**
- **Number**: 7-8565U / 7-8665U
- **Base Frequency**: 1.8 GHz / 1.9 GHz
- **Max Turbo Frequency**: 4.6 GHz / 4.8 GHz
- **Cache**: 8MB
- **Memory Types**:
  - DDR4-2400
- **Processors**:
  - 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
- **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

### Memory
- **Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation**
- **48GB max / 2400MHz DDR4, dual-channel capable**, Intel SoC (System on Chip) platform

### Chipset
- **supports three independent displays**;
- **Max resolution**: 3840x2160@60Hz (USB-C); 3840x2160@30Hz (HDMI)

### Display
- **Size**:
  - 14.0” FHD (1920x1080)
  - 14.0” FHD (1920x1080)
  - 14.0” FHD (1920x1080)
- **Resolution**:
  - IPS Anti-glare: 250 nits (non-touch) / 300 nits (multi-touch)
  - IPS Anti-glare: 400 nits
  - IPS Anti-glare: 400 nits
  - IPS Glossy: 500 nits
- **Brightness**:
  - 700:1
  - 800:1
  - 1000:1
- **Aspect Ratio**:
  - 16:9
  - 16:9
  - 16:9
- **Color Gamut**:
  - 45%
  - 72%
  - 72%
- **Viewing Angle**:
  - 170°
  - 170°
  - 170°

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

### Pen
- 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**

### Optical
- None

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

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

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

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

### Case Color
- **Display cover**: PPS / 50% GF; PA / 50% GF

### Case Material
- **Black

### Security
- **Security chip**: Discrete TPM 2.0, TCG Certified
- **System Mgt (optional)**: Intel vPro Technology
- **Battery**: Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- **Max battery life**:
  - MobileMark 2014: 14.7 hr
  - Battery life varies significantly with settings, usage, & other factors
- **AC adapter**: 65W or 65W slim 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® Silver; ENERGY STAR® 7.1; RoHS-compliant

**Note**: The specifications above may not be available in all regions.
### 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 Number</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>i7-6620HQ</td>
</tr>
<tr>
<td>E3-1505M v5</td>
</tr>
<tr>
<td>i7-7700HQ</td>
</tr>
<tr>
<td>i7-7820HQ</td>
</tr>
</tbody>
</table>

**Graphics**

Intel HD Graphics 530, 630, P530, or P630 in processor and NVIDIA Quadro® M1200 or M2200, 4GB memory; supports external display; Max resolution: 3840x2160@60Hz (DisplayPort via Mini DisplayPort cable); some: 4K (3840x2160), HD+ (1920x1080). Supports four independent displays.

**Chipset**

Mobile Intel CM238 Chipset

Mobile Intel CM238 Chipset 44GB max / 2400MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, four 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, 160° viewing angle.

**Multi-touch (optional)**

Pen: Proactive pen for multi-touch display

**Storage**

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

**RAID (optional)**

RAID 0/1 support

**Ethernet**


**WLAN**

One of the following, configurable by model:

- Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
- Intel Dual Band Wireless-AC 8260, Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
- Intel M.2 PCIe NVMe SSD 3.0 x 4, 32GB/s

**BlueTooth**

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

**WWAN (optional)**

One of the following, configurable by model:

- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A, Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
- Micro-SIM card slot, optional Verizon LTE (US) or Lenovo™ Connect (EMEA) SIM card

**Media reader**

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

**Battery**

Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh)

**Operating system**

One of the following, configurable by model:

- Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro 64 for Workstations

**Limited warranty**

One of the following, configurable by model:

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

**Mi-Spec test**

MIL-STD-810G military testing

**Environment**

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

**Dimensions**

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

**Weight**

Non-touch: 5.6 lb / 2.55kg 5.9 lb / 2.67kg

Multi-touch: 6.2 lb / 2.82kg 6.4 lb / 2.90kg

**Camera**

Optional: Smart card reader

**Audio support**

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

**Smart card reader**

One of the following, configurable by model:

ExpressCard: One slot (ExpressCard/34)

Media reader: One of the following, configurable by model:

ExpressCard: One slot (ExpressCard/34)

Ports:

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

**Security**

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

**Fingerprint reader**

Optional: Pantone® color calibrator by X-Rite® color calibration sensor in palm rest

**Color calibration**

None

**UltraNav™**

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

**Camera (optional)**

MobileMark® 2014

**Battery life**

Hybrid Graphics: 4.5 hr 6.1 hr

Discrete Graphics: 6.5 hr 8.9 hr

**AC adapter**

6.5 hr 8.9 hr

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

**Weight**

Non-touch: 5.6 lb / 2.55kg 5.9 lb / 2.67kg

Multi-touch: 6.2 lb / 2.82kg 6.4 lb / 2.90kg

**Camera**

Optional: Smart card reader

**Audio support**

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

**Security**

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

**Fingerprint reader**

Optional: Pantone® color calibrator by X-Rite® color calibration sensor in palm rest

**Color calibration**

None

**UltraNav™**

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

**Battery**

Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh)

**Operating system**

One of the following, configurable by model:

- Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
- Windows® 10 Home 64
- Windows 10 Pro 64
- Windows 10 Pro 64 for Workstations

**Limited warranty**

One of the following, configurable by model:

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

**Mi-Spec test**

MIL-STD-810G military testing

**Environment**

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

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

Lenovo

September 2018
### ThinkPad P52 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>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<tr>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>59-9590HK</td>
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<td>2.9 GHz</td>
<td>4.8 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<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
- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- *Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation*
- *128GB non-ECC memory for special bid only*

**Display**

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

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

**Optane™ memory**

- **Optional:** Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2
- **RAID (optional)**
- **RAID 0/1 support**
- **Optical**
- **None**

**Ethernet**

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

**WLAN**

- **Bluetooth™**
- **Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7380 (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
- **WxDxH(Touch):** 14.86" x 9.93" x 1.02-1.21"; 377.4mm x 252.3mm x 25.8-30.7mm

