

**Lenovo** ThinkPad Laptops

# PSREF



**Product Specifications Reference**

Version 545, July 2019

Visit <http://psref.lenovo.com> for the latest version

# Contents

---

<b>Cover</b>		<b>33</b>
<b>Contents</b>		
<b>Summary Of Change</b>		
<b>11e Series</b>		
<b>ThinkPad 11e (5th Gen)</b>		
ThinkPad 11e (5th Gen) Platform Specifications		
<b>A Series</b>		
<b>ThinkPad A275</b>		
ThinkPad A275 Platform Specifications		
<b>ThinkPad A285</b>		
ThinkPad A285 Platform Specifications		
<b>ThinkPad A475</b>		
ThinkPad A475 Platform Specifications		
<b>ThinkPad A485</b>		
ThinkPad A485 Platform Specifications		
<b>E Series</b>		
<b>ThinkPad E480</b>		
ThinkPad E480 Platform Specifications		
<b>ThinkPad E485</b>		
ThinkPad E485 Platform Specifications		
<b>ThinkPad E490</b>		
ThinkPad E490 Platform Specifications		
<b>ThinkPad E490s</b>		
ThinkPad E490s Platform Specifications		
<b>ThinkPad E495</b>		
ThinkPad E495 Platform Specifications		
<b>ThinkPad E580</b>		
ThinkPad E580 Platform Specifications		
<b>ThinkPad E585</b>		
ThinkPad E585 Platform Specifications		
<b>ThinkPad E590</b>		
ThinkPad E590 Platform Specifications		
<b>ThinkPad E595</b>		
ThinkPad E595 Platform Specifications		
<b>L Series</b>		
	<b>1 ThinkPad L380</b>	<b>33</b>
	<b>2 ThinkPad L380 Platform Specifications</b>	<b>34</b>
	<b>4 ThinkPad L390</b>	<b>35</b>
	<b>5 ThinkPad L390 Platform Specifications</b>	<b>36</b>
	<b>5 ThinkPad L470</b>	<b>37</b>
	<b>6 ThinkPad L470 Platform Specifications</b>	<b>38</b>
	<b>7 ThinkPad L480</b>	<b>39</b>
	<b>7 ThinkPad L480 Platform Specifications</b>	<b>40</b>
	<b>8 ThinkPad L490</b>	<b>41</b>
	<b>9 ThinkPad L490 Platform Specifications</b>	<b>42</b>
	<b>10 ThinkPad L570</b>	<b>43</b>
	<b>11 ThinkPad L570 Platform Specifications</b>	<b>44</b>
	<b>12 ThinkPad L580</b>	<b>45</b>
	<b>13 ThinkPad L580 Platform Specifications</b>	<b>46</b>
	<b>14 ThinkPad L590</b>	<b>47</b>
	<b>15 ThinkPad L590 Platform Specifications</b>	<b>48</b>
	<b>15 P Series</b>	<b>49</b>
	<b>16 ThinkPad P1</b>	<b>49</b>
	<b>17 ThinkPad P1 Platform Specifications</b>	<b>50</b>
	<b>18 ThinkPad P1 (2nd Gen)</b>	<b>51</b>
	<b>19 ThinkPad P1 (2nd Gen) Platform Specifications</b>	<b>52</b>
	<b>20 ThinkPad P51</b>	<b>53</b>
	<b>21 ThinkPad P51 Platform Specifications</b>	<b>54</b>
	<b>22 ThinkPad P52</b>	<b>55</b>
	<b>23 ThinkPad P52 Platform Specifications</b>	<b>56</b>
	<b>24 ThinkPad P52s</b>	<b>57</b>
	<b>25 ThinkPad P52s Platform Specifications</b>	<b>58</b>
	<b>26 ThinkPad P53s</b>	<b>59</b>
	<b>27 ThinkPad P53s Platform Specifications</b>	<b>60</b>
	<b>28 ThinkPad P72</b>	<b>61</b>
	<b>29 ThinkPad P72 Platform Specifications</b>	<b>62</b>
	<b>30 T Series</b>	<b>63</b>
	<b>31 ThinkPad T470</b>	<b>63</b>
	<b>32 ThinkPad T470 Platform Specifications</b>	<b>64</b>
	<b>33 ThinkPad T470s</b>	<b>65</b>

# Contents

---

ThinkPad T470s Platform Specifications	66
<b>ThinkPad T480</b>	<b>67</b>
ThinkPad T480 Platform Specifications	68
<b>ThinkPad T480s</b>	<b>69</b>
ThinkPad T480s Platform Specifications	70
<b>ThinkPad T490</b>	<b>71</b>
ThinkPad T490 Platform Specifications	72
<b>ThinkPad T490s</b>	<b>73</b>
ThinkPad T490s Platform Specifications	74
<b>ThinkPad T495</b>	<b>75</b>
ThinkPad T495 Platform Specifications	76
<b>ThinkPad T495s</b>	<b>77</b>
ThinkPad T495s Platform Specifications	78
<b>ThinkPad T580</b>	<b>79</b>
ThinkPad T580 Platform Specifications	80
<b>ThinkPad T590</b>	<b>81</b>
ThinkPad T590 Platform Specifications	82
<b>X Series</b>	<b>83</b>
<b>ThinkPad X1 Carbon (5th Gen)</b>	<b>83</b>
ThinkPad X1 Carbon (5th Gen) Platform Specifications	84
<b>ThinkPad X1 Carbon (6th Gen)</b>	<b>85</b>
ThinkPad X1 Carbon (6th Gen) Platform Specifications	86
<b>ThinkPad X1 Carbon (7th Gen)</b>	<b>87</b>
ThinkPad X1 Carbon (7th Gen) Platform Specifications	88
<b>ThinkPad X1 Extreme</b>	<b>89</b>
ThinkPad X1 Extreme Platform Specifications	90
<b>ThinkPad X270</b>	<b>91</b>
ThinkPad X270 Platform Specifications	92
<b>ThinkPad X280</b>	<b>93</b>
ThinkPad X280 Platform Specifications	94
<b>ThinkPad X390</b>	<b>95</b>
ThinkPad X390 Platform Specifications	96
<b>ThinkPad X395</b>	<b>97</b>
ThinkPad X395 Platform Specifications	98
<b>Legal Information</b>	<b>99</b>

# 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.

## July 17, 2019 - Version 545

### Additions in this update

▶ **New product(s)**

ThinkPad P1 (2nd Gen) announced July 2019

ThinkPad X1 Extreme (2nd Gen) announced July 2019

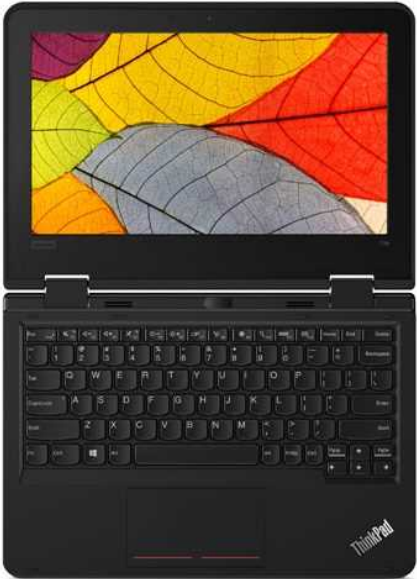
▶ **Others**

ThinkPad X395 - Ethernet corrected to Realtek RTL8153

### Withdrawals in this update

▶ **Withdrawn product(s)**

None



# ThinkPad 11e (5<sup>th</sup> Gen) Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ m / i5 Processor, Intel Celeron® processor, or Intel Pentium® Silver processor							Dimensions	<i>WxDxH:</i> 11.81" x 8.27" x 0.86"; 300mm x 210mm x 21.9mm																																	
	<table border="1"> <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 rowspan="2">2</td> <td rowspan="2">4</td> <td>1.0 GHz</td> <td>2.6 GHz</td> <td>4MB</td> <td rowspan="2">LPDDR3-1866</td> <td rowspan="2">Intel HD Graphics 615</td> </tr> <tr> <td>i5-7Y54</td> <td>1.2 GHz</td> <td>3.2 GHz</td> <td>4MB</td> </tr> <tr> <td>Celeron N4100</td> <td rowspan="2">4</td> <td rowspan="2">4</td> <td>1.1 GHz</td> <td>2.4 GHz</td> <td>4MB</td> <td rowspan="2">DDR4-2400</td> <td>Intel UHD Graphics 600</td> </tr> <tr> <td>Pentium Silver N5000</td> <td>1.1 GHz</td> <td>2.7 GHz</td> <td>4MB</td> <td>Intel UHD Graphics 605</td> </tr> </tbody> </table>							Processor Number	# of Cores	# of Threads	Base Frequency	Burst Frequency	Cache	Memory Types	Processor Graphics	m3-7Y30	2	4	1.0 GHz	2.6 GHz	4MB	LPDDR3-1866	Intel HD Graphics 615	i5-7Y54	1.2 GHz	3.2 GHz	4MB	Celeron N4100	4	4	1.1 GHz	2.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 600	Pentium Silver N5000	1.1 GHz	2.7 GHz	4MB	Intel UHD Graphics 605	Weight	Starting at 2.99 lb (1.36 kg)
								Processor Number	# of Cores	# of Threads	Base Frequency	Burst Frequency	Cache	Memory Types	Processor Graphics																											
	m3-7Y30	2	4	1.0 GHz	2.6 GHz	4MB	LPDDR3-1866	Intel HD Graphics 615																																		
	i5-7Y54			1.2 GHz	3.2 GHz	4MB																																				
Celeron N4100	4	4	1.1 GHz	2.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 600																																			
Pentium Silver N5000			1.1 GHz	2.7 GHz	4MB		Intel UHD Graphics 605																																			
Case color	Black																																									
Case material	<i>Display cover:</i> PC/ABS+GF; <i>Bottom:</i> PC/ABS plastic																																									
Media reader	MicroSD card reader																																									
Ports	Two USB 3.1 Gen 1, one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>																																									
Camera	HD720p camera, fixed focus																																									
Audio support	HD Audio, Realtek® ALC3287 codec, stereo speakers, 2W x 2, Dolby® Audio™, monaural digital microphone, combo audio/microphone jack																																									
Graphics	Intel HD Graphics 615, Intel UHD Graphics 600 or 605 in processor, supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 3840x2160@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)							Keyboard	6-row, spill-resistant, multimedia Fn keys																																	
Chipset	Intel SoC (System on Chip) platform							Touchpad	Buttonless Mylar surface touchpad below keyboard, multi-touch																																	
Memory	4GB or 8GB / 1866MHz LPDDR3 or 2400MHz DDR4 / soldered to systemboard, no sockets							Security	Power-on password, supervisor password, security keyhole																																	
Display	<i>Some:</i> 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio <i>Some:</i> 11.6" (295mm) HD (1366x768), anti-glare, LED backlight, IPS, multi-touch, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle							Security chip	Discrete TPM 2.0, TCG Certified																																	
Multi-touch	Capacitive-type multi-touch, supports 10-finger gesture (HD IPS only)							vPro	None																																	
Storage	eMMC flash memory on board or M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s							Fingerprint reader	None																																	
Optane™ memory	None							NFC	None																																	
Optical	None							Battery	Integrated Li-ion 42Wh battery																																	
Ethernet	Realtek RTL8111GUS Gigabit Network Connection							Max battery life	<i>MobileMark® 2014:</i> 13.9 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>																																	
WLAN + Bluetooth™	<i>One of the following, configurable by model:</i> • 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)							AC adapter	45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter																																	
WWAN	None							Preload	Windows® 10 Home 64 or Windows 10 Pro 64																																	
								Limited warranty	<i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service																																	
								Mil-Spec test	MIL-STD-810G military testing																																	
								Environment	EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant																																	

Lenovo  
June 2019



# ThinkPad A275 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD PRO A-Series APUs								Smart card reader Media reader Ports	<i>Optional:</i> Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC) Two USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45) <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>								
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics										
	PRO A10-8730B	4	4	2.4 GHz	3.3 GHz	2MB	DDR4-1866	AMD Radeon™ R5 Graphics										
	PRO A12-8830B			2.5 GHz	3.4 GHz			AMD Radeon R7 Graphics										
	PRO A10-9700B			2.5 GHz	3.4 GHz													
PRO A12-9800B	2.7 GHz			3.6 GHz														
* Windows 7 is only supported by PRO A10-8730B and PRO A12-8830B																		
Graphics	AMD Radeon R5 or R7 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2160@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)								Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter								
Chipset	AMD SoC (System on Chip) platform								Camera (optional)	HD720p resolution, fixed focus								
Memory	16Gb max / 1866MHz DDR4, one DDR4 SO-DIMM socket								Audio support	HD Audio, Realtek ALC3268 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack								
Display	<i>Some:</i> 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio <i>Some:</i> 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle								Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight								
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only, US only)								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad								
Storage	<i>System has one HDD slot or one M.2 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s								Security	Power-on password, hard disk password, supervisor password, security keyhole								
Optical	None								Security chip	dTPM 1.2: discrete TPM 1.2, TCG Certified dTPM 2.0: discrete TPM 2.0, TCG Certified								
Ethernet	Realtek® RTL8111EPV Gigabit Ethernet connection								Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest								
WLAN	Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card								NFC	None								
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Internal battery	<i>Optional:</i> Integrated Li-ion or Li-Polymer 3-cell (23Wh)								
WWAN (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)</li> </ul> <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>								External battery	Li-ion 3-cell (23Wh) or 6-cell (48Wh)								
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) SIM card								Max battery life (MobileMark® 2014)	<table border="1"> <thead> <tr> <th>Models</th> <th>No + 3-cell</th> <th>3-cell + 3-cell</th> <th>3-cell + 6-cell 48Wh</th> </tr> </thead> <tbody> <tr> <td>Max battery life</td> <td>5.05 hr</td> <td>10.1 hr</td> <td>15.6 hr</td> </tr> </tbody> </table>	Models	No + 3-cell	3-cell + 3-cell	3-cell + 6-cell 48Wh	Max battery life	5.05 hr	10.1 hr	15.6 hr
Models	No + 3-cell	3-cell + 3-cell	3-cell + 6-cell 48Wh															
Max battery life	5.05 hr	10.1 hr	15.6 hr															
Dimensions	WxDxH: 12.03" x 8.21" x 0.80"; 305.5mm x 208.5mm x 20.3mm								AC adapter	45W slim tip AC adapter or 45W USB Type-C AC adapter								
Weight	<table border="1"> <thead> <tr> <th>Models</th> <th>No + 3-cell</th> <th>3-cell + 3-cell</th> <th>3 + 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>								Models	No + 3-cell	3-cell + 3-cell	3 + 6-cell	Weight	2.79 lb / 1.27 kg	2.98 lb / 1.36 kg	3.33 lb / 1.52 kg	Preload	Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 <ul style="list-style-type: none"> <li>Lenovo Solution Center</li> <li>Lenovo PowerEngage</li> <li>ThinkVantage Product Recovery</li> <li>ThinkVantage System Update</li> <li>Adobe® Reader®</li> <li>Microsoft® Office preloaded; purchase a product key to activate</li> <li>McAfee® LiveSafe™ (30-day trial)</li> </ul>
Models	No + 3-cell	3-cell + 3-cell	3 + 6-cell															
Weight	2.79 lb / 1.27 kg	2.98 lb / 1.36 kg	3.33 lb / 1.52 kg															
Case color	Black								Limited warranty	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>								
Case material	Glass-Fiber Reinforced Plastic								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  
April 2019



