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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.

February 12, 2020 - Version 555

Additions in this update

► New product(s)
  None

► Others
  ThinkPad 11e (5th Gen) - spec updated
  ThinkPad E14, E15 - spec updated
  ThinkPad T490 - spec updated
  ThinkPad T495 - spec updated
  ThinkPad T495s - spec updated
  ThinkPad X395 - spec updated

Withdrawals in this update

► Withdrawn product(s)
  None
## ThinkPad 11e (5th Gen) Platform Specifications

### Processor
<table>
<thead>
<tr>
<th>Processor Number</th>
<th>Core</th>
<th>Threads</th>
<th>Base Frequency</th>
<th>Burst Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>m3-7Y30</td>
<td>2</td>
<td></td>
<td>1.0 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 615</td>
</tr>
<tr>
<td>E5-7Y54</td>
<td>2</td>
<td></td>
<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel HD Graphics 615</td>
</tr>
<tr>
<td>Celeron N4100</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>2.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Celeron N4120</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 605</td>
</tr>
<tr>
<td>Pentium Silver N5000</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Pentium Silver N5030</td>
<td>4</td>
<td></td>
<td>1.1 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td></td>
<td>Intel UHD Graphics 605</td>
</tr>
</tbody>
</table>

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

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

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

### Display
- Size: 11.6”
- Resolution: HD
- Type: TN
- Brightness: 250 nits
- Aspect Ratio: 16:9
- Contrast Ratio: 800:1
- Color Gamut: 45%
- Viewing Angle: 109°
- Multi-touch (opt): Capacitive-type multi-touch, supports 10-finger gesture (HD IPS only, NOT available in EMEA)

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

### Optical
- None

### Ethernet
- Realtek RTL8111GUS Gigabit Network Connection

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

### WWAN
- None

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

### Weight
- Starting at 2.99 lb / 1.36 kg

### Case color
- Black

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

### Smart card reader
- None

### Media reader
- MicroSD card reader

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

### Camera
- HD720p camera, fixed focus

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

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

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

### Security chip
- Power-on password, supervisor password, security keyhole

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

### Fingerprint reader
- None

### NFC
- None

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

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

### Operating system
- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro in S mode

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

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

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

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

Note: The specifications above may not be available in all regions.
## ThinkPad Yoga 11e (5th Gen) Platform Specifications

### 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>5Y7Y54</td>
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<td>4</td>
<td>1.2 GHz</td>
<td>3.2 GHz</td>
<td>4MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 615</td>
</tr>
<tr>
<td>Celeron N4100</td>
<td>1</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 600</td>
</tr>
<tr>
<td>Celeron N4120</td>
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<td>4</td>
<td>1.1 GHz</td>
<td>2.6 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
<tr>
<td>Pentium Silver N5000</td>
<td>1</td>
<td>4</td>
<td>1.1 GHz</td>
<td>2.7 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
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<td>Pentium Silver N5030</td>
<td>1</td>
<td>4</td>
<td>1.1 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 600</td>
</tr>
</tbody>
</table>

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

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

### Display
- 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle, Corning® Gorilla® Glass

### MultiTouch
- Capacitive-type multi-touch, supports 10 fingers

### Camera

### Hinge
- Yoga hinge, 360 degree
- Optional: ThinkPad Pen Pro, batteries required, on-board garage

### Pen
- Optional: ThinkPad Pen Pro

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

### Optical
- None

### Ethernet
- Realtek RTL8111GUS-CG Gigabit Network Connection

### WLAN
- One of the following, configurable by model:
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
  - Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Bluetooth wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN
- None

### Media reader
- MicroSD card reader

### Ports
- Two USB 3.1 Gen 1, one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI1.4, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole

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

### Battery
- Integrated Li-Ion 42Wh battery
- Max battery life: MobileMark® 2014: 12 hrs

### Preload
- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro in S mode

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

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

### Environment
- EPEAT™ Gold; ENERGY STAR™ 6.1; RoHS-compliant

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**Dimensions**
- WxDxH: 11.81" x 8.27" x 0.89"; 300mm x 210mm x 22.5mm

**Weight**
- From 3.4 lb / 1.54kg

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

**Media reader:**
- MicroSD card reader

**Ports:**
- Two USB 3.1 Gen 1, one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI1.4, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole

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

**Camera:**
- One of the following, configurable by model:
  - 720p: HD720p resolution, low light sensitive, fixed focus
  - World facing: Rear camera, 5MP resolution, auto focus

**Audio support:**
- HD Audio, Realtek® ALC3287 codec Dolby Audio™ / stereo speakers, 2W x 2 / monaural microphone, headphone / microphone combo jack

**Keyboard:**
- 6-row, multimedia Fn keys

**UltraNav™:**
- Two buttons click pad below keyboard, multi-touch

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

**System Mgt (opt):**
- None

**Fingerprint reader:**
- None

**Battery:**
- Integrated Li-Ion 42Wh battery

**Max battery life:**
- MobileMark® 2014: 12 hrs

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

**Preload:**
- One of the following, configurable by model:
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro in S mode

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

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

**Environment:**
- EPEAT™ Gold; ENERGY STAR™ 6.1; RoHS-compliant

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Lenovo
February 2020
<table>
<thead>
<tr>
<th>Processor</th>
<th>10th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
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<td><strong>Platform</strong></td>
<td>10th Generation Intel® Core™ i3 / i5 / i7 Processor</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>Intel UHD Graphics</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Case Material</th>
<th>Dimensions (WxDxH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>12.80&quot; x 9.13&quot; x 0.70&quot;; 325mm x 232mm x 17.9mm</td>
</tr>
<tr>
<td>PC/ABS</td>
<td>12.80&quot; x 9.13&quot; x 0.81&quot;; 325mm x 232mm x 20.5mm</td>
</tr>
</tbody>
</table>

**Weight**

<table>
<thead>
<tr>
<th>Case Material</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>starting at 3.81 lb / 1.73 kg</td>
</tr>
<tr>
<td>PC/ABS</td>
<td>starting at 3.90 lb / 1.77 kg</td>
</tr>
</tbody>
</table>

**Chipset**

- **Intel SoC (System on Chip) platform**
- **16GB max / 2666MHz DDR4, one DDR4 SO-DIMM socket**

**Graphics**

- **Integrated**
  - Intel UHD Graphics
- **Discrete**
  - AMD Radeon RX 640 Graphics (2GB GDDR5)

**Multi-touch**

None

**Storage**

Up to two drives (one M.2 SSD and one HDD)
- HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
- M.2 2280 SSD / SATA 6.0Gb/s
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

**Optical**

None

**Ethernet**

Gigabit Ethernet Connection, Realtek RTL8111GUS

**WLAN + Bluetooth™**

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

**WWAN**

None

**SIM card**

None

**Display**

- **Size**: 14.0" FHD (1920x1080), 14.0" FHD (1920x1080)
- **Resolution**: 1920x1080
- **Type**: TN Anti-glare, IPS Anti-glare
- **Brightness**: 220 nits, 250 nits
- **Aspect Ratio**: 16:9
- **Contrast Ratio**: 400:1, 700:1
- **Viewing Angle**: 90°, 170°

**Audio support**

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

**Camera**

HD720p camera with optional ThinkShutter camera privacy, fixed focus

**Security chip**

Integrated model: discrete TPM 2.0, TCG Certified

**Security**

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

**System Mgt**

Firmware TPM 2.0 integrated in chipset

**Battery**

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

**Max battery life**

- **MobileMark® 2014**: 12.8 hr
- *Battery life varies significantly with settings, usage, & other factors*

**AC adapter**

45W or 65W USB Type-C AC adapter

**Operating system**

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

**Limited warranty**

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

**Mil-Spec test**

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

**Environment**

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

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

Processor 10th Generation Intel® Core™ i3 / i5 / i7 Processor
* i7-10710U is NOT available in EMEA
Processor ... Reference (PSREF)
Note: The specifications above may not be available in all regions. Lenovo
February 2020

Graphics
Integrated Graphics Discrete Graphics (Memory)
Intel UHD Graphics

Chipset
Intel SoC (System on Chip) platform
16GB max / 2666MHz DDR4, one DDR4 SO-DIMM socket

Display
Size 15.6” FHD (1920x1080)
Resolution 1080p
Type TN
Surface Anti-glare
Brightness 220 nits
Aspect Ratio 16:9
Contrast Ratio 400:1
Viewing Angle 90°

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

Optical
None

Ethernet
Gigabit Ethernet Connection, Realtek R8111GUS

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

WWAN
SIM card None

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7020U</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>
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<tr>
<td>i3-7130U</td>
<td>2</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</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>
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<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8550U</td>
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<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @60Hz
- Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio

### Chipset

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

### Display

- Multi-touch: None
- Storage: Up to 2 drives (one M.2 SSD and one HDD)
- Some: SDD / SATA 6.0Gbps, 2.5" wide, removable, upgradable, Active Protection System<sup>TM</sup>
- Some: M.2 SSD / PCIe NVMe

### Optane™ memory

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

### Optical

- None

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### WLAN + Bluetooth™

- One of the following, configurable by model:
  - RealtekRTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card
  - Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
  - Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card
  - * Intel 3165ac card supports BT 4.2 but is limited to BT 4.1 by Windows OS

### WWAN

- SIM card: None

### Smart card reader

- Media reader: None

### Case color

- Black or silver

### Case material

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

### Security

- Security chip (opt): Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified
- Security chips: None
- Security keyhole: None
- Fingerprint reader: None
- TrackPoint<sup>®</sup> pointing device and buttonless Mylar surface multi-touch touchpad
- Advanced Audio / HD Audio, Synaptic<sup>®</sup> CX11852 codec
- Camera: HD720p camera, fixed focus
- HD720p camera, fixed focus
- HD720p camera, fixed focus
- HD Audio, Synaptic<sup>®</sup> CX11852 codec
- Stereo speakers, 1.5W x 2, Dolby<sup>®</sup> Advanced Audio
- Dual array microphone, headphone / microphone combo jack
- 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

### Battery

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

### Operating system

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

### Limited warranty

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

### Mil-Spec test

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

### Certification

- FCC and CE Markings: RoHS-compliant
- 65W AC adapter: 100-240V 50/60Hz
- 65W AC adapter: 100-240V 50/60Hz
- 65W AC adapter: 100-240V 50/60Hz
- 65W AC adapter: 100-240V 50/60Hz
- 65W AC adapter: 100-240V 50/60Hz
- 65W AC adapter: 100-240V 50/60Hz

### Environment

- Environment: EPEAT<sup>™</sup> Gold (US only); ENERGY STAR<sup>®</sup> 6.1; RoHS-compliant
- Environment: EPEAT<sup>™</sup> Gold (US only); ENERGY STAR<sup>®</sup> 6.1; RoHS-compliant
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- Environment: EPEAT<sup>™</sup> Gold (US only); ENERGY STAR<sup>®</sup> 6.1; RoHS-compliant

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

Lenovo
August 2019
## ThinkPad E490 Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor 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>i3-8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</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 630</td>
</tr>
</tbody>
</table>

* i5-8365U is for special bid only

### Graphics

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

### Chipset

Intel SoC (system on chip) platform

### Memory

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

### Display

<table>
<thead>
<tr>
<th>Size / Resolution</th>
<th>Surface</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Viewing Angle</th>
<th>Multi-touch</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; HD (1366x768)</td>
<td>Anti-glare</td>
<td>TN</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>90°</td>
<td>Non-touch</td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>Anti-glare</td>
<td>IPS</td>
<td>255 nits</td>
<td>16:9</td>
<td>600:1</td>
<td>170°</td>
<td>Non-touch</td>
</tr>
</tbody>
</table>

### Storage

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

### Optane™ memory

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

### Optical

- None

### Ethernet

Gigabit Ethernet Connection, Realtek 8111GUS

### WLAN + Bluetooth™

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

### WWAN

None

### SIM card

None

### Smart card reader

None

### Media reader

MicroSD card reader

### Ports

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

### Monitor cable

None

### Camera

HD720p camera, fixed focus

### Audio support

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

### System Mgt

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

### Security

- System Mgt: 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 AC adapter
- Max battery life: MobileMark® 2014: 13 hr
- AC adapter: 45W or 65W USB Type-C AC adapter