**Weight**

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

**Case color**

- Black

**Case material**

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

**Smart card reader**

- **Optional:** Smart card reader

**Media reader**

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

**Ports**

- **USB**
- **HDMI**
- **Mini DisplayPort**
- **Ethernet (RJ-45)**
- **Thunderbolt 3**
- **Card reader**
- **MMI (optional)**

**Camera (optional)**

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera, fixed focus
  - HD Audio, Realtek ALC3286 codec / stereo speakers, 2W x 2, Dolby Audio Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone

**Audio support**

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

**Battery**

- **Discrete mode:** 6.1 hr; **Hybrid mode:** 8.9 hr
- **Premium / dual array microphone, 2W x 2, Dolby Audio Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone**

**Keyboard**

- **UltraNav™:** 6-row, spill-resistant, multimedia Fn keys, LED backlight
- **Fingerprint reader**
- **Touchpad** multi-touch touchpad
- **Near Field Communication**

**Security**

- **Security chip**
- **Fingerprint reader**
- **Touchpad** multi-touch touchpad
- **Security keyhole**

**Security chip**

- **vPro Technology**
- **Fingerprint reader**
- **Touchpad** multi-touch touchpad
- **Security keyhole**

**Audio support**

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

**Battery**

- **Swappable Li-ion 90Wh battery**
  - **(MobileMark® 2014):** 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.

October 2019
### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I5-8550U</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 and NVIDIA Quadro P500, 2GB GDDR5 memory
- supports external digital monitor via HDMI or USB Type-C
- supports three independent displays
- Max resolution: 4096x2304 @60Hz (USB Type-C); 4096x2160 @30Hz (HDMI)

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

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

### Storage
- System has one HDD slot or one M.2 2280 slot exclusively for storage
- * System clocks down for processors with lower memory controller
- **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. 1x2GB SSD)
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- **Some:** 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

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

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

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

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- * 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: 14.40" x 9.95" x 0.79-0.80"; 365.8mm x 252.8mm x 19.95-20.2mm

### Weight
- starting at 4.39 lb / 1.99 kg

### Case color
- Black

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

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

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

### Ports
- Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 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, 4-in-1 reader (MMC, SD, SDHC, SDX)

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

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

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

### Keyboard
- 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface multi-touch trackpad

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

### Calibration
- Intel vPro Technology

### FingerPrint reader (optional)
- Option: Touch style match on chip fingerprint reader on the palm rest
- anti-spoofing technology

### NFC (optional)
- Near Field Communication

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

### Max battery life (MobileMark 2014)
- * 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
  - 1-year depot with 2-year planar repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service
  - 3-year (including battery) limited onsite service

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

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

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

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></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>
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</tr>
<tr>
<td>i7-9850H</td>
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<td>12</td>
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<td>4.6 GHz</td>
<td>12MB</td>
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<tr>
<td>i9-9880H</td>
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<td>E-2276M</td>
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<td>4.7 GHz</td>
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<td>DDR4-2666</td>
<td></td>
</tr>
</tbody>
</table>

### Graphics

Intel UHD Graphics 630 or P630 in processor and NVIDIA® Quadro® T1000 (4GB GDDR5), T2000 (4GB GDDR5), RTX 3000 (6GB GDDR6, VR ready), RTX 4000 (8GB GDDR6, VR ready), or RTX 5000 (16GB GDDR6, VR ready).

- supports external digital monitor via 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.

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

### Display

- **Size**: 15.6” or 15.6”
- **Resolution**: Full HD (1920x1080)
- **Type**: IPS
- **Surface**: Anti-glare
- **Brightness**: 300 nits
- **Aspect Ratio**: 16:9
- **Contrast Ratio**: 720:1
- **Color Gamut**: 72% NTSC
- **Viewing Angle**: 160°

### Storage

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

### Optane™ memory (optional)

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

### RAID (optional)

- RAID 0/1/5 support

### Ethernet

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

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

### WLAN (optional) Bluetooth™ (optional)

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

### WWAN (optional)

- 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 (touch)**: 14.86” x 9.93” x 1.02-1.21”

### Weight

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

### Audio support

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

### Security

- Security chip
  - vPro (optional)

### Security chip fingerprint reader

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

### Security chip fingerprint reader

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

### Security chip fingerprint reader

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

### Security chip fingerprint reader

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

### Battery

- **Battery life (MobileMark® 2014)**
  - Hybrid mode: 13 hr
  - Discrete mode: 8 hr

### Operating system

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

### Limited warranty

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

### 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

September 2019
**ThinkPad P53s Platform Specifications**

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
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<th># of Threads</th>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8665U</td>
<td>8</td>
<td>16</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset Memory**

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

**Display**

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

**Multi-touch (opt) Pen**

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

**Storage**

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

**Optical**

None

**Ethernet**

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

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

**WLAN**

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

**WWAN (optional)**

One of the following, configurable by model:

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

- 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

**Smart card reader**

Optional: Smart card reader

**Media reader**

MicroSD card reader

**Ports**

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

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

**Monitor cable (optional)**

HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

**Bundled Accy**

Lenovo USB-C to DisplayPort Adapter

**Camera (optional)**

One of the following, configurable by model:

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

**Audio support**

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

**Keyboard**

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

**UltraNav™**

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

**Security**

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

**Security chip**

Discrete TPM 2.0, TG Certified

**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

**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/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 P72 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>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>
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<tr>
<td>E-2178M</td>
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<td>8</td>
<td>3.0 GHz</td>
<td>4.5 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>E-2186M</td>
<td>8</td>
<td>8</td>
<td>2.9 GHz</td>
<td>4.6 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 P600 (4GB memory), P2000 (4GB memory), P3000 (6GB memory), P4000 (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
- 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets
- *Installed DIMMs are actually 3666MHz but run at 2400MHz due to Intel limitation