# ThinkPad A285 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics	Smart card reader Media reader Ports	Optional: Smart card reader MicroSD card reader, in the combo slot with nano-SIM card One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, combo slot of nano-SIM card (WWAN models) and microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>																										
	<table border="1"> <thead> <tr> <th>Processor Number</th> <th># of Cores</th> <th># of Threads</th> <th>Base Frequency</th> <th>Max Turbo Frequency</th> <th>Cache</th> <th>Memory Types</th> <th>Processor Graphics</th> </tr> </thead> <tbody> <tr> <td>Ryzen 3 PRO 2300U</td> <td rowspan="3">4</td> <td>4</td> <td>2.0 GHz</td> <td>3.4 GHz</td> <td rowspan="3">2MB L2 / 4MB L3</td> <td rowspan="3">DDR4-2400</td> <td>Radeon Vega 6 Graphics</td> </tr> <tr> <td>Ryzen 5 PRO 2500U</td> <td>8</td> <td>2.0 GHz</td> <td>3.6 GHz</td> <td>Radeon Vega 8 Graphics</td> </tr> <tr> <td>Ryzen 7 PRO 2700U</td> <td>8</td> <td>2.2 GHz</td> <td>3.8 GHz</td> <td>Radeon Vega 10 Graphics</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Ryzen 3 PRO 2300U	4	4	2.0 GHz	3.4 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 6 Graphics	Ryzen 5 PRO 2500U	8	2.0 GHz	3.6 GHz	Radeon Vega 8 Graphics	Ryzen 7 PRO 2700U	8	2.2 GHz	3.8 GHz	Radeon Vega 10 Graphics	Monitor cable (optional) Bundled Accy	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 Optional: ThinkPad Ethernet Extension Adapter Gen 2
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																						
Ryzen 3 PRO 2300U	4	4	2.0 GHz	3.4 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 6 Graphics																						
Ryzen 5 PRO 2500U		8	2.0 GHz	3.6 GHz			Radeon Vega 8 Graphics																						
Ryzen 7 PRO 2700U		8	2.2 GHz	3.8 GHz			Radeon Vega 10 Graphics																						
Graphics	AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports four independent displays; Max resolution: 5120x2880@60Hz (USB Type-C); 4096x2160@60Hz (HDMI)	Camera (optional)	One of the following, configurable by model: • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus																										
Chipset	AMD SoC (System on Chip) platform	Audio support	HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack																										
Memory	8GB or 16GB / 2400MHz DDR4, soldered to systemboard, no sockets	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight																										
Display	Some: 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio Some: 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle	UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																										
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)	Security	Power-on password, hard disk password, supervisor password, security keyhole																										
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	Security chip	Discrete TPM 2.0, TCG Certified																										
Optical	None	System Mgt	DASH Management																										
Ethernet	Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2	Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest																										
WLAN	Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card	NFC	None																										
Bluetooth™	Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo adapter	Battery	Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter																										
WWAN (optional)	Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>	Max battery life	MobileMark® 2014: 10.55 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>																										
SIM card (opt)	Nano-SIM card slot, in the combo slot with microSD card reader, optional Verizon LTE (US) SIM card	AC adapter	45W or 65W USB Type-C AC adapter																										
Dimensions	WxDxH (HD & FHD multi-touch): 12.11" x 8.26" x 0.69"; 307.7mm x 209.8mm x 17.4mm WxDxH (FHD non-touch): 12.11" x 8.26" x 0.70"; 307.7mm x 209.8mm x 17.8mm	Preload	Windows® 10 Home 64 or Windows 10 Pro 64																										
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	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																										
Case color	Black	Mil-Spec test	MIL-STD-810G military testing																										
Case material	Display cover: Carbon Fiber (FHD non-touch model) or PPS (HD & FHD multi-touch model); Bottom: Magnesium/Aluminum	Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																										

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

Lenovo  
April 2019



# ThinkPad A475 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD PRO A-Series APUs								Smart card reader Media reader Ports Monitor cable Camera (optional) Audio support	Optional: Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), Dock connector * Depending on many factors, actual data transfer speed may be lower than theoretical speed Optional: Lenovo USB-C to VGA Adapter HD720p resolution, fixed focus HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack										
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics												
	PRO A10-8730B	4	4	2.4 GHz	3.3 GHz	2MB	DDR4-1866	AMD Radeon™ R5 Graphics												
	PRO A12-8830B			2.5 GHz	3.4 GHz			AMD Radeon R7 Graphics												
	PRO A10-9700B			2.5 GHz	3.4 GHz															
PRO A12-9800B	2.7 GHz			3.6 GHz																
* Windows 7 is only supported by PRO A10-8730B and PRO A12-8830B																				
Graphics	AMD Radeon R5 or R7 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2160@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)								Keyboard UltraNav™ Security Security chip	6-row, spill-resistant, multimedia Fn keys, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad Power-on password, hard disk password, supervisor password, security keyhole dTPM 1.2: discrete TPM 1.2, TCG Certified dTPM 2.0: discrete TPM 2.0, TCG Certified										
Chipset Memory	AMD SoC (System on Chip) platform 32GB max / 1866MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets								Fingerprint reader NFC	Optional: Touch style match on chip fingerprint reader on the keyboard bezel None										
Display	Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle								Internal battery External battery Max battery life (MobileMark® 2014)	Optional: Integrated Li-Polymer 3-cell (24Wh) Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh) <table border="1"> <thead> <tr> <th>Models</th> <th>3-cell</th> <th>3 + 3-cell</th> <th>6-cell 48Wh</th> <th>3 + 6-cell 48Wh</th> </tr> </thead> <tbody> <tr> <td>Max battery life</td> <td>5.13 hr</td> <td>10.26 hr</td> <td>10.26 hr</td> <td>15.4 hr</td> </tr> </tbody> </table>	Models	3-cell	3 + 3-cell	6-cell 48Wh	3 + 6-cell 48Wh	Max battery life	5.13 hr	10.26 hr	10.26 hr	15.4 hr
Models	3-cell	3 + 3-cell	6-cell 48Wh	3 + 6-cell 48Wh																
Max battery life	5.13 hr	10.26 hr	10.26 hr	15.4 hr																
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only, US only)								* Battery life varies significantly with settings, usage, & other factors											
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								AC adapter	45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter										
Optical	None								Preload	Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 • Lenovo Solution Center • Lenovo PowerEngage • ThinkVantage Product Recovery • ThinkVantage System Update • Adobe® Reader® • Microsoft® Office preloaded; purchase a product key to activate • McAfee® LiveSafe™ (30-day trial) Some: Windows 10 Home 64 Some: Windows 10 Pro 64 • Lenovo Companion • Lenovo Setting • Microsoft Office preloaded; purchase a product key to activate										
Ethernet	Realtek® RTL8111EPV Gigabit Ethernet connection								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										
WLAN Bluetooth™	Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Mil-Spec test	MIL-STD-810G military testing										
WWAN (optional)	One of the following, configurable by model: • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455) * For non-WWAN model, it means the model is NOT WWAN upgradable								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant										
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) SIM card																			
Dimensions Weight	WxDxH: 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm <table border="1"> <thead> <tr> <th>Models</th> <th>3-cell or 3 + 3-cell</th> <th>6-cell or 3 + 6-cell</th> </tr> </thead> <tbody> <tr> <td>Magnesium</td> <td>3.49 lb / 1.58 kg</td> <td>3.92 lb / 1.78 kg</td> </tr> <tr> <td>PPS</td> <td>3.63 lb / 1.65 kg</td> <td>4.35 lb / 1.85 kg</td> </tr> </tbody> </table>								Models	3-cell or 3 + 3-cell	6-cell or 3 + 6-cell	Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg	PPS	3.63 lb / 1.65 kg	4.35 lb / 1.85 kg			
Models	3-cell or 3 + 3-cell	6-cell or 3 + 6-cell																		
Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg																		
PPS	3.63 lb / 1.65 kg	4.35 lb / 1.85 kg																		
Case color	Black																			
Case material	Display cover: Magnesium Hybrid or PPS (Magnesium Hybrid for US only); Bottom: Glass-Fiber Reinforced Plastic																			

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

Lenovo  
April 2019



# ThinkPad A485 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics	Smart card reader Media reader Ports	Optional: Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 media reader (MMC, SD, SDHC, SDXC), side docking connector, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>																										
	<table border="1"> <thead> <tr> <th>Processor Number</th> <th># of Cores</th> <th># of Threads</th> <th>Base Frequency</th> <th>Max Turbo Frequency</th> <th>Cache</th> <th>Memory Types</th> <th>Processor Graphics</th> </tr> </thead> <tbody> <tr> <td>Ryzen 3 PRO 2300U</td> <td rowspan="3">4</td> <td>4</td> <td>2.0 GHz</td> <td>3.4 GHz</td> <td rowspan="3">2MB L2 / 4MB L3</td> <td rowspan="3">DDR4-2400</td> <td>Radeon Vega 6 Graphics</td> </tr> <tr> <td>Ryzen 5 PRO 2500U</td> <td>8</td> <td>2.0 GHz</td> <td>3.6 GHz</td> <td>Radeon Vega 8 Graphics</td> </tr> <tr> <td>Ryzen 7 PRO 2700U</td> <td>8</td> <td>2.2 GHz</td> <td>3.8 GHz</td> <td>Radeon Vega 10 Graphics</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Ryzen 3 PRO 2300U	4	4	2.0 GHz	3.4 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 6 Graphics	Ryzen 5 PRO 2500U	8	2.0 GHz	3.6 GHz	Radeon Vega 8 Graphics	Ryzen 7 PRO 2700U	8	2.2 GHz	3.8 GHz	Radeon Vega 10 Graphics	Monitor cable (opt) Bundled Accy Camera (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter None <i>One of the following, configurable by model:</i>
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																						
Ryzen 3 PRO 2300U	4	4	2.0 GHz	3.4 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 6 Graphics																						
Ryzen 5 PRO 2500U		8	2.0 GHz	3.6 GHz			Radeon Vega 8 Graphics																						
Ryzen 7 PRO 2700U		8	2.2 GHz	3.8 GHz			Radeon Vega 10 Graphics																						
Graphics	AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports four independent displays; Max resolution: 5120x2880@60Hz (USB Type-C); 4096x2160@60Hz (HDMI)	Audio support	<ul style="list-style-type: none"> <li>• HD720p camera with ThinkShutter camera privacy, fixed focus</li> <li>• IR camera and HD720p camera, fixed focus</li> </ul> HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack																										
Chipset	AMD SoC (System on Chip) platform	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																										
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* Installed DIMMs are actually 2666MHz but run at 2400MHz due to AMD limitation</i>	Security	Power-on password, hard disk password, supervisor password, security keyhole																										
Display	<i>Some:</i> 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio <i>Some:</i> 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle	Security chip	Discrete TPM 2.0, TCG Certified																										
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)	System Mgt	DASH Management																										
Storage	<i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 4 <i>Some:</i> 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, in WWAN slot as 2nd Storage, mutually exclusive with WWAN <i>* 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</i>	Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the keyboard bezel																										
Optical	None	NFC	None																										
Ethernet	Realtek® RTL8111GUL Gigabit Ethernet connection	Battery	Integrated Li-ion 24Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery																										
WLAN	Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card	Max battery life (MobileMark® 2014)	<table border="1"> <thead> <tr> <th>Models</th> <th>24Wh</th> <th>48Wh</th> <th>72Wh</th> <th>24Wh + 24Wh</th> <th>24Wh + 48Wh</th> <th>24Wh + 72Wh</th> </tr> </thead> <tbody> <tr> <td>Max battery life</td> <td>5.37 hr</td> <td>10.76 hr</td> <td>16.4 hr</td> <td>10.76 hr</td> <td>16.4 hr</td> <td>22.15 hr</td> </tr> </tbody> </table>	Models	24Wh	48Wh	72Wh	24Wh + 24Wh	24Wh + 48Wh	24Wh + 72Wh	Max battery life	5.37 hr	10.76 hr	16.4 hr	10.76 hr	16.4 hr	22.15 hr												
Models	24Wh	48Wh	72Wh	24Wh + 24Wh	24Wh + 48Wh	24Wh + 72Wh																							
Max battery life	5.37 hr	10.76 hr	16.4 hr	10.76 hr	16.4 hr	22.15 hr																							
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter	AC adapter	45W or 65W USB Type-C AC adapter																										
WWAN (optional)	Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>	Preload	Windows® 10 Home 64 or Windows 10 Pro 64																										
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card	Limited warranty	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>• 1-year depot repair service</li> <li>• 3-year/1-yr battery depot repair service</li> <li>• 3-year/1-yr battery limited onsite service</li> </ul>																										
Dimensions	<i>WxDxH:</i> 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm	Mil-Spec test	MIL-STD-810G military testing																										
Weight	<table border="1"> <tbody> <tr> <td>Models</td> <td>24Wh or 24Wh + 24Wh</td> <td>48Wh, 72Wh, or 24Wh + 48Wh / 72Wh</td> </tr> <tr> <td>Magnesium</td> <td>3.49 lb / 1.58 kg</td> <td>3.92 lb / 1.78 kg</td> </tr> <tr> <td>PPS</td> <td>3.63 lb / 1.65 kg</td> <td>4.08 lb / 1.85 kg</td> </tr> </tbody> </table>	Models	24Wh or 24Wh + 24Wh	48Wh, 72Wh, or 24Wh + 48Wh / 72Wh	Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg	PPS	3.63 lb / 1.65 kg	4.08 lb / 1.85 kg	Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																	
Models	24Wh or 24Wh + 24Wh	48Wh, 72Wh, or 24Wh + 48Wh / 72Wh																											
Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg																											
PPS	3.63 lb / 1.65 kg	4.08 lb / 1.85 kg																											
Case color	Black																												
Case material	<i>Display cover:</i> Magnesium Hybrid or PPS; <i>Bottom:</i> Glass-Fiber Reinforced Plastic																												

