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Summary of Changes

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

May 15, 2019 - Version 542

Additions in this update

► New product(s)
  ThinkPad E495 models announced April 2019
  ThinkPad E595 models announced April 2019

► New model(s)
  ThinkPad E490 models announced April and May 2019
  ThinkPad E590 models announced April and May 2019
  ThinkPad L390 models announced April 2019
  ThinkPad P1 models announced May 2019
  ThinkPad P52 models announced April 2019
  ThinkPad T480 models announced April 2019

► Others
  None

Withdrawals in this update

► Withdrawn product(s)
  None
### Processor
7th Generation Intel® Core™ m / i5 Processor, Intel Celeron® processor, or Intel Pentium® Silver processor

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

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

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

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

### Display
**Some**: 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio

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

### Multi-touch

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

### Optical
None

### Ethernet
Realtek RTL8111GUS Gigabit Network Connection

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

### WWAN
None

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

### Weight
Starting at 2.99 lb (1.36 kg)

### Case color
Black

### Case material
Display cover: PC/ABS+GF; Bottom: PC/ABS plastic

### Media reader
MicroSD card reader

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

### Camera
HD720p camera, fixed focus

### Audio support
HD Audio, Realtek ALC3287 codec, stereo speakers, 2W x 2, Dolby Audio™, monaural digital microphone, combo audio/microphone jack

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

### Touchpad
Buttonless Mylar surface touchpad below keyboard, multi-touch

### Security chip
vPro

### Security chip
None

### Security chip
Discrete TPM 2.0, TCG Certified

### Power-on password
None

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

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

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

### Environment
EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant
### ThinkPad A275 Platform Specifications

**Processor AMD PRO A-Series APUs**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRO A10-8730B</td>
<td>4</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.3 GHz</td>
<td>2MB</td>
<td>DDR4-1666</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>DDR4-1666</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
<tr>
<td>PRO A10-9700B</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>2MB</td>
<td>DDR4-1666</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
<tr>
<td>PRO A12-9800B</td>
<td>4</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>2MB</td>
<td>DDR4-1666</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**

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

**Storage**

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

**Optical**

- None

**Ethernet**

- Realtek® RTL8111EPV Gigabit Ethernet connection

**WLAN**

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

**WWAN (optional)**

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

**SIM card (optional)**

**Dimensions**

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

**Camera**

- Optional: HD720p resolution, fixed focus

**Audio support**

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

**UltraNav™**

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

**Security**

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

**Fingerprint reader**

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

**Keyboard**

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

**AC adapter**

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

**Preload**

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

**Operating system**

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

**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)

**Monitor cable**

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

**Camera (optional)**

- HD200p resolution, fixed focus

**Audio support**

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

**Keyboard**

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

**Security**

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

**Fingerprint reader**

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

**Internal battery**

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

**AC adapter**

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

**Preload**

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

**Limited warranty**

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

**MI-Spec test**

- MIL-STD-810G military certification

**Environment**

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

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

**Lenovo**

April 2019
### ThinkPad A285 Platform Specifications

**Product Specifications Reference (PSREF)**

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

**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: $1200\times800$ @ 60Hz (USB Type-C); $4096\times2160$ @ 60Hz (HDMI)

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

**Optical**
- None

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

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

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

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

**Dimensions**
- $W\times D\times H$ (HD & FHD multi-touch):
  - 12.11" $\times$ 8.26" $\times$ 0.69"; 307.7mm $\times$ 209.8mm $\times$ 17.4mm
- $W\times D\times H$ (FHD non-touch):
  - 12.11" $\times$ 8.26" $\times$ 0.57; 307.7mm $\times$ 209.8mm $\times$ 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

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

**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

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

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

**Environment**
- MIL-Spec test MIL-STD-810G military certification
- EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo
April 2019
**ThinkPad A475 Platform Specifications**

**Processor AMD PRO A-Series APUs**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRO A10-8730B</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.3 GHz</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
<tr>
<td>PRO A12-8830B</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>AMD Radeon™  R5 Graphics</td>
</tr>
<tr>
<td>PRO A10-9700B</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.4 GHz</td>
<td>AMD Radeon™ R7 Graphics</td>
</tr>
<tr>
<td>PRO A12-9800B</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.6 GHz</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
- Type: R5 Graphics, R7 Graphics

**Display**

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

**Storage**

- System has one HDD slot or one M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g., xxxGB SSD)
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s

**Optical**

- None

**Ethernet**

- Realtek® RTL8111EPV Gigabit Ethernet connection

**WLAN**

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

**WWAN (optional)**

- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
- Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)
- For non-WWAN model, it means the model is NOT WWAN upgradable

**SIM card (optional)**

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

**Dimensions**

<table>
<thead>
<tr>
<th>Weight</th>
<th>Weight Models</th>
<th>Weight Magnesium</th>
<th>Weight PPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WxDxH:</td>
<td>13.25&quot; x 9.15&quot; x 0.79&quot;; 336.6mm x 232.5mm x 19.95mm</td>
<td>3.49 lb / 1.58 kg</td>
<td>3.63 lb / 1.65 kg</td>
</tr>
<tr>
<td>3-cell or 3 + 3-cell</td>
<td>3-cell or 3 + 3-cell</td>
<td>3.92 lb / 1.78 kg</td>
<td>4.35 lb / 1.95 kg</td>
</tr>
<tr>
<td>6-cell or 3 + 6-cell</td>
<td>6-cell or 3 + 6-cell</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Case color**

- Black

**Case material**

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

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

Lenovo
April 2019
## ThinkPad A485 Platform Specifications

### Processor

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

### Graphics

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

### Chipset

AMD SoC (System on Chip) platform

### Memory

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

### Display

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

### Multi-touch (opt)

On-cell touch, supports 10-finger gesture

### Storage

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

### Optical

None

### Ethernet

Realtek RTL8111GUL Gigabit Ethernet connection

### WLAN

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

### Bluetooth™

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

### WWAN (optional)

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

### SIM card (opt)

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

### Dimensions

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

### Case color

Black

### Case material

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

### Processor Number

Ryzen 3 PRO 2300U, Ryzen 5 PRO 2500U, Ryzen 7 PRO 2700U

### Processor Features

- **Base Frequency**: 2.0 GHz - 3.4 GHz
- **Max Turbo Frequency**: 3.4 GHz - 3.8 GHz
- **Cache**: 2MB L2 / 4MB L3
- **Memory Types**: DDR4-2400

### Graphics

- **Model**: Ryzen 3 PRO 2300U, AMD Ryzen PRO Mobile Processors with Radeon Vega Graphics
- **Base Frequency**: 2.0 GHz
- **Max Turbo Frequency**: 3.4 GHz
- **Cache**: 2MB L2 / 4MB L3

### Chipset

- **Model**: Ryzen 5 PRO 2500U
- **Base Frequency**: 2.0 GHz
- **Max Turbo Frequency**: 3.6 GHz
- **Cache**: Radeon Vega 8 Graphics

### Memory

- **Model**: Ryzen 7 PRO 2700U
- **Base Frequency**: 2.2 GHz
- **Max Turbo Frequency**: 3.8 GHz
- **Cache**: Radeon Vega 10 Graphics

### Display

- **Model**: ThinkPad A485
- **Dimensions**: 13.25" x 9.15" x 0.79"
- **Weight**: 336.6mm x 232.5mm x 19.95mm

### Case Color

- **Color**: Black
- **Material**: Magnesium Hybrid or PPS; Bottom: Glass-Fiber Reinforced Plastic

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

Product Specifications Reference (PSREF)

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>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.7 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

8th Generation Intel Core i3 / i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

Chipset

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

Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB DDR3 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display;
- Max resolution: 1920x1080 (HDMI) @ 60Hz

Memory

- DDR4-2133 (Intel Core i3 / i5 processor)
- DDR4-2400 (Intel Core i7 processor)

Display

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

Storage

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

Optical

- None

Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

WLAN + Bluetooth™

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

WWAN

- None

SIM card

- None

Dimensions

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

Weight

- Starting at 3.87 lb / 1.75kg

Case color

- Black or silver

Case material

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

Smart card reader

- None

Media reader

- MicroSD card reader

Ports

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

Camera

- HD720p camera, fixed focus

Audio support

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

Keyboard

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

Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Security chip (opt): Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified
- vPro: None
- Fingerprint reader (opt): Touch style fingerprint reader on the palm rest
- NFC: None