#### Display

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

#### Multi-touch Pen

- None
- Supports pen accessory, please see the accessory compatibility for details

#### Storage

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

#### Optical

- None
- 3-button Mylar surface multi-touch touchpad

#### Ethernet

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

#### WLAN

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

#### WWAN

- None
- 3-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card
- 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole

#### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip
  - Discrete TPM 2.0, TCG Certified
- Fingerprint reader
  - Touch style match on chip fingerprint reader on the palm rest
- Color calibration
  - None
- NFC
  - Near Field Communication

#### Battery

- Li-ion 99Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark® 2014: 16 hr
- *Battery life varies significantly with settings, usage, & other factors

#### AC adapter

- 230W slim tip AC adapter

#### Operating system

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

#### Limited warranty

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

#### Mil-Spec test

- MIL-STD-810G military testing

#### Environment

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

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**Note:** The specifications above may not be available in all regions.
## ThinkPad P73 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>i5-9400H</td>
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<td>8</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>8MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>i7-9750H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>i7-9850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
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<td>12MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<td>i9-9880H</td>
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<td>16</td>
<td>2.3 GHz</td>
<td>4.8 GHz</td>
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<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<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 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 (128GB max / 2666MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets

### Memory

- * Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16.9</td>
<td>700:1</td>
<td>72%</td>
</tr>
<tr>
<td>17.3&quot;</td>
<td>UHD (3840x2160)</td>
<td>Dolby Vision™HDR</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16.9</td>
<td>1000:1</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Multi-touch Pen

- None

### Storage

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

### Optane™ memory

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

### RAID (optional)

RAID 0/1 support

### Ethernet

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

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

### WLAN

- Intel 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

### Operating system

One of the following, configurable by model:

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

### Battery

Integrated Li-ion 99Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

### AC adapter

170W or 230W slim tip AC adapter

### Security

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

Security chip

- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology

Fingerprint reader

Touch style match on chip fingerprint reader on the palm rest

### Color calibration

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

### NFC (optional)

Near Field Communication

### Audio support

HD Audio, Synaptic

Audio support

Dolby Atmos® sound system

### Operating system

One of the following, configurable by model:

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

### Limited warranty

One of the following, configurable by model:

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

### Mil-Spec test

MIL-STD-810G military testing

### Environment

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

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

Lenovo

August 2019
**ThinkPad T470 Platform Specifications**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i7-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

* i7-6500U is not available in EMEA

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio
- Some: 11.6" (300mm) 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 IPS panel with PPS cover 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: 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
- Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN and WiGiG

### Optical

- None

### Ethernet

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

### WLAN

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

### Bluetooth™

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

### WWAN (optional)

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

### SIM card (opt)

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

### Dimensions

- **Weight**
  - Models 3 -cell or 3 + 3-cell: 6-cell or 3 + 6-cell
  - Magnesium: 3.49 lb / 1.65 kg
  - PPS: 3.63 lb / 1.65 kg

### 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

### 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 speed may be lower than theoretical speed

### WiGiG dock (opt)

- ThinkPad WiGiG dock

### Monitor cable

- Optional: Lenovo USB-C to VGA Adapter

### Camera

- Optional: 720p IR & 720p IR camera and HD720p camera (mutually exclusive with WiGiG)

### Audio support

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

### Keyboard

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

### UltraNav™

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

### Security

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

### Security chip

- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology

### Fingerprint reader

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

### NFC (optional)

- Near Field Communication

### Internal battery

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

### External battery

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

### Max battery life (MobileMark® 2014)

<table>
<thead>
<tr>
<th>Models</th>
<th>3-cell</th>
<th>3 + 3-cell</th>
<th>6-cell</th>
<th>6-cell (24Wh)</th>
<th>3 + 6-cell</th>
<th>6-cell (72Wh)</th>
<th>3 + 6-cell (72Wh)</th>
<th>3 + 6-cell (72Wh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated</td>
<td>6.9 hr</td>
<td>13.9 hr</td>
<td>13.9 hr</td>
<td>20.9 hr</td>
<td>20.9 hr</td>
<td>27.1 hr</td>
<td>21.2 hr</td>
<td>28.6 hr</td>
</tr>
<tr>
<td>Discrete</td>
<td>6.9 hr</td>
<td>13.9 hr</td>
<td>14.3 hr</td>
<td>21.6 hr</td>
<td>21.2 hr</td>
<td>28.6 hr</td>
<td>21.2 hr</td>
<td>28.6 hr</td>
</tr>
</tbody>
</table>

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

### AC adapter

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

### 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) / ENERGY STAR® 6.1 / RoHS-compliant

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

Lenovo

September 2018
### 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>i5-6200U</td>
<td>2</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>2.4 GHz</td>
<td>3.0 GHz</td>
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<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<td>i7-6600U</td>
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<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<td>2.5 GHz</td>
<td>3.1 GHz</td>
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<td>Intel HD Graphics 520</td>
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<td>i7-7500U</td>
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<td>3.5 GHz</td>
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<td>Intel HD Graphics 620</td>
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<tr>
<td>i7-7600U</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: 4096x2304@60Hz (USB Type-C);
- 4096x2160@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform
- 20GB or 24GB max 1 / 2400MHz DDR4, dual-channel capable, 4GB or 6GB memory soldered to systemboard, one DDR4 SO-DIMM socket
- * System clocks down for processors with lower memory controller

### Display

- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
- Some: 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
- On-cell touch, supports 10-finger gesture, 250 nits (FHD only)

### Multi-touch (opt)

### Storage

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

### Optical

- 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 / 18265ac 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 (EMEA) SIM card