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

Lenovo  
May 2019



# ThinkPad E480 Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i3 / i5 Processor (i3-7130U is NOT available in US and EMEA) or	Dimensions	Aluminum (WxDxH): 12.96" x 9.53" x 0.78"; 329mm x 242mm x 19.9mm PC/ABS (WxDxH): 12.96" x 9.53" x 0.83"; 329mm x 242mm x 21.9mm																										
	<table border="1"> <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 rowspan="3">2</td> <td rowspan="3">4</td> <td>2.3 GHz</td> <td>-</td> <td>3MB</td> <td rowspan="3">DDR4-2133</td> <td rowspan="3">Intel HD Graphics 620</td> </tr> <tr> <td>i3-7130U</td> <td>2.7 GHz</td> <td>-</td> <td>3MB</td> </tr> <tr> <td>i5-7200U</td> <td>2.5 GHz</td> <td>3.1 GHz</td> <td>3MB</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i3-7020U	2	4	2.3 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620	i3-7130U	2.7 GHz	-	3MB	i5-7200U	2.5 GHz	3.1 GHz	3MB	Weight Case color Case material	Starting at 3.87 lb / 1.75kg Black or silver Display cover: Aluminum or PC/ABS plastic; Bottom: PC/ABS plastic		
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																						
i3-7020U	2	4	2.3 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620																						
i3-7130U			2.7 GHz	-	3MB																								
i5-7200U			2.5 GHz	3.1 GHz	3MB																								
	8th Generation Intel Core i3 / i5 / i7 Processor	Smart card reader	None																										
	<table border="1"> <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 rowspan="3">DDR4-2400</td> <td rowspan="3">Intel UHD Graphics 620</td> </tr> <tr> <td>i5-8250U</td> <td rowspan="2">4</td> <td rowspan="2">8</td> <td>1.6 GHz</td> <td>3.4 GHz</td> <td>6MB</td> </tr> <tr> <td>i7-8550U</td> <td>1.8 GHz</td> <td>4.0 GHz</td> <td>8MB</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB	i7-8550U	1.8 GHz	4.0 GHz	8MB	Media reader Ports	MicroSD card reader 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
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																						
i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620																						
i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB																								
i7-8550U			1.8 GHz	4.0 GHz	8MB																								
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 DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @60Hz	Camera	HD720p camera, fixed focus																										
Chipset	Intel SoC (System on Chip) platform	Audio support	HD Audio, Synaptic® CX11852 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack																										
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * System clocks down for processors with lower memory controller	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight																										
Display	Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio	UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																										
Multi-touch	None	Security	Power-on password, hard disk password, supervisor password, security keyhole																										
Storage	Up to 2 drives (one M.2 SSD and one HDD) Some: HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable, Active Protection System™ Some: M.2 SSD / PCIe NVMe	Security chip (opt)	Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified																										
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2	vPro	None																										
Optical	None	Fingerprint reader	Optional: Touch style fingerprint reader on the palm rest																										
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS	NFC	None																										
WLAN + Bluetooth™	One of the following, configurable by model: • Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card • Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card • Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card * Intel 3165ac card supports BT4.2 but is limited to BT4.1 by Windows OS	Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter																										
WWAN	None	Max battery life	MobileMark® 2014: 13.51 hr * Battery life varies significantly with settings, usage, & other factors																										
SIM card	None	AC adapter	45W or 65W USB Type-C AC adapter																										
Note: The specifications above may not be available in all regions.		Preload (optional)	Windows® 10 Home 64 or Windows 10 Pro 64																										
		Limited warranty	1-year depot repair service																										
		Mil-Spec test	MIL-STD-810G military testing																										
		Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																										



# ThinkPad E485 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics							Dimensions <i>Aluminum (WxDxH):</i> 12.96" x 9.53" x 0.78"; 329mm x 242mm x 19.9mm <i>PC/ABS (WxDxH):</i> 12.96" x 9.53" x 0.86"; 329mm x 242mm x 21.9mm	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller		Processor Graphics
	Ryzen 3 2200U	2	4	2.5 GHz	3.4 GHz	1MB L2 / 4MB L3	DDR4-2400		Radeon Vega 3 Graphics
	Ryzen 5 2500U	4	8	2.0 GHz	3.6 GHz	2MB L2 / 4MB L3			Radeon Vega 8 Graphics
Ryzen 7 2700U	2.2 GHz			3.8 GHz	2MB L2 / 4MB L3	Radeon RX Vega 10 Graphics			
Graphics	AMD Radeon Vega 3, Vega 8, or RX Vega 10 Graphics in processor; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @60Hz							Weight Case color Case material	
Chipset	AMD SoC (System on Chip) platform							Smart card reader	
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets							Media reader	
Display	<i>Some:</i> 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio <i>Some:</i> 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 400:1 contrast ratio							Ports	
Multi-touch	None							Camera	
Storage	<i>Up to 2 drives (one M.2 SSD and one HDD)</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable, Active Protection System™ <i>Some:</i> M.2 SSD / PCIe NVMe							Audio support	
Optical	None							Keyboard	
Ethernet	Gigabit Ethernet Connection, Realtek RTL8111GUS							UltraNav™	
WLAN + Bluetooth™	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Qualcomm QCNFA435, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card</li> <li>Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card</li> <li>Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</li> </ul>							Security	
WWAN	None							Security chip	
SIM card	None							Fingerprint reader	
								NFC	
								Battery	
								Max battery life	
								AC adapter	
								Preload (optional)	
								Limited warranty	
								Mil-Spec test	
								Environment	

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

Lenovo  
June 2019



# ThinkPad E490 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i3 / i5 / i7 Processor								Dimensions <i>Aluminum (WxDxH):</i> 12.96" x 9.53" x 0.78"; 329mm x 242mm x 19.9mm <i>PC/ABS (WxDxH):</i> 12.96" x 9.53" x 0.83"; 329mm x 242mm x 21.9mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB			
i7-8565U	1.8 GHz			4.6 GHz	8MB				
Graphics	Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon RX 550X Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)								Weight Case color Case material
Chipset	Intel SoC (System on Chip) platform								Smart card reader
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation</i>								Media reader
Display	Size / Resolution	Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Multi-touch	Ports
	14.0" HD (1366x768)	Anti-glare	TN	220 nits	16:9	400:1	90°	Non-touch	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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
	14.0" FHD (1920x1080)	Anti-glare	IPS	250 nits	16:9	600:1	170°	Non-touch	
Multi-touch	None								Monitor cable
Storage	Up to two drives (one M.2 SSD and one HDD)								Bundled Accy
	<ul style="list-style-type: none"> <li>HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™</li> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> </ul>								Camera
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								Audio support
Optical	None								Keyboard
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								UltraNav™
WLAN + Bluetooth™	One of the following, configurable by model: <ul style="list-style-type: none"> <li>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card</li> <li>Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card</li> </ul>								Security
WWAN	None								Security chip
SIM card	None								System Mgt
									Fingerprint reader
									NFC
									Battery
									Max battery life
									AC adapter
									Preload (optional)
									Limited warranty
									Mil-Spec test
									Environment

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

Lenovo  
July 2019



# ThinkPad E490s Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor								Dimensions	WxDxH: 12.96" x 9.13" x 0.70"; 329mm x 232mm x 17.9mm		
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	Starting at 3.68 lb / 1.67 kg		
	i5-8265U i7-8565U	4	8	1.6 GHz 1.8 GHz	3.9 GHz 4.5 GHz	6MB 8MB	DDR4-2400	Intel UHD Graphics 620	Case color	Black or silver		
								Case material	Aluminum			
Graphics	Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon RX 540X Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent display; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)								Smart card reader	None		
									Media reader	MicroSD card reader		
Chipset	Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation</i>								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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>		
									Camera	HD720p camera, fixed focus		
Memory									Audio support	HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack		
Display	Size / Resolution		Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Multi-touch	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight	
	14.0" FHD (1920x1080)		Anti-glare	TN	220 nits	16:9	400:1	90°	Non-touch	UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad	
	14.0" FHD (1920x1080)		Anti-glare	IPS	250 nits	16:9	600:1	170°	Non-touch	Security	Power-on password, hard disk password, supervisor password, security keyhole	
Multi-touch	None								Security chip	<i>Integrated model:</i> discrete TPM 2.0, TCG Certified <i>Discrete model:</i> firmware TPM 2.0 integrated in chipset		
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								System Mgt	None		
Optane™ memory	None								Fingerprint reader	Touch style fingerprint reader on the palm rest		
Optical	None								NFC	None		
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								Battery	Integrated Li-ion 42Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter		
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								Max battery life	<i>MobileMark® 2014:</i> 11.5 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>		
WWAN	None								AC adapter	45W or 65W USB Type-C AC adapter		
SIM card	None								Preload (optional)	Windows® 10 Home 64 or Windows 10 Pro 64		
									Limited warranty	1-year depot repair service		
									Mil-Spec test	MIL-STD-810G military testing		
									Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant		

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

Lenovo  
July 2019



# ThinkPad E495 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics								Dimensions <i>Aluminum (WxDxH):</i> 12.96" x 9.53" x 0.78"; 329mm x 242mm x 19.9mm <i>PC/ABS (WxDxH):</i> 12.96" x 9.53" x 0.83"; 329mm x 242mm x 21.9mm																							
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller	Processor Graphics		Weight Starting at 3.87 lb / 1.75 kg Case color Black Case material <i>Display cover:</i> Aluminum or PC/ABS plastic; <i>Bottom:</i> PC/ABS plastic																						
	Ryzen 3 3200U	2	4	2.6 GHz	3.5 GHz	1MB L2 / 4MB L3	DDR4-2400	Radeon Vega 3 Graphics																								
	Ryzen 5 3500U	4	8	2.1 GHz	3.7 GHz	2MB L2 / 4MB L3		Radeon Vega 8 Graphics																								
Ryzen 7 3700U	2.3 GHz			4.0 GHz	2MB L2 / 4MB L3	Radeon RX Vega 10 Graphics																										
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)								Smart card reader None Media reader MicroSD card reader Ports One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i> 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																							
Chipset	AMD SoC (System on Chip) platform																															
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation</i>																															
Display	<table border="1"> <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" 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" FHD (1920x1080)</td> <td>Anti-glare</td> <td>IPS</td> <td>250 nits</td> <td>16:9</td> <td>600:1</td> <td>170°</td> <td>Non-touch</td> </tr> </tbody> </table>									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°
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								Keyboard 6-row, spill-resistant, multimedia Fn keys UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad Security Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified Fingerprint reader None NFC None Battery Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter Max battery life <i>MobileMark® 2014:</i> 11 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i> AC adapter 45W or 65W USB Type-C AC adapter Preload (optional) Windows® 10 Home 64 or Windows 10 Pro 64 Limited warranty 1-year depot repair service Mil-Spec test None Environment EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant																							
Storage	Up to two drives (one M.2 SSD and one HDD) • HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ • M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4																															
Optical	None																															
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS																															
WLAN + Bluetooth™	One of the following, configurable by model: • Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card • Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card																															
WWAN	None																															
SIM card	None																															

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

Lenovo  
July 2019



# ThinkPad E580 Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i3 / i5 Processor or								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>• Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card</li> <li>• Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</li> <li>• Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card</li> <li>* Intel 3165ac card supports BT4.2 but is limited to BT4.1 by Windows OS</li> </ul>
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	i3-7020U	2	4	2.3 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620	
	i3-7130U			2.7 GHz	-	3MB			
i5-7200U	2.5 GHz			3.1 GHz	3MB				
Processor	8th Generation Intel Core i3 / i5 / i7 Processor								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>• Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card</li> <li>• Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</li> <li>• Intel Dual Band Wireless-AC 3165, 1x1, Wi-Fi + Bluetooth 4.1, M.2 Card</li> <li>* Intel 3165ac card supports BT4.2 but is limited to BT4.1 by Windows OS</li> </ul>
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	
	i5-8250U			1.6 GHz	3.4 GHz	6MB			
i7-8550U	1.8 GHz			4.0 GHz	8MB				
* i3-7130U is NOT available in US and EMEA									
Graphics	Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon RX 550 Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @60Hz								Dimensions WxDxH: 14.53" x 9.92" x 0.78"; 369mm x 252mm x 19.95mm
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								Weight Starting at 4.7 lb / 2.1kg
Memory	Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * System clocks down for processors with lower memory controller								Case color Black or silver
Display	<i>Some:</i> 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio <i>Some:</i> 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio								Case material <i>Display cover:</i> Aluminum; <i>Bottom:</i> PC/ABS plastic
Multi-touch	None								Smart card reader None
Storage	<i>Up to 2 drives (one M.2 SSD and one HDD)</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable, Active Protection System™ <i>Some:</i> M.2 SSD / PCIe NVMe								Media reader MicroSD card reader
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								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
Optical	None								Camera HD720p camera, fixed focus
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								Audio support HD Audio, Synaptic® CX11852 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
Keyboard									6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight
UltraNav™									TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
Security									Power-on password, hard disk password, supervisor password, security keyhole
Security chip (opt)									Firmware TPM 2.0 integrated in chipset or discrete TPM 2.0 TCG Certified
vPro									None
Fingerprint reader									Optional: Touch style fingerprint reader on the palm rest
NFC									None
Battery									Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
Max battery life									MobileMark® 2014: 12.23 hr * Battery life varies significantly with settings, usage, & other factors
AC adapter									45W or 65W USB Type-C AC adapter
Preload (optional)									Windows® 10 Home 64 or Windows 10 Pro 64
Limited warranty									1-year depot repair service
Mil-Spec test									MIL-STD-810G military testing
Environment									EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
June 2019