Battery

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

AC adapter

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

Preload (optional)

- Windows® 10 Home 64 or Windows 10 Pro 64

Limited warranty

- 1-year depot repair service

Mil-Spec test

- MIL-STD-810G military certification

Environment

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

Note:

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

April 2019
### ThinkPad E485 Platform Specifications

<table>
<thead>
<tr>
<th>Processor</th>
<th>AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Number</td>
</tr>
<tr>
<td>Ryzen 3 2200U</td>
<td>2</td>
</tr>
<tr>
<td>Ryzen 5 2500U</td>
<td>4</td>
</tr>
<tr>
<td>Ryzen 7 2700U</td>
<td>4</td>
</tr>
</tbody>
</table>

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

| Chipset | AMD SoC (System on Chip) platform |
| 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) |
| Optical | Gigabit Ethernet Connection, Realtek RTL8111GUS |

<table>
<thead>
<tr>
<th>WLAN + Bluetooth™</th>
<th>One of the following, configurable by model:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card</td>
<td></td>
</tr>
<tr>
<td>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</td>
<td></td>
</tr>
</tbody>
</table>

| Dimensions | Aluminum (WxDxH): 12.96" x 9.53" x 0.78": 329mm x 242mm x 19.9mm |
| Weight | PC/ABS (WxDxH): 12.96" x 9.53" x 0.86": 329mm x 242mm x 21.9mm |
| Case color | Black |
| Case material | Display cover: Aluminum or PC/ABS plastic; Bottom: PC/ABS plastic |

### Smart card reader
- None

### Media reader
- MicroSD card reader

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

### Camera
- HD720p camera, fixed focus

### Audio support
- HD Audio, Conexant® CX11852 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

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

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

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

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

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

Note: The specifications above may not be available in all regions.
### ThinkPad E490 Platform Specifications

<table>
<thead>
<tr>
<th>Processor 8th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processor</strong> 8th Generation Intel® Core™ i3 / i5 / i7 Processor</td>
</tr>
<tr>
<td><strong>Processor Number</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>i3-8145U</td>
</tr>
<tr>
<td>i5-8265U</td>
</tr>
<tr>
<td>i7-8565U</td>
</tr>
</tbody>
</table>

- **Graphics**: Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon RX 550X Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 4096x2160@24Hz (HDMI).<br>
- **Chipset**: Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets. *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation.*
- **Display**: 14.0” HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch.<br>14.0” FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch.<br>Supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI).
- **Multi-touch**: 6-row, spill-resistant, multimedia Fn keys, optional LED backlight.<br>TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad.
- **Security**: Power-on password, hard disk password, supervisor password, security keyhole.<br>Integrated model: discrete TPM 2.0, TCG Certified.<br>Discrete model: firmware TPM 2.0 integrated in chipset.<br>Optional: Touch style fingerprint reader on the palm rest. NFC None.<br>Battery: Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter.<br>Max battery life: 13 hr *Battery life varies significantly with settings, usage, & other factors.<br>AC adapter: 45W or 65W USB Type-C AC adapter.<br>Preload: (optional) Windows® 10 Home 64 or Windows 10 Pro 64.
- **WWAN**: None
- **AC adapter**: 65W USB Type-C AC adapter.

---

**Note:** The specifications above may not be available in all regions.
### Processor AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 3200U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>1MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 3 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon RX Vega 10 Graphics</td>
</tr>
</tbody>
</table>

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

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

### Display
- **14.0” HD (1366x768)**
  - Anti-glare
  - TN
  - 220 nits
  - 16:9
  - 400:1
  - 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 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4

### Optane™ Memory
- None

### Optical Drive
- None

### Ethernet
- Gigabit Ethernet Connection, Realtek R8111GUS

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

### WWAN
- None

### Dimensions
- Aluminum (WxDxH): 12.96” x 9.53” x 0.78”; 329mm x 242mm x 19.9mm
- PC/ABS (WxDxH): 12.96” x 9.53” x 0.83”; 329mm x 242mm x 21.9mm
- Weight: Starting at 3.87 lb / 1.75 kg

### Case color
- Black

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

### Smart card reader
- None

### Media reader
- MicroSD card reader

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

### Monitor cable
- None

### Camera
- HD720p camera, fixed focus

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

### Keyboard
- UltraNav™ 6-row, spill-resistant, multimedia Fn keys

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

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

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

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

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

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

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

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7020U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7260U</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>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 in processor and AMD Radeon RX 550 Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display, dual independent display.

### 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**: 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)

### Optical

- M.2 SSD / PCIe NVMe

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### Network

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

### Audio

- Stereo speakers, 2W x 2, Dolby Audio

### Audio Support

- HD Audio, Conexant CX11852 codec / Advanced Audio / dual array microphone / headphone / microphone combo jack

### Security

- Security chip (opt)
- Fingerprint reader (opt)
- Security keyhole

### Power

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

### Warranty

- 1-year depot repair service

### Environment

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

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

**Product Specifications Reference (PSREF)**

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

<table>
<thead>
<tr>
<th>Processor</th>
<th>AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td># of Cores</td>
</tr>
<tr>
<td>Ryzen 3 2200U</td>
<td>2</td>
</tr>
<tr>
<td>Ryzen 5 2500U</td>
<td>4</td>
</tr>
<tr>
<td>Ryzen 7 2700U</td>
<td>8</td>
</tr>
</tbody>
</table>

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

| Chipset 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) |
| Optical | Some: M.2 SSD / PCIe NVMe |

| Ethernet | Gigabit Ethernet Connection, Realtek RTL8111GUS |

| WLAN + Bluetooth™ | One of the following, configurable by model: Qualcomm QCNFA435, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card; Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card; Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card |

| WWAN | None |

| SIM card | None |

| Dimensions | WxDxH: 14.53" x 9.92" x 0.79"; 369mm x 252mm x 19.95mm |
| Weight | Starting at 4.7 lb / 2.1kg |
| Case color | Black |
| Case material | Display cover: Aluminum; Bottom: PC/ABS plastic |
| Smart card reader | None |
| Media reader | MicroSD card reader |
| Ports | One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole |

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

| Camera | HD720p camera, fixed focus |
| Audio support | HD Audio, Conexant® CX11852 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack |

| Keyboard | UltraNav™ 6-row, spill-resistant, multimedia Fn keys 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 |
| Security | None |
| Fingerprint reader | None |
| NFC | None |

| Battery | Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter |
| Max battery life | MobileMark® 2014: 8.63 hr |
| AC adapter | 45W or 65W USB Type-C AC adapter |

| Preload (optional) | Windows® 10 Home 64 or Windows 10 Pro 64 |

| Limited warranty | 1-year depot repair service |
| Mil-Spec test | None |
| Environment | EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant |

Lenovo
April 2019
## ThinkPad E590 Platform Specifications

### Processor

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

### Graphics

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

### Chipset

Intel SoC (System on Chip) platform

### Memory

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

### Display

- **Size / Resolution**: 15.6" HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90°
- **Size / Resolution**: 15.6" FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170°

### Multi-touch

None

### Storage

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

None

### Dimensions

WxDxH: 14.53" x 9.94" x 0.78"; 369mm x 252.5mm x 19.9mm

### Weight

Starting at 4.68 lb / 2.12 kg

### Case color

Black or silver

### Case material

Display cover: Aluminum; Bottom: PC/ABS plastic

### Smart card reader

None

### Media reader

MicroSD card reader

### Ports

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

* 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, Conexant CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack

### Keyboard

6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight TrackPoint® 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
Discrete model: firmware TPM 2.0 integrated in chipset

### System Mgt

None

### Fingerprint reader

Optional: Touch style fingerprint reader on the palm rest NFC

### Battery

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

### Max battery life

MobileMark® 2014: 11 hr

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

### AC adapter

45W or 65W USB Type-C AC adapter

### Preload (optional)

Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

1-year depot repair service

### Mil-Spec test

MIL-STD-810G military certification

### Environment

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

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Note: The specifications above may not be available in all regions. Lenovo May 2019
## ThinkPad E595 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 3200U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>1MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 3 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>8</td>
<td>16</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon RX Vega 10 Graphics</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- AMD SoC (System on Chip) platform