### WWAN (optional)

### Supported Operating System

- • Windows 10 Pro 64/64
- • Windows 10 Home 64
- • 3-year/1-yr battery limited onsite service
- • 3-year/1-yr battery depot repair service
- • 1-year depot repair service

### Security

- Security chip: Intel vPro Technology
- Biometric: Smart card reader
- Security keyhole: 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified

### Audio support

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

### Camera

- Camera (optional): HD720p resolution, fixed focus
- Webcam (models without camera are NOT available in EMEA)
- HD Audio, Realtek® ALC3268 codec / stereo speakers, 1W x 2 / dual array microphone, combo audio/microphone jack

### Additional Features

- Displays:
  - 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
  - 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
  - On-cell touch, supports 10-finger gesture, 250 nits (FHD only)

### Operating System

- One of the following, configurable by model:
  - Windows® 7 Professional 64 preinstalled
  - through downgrade rights in Windows 10 Pro 64
  - Lenovo USB-C to VGA Adapter
  - 45W slim tip AC adapter, 45W or 65W USB Type-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
  - 3-year/1-yr battery limited onsite service

### Environment

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

**Dimensions:**

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

**Weight:**

- Starting at 2.9 lb / 1.32 kg

**Case color:**

- Black or Silver

**Case material:**

- Display cover: CFRP Hybrid;
- Bottom: Magnesium

**Smart card reader:**

- Optional: Smart card reader

**Media reader:**

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

**Ports:**

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

**WiGig dock (opt):**

- ThinkPad WiGig dock, mutually exclusive with WWAN

**Monitor cable (optional):**

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

**Camera:**

- Optional: 2MP HD camera in FHD models
- Optional: 720p HD camera in HD models

**Keyboard:**

- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- ALC3268 codec / stereo speakers, 1W x 2 / dual array microphone, combo audio/microphone jack

**Operating system:**

- One of the following, configurable by model:
  - Windows® 7 Professional 64 preinstalled
  - through downgrade rights in Windows 10 Pro 64
  - Lenovo USB-C to VGA Adapter
  - 45W slim tip AC adapter, 45W or 65W USB Type-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
  - 3-year/1-yr battery limited onsite service

**Mil-Spec test:**

- MIL-STD-810G military testing

**Equipment:**

- EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
**ThinkPad T480 Platform Specifications**

**Product Specifications Reference (PSREF)**

**Processor**

7th Generation Intel® Core™ i5 Processor

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

8th Generation Intel® Core™ i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>5-8350U</td>
<td>4</td>
<td>8</td>
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<tr>
<td>7-8550U</td>
<td>4</td>
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<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX150, 2GB GDDR5 memory (discrete graphics is available only on i7 models in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)

**Chipset**

Intel SoC (System on Chip) platform

**Memory**

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

**Display**

Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio.

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

Some: 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle.

**Multi-touch (opt)**

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

**Storage**

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

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

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

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

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

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

**Optane™ memory**

Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

**Optical**

None

**Ethernet**

Non-vPro model: Intel Ethernet Connektion 2191-V (Jacksonville)

vPro model: Intel Ethernet Connektion 2191-ML (Jacksonville)

**WLAN + Bluetooth™**

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

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

**WWAN (optional)**

One of the following, configurable by model (mutually exclusive with Intel Optane memory):

- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom LB50-GL), M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom LB50-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

**Smart card reader**

Optional: Smart card reader

**Media reader**

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

**Ports**

Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 media reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole

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

**Battery**

HMG (US only); ENERGY STAR

Operating system

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

**AC adapter**

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

**Dimensions**

WxDxH: 13.25" x 9.15" x 0.79".

<table>
<thead>
<tr>
<th>Models</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>24Wh or 24Wh + 24Wh</td>
<td>33.6mm x 232.5mm x 19.95mm</td>
</tr>
<tr>
<td>48Wh, 72Wh, or 24Wh + 48Wh / 72Wh</td>
<td></td>
</tr>
</tbody>
</table>

**Integrated Magnesium**

3.49 lb / 1.58 kg

3.92 lb / 1.78 kg

**Integrated PPS**

3.63 lb / 1.65 kg

4.08 lb / 1.85 kg

**Discrete Magnesium**

3.53 lb / 1.60 kg

3.97 lb / 1.80 kg

**Discrete PPS**

3.68 lb / 1.67 kg

4.12 lb / 1.87 kg

**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® ALC3297 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 multi-touch touchpad

**Fingerprint reader (optional)**

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

**Battery life** (MobileMark® 2014)

<table>
<thead>
<tr>
<th>Battery life</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>24Wh 24Wh + 24Wh 24Wh + 48Wh 24Wh + 72Wh</td>
<td>3.68 lb / 1.67 kg 3.92 lb / 1.78 kg 4.08 lb / 1.85 kg</td>
</tr>
</tbody>
</table>

**Max battery life**

23.9 hr

19.8 hr

16.4 hr

12.6 hr

9.3 hr

6.6 hr

**NFC (optional)**

Near Field Communication

**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 planar 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

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

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</table>

or 8th Generation Intel Core i5 / i7 Processor

<table>
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<td>i5-8250U</td>
<td>4</td>
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<td>8MB</td>
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<td>Intel HD 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
4GB or 8GB memory soldered to systemboard; one DDR4 SO-DIMM socket
* System clocks down for processors with lower memory controller

### Display

**Some:** 14.0” (356mm) 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” (356mm) QHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle

### Multi-touch (opt)

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

### Storage

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

### Optical

None

### Ethernet

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

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

### WLAN + Bluetooth<sup>™</sup>

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

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

### WWAN (optional)

One of the following, configurable by model:
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

### SIM card (opt)

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

### Processor Specifications Reference (PSREF)

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

**Specifications Reference (PSREF)**

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

**Dimensions**

- **WxDxH:** 13.03” x 8.93” x 0.73”
- **Case:** 331mm x 226.8mm x 18.45mm

**Weight**

Starting at 2.9 lb / 1.32 kg

**Case color**

Black or Silver

**Case material**

Display cover: CFRP Hybrid;