# ThinkPad E585 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics							Dimensions	<i>WxDxH:</i> 14.53" x 9.92" x 0.79"; 369mm x 252mm x 19.95mm	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller	Processor Graphics	Weight	Starting at 4.7 lb / 2.1kg
	Ryzen 3 2200U	2	4	2.5 GHz	3.4 GHz	1MB L2 / 4MB L3	DDR4-2400	Radeon Vega 3 Graphics	Case color	Black
	Ryzen 5 2500U	4	8	2.0 GHz	3.6 GHz	2MB L2 / 4MB L3		Radeon Vega 8 Graphics	Case material	<i>Display cover:</i> Aluminum; <i>Bottom:</i> PC/ABS plastic
Ryzen 7 2700U	2.2 GHz			3.8 GHz	2MB L2 / 4MB L3	Radeon RX Vega 10 Graphics		Smart card reader	None	
Graphics	AMD Radeon Vega 3, Vega 8, or RX Vega 10 Graphics in processor only; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 1920x1080 (HDMI) @60Hz							Media reader	MicroSD card reader	
Chipset	AMD SoC (System on Chip) platform							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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>	
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets							Camera	HD720p camera, fixed focus	
Display	<i>Some:</i> 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio (NOT available in EMEA) <i>Some:</i> 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio							Audio support	HD Audio, Synaptic® CX11852 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack	
Multi-touch	None							Keyboard	6-row, spill-resistant, multimedia Fn keys	
Storage	<i>Up to 2 drives (one M.2 SSD and one HDD)</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, removable, upgradable, Active Protection System™ <i>Some:</i> M.2 SSD / PCIe NVMe							UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad	
Optical	None							Security	Power-on password, hard disk password, supervisor password, security keyhole	
Ethernet	Gigabit Ethernet Connection, Realtek RTL8111GUS							Security chip	Discrete TPM 2.0, TCG Certified	
WLAN + Bluetooth™	<i>One of the following, configurable by model:</i> • Qualcomm QCNFA435, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card • Realtek® RTL8821CE, Wi-Fi 1x1 802.11ac + Bluetooth 4.1, M.2 card • Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card							Fingerprint reader	None	
WWAN	None							NFC	None	
SIM card	None							Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter	
								Max battery life	<i>MobileMark® 2014:</i> 8.63 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>	
								AC adapter	45W or 65W USB Type-C AC adapter	
								Preload (optional)	Windows® 10 Home 64 or Windows 10 Pro 64	
								Limited warranty	1-year depot repair service	
								Mil-Spec test	None	
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant	

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

Lenovo  
June 2019



# ThinkPad E590 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i3 / i5 / i7 Processor								Dimensions	WxDxH: 14.53" x 9.94" x 0.78"; 369mm x 252.5mm x 19.9mm		
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	Starting at 4.68 lb / 2.12 kg		
	i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	Case color	Black or silver		
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB			Case material	Display cover: Aluminum; Bottom: PC/ABS plastic		
i7-8565U	1.8 GHz			4.6 GHz	8MB	Smart card reader			None			
Graphics	Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon RX 550X Graphics, 2GB DDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports dual independent display; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)								Media reader	MicroSD card reader		
Chipset	Intel SoC (System on Chip) platform								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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>		
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation</i>								Monitor cable	None		
Display	Size / Resolution	Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Multi-touch	Bundled Accy	None		
	15.6" HD (1366x768)	Anti-glare	TN	220 nits	16:9	400:1	90°	Non-touch	Camera	HD720p camera, fixed focus		
	15.6" FHD (1920x1080)	Anti-glare	IPS	250 nits	16:9	600:1	170°	Non-touch	Audio support	HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack		
Multi-touch	None								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight		
Storage	Up to two drives (one M.2 SSD and one HDD) • HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ • M.2 2280 SSD / SATA 6.0Gb/s • M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 2 • M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad		
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								Security	Power-on password, hard disk password, supervisor password, security keyhole		
Optical	None								Security chip	Integrated model: discrete TPM 2.0, TCG Certified Discrete model: firmware TPM 2.0 integrated in chipset		
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								System Mgt	None		
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								Fingerprint reader	Optional: Touch style fingerprint reader on the palm rest		
WWAN	None								NFC	None		
SIM card	None								Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter		
									Max battery life	MobileMark® 2014: 11 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>		
									AC adapter	45W or 65W USB Type-C AC adapter		
									Preload (optional)	Windows® 10 Home 64 or Windows 10 Pro 64		
									Limited warranty	1-year depot repair service		
									Mil-Spec test	MIL-STD-810G military testing		
									Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant		

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

Lenovo  
July 2019



# ThinkPad E595 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics								Dimensions	<i>WxDxH:</i> 14.53" x 9.92" x 0.78"; 369mm x 252mm x 19.9mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller	Processor Graphics	Weight	Starting at 4.7 lb / 2.1kg
	Ryzen 3 3200U	2	4	2.6 GHz	3.5 GHz	1MB L2 / 4MB L3	DDR4-2400	Radeon Vega 3 Graphics	Case color	Black
	Ryzen 5 3500U	4	8	2.1 GHz	3.7 GHz	2MB L2 / 4MB L3		Radeon Vega 8 Graphics	Case material	<i>Display cover:</i> Aluminum; <i>Bottom:</i> PC/ABS plastic
Ryzen 7 3700U	2.3 GHz			4.0 GHz	2MB L2 / 4MB L3	Radeon RX Vega 10 Graphics		Smart card reader	None	
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)								Media reader	MicroSD card reader
Chipset	AMD SoC (System on Chip) platform								Ports	One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation</i>								Monitor cable	None
Display	Size / Resolution		Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Bundled Accy	None
	15.6" HD (1366x768)		Anti-glare	TN	220 nits	16:9	400:1	90°	Camera	HD720p camera, fixed focus
	15.6" FHD (1920x1080)		Anti-glare	IPS	250 nits	16:9	600:1	170°	Audio support	HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
Multi-touch	None								Keyboard	6-row, spill-resistant, multimedia Fn keys
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								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
Optical	None								Security	Power-on password, hard disk password, supervisor password, security keyhole
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								Security chip	Discrete TPM 2.0, TCG Certified
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								Fingerprint reader	None
WWAN	None								NFC	None
SIM card	None								Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
									Max battery life	<i>MobileMark® 2014:</i> 10.3 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>
									AC adapter	45W or 65W USB Type-C AC adapter
									Preload (optional)	Windows® 10 Home 64 or Windows 10 Pro 64
									Limited warranty	1-year depot repair service
									Mil-Spec test	None
									Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad L380 Platform Specifications

Product Specifications Reference (PSREF)

Processor	Intel® Celeron® Processor, 7th Generation Intel Core™ i3 / i5 Processor or							Dimensions	<i>WxDxH:</i> 12.67" x 8.83" x 0.74"; 321.8mm x 224.2mm x 18.8mm	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	Starting at 3.22 lb / 1.46 kg
	Cel 3965U	2	2	2.2 GHz	-	2MB	DDR4-2133	Intel HD Graphics 610	Case color	Black or Silver
	i3-7130U		4	2.7 GHz	-	3MB		Intel HD Graphics 620	Case material	<i>Display cover:</i> Aluminum
i5-7200U			2.5 GHz	3.1 GHz	3MB			<i>Bottom:</i> GFRP		
8th Generation Intel Core i5 / i7 Processor										
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Smart card reader	None	
i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	Media reader	MicroSD card reader	
i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB			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	
i5-8350U			1.7 GHz	3.6 GHz	6MB			Monitor cable (optional)	<i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i> <i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter	
i7-8550U			1.8 GHz	4.0 GHz	8MB			Bundled Accy	<i>Optional:</i> ThinkPad Ethernet Extension Cable	
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)								Camera	HD720p camera, fixed focus	
Chipset								Audio support	HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack	
Memory								Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight	
32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch	
* System clocks down for processors with lower memory controller								Security	Power-on password, hard disk password, supervisor password, security keyhole	
Display								Security chip	Discrete TPM 2.0, TCG Certified	
Some: 13.3" (338mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 500:1 contrast ratio								vPro (optional)	Intel vPro Technology	
Some: 13.3" (338mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle								Fingerprint reader	<i>Optional:</i> Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology	
Multi-touch (opt) on-cell touch, supports 10-finger gesture								NFC (optional)	Near Field Communication	
Storage								Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter	
One of the following, configurable by model:								Max battery life	<i>MobileMark® 2014:</i> 16.1 hr	
• M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)								AC adapter	45W or 65W USB Type-C AC adapter	
• M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)								Preload	Windows® 10 Home 64 or Windows 10 Pro 64	
Optane™ memory								Limited warranty	<i>One of the following, configurable by model:</i>	
Optical									• 1-year depot repair service	
Ethernet									• 3-year/1-yr battery depot repair service	
Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via optional ThinkPad Ethernet Extension Cable									• 3-year/1-yr battery limited onsite service	
WLAN + Bluetooth™								Mil-Spec test	MIL-STD-810G military testing	
Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant	
* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS										
WWAN										
SIM card										
None										
None										

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

Lenovo  
April 2019



# ThinkPad L390 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i3 / i5 / i7 Processor								Smart card reader	None
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Media reader	MicroSD card reader
	i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	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
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB				
	i5-8365U			1.6 GHz	4.1 GHz	6MB				
i7-8565U	1.8 GHz			4.6 GHz	8MB					
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)								Monitor cable (optional)	<ul style="list-style-type: none"> <li>USB-C to VGA: Lenovo USB-C to VGA Adapter</li> <li>USB-C to VGA + Power Adapter: Lenovo USB-C to VGA plus Power Adapter</li> <li>USB-C to HDMI: Lenovo USB-C to HDMI Adapter</li> <li>USB-C to HDMI + Power Adapter: Lenovo USB-C to HDMI plus Power Adapter</li> <li>USB-C to DP: Lenovo USB-C to DisplayPort Adapter</li> <li>USB-C to RJ45: Lenovo USB-C to Ethernet Adapter</li> <li>USB-C to USB-A: Lenovo USB-C to USB-A Adapter</li> <li>USB-C to USB-C: Lenovo USB-C to USB-C Cable 2M</li> </ul>
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								Bundled Accessories (optional)	
Display	Size	Resolution	Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Camera	HD720p camera, fixed focus
	13.3"	HD (1366x768)	Anti-glare	TN	250 nits	16:9	500:1	90°	Audio support	HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack
	13.3"	FHD (1920x1080)	Anti-glare	IPS	250 nits	16:9	700:1 (non-touch) 800:1 (multi-touch)	170°	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch
Storage	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</li> </ul>								Security	Power-on password, hard disk password, supervisor password, security keyhole
Optical	None								Security chip	Discrete TPM 2.0, TCG Certified
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								System Mgt (opt)	Intel vPro Technology
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								Fingerprint reader	Optional: Touch style fingerprint reader on the palm rest
WWAN SIM card	None								NFC (optional)	Near Field Communication
Dimensions	WxDxH: 12.67" x 8.83" x 0.74"; 321.8mm x 224.2mm x 18.8mm								Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
Weight	Starting at 3.22 lb / 1.46 kg								Max battery life	MobileMark® 2014: 14.61 hr * Battery life varies significantly with settings, usage, & other factors
Case color	Black or Silver								AC adapter	45W or 65W USB Type-C AC adapter
Case material	Display cover: Aluminum Bottom: GFRP								Preload	Windows® 10 Home 64 or Windows 10 Pro 64
									Limited warranty	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>
									Mil-Spec test	MIL-STD-810G military testing
									Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad L470 Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th Generation Intel® Core™ i3 / i5 / i7 Processor or								WWAN (optional) <i>One of the following, configurable by model:</i>	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		<ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card</li> <li>Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)</li> </ul>
	i3-6006U	2	4	2.0 GHz	-	3MB	DDR4-2133	Intel HD Graphics 520	SIM card (opt) Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card	
	i3-6100U			2.3 GHz	-	3MB				
	i5-6200U			2.3 GHz	2.8 GHz	3MB				
	i5-6300U			2.4 GHz	3.0 GHz	3MB				
	Intel Celeron® Processor or 7th Generation Intel Core i3 / i5 / i7 Processor								Dimensions <i>WxDxH:</i> 13.35" x 9.25" x 0.94"; 339mm x 235mm x 23.9mm	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		Weight
	Cel 3965U	2	4	2.2 GHz	-	2MB	DDR4-2133	Intel HD Graphics 610	<i>Models</i>	
	i3-7100U			2.4 GHz	-	3MB		<i>3-cell</i>		
	i5-7200U			2.5 GHz	3.1 GHz	3MB		<i>Integrated model</i>	4.13 lb / 1.87 kg	4.45 lb / 2.02 kg
	i5-7300U			2.6 GHz	3.5 GHz	3MB		<i>Discrete model</i>	4.16 lb / 1.89 kg	4.48 lb / 2.03 kg
	i7-7500U			2.7 GHz	3.5 GHz	4MB				
	i7-7600U			2.8 GHz	3.9 GHz	4MB				
								Smart card reader <i>Optional:</i> Smart card reader		
								Media reader 4-in-1 reader (MMC, SD, SDHC, SDXC)		
								Ports Three USB 3.1 Gen 1 (USB 3.0, one Always On), VGA, Mini DisplayPort, Ethernet (RJ-45), Dock connector		
								<i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>		
								Camera (optional) HD720p resolution, fixed focus		
								Audio support HD Audio, Realtek ALC3268 codec / stereo speakers, 1W x 2 / dual array microphone, combo audio/microphone jack		
Graphics	Intel HD Graphics 610 or 620 in processor only, or Intel HD Graphics 620 in processor and AMD Radeon™ R5 M430, 2GB memory; supports external analog monitor via VGA and digital monitor via Mini DisplayPort; supports three independent displays; Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)								Keyboard 6-row, spill-resistant, multimedia Fn keys UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad	
Chipset	Intel SoC (System on Chip) platform								Security Power-on password, hard disk password, supervisor password, security keyhole	
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>								Security chip Discrete TPM 2.0, TCG Certified vPro (optional) Intel vPro Technology	
Display	<i>Some:</i> 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio <i>Some:</i> 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle								Fingerprint reader <i>Optional:</i> Swipe style fingerprint reader on the keyboard bezel	
Multi-touch	None								NFC None	
Storage	<i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm or 9.5mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s <i>Some:</i> 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN								Battery Li-ion 3-cell (24Wh) or 6-cell (48Wh or 72Wh) Max battery life <sup>10</sup> (MobileMark® 2014)	
Optical	None								<i>Models</i>	
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								<i>Integrated model</i>	
WLAN	<i>One of the following, configurable by model:</i> • Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card								<i>Discrete model</i>	
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter <i>* Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS</i>								4.34 hr	
									8.68 hr	
									13.02 hr	
									<i>* Battery life varies significantly with settings, usage, &amp; other factors</i>	
									AC adapter 45W or 65W slim tip AC adapter	
									Preload Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 • Lenovo Solution Center • Lenovo PowerEngage • ThinkVantage Product Recovery • ThinkVantage System Update • Adobe® Reader® • Microsoft® Office preloaded; purchase a product key to activate • McAfee® LiveSafe™ (30-day trial)	
									Limited warranty <i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service	
									Mil-Spec test MIL-STD-810G military testing	
									Environment EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant	