### Operating system

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

### Limited warranty

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

### Mil-Spec test

MIL-STD-810G military testing

### Environment

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

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

Lenovo

December 2019
### ThinkPad E490s Platform Specifications

#### Processor

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

#### Graphics

- Intel UHD Graphics 620 in processor only or
- Intel UHD Graphics 620 in processor and AMD Radeon RX 540X Graphics, 2GB GDDR5 memory;
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent display;
- Max resolution: 4096x2304 @60Hz (USB Type-C); 4096x2160 @24Hz (HDMI)

#### Chipset

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

#### Display

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

#### Storage

- One of the following, configurable by model:
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2282 SSD / PCIe NVMe, PCIe 3.0 x 2
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
  - M.2 2280 SSD & PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation

#### Optical

- Gigabit Ethernet Connection, Realtek R8111GUS

#### Ethernet + Bluetooth

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

#### WWAN

- None

#### SIM card

- None

#### Battery

- Integrated Li-ion 42Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- Max battery life: MobileMark 2014: 11.5 hr
- AC adapter: 45W or 65W USB Type-C AC adapter

#### Operating system

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

#### Environmental

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

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

Product Specifications Reference (PSREF)

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 AMD SoC (System on Chip) platform

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

Display Size / Resolution Surface Type Brightness Aspect Ratio Contrast Ratio Viewing Angle Multi-touch
14.0" HD (1366x768) Anti-glare TN 220 nits 16:9 400:1 90° Non-touch
14.0" FHD (1920x1080) Anti-glare IPS 250 nits 16:9 600:1 170° Non-touch

Multi-touch None

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

Optical None

Ethernet Gigabit Ethernet Connection, Realtek R8111GUS

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

WWAN SIM card None

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

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 1.4, Ethernet (RJ-45), headphone / microphone combo jack,
MicroSD card reader, security keyhole

Monitor cable None

Bundled Accy None

Camera HD720p camera, fixed focus

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

Keyboard 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

Fingerprint reader None

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

with 65W AC adapter

Max battery life MobileMark® 2014: 11 hr

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

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

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

Limited warranty 1-year mail-in repair service

1-year depot repair service

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

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

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

### Processor

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

### Graphics

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

### Chipset

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

### Display

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

### Multi-touch

- None

### Storage

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

### Optical

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

### Ethernet

- Gigabit Ethernet Connection, Realtek R8111GUS

### Memory

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

### Chipset

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

### Processor Specifications Reference (PSREF)

Note: The specifications above may not be available in all regions. Lenovo August 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>
</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></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DDR4-2400</td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics

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

#### Chipset

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

#### Display

- 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

#### Storage

- Up to two drives (one M.2 SSD and one HDD)
  - M.2 2280 SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
  - M.2 2280 SSD / PCIe NVMe, PCie 3.0 x 2
  - M.2 2280 SSD / PCIe NVMe, PCie 3.0 x 4
  - * Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

#### Memory

- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

#### Chipset

- Intel SoC (System on Chip) platform
- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

#### Display

- 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

#### Security

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

#### Battery

- Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- * Battery life varies significantly with settings, usage, & other factors
- Max battery life: MobileMark® 2014: 11 hr
- AC adapter: 45W or 65W USB Type-C AC adapter

#### Operating system

- Windows® 10 Home 64 or Windows 10 Pro 64
- One of the following, configurable by model:
  - Windows® 10 Home 64 or Windows 10 Pro 64
  - One of the following, configurable by model:
    - 1-year mail-in repair service
    - 1-year depot repair service

#### Warranty

- Limited warranty: 1-year mail-in repair service
- 1-year depot repair service

#### Environmental

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

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

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 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>Radeon Vega 8 Graphics</td>
<td></td>
</tr>
<tr>
<td>Ryzen 7 3700U</td>
<td>8</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2/4MB L3</td>
<td>Radeon RX Vega 10 Graphics</td>
<td></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 2866MHz but run at 2400MHz due to AMD 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 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
  - None

Optical

- Gigabit Ethernet Connection, RealTek RTL8111GUS

WLAN + Bluetooth™

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

WWAN

- None

SIM card

- None

Camera

- HD720p camera, fixed focus

Audio support

- HD Audio, Synthetic® 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
- 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

Battery

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

Operating system

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

Limited warranty

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

Mil-Spec test

- MIL-STD-810G military testing

Environment

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

Dimensions

| WxDxH: 14.53" x 9.92" x 0.78"; 369mm x 252mm x 19.9mm |

Weight

- Starting at 4.7 lb / 2.1 kg

Chipset

- AMD SoC (System on Chip) platform

Memory

- 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets
- *Installed memory is actually 2866MHz but run at 2400MHz due to AMD limitation

Display

- 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)
- *Installed memory is actually 2866MHz but run at 2400MHz due to AMD limitation

Optical

- Gigabit Ethernet Connection, RealTek RTL8111GUS

WLAN + Bluetooth™

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

WWAN

- None

SIM card

- None

Camera

- HD720p camera, fixed focus

Audio support

- HD Audio, Synthetic® 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
- 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

Battery

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

Operating system

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

Limited warranty

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

Mil-Spec test

- MIL-STD-810G military testing

Environment

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

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

Lenovo

November 2019
## ThinkPad L13 Platform Specifications

### Processor

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

### Graphics

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

### Chipset

Intel SoC (System on Chip) platform

### Memory

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

### Display

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

### Multi-touch (optional)

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

### Storage

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

### Optical

None

### Ethernet

Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro), RJ45 connector via optional ThinkPad Ethernet Adapter Gen 2 or Lenovo USB-C to Ethernet Adapter

### WLAN + Bluetooth™

- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0, M.2 card

### WWAN

None

### SIM card (optional)

None

### Dimensions

| Width x Depth x Height | 12.26" x 8.62" x 0.69"; 311.5mm x 219mm x 17.6mm |

### Weight

Starting at 3.06 lb / 1.38 kg

### Case color

Black or Silver

### Case material

Display cover: Aluminum

### Display cover (optional)

- Lenovo USB-C to Ethernet Adapter
- ThinkPad Ethernet Extension Adapter Gen 2

### Camera

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

### Audio support

HD Audio, Synaptics CX11880 codec / stereo speakers, 2W x 2, Dolby Audio Premium / dual array microphone, headphone / microphone combo jack

### Operating system

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

### Security chip

System Mgt (optional): Intel vPro Technology

### Security

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

### Security keyhole

Discrete TPM 2.0, TCG Certified

### Power-on password

Fingerprint reader: Optional: Touch style fingerprint reader on the palm rest

### NFC

None

### Battery

Integrated Li-ion 46Wh battery, supports Rapid Charge (charge up to 80% in 1hr)

### Max battery life

MobileMark® 2014: 14.1 hr

### AC adapter

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

### Operating system (optional)

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

### Limited warranty (optional)

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

### Mil-Spec test

MIL-STD-810G military testing

### Environment

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

---

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

Lenovo December 2019
# ThinkPad L13 Yoga 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>10th Generation Intel® Core™ i3</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>4.1 GHz</td>
<td>4MB DDR4-2666</td>
<td></td>
<td>Intel UHD Graphics</td>
</tr>
<tr>
<td>5th Generation Intel® Core™ i5</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th Generation Intel® Core™ i7</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.9 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

## Graphics

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

## Chipset

Intel SoC (System on Chip) platform

## Memory

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

## Display

- **Size:** 13.3”
- **Resolution:** (1920x1080)
- **Type:** IPS
- **Brightness:** 300 nits
- **aspect ratio:** 16:9
- **Contrast:** 800:1
- **Color gamut:** 72%
- **Viewing Angle:** 170°

## Multi-touch

Capacitive-type multi-touch, supports 10-finger gesture, anti-reflection (AR), could reduce the brightness by up to 10%

## Hinge

Yoga hinge, 360 degree

## Convert-mode Pen

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

## Storage

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

## Optical

None

## Ethernet

Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro), RJ45 connector via optional ThinkPad Ethernet Extension Adapter Gen 2 or Lenovo USB-C to Ethernet Adapter

## WLAN + Bluetooth™

- **Network:** Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card
- **WLAN:** Wi-Fi 5 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0, M.2 card

## WWAN

- **SIM card:** None
- **Weight:** Starting at 3.17lb / 1.43kg
- **Case color:** Black or Silver
- **Display cover:** Magnesium / Aluminum
- **Bottom:** GFRP

## Smart card reader

Optional: Smart card reader

## Media reader

- **MicroSD card reader:**
- **Media reader:**

## Ports

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

## Monitor cable

- **(optional):**
- **Monitor cable:**

## Bundled accessories

- **(optional):**
- **Bundled accessories:**

## Camera

One of the following, configurable by model:

- **Camera:**
- **Audio support:** HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack

## Keyboard

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

## Security

- **Security chip:**
- **Security chip:**

## Battery

Integrated Li-ion 46Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter

## AC adapter

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

## Light sensor

G-sensor

## Environment

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

**Note:** The specifications above may not be available in all regions. Lenovo December 2019
## Processor Specifications

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>i3-7020U</td>
<td>2</td>
<td>2</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>i3-7130U</td>
<td>4</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</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 i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8130U</td>
<td>2</td>
<td>4</td>
<td>2.2 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

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

### Display

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

### Multi-touch (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)

### Optical

- 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

### Memory

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

### SIM card

- None

### WWAN

- None

---

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

---

**Product Specifications Reference (PSREF)**

**ThinkPad L380 Platform Specifications**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>WxDxH: 12.67” x 8.83” x 0.74”; 321.88mm x 224.22mm x 18.8mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Starting at 3.22 lb / 1.46 kg</td>
</tr>
<tr>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>Case material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Display cover</td>
<td>Bottom: GFRP</td>
</tr>
<tr>
<td>Processor</td>
<td>Intel Celeron Processor, 7th Generation Intel Core™ i3 / i5 Processor or 8th Generation Intel Core i5 / i7 Processor</td>
</tr>
<tr>
<td>Memory</td>
<td>DDR4-2133 on Intel HD Graphics 610</td>
</tr>
<tr>
<td>SIM card</td>
<td>None</td>
</tr>
<tr>
<td>WWAN</td>
<td>None</td>
</tr>
</tbody>
</table>
| Ports          | Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, headphone / microphone combo jack, microSD card reader, security keyhole
| Monitor cable  | Optional: ThinkPad Ethernet Extension Cable                 |
| Bundled Accy   | Optional: ThinkPad Ethernet Extension Cable                 |
| Camera         | HD720p camera, fixed focus                                  |
| Audio support  | HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack |
| Keyboard       | 6-row, spill-resistant, multimedia Fn keys, optional LED backlight |
| UltraNav™      | TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch |
| Security chip  | Power-on password, hard disk password, supervisor password, security keyhole |
| Security chip  | Intel vPro Technology                                        |
| Ultramountable | Optional: Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology |
| NFC (optional) | Near Field Communication                                   |
| Battery        | Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter |
| Max battery life | MobileMark® 2014: 16.1 hr                                      |
| AC adapter     | 45W or 65W USB Type-C AC adapter                            |
| Operating system | Optional: Windows® 10 Home 64 or Windows 10 Pro 64          |
| Limited warranty | One of the following, configurable by model:          |
|                 | • 1-year depot repair service                              |
|                 | • 3-year/1-yr battery depot repair service                 |
|                 | • 3-year/1-yr battery limited onsite service               |
| Mil-Spec test   | MIL-STD-810G military testing                              |
| Environment    | EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant   |

**Lenovo August 2019**
## ThinkPad L380 Yoga Platform Specifications

### Processor

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

### Graphics

- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor;
- supports three independent displays;
- Max resolution: 4096x2304 @ 86Hz (USB Type-C); 4096x2160 @ 90Hz (HDMI)

### Chipset

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

### Display

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

### Convert-mode Pen

- ThinkPad Pen Pro, active pen for multi-touch display, on-board garage

### 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)
- None

### Ethernet

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

### WLAN + Bluetooth™

- **Wireless card supports BT4.2 but is limited to BT4.1 by Windows OS**

### WWAN

- None

### SIM card

- None

### Dimensions

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

### Weight

- Starting at 3.44 lb / 1.56 kg

### Case color

- Black or Silver

### Case material

- Display cover: Aluminum
- Bottom: GFRP

### Smart card reader

- None

### Media reader

- MicroSD card reader

### Ports

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

### Camera

- 720p:
  - HD720p resolution, low light sensitive, fixed focus
- IR & 720p:
  - IR camera and HD720p camera, fixed focus
- World facing:
  - Rear camera, 5MP resolution, auto focus

### Audio support

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

### Keyboard

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

### Security

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

### Security chip

- Optional:
  - Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology
  - Near Field Communication