**Bottom:** Magnesium

**Smart card reader**

Optional: Smart card reader

**Media reader**

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

**Ports**

Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole

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

**Monitor cable**

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

**Camera**

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

**Audio support**

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

**Keyboard**

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

**UltraNav™**

pointing device and buttonless Mylar surface multi-touch touchpad

**Security chip**

Discrete TPM 2.0, TCG Certified

**Security chip**

Intel vPro Technology

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

**Max battery life**

MobileMark<sup>™</sup> 2014: 15.6 hr

**AC adapter**

45W or 65W USB Type-C AC adapter

**Operating system**

Optional: Windows<sup>®</sup> 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

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

**MiLC test**

MIL-STD-810G military testing

**Environment**

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

Lenovo August 2019
## Processor

<table>
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<tr>
<th>Processor Number</th>
<th># of Cores</th>
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<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-9350U</td>
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<td>8</td>
<td>1.6 GHz</td>
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<td>i7-8565U</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

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## 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

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

**Size**

- 14.0” HD (1366x768)
- 14.0” FHD (1920x1080)
- 14.0” FHD (1920x1080) Low Power
- 14.0” ThinkPad Privacy Guard
- 14.0” WQHD (2560x1440)

**Type**

- TN Anti-glare
- IPS Anti-glare
- IPS Anti-glare
- IPS Glossy

**Surface**

- 220 nits
- 300 nits (multi-touch)
- 400 nits
- 500 nits

**Brightness**

- 45% 90°
- 45% 170°
- 72% 170°
- 100% Adobe

**Aspect Ratio**

- 16:9

**Contrast Ratio**

- 400:1
- 700:1
- 800:1
- 1000:1

**Color Gamut**

- sRGB
- 70% NTSC

**Viewing Angle**

- 178°

**Multi-touch (opt)**

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 2280 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

**optional**

- 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)

- Wireless WAN upgradeable
- Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 4x4, M.2 card

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

## SIM card (opt)

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

---

### Dimensions

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

### Weight

<table>
<thead>
<tr>
<th>Models</th>
<th>HD</th>
<th>FHD</th>
<th>FHD Low Power / WQHD</th>
<th>Privacy Guard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>3.37 lb / 1.53 kg</td>
<td>3.41 lb / 1.55 kg</td>
<td>3.23 lb / 1.46 kg</td>
<td>3.56 lb / 1.61 kg</td>
</tr>
</tbody>
</table>

### Case color

- Black

### Case material

**Display cover:**

- FHD
- FHD Low Power
- FHD Privacy Guard

### Media reader

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

### Bundled Accy

- None

### Camera

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

### Audio support

- 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

### Security chip

- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)
- Security chip System Mgt (opt)

### KeyPad

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

### Battery

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

### AC adapter

- Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark 2014: 16.11 hr

### Preload

- 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
  - 1-year depot with 2-year planar repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

### Environment

- EPEAT Silver / ENERGY STAR 7.1; RoHS-compliant

**Note:** The specifications above may not be available in all regions.
### ThinkPad T490s Platform Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Freq</th>
<th>Max Turbo</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8655U</td>
<td>4</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>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset and Memory**

- Intel SoC (System on Chip) platform
- 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to system board, no sockets
- *Installed memory is actually 2866MHz but runs at 2400MHz due to Intel limitation

**Display**

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

**Storage**

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

**Optical**

- None

**Ethernet**

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

**SIM card (optional)**

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

**Weight**

- Models: Black with FHD / Privacy Guard, Black with FHD Low Power / WQHD / Privacy Guard, Silver
- Weight: 2.96 lb / 1.35 kg; 2.81 lb / 1.27 kg; 3.29 lb / 1.49 kg

**Case color**

- Black or Silver

**Display cover**

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

**Smart card reader**

- Optional: Smart card reader

**Media reader**

- MicroSD card reader

**Ports**

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

**Monitor cable (optional)**

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

**Audio support**

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

**Camera**

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

**Keyboard**

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

**Security chip**

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

**Operating system**

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

**Battery**

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

**Fingerprint reader**

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

**NFC (optional)**

- Near Field Communication

**Environment**

- EPEAT Silver; ENERGY STAR 7.1; RoHS-compliant

**Weight**

- 2.96 lb / 1.35 kg; 2.81 lb / 1.27 kg; 3.29 lb / 1.49 kg

**Limited warranty**

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

**Operating system**

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

**Dimensions**

<table>
<thead>
<tr>
<th>WxDxH</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>(black with FHD / Privacy Guard): 12.95&quot; x 8.90&quot; x 0.66&quot;; 329.0mm x 226.15mm x 16.7mm</td>
<td>2.96 lb / 1.35 kg</td>
</tr>
<tr>
<td>(black with FHD Low Power / WQHD): 12.94&quot; x 8.99&quot; x 0.63&quot;; 328.8mm x 225.8mm x 16.1mm</td>
<td>2.81 lb / 1.27 kg</td>
</tr>
<tr>
<td>(silver): 12.96&quot; x 8.92&quot; x 0.68&quot;; 329.15mm x 226.45mm x 17.2mm</td>
<td>3.29 lb / 1.49 kg</td>
</tr>
</tbody>
</table>

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

### Processor

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

### Graphics

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

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; HD</td>
<td>(1366x768)</td>
<td>TN Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
</tr>
<tr>
<td>14.0&quot; FHD</td>
<td>(1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
</tr>
<tr>
<td>14.0&quot; FHD Low Power</td>
<td>(1920x1080)</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</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 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

### WWAN (optional)

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

### Case

- Black

### Case material

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

### Smart card reader

- Optional: Smart card reader

### Ports

- Monitor cable (optional): USB-C to VGA: Lenovo USB-C to VGA Adapter
- Bundled Acry: None