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

Lenovo  
September 2018



# ThinkPad L480 Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i3 / i5 Processor or								WWAN (optional) <i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)</li> <li>Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card</li> </ul> <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i> Nano-SIM card slot, optional Verizon LTE (US) SIM card
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	i3-7130U	2	4	2.7 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620	
	i5-7200U			2.5 GHz	3.1 GHz	3MB			
	i5-7300U			2.6 GHz	3.5 GHz	3MB			
	8th Generation Intel Core i3 / i5 / i7 Processor								
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	
	i5-8250U			1.6 GHz	3.4 GHz	6MB			
	i5-8350U			4	8	1.7 GHz			3.6 GHz
	i7-8550U	1.8 GHz	4.0 GHz			8MB			
	<i>* i3-7130U is NOT available in US and EMEA</i>								
Graphics	Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and AMD Radeon 530, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)								
Chipset	Intel SoC (System on Chip) platform								
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>								
Display	<i>Some:</i> 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio <i>Some:</i> 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	<i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s <i>Some:</i> 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	None								
Optical	None								
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								
WLAN + Bluetooth™ (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)</li> <li>Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</li> </ul> <i>* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS</i>								
	Dimensions	WxDxH: 13.19" x 9.25" x 0.89"; 335mm x 235mm x 22.5mm							
	Weight	Starting at 3.71 lb / 1.68 kg							
	Case color	Black							
	Case material	PC/ABS plastic							
	Smart card reader	<i>Optional:</i> Smart card reader							
	Media reader	MicroSD card reader							
	Ports	Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>							
	Monitor cable (optional)	<i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter							
	Camera (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>HD720p camera, fixed focus</li> <li>IR camera and HD720p camera, fixed focus</li> </ul>							
	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 multi-touch touchpad							
	Security	Power-on password, hard disk password, supervisor password, security keyhole							
	Security chip	Discrete TPM 2.0, TCG Certified							
	vPro (optional)	Intel vPro Technology							
	Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the keyboard bezel, anti-spoofing technology							
	NFC (optional)	Near Field Communication							
	Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter							
	Max battery life	<i>MobileMark® 2014:</i> 12.2 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>							
	AC adapter	45W or 65W USB Type-C AC adapter							
	Preload	Windows® 10 Home 64 or Windows 10 Pro 64							
	Limited warranty	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>							
	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  
April 2019



# ThinkPad L490 Platform Specifications

Product Specifications Reference (PSREF)

Processor	Intel® Celeron® Processor or 8th Generation Intel Core™ i3 / i5 / i7 Processor									Dimensions	<i>WxDxH:</i> 13.19" x 9.25" x 0.89"; 335mm x 235mm x 22.5mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		Weight	Starting at 3.72 lb / 1.69 kg
	Cel 4305U	2	2	2.2 GHz	-	2MB	DDR4-2133	Intel UHD Graphics 610		Case color	Black
	i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620		Case material	PC/ABS plastic
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB				Smart card reader	<i>Optional:</i> Smart card reader
	i5-8365U	4	8	1.6 GHz	4.1 GHz	6MB				Media reader	MicroSD card reader
i7-8565U	4	8	1.8 GHz	4.6 GHz	8MB	Ports				Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole	
i7-8665U	4	8	1.9 GHz	4.8 GHz	8MB			* Depending on many factors, actual data transfer speed may be lower than theoretical speed			
Graphics	Intel UHD Graphics 610 or 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon 535, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)									Monitor cable ( <i>optional</i> )	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
Chipset	Intel SoC (System on Chip) platform									Camera ( <i>optional</i> )	One of the following, configurable by model:
Memory	64GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * Installed memory is actually 2666MHz but run at 2133MHz or 2400MHz due to Intel limitation									Audio support	• HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
	14.0"	HD (1366x768)	TN	Anti-glare	220 nits	16:9	400:1	45%	90°		
Multi-touch ( <i>opt</i> )	On-cell touch, supports 10-finger gesture (FHD only)									Security	Power-on password, hard disk password, supervisor password, security keyhole
Storage	<ul style="list-style-type: none"> <li>HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™</li> <li>SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> </ul> * Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation									Security chip	Discrete TPM 2.0, TCG Certified
										System Mgt ( <i>opt</i> )	Intel vPro Technology
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2									Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest
Optical	None									NFC ( <i>optional</i> )	Near Field Communication
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)									Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
WLAN + Bluetooth™ ( <i>optional</i> )	One of the following, configurable by model: <ul style="list-style-type: none"> <li>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card (NOT available in EMEA)</li> <li>Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0</li> <li>Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0</li> </ul>									Max battery life	MobileMark® 2014: 12 hr * Battery life varies significantly with settings, usage, & other factors
										AC adapter	45W or 65W USB Type-C AC adapter
WWAN ( <i>optional</i> )	One of the following, configurable by model: <ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> * For non-WWAN model, it means the model is NOT WWAN upgradable									Preload	Windows® 10 Home 64 or Windows 10 Pro 64
SIM card	None									Limited warranty	One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service
										Mil-Spec test	MIL-STD-810G military testing
										Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad L570 Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th Generation Intel® Core™ i3 / i5 / i7 Processor or								WWAN (optional) <i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card</li> <li>Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)</li> </ul> SIM card (opt) Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	i3-6006U	2	4	2.0 GHz	-	3MB	DDR4-2133	Intel HD Graphics 520	
	i3-6100U			2.3 GHz	-	3MB			
	i5-6200U			2.3 GHz	2.8 GHz	3MB			
	i5-6300U			2.4 GHz	3.0 GHz	3MB			
	i7-6500U			2.5 GHz	3.1 GHz	4MB			
	i7-6600U			2.6 GHz	3.4 GHz	4MB			
	Intel Celeron® Processor or 7th Generation Intel Core i3 / i5 / i7 Processor								
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	
	Cel 3965U	2	4	2.2 GHz	-	2MB	DDR4-2133	Intel HD Graphics 610	
	i3-7100U			2.4 GHz	-	3MB		Intel HD Graphics 620	
	i5-7200U			2.5 GHz	3.1 GHz	3MB			
	i5-7300U			2.6 GHz	3.5 GHz	3MB			
	i7-7500U			2.7 GHz	3.5 GHz	4MB			
	i7-7600U			2.8 GHz	3.9 GHz	4MB			
	<i>* i7 processor is NOT available in EMEA</i>								
Graphics	Intel HD Graphics 520, 610, or 620 in processor only; supports external analog monitor via VGA and digital monitor via Mini DisplayPort; supports three independent displays; Max resolution: 3840x2160@60Hz (DP via mDP cable); 1920x1200@60Hz (VGA)								
Chipset Memory	Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>								
Display	Some: 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 600:1 contrast ratio, 160° viewing angle								
Multi-touch	None								
Storage	Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN								
Optical (optional)	DVD-ROM or DVD burner, 9mm high, fixed, not removable, tray-in								
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)								
WLAN	One of the following, configurable by model: <ul style="list-style-type: none"> <li>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card (US only)</li> <li>Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</li> <li>Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</li> </ul>								
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter * Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS								
Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad								
UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad								
Security chip	Power-on password, hard disk password, supervisor password, security keyhole								
vPro (optional)	Discrete TPM 2.0, TCG Certified								
Fingerprint reader	Intel vPro Technology								
NFC	Optional: Swipe style fingerprint reader on the palm rest								
Battery	Li-ion 6-cell (48Wh)								
Max battery life	MobileMark® 2014: 14.8 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>								
AC adapter	45W slim tip AC adapter								
Preload	Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 Some: Windows 10 Home 64 Some: Windows 10 Pro 64 <ul style="list-style-type: none"> <li>Lenovo Companion</li> <li>Lenovo Setting</li> <li>Microsoft Office preloaded; purchase a product key to activate</li> </ul>								
Limited warranty	One of the following, configurable by model: <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>								
Mil-Spec test	MIL-STD-810G military testing								
Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant								

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

Lenovo  
September 2018



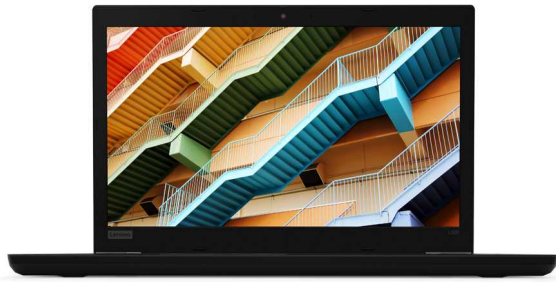
# ThinkPad L580 Platform Specifications

Product Specifications Reference (PSREF)

Processor	Intel® Celeron® Processor, 7th Generation Intel Core™ i3 / i5 Processor or							WWAN (optional) <i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only)</li> <li>Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card</li> </ul> <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i> SIM card (opt) Nano-SIM card slot, optional Verizon LTE (US) SIM card
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	
	Cel 3965U	2	2	2.2 GHz	-	2MB	DDR4-2133	Intel HD Graphics 610
	i3-7130U			2.7 GHz	-	3MB		Intel HD Graphics 620
	i5-7200U	4	4	2.5 GHz	3.1 GHz	3MB		
	i5-7300U			2.6 GHz	3.5 GHz	3MB		
	8th Generation Intel Core i3 / i5 / i7 Processor							
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics
	i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620
	i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB		
	i5-8350U			1.7 GHz	3.6 GHz	6MB		
	i7-8550U			1.8 GHz	4.0 GHz	8MB		
	<i>* i3-7130U is NOT available in US and EMEA</i>							
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)							Monitor cable (optional) HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter
Chipset	Intel SoC (System on Chip) platform							Camera (optional) HD720p camera, fixed focus
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>							Audio support HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ / dual array microphone, headphone / microphone combo jack
Display	<i>Some:</i> 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio <i>Some:</i> 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle							Keyboard 6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
Multi-touch	None							Security Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified vPro (optional) Intel vPro Technology Fingerprint reader <i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology
Storage	<i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s <i>Some:</i> 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN							NFC (optional) Near Field Communication
Optane™ memory	None							Battery Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
Optical	None							Max battery life <i>MobileMark® 2014:</i> 12 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)							AC adapter 45W or 65W USB Type-C AC adapter
WLAN + Bluetooth™ (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card (US only)</li> <li>Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card</li> </ul> <i>* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS</i>							Preload Windows® 10 Home 64 or Windows 10 Pro 64
								Limited warranty <i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>
								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  
April 2019



# ThinkPad L590 Platform Specifications

Product Specifications Reference (PSREF)

Processor	Intel® Celeron® Processor or 8th Generation Intel Core™ i3 / i5 / i7 Processor									Dimensions	<i>WxDxH:</i> 14.82" x 10.02" x 0.90"; 376.5mm x 254.5mm x 22.95mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		Weight	Starting at 4.48 lb / 2.0 kg
	Cel 4305U	2	2	2.2 GHz	-	2MB	DDR4-2133	Intel UHD Graphics 610		Case color	Black
	i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620		Case material	PC/ABS plastic
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB				Smart card reader	<i>Optional:</i> Smart card reader
	i5-8365U	4	8	1.6 GHz	4.1 GHz	6MB				Media reader	MicroSD card reader
i7-8565U	4	8	1.8 GHz	4.6 GHz	8MB	Ports				Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole	
i7-8665U	4	8	1.9 GHz	4.8 GHz	8MB			* Depending on many factors, actual data transfer speed may be lower than theoretical speed			
Graphics	Intel UHD Graphics 610 or 620 in processor only or Intel UHD Graphics 620 in processor and AMD Radeon 535, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)									Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter
Chipset	Intel SoC (System on Chip) platform									Camera (optional)	<i>One of the following, configurable by model:</i>
Memory	64GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * Installed memory is actually 2666MHz but run at 2133MHz or 2400MHz due to Intel limitation									Audio support	• HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
	15.6"	HD (1366x768)	TN	Anti-glare	220 nits	16:9	400:1	45%	90°		
Multi-touch	None									Security	Power-on password, hard disk password, supervisor password, security keyhole
Storage	• HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ • SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high • M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4 • M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2 * Installed M.2 2280 SSD is PCIe 3x4 but run at PCIe 3x2 due to M.2 SSD adapter limitation									Security chip	Discrete TPM 2.0, TCG Certified
	Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2									System Mgt (opt)
Optical	None									Fingerprint reader	<i>Optional:</i> Touch style fingerprint reader on the palm rest
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)									NFC (optional)	Near Field Communication
WLAN + Bluetooth™ (optional)	<i>One of the following, configurable by model:</i> • Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card (NOT available in EMEA) • Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 • Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0									Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
WWAN (optional)	<i>One of the following, configurable by model:</i> • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only) • Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card * For non-WWAN model, it means the model is NOT WWAN upgradable									Max battery life	<i>MobileMark® 2014:</i> 12 hr * Battery life varies significantly with settings, usage, & other factors
SIM card	None									AC adapter	45W or 65W USB Type-C AC adapter
										Preload	Windows® 10 Home 64 or Windows 10 Pro 64
										Limited warranty	<i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service
										Mil-Spec test	MIL-STD-810G military testing
										Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad P1 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor or Intel Xeon® E Processor								Smart card reader	<i>Optional</i> : Smart card reader
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	ExpressCard	None
	i5-8400H	4	8	2.5 GHz	4.2 GHz	8MB	DDR4-2666	Intel UHD Graphics 630	Media reader	SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card
	i7-8750H	6	12	2.2 GHz	4.1 GHz	9MB			Ports	Two USB 3.1 Gen 1 (one Always On), two USB Type-C / Thunderbolt 3 (with the function of Power Delivery and DP), HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, SD card reader, security keyhole
	i7-8850H			2.6 GHz	4.3 GHz	9MB		Intel UHD Graphics P630		
	E-2176M			2.7 GHz	4.4 GHz	12MB				* Power Delivery only supports power-out for charging peripherals * Depending on many factors, actual data transfer speed may be lower than theoretical speed
Graphics	Intel UHD Graphics 630 or P630 in processor and NVIDIA® Quadro® P1000 or P2000 Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)								Monitor cable ( <i>optional</i> )	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter
Chipset	Mobile Intel CM246 Chipset								Bundled Accy	<i>Optional</i> : ThinkPad Ethernet Extension Cable
Memory	64GB max / 2666MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, two DDR4 SO-DIMM sockets								Camera ( <i>optional</i> )	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus
Display	<i>Some</i> : 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 <i>Some</i> : 15.6" (396mm) UHD (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)								Audio support	HD Audio, Realtek® ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone
Multi-touch ( <i>opt</i> )	Capacitive-type multi-touch, supports 10-finger gesture (4K only)								Keyboard	6-row, spill-resistant, multimedia Fn keys, LED backlight
Pen	Supports pen accessory, please see the accessory compatibility for details								UltraNav™	TrackPoint® pointing device and buttonless glass surface multi-touch touchpad
Storage	<i>Up to 2 drives (two M.2 SSD)</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s								Security	Power-on password, hard disk password, supervisor password, security keyhole
Optane™ memory	None								Security chip	Discrete TPM 2.0, TCG Certified
RAID ( <i>optional</i> )	RAID 0/1 support								vPro ( <i>optional</i> )	Intel vPro Technology
Optical	None								Fingerprint reader	Touch style match on chip fingerprint reader on the keyboard bezel
Ethernet	Native Intel Ethernet Connection I219-V ( <i>Non-vPro</i> ) or I219-LM ( <i>vPro</i> ) via bundled or optional ThinkPad Ethernet Extension Cable								Color calibration	None
WLAN	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card								NFC	None
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Battery	Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
WWAN	None								Max battery life ( <i>MobileMark 2014</i> )	<i>Discrete mode</i> : 7.36 hr; <i>Hybrid mode</i> : 13.87 hr * Battery life varies significantly with settings, usage, & other factors
SIM card	None								AC adapter	135W slim tip AC adapter
Dimensions	<i>WxDxH (non-touch)</i> : 14.24" x 9.67" x 0.72"; 361.8mm x 245.7mm x 18.4mm <i>WxDxH (multi-touch)</i> : 14.24" x 9.67" x 0.74"; 361.8mm x 245.7mm x 18.7mm <i>Non-touch model</i> : starting at 3.76 lb (1.7 kg); <i>Multi-touch model</i> : starting at 4.06 lb (1.8 kg)								Preload	<i>One of the following, configurable by model:</i> • Windows® 10 Home 64 • Windows 10 Pro 64 • Windows 10 Pro 64 for Workstations
Weight									Limited warranty	<i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service
Case color	Black								Mil-Spec test	MIL-STD-810G military testing
Case material	<i>Display cover</i> : CFRP/GFRP hybrid; <i>Bottom</i> : Aluminum alloy								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad P1 (2nd Gen) Platform Specifications