### Memory

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

### Display

- **Size / Resolution**: 15.6” HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch
- **15.6” FHD (1920x1080)** Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch

### Multi-touch

- None

### Storage

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

### Optane™ memory

- None

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

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

### WWAN

- None

### Dimensions

- **WxDxH**: 14.53” x 9.92” x 0.78”; 369mm x 252mm x 19.9mm

### Weight

- Starting at 4.7 lb / 2.1kg

### Case color

- Black

### Case material

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

### 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, HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole

### Monitor cable

- None

### Camera

- HD720p camera, fixed focus

### Audio support

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

### Keyboard

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

### Security chip

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

### Security

- None

### Battery

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

### Max battery life

- MobileMark® 2014: 10.3 hr
  - Battery life varies significantly with settings, usage, & other factors

### AC adapter

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

### Preload

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

### Limited warranty

- 1-year depot repair service

### Overheat protection

- None

### Environment

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

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

Product Specifications Reference (PSREF)

<table>
<thead>
<tr>
<th>Processor</th>
<th>Intel® Celeron® Processor, 7th Generation Intel Core™ i3 / i5 Processor or 8th Generation Intel Core i5 / i7 Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td># of Cores</td>
<td># of Threads</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>Max Turbo Frequency</td>
</tr>
<tr>
<td>Cel 3965U</td>
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<tr>
<td>3-7130U</td>
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<tr>
<td>i5-7200U</td>
<td>4</td>
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</table>

8th Generation Intel Core 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>Memory Types</th>
<th>Processor Graphics</th>
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<tr>
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<td>4MB</td>
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<td>Intel UHD Graphics 620</td>
<td></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>
<td></td>
</tr>
<tr>
<td>5-8350U</td>
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<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
</tbody>
</table>

8th Generation Intel Core i7 Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i7-8550U</td>
<td>2</td>
<td>2</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

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

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

Multi-touch (opt): on-cell touch, supports 10-finger gesture

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

Optane™ memory: None

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

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

WWAN: None
SIM card: None

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

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

Security: Power-on password, hard disk password, supervisor password, security keyhole
Security chip: Intel vPro Technology
Fingerprint reader: Optional: Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology
NFC (optional): Near Field Communication

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

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

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

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

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

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

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

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8255U</td>
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<td>8</td>
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<td>i5-8365U</td>
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<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8 MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8 MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics

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

#### Chipset

- Intel SoC (System on Chip) platform
- 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: 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°
- Multi-touch (opt): On-cell touch, supports 10-finger gesture (FHD only)

#### Storage

- M.2 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
- M.2 (2280) SSD / PCie NVMe, PCie 3.0 x 4

#### Optane™ memory

None

#### Optical

None

#### Ethernet

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

#### WLAN

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

#### WWAN

None

#### Dimensions

<table>
<thead>
<tr>
<th>Width x Depth x Height</th>
<th>Weight</th>
<th>Case Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.67&quot; x 8.83&quot; x 0.74&quot;</td>
<td>321.8mm x 224.2mm x 18.8mm</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>32.18mm x 224.2mm x 18.8mm</td>
<td>1.46 kg</td>
<td>Aluminum</td>
</tr>
</tbody>
</table>

#### Processor Specifications

- Processor: 8th Generation Intel® Core™ i3 / i5 / i7 Processor
- Number: Processor 8th Generation Intel® Core™ i3 / i5 / i7 Processor
- # of Cores: # of Cores: # of Cores
- # of Threads: # of Threads: # of Threads
- Base Frequency: Base Frequency: Base Frequency
- Max Turbo Frequency: Max Turbo Frequency: Max Turbo Frequency
- Cache: Cache: Cache
- Memory Types: Memory Types: Memory Types
- Processor Graphics: Intel UHD Graphics 620

#### Media reader

- None

#### Ports

- Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, headphone / microphone combo jack, microSD card reader, security keyhole
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed
- USB-C to VGA: Lenovo USB-C to VGA Adapter
- USB-C to VGA + Power Adapter: Lenovo USB-C to VGA plus Power Adapter
- USB-C to HDMI: Lenovo USB-C to HDMI Adapter
- USB-C to HDMI + Power Adapter: Lenovo USB-C to HDMI plus Power Adapter
- USB-C to DP: Lenovo USB-C to DisplayPort Adapter
- USB-C to RJ45: Lenovo USB-C to Ethernet Adapter
- USB-C to USB-A: Lenovo USB-C to USB-A Adapter
- USB-C to USB-C: Lenovo USB-C to USB-C Cable 2M

#### Monitor cable

- (optional)

#### Camera

- HD720p camera, fixed focus
- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack
- UltraNav™ 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch
- Security chip: Discrete TPM 2.0, TCG Certified
- System Mgt: None
- Fingerprint reader: Touch style fingerprint reader on the palm rest
- NFC: Optional

#### Battery

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
- Battery life: MobileMark® 2014: 14.61 hr
- Battery life varies significantly with settings, usage, & other factors
- AC adapter: 45W or 65W USB Type-C AC adapter

#### Preload

- Windows® 10 Home 64 or Windows 10 Pro 64

#### Limited warranty

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

#### Mil-Spec test

- MIL-STD-810G military certification

#### Environment

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

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

Lenovo
May 2019
ThinkPad L470 Platform Specifications

Product Specifications Reference (PSREF)

Processor

<table>
<thead>
<tr>
<th>Processor or 7th Generation Intel Core™ Processor</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-6006U</td>
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<td>2.0 GHz</td>
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<tr>
<td>i3-6100U</td>
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<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i5-6200U</td>
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<td>DDR4-2133</td>
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</table>

Intel Celeron™ Processor

<table>
<thead>
<tr>
<th>Processor or 7th Generation Intel Core™ Processor</th>
<th># of Cores</th>
<th>Base Frequency</th>
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<th>Cache</th>
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<th>Processor Graphics</th>
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<td>Intel HD Graphics 620</td>
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<tr>
<td>i5-7200U</td>
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<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7500U</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>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>

Note: The specifications above may not be available in all regions. Lenovo September 2018

WLAN

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

Bluetooth™

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

Graphics

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

Chipset Memory

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

Display

- Some: 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, 700:1 contrast ratio, 170° viewing angle

Multi-touch

- None

Storage

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

Optical

- None

Ethernet

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

WLAN

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

Bluetooth™

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

WWAN (optional)

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

SIM card (optional)

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

Dimensions

- Weight
  - Models: 3-cell 3.83 lb / 1.74 kg 4.13 lb / 1.87 kg Discrete model 4.16 lb / 1.89 kg 4.48 lb / 2.03 kg

Camera (optional)

- HD720p resolution, fixed focus

Audio support

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

Security

- Intel vPro Technology
- Security chip
- (optional) Fingerprint reader

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0, TCG Certified
- MobileMark® 2014

Keyboard

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

Smart card reader

- Optional: Smart card reader

Media reader

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

Ports

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

AC adapter

- 45W or 65W slim tip AC adapter

Battery

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

Max battery life

- (MobileMark® 2014)
  - Models: 3-cell 3.83 hr 4.09 hr 4.25 hr 6-cell 48Wh 7.24 hr 14.48 hr 21.72 hr 6-cell 72Wh 4.34 hr 8.66 hr 13.02 hr

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 certification

Environment

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

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

### Processor

<table>
<thead>
<tr>
<th>Processor</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 Graphics</th>
<th>Memory Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-7130U</td>
<td>3-7200U</td>
<td>3-7300U</td>
<td></td>
<td>2.7 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>Intel HD Graphics 620</td>
<td>DDR4-2133</td>
</tr>
<tr>
<td>8th Generation Intel Core i3 / i5 Processor</td>
<td>3-8130U</td>
<td>3-8250U</td>
<td>3-8550U</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>Intel UHD Graphics 620</td>
<td>DDR4-2400</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 in processor and AMD Radeon 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

### Memory

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

### Display

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

### Optical

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

### Ethernet

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

### WLAN + Bluetooth™

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

### WWAN (optional)

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

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

### SIM card (opt)

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

### Dimensions

- WxDxH: 13.18” 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 (optional)