### Battery

- Integrated Li-Ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- 3-year/1-yr battery limited onsite service
- 3-year/1-yr battery depot repair service
- 1-year depot with 2-year system board service
- 3-year/1-yr battery depot repair service
- 3-year/1-yr battery limited onsite service

### AC adapter

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

### Preload

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

### Limited warranty

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

### Mil-Spec test

- MIL-STD-810G military testing

### Environment

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

---

*Lenovo December 2019*
### ThinkPad L390 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 4305U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 610</td>
</tr>
<tr>
<td>i5-815U</td>
<td>4</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</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></td>
<td></td>
</tr>
<tr>
<td>i7-8565U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Graphics

- Intel UHD Graphics 610 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@30Hz (HDMI)

#### Chipset Memory

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

#### Display

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

#### Multi-touch (opt)

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

#### Storage

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

#### Optical

- None

#### Ethernet

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

#### WLAN

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

#### WWAN

- SIM card: None
- Mobile Broadband: None

#### Dimensions

<table>
<thead>
<tr>
<th>Weight</th>
<th>3.22 lb / 1.46 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case color</td>
<td>Black or Silver</td>
</tr>
<tr>
<td>Display cover</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Bottom</td>
<td>GFRP</td>
</tr>
</tbody>
</table>

#### Camera

- HD 720p camera, fixed focus
- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack

#### Audio support

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

#### Security

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

#### Security chip

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

#### Battery

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

#### Operating system

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

#### Limited warranty

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

#### Mil-Spec test

- MIL-STD-810G military testing

#### Environment

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

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

<table>
<thead>
<tr>
<th>Processor 8th Generation Intel® Core™ i3 / i5 / i7 Processor</th>
<th>Smart card reader</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>Media reader</td>
<td>MicroSD card reader</td>
</tr>
<tr>
<td># of Cores</td>
<td>Ports</td>
<td>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</td>
</tr>
<tr>
<td># of Threads</td>
<td>Monitor cable (optional)</td>
<td>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>Cache</td>
<td>DDR4-2400</td>
</tr>
<tr>
<td>Cache</td>
<td>Memory Types</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>Graphics</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>Case material</td>
<td>Memory</td>
<td>32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
</tr>
<tr>
<td>Case color</td>
<td>Chipset</td>
<td>* Installed memory is actually 2966MHz but run at 2400MHz due to Intel limitation</td>
</tr>
<tr>
<td>Weight</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Memory</td>
<td>32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</td>
</tr>
<tr>
<td>WWAN</td>
<td>Memory</td>
<td>* Installed memory is actually 2966MHz but run at 2400MHz due to Intel limitation</td>
</tr>
<tr>
<td>WLAN</td>
<td>Memory</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>Bluetooth™</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>WWAN</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>SIM card</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>Weight</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>Case color</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
<tr>
<td>Case material</td>
<td>Chipset</td>
<td>Intel SoC (System on Chip) platform</td>
</tr>
</tbody>
</table>

### Product Specifications Reference (PSREF)

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

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**Processor Specifications**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-8145U</td>
<td>2</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>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>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

- Intel SoC (System on Chip) platform

**Memory**

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

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>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>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-reflection</td>
<td>300 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
</tbody>
</table>

**Multi-touch**

- Capacitive-type multi-touch, supports 10-finger gesture, anti-reflection (AR), could reduce the brightness by up to 10%

**Hinge**

- Yoga hinge, 360 degree

**Multi-mode Pen (optional)**

- ThinkPad Pen Pro, active pen for multi-touch display, on-board garage

**Storage**

- One of the following, configurable by model:
  - M.2 2280 SSD / SATA 6.0Gb/s
  - M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
  - M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
  - Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4
  - None

**Optical**

- None

**Ethernet**

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

**WLAN**

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

**WWAN**

- None

**SIM card**

- None

**Dimensions**

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

**Weight**

- Starting at 3.44 lbs / 1.56 kg

**Case color**

- Black or Silver

**Case material**

- Display cover: Magnesium / Aluminum
- Bottom: FRP

**Audio support**

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

**Battery**

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

**Max battery life**

- MobileMark 2014: 12.17 hr

**AC adapter**

- 45W or 65W USB-C AC adapter

**Operating system**

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

**Limited warranty**

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

**Mi-Spec test**

- MIL-STD-810G military testing

**Environment**

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

<table>
<thead>
<tr>
<th>Number</th>
<th>Processor</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cel 3965U</td>
<td>Celeron Processor, 7th Generation Intel Core™ i3 / i5 Processor</td>
<td>2</td>
<td>2.2 GHz</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
<td></td>
</tr>
<tr>
<td>3-7020U</td>
<td>i3-7130U</td>
<td>2</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>Intel HD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>5-7200U</td>
<td>i5-8250U</td>
<td>4</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>7-8350U</td>
<td>i5-8350U</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>Intel UHD Graphics 620</td>
<td></td>
</tr>
<tr>
<td>7-8550U</td>
<td>i5-8550U</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

## Graphics

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

## Chipset

- Intel SoC (System on Chip) platform
- * 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, 800:1 contrast ratio, 170° viewing angle
- Multi-touch (opt) On-cell touch, supports 10-finger gesture (FHD only)

## Storage

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

## Optical

- None

## Ethernet

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

## WWAN (optional)

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

## Security chip

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

## Camera

- HD720p camera, fixed focus
- IR camera and HD720p camera, fixed focus
- HD Audio, Realtek ALC3287 codec / stereo speakers, 2x2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack

## Keyboard

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

## Audio

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

## Warranty

- Limited warranty (optional): 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
## ThinkPad L490 Platform Specifications

Product Specifications Reference (PSREF)  

<table>
<thead>
<tr>
<th>Processor Intel® Celeron® Processor or 8th Generation Intel Core™ i3 / i5 / i7 Processor</th>
<th>Dimensions Width x Height x Depth</th>
<th>Weight Starting at 3.72 lb / 1.69 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webster or 8th Generation Intel Core i3 / i5 / i7 Processor</td>
<td>13.19&quot; x 9.25&quot; x 0.89&quot;; 335mm x 235mm x 22.5mm</td>
<td>Black</td>
</tr>
<tr>
<td>Processor Number</td>
<td>Processor</td>
<td>Cache</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Cel 4305U</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3-3185U</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>5-8265U</td>
<td>4</td>
<td>8</td>
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<tr>
<td>5-8365U</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>7-8665U</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Chipset Intel SoC (System on Chip) platform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>Installed memory is actually 2666MHz but run at 2133MHz or 2400MHz due to Intel limitation</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>HDD / SATA 6.0 Gb/s, 2.5&quot; wide, 7mm high, Active Protection System™</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SSD / SATA 6.0 Gb/s, 2.5&quot; wide, 7mm high</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation</td>
<td></td>
</tr>
<tr>
<td>Optane™ memory Optane Memory</td>
<td>Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2</td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)</td>
<td></td>
</tr>
<tr>
<td>WLAN - Bluetooth™ (optional)</td>
<td>One of the following, configurable by model:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card (NOT available in EMEA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0</td>
<td></td>
</tr>
<tr>
<td>WWAN (optional)</td>
<td>One of the following, configurable by model:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wireless WAN upgradable (special bid only in EMEA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For non-WWAN model, it means the model is NOT WWAN upgradable</td>
<td></td>
</tr>
<tr>
<td>SIM card</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

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

Lenovo October 2019
### ThinkPad L580 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>Cel 3965U</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td>-</td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 610</td>
</tr>
<tr>
<td>3-7202U</td>
<td>4</td>
<td>4</td>
<td>2.3 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR3-12800</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>3-7130U</td>
<td>4</td>
<td>4</td>
<td>2.7 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR3-12800</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>5-7200U</td>
<td>4</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR3-12800</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>5-7300U</td>
<td>4</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR3-12800</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

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

#### Graphics

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

#### Chipset

- 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

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

#### Storage

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

#### Optical

- None

#### Network

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

#### WLAN + Bluetooth™ (optional)

- One of the following, configurable by model:
  - Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)
  - Intel Dual Band Wireless-Ac 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
  - Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS

#### SIM card (optional)

- One of the following, configurable by model:
  - Wireless WAN upgradable (special bid only)
  - 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

#### WWAN (optional)

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

#### Battery

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

#### AC adapter

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

#### Operating system

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

#### Limited warranty

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

#### 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 February 2020**
## ThinkPad L590 Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Celeron</td>
<td>2</td>
<td>2</td>
<td>2.2 GHz</td>
<td></td>
<td>2MB</td>
<td>DDR4-2133</td>
<td>Intel UHD Graphics 610</td>
</tr>
<tr>
<td>4305U</td>
<td>2</td>
<td>2</td>
<td>2.1 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>845U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>855U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>865U</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 610 or 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon 535, 2GB GDDR5 memory (discrete models are NOT available in EMEA);
- Supports external digital monitor via HDMI or USB Type-C;
- Supports three independent displays;
- Max resolution: 4096x2304 at 60Hz (USB Type-C); 4096x2160 at 24Hz (HDMI)

### Chipset

- Intel SoC (System on Chip) platform

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot; HD (1366x768)</td>
<td>TN Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>500:1</td>
<td>45%</td>
<td>90°</td>
<td></td>
</tr>
<tr>
<td>15.6&quot; FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>45%</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

### Storage

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

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

### Optical

- None

### Ethernet

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

### WLAN + Bluetooth™ (optional)

- Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M2 card (NOT available in EMEA)
- Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0

### WWAN (optional)

- Wireless WAN upgradable (special bid only in EMEA)
- Integrated Mobile Broadband 4G LTE, Fibocam L830-EB, M2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocam L850-GL, M2 card
- Not for WWAN model, it means the model is NOT WWAN upgradable

### SIM card

- None

### Note:

The specifications above may not be available in all regions.

### Lenovo

December 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>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-8400H</td>
<td>4</td>
<td>8</td>
<td>2.5 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>12</td>
<td>2.5 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
<td>6</td>
<td>12</td>
<td>2.7 GHz</td>
<td>4.4 GHz</td>
<td>12MB</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

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

### Chipset
- Mobile Intel CM246 Chipset

### Memory
- Mobile max / 2666MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, two DDR4 SO-DIMM sockets
- Up to two M.2 SSD, supports single or double M.2 drive operation
- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

### 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-reflection, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch

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

### Storage
- Up to two M.2 SSD, supports single or double M.2 drive operation

### RAID (optional)
- RAID 0/1 support

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

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

### WWAN
- None

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

### Weight
- Non-touch model: starting at 3.76 lb / 1.7 kg
- Multi-touch model: starting at 3.86 lb / 1.8 kg

### Case color
- Black

### Case material
- Display cover: CFRP/GFRP hybrid;
- Bottom: Aluminum alloy

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

### Media reader
- None

### Ports
- None

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

### Bundled Accy
- One of the following, configurable by model:
  - Lenovo HDMI to VGA Monitor Adapter
  - One of the following, configurable by model:
    - HD Audio, Realtek ALC3286 codec / stereo speakers, 2W x 2, Dolby Audio Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos headphone

### Security chip
- VPro

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

### Audio support
- HD Audio, Realtek

### Battery
- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life
  - Discrete mode: 7.36 hr
  - Hybrid mode: 13.87 hr
  - Battery life varies significantly with settings, usage, & other factors

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

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

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

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

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

Lenovo November 2019
**ThinkPad P1 (2nd Gen) Platform Specifications**

---

**Processor**

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

**Graphics**

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

**Chipset Memory**

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

**Display**

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

**Multi-touch (opt)**

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

**Pen (optional)**

- Lenovo Pen Pro (special bid only)

**Storage**

- Up to two M.2 SSD, supports single sided M.2 2280 drives only
- M.2 2280 SSD / PCIe NVMe 3.0 x 4

**RAID (optional)**

- RAID 0/1 support

**Ethernet**

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

**WLAN (optional)**

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

**WWAN (optional)**

- None

**SIM card**

- None

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

---

**Dimensions**

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

**Weight**

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

**Case color**

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

**Case material**

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

**Smart card reader**

- Optional: Smart card 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, SD card reader, security keyhole

**Media reader**

- Optional: Media reader
  - USB-C to: Lenovo USB-C to VGA Adapter
  - USB-C to DP: Lenovo USB-C to DisplayPort Adapter