### Audio support

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

### Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip
- DASH Management
- System Mgt

### Battery

- Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: MobileMark® 2014: 13.4 hr

### AC adapter

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

### Operating system

- Windows® 10 Home 64 or Windows 10 Pro 64

### Warranty

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

### Environment

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

### Note

The specifications above may not be available in all regions.
**ThinkPad T495s 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 Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 5 Pro 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</td>
<td>4</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 10 Graphics</td>
</tr>
</tbody>
</table>

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

### Graphics

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

### Chipset

- AMD SoC (System on Chip) platform

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>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>
</tr>
<tr>
<td>14.0&quot;</td>
<td>H720p (1366x768)</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>
</tr>
<tr>
<td>14.0&quot;</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>
</tr>
</tbody>
</table>

### Multi-touch (optional)

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

### Storage

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

### Ethernet

- Realtek® RT8111EPV 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**

<table>
<thead>
<tr>
<th>Model</th>
<th>WxDxH (FHD / Privacy Guard):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.95&quot; x 8.90&quot; x 0.66&quot;</td>
</tr>
<tr>
<td></td>
<td>329.0mm x 226.15mm x 16.7mm</td>
</tr>
</tbody>
</table>

**Weight**

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

**Case color**

- Black

**Display cover:**

- CFP 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), headset, 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
- Optional: ThinkPad Ethernet Extension Adapter Gen 2

### Monitor (optional)

- One of the following, configurable by model:
  - 10.1" HD HD720p camera with ThinkShutter camera privacy, fixed focus
  - MicroSD card reader, side docking connector, security keyhole

### Audio support

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

### Keyboard

- UltraNav™ 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- 2014: Lenovo USB-C to VGA Adapter

### Security chip

- Security chip
  - System Mgt
  - Fingerprint reader
  - Optional: Touch style match on chip fingerprint reader on the palm rest
  - NFC

### Security

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

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 1 year depot repair service
- 16.4 hr
- Battery life varies significantly with settings, usage, & other factors
- 45W or 65W USB Type-C AC adapter
- Optional: Windows® 10 Home 64 or Windows 10 Pro 64

### Operating system

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

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

Lenovo

October 2019
### Processor Specifications

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
<td>i5-7200U</td>
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<td>3MB</td>
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<td>Intel HD Graphics 620</td>
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<tr>
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<td>3.8 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>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
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<td>4</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
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<td>Intel UHD Graphics 620</td>
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<tr>
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<td>4</td>
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<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>7-8550U</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>
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<tr>
<td>7-8650U</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset 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

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

### Optane™ memory

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

### Ethernet

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

### WWAN (optional)

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

### WWAN (optional)

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

### WWAN (optional)

- One of the following, configurable by model:
  - Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole
  - * Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Camera (optional)

- One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - 4K IR camera and HD720p camera, fixed focus

### Audio support

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

### Battery

- 45W or 65W USB Type-C AC adapter
- Max battery life (MobileMark® 2014):
  - Models 24Wh 48Wh 72Wh 32Wh + 24Wh 32Wh + 48Wh 32Wh + 72Wh
  - Battery life: 5.8 hr 12.5 hr 18.1 hr 13.8 hr 20.3 hr 26.1 hr
  - * Battery life varies significantly with settings, usage, & other factors

### Operating system

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

### AC adapter

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

### Limited warranty

- 1-year depot repair service
- 1-year with 2-year planar repair service
- 3-year depot repair service
- 3-year limited onsite service
**ThinkPad T590 Platform Specifications**

**Processor**

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
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</tr>
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<td>i7-8665U</td>
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<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

- Intel Soc (System on Chip) platform
- 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**

- **Size**
  - 15.6” FHD (1920x1080)
  - 15.6” UHD (3840x2160)
- **Type**
  - IPS Anti-glare
  - IPS Anti-glare
- **Brightness**
  - 250 nits
  - 500 nits
- **Aspect Ratio**
  - 16:9
  - 16:9
- **Contrast Ratio**
  - 700:1
  - 1200:1
- **Color Gamut**
  - 45% Adobe neutral 100%
- **Viewing Angle**
  - 170°

**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 (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)**

- *Depending on many factors, actual data transfer speed may be lower than theoretical speed*
- Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- One of the following, configurable by model:
  - Limited warranty
    - 1-year depot repair service
    - 1-year depot with 2-year planar repair service
    - 3-year/1-year battery depot repair service
    - 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket
    - DDR4-2400 Intel UHD Graphics 620
    - NVIDIA GeForce MX250, 2GB GDDR5 memory
    - 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)
    - 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*

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

**Display cover**

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

**Keyboard**

- 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight 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 Mgmt (optional)**

- Intel vPro Technology

**Fingerprint reader**

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

**Operating system**

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

**Battery**

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life
  - MobileMark® 2014: 14.98 hr (9.5 hr for UHD model with discrete graphics)
- AC adapter
  - 45W or 65W USB Type-C AC adapter

**Environment**

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

**Dimensions**

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

**Weight**

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

**Case color**

- Black

**Case material**

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

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

Lenovo

August 2019
## ThinkPad X1 Carbon (6th Gen) 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>
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</tr>
</thead>
<tbody>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>LPDDR3</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i5-8250U</td>
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<td>8</td>
<td>1.6 GHz</td>
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<td>6MB</td>
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<td>i5-8350U</td>
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<td>i7-8550U</td>
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<td>i7-8650U</td>
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<td>8MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

### Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor; supports external digital monitor via HDMI or USB Type-C; supports three independent displays;
- Max resolution: 5120x2880 @ 60Hz (USB Type-C); 4096x2160 @ 30Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

- 8GB or 16GB / 2133MHz LPDDR3 / soldered to system board, no sockets
- * System clocks down for processors with lower memory controller