Product Specifications Reference (PSREF)

Processor	9th Generation Intel® Core™ i5 / i7 / i9 Processor or Intel Xeon® E Processor									Dimensions	<i>WxDxH (non-touch):</i> 14.24" x 9.67" x 0.72"; 361.8mm x 245.7mm x 18.4mm <i>WxDxH (multi-touch):</i> 14.24" x 9.67" x 0.74"; 361.8mm x 245.7mm x 18.7mm								
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		Weight	<i>Non-touch model:</i> starting at 3.75 lb (1.7 kg); <i>Multi-touch model:</i> starting at 4.0 lb (1.81 kg)								
	i5-9400H	4	8	2.5 GHz	4.3 GHz	8MB	DDR4-2666	Intel UHD Graphics 630		Case color	Black paint (FHD model) or black weave (UHD model)								
	i7-9750H	6	12	2.6 GHz	4.5 GHz	12MB		Intel UHD Graphics 630		Case material	<i>Display cover:</i> CFRP/GFRP hybrid; <i>Bottom:</i> Aluminum alloy								
	i7-9850H	6	12	2.6 GHz	4.6 GHz	12MB		Intel UHD Graphics 630		Smart card reader	<i>Optional:</i> Smart card reader								
	i9-9880H	8	16	2.3 GHz	4.8 GHz	16MB		Intel UHD Graphics P630		Media reader	SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card								
Graphics	Intel UHD Graphics 630 in processor only or Intel UHD Graphics 630 or P630 in processor and NVIDIA® Quadro® T1000 or T2000 Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 4096x2160@60Hz (Thunderbolt); 4096x2160@60Hz (HDMI)									Ports	Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, SD card reader, security keyhole, slim tip AC adapter <i>* Power Delivery only supports power-out for charging peripherals</i> <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>								
Chipset	Mobile Intel CM246 Chipset									Monitor cable (optional)	<i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter								
Memory	64GB max / 2666MHz DDR4, ECC or non-ECC (ECC function supported only on Xeon processor), dual-channel capable, two DDR4 SO-DIMM sockets									Bundled Accy	<i>Optional:</i> ThinkPad Ethernet Extension Cable								
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	Camera (optional)	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus								
	15.6"	FHD (1920x1080)	IPS	Anti-glare	300 nits	16:9	700:1	72% NTSC	170°	Audio support	HD Audio, Synaptic® CX11880 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack, Dolby Atmos® sound system								
	15.6"	FHD (1920x1080) HDR 400, Dolby Vision™	IPS	Anti-glare	500 nits	16:9	1200:1	72% NTSC	170°	Keyboard	6-row, spill-resistant, multimedia Fn keys, LED backlight UltraNav™ TrackPoint® pointing device and buttonless glass surface multi-touch touchpad								
	15.6"	UHD (3840x2160) HDR 400, Dolby Vision	IPS	Anti-glare	500 nits	16:9	1200:1	100% Adobe	170°	Security	Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified								
	15.6"	UHD (3840x2160) HDR 500 True Black, Dolby Vision, Multi-touch	OLED	AR, AS	SDR 400nit HDR 500nit (Peak)	16:9	100000:1	100% DCI-P3	170°	System Mgt (opt)	Intel vPro Technology								
Multi-touch (opt)	Capacitive-type multi-touch, supports 10-finger gesture (UHD OLED only), anti-reflection (AR), anti-smudge (AS) coating Supports pen accessory, please see the accessory compatibility for details									Fingerprint reader	Touch style match on chip fingerprint reader on the keyboard bezel								
Pen	Supports pen accessory, please see the accessory compatibility for details									Color calibration	<i>Optional:</i> X-Rite Pantone factory color calibration (UHD model only)								
Storage	Up to two M.2 SSD M.2 2280 SSD / PCIe NVMe 3.0 x 4									NFC	None								
RAID (optional)	RAID 0/1 support									Battery	Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)								
Optical	None									Max battery life	<i>MobileMark® 2014:</i> 13.8 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>								
Ethernet	Native Intel Ethernet Connection I219-V ( <i>Non-vPro</i> ) or I219-LM ( <i>vPro</i> ) via bundled or optional ThinkPad Ethernet Extension Cable									AC adapter	135W slim tip AC adapter								
WLAN	Intel Wireless-AX 22260, Wi-Fi 2x2 802.11ax + Bluetooth 5.1									Preload	<i>One of the following, configurable by model:</i> • Windows® 10 Home 64 • Windows 10 Pro 64 • Windows 10 Pro 64 for Workstations								
Bluetooth™	Bluetooth 5.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter									Limited warranty	<i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service								
WWAN	None									Mil-Spec test	MIL-STD-810G military testing								
SIM card	None									Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant								

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

Lenovo  
July 2019



# ThinkPad P51 Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th or 7th Generation Intel® Core™ i7 Processor or Intel Xeon® Processor E3 v5 or v6 Family							Dimensions	<i>WxDxH:</i> 14.86" x 9.93" x 0.96-1.16"; 377.4mm x 252.3mm x 24.5-29.4mm <i>WxDxH(Touch):</i> 14.86" x 9.93" x 1.02-1.21"; 377.4mm x 252.3mm x 25.8-30.7mm												
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	<table border="1"> <thead> <tr> <th>Models</th> <th>4-cell</th> <th>6-cell</th> </tr> </thead> <tbody> <tr> <td>Non-touch</td> <td>5.6 lb / 2.55kg</td> <td>5.9 lb / 2.67kg</td> </tr> <tr> <td>Multi-touch</td> <td>6.2 lb / 2.82kg</td> <td>6.4 lb / 2.90kg</td> </tr> </tbody> </table>			Models	4-cell	6-cell	Non-touch	5.6 lb / 2.55kg	5.9 lb / 2.67kg	Multi-touch	6.2 lb / 2.82kg	6.4 lb / 2.90kg
	Models	4-cell	6-cell																		
	Non-touch	5.6 lb / 2.55kg	5.9 lb / 2.67kg																		
	Multi-touch	6.2 lb / 2.82kg	6.4 lb / 2.90kg																		
	i7-6820HQ	4	8	2.7 GHz	3.6 GHz	8MB	DDR4-2133	Intel HD Graphics 530	Case color Case material	Black <i>Display cover:</i> Glass-Fiber Reinforced Plastic; <i>Bottom:</i> Magnesium/Aluminum											
	E3-1505M v5			2.8 GHz	3.7 GHz			Intel HD Graphics P530													
	i7-7700HQ			2.8 GHz	3.8 GHz	6MB	DDR4-2400	Intel HD Graphics 630	Smart card reader ExpressCard Media reader Ports	Optional: Smart card reader One slot (ExpressCard/34) 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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>											
i7-7820HQ	2.9 GHz			3.9 GHz	Intel HD Graphics P630																
E3-1505M v6	3.0 GHz			4.0 GHz	8MB	DDR4-2400	Intel HD Graphics P630	Camera (optional) Audio support	HD720p resolution, fixed focus HD Audio, Realtek® ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack												
E3-1535M v6	3.1 GHz			4.2 GHz			Intel HD Graphics P630														
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)							Keyboard UltraNav™	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight 3-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad												
Chipset Memory	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 <i>* System clocks down for processors with lower memory controller</i>							Security Security chip vPro (optional) Fingerprint reader Color calibration NFC	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology Touch style match on chip fingerprint reader on the palm rest Optional: Pantone® color calibrator by X-Rite® color calibration sensor in palm rest None												
Display	Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle Some: 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle							Battery Max battery life <sup>10</sup> (MobileMark® 2014)	Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh) <table border="1"> <thead> <tr> <th>Model</th> <th>4-cell</th> <th>6-cell</th> </tr> </thead> <tbody> <tr> <td>Discrete Graphics</td> <td>4.5 hr</td> <td>6.1 hr</td> </tr> <tr> <td>Hybrid Graphics</td> <td>6.5 hr</td> <td>8.9 hr</td> </tr> </tbody> </table> <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>			Model	4-cell	6-cell	Discrete Graphics	4.5 hr	6.1 hr	Hybrid Graphics	6.5 hr	8.9 hr	
Model	4-cell	6-cell																			
Discrete Graphics	4.5 hr	6.1 hr																			
Hybrid Graphics	6.5 hr	8.9 hr																			
Multi-touch (opt) Pen (optional)	Capacitive-type multi-touch, supports 10-finger gesture, 220 nits (FHD only) ThinkPad Pen Pro, active pen for multi-touch display							AC adapter	170W slim tip AC adapter												
Storage	Up to 3 drives (two M.2 SSD and one HDD) Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s							Preload	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												
RAID (optional) Optical	RAID 0/1 support None							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												
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)							Mil-Spec test	MIL-STD-810G military testing												
WLAN	One of the following, configurable by model: • Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card							Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant												
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter <i>* Intel 8260ac / 8265ac card support BT4.2 but is limited to BT4.1 by Windows OS</i>																				
WWAN (optional)	One of the following, configurable by model: • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card																				
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card																				

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

Lenovo  
September 2018



# ThinkPad P52 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i7 / i9 Processor or Intel Xeon® E Processor								Dimensions	<i>WxDxH:</i> 14.86" x 9.93" x 0.96-1.16"; 377.4mm x 252.3mm x 24.5-29.4mm <i>WxDxH(Touch):</i> 14.86" x 9.93" x 1.02-1.21"; 377.4mm x 252.3mm x 25.8-30.7mm <i>Non-touch model:</i> starting at 5.4 lb (2.45kg); <i>Multi-touch model:</i> starting at 6.4 lb (2.9kg)
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	Black <i>Display cover:</i> Glass-Fiber Reinforced Plastic; <i>Bottom:</i> Magnesium/Aluminum
	i7-8750H	6	12	2.2 GHz	4.1 GHz	9MB	DDR4-2400	Intel UHD Graphics 630	Case color Case material	<i>Optional:</i> Smart card reader ExpressCard None
	i7-8850H			2.6 GHz	4.3 GHz	9MB				
	i9-8950HK			2.9 GHz	4.8 GHz	12MB				
E-2176M	2.7 GHz			4.4 GHz	12MB	Intel UHD Graphics P630				
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)								Media reader Ports	4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card Three USB 3.1 Gen 1 (one Always On), two USB Type-C / Thunderbolt 3 (with the function of Power Delivery and DP), Mini DisplayPort 1.4, HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole <i>* Power Delivery only supports power-out for charging peripherals</i> <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
Chipset Memory	Mobile Intel CM246 Chipset 128GB non-ECC or 64GB ECC max / 2400MHz DDR4 (ECC function supported only on Xeon processor), dual-channel capable, four DDR4 SO-DIMM sockets <i>* Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation</i> <i>* 128GB non-ECC memory for special bid only</i>								Camera (optional)	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus
Display	<i>Some:</i> 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 <i>Some:</i> 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch								Audio support	HD Audio, Realtek® ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone
Multi-touch (opt) Pen	Capacitive-type multi-touch, supports 10-finger gesture (4K only) Supports pen accessory, please see the accessory compatibility for details								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
Storage	<i>Up to 3 drives (two M.2 SSD and one HDD)</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s								Security Security chip vPro (optional) Fingerprint reader Color calibration NFC (optional)	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology Touch style match on chip fingerprint reader on the palm rest None Near Field Communication
Optane™ memory RAID (optional) Optical	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2 RAID 0/1 support None								Battery Max battery life (MobileMark® 2014) AC adapter	Li-ion 90Wh battery <i>Discrete mode:</i> 6.1 hr; <i>Hybrid mode:</i> 8.9 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i> 170W slim tip AC adapter
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								Preload	<i>One of the following, configurable by model:</i> • Windows® 10 Home 64 • Windows 10 Pro 64 • Windows 10 Pro 64 for Workstations
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								Limited warranty	<i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service
WWAN (optional) SIM card (opt)	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								Mil-Spec test	MIL-STD-810G military testing
									Environment	EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad P52s Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor								Dimensions	<i>WxDxH:</i> 14.40" x 9.95" x 0.79-0.80"; 365.8mm x 252.8mm x 19.95-20.2mm					
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	starting at 4.39 lb / 1.99 kg					
	i5-8350U	4	8	1.7 GHz	3.6 GHz	6MB	DDR4-2400	Intel UHD Graphics 620	Case color	Black					
	i7-8550U			Case material	<i>Display cover:</i> Glass-Fiber Reinforced Plastic (PPS); <i>Bottom:</i> Glass-Fiber Reinforced Plastic										
i7-8650U	1.9 GHz			4.2 GHz	8MB	Smart card reader			<i>Optional:</i> Smart card reader						
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)								Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC)					
Chipset	Intel SoC (System on Chip) platform								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					
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>								Monitor cable (optional)	<i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter					
Display	<i>Some:</i> 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle <i>Some:</i> 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								Camera (optional)	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus					
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)								Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack					
Storage	<i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s <i>Some:</i> 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad					
Optane™ memory	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								Security	Power-on password, hard disk password, supervisor password, security keyhole					
Optical	None								Security chip	Discrete TPM 2.0, TCG Certified					
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								vPro (optional)	Intel vPro Technology					
WLAN + Bluetooth™	Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card <i>* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS</i>								Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest anti-spoofing technology					
WWAN (optional)	<i>One of the following, configurable by model:</i> • 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 <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>								NFC (optional)	Near Field Communication					
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card								Battery	Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery					
								Max battery life (MobileMark® 2014)	<i>Models</i>	48Wh	72Wh	32Wh + 24Wh	32Wh + 48Wh	32Wh + 72Wh	
								<i>Max battery life</i>		12.2 hr	18.5 hr	13.5 hr	20.1 hr	26.3 hr	
									<i>* Battery life varies significantly with settings, usage, &amp; other factors</i>						
								AC adapter	65W USB Type-C AC adapter						
								Preload	Windows® 10 Home 64 or Windows 10 Pro 64						
								Limited warranty	<i>One of the following, configurable by model:</i> • 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® 6.1; RoHS-compliant						