**Bundled Accy**

- Optional: ThinkPad Ethernet Extension Cable

**Camera (optional)**

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

**Audio support**

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

**Security chip**

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

**System Mgt (opt)**

- Security chip
- Intel vPro Technology
- Lenovo USB-C to DisplayPort Adapter

**Fingerprint reader**

- Discrete TPM 2.0, TCG Certified
- Lenovo USB-C to DisplayPort Adapter

**Color calibration**

- Option: X-Rite Pantone factory color calibration (UHD model only)
- None

**Battery**

- Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- MobileMark® 2014: 13.8 hr

**Max battery life**

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

**AC adapter**

- 135W slim tip AC adapter

**Operating system**

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

**Limited warranty**

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

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

- ENERGY STAR® 7.1, RoHS-compliant

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*Lenovo November 2019*
ThinkPad P43s Platform Specifications

**Product Specifications Reference (PSREF)**

### 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>i5-8350U</td>
<td>3</td>
<td>1.7 GHz</td>
<td>4.2 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i3-8350U, i3-8145U</td>
<td>4</td>
<td>1.9 GHz</td>
<td>4.0 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 and NVIDIA Quadro® P520, 2GB GDDR5 memory;
- supports external digital monitor via HDMI or USB Type-C;
- supports three independent displays;
- Max resolution: 3840x2160@60Hz (USB-C); 3840x2160@30Hz (HDMI)

### Chipset Memory

- Intel SoC (System on Chip) platform;
- 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket;
- * Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

### Display

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

### Multi-touch (optional)

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

### Security

- Security chip: Power-on password, hard disk password, supervisor password, security keyhole
- Security chip: Discrete TPM 2.0, TCG Certified
- Security chip: Intel vPro Technology
- Security chip: Near Field Communication

### Battery

- Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Battery life: MobileMark® 2014: 14.7 hr
- Battery life varies significantly with settings, usage, & other factors

### Operating system

- Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

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

### Environments

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

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

### Processor
- **6th or 7th Generation Intel® Core™ i7 Processor or Intel Xeon® Processor E3 v5 or v6 Family**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i7-6620HQ</td>
<td>4</td>
<td>8</td>
<td>2.7 GHz</td>
<td>3.6 GHz</td>
<td>8MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 530</td>
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<tr>
<td>E3-1505M v6</td>
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<td>2.8 GHz</td>
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<td>i7-7700HQ</td>
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<td>8</td>
<td>2.8 GHz</td>
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<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel HD Graphics 630</td>
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<tr>
<td>E3-1550M v6</td>
<td>4</td>
<td>8</td>
<td>2.9 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel HD Graphics P630</td>
</tr>
<tr>
<td>E3-1535M v6</td>
<td>4</td>
<td>8</td>
<td>3.0 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel HD Graphics P630</td>
</tr>
</tbody>
</table>

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

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

### Memory
- 4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card
- Four USB 3.1 Gen 1 (USB 3.0, one Always On), USB Type-C / Thunderbolt 3, Mini DisplayPort 1.2a, HDMI 1.4b, Ethernet (RJ-45), Dock connector
- *Depending on many factors, actual data transfer speed may be lower than theoretical speed*

### Storage
- **Up to 3 drives (two M.2 SSD and one HDD), supports single sided M.2 2280 drives only**
  - Some: 15.6" (396mm) FHD (1920x1080), anti-glares, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle
  - Some: 15.6" (396mm) 4K (3840x2160), anti-glares, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle

### Multi-touch (opt)
- Capacitive-type multi-touch, supports 10-finger gesture, 220 nits (FHD only)
  - ThinkPad Pen Pro, active pen for multi-touch display

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

### Optical (optional)
- **3-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad**

### Security
- **Power-on password, hard disk password, supervisor password, security keyhole**
- **Discrete TPM 2.0, TCG Certified**
- **Intel vPro Technology**
- **Fingerprint reader**
  - Touch style match on chip fingerprint reader on the palm rest
- **Color calibration**
  - Optional: Pantone® color calibrator by X-Rite® color calibration sensor in palm rest
  - None

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

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

### Operating system
- **One of the following, configurable by model:**
  - Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64
  - Windows® 10 Home 64
  - Windows 10 Pro 64
  - Windows 10 Pro 64 for Workstations

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

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

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

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

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**Lenovo**

**November 2019**
**ThinkPad P52 Platform Specifications**

**Processor**

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>7-8850H</td>
<td>6</td>
<td>2.6 GHz</td>
<td>4.3 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>i9-8950HK</td>
<td>12</td>
<td>2.9 GHz</td>
<td>4.8 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2176M</td>
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<td>4.4 GHz</td>
<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

Mobile Intel CM246 Chipset

**Memory**

Mobile ECC or 4GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets. *Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation.*

**Display**

Some: 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) UHD (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)**

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

**Storage**

Up to 3 drives (two M.2 SSD and one HDD), supports single sided M.2 2280 drives only. Some: M.2 SSD / Pcie NVMe, Pcie 3.0 x 4, 32Gb/s

**Optane™ memory**

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

**RAID (optional)**

RAID 0/1 support

**Optical**

None

**Ethernet**

Intel Ethernet Connection I219-V (Jacksonville)

**WLAN**

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

**Bluetooth™**

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

**WWAN (optional)**

One of the following, configurable by model:

- Wireless WAN upgradable
- 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

**Camera (optional)**

One of the following, configurable by model:

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

**Audio support**

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

**Keyboard**

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

**Touchpad**

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

**Security**

WinPAM model: Intel vPro Technology

**Battery**

Swapable Li-ion 90Wh battery

**AC adapter**

Discrete mode: 6.1 hr; Hybrid mode: 8.9 hr

**Operating system**

One of the following, configurable by model:

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

**Limited warranty (optional)**

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

**Environmental**

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

**Dimensions**

WxDxH: 14.86" x 9.93" x 0.96 - 1.16"; 377.4mm x 252.3mm x 25.8 - 30.7mm

**Weight**

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

**Case color**

Black

**Case material**

Top: Glass-Fiber Reinforced Plastic;
Bottom: Magnesium/Aluminum

**Smart card reader**

Optional: Smart card reader

**Media reader**

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

**Ports**

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

* Power Delivery only supports power-out for charging peripherals

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

**Note:** The specifications above may not be available in all regions.
## ThinkPad P52s 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>i5-8350U</td>
<td>4</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i7-8550U</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8650U</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

- Intel 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

- Intel Ethernet Connection I219-LM (Jacksonville)
- Intel Ethernet Connection I219-V (Jacksonville)

### Display

- 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 45% gamut, 170° viewing angle.
- Some: 15.6" (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle.

### Storage

System has one HDD slot or one M.2 SSD slot exclusively for storage, and supports single sided M.2 2280 drives only.

- 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

### Optane memory

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

### Optical Drive

None

### Ethernet

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

### WLAN + Bluetooth™

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

### WWAN (optional)

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

### SIM card (opt)

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

### Memory

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

### Chipset

Intel SoC (System on Chip) platform

- Intel XMM 7262 (Fibocom L830-EB), M.2 card
- Intel XMM 7360 (Fibocom L850-GL), M.2 card

### Graphics

Intel UHD Graphics 620 in processor and NVIDIA Quadro P500, 2GB GDDR5 memory.

### Media reader

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

### Monitor cable

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

### Camera (optional)

One of the following, configurable by model:

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

### Audio support

- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / optional dual array microphone, headphone / microphone combo jack
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

### Battery

- Optional integrated Li-ion 32Wh battery and swappable Li-ion 24Wh, 48Wh, or 72Wh battery
- Max battery life (MobileMark® 2014)
  - 48Wh: 12.2 hr
  - 72Wh: 18.5 hr
  - 32Wh + 24Wh: 20.1 hr
  - 32Wh + 48Wh: 26.3 hr

### AC adapter

- 65W USB Type-C AC adapter

### Operating system

Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

One of the following, configurable by model:

- 1-year depot repair service
- 1-year depot with 2-year system board repair service
- 3-year/1-year battery depot repair service
- 3-year/1-year battery limited onsite service
- 3-year (including battery) limited onsite service

### Mil-Spec test

MIL-STD-810G military testing

### Environment

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

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Graphics</th>
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<td>4.3 GHz</td>
<td>8 MB</td>
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<td>Intel UHD Graphics 630</td>
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<tr>
<td>i7-9750H</td>
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<td>12</td>
<td>2.6 GHz</td>
<td>4.5 GHz</td>
<td>12 MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<td>i7-9850H</td>
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<td>12</td>
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<td>12 MB</td>
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<td>E-2276M</td>
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<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
</tr>
</tbody>
</table>

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

## Graphics

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

## Chipset

 Mobile Intel CM246 Chipset Mobile CM246 Chipset Mobile CM246 Chipset Mobile CM246 Chipset Mobile CM246 Chipset Mobile CM246 Chipset Mobile CM246 Chipset

## Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>100%</td>
<td>170°</td>
</tr>
<tr>
<td>15.6&quot;</td>
<td>UHD (3840x2160)</td>
<td>OLED</td>
<td>Anti-reflection/ Anti-smudge</td>
<td>SDR 400nits, HDR 500nits (peak)</td>
<td>16:9</td>
<td>10000:1</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

## Multi-touch (optional)

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

## Pen (optional)

 Lenovo Pen Pro (special bid only)

## Storage

 Up to 3 drives (3x M.2 SSD or 1x HDD + 2x M.2 SSD), supports single sided M.2 2280 drives only

### Optional memory

Intel Optane memory, Pcle NVMe, Pcle 3.0 x 4

### RAID (optional)

RAID 0/1/5 support

### Optical

None

## Ethernet

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

## WLAN (optional)

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

## Bluetooth (optional)

 Optional: Intel wireless, integrated in Wi-Fi + Bluetooth combo adapter

## WWAN (optional)

 One of the following, configurable by model:

- Wireless WAN upgradable (special bid only in EMEA)
- Integrated Mobile Broadband 4G LTE-A, Fibocob L850-GL, M.2 card

### SIM card (optional)

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

## Camera (optional)

 HD720p camera with ThinkShutter camera privacy, fixed focus

## Audio support

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

## Keyboard

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

## Security

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

## Security chip

 vPro (optional)

 Intel vPro Technology

## Fingerprint reader

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

## Color calibration

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

## NFC (optional)

 Near Field Communication

## Battery

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

## Max battery life (MobileMark 2014)

 Discrete mode: 8 hr; Hybrid mode: 13 hr

## AC adapter

 170W or 230W slim tip AC adapter

## Operating system

 One of the following, configurable by model:

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

## Limited warranty

 One of the following, configurable by model:

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

## Mil-Spec test

 MIL-STD-810G military testing

## Environment

 EPEAT Silver; ENERGY STAR 7.1; RoHS-compliant

Lenovo November 2019
**ThinkPad P53s Platform Specifications**

**Product Specifications Reference (PSREF)**

**Processor**

<table>
<thead>
<tr>
<th>Processor</th>
<th>Number</th>
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<tr>
<td>7-8565U</td>
<td>4</td>
<td>8</td>
<td></td>
<td>1.6 GHz</td>
<td>4.6 GHz</td>
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<td>Intel UHD Graphics 620</td>
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<tr>
<td>7-8665U</td>
<td>4</td>
<td>8</td>
<td></td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8 MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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</table>

**Graphics**

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

**Chipset**

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

**Display**

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

**Multi-touch (opt)**

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

**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

**WWAN (optional)**

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

**SIM card (opt)**

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

**Supported operating system**

- Windows 10 Home 64 or Windows 10 Pro 64

**Limited warranty**

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

**Related**

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

**Note:** The specifications above may not be available in all regions.
### ThinkPad P72 Platform Specifications

**Processor**

- **8th Generation Intel® Core™ i7 Processor or Intel Xeon® E Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8750H</td>
<td>6</td>
<td>12</td>
<td>2.2 GHz</td>
<td>4.1 GHz</td>
<td>9MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>7-8850H</td>
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<td>12</td>
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<td>4.3 GHz</td>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
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<tr>
<td>E-2176M</td>
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<td>16</td>
<td>2.7 GHz</td>
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<td>12MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 630</td>
</tr>
<tr>
<td>E-2186M</td>
<td>8</td>
<td>16</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
  - *Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation*

**Display**

- Some: 17.3" (439mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 72% gamut, 170° viewing angle
  - *Depending on many factors, actual data transfer speed may be lower than theoretical speed*
  - Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 4, 32Gb/s

**Multi-touch Pen**

- None

**Storage**

- Up to 3 drives (two M.2 SSD and one HDD), supports single sided M.2 2280 drives only
  - *Depending on many factors, actual data transfer speed may be lower than theoretical speed*