### Display

- One of the following, configurable by model:
  - 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle
  - 14.0" (355mm) 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 QHD (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)

### Multi-touch (opt)

- Supports 10-finger gesture (FHD only)

### Storage

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

### Optical

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

### Ethernet

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

### WWAN (optional)

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

### SIM card (opt)

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

### Dimensions

| WxDxH: | 12.74 x 8.55 x 0.63 | 323.5mm x 217.1mm x 15.95mm |

### Weight

- Starting at 2.49 lb / 1.13 kg

### Color

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

### Case material

- Display cover: CFRP/GFRP hybrid

### Smart card reader

- None

### Media reader

- MicroSD card reader, supports UHS-II

### Ports

- Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, microSD card reader, side docking connector, security keyhole
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Monitor cable (optional)

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

### Bundled Acy

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

### Camera (optional)

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

### Audio support

- HD Audio, Realtek® ALC3286 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby® Atmos™ via headphones

### Keyboard

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

### TrackPoint® pointing device and buttonless glass surface multi-touch touchpad

### Security

- Security chip: Intel vPro Technology
- Security keyhole: Discrete TPM 2.0, TCG Certified
- Fingerprint reader: Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology

### NFC (optional)

- Near Field Communication

### Battery

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Max battery life: MobileMark® 2014: 19.3 hr
- * Battery life varies significantly with settings, usage, & other factors

### AC adapter

- 45W, 65W, or 65W Low Halogen 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 with 2-year planar repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

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

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

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Cores</th>
<th>Frequency</th>
<th>Cache</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>1.6 GHz</td>
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<tr>
<td>i5-8365U</td>
<td>4</td>
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<td>6MB</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8565U</td>
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<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8665U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>6MB</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-10210U</td>
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<td>i5-10510U</td>
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<td>i7-10710U</td>
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<td>1.1 GHz</td>
<td>12MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

### Graphics

- Intel UHD Graphics 620 or Intel UHD Graphics in processor;
- Supports external digital monitor via HDMI or USB Type-C / Thunderbolt;
- Supports three independent displays;
- Max resolution: 5K@60Hz (Thunderbolt); 4K@24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

- Optional: Lenovo ULP with Solid State Storage, or Lenovo ULP with 16GB Memory
- Optional: Lenovo ULP with 16GB Memory

### 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>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; FHD (1920x1080) Multi-touch IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080) Low Power IPS</td>
<td>Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; WQHD (2560x1440) IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot; UHD (3840x2160) HDR 400</td>
<td>Glossy</td>
<td>500 nits</td>
<td>16:9</td>
<td>1400:1</td>
<td>90%</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

### Multi-touch (optional)

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

### Storage

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

### Optical

- None

### Ethernet

- None

### WLAN + Bluetooth

### Notebook Features

- 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

### SIM card (optional)

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

### 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

### Camera (optional)

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

### Audio support

- HD Audio, Realtek ALC3286 codec / Dolby Atmos speaker system, 2W x 2, 0.8 x 2 / 4 array far-field microphones, headphone / microphone combo jack

### Security

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

### Battery

- Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 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 planar repair service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

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

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

Lenovo
September 2019
### ThinkPad X1 Extreme Platform Specifications

<table>
<thead>
<tr>
<th>Processor</th>
<th>8th Generation Intel® Core™ i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>i5-8300H</td>
<td>4</td>
</tr>
<tr>
<td>i5-8400H</td>
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<td>6</td>
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<tr>
<td>i7-8850H</td>
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</tr>
</tbody>
</table>

### Graphics
- Intel UHD Graphics 630 in processor and NVIDIA® GeForce® GTX 1050 Ti, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI)

### Chipset
- Mobile Intel CM246 Chipset

### Display
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 720p resolution; 170° viewing angle
- 14.24" x 9.67" x 0.72"; 361.8mm x 245.7mm x 18.4mm

### Multi-touch (opt)
- Supports pen accessory, please see the accessory compatibility for details

### Storage
- Up to 2 drives (two M.2 SSD)
- M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)
- RAID 0/1 support

### Optical
- Optical drive: DVD±R/RW (Dual Layer), support up to 8x read, 8x write and 6x rewrite speeds

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

### 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
- 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

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

### Audio support
- HD Audio, Realtek ALC2286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone

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

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

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

### Broadcom
- Discrete mode: Support external digital monitor via HDMI or Thunderbolt

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

### 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

### August 2019

Lenovo
ThinkPad X1 Extreme (2nd Gen) Platform Specifications

Product Specifications Reference (PSREF)

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
<td>i5-9300H</td>
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<td>2.4 GHz</td>
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<td>16MB</td>
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<td>Intel UHD Graphics 630</td>
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</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 @ 60 Hz (Thunderbolt); 4K @ 60 Hz (HDMI)

Chipset

Mobile Intel CM246 Chipset

Memory

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

Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
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<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72% NTSC</td>
<td>170°</td>
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<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100% Adobe</td>
<td>170°</td>
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<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>OLED</td>
<td>AR, AS</td>
<td>SDR 400nit. (HDR 500nit (peak))</td>
<td>16:9</td>
<td>1000000:1</td>
<td>100% DCI-P3</td>
<td>170°</td>
</tr>
</tbody>
</table>

Pen

- Capacitive-type multi-touch, supports 10-finger gesture (UHD OLED only), anti-reflection (AR), anti-smudge (AS) coating;
- Supports pen accessory, please see the accessory compatibility details

Storage

- Up to two M.2 SSD
- M.2 2280 SSD / PCIe NVMe 3.0 x 4
- RAID (optional)
- RAID 0/1 support: None

Ethernet

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

WLAN (optional)

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

Bluetooth™

- None

WWAN

- None

SIM card

- None

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>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<td>Intel HD Graphics 620</td>
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<td>Intel HD Graphics 620</td>
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<td>i7-6600U</td>
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<td>Intel HD Graphics 620</td>
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</table>