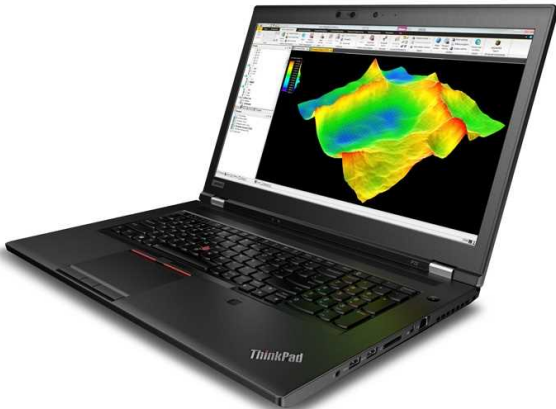
# ThinkPad P53s Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i7 Processor									Dimensions Weight Case color Case material	<i>WxDxH:</i> 14.40" x 9.76" x 0.75"; 365.8mm x 248mm x 19.1mm starting at 3.87 lb / 1.75 kg Black <i>Display cover:</i> PPS / 50% GF; <i>Bottom:</i> PA / 50% GF
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics			
Graphics	i7-8565U	4	8	1.8 GHz	4.6 GHz	8MB	DDR4-2400	Intel UHD Graphics 620		Smart card reader Media reader Ports	<i>Optional:</i> Smart card reader MicroSD card reader 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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i> <i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter
	i7-8665U			1.9 GHz	4.8 GHz	8MB					
Chipset	Intel SoC (System on Chip) platform									Monitor cable (optional)	* Depending on many factors, actual data transfer speed may be lower than theoretical speed <i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter
Memory	48GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket * Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation										
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	Bundled Accy	Camera (optional) <i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus Audio support HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack
	15.6"	FHD (1920x1080)	IPS	Anti-glare	250 nits	16:9	700:1	45%	170°		
	15.6"	UHD (3840x2160) Dolby Vision™ HDR	IPS	Anti-glare	500 nits	16:9	1200:1	100% Adobe	170°		
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)										
Storage	<ul style="list-style-type: none"> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</li> </ul>										
Optical	None										
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)										
WLAN	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0										
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter										
WWAN (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>										
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card										
Battery	Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)									Max battery life <i>MobileMark® 2014:</i> 15 hr (FHD model) / 10 hr (UHD model) <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>	
AC adapter	65W USB Type-C AC adapter										
Preload	Windows® 10 Home 64 or Windows 10 Pro 64										
Limited warranty	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>										
Mil-Spec test	MIL-STD-810G military testing										
Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant										

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

Lenovo  
July 2019



# ThinkPad P72 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i7 Processor or Intel Xeon® E Processor								Dimensions	<i>WxDxH:</i> 16.38" x 11.06" x 0.96-1.16"; 416mm x 281mm x 24.5-29.4mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	Starting at 7.5 lb (3.4kg)
	i7-8750H	6	12	2.2 GHz	4.1 GHz	9MB	DDR4-2400	Intel UHD Graphics 630	Case color	Black
	i7-8850H			2.6 GHz	4.3 GHz	9MB		Intel UHD Graphics P630	Case material	<i>Display cover:</i> GFRP + PPS; <i>Bottom:</i> Magnesium/Aluminum
	E-2176M			2.7 GHz	4.4 GHz	12MB		Intel UHD Graphics P630	Smart card reader	<i>Optional:</i> Smart card reader
E-2186M	2.9 GHz			4.8 GHz	12MB	ExpressCard		None		
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)								Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card
Chipset	Mobile Intel CM246 Chipset								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 <i>* Power Delivery only supports power-out for charging peripherals</i> <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
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 <i>* Installed DIMMs are actually 2666MHz but run at 2400MHz due to Intel limitation</i>								Monitor cable	<i>Optional:</i> Lenovo Mini-DisplayPort to DisplayPort Monitor Cable
Display	<i>Some:</i> 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 <i>Some:</i> 17.3" (439mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 100% Adobe CG, 170° viewing angle								Camera ( <i>optional</i> )	IR camera and HD720p camera, fixed focus
Multi-touch Pen	None Supports pen accessory, please see the accessory compatibility for details								Audio support	HD Audio, Realtek® ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone
Storage	<i>Up to 3 drives (two M.2 SSD and one HDD)</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, LED backlight
Optane™ memory	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								UltraNav™	3-button TrackPoint® pointing device and 3-button Mylar surface multi-touch touchpad
RAID ( <i>optional</i> )	RAID 0/1 support								Security	Power-on password, hard disk password, supervisor password, security keyhole
Optical	None								Security chip	Discrete TPM 2.0, TCG Certified
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								vPro ( <i>optional</i> )	Intel vPro Technology
WLAN	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card								Fingerprint reader	Touch style match on chip fingerprint reader on the palm rest
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Color calibration	None
WWAN	None								NFC ( <i>optional</i> )	Near Field Communication
SIM card	None								Battery	Li-ion 99Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
									Max battery life	<i>MobileMark® 2014:</i> 18 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>
									AC adapter	230W slim tip AC adapter
									Preload	<i>One of the following, configurable by model:</i> • Windows® 10 Home 64 • Windows 10 Pro 64 • Windows 10 Pro 64 for Workstations
									Limited warranty	<i>One of the following, configurable by model:</i> • 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	EPPEAT™ Gold (US only); ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo  
May 2019



# ThinkPad T470 Platform Specifications

Product Specifications Reference (PSREF)

<p><b>Processor</b></p> <p>6th Generation Intel® Core™ i5 / i7 Processor or</p> <table border="1"> <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 rowspan="4">2</td> <td rowspan="4">4</td> <td>2.3 GHz</td> <td>2.8 GHz</td> <td>3MB</td> <td rowspan="4">DDR4-2133</td> <td rowspan="4">Intel HD Graphics 520</td> </tr> <tr> <td>i5-6300U</td> <td>2.4 GHz</td> <td>3.0 GHz</td> <td>3MB</td> </tr> <tr> <td>i7-6500U</td> <td>2.5 GHz</td> <td>3.1 GHz</td> <td>4MB</td> </tr> <tr> <td>i7-6600U</td> <td>2.6 GHz</td> <td>3.4 GHz</td> <td>4MB</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i5-6200U	2	4	2.3 GHz	2.8 GHz	3MB	DDR4-2133	Intel HD Graphics 520	i5-6300U	2.4 GHz	3.0 GHz	3MB	i7-6500U	2.5 GHz	3.1 GHz	4MB	i7-6600U	2.6 GHz	3.4 GHz	4MB	<p><b>Dimensions</b> <i>WxDxH:</i> 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm</p> <p><b>Weight</b></p> <table border="1"> <thead> <tr> <th>Models</th> <th>3-cell or 3 + 3-cell</th> <th>6-cell or 3 + 6-cell</th> </tr> </thead> <tbody> <tr> <td>Magnesium</td> <td>3.49 lb / 1.58 kg</td> <td>3.92 lb / 1.78 kg</td> </tr> <tr> <td>PPS</td> <td>3.63 lb / 1.65 kg</td> <td>4.35 lb / 1.85 kg</td> </tr> </tbody> </table> <p><b>Case color</b> <b>Case material</b></p> <p>Black Display cover: Magnesium Hybrid or PPS; Bottom: Glass-Fiber Reinforced Plastic</p>	Models	3-cell or 3 + 3-cell	6-cell or 3 + 6-cell	Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg	PPS	3.63 lb / 1.65 kg	4.35 lb / 1.85 kg
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																															
i5-6200U	2	4	2.3 GHz	2.8 GHz	3MB	DDR4-2133	Intel HD Graphics 520																															
i5-6300U			2.4 GHz	3.0 GHz	3MB																																	
i7-6500U			2.5 GHz	3.1 GHz	4MB																																	
i7-6600U			2.6 GHz	3.4 GHz	4MB																																	
Models	3-cell or 3 + 3-cell	6-cell or 3 + 6-cell																																				
Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg																																				
PPS	3.63 lb / 1.65 kg	4.35 lb / 1.85 kg																																				
<p>7th Generation Intel Core i3 / i5 / i7 Processor</p> <table border="1"> <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>i3-7100U</td> <td rowspan="5">2</td> <td rowspan="5">4</td> <td>2.4 GHz</td> <td>-</td> <td>3MB</td> <td rowspan="5">DDR4-2133</td> <td rowspan="5">Intel HD Graphics 620</td> </tr> <tr> <td>i5-7200U</td> <td>2.5 GHz</td> <td>3.1 GHz</td> <td>3MB</td> </tr> <tr> <td>i5-7300U</td> <td>2.6 GHz</td> <td>3.5 GHz</td> <td>3MB</td> </tr> <tr> <td>i7-7500U</td> <td>2.7 GHz</td> <td>3.5 GHz</td> <td>4MB</td> </tr> <tr> <td>i7-7600U</td> <td>2.8 GHz</td> <td>3.9 GHz</td> <td>4MB</td> </tr> </tbody> </table> <p><i>* i7-6500U is NOT available in EMEA</i></p>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i3-7100U	2	4	2.4 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620	i5-7200U	2.5 GHz	3.1 GHz	3MB	i5-7300U	2.6 GHz	3.5 GHz	3MB	i7-7500U	2.7 GHz	3.5 GHz	4MB	i7-7600U	2.8 GHz	3.9 GHz	4MB	<p><b>Smart card reader</b> <b>Media reader</b> <b>Ports</b></p> <p><i>Optional:</i> Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 / Thunderbolt 3 (w/ the function of Power Delivery and DP), HDMI 1.4b, Ethernet (RJ-45), Dock connector <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i></p> <p><b>WiGig dock (opt)</b> <b>Monitor cable</b></p> <p>ThinkPad WiGig dock <i>Optional:</i> Lenovo USB-C to VGA Adapter</p>					
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																															
i3-7100U	2	4	2.4 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620																															
i5-7200U			2.5 GHz	3.1 GHz	3MB																																	
i5-7300U			2.6 GHz	3.5 GHz	3MB																																	
i7-7500U			2.7 GHz	3.5 GHz	4MB																																	
i7-7600U			2.8 GHz	3.9 GHz	4MB																																	
<p><b>Graphics</b></p> <p>Intel HD Graphics 520 or 620 in processor only, or Intel HD Graphics 620 in processor and NVIDIA GeForce® 940MX, 2GB 2.5GHz GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)</p>	<p><b>Camera (optional)</b> <b>Audio support</b></p> <p>720p: HD720p resolution, fixed focus IR &amp; 720p: IR camera and HD720p camera (mutually exclusive with WiGig) HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack</p>																																					
<p><b>Chipset</b> <b>Memory</b></p> <p>Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i></p>	<p><b>Keyboard</b> <b>Security</b> <b>Security chip</b> <b>vPro (optional)</b> <b>Fingerprint reader</b> <b>NFC (optional)</b></p> <p>6-row, spill-resistant, multimedia Fn keys, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology <i>Optional:</i> Touch style match on chip fingerprint reader on the keyboard bezel Near Field Communication</p>																																					
<p><b>Display</b></p> <p><i>Some:</i> 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 contrast ratio <i>Some:</i> 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 contrast ratio <i>Some:</i> 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle</p> <p><b>Multi-touch (opt)</b> On-cell touch, supports 10-finger gesture (FHD IPS panel with PPS cover only)</p>	<p><b>Internal battery</b> <b>External battery</b> <b>Max battery life (MobileMark® 2014)</b></p> <p><i>Optional:</i> Integrated Li-Polymer 3-cell (24Wh) Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh or 72Wh)</p> <table border="1"> <thead> <tr> <th>Models</th> <th>3-cell</th> <th>3 + 3-cell</th> <th>6-cell 48Wh</th> <th>6-cell 72Wh</th> <th>3 + 6-cell 48Wh</th> <th>3 + 6-cell 72Wh</th> </tr> </thead> <tbody> <tr> <td>Integrated</td> <td>6.9 hr</td> <td>13.9 hr</td> <td>13.9 hr</td> <td>20.9 hr</td> <td>20.9 hr</td> <td>27.1 hr</td> </tr> <tr> <td>Discrete</td> <td>6.9 hr</td> <td>13.9 hr</td> <td>14.3 hr</td> <td>21.6 hr</td> <td>21.2 hr</td> <td>28.6 hr</td> </tr> </tbody> </table> <p><i>* Battery life varies significantly with settings, usage, &amp; other factors</i></p>	Models	3-cell	3 + 3-cell	6-cell 48Wh	6-cell 72Wh	3 + 6-cell 48Wh	3 + 6-cell 72Wh	Integrated	6.9 hr	13.9 hr	13.9 hr	20.9 hr	20.9 hr	27.1 hr	Discrete	6.9 hr	13.9 hr	14.3 hr	21.6 hr	21.2 hr	28.6 hr																
Models	3-cell	3 + 3-cell	6-cell 48Wh	6-cell 72Wh	3 + 6-cell 48Wh	3 + 6-cell 72Wh																																
Integrated	6.9 hr	13.9 hr	13.9 hr	20.9 hr	20.9 hr	27.1 hr																																
Discrete	6.9 hr	13.9 hr	14.3 hr	21.6 hr	21.2 hr	28.6 hr																																
<p><b>Storage</b></p> <p><i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s <i>Some:</i> 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN and WiGig</p>	<p><b>AC adapter</b> <b>Preload</b></p> <p>45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 <i>Some:</i> Windows 10 Home 64 <i>Some:</i> Windows 10 Pro 64 • Lenovo Solution Center • Lenovo PowerEngage • ThinkVantage Product Recovery • ThinkVantage System Update • Adobe® Reader® • Microsoft® Office preloaded; purchase a product key to activate • McAfee® LiveSafe™ (30-day trial)</p>																																					
<p><b>Optical</b> <b>Ethernet</b></p> <p>None <i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)</p>	<p><b>Limited warranty</b></p> <p><i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service</p>																																					
<p><b>WLAN</b></p> <p><i>One of the following, configurable by model (WiGig can coexist with WWAN):</i> • Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</p> <p><b>Bluetooth™</b> Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter <i>* Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS</i></p>	<p><b>Mil-Spec test</b> <b>Environment</b></p> <p>MIL-STD-810G military testing EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</p>																																					
<p><b>WWAN (optional)</b> <i>One of the following, configurable by model (WWAN can coexist with WiGig):</i> • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card • Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)</p> <p><b>SIM card (opt)</b> Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card</p>																																						