**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

**WAN**

- None

**SIM card**

- None

**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/Aluminum*

**Smart card reader**

- Optional: Smart card reader

**ExpressCard**

- None

**Media reader**

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

**Ports**

- 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

**Monitor cable**

- Optional: Lenovo Mini-DisplayPort to DisplayPort Monitor Cable

**Camera (optional)**

- IR camera and HD720p camera, fixed focus

**Audio support**

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

**Keyboard**

- UltraNav™: 6-row, spill-resistant, multimedia Fn keys, numeric keypad, LED backlight

**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)

**Max battery life**

- MobileMark® 2014: 16 hr

**AC adapter**

- 230W slim tip AC adapter

**Operating system (optional)**

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

**Limited warranty**

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

**Mil-Spec test**

- MIL-STD-810G military testing

**Environment**

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

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

Lenovo

November 2019
### ThinkPad P73 Platform Specifications

#### Processor

<table>
<thead>
<tr>
<th>Processor Type</th>
<th>9th Generation Intel® Core™ i5 / i7 / i9 Processor or Intel Xeon® E Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor Number</td>
<td>5-9400H, 7-9750H, 9-9880H, E-2278M</td>
</tr>
<tr>
<td>Cores / Threads</td>
<td>4 / 8, 6 / 12, 6 / 12, 6 / 12</td>
</tr>
<tr>
<td>Base Frequency</td>
<td>2.5 GHz, 2.6 GHz, 2.6 GHz, 2.8 GHz</td>
</tr>
<tr>
<td>Max Turbo Frequency</td>
<td>4.3 GHz, 4.5 GHz, 4.6 GHz, 4.7 GHz</td>
</tr>
<tr>
<td>Cache</td>
<td>8MB, 12MB</td>
</tr>
<tr>
<td>Memory Types</td>
<td>DDR4-2666</td>
</tr>
</tbody>
</table>

#### Graphics

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

#### Chipset

- Mobile Intel CM246 Chipset
- Dual-channel capable, four DDR4 SO-DIMM sockets

#### 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>View Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.3”</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>160°</td>
</tr>
<tr>
<td>17.3”</td>
<td>UHD (3840x2160)</td>
<td>Dolby Vision® HDR</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16:10</td>
<td>100%</td>
<td>170°</td>
</tr>
</tbody>
</table>

#### Multi-touch Pen

- None

#### Storage

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

#### Optane™ memory

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

#### RAID (optional)

- RAIDX 0/1 support

#### Optical Ethernet

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

#### WLAN (optional)

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

#### WWAN (optional)

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

#### SIM card

- None

#### Processor Specifications Reference (PSREF)

- Product Specifications Reference (PSREF)

- Limited warranty
  - One of the following, configurable by model:
    - 1-year depot repair service
    - 3-year/1-yr battery depot repair service
    - 3-year/1-yr battery limited onsite service
  - MIL-Spec test
    - MIL-STD-810G military testing
- Environment
  - EPEAT Silver; ENERGY STAR® 7.1; RoHS-compliant

Note: The specifications above may not be available in all regions.
**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>4</td>
<td>-</td>
<td>2.3 GHz</td>
<td>2.8 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6300U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>3.0 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i5-6500U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
<tr>
<td>i7-6600U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
</tr>
</tbody>
</table>

**Graphics**

- Intel HD Graphics 520 or 620 in processor only.
- Intel HD Graphics 620 in processor and NVIDIA GeForce® 940MX, 2GB 256-bit 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

**Display**

- Some: 14.0” (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio
- Some: 14.0” (355mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 or 600:1 contrast ratio
- Some: 14.0” (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- On-cell touch, supports 10-finger gesture (FHD IPS panel with PPS cover only)

**Storage**

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

**Optical**

- None

**Ethernet**

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

**WLAN**

- [WLAN](#)
  - 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 2265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card
  - Intel Tri-Band Wireless-AC 18265, Wi-Fi 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*

**WLAN (optional)**

- One of the following, configurable by model (WWAN can coexist with WiGig):
  - LTE-A
  - Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
  - Integrated Mobile Broadband 4G LTE-A
  - Intel XMM™ 7610 (Bicom L831-EAU), M.2 card (EMEA only)
  - Intel vPro Technology

**WWAN (optional)**

- One of the following, configurable by model (WWAN can coexist with WiGig):
  - Integrated Mobile Broadband 4G LTE-A
  - Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card
  - Integrated Mobile Broadband 4G LTE-A
  - Intel XMM™ 7610 (Bicom L831-EAU), M.2 card (EMEA only)

**Dimensions**

- **Weight**
  - WxDxH: 13.25” x 9.15” x 0.79”; 336.6mm x 232.5mm x 19.95mm

**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

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

**Audio support**

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

**Security**

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 1.2 or 2.0, TCG Certified

**Security chip vPro (optional)**

- Intel vPro Technology

**Fingerprint reader (optional)**

- Touch style match on chip fingerprint reader on the keyboard bezel
- Near Field Communication (NFC)

**Internal battery**

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

**Max battery life**

- MobileMark® 2014
  - **Optional:**
    - Integrated Li-Polymer 3-cell (24Wh)
    - Li-Polymer 3-cell (24Wh) or Li-Ion 6-cell (48Wh or 72Wh)

**Display**

- 13.3” (337mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**Processors**

<table>
<thead>
<tr>
<th>Processor</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3-7100U</td>
<td>2</td>
<td>4</td>
<td>2.4 GHz</td>
<td>-</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7200U</td>
<td>2</td>
<td>4</td>
<td>2.5 GHz</td>
<td>3.1 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7500U</td>
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<td>2.7 GHz</td>
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<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i7-7600U</td>
<td>2</td>
<td>4</td>
<td>2.8 GHz</td>
<td>3.9 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

**Processor**

- Processor 6th Generation Intel® Core™ i5 / i7 Processor or
- Number
- # of Cores
- # of Threads
- Base Frequency
- Max Turbo Frequency
- Cache
- Memory Types
- Processor Graphics
## ThinkPad T470s 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>
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<tr>
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<td>2.3 GHz</td>
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<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 520</td>
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<tr>
<td>i7-6600U</td>
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<td>2.6 GHz</td>
<td>3.4 GHz</td>
<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

or 7th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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<tbody>
<tr>
<td>i5-7200U</td>
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<td>4</td>
<td>2.5 GHz</td>
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<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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<td>Intel HD Graphics 620</td>
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<td>i7-7600U</td>
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<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>

### Memory
- 20GB or 24GB max / 2400MHz DDR4, dual-channel capable, Intel SoC (System on Chip) platform

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

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

### Multi-touch (opt)
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

### 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)

### 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)
- None

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

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

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

### WWAN (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

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

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

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

### Monitor cable (opt)
- ThinkPad WiGig dock, mutually exclusive with WWAN
- HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

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

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

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

### Max battery life
- 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

### Display ports
- HDMI 1.4b, Ethernet (RJ-45), Dock connector
- 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

### 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

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

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

---

**Dimensions:** WxDxH: 13.03" x 9.33" x 0.67-0.74"; 331mm x 226.8mm x 16.9-18.8mm

**Weight:** Starting at 2.9 lb / 1.32 kg

**Case color:** Black or Silver

**Case material:** Bottom: Magnesium

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

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

**Ports:** Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 / Thunderbolt 3 (w/ the function of Power Delivery and DP), HDMI 1.4b, Ethernet (RJ-45), Dock connector

**WIgig dock (opt):** ThinkPad WiGig dock, mutually exclusive with WWAN

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

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

**Audio support:** 6-row, spill-resistant, multimedia Fn keys, optional LED backlight

**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 (optional):** Near Field Communication

**Internal battery:** Front Li-Polymer 3-cell (23Wh) and rear Li-ion 3-cell (26Wh), both Integrated

**Max battery life:** MobileMark 2014: up to 10.5 hr

**AC adapter:** 45W slim tip AC adapter, 45W or 65W USB Type-C AC adapter
ThinkPad T480 Platform Specifications

Processor 7th Generation Intel® Core™ i5 Processor

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

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
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<tr>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>7-8650U</td>
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<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

Graphics

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

Audio

HD Audio, Realtek® ALC298 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone (optional for special bid model), headphone / microphone combo jack

Multi-touch (opt)

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

Storage

System has one HDD slot or one M.2 2280 slot exclusively for storage
Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™
Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)
Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4
Some: 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, in WWAN slot as 2nd Storage, mutually exclusive with WWAN
* Installed M.2 SSD is PCIe 3.0 x 4 but run at PCIe 3.0 x 2 due to M.2 SSD adapter limitation

Optane™ memory

Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2

Ethernet

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

WLAN + Bluetooth™ (opt)

* 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 (mutually exclusive with Intel Optane memory):
- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card
- Integrated Mobile Broadband 4G LTE-A
- Intel XMM™ 7360 (Fibocom L850-GL), M.2 card

SIM card (opt)

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

Audio support

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

Headset: Stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone (optional for special bid model), headphone / microphone combo jack

Intelligent Security

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)

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

HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter

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

Camera (optional)

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

Audio support

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

Headset: Stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone (optional for special bid model), headphone / microphone combo jack

Keyboard

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

TrackPoint® pointing device and buttonless Mylar surface multi-touchpad

Security

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

Discrete TPM 2.0, TCG Certified

Near Field Communication

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

Battery

Max battery life
(MobileMark® 2014)

Integrated model: 7.2 hr 14.4 hr 21.8 hr 21.8 hr 28.0 hr
Discrete model: 6.6 hr 13.2 hr 19.8 hr 13.6 hr 19.8 hr 26.4 hr

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

AC adapter

45W or 65W USB Type-C AC adapter

Operating system

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

Limited warranty (optional)

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

Lenovo December 2019

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
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<td>3.1 GHz</td>
<td>3MB</td>
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<td>Intel HD Graphics 620</td>
</tr>
<tr>
<td>i5-7300U</td>
<td>1</td>
<td>2</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
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</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
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</tr>
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<tbody>
<tr>
<td>i5-8250U</td>
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<td>i5-8350U</td>
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<td>7-8650U</td>
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<td>8</td>
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<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

**Specifications Reference (PSREF)**

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

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

- Environmental: ENERGY STAR 6.1, ENERGY STAR 6.1, RoHS-compliant

**Product Specifications Reference (PSREF)**

- Dimensions: WxDxH: 13.03" x 8.93" x 0.73"; 331mm x 226.8mm x 18.45mm
- Weight: Starting at 2.9 lb / 1.32 kg
- Case color: Black or Silver
- Case material: Display cover: CFFR Hybrid; Bottom: Magnesium
- Smart card reader: Optional: Smart card reader
- Media reader: 4-in-1 reader (MMC, SD, SDHC, SDXC)
- Ports:
  - Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole
  - * Depending on many factors, actual data transfer speed may be lower than theoretical speeds
- Monitor cable (optional): USB-C to VGA: Lenovo USB-C to VGA Adapter, USB-C to DP: Lenovo USB-C to DisplayPort Adapter
- Camera (optional): One of the following, configurable by model:
  - HD720p camera with ThinkShutter camera privacy, fixed focus
  - IR camera and HD720p camera, fixed focus
- Audio support:
  - HD Audio, Realtek ALC3287 codec / stereo speakers, 1W x 2, Dolby Audio Premium / optional dual array microphone, headphone / microphone combo jack
- Keyboard: 6-row, spill-resistant, multimedia Fn keys, optional LED backlight
- UltraNav:
  - pointing device and buttonless Mylar surface multi-touch touchpad
- Security:
  - Power-on password, hard disk password, supervisor password, security keyhole
  - Discrete TPM 2.0, TCG Certified
  - Intel vPro Technology
  - Fingerprint reader (optional): Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology
- NFC (optional): Near Field Communication
- Battery: Integrated Li-ion 57Wh battery, supports Rapid Charge (0-80% in 60 mins) with 65W USB Type-C AC adapter
- Max battery life:
  - MobileMark® 2014: 15.6 hr
  - * Battery life varies significantly with settings, usage, & other factors
- AC adapter: 45W or 65W USB Type-C AC adapter
- Operating system:
  - Optional: Windows® 10 Home 64 or Windows 10 Pro 64
- Warranty:
  - One of the following, configurable by model:
  - 1-year depot repair service
  - 1-year depot with 2-year system board repair service
  - 3-year/1-yr battery depot repair service
  - 3-year/1-yr battery limited onsite service
- **ThinkPad T480s Platform Specifications**