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

### Camera (optional)

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

### Audio support

- IR camera and HD720p camera, fixed focus

### Security chip (optional)

- Discrete TPM 2.0, TCG Certified

### Security (optional)

- Intel vPro Technology

### Battery

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

### AC adapter

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

### Preload

- Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

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

### Mil-Spec test

- MIL-STD-810G military certification

### Environment

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

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

Lenovo
April 2019
**ThinkPad L570 Platform Specifications**

**Processor**
- 6th Generation Intel® Core™ i3 / i5 / i7 Processor or
- Processor Number
  - i3-6006U
  - i3-6100U
  - i5-6200U
  - i5-6300U
  - i5-6500U
  - i7-6500U
  - i7-6600U

- Numbers
  - 2
  - 4
  - Processor or 7th Generation Intel Core i3 / i5 / i7 Processor

- # of Cores
  - 2
  - 4

- Base Frequency
  - 2.0 GHz
  - 2.4 GHz
  - 2.5 GHz

- Max Turbo Frequency
  - -
  - 2.8 GHz
  - 3.0 GHz

- Cache
  - 3MB

- Types
  - DDR4-2133

- Graphics
  - Intel HD Graphics 520

- Haswell
  - i7-5600U
  - i5-5300U
  - i5-5200U
  - i5-5200U
  - i5-5200U
  - i3-5100U

- # of Cores
  - 2
  - 4

- Base Frequency
  - 2.2 GHz
  - 2.4 GHz
  - 2.5 GHz

- Max Turbo Frequency
  - -
  - 3.1 GHz
  - 4.0 GHz

- Cache
  - 2MB

- Types
  - DDR4-2133

- Graphics
  - Intel HD Graphics 620

- Intel Celeron® Processor
- Processor Number
  - 3965U

- # of Cores
  - 2

- Base Frequency
  - 2.2 GHz

- Max Turbo Frequency
  - -

- Cache
  - 2MB

- Types
  - Intel HD Graphics 610

- Graphics
  - Intel HD Graphics 620

- Haswell
  - i7-4600U
  - i5-4400U
  - i5-4200U
  - i5-4200U
  - i3-4100U

- # of Cores
  - 2
  - 4

- Base Frequency
  - 2.3 GHz
  - 2.4 GHz
  - 2.5 GHz

- Max Turbo Frequency
  - -
  - 3.0 GHz
  - 3.1 GHz

- Cache
  - 3MB

- Types
  - Intel HD Graphics 4000

- Graphics
  - Intel HD Graphics 5500

**Memory**
- 32GB max
- 2400MHz DDR4, dual-channel capable
- Two DDR4 SO-DIMM sockets

**Chipset**
- Intel SoC (System on Chip) platform
- Intel Ethernet Connection I219-LM (Jacksonville)
- Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)

**Display**
- 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio, 160° viewing angle
- Some: 15.6" (396mm) FHD (1920x1080), LQD blacklight, IPS, 250 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio
- 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**
- 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 8260/8265ac card support BT4.2 but is limited to BT4.1 by Windows OS

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

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

**Dimensions**
- WxDxH: 396.8 x 255 x 27.6-30.85mm

**Weight**
- Starting at 1.9 lbs / 890g

**Case color**
- Black

**Battery**
- Li-ion 6-cell (48Wh)
- MobilityMark® 2014: 14.8 hr
- 45W slim tip AC adapter

**Preload**
- Windows® 10 Professional 64 preinstalled
- Lenovo Solution Center
- Microsoft Office preloaded
- Lenovo Companion
- Lenovo Setting
- Microsoft Office preloaded
- Microsoft Office preloaded
- purchase a product key to activate

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

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

**Audio support**
- Intel HD Audio, Realtek® ALC2345 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack

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

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

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

**Computer Ports & Connectors**
- ExpressCard (opt)
- One slot (ExpressCard/34)
- Smart card reader
- Optional: Smart card reader
- 4-in-1 reader (MMC, SD, SDHC, SDXC)
- Ports
  - Four USB 3.0 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)

**Security chip**
- Intel HD Chipset
- Intel E8500 USB 3.0 2.0 Combo Card (EMEA only)

**Software**
- ThinkVantage Product Recovery
- Lenovo PowerEngage
- Lenovo Solution Center
- Windows 10 Pro 64
- McAfee LiveSafe
- Windows 8 Pro 64
- Lenovo Solution Center
- Lenovo Solution Center
- Lenovo Solution Center
- Microsoft Office preloaded
- Microsoft Office preloaded
- purchase a product key to activate

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

**Lenovo**
- September 2017

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

### Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2 MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform

### Display

### Multi-touch

### 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
- None

### Optical

### Ethernet

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

### WLAN + Bluetooth™

### Note:

*The specifications above are not available in all regions.*

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**Lenovo April 2019**
## ThinkPad P1 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</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 HD Graphics 630</td>
</tr>
<tr>
<td>i7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel HD Graphics 630</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 in processor and NVIDIA Quadro P1000 or P2000, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt;
- supports four independent displays;
- Max resolution: 5120x2880 @30Hz (Thunderbolt), 4096x2160 @60Hz (HDMI)

### Chipset

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

### Display

- **Some:** 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle
- **Some:** 15.6" (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)
- Capacitive-type multi-touch, supports 10-finger gesture (4K only)
- Supports pen accessory, please see the accessory compatibility for details

### Storage

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

### Optane™ memory

- None
- 0/1 support
- Optional

### Ethernet

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

### WLAN

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

### WWAN

- None

### Dimensions

- **Non-touch:** 14.24" x 9.67" x 0.72"; 361.8mm x 245.7mm x 18.4mm
- **Non-touch:** starting at 3.76 lb (1.7 kg)
- **Multi-touch:** 14.24" x 9.67" x 0.74"; 361.8mm x 245.7mm x 18.7mm
- **Multi-touch:** starting at 4.06 lb (1.8 kg)

### Case color

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

### Case material

- Aluminum alloy

### Battery

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

### Power-on password

- Hard disk password
- Supervisor password
- Security keyhole

### Physical security

- Security chip
- Discrete TPM 2.0, TCG Certified

### Data security

- Security chip
- vPro Technology
- Touch style match on chip fingerprint reader on the keyboard bezel

### Audio

- HD Audio, Realtek ALC3286 codec / ALC3226 codec / ALC2696 codec
- Stereo speakers, 2W x 2, Dolby Audio
- HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, supports external digital monitor via HDMI or Thunderbolt

### Preload

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

### Limited warranty

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

### MIL-Spec test

- MIL-STD-810G military certification

### Environment

- EPEAT™ Gold
- ENERGY STAR® 6.1
- RoHS-compliant

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**Note:** The specifications above may not be available in all regions.
### ThinkPad P51 Platform Specifications

#### Processor
- 6th or 7th Generation Intel® Core™ i7 Processor or Intel Xeon® Processor E3 v5 or v6 Family
- Processor: 17-6820HQ, E3-1505M v6, 17-7700HQ, E3-1535M v6
- Base Frequency: 2.7 GHz, 2.8 GHz, 2.8 GHz, 3.1 GHz
- Max Turbo Frequency: 3.6 GHz, 3.7 GHz, 3.8 GHz, 4.2 GHz
- Cache: 8MB DDR4-2133, 8MB DDR4-2400
- Memory Types: Intel HD Graphics P530, Intel HD Graphics 530
- Graphics: Intel HD Graphics 530, 630, P530, or P630 in processor and NVIDIA Quadro M1200 or M2200, 4GB memory;
- Supports external digital monitor via HDMI, Mini DisplayPort, or Thunderbolt™;
- Supports four independent displays;
- Max resolution: 3840x2160@60Hz (DisplayPort via Mini DisplayPort cable);
- Supports four independent displays;
- Max resolution: 3840x2160@60Hz (Thunderbolt);
- 4096x2160@24Hz (HDMI)

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

#### Display
- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle
- 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle
- Capacitive-type multi-touch, supports 10-finger gesture, 220 nits (FHD only)
- ThinkPad Pen Pro, active pen for multi-touch display