**or 7th 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>Memory Types</th>
<th>Processor Graphics</th>
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<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

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

### Display

| Some: 12.5" (317.5mm) | HD (1366x768), anti-glare, LED backlight, 220 nits, 16.9 aspect ratio, 500:1 contrast ratio |
| Some: 12.5" (317.5mm) | HD (1366x768), anti-glare, LED backlight, IPS, 300 nits, 16.9 aspect ratio, 700:1 contrast ratio, 170° viewing angle |
| Some: 12.5" (317.5mm) | FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16.9 aspect ratio, 700:1 contrast ratio, 170° viewing angle |

### Multi-touch (opt)

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

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

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

### 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

### SIM card (opt)

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

### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>WxDxH: 12.03&quot; x 8.21&quot; x 0.80&quot;; 305.5mm x 208.5mm x 20.3mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Models No + 3-cell 3-cell + 3-cell 3 + 6-cell</td>
</tr>
<tr>
<td></td>
<td>Weight 2.79 lb / 1.27 kg 2.98 lb / 1.36 kg 3.33 lb / 1.52 kg</td>
</tr>
</tbody>
</table>

### Smart Card Reader

- Optional: Smart card reader

### Media Reader

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

### Ports

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

### Wireless LAN (WiGig dock (opt))

- ThinkPad WiGig dock, mutually exclusive with WWAN (US only)

### Monitor controller (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)

- HD720p resolution, fixed focus

### Audio support

- HD Audio, Realtek ALC2368 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack

### Keyboard

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

### Security

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

### Security chip

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

### Display cover:

- Glass-Fiber Reinforced Plastic

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

### Lenovo

August 2019
## ThinkPad X280 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>i3-7020U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>3.9 GHz</td>
<td>3MB</td>
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<td>Intel HD Graphics 620</td>
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<td>Intel HD Graphics 620</td>
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</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>Max Turbo Frequency</th>
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<td>DDR4-2400</td>
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<td>i7-8550U</td>
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<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

Intel SoC (System on Chip) platform

### Memory

8GB, 16GB, or 32GB DDR4 / soldered to systemboard, no sockets

* 4GB memory is NOT available in US and EMEA
* System clocks down for processors with lower memory controller

### Display

**Some:** 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio

**Some:** 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

### Multi-touch (opt)

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

### Storage

One of the following, configurable by model:

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

### Optical

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

### Ethernet + Bluetooth

Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
* Intel 8265ac card supports BT 4.2 but is limited to BT4.1 by Windows OS

### WWAN (optional)

One of the following, configurable by model:

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

### SIM card (opt)

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

### Chipset

Intel SoC (System on Chip) platform

* 4GB memory is NOT available in US and EMEA
* System clocks down for processors with lower memory controller

### Audio

- 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

### Security

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

### Audio

- ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium
- ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium
- ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium

### Display

HD non-touch model: 2.78 lb / 1.27 kg

### Bluetooth

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

### Security

Discrete TPM 2.0, TCG Certified

### Battery

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

### Operating system

Optional: Windows® 10 Home 64 or Windows 10 Pro 64
ThinkPad X390 Platform Specifications
Product Specifications Reference (PSREF)

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<td>Intel UHD Graphics 620</td>
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</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>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<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>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

Chipset

Intel SoC (System on Chip) platform

Memory

4GB, 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets

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

Display

Size | Resolution | Type | Surface | Brightness | Aspect Ratio | Contrast Ratio | Color Gamut | Viewing Angle |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot; HD (1366x768)</td>
<td>TN Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>500:1</td>
<td>45%</td>
<td>90°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.3&quot; FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
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<td>800:1 (non-touch)</td>
<td>700:1 (multi-touch)</td>
<td>72%</td>
<td>170°</td>
<td></td>
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<td>1000:1</td>
<td>72%</td>
<td>178°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multi-touch (opt)

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

Storage

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

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)

Memory

4GB, 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets

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

Weight

Models FHD Non-touch HD / FHD Multi-touch
- Carbon Fiber 311.9mm x 217.0mm x 16.5mm 12.28" x 8.54" x 0.65"
- PPS 312.0mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"
- 312mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"

Case material

Black

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

Smart card reader

Optional: Smart card reader

Media reader

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

Ports

Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDFM 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)

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

Audio support

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

Keyboard

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

UltraNav™

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 Intel vPro Technology

Fingerprint reader

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

NFC (optional)

Near Field Communication

Battery

Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter

Max battery life

MobileMark 2014: 17.6 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 with 2-year planar repair service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

Mil-Spec test

MIL-STD-810G military testing

Environment

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

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

Lenovo
September 2019
ThinkPad X395 Platform Specifications

### 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 Controller</th>
<th>Graphics</th>
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<tr>
<td>Ryzen 3 Pro 3300U</td>
<td>4</td>
<td>2</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>2.4 GHz</td>
<td>3.9 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>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>
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**Graphics**

AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI; supports three independent displays; Max resolution: 4096x2304@60Hz (USB-C); 4096x2160@24Hz (HDMI)

### Chipset and Memory

**Chipset**

AMD SoC (System on Chip) platform:

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

**Memory**

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

### Display

<table>
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<td>ThinkPad Privacy Guard</td>
<td>Anti-glare</td>
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<td>1000:1</td>
<td>72% 178°</td>
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**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

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

### Battery

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

### 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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Expedited Depot: Parts and labor coverage with expedited turnaround. Shipping (including packaging) or delivery to the repair center is paid for by Lenovo.
Onsite / In-home Service: Parts and labor repair coverage where labor is provided onsite at your place of business.
If Lenovo determines your product problem is covered by the product warranty and cannot be resolved over the telephone, a technician will be dispatched to arrive onsite, typically the next day.
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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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