- 7th Generation Intel® Core™ i5 Processor
- 8th Generation Intel® Core™ i5 / i7 Processor
- Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX150, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays;
- Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)
- Chipset: Intel SoC (System on Chip) platform
- Memory:
  - 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket
  - * System clocks down for processors with lower memory controller
- Display:
  - 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle, supports ThinkPad Privacy Guard on some models
  - 14.0" (355mm) QHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle
- Multi-touch (opt):
  - On-cell touch, supports 10-finger gesture, 250 nits (FHD only)
- Storage:
  - One of the following, configurable by model:
    - M.2 SSD / SATA 6.0Gb/s
    - M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s
- Optical:
  - None
- Ethernet:
  - Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville)
  - vPro model: Intel Ethernet Connection I219-LM (Jacksonville)
- WLAN + Bluetooth™ (opt):
  - 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):
  - Wireless WAN upgradable
  - 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, optional Verizon LTE (US) SIM card
### 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>
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<tbody>
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or 10th Generation Intel i5 / i7 Processor (NOT available in EMEA)

<table>
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<tr>
<th>Processor Number</th>
<th># of Cores</th>
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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

#### Graphics

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

#### Chipset Memory

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

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

#### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
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</thead>
<tbody>
<tr>
<td>14.0” FHD</td>
<td>(1920x1080)</td>
<td>IPS Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
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<td>14.0” FHD</td>
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<tr>
<td>14.0” FHD</td>
<td>(1920x1080)</td>
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<td>(2560x1440)</td>
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<td>16:9</td>
<td>1500:1</td>
<td>100% Adobe 170°</td>
</tr>
</tbody>
</table>

#### Multi-touch (opt)

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

#### Storage

- M.2 2280 SSD / SATA 6.0Gb/s (NOT available in EMEA)
- M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4
- M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2
- Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4

#### Optical

None

#### Ethernet

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

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

#### WLAN + Bluetooth™ (optional)

One of the following, configurable by model:
- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0 (AX201 for 10th Gen processor only)

#### WWAN (optional)

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

#### SIM card (opt)

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

#### Case color

Black

#### Case material

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

#### Smart card reader

Optional: Smart card reader

#### Media reader

MicroSD card reader

#### Ports

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

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

#### Monitor cable (optional)

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

#### Bundled Accy

None

#### Camera (optional)

One of the following, configurable by model:

- HD720p camera with ThinkShutter camera privacy, fixed focus
- 10 Home 64
- 10 Pro 64

#### Audio support

- HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby Audio Premium / dual array far-field microphone (optional for special bid model), headphone / microphone combo jack

#### Keyboard

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

#### Security chip

- Discrete TPM 2.0, TCG Certified
- Intel vPro Technology

#### Finger print reader

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

#### Battery

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

#### Max battery life

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

#### AC adapter

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

#### Operating system (optional)

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

#### Limited warranty (optional)

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

#### Mil-Spec test (optional)

- MIL-STD-810G military testing

#### Environment

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

Note: The specifications above may not be available in all regions.
ThinkPad T490 Secure Access / Healthcare Edition Platform Specifications

Product Specifications Reference (PSREF)

### Processor
- **Processor**: 8th Generation Intel® Core™ i5 / i7 Processor
  - **Processor Number**: 
  - **# of Cores**: 4
  - **# of Threads**: 8
  - **Base Frequency**: 1.6 GHz
  - **Max Turbo Frequency**: 3.9 GHz
  - **Cache**: 6MB
  - **Memory Types**: DDR4-2400
  - **Processor Graphics**: Intel UHD Graphics 620

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

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

### Memory
- **Memory**: 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
- **Display**: 14.0" FHD (1920x1080)
  - **Dimensions**: 12.95" x 8.94" x 0.70"; 329mm x 227mm x 17.9mm
  - **Resolution**: 1920 x 1080
  - **Type**: IPS Anti-glare
  - **Brightness**: 250 nits (non-touch) 300 nits (multi-touch)
  - **Aspect Ratio**: 16:9
  - **Contrast Ratio**: 700:1
  - **Color Gamut**: 45%
  - **Viewing Angle**: 170°
  - **On-cell touch, supports 10-finger gesture (FHD only)**

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

### Optical
- **Optical**: None

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

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

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

### SIM card (optional)
- **None**

### Smart card reader
- **None**

### 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, supervisor password, security keyhole**
  - **Security chip**: Discrete TPM 2.0, TCG Certified
  - **System Mgl (optional)**: Intel vPro Technology
  - **Fingerprint reader**: FIPS 201 fingerprint reader on palm rest

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

### AC adapter
- **45W, 65W, or 65W slim USB-C AC adapter**

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

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

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

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

Lenovo
December 2019
## ThinkPad T490s Platform Specifications

**Product Specifications Reference (PSREF)**

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8365U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

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

### Display

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

### Storage

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

### Optical

None

### Ethernet

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

### WLAN - Bluetooth™ (optional)

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

### WWAN (optional)

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

### SIM card (optional)

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

### Case color

Black or Silver

### Case material

Black or Silver

### Display cover

CFRP Hybrid (black) or Aluminum (silver)

### Keyboard

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

### Audio support

Integrated ALC3287 codec / ALC3287 codec

### Security

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

### Security chip

Discrete TPM 2.0, TCG Certified

### Fingerprint reader

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

### Battery

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

### Operating system

Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty

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

### MIL-Spec test

MIL-STD-810G military testing

### Environment

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

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

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*Lenovo October 2019*
### Processor

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 Pro 3300U</td>
<td>4</td>
<td>4</td>
<td></td>
<td>2.1 GHz</td>
<td>3.5 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 Pro 3500U</td>
<td>4</td>
<td>8</td>
<td></td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</td>
<td>4</td>
<td>8</td>
<td></td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 10 Graphics</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

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

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot;</td>
<td>HD (1366x768)</td>
<td>TN Anti-glare</td>
<td>220 nits</td>
<td>16:9</td>
<td>400:1</td>
<td>45%</td>
<td>90°</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits (non-touch) / 300 nits (multi-touch)</td>
<td>16:9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080)</td>
<td>Low Power</td>
<td>IPS Anti-glare</td>
<td>400 nits (multi-touch)</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
</tr>
</tbody>
</table>

### Storage

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

### Optical

None

### Ethernet

Realtek RTL88111 Gigabit Ethernet connection

### WLAN

One of the following, configurable by model:
- RealtekRTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card
- Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Bluetooth 4.2 or 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### Bluetooth™

Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card

### WWAN (optional)

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

### SIM card (optional)

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

### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>WxHxD:</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>12.95&quot; x 8.94&quot; x 0.70&quot;</td>
<td>3.46 lb / 1.57 kg</td>
</tr>
<tr>
<td>FHD</td>
<td>12.95&quot; x 8.94&quot; x 0.70&quot;</td>
<td>3.46 lb / 1.57 kg</td>
</tr>
<tr>
<td>FHD Low Power</td>
<td>12.95&quot; x 8.94&quot; x 0.70&quot;</td>
<td>3.39 lb / 1.54 kg</td>
</tr>
</tbody>
</table>

### Case color

Black

### Case material

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

### Smart card reader

Optional: Smart card reader

### Media reader

MicroSD card reader

### Ports

One of the following, configurable by model:
- USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort 1.4), HDMI 2.0, Ethernet RJ-45, nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole

### Monitor cable

(Optional) Lenovo HDMI to VGA Monitor Adapter

### Bundled Accy

None

### Camera (optional)

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

### Audio support

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

### Keyboard

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

### Security

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

### Security chip

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

### Battery

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

### Max battery life

- MobileMark 2014: 13.4 hr
- Battery life varies significantly with settings, usage, & other factors

### AC adapter

45W or 65W USB Type-C AC adapter

### Operating system

Optional: Windows 10 Home 64 or Windows 10 Pro 64

### Limited warranty (optional)

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

### Mil-Spec test

MIL-STD-810G military testing

### Environment

EPEAT Silver; ENERGY STAR 7.1; RoHS-compliant
### ThinkPad T495s Platform Specifications

**Processor**

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

**Graphics**

AMD Radeon Vega 8 or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI; supports three independent displays; Max resolution: 4096x2100@60Hz (USB-C); 4096x2160@24Hz (HDMI)

**Chipset**

AMD SoC (System on Chip) platform

**Memory**

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

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

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.0&quot; FHD (1920x1080)</td>
<td>IPS Anti-glare</td>
<td>250 nits (non-touch) 300 nits (multi-touch)</td>
<td>16.9</td>
<td>700:1</td>
<td>45%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080) Low Power</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16.9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
</tr>
<tr>
<td>14.0&quot; FHD (1920x1080) ThinkPad Privacy Guard</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16.9</td>
<td>1000:1</td>
<td>72%</td>
<td>170°</td>
</tr>
</tbody>
</table>

**Multi-touch (opt)**

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

**Storage**

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

**Optical**

None

**Ethernet**

Realtek RTL8111E PV Gigabit Ethernet connection

**WLAN (optional)**

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

**WWAN (optional)**

One of the following, configurable by model:

- Wireless WAN upgradable
- Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card

* 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

**Audio support**

One of the following, configurable by model:

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

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

**Camera**

One of the following, configurable by model:

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

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

**Monitor cable (optional)**

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

**Audio**

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

**Security**

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

**Battery**

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

**Max battery life**

18.4 hr

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

**AC adapter**

45W or 65W USB Type-C AC adapter

**Operating system**

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

**Limited warranty (optional)**

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**

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>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>3.5 GHz</td>
<td>3MB</td>
<td>DDR4-2133</td>
<td>Intel HD 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># 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>5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>5-8350U</td>
<td>4</td>
<td>8</td>
<td>1.7 GHz</td>
<td>3.6 GHz</td>
<td>6MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

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

### Display

- **Some:** 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle
- **Some:** 15.6" (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle
- 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. xxGB SSD)
- **Some:** M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 2GB/s
- **Some:** 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16GB/s
- in WWAN slot as 2nd Storage, mutually exclusive with WWAN

### Optane™ memory

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

### Optical

- None

### Ethernet

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

### WWAN

**optional**

- One of the following, configurable by model:
  - Wireless WAN upgradable (special bid only)
  - 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
- Nano-SIM card slot, optional Verizon LTE (US) SIM card

### Battery

- Max battery life (MobileMark® 2014)
  - Models: 24Wh, 48Wh, 72Wh, 32Wh + 24Wh, 32Wh + 48Wh, 32Wh + 72Wh
  - Max battery life: 5.6 hr, 12.5 hr, 18.1 hr, 13.8 hr, 20.3 hr, 26.1 hr

### AC adapter

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

### Operating system

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

### Limited warranty (optional)

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

### Mil-Spec test

- MIL-STD-810G mandatory testing

### Environmental

- EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant
ThinkPad T590 Platform Specifications

Product Specifications Reference (PSREF)

Processor

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

Graphics

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

Chipset

Intel SoC (System on Chip) platform

Memory

- 4GB max / 2400MHz DDR4, dual-channel capable,
- 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket
- Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation

Display

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

Multi-touch (opt)

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

Storage

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

Optical

None

Ethernet

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

WLAN (optional)

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

WWAN (optional)

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

SIM card

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

Dimensions

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

Weight

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

Case color

Black

Case material

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

Smart card reader

Optional: Smart card reader

Media reader

MicroSD card reader

Ports

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

Monitor cable

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

Bundled Accy

None

Camera (opt)

One of the following, configurable by model:

Audio support

- HD720p camera with ThinkShutter camera privacy, fixed focus
- HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone (optional for special bid model),
- microphone combo jack

Keyboard

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

Security

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

Fingerprint reader

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

NFC (optional)

Near Field Communication

Battery

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

Max battery life

- MobileMark® 2014: 14.98 hr (9.5 hr for UHD model with discrete graphics)
- * Battery life varies significantly with settings, usage, & other factors

AC adapter

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

Operating system

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

Limited warranty

One of the following, configurable by model:

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

Mi-Spec test

MIL-STD-810G military testing

Environment

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

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

Lenovo

August 2019
### Processor Specifications

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
<td>3MB</td>
<td>LPDDR3-1866</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8250U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>3.4 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
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<tr>
<td>i5-8350U</td>
<td>1</td>
<td>3</td>
<td>1.7 GHz</td>
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<td></td>
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<tr>
<td>7-8550U</td>
<td>1</td>
<td>2</td>
<td>1.8 GHz</td>
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<td>8MB</td>
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<tr>
<td>7-8650U</td>
<td>1</td>
<td>2</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graphics Specifications