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

#### Optical
- Optional: None

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

#### WLAN
- One of the following, configurable by model:
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT 4.1, M.2 card
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT 4.1, 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
- One of the following, configurable by model:
  - Wireless WAN upgradeable
  - Integrated Mobile Broadband 4G LTE-A, Qualcomm Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
- Some:
  - Snapdragon X7 LTE-A (Sierra Wireless EM7455), M.2 card

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

#### 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
- Models: 4-cell / 6-cell
- Non-touch: 5.6 lb / 2.55kg
- Multi-touch: 6.2 lb / 2.82kg
- 5.9 lb / 2.67kg
- 6.4 lb / 2.90kg

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

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

#### Security
- Security chip
- Security chip vPro (optional)
- * Intel vPro Technology
- * Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS
- Fingerprint reader
- Touch style match on chip fingerprint reader on the palm rest

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

#### Battery
- Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh)
- Model 4-cell / 6-cell
- Discrete Graphics: 4.5 hr / 6.1 hr
- Hybrid Graphics: 6.5 hr / 8.9 hr

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

#### Preload
- Windows® 7 Professional 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 certification

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

---

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

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*Lenovo September 2018*
### 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>7-6400U</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 520</td>
</tr>
<tr>
<td>7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
</tbody>
</table>

or 7th Generation Intel Core 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>5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-7500U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 520 or 620 in processor and NVIDIA Quadro M520, 2GB 2.5GHz GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays:
  - Max resolution: 4096x2304@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- **Some:** 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16.9 aspect ratio, 1000:1 contrast ratio, 170° viewing angle
- **Some:** 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16.9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle

### Multi-touch (opt)

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

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

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

### Bluetooth

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

### WWAN (optional)

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

### Military Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WXxDxH: 14.40&quot; x 9.95&quot; x 0.79-0.80&quot;</td>
<td><strong>4+3-cell</strong> 4.39 lb / 2.01 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case color</th>
<th>Case material</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-touch model</strong></td>
<td>Black</td>
</tr>
<tr>
<td><strong>Multi-touch model</strong></td>
<td>Display cover: Glass-Fiber Reinforced Plastic (PPS); Bottom: Glass-Fiber Reinforced Plastic</td>
</tr>
</tbody>
</table>

### Security

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

### NFC (optional)

- Near Field Communication

### Internal battery

<table>
<thead>
<tr>
<th>Model</th>
<th>Max battery life</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 + 3-cell</td>
<td>13.6 hr</td>
</tr>
<tr>
<td>6-cell 48Wh</td>
<td>12.5 hr</td>
</tr>
<tr>
<td>6-cell 72Wh</td>
<td>18.5 hr</td>
</tr>
<tr>
<td>4 + 6-cell 48Wh</td>
<td>20.0 hr</td>
</tr>
<tr>
<td>4 + 6-cell 72Wh</td>
<td>26.8 hr</td>
</tr>
</tbody>
</table>

### AC adapter

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

### Environment

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

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Lenovo
March 2018
### ThinkPad P52 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Core</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>L2 Cache</th>
<th>Memory Types</th>
<th>Graphics</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>2.9 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
<td></td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.6 GHz</td>
<td>3.2 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
<td></td>
</tr>
<tr>
<td>9-8950HK</td>
<td>6</td>
<td>12</td>
<td>2.9 GHz</td>
<td>4.8 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics P630</td>
<td></td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>12</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics P630</td>
<td></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

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

#### Storage

- Up to 3 drives (two M.2 SSD and one HDD)
- Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 160° viewing angle
- Some: 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch

#### Multi-touch (opt)

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

#### Security

- Security chip
- Security chip
- Intel vPro Technology
- Discrete mode: 6.1 hr; Hybrid mode: 8.9 hr
- Battery life
- Battery life varies significantly with settings, usage, & other factors
- 170W slim tip AC adapter
- 1-year depot repair service
- 3-year/1-yr battery depot repair service
- 5-year/1-yr battery limited onsite service

#### Preload

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

#### Limited warranty

- One of the following, configurable by model:
  - 3-year/1-yr warranty
  - 5-year/1-yr warranty

#### Mil-Spec test

- MIL-STD-810G military certification

#### Environment

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

### Note

The specifications above may not be available in all regions. Lenovo April 2019
### ThinkPad P52s Platform Specifications

**Product Specifications Reference (PSREF)**

**May 2019**

<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>I5-8550U</td>
<td>4</td>
</tr>
<tr>
<td>I7-8550U</td>
<td>4</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

Intel SoC (System on Chip) platform

**Display**

- **Some:** 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16.9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 15.6" (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16.9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle

**Multi-touch (opt)**

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

**Storage**

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

**Optane™ Memory**

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

**Ethernet**

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

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

**WLAN + Bluetooth™**

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

- * Intel 8265ac card supports BT4.2, but 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™ 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

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**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 material**

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

**Smart card reader**

Optional: Smart card reader

**Media reader**

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

**Ports**

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

**Monitor cable**

- Optional: 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
- 1080p camera and HD720p camera, fixed focus

**Audio support**

- HD Audio, Realtek® ALC2687 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack

**Keyboard**

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

**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 anti-spoofing technology

**NFC (optional)**

Near Field Communication

**Battery**

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

**Max battery life**

- MobileMark® 2014: Models 48Wh 72Wh 32Wh + 24Wh 32Wh + 48Wh 32Wh + 72Wh Max battery life 12.2 hr 18.5 hr 15.5 hr 20.1 hr 26.3 hr

**AC adapter**

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

**Preload**

Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

One of the following, configurable by model:

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

**Mi-Spec test**

MIL-STD-810G military certification

**Environment**

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

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Lenovo
May 2019
### ThinkPad P72 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>12</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2168M</td>
<td>6</td>
<td>2.9 GHz</td>
<td>4.8 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

#### Graphics

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

#### Chipset

- Mobile Intel CM246 Chipset

#### Memory

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

#### Display

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

#### Multi-touch Pen

- None

#### Storage

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

#### Optane™ memory

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

#### Optical

- None

#### Ethernet

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

#### WLAN

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

#### WWAN

- None

#### SIM card

- None

#### Chipset

- Mobile Intel CM246 Chipset

#### Security

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

#### Audio

- HD Audio, Realtek ALC3286 codec /
- Premium / dual array microphone, HD720p camera, fixed focus
- headphone / microphone combo jack, Dolby Atmos® headphone
- Audio support: HD Audio, Realtek ALC3286 codec / stereo speakers, 2W x 2, Dolby Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone

#### Notebook cover:

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

#### Dimensions

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

#### Weight

- Starting at 7.5 lb (3.4kg)

#### Case color

- Black

#### Case material

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

#### Smart card reader

- Optional: Smart card reader

#### ExpressCard

- None

#### Media reader

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

#### Ports

- Four USB 3.1 Gen 1 (one Always On), two USB Type-C / Thunderbolt 3 (with the function of Power Delivery and DP), Mini DisplayPort 1.4, HDMI 2.0, Ethernet (RJ-45), 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
- Depending on many factors, actual data transfer speed may be lower than theoretical speed

#### Optional:

- Lenovo Mini-DisplayPort to DisplayPort Monitor Cable

#### Monitor cable

- None

#### Camera (optional)

- IR camera and HD720p camera, fixed focus

#### Audio support

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

#### Keyboard

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

#### 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

- None

#### NFC (optional)

- Near Field Communication

#### Battery

- Li-ion 99Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark® 2014: 18 hr

#### Max battery life

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

#### AC adapter

- 230W slim tip AC adapter

#### Preload

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

#### Limited warranty

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

#### MIL-Spec test

- MIL-STD-810g military certification

#### Environment

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

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

Lenovo
May 2019
### ThinkPad T470 Platform Specifications

**Product Specifications Reference (PSREF)**

**Lenovo**

**April 2019**

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#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
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<th>Max Turbo Frequency</th>
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<td>i5-6200U</td>
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#### 7th Generation Intel Core i3 / i5 / i7 Processor

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</table>

#### Graphics

Intel HD Graphics 520 or 620 in processor only. 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