- 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 Specifications

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

### Memory Specifications

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

### Display Specifications

- 14.0" (355mm) FHD (1920 x 1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 170° viewing angle
- 14.0" (355mm) QHD (2560 x 1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 170° viewing angle
- 14.0" (355mm) WQHD (2560 x 1440) with Dolby Vision™, glossy, LED backlight, IPS, 500 nits, 16:9 aspect ratio, 1500:1 contrast ratio, 100% gamut, 170° viewing angle
- Multi-touch (optional) supports 10-finger gesture (FHD only)

### Storage Specifications

- M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g., 256GB SSD M.2 PCIe NVMe)
- M.2 SSD / SATA 6.0Gb/s (e.g., 256GB SSD M.2)

### Optical Specifications

- None

### Ethernet Specifications

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

### WLAN + Bluetooth

- One of the following, configurable by model:
  - Intel Dual Band Wireless-Ac 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card
  - Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card (special bid only)
  - 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 (optional)

- Nano-SIM card slot, optional Verizon LTE (US) SIM card
- Nano-SIM card slot, optional Mobile Broadband 4G LTE-A

### Camera Specifications

- One of the following, configurable by model:
  - HD720p camera, ThinkShutter camera privacy, fixed focus
  - 4K camera and HD720p camera, fixed focus
  - UltraNav™ pointing device and buttonless glass surface multi-touch touchpad

### Audio Specifications

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

### Security Specifications

- Power-on password, hard disk password, supervisor keyhole
- Security chip: Intel vPro Technology
- Fingerprint reader: Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology
- NEC (optional)

### Battery Specifications

- Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- Max battery life: MobileMark® 2014: 19.3 hr
- Optional: 3-year/1-yr battery depot repair service

### Operating System

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

### Limited Warranty

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

### Environment

- EPEAT Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
ThinkPad X1 Carbon (7th Gen) Platform Specifications

Product Specifications Reference (PSREF)

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-8265U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.1 GHz</td>
<td>6MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i5-8566U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.6 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
<td>i5-10210U</td>
<td>4</td>
<td>8</td>
<td>1.6 GHz</td>
<td>4.2 GHz</td>
<td>6MB</td>
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<td>Intel UHD Graphics 620</td>
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<td>7-10510U</td>
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<td>7-10710U</td>
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<td>12</td>
<td>1.1 GHz</td>
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<td>12MB</td>
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</tr>
</tbody>
</table>

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

### Chipset
Soldered to systemboard, no sockets

### Memory
8GB or 16GB / 2133MHz LPDDR3

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface/Backlight</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) Multi-touch</td>
<td>IPS Anti-reflection Anti-smudge</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>FHD (1920x1080) Low Power</td>
<td>IPS Anti-glare</td>
<td>400 nits</td>
<td>16:9</td>
<td>800:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>WQHD (2560x1440)</td>
<td>IPS Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72%</td>
<td>170°</td>
<td></td>
</tr>
<tr>
<td>14.0&quot;</td>
<td>UHD (3840x2160) HDR 400, Dolby Vision™</td>
<td>IPS Glossy</td>
<td>500 nits</td>
<td>16:9</td>
<td>1400:1</td>
<td>90%</td>
<td>170°</td>
<td></td>
</tr>
</tbody>
</table>

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

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

### Optical
None

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

### WLAN + Bluetooth™
One of the following, configurable by model:
- Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
- Intel Wi-Fi 6 AX201, Wi-Fi 2x2 802.11ax + Bluetooth 5.0 (AX201 for 10th Gen processor only and NOT available in AP)

### WWAN (optional)
One of the following, configurable by model:
- Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card

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

### Dimensions

<table>
<thead>
<tr>
<th>Weight</th>
<th>Other model: starting at 2.4 lb / 1.09 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case color</td>
<td>Black paint or black weave</td>
</tr>
<tr>
<td>Case material</td>
<td>Display cover: Carbon Fiber; Bottom: magnesium alloy</td>
</tr>
</tbody>
</table>

### Monitor cable
Bundled Accy

### Smart card reader
None

### Media reader
None

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

### Audio support
Dolby Atmos™ speaker system, 2W x 2, 0.8 x 2 / four 360° far-field microphones, headphone / microphone combo jack

### Security chip
Security keyhole / fingerprint reader / microphone combo jack

### Security
- Power-on password, supervisor password, security keyhole
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card

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

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

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

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

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

### Security
- Power-on password, supervisor password, security keyhole
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card
- Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card

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

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

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

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

### Environment
EPEAT™ Gold; ENERGY STAR® 7.1; RoHS-compliant
## ThinkPad X1 Extreme (2nd Gen) Platform Specifications

### Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2.4 GHz</td>
<td>4.1 GHz</td>
<td>8 MB</td>
<td>DDR4-2666</td>
<td>Intel UHD Graphics 630</td>
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<tr>
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<td>Intel UHD Graphics 630</td>
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<tr>
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<td>Intel UHD Graphics 630</td>
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<td>i5-9880H</td>
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<td>4.6 GHz</td>
<td>16 MB</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 1650, 4GB GDDR5 memory;
- supports external digital monitor via HDMI or Thunderbolt™;
- supports four independent displays;
- Max resolution: 5K@60Hz (Thunderbolt); 4K@60Hz (HDMI)

### Chipset and Memory

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

### Display

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution</th>
<th>Type</th>
<th>Surface</th>
<th>Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Color Gamut</th>
<th>Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.6''</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>300 nits</td>
<td>16:9</td>
<td>700:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6''</td>
<td>FHD (1920x1080)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>1200:1</td>
<td>72% NTSC</td>
<td>170°</td>
</tr>
<tr>
<td>15.6''</td>
<td>UHD (3840x2160)</td>
<td>IPS</td>
<td>Anti-glare</td>
<td>500 nits</td>
<td>16:9</td>
<td>3000:1</td>
<td>100% Adobe</td>
<td>170°</td>
</tr>
<tr>
<td>15.6''</td>
<td>UHD (3840x2160)</td>
<td>OLED</td>
<td>Anti-reflection</td>
<td>Anti-smudge</td>
<td>16:9</td>
<td>10000:1:1</td>
<td>100% DCI-P3</td>
<td>170°</td>
</tr>
</tbody>
</table>

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

**Pen (optional)**
- Lenovo Pen Pro (special bid only)

### Storage

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

### RAID (optional) and Optical

- RAID 0/1 support

### Ethernet

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

### WLAN (optional)

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

### WWAN

- None

### Operating System

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

### Limited Warranty

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

### MIL-Spec Test

- MIL-STD-810G military testing

### Environment

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

---

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

Lenovo
December 2019
ThinkPad X1 Yoga (3rd Gen) Platform Specifications

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>i5-7300U</td>
<td>2</td>
<td>4</td>
<td>2.6 GHz</td>
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<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

8th Generation Intel Core i5 / i7 Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
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<th>Processor Graphics</th>
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<tr>
<td>i5-8550U</td>
<td>4</td>
<td>8</td>
<td>1.8 GHz</td>
<td>4.0 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-8650U</td>
<td>4</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.2 GHz</td>
<td>8MB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graphics

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

Chipset

Intel SoC (System on Chip) platform

Memory

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

Display

Some: 14.0" (355mm) FHD (1920x1080), LED backlight, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle, IPS, AR (anti-reflection)

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

Some: 14.0" (355mm) HDR WQHD (2560x1440) with Dolby Vision®

Multi-touch

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

Hinge

Yoga hinge, 360 degree

Convert-mode Pen (optional)

Laptop, tent, stand, and tablet

Storage

Some: M.2 SSD / SATA 6.0Gb/s (e.g. xxxG SSD)

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

None

Optical

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

WLAN

One of the following, configurable by model:

• Intel Dual Band Wireless-AC 8265, 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

Bluetooth™

Bluetooth 4.2 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

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

Weight

Starting at 3.08 lb / 1.4kg

Case color

Black or silver

Case material

Display cover: Carbon-Fiber and Glass-Fiber hybrid; Bottom: magnesium-PPS hybrid

Limitations

One of the following, configurable by model:

• 1-year depot repair service

• 1-year depot with 2-year system board service

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

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

Mil-Spec test

MIL-STD-810G military testing

Environmental

EPEAT Silver; ENERGY STAR; RoHS-compliant

Lenovo

December 2019
## ThinkPad X1 Yoga (4th 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>Graphics</th>
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</thead>
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<td>8</td>
<td>1.6 GHz</td>
<td>3.9 GHz</td>
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<td>LPDDR3-2133</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>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
<tr>
<td>i7-8665U</td>
<td>8</td>
<td>8</td>
<td>1.9 GHz</td>
<td>4.8 GHz</td>
<td>8MB</td>
<td>LPDDR3-2133</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

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

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform

### Memory

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

### Display

- Size: 14.0”
- Resolution: FHD (1920x1080) Low Power
- Type: IPS
- Brightness: 400 nits
- Aspect Ratio: 16:9
- Contrast Ratio: 800:1
- Color Gamut: 72%
- Viewing Angle: 170°

### Multi-touch

- Capacitive-type multi-touch, supports 10-finger gesture, AR (anti-reflection) / AS (anti-smudge) coating, could reduce the brightness by up to 10%

### Hinge

- Yoga hinge, 360 degree

### Convert-mode Pen

- Laptop, tent, stand and tablet

### Storage

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

### Optical

- None

### Ethernet

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

### WLAN

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

### Bluetooth

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

### WWAN (optional)

- One of the following, configurable by model:
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card
  - Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 2x2, M.2 card

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

### SIM card (opt)

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

### Dimensions

- WxDxH (Privacy Guard): 12.71” x 8.58” x 0.63”
- WxDxH (other model): 12.71” x 8.58” x 0.61”

### Weight

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

### Case color

- Iron Grey

### Case material

- Display cover: Aluminum;
  - Bottom: Magnesium

### Smart card reader

- None

### Media reader

- None

### Ports

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

### Monitor cable

- Bundled Accy
- Optional: Lenovo HDMI to VGA Monitor Adapter

### Security chip

- System Mgt (opt)
- Intel vPro Technology

### Security

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

### Fingerprint reader

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

### Camera (optional)

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

### Audio support

- HD Audio, Realtek ALC3286 codec / Dolby Atmos™ speaker system, 2W x 2, 0.8 x 2 / four 360° far-field microphones, headphone / microphone combo jack

### Keyboard

- Keyboard
- UltraNav™ pointing device and buttonless glass surface multi-touch touchpad

### Security chip

- Security chip
- System Mgt (opt)

### Fingerprint reader

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

### NFC (optional)

- Near Field Communication

### Battery

- Battery
- Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W AC adapter
- Max battery life
- MobileMark® 2014: 18.1 hr
- * Battery life varies significantly with settings, usage, & other factors

### AC adapter

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

### Operating system

- Windows® 10 Home 64 or Windows 10 Pro 64

### Limited warranty (optional)

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

### MIL-Spec test

- MIL-STD-810G military testing

### Environment

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

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

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<thead>
<tr>
<th>Processor Number</th>
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<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Types</th>
<th>Processor Graphics</th>
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</thead>
<tbody>
<tr>
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<td>4</td>
<td>2.0 GHz</td>
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<td>3MB</td>
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<td>Intel HD Graphics 520</td>
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<td>Intel HD Graphics 620</td>
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<tr>
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<td>4</td>
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<td>3.4 GHz</td>
<td>4MB</td>
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<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
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<th>Memory Types</th>
<th>Processor Graphics</th>
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<td>DDR4-2133</td>
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<td>Intel HD Graphics 520</td>
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<td>5-7300U</td>
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<td>4</td>
<td>2.6 GHz</td>
<td>3.5 GHz</td>
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<td>4MB</td>
<td>DDR4-2133</td>
<td>Intel HD Graphics 620</td>
</tr>
</tbody>
</table>

### Graphics

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

### Chipset

- Intel SoC (System on Chip) platform
- 16GB max / 2400MHz DDR4, one DDR4 SO-DIMM socket
- One of the following, configurable by model (WiGig is mutually exclusive with WWAN):
  - Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1
  - Intel XMM™ 7160 (Fibocom L831-EAU) (EMEA only)

### Display

- Some: 12.5” (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio
- Some: 12.5” (317.5mm) HD (1366x768), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- Some: 12.5” (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle
- Multi-touch (opt): On-cell touch, supports 10-finger gesture (FHD only)

### Storage

- System has one HDD slot or one M.2 2280 slot exclusively for storage
- Internal battery 6.52 hr (48Wh or 72Wh)

### Optical

- None

### Ethernet

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

### PPPoE

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

### Bluetooth™

- Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter
- Bluetooth is mutually exclusive with WWAN

### WWAN (optional)

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

### 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

<table>
<thead>
<tr>
<th>Models</th>
<th>3-cell + 3-cell</th>
<th>3-cell + 3-cell</th>
<th>3-cell + 6-cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>2.79 lb / 1.27 kg</td>
<td>2.98 lb / 1.36 kg</td>
<td>3.33 lb / 1.52 kg</td>
</tr>
</tbody>
</table>

---

### Security

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

### Operating system

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

### Limited warranty

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

### MIL-Spec test

- MIL-STD-810G military testing

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### Lenovo

February 2020
ThinkPad X280 Platform Specifications

Product Specifications Reference (PSREF)

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

### 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>
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</table>
| or 8th Generation Intel Core / i3 / i5 / i7 Processor

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

**Graphics**

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

**Chipset**

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

**Display**

* Some: 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16.9 aspect ratio, 400:1 contrast ratio
* Some: 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16.9 aspect ratio, 700:1 contrast ratio, 170° viewing angle

**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)
- None

**Optical**

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

**WLAN + Bluetooth (opt)**

- 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 (opt)**

- Wireless WAN upgradable (special bid only)
- 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, in the combo slot with microSD card reader, optional Verizon LTE (US) SIM card

**Operating system**

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

**Limited warranty**

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

**Environment**

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

**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

**Case color**

- Black

**Case material**

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

**Smart card reader**

- Optional: Smart card reader

**Media reader**

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

**Ports**

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

**Bundled Accy**

- Optional: ThinkPad Ethernet Extension Adapter Gen 2

**Camera (optional)**

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

**Audio support**

- High Definition Audio, Realtek®
- * Depending on many factors, actual data transfer speed may be lower than theoretical speed

**Security chip**

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

**Fingerprint reader**

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

**Battery**

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

**Max battery life**

- MobileMark® 2014: 16.6 hr
- * Battery life varies significantly with settings, usage, & other factors

**AC adapter**

- 45W or 65W USB-C AC adapter

**MIL-Spec test**

- MIL-STD-810G military testing

February 2020

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

Lenovo
## Processor

<table>
<thead>
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or 8th Generation Intel Core i3 / i5 / i7 Processor

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<td>DDR4-2400</td>
<td>Intel UHD Graphics 620</td>
</tr>
</tbody>
</table>

## Graphics

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

## Chipset

- Intel SoC (on System on Chip) platform
- 8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
- * System clocks down for processors with lower memory controller

## Display

13.3” (337.8mm) FHD (1920x1080), LED backlight, IPS
- 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle, AR (anti-reflection)
- Capacitive-type multi-touch, AR (anti-reflection), AR (anti-smudge), supports 10-finger gesture
- Yoga hinge, 360 degree

## Storage

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

## Optical

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

## Ethernet

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

## WWAN (optional)

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

## SIM card (optional)

- Nano-SIM card slot

## Dimensions

- WxDxH: 12.34” x 8.75” x 0.72”;
- Weight: Starting at 3.17 lb / 1.43kg

## Security

- Power-on password, hard disk password, supervisor password, security keyhole
- Discrete TPM 2.0 TCG Certified
- Battery life varies significantly with settings, usage, & other factors

## Camera

- IR & 720p: IR camera and HD720p camera, fixed focus
- HD Audio, Conexant® CX11771 codec / stereo speakers, 2W x 2 / optional dual array microphone, headphone / microphone combo jack

## Audio support

- HD Audio, Conexant® CX11771 codec / stereo speakers, 2W x 2 / optional dual array microphone, headphone / microphone combo jack
- TrackPoint® pointing device and 3+2 buttons Mylar surface multi-touch click pad
- UltraNav™ 6-row, spill-resistant, multimedia Fn keys, LED backlight

## Operating system

- Optional: Windows 10 Home 64 or Windows 10 Pro 64
- Limited warranty: One of the following, configurable by model:
  - 1-year depot repair service
  - 1-year depot with 2-year system board service
  - 3-year/1-year battery depot repair service
  - 3-year/1-year battery limited onsite service

## Environment

- EPEAT Gold; ENERGY STAR®; RoHS-compliant
- Mil-Spec test MIL-STD-810G military testing
ThinkPad X390 Platform Specifications

Processor

<table>
<thead>
<tr>
<th>Processor Number</th>
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</table>

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

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<td>Intel UHD Graphics 620</td>
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</tbody>
</table>

Chipset

Intel SoC (System on Chip) platform

Memory

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

**Note:** 32GB memory is NOT available for models with 10th Gen processor

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

Graphics

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

Display

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

Multi-touch (opt)

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

Storage

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

Optical

None

Ethernet

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

WLAN (optional)

- 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™ (opt)

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

WWAN (optional)

Wireless WAN upgradeable (special bid only in EMEA)

- Integrated Mobile Broadband 4G LTE, Fibocom LB300-EB, M.2 card (EMEA only)
- Integrated Mobile Broadband 4G LTE-A, Fibocom LB300-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

Security

Security chip
Discrete TPM 2.0, TCG Certified

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 AC adapter

Max battery life
MobileMark® 2014: 17.6 hr

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

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

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

Limited warranty (optional)
- 1-year depot repair service
- 1-year depot with 2-year system board repair service
- 1-year limited onsite service
- 3-year/1yr battery depot repair service
- 3-year/1yr battery limited onsite service

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

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

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

Lenovo December 2019
## ThinkPad X390 Yoga Platform Specifications

### Processor

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<td>1.6 GHz</td>
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<td>6MB</td>
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<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

### Memory
- 8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
- *Installed memory is actually 2966MHz but run at 2400MHz due to Intel limitation*

### Display
- **Size**: 13.3” FHD (1920x1080)
- **Type**: IPS
- **Brightness**: 300 nits
- **Aspect Ratio**: 16:9
- **Contrast Ratio**: 800:1
- **Color Gamut**: 72%
- **Viewing Angle**: 170°

### Multi-touch
- Capacitive-type multi-touch, supports 10-finger gesture, anti-reflection (AR), anti-smudge, could reduce the brightness by up to 10%

### Hinge
- **Type**: Yoga hinge, 360 degree

### Convert-mode
- **Type**: Laptop, tent, stand and tablet

### Pen
- ThinkPad Pen Pro, active pen for multi-touch display, on-board rechargeable

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

### Optical
- **Type**: None

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

### WLAN (optional)
- One of the following, configurable by model:
  - **Model**: Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0
  - **Model**: Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0
  - **Model**: Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter
  - **Model**: Lenovo USB-C to VGA Adapter
  - **Model**: Lenovo HDMI to VGA Monitor Adapter
  - **Model**: Lenovo HDMI to VGA Monitor Adapter

### Bluetooth™ (opt)
- One of the following, configurable by model:
  - **Model**: Intel 802.11ac dual-band wireless-AC + Bluetooth 5.0
  - **Model**: Intel 802.11ax dual-band wireless-AX + Bluetooth 5.0
  - **Model**: Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)
- One of the following, configurable by model:
  - **Model**: Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - **Model**: Integrated Mobile Broadband 4G LTE-E, Fibocom L850-GL, M.2 card
  - **Model**: Nanosim card slot, optional Verizon LTE (US) SIM card for special bid only

### SIM card (opt)
- One of the following, configurable by model:
  - **Model**: Integrated Mobile Broadband 4G LTE, M.2 card (EMEA only)
  - **Model**: Integrated Mobile Broadband 4G LTE-E, Fibocom L850-GL, M.2 card
  - **Model**: Nano-SIM card slot, optional Verizon LTE (US) SIM card for special bid only

### 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

### Memory
- 8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets
- *Installed memory is actually 2966MHz but run at 2400MHz due to Intel limitation*

### Display
- **Size**: 13.3” FHD (1920x1080)
- **Type**: IPS
- **Brightness**: 300 nits
- **Aspect Ratio**: 16:9
- **Contrast Ratio**: 800:1
- **Color Gamut**: 72%
- **Viewing Angle**: 170°

### Multi-touch
- Capacitive-type multi-touch, supports 10-finger gesture, anti-reflection (AR), anti-smudge, could reduce the brightness by up to 10%

### Hinge
- **Type**: Yoga hinge, 360 degree

### Convert-mode
- **Type**: Laptop, tent, stand and tablet

### Pen
- ThinkPad Pen Pro, active pen for multi-touch display, on-board rechargeable

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

### Optical
- **Type**: None

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

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

### Bluetooth™ (opt)
- One of the following, configurable by model:
  - **Model**: Intel 802.11ac dual-band wireless-AC + Bluetooth 5.0
  - **Model**: Intel 802.11ax dual-band wireless-AX + Bluetooth 5.0
  - **Model**: Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter

### WWAN (optional)
- One of the following, configurable by model:
  - **Model**: Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)
  - **Model**: Integrated Mobile Broadband 4G LTE-E, Fibocom L850-GL, M.2 card
  - **Model**: Nano-SIM card slot, optional Verizon LTE (US) SIM card for special bid only

### SIM card (opt)
- One of the following, configurable by model:
  - **Model**: Integrated Mobile Broadband 4G LTE, M.2 card (EMEA only)
  - **Model**: Integrated Mobile Broadband 4G LTE-E, Fibocom L850-GL, M.2 card
  - **Model**: Nano-SIM card slot, optional Verizon LTE (US) SIM card for special bid only

### Camera (optional)
- *One of the following, configurable by model:
  - **Model**: One 5MP camera with ThinkShutter camera privacy, fixed focus
  - **Model**: One 5MP camera with ThinkShutter camera privacy, fixed focus

### Audio support
- *HD Audio, Realtek® ALC2287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack*

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

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

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

### UltraNav™

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

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

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

### Light sensor
- *None
- *3D accelerometer
- *3D gyrometer

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

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

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

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

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**Note:** The specifications above may not be available in all regions.
### ThinkPad X395 Platform Specifications

**Product Specifications Reference (PSREF)**

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**Processor**

<table>
<thead>
<tr>
<th>Processor Number</th>
<th># of Cores</th>
<th># of Threads</th>
<th>Base Frequency</th>
<th>Max Turbo Frequency</th>
<th>Cache</th>
<th>Memory Controller</th>
<th>Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryzen 3 Pro 3300U</td>
<td>4</td>
<td>4</td>
<td>2.1 GHz</td>
<td>3.5 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 6 Graphics</td>
</tr>
<tr>
<td>Ryzen 5 Pro 3500U</td>
<td>4</td>
<td>8</td>
<td>2.1 GHz</td>
<td>3.7 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 8 Graphics</td>
</tr>
<tr>
<td>Ryzen 7 Pro 3700U</td>
<td>8</td>
<td>8</td>
<td>2.3 GHz</td>
<td>4.0 GHz</td>
<td>2MB L2 / 4MB L3</td>
<td>DDR4-2400</td>
<td>Radeon Vega 10 Graphics</td>
</tr>
</tbody>
</table>

**Graphics**

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

**Chipset**

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

**Display**

<table>
<thead>
<tr>
<th>Size</th>
<th>Resolution Type</th>
<th>Surface Brightness</th>
<th>Aspect Ratio</th>
<th>Contrast Ratio</th>
<th>Gamut Viewing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.3&quot; HD</td>
<td>(1366x768) TN</td>
<td>Anti-glare 250 nits</td>
<td>16:9</td>
<td>300:1</td>
<td>45% 90°</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>(1920x1080) IPS</td>
<td>Anti-glare 300 nits</td>
<td>16:9</td>
<td>800:1 (non-touch)</td>
<td>72% 170°</td>
</tr>
<tr>
<td>13.3&quot; FHD</td>
<td>(1920x1080) IPS</td>
<td>Anti-glare 400 nits</td>
<td>16:9</td>
<td>1000:1</td>
<td>72% 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
- None

**Optical**

- Native Realtek® RTL8113 Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2

**WLAN (optional)**

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

**Bluetooth**

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

**WWAN (optional)**

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

**SIM card (optional)**

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

**Battery**

- Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
- Max battery life: MobileMark® 2014: 14.5 hr
  - *Battery life varies significantly with settings, usage, & other factors
- AC adapter: 45W or 65W USB Type-C AC adapter

**Operating system**

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

**Limited warranty**

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

**Environment**

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

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

Lenovo
February 2020
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Limited warranty: Support unrelated to a warranty issue may be subject to additional charges.

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

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

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

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

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


**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.