**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
- 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio

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

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

#### Optical

None

#### Ethernet

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

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

#### WLAN

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

#### Bluetooth™

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

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

#### WWAN (optional)

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

#### SIM card (opt)

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

---

#### Dimensions

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

**Models**

<table>
<thead>
<tr>
<th>3-cell</th>
<th>3 + 3-cell</th>
<th>6-cell</th>
<th>3 + 6-cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.65 lb / 1.65 kg</td>
<td>3.92 lb / 1.78 kg</td>
<td>4.35 lb / 1.85 kg</td>
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</tr>
</tbody>
</table>

#### Case color

Black

#### Case material

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

#### Smart card reader

Optional: Smart card reader

#### Media reader

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

#### Ports

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

#### WiGig dock (opt)

ThinkPad WiGig dock

Optional: Lenovo USB-C to VGA Adapter

#### Camera (optional)

720p: HD720p resolution, fixed focus

Audio support

HD Audio, Realtek 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

#### Security

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

#### Security chip

Discrete TPM 2.0, TCG Certified

#### vPro Technology

Intel vPro Technology

#### Finger print reader

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

#### NFC (optional)

Near Field Communication

#### Internal battery

Integrated Li-Polymer 3-cell (24Wh)

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

#### External battery

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

#### AC adapter

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

#### Preload

Windows® 7 Professional 64 preinstalled Some: Windows 10 Home 64 Some: Windows 10 Pro 64

- Lenovo Solution Center
- Lenovo PowerEngage
- ThinkVantage Product Recovery
- ThinkVantage System Update
- Adobe® Reader®

- Microsoft® Office preloaded; purchase a product key to activate

#### Limited warranty

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 certification

#### Environment

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

Lenovo April 2019
## ThinkPad T470s Platform Specifications

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### 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
- 2GB or 4GB max / 2400MHz DDR4, dual-channel capable
- 4GB or 8GB memory soldered to system board, 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)

- **On-cell touch, supports 10-finger gesture, 250 nits (FHD only)**
- **On-cell touch, supports 10-finger gesture, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle**
- **On-cell touch, supports 10-finger gesture, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle**

### Storage

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

### Optical

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

### 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 (opt)

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

### 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

### Monitor cable (opt)

- ThinkPad WiGig dock, mutually exclusive with WWAN
- HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter
- USB-C to VGA: Lenovo USB-C to VGA Adapter

### Camera (optional)

- UltrNav™: pointing device and buttonless Mylar surface multi-touch touchpad
- Camera resolution, fixed focus

### Audio support

- 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- TrackPoint® pointing device

### Security

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

### NFC (optional)

- Near Field Communication

### Internal battery

- Front Li-Polymer 3-cell (23Wh) and rear Li-ion 3-cell (26Wh), both Integrated Battery
- MobileMark® 2014: up to 10.5 hr
- Battery life varies significantly with settings, usage, & other factors

### AC adapter

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

### Windows 10

- *Microsoft Office preloaded; purchase a product key to activate*
- Windows 7 Professional 64 preinstalled
- Some: Windows 10 Home 64 through downgrade rights in 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 certification

### Environmental

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

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Lenovo  
April 2019
ThinkPad T480 Platform Specifications

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<td>Intel UHD Graphics 620</td>
</tr>
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</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. xxxx SSD)
- Some: M.2 SSD / PCIe NVMe, PCie 3.0 x 2, 16Gbps
- Some: 128GB M.2 SSD / PCIe NVMe, PCie 3.0 x 2, 16Gbps, in WWAN slot as 2nd Storage, mutually exclusive with WWAN

Optane memory

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

Optical

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

Ethernet

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

WWAN (optional)

- One of the following, configurable by model (mutually exclusive with Intel Optane memory):
  - Integrated Mobile Broadband 4G LTE, Intel XMM 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 (opt)

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

Dimensions

<table>
<thead>
<tr>
<th>Weight</th>
<th>WxDxH: 13.25&quot; x 9.15&quot; x 0.79&quot;; 336.8mm x 232.5mm x 19.95mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
<td>24Wh or 24Wh + 24Wh</td>
</tr>
<tr>
<td></td>
<td>48Wh, 72Wh, or 24Wh + 48Wh / 72Wh</td>
</tr>
<tr>
<td>Integrated Magnesium</td>
<td>3.49 lb / 1.58 kg</td>
</tr>
<tr>
<td>Integrated PPS</td>
<td>3.63 lb / 1.65 kg</td>
</tr>
<tr>
<td>Discrete Magnesium</td>
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<td>Discrete PPS</td>
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Smart card reader

- Optional: Smart card reader

Media reader

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

Ports

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

Monitor cable (optional)

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

Fingerprint reader

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

NFC (optional)

- Near Field Communication

Battery

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

Max battery life (MobileMark® 2014)

<table>
<thead>
<tr>
<th>Models</th>
<th>24Wh</th>
<th>48Wh</th>
<th>72Wh</th>
<th>24Wh + 24Wh</th>
<th>48Wh + 48Wh</th>
<th>24Wh + 48Wh / 72Wh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated</td>
<td>7.2 hr</td>
<td>14.4 hr</td>
<td>21.8 hr</td>
<td>14.4 hr</td>
<td>21.8 hr</td>
<td>29.0 hr</td>
</tr>
<tr>
<td>Discrete</td>
<td>6.6 hr</td>
<td>13.2 hr</td>
<td>19.8 hr</td>
<td>13.6 hr</td>
<td>19.8 hr</td>
<td>26.4 hr</td>
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AC adapter

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

Preload

- Windows® 10 Home 64 or Windows 10 Pro 64

Limited warranty

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

Mil-Spec test

- MIL-STD-810G military certification

Environment

- EPEAT® Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
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<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>5-7300U</td>
<td>2</td>
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<td>Intel UHD Graphics 620</td>
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<td>5-8350U</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>
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<td>1.8 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and NVIDIA\textsuperscript{a} GeForce\textsuperscript{b} 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
- Intel SoC (System on Chip) platform
- 4GB or 8GB memory soldered to systemboard; one DDR4 SO-DIMM socket
- * System clocks down for processors with lower memory controller

### Display
- Some: 14.0” (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle, supports ThinkPad Privacy Guard on some models
- Some: 14.0” (355mm) QHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle

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

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

### Optane™ memory
- None

### Ethernet
- Non-vPro model: Intel Ethernet Connection i219-V (Jacksonville)
- vPro model: Intel Ethernet Connection i219-LM (Jacksonville)
- WLAN + Bluetooth\textsuperscript{a}
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
  - Intel 8265ac card supports BT 4.2 but is limited to BT 4.1 by Windows OS

### WWAN (optional)
- One of the following, configurable by model:
  - Wireless WAN upgradable
  - Integrated Mobile Broadband 4G LTE, Intel XMM\textsuperscript{a} 7262 (Fibocom L830-EB), M.2 card (EMEA only)
  - Integrated Mobile Broadband 4G LTE-A, Intel XMM\textsuperscript{a} 7360 (Fibocom L850-GL), M.2 card
  - Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Security
- BD Pro: Security chip
- Biometric: Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology

### Media 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

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

### Display cover
- CFRP Hybrid
- Bottom: Magnesium

### Weight
- Starting at 2.9 lb (1.32kg)

### Case color
- Black or Silver

### Case material
- Display: CFRP Hybrid
- Bottom: Magnesium

### Product Specifications Reference (PSREF)

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

Lenovo
April 2019
ThinkPad T490 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>8th Generation Intel® Core™ i5 / i7 Processor</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>
</tbody>
</table>

**Graphics**

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

**Chipset**

- Intel SoC (System on Chip) platform

**Memory**

- 48GB max / 2400MHz DDR4, dual-channel capable,
- 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket
- *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

**Display**

- 14.0" HD (1366x768) TN Anti-glare 220 nits 16:9 45% 90°
- 14.0" FHD (1920x1080) IPS Anti-glare 250 nits (non-touch) 300 nits (multi-touch) 16:9 700:1 45% 170°
- 14.0" FHD (1920x1080) Low Power IPS Anti-glare 400 nits 16:9 800:1 72% 170°
- 14.0" FHD (1920x1080) ThinkPad Privacy Guard IPS Anti-glare 500 nits 16:9 1000:1 72% 170°
- 14.0" WQHD (2560x1440) Dolby Vision™ HDR IPS Glossy 500 nits 16:9 1500:1 100% Adobe 170°

**Multi-touch (opt)**

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

**Storage**

- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

**Optane™ memory**

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

**Ethernet**

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

**WWAN (optional)**

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

**Battery**

- Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: 16.11 hr
- *Battery life varies significantly with settings, usage, & other factors

**AC adapter**

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

**Preload**

- Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

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

**Environment**

- MIL-STD-810G military certification
- EPEAT® Bronze; ENERGY STAR® 7.0; RoHS-compliant

**Product Specifications Reference (PSREF)**

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

May 2019
**ThinkPad T490s 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>
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</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>
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<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>
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<tr>
<td>i7-8565U</td>
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<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8665U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

**Chipset**

Intel SoC (System on Chip) platform

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

* Installed memory is actually 2966MHz but run at 2400MHz due to Intel limitation

**Display**

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

**WLAN**

One of the following, configurable by model:

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wireless-AX 22260, Wi-Fi 2x2 802.11ax + Bluetooth 5.0
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

**Optane™ memory**

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

**Optical**

None

**Ethernet**

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

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

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

**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 (EAMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card

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

**Lenovo May 2019**

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**Dimensions**

| WxDxH (black with FHD / Privacy Guard): | 12.94" x 8.90" x 0.69" | 328.8mm x 226.15mm x 16.7mm |
| WxDxH (black with FHD Low Power / WQHD): | 12.98" x 8.92" x 0.63" | 329.0mm x 226.8mm x 16.1mm |
| WxDxH (silver): | 12.96" x 8.92" x 0.68" | 329.15mm x 226.45mm x 17.2mm |

**Weight**

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

**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 control**

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

**Audio**

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

**Keyboard**

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

**Security**

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

**Camera**

One of the following, configurable by model:

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

**Charge**

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

**Battery life**

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

**NFC (optional)**

Near Field Communication

**Preload**

Windows 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

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

**Mil-Spec test**

MIL-STD-810G military certification

**Environment**

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-6200U</td>
<td>2</td>
<td>4</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<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 620</td>
</tr>
<tr>
<td>7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<td>i5-7300U</td>
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<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i7-7500U</td>
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<td>4</td>
<td>2.7 GHz</td>
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<td>Intel HD Graphics 620</td>
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<td>i7-7600U</td>
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<td>4</td>
<td>2.6 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

Graphics

- Intel HD Graphics 520 or 620 in processor only.
- Intel HD Graphics 520 or 620 in processor and NVIDIA GeForce® 940MX, 2GB 256 bits 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
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- * System clocks down for processors with lower memory controller

Display

- Some: 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16.9 aspect ratio, 400:1 contrast ratio
- 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) 4K (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 SSD slot or one M.2 2280 slot exclusively for storage
- Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm height, Active Protection System™
- Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm height (e.g. xxxGB SSD)
- Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 16Gb/s
- Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN and WiGig

Optical

- None

Ethernet

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

WLAN

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

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

WWAN (optional)

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

SIM card (optional)

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

Dimensions

- WxDxH: 14.40" x 9.95" x 0.79-0.80"
- Weight: Starting at 4.34 lb / 1.97 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), 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

WiGig dock (optional)

- ThinkPad WiGig dock (US only)

Monitor cable (optional)

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

Camera (optional)

- 720p: HD720p resolution, fixed focus
- 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, numeric keypad, optional LED backlight
- UltraNav™: pointing device and buttonless Mylar surface multi-touch touchpad

Security

- Power-on password, hard disk password, supervisor password, security key/lock
- Security chip: vPro (optional)

Fingerprint reader

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

Internal battery

- Optional: Integrated Li-Polymer 4-cell (32Wh)
- Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh or 72Wh)

External battery

- Max battery life (MobileMark® 2014):
  - Integrated: 13.8 hr, 12.5 hr, 18.5 hr, 20.3 hr, 27.1 hr
  - Discrete: 13.8 hr, 12.5 hr, 18.5 hr, 20.3 hr, 26.8 hr

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

AC adapter

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

Preload

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

Limited warranty

- 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

April 2019

Lenovo
## ThinkPad T580 Platform Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7200U</td>
<td>2</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>2.6 GHz</td>
<td>3.5 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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</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>
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<th>Memory Types</th>
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<td>7-8550U</td>
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<td>4.0 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
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<td>4</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset Memory**

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

**Display**

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

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

**Multi-touch (opt)**

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

**Storage**

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

System specifications reference (PSREF)

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

Note: The specifications above may not be available in all regions. Lenovo May 2019
### Processor
<table>
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<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<td>DDR4-2400</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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<td>i7-8765U</td>
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<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
- 4GB max / 2400MHz DDR4, dual-channel capable
- 8GB or 16GB memory soldered to system board, one DDR4 SO-DIMM socket
- *Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation*

### Display
- **Size:**
  - 15.6" FHD (1920x1080)
  - 15.6" UHD (3840x2160)

- **Resolution:**
  - FHD Anti-glare 250 nits 16:9 700:1 45% 170°
  - UHD Anti-glare 500 nits 16:9 1200:1 100% 170°

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

### Storage
- • M.2 2280 SSD / SATA 6.0Gb/s
- • M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- • M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

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

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

### WWAN (optional)
- 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*

### Security
- **Power-on password:**
- **Hard disk password:**
- **Supervisor password:**
- **Security keyhole:**
- **Discrete TPM 2.0, TCG Certified**

### Battery
- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark® 2014: 14.98 hr (9.5 hr for UHD model with discrete graphics)

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

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

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

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

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

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

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

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tr>
<td>i5-6200U</td>
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<tr>
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<td>3.4 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 520</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

### Memory

8GB or 16GB / 1866MHz LPDDR3 / soldered to system board, no sockets

### Display

- **Base Frequency**: Supports 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle.
- **Max Turbo Frequency**: Supports 14.0" (355nm) QHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle.

### Multi-touch

None

### Optical

None

### Ethernet

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

### WLAN

**Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card**

### Bluetooth

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

### WWAN (optional)

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

### SIM card (optional)

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

### Dimensions and Weight

- **Width x Height x Depth**: 12.74" x 8.55" x 0.63"; 323.5mm x 217.1mm x 15.95mm
- **Starting weight**: 2.49 lb / 1.13 kg

### Case Color

Black or Silver (silver is NOT available in EMEA)

### Case Material

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

### Security

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

### Media Reader

Multi-touch pointing device and buttonless Glass surface multi-touch touchpad

### Optical Drive

None

### Audio

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

### Preload

Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64, Lenovo Solution Center, Lenovo PowerEngage, ThinkVantage System Update, Adobe® Creative Cloud, Microsoft® Office preloaded: purchase a product key to activate

### Battery

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

### 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**
## Processor

<table>
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<tr>
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</table>

or 8th Generation Intel Core® i5 / i7 Processor

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<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Graphics

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

## Chipset

Intel SoC (System on Chip) platform

## Memory

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

## Display

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

## Multi-touch (opt)

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

## Storage

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

## Optane™ memory

None

## Optical

None

## Ethernet

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

## WLAN + Bluetooth™

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

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

## WWAN (optional)

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

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

## SIM card (opt)

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

---

**Product Specifications Reference (PSREF)**

**Dimensions**

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

**Weight**

Starting at 2.49 lb / 1.13 kg

**Case color**

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

**Case material**

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

---

**Smart card reader**

None

**Media reader**

MicroSD card reader, supports UHS-II

**Ports**

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

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

**Monitor cable**

( optional)

HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

**Bundled Accy**

( optional)

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

Optional: ThinkPad Ethernet Extension Adapter Gen 2

**Camera**

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

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

**Security**

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

**Security chip**

Discrete TPM 2.0, TCG Certified

**Fingerprint reader**

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**

* Battery life varies significantly with settings, usage, & other factors
- MobileMark® 2014: 19.3 hr

**AC adapter**

45W or 65W USB Type-C AC adapter

**Preload**

Windows® 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

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

**Mil-Spec test**

MIL-STD-810G military certification

**Environment**

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

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Lenovo

April 2019
## ThinkPad X1 Extreme Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
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<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8300H</td>
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<td>8</td>
<td>2.3 GHz</td>
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<td>8MB</td>
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<td>Intel UHD Graphics 630</td>
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<td>i5-8500H</td>
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<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

### Graphics

- Intel UHD Graphics 630 in processor and NVIDIA® GeForce® GTX 1050 Ti Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)

### Chipset

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

### Display

- **Some**: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 120 Hz refresh rate, 72% gamut, 170° viewing angle
- **Some**: 15.6" (396mm) HDR 4K (3840x2160) with Dolby Vision™, anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)

### Multi-touch (opt)

- Capacitive-type multi-touch, supports 10-finger gesture (4K only)
- 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 (optional): 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 Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN

- None

### Dimensions

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

### Weight

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

### Case color

- Black

### Case material

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

### Note

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

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

**Media reader**
- SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card
- Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole
- Depending on many factors, actual data transfer speed may be lower than theoretical speed

**Monitor cable**
- (optional) USB-C to DP: Lenovo USB-C to DisplayPort Adapter
- Bundled Accy: Optional: ThinkPad Ethernet Extension Cable

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

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

**Security**
- Security chip: vPro Technology
- Security chip: Discrete TPM 2.0, TCG Certified
- Security chip: Intel vPro Technology
- Security chip: Discrete mode: 9.5 hr; Hybrid mode: 14.9 hr
- *Battery life varies significantly with settings, usage, & other factors

**Battery**
- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 135W slim tip AC adapter

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

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

**Mil-Spec test**
- MIL-STD-810G military certification

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

**Lenovo**
- April 2019
## ThinkPad X270 Platform Specifications

**Product Specifications Reference (PSREF)**

**Lenovo**

**April 2019**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-6006U</td>
<td>2</td>
<td>4</td>
<td>2.0 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i3-6100U</td>
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<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i5-6200U</td>
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<td>4</td>
<td>2.5 GHz</td>
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<td>Intel HD Graphics 620</td>
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<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
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<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7600U</td>
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<td>4</td>
<td>2.6 GHz</td>
<td>3.9 GHz</td>
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<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-760U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

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

### Graphics

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

### Chipset

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

### Display

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

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

### Storage

- **System has one HDD slot or one M.2 2280 slot exclusively for storage**
  - HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
  - SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)
  - 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, mutually exclusive with WWAN and WiGig

### Optical

- **None**

### Ethernet

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

### WLAN

- **One of the following, configurable by model (WiGig is mutually exclusive with WWAN):**
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel Tri-Band Wireless-AC 18265, WiGig 2.11ad + 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 (optional)

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

### Dimensions

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

### Weight

- **Models**
  - No + 3-cell: 2.79 lb / 1.27 kg
  - 3-cell + 3-cell: 2.98 lb / 1.36 kg
  - 3 + 6-cell: 3.33 lb / 1.52 kg

### Case color

- **Black**

### Case material

- **Display cover:** Glass-Fiber Reinforced Plastic;
  - Bottom: Glass-Fiber Reinforced Plastic

### Smart card reader

- **Optional:** Smart card reader

### Media reader

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

### Memory

- **Types:**
  - DDR4-2133

### Ultrabase

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

### Security chip

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

### Security

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

### Fingerprint reader

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

### NFC

- **Near Field Communication**

### Internal battery

- **Models:**
  - 3-cell 3-cell (23Wh)
  - 3-cell + 3-cell (48Wh or 72Wh)

### External battery

- **Typical use:** 6.52 hr
- **Max battery life:** 13.04 hr
- **AC adapter:** 20.1 hr

### Preload

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

### Limited warranty

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

### Mil-Spec test

- **MIL-STD-810G military certification**

### Environment

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

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

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Lenovo

April 2019
## ThinkPad X280 Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>3.1 GHz</td>
<td>3 MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i3-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3 MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<tr>
<td>i5-7200U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>4.0 GHz</td>
<td>8 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset Memory

Intel SoC (System on Chip) platform

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

### Display

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

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

### Multi-touch (opt)

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

* FHD non-touch model is NOT available in US

### Storage

One of the following, configurable by model:

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

### Optane™ memory

None

### Optical

None

### Ethernet

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

### WLAN + Bluetooth™

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

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

### WWAN (optional)

One of the following, configurable by model:

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

### SIM card (opt)

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

### Dimensions

WxDxH: 12.11" x 8.26" x 0.69-0.70"; 307.7mm x 209.8mm x 17.4-17.8mm

### Weight

FHD non-touch model: 2.49 lb / 1.13 kg;
HD non-touch model: 2.78 lb / 1.26 kg;
FHD multi-touch model: 2.79 lb / 1.27 kg

### Camera (optional)

One of the following, configurable by model:

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

### Audio support

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

### Security

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

Discrete TPM 2.0, TCG Certified

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

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

MobileMark 2014: 16.6 hr

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

54Wh battery limited onsite service

### Max battery life

MobileMark 2014: 16.6 hr

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

45W or 65W USB Type-C AC adapter

### AC adapter

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

MobileMark 2014: 16.6 hr

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

45W or 65W USB Type-C AC adapter

### Preload

Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

One of the following, configurable by model:

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

### Mil-Spec test

MIL-STD-810G military certification

### Environment

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

### Lenovo

April 2019

* Note: The specifications above may not be available in all regions.
**ThinkPad X390 Platform Specifications**

**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>6MB</td>
<td>DDR4</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>DDR4</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8565U</td>
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<td>8</td>
<td>1.8 GHz</td>
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<td>DDR4</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8655U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>DDR4</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

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

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot;</td>
<td>HD (1366x768)</td>
<td>TN</td>
<td>250 nits</td>
<td>16:9</td>
<td>300:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>13.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>300 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>13.3&quot;</td>
<td>FHD (1920x1080)</td>
<td>ThinkPad Privacy Guard</td>
<td>400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72%</td>
<td>178°</td>
</tr>
</tbody>
</table>

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

**Storage**
- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2

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

**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:
  - 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*

**Dimensions**

<table>
<thead>
<tr>
<th>Models</th>
<th>FHD Non-touch</th>
<th>HD / FHD Multi-touch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Fiber</td>
<td>311.9mm x 217.0mm x 16.5mm</td>
<td>12.28&quot; x 8.54&quot; x 0.65&quot;</td>
</tr>
<tr>
<td>PPS</td>
<td>321.0mm x 217.2mm x 16.9mm</td>
<td>12.28&quot; x 8.55&quot; x 0.67&quot;</td>
</tr>
</tbody>
</table>

**Weight**
- **Models**:
  - FHD Non-touch: HD: 2.10 lb / 0.95 kg
  - FHD Multi-touch: 2.93 lb / 1.33 kg
- **PPS**:
  - 2.85 lb / 1.29 kg

**Case color**
- Black

**Case material**
- Display cover: Carbon Fiber (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), HDMI 1.4b, Ethernet extension connector, combo slot of nano-SIM card (WWAN models) and microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole

**Monitor cable**
- Optional: ThinkPad Ethernet Extension Adapter Gen 2

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

**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
- 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
- MobileMark® 2014: 17.6 hr
  - *Battery life varies significantly with settings, usage, & other factors*

**Max battery life**
- 45W or 65W USB Type-C AC adapter

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

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

**Mil-Spec test**
- MIL-STD-810G military certification

**Environment**
- EPEAT® Bronze; ENERGY STAR® 7.0; RoHS-compliant
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Limited warranty: Support unrelated to a warranty issue may be subject to additional charges.

Lenovo Services:

Carry-in or Mail-in Service: Parts and labor repair coverage where the customer is responsible for shipping (including packaging) or delivery to authorized warranty provider or repair center.

Depot or Courier Service: Parts and labor repair coverage where shipping (including packaging) or delivery to the repair center is paid for by Lenovo.

Expedited Depot: Parts and labor coverage with expedited turnaround. Shipping (including packaging) or delivery to the repair center is paid for by Lenovo.

Onsite / In-home Service: Parts and labor repair coverage where labor is provided onsite at your place of business.

If Lenovo determines your product problem is covered by the product warranty and cannot be resolved over the telephone, a technician will be dispatched to arrive onsite, typically the next day.


Visit www.lenovo.com/warranty for Lenovo Warranty Services terms and conditions for complete details and restrictions.

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

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


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