# ThinkPad T470s Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th Generation Intel® Core™ i5 / i7 Processor								Dimensions Weight Case color Case material	<i>WxDxH:</i> 13.03" x 8.93" x 0.67-0.74"; 331mm x 226.8mm x 16.9-18.8mm Starting at 2.9 lb (1.32kg) Black or Silver <i>Display cover:</i> CFRP Hybrid; <i>Bottom:</i> Magnesium
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		
	i5-6200U	2	4	2.3 GHz	2.8 GHz	3MB	DDR4-2133	Intel HD Graphics 520		
	i5-6300U			2.4 GHz	3.0 GHz	3MB				
i7-6600U	2.6 GHz			3.4 GHz	4MB					
Processor	or 7th Generation Intel Core i5 / i7 Processor								Smart card reader Media reader Ports	<i>Optional:</i> Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC) 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 * <i>Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		
	i5-7200U	2	4	2.5 GHz	3.1 GHz	3MB	DDR4-2133	Intel HD Graphics 620		
	i5-7300U			2.6 GHz	3.5 GHz	3MB				
i7-7500U	2.7 GHz			3.5 GHz	4MB					
i7-7600U	2.8 GHz			3.9 GHz	4MB					
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)								WiGig dock (opt) Monitor cable (optional)	ThinkPad WiGig dock, mutually exclusive with WWAN HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter
Chipset	Intel SoC (System on Chip) platform								Camera (optional)	HD720p resolution, fixed focus (models without camera are NOT available in EMEA)
Memory	20GB or 24GB max <sup>7</sup> / 2400MHz DDR4, dual-channel capable, 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket * <i>System clocks down for processors with lower memory controller</i>								Audio support	HD Audio, Realtek® ALC3268 codec / stereo speakers, 1W x 2 / dual array microphone, combo audio/microphone jack
Display	Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle Some: 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle								Keyboard UltraNav™	6-row, spill-resistant, multimedia Fn keys, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
Multi-touch (opt)	On-cell touch, supports 10-finger gesture, 250 nits (FHD only)								Security Security chip vPro (optional) Fingerprint reader NFC (optional)	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology <i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest Near Field Communication
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)								Internal battery Max battery life	Front Li-Polymer 3-cell (23Wh) and rear Li-ion 3-cell (26Wh), both Integrated <i>MobileMark® 2014:</i> up to 10.5 hr * <i>Battery life varies significantly with settings, usage, &amp; other factors</i>
Optical	None								AC adapter	45W slim tip AC adapter, 45W or 65W USB Type-C AC adapter
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)								Preload	Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 • Lenovo Solution Center • Lenovo PowerEngage • ThinkVantage Product Recovery • ThinkVantage System Update • Adobe® Reader® • Microsoft® Office preloaded; purchase a product key to activate • McAfee® LiveSafe™ (30-day trial)
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								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
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter * <i>Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS</i>								Mil-Spec test	MIL-STD-810G military testing
WWAN (optional)	One of the following, configurable by model (mutually exclusive with WiGig): • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card • Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
SIM card (opt)										



# ThinkPad T480 Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i5 Processor							Dimensions Weight	WxDxH: 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm						
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types		Processor Graphics	Models	24Wh or 24Wh + 24Wh	48Wh, 72Wh, or 24Wh + 48Wh / 72Wh			
	i5-7200U	2	4	2.5 GHz	3.1 GHz	3MB	DDR4-2133	Intel HD Graphics 620	Integrated Magnesium	3.49 lb / 1.58 kg	3.92 lb / 1.78 kg				
	i5-7300U			2.6 GHz	3.5 GHz	3MB			Integrated PPS	3.63 lb / 1.65 kg	4.08 lb / 1.85 kg				
	or 8th Generation Intel Core i3 / i5 / i7 Processor							Case color Case material	Black Display cover: Magnesium Hybrid or PPS; Bottom: Glass-Fiber Reinforced Plastic						
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types		Processor Graphics	Smart card reader	Optional: Smart card reader				
	i3-8130U	4	8	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC)					
	i5-8250U			1.6 GHz	3.4 GHz	6MB			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					
	i5-8350U			1.7 GHz	3.6 GHz	6MB			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					
	i7-8550U			1.8 GHz	4.0 GHz	8MB			Camera (optional)	One of the following, configurable by model: • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus					
	i7-8650U			1.9 GHz	4.2 GHz	8MB			Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack					
Graphics	Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel HD Graphics 620 or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX150, 2GB GDDR5 memory (discrete graphics is available only on i7 models in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)							Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad						
Chipset	Intel SoC (System on Chip) platform							Security	Power-on password, hard disk password, supervisor password, security keyhole						
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * System clocks down for processors with lower memory controller							Security chip	Discrete TPM 2.0, TCG Certified						
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							vPro (optional)	Intel vPro Technology						
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)							Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the keyboard bezel, anti-spoofing technology						
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							NFC (optional)	Near Field Communication						
Optane™ memory	Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2							Battery	Optional integrated Li-ion 24Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery						
Optical	None							Max battery life (MobileMark® 2014)	Models	24Wh	48Wh	72Wh	24Wh + 24Wh	24Wh + 48Wh	24Wh + 72Wh
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)							AC adapter	45W or 65W USB Type-C AC adapter						
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							Preload	Windows® 10 Home 64 or Windows 10 Pro 64						
WWAN (optional)	One of the following, configurable by model (mutually exclusive with Intel Optane memory): • Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only) • Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card * For non-WWAN model, it means the model is NOT WWAN upgradable							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						
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card							Mil-Spec test	MIL-STD-810G military testing						
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant						

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

Lenovo  
May 2019



# ThinkPad T480s Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i5 Processor							Dimensions Weight Case color Case material	<i>WxDxH:</i> 13.03" x 8.93" x 0.73"; 331mm x 226.8mm x 18.45mm Starting at 2.9 lb (1.32kg) Black or Silver <i>Display cover:</i> CFRP Hybrid; <i>Bottom:</i> Magnesium
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types		
	i5-7200U	2	4	2.5 GHz	3.1 GHz	3MB	DDR4-2133	Intel HD Graphics 620	
	i5-7300U			2.6 GHz	3.5 GHz	3MB			
	or 8th Generation Intel Core i5 / i7 Processor							Smart card reader Media reader Ports	<i>Optional:</i> Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC) 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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types		
	i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB	DDR4-2400	Intel UHD Graphics 620	
	i5-8350U			1.7 GHz	3.6 GHz	6MB			
	i7-8550U			1.8 GHz	4.0 GHz	8MB			
	i7-8650U			1.9 GHz	4.2 GHz	8MB			
Graphics	Intel HD Graphics 620 or Intel UHD Graphics 620 in processor only or Intel UHD Graphics 620 in processor and NVIDIA® GeForce® MX150, 2GB GDDR5 memory (discrete models are NOT available in EMEA); supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)							Monitor cable (optional)	USB-C to VGA: Lenovo USB-C to VGA Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter
Chipset	Intel SoC (System on Chip) platform							Camera	One of the following, configurable by model: • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus
Memory	20GB or 24GB max / 2400MHz DDR4, dual-channel capable, 4GB or 8GB memory soldered to systemboard, one DDR4 SO-DIMM socket <i>* System clocks down for processors with lower memory controller</i>							Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack
Display	Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle, supports ThinkPad Privacy Guard on some models Some: 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle							Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight
Multi-touch (opt)	On-cell touch, supports 10-finger gesture, 250 nits (FHD only)							UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
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							Security	Power-on password, hard disk password, supervisor password, security keyhole
Optane™ memory	None							Security chip	Discrete TPM 2.0, TCG Certified
Optical	None							vPro (optional)	Intel vPro Technology
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)							Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology
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							NFC (optional)	Near Field Communication
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							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
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card							AC adapter	45W or 65W USB Type-C AC adapter
								Operating system	Windows® 10 Home 64 or Windows 10 Pro 64
								Limited warranty	One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service
								Mil-Spec test	MIL-STD-810G military testing
								Environment	EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad T490 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor									Dimensions Weight	WxDxH: 12.95" x 8.94" x 0.70"; 329mm x 227mm x 17.9mm		
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Models		FHD	FHD Low Power / WQHD	
Graphics	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	DDR4-2400	Intel UHD Graphics 620	Weight	3.41 lb / 1.55 kg	3.23 lb / 1.46 kg		
	i5-8365U			1.6 GHz	4.1 GHz	6MB			Case color Case material	Black			
	i7-8565U			1.8 GHz	4.6 GHz	8MB				Display cover: PPS / 50% GF; Bottom: PA / 50% GF			
	i7-8665U			1.9 GHz	4.8 GHz	8MB				Optional: Smart card reader			
Chipset	Intel SoC (System on Chip) platform									Media reader	MicroSD card reader		
Memory	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									Ports	Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole * Depending on many factors, actual data transfer speed may be lower than theoretical speed		
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	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		
	14.0"	HD (1366x768)	TN	Anti-glare	220 nits	16:9	400:1	45%	90°	Bundled Accy	None		
	14.0"	FHD (1920x1080)	IPS	Anti-glare	250 nits (non-touch) 300 nits (multi-touch)	16:9	700:1	45%	170°	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		
	14.0"	FHD (1920x1080) Low Power	IPS	Anti-glare	400 nits	16:9	800:1	72%	170°	Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack		
	14.0"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	170°	Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad		
	14.0"	WQHD (2560x1440) HDR, Dolby Vision™	IPS	Glossy	500 nits	16:9	1500:1	100% Adobe	170°	Security	Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified System Mgt (opt) Intel vPro Technology Fingerprint reader Optional: Touch style match on chip fingerprint reader on the palm rest NFC (optional) Near Field Communication		
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)									Battery	Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr)		
Storage	<ul style="list-style-type: none"> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</li> </ul>									Max battery life	MobileMark® 2014: 16.11 hr * Battery life varies significantly with settings, usage, & other factors		
Optical	None									AC adapter	45W or 65W USB Type-C AC adapter		
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)									Preload	Windows® 10 Home 64 or Windows 10 Pro 64		
WLAN (optional)	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0									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		
Bluetooth™ (opt)	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter									Mil-Spec test	MIL-STD-810G military testing		
WWAN (optional)	One of the following, configurable by model: • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only) • Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card • Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 4x4, M.2 card * For non-WWAN model, it means the model is NOT WWAN upgradable									Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant		
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card												

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



# ThinkPad T490s Platform Specifications

Product Specifications Reference (PSREF)

<p><b>Processor</b> 8th Generation Intel® Core™ i5 / i7 Processor</p> <table border="1"> <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 rowspan="4">4</td> <td rowspan="4">8</td> <td>1.6 GHz</td> <td>3.9 GHz</td> <td>6MB</td> <td rowspan="4">DDR4-2400</td> <td rowspan="4">Intel UHD Graphics 620</td> </tr> <tr> <td>i5-8365U</td> <td>1.6 GHz</td> <td>4.1 GHz</td> <td>6MB</td> </tr> <tr> <td>i7-8565U</td> <td>1.8 GHz</td> <td>4.6 GHz</td> <td>8MB</td> </tr> <tr> <td>i7-8665U</td> <td>1.9 GHz</td> <td>4.8 GHz</td> <td>8MB</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	DDR4-2400	Intel UHD Graphics 620	i5-8365U	1.6 GHz	4.1 GHz	6MB	i7-8565U	1.8 GHz	4.6 GHz	8MB	i7-8665U	1.9 GHz	4.8 GHz	8MB	<p><b>Dimensions</b> <i>WxDxH (black with FHD / Privacy Guard):</i> 12.95" x 8.90" x 0.66"; 329.0mm x 226.15mm x 16.7mm <i>WxDxH (black with FHD Low Power / WQHD):</i> 12.94" x 8.89" x 0.63"; 328.8mm x 225.8mm x 16.1mm <i>WxDxH (silver):</i> 12.96" x 8.92" x 0.68"; 329.15mm x 226.45mm x 17.2mm</p> <p><b>Weight</b></p> <table border="1"> <thead> <tr> <th>Models</th> <th>Black with FHD</th> <th>Black with FHD Low Power / WQHD / Privacy Guard</th> <th>Silver</th> </tr> </thead> <tbody> <tr> <td>Weight</td> <td>2.98 lb / 1.35 kg</td> <td>2.81 lb / 1.27 kg</td> <td>3.29 lb / 1.49 kg</td> </tr> </tbody> </table>	Models	Black with FHD	Black with FHD Low Power / WQHD / Privacy Guard	Silver	Weight	2.98 lb / 1.35 kg	2.81 lb / 1.27 kg	3.29 lb / 1.49 kg									
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																																							
i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	DDR4-2400	Intel UHD Graphics 620																																							
i5-8365U			1.6 GHz	4.1 GHz	6MB																																									
i7-8565U			1.8 GHz	4.6 GHz	8MB																																									
i7-8665U			1.9 GHz	4.8 GHz	8MB																																									
Models	Black with FHD	Black with FHD Low Power / WQHD / Privacy Guard	Silver																																											
Weight	2.98 lb / 1.35 kg	2.81 lb / 1.27 kg	3.29 lb / 1.49 kg																																											
<p><b>Graphics</b> 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)</p>	<p><b>Case color</b> Black or Silver <b>Case material</b> <i>Display cover:</i> CFRP Hybrid (black) or Aluminum (silver); <i>Bottom:</i> Magnesium</p>																																													
<p><b>Chipset</b> Intel SoC (System on Chip) platform <b>Memory</b> 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation</i></p>	<p><b>Smart card reader</b> <i>Optional:</i> Smart card reader <b>Media reader</b> MicroSD card reader <b>Ports</b> Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i></p>																																													
<p><b>Display</b></p> <table border="1"> <thead> <tr> <th>Size</th> <th>Resolution</th> <th>Type</th> <th>Surface</th> <th>Brightness</th> <th>Aspect Ratio</th> <th>Contrast Ratio</th> <th>Color Gamut</th> <th>Viewing Angle</th> </tr> </thead> <tbody> <tr> <td>14.0"</td> <td>FHD (1920x1080)</td> <td>IPS</td> <td>Anti-glare</td> <td>250 nits (non-touch) 300 nits (multi-touch)</td> <td>16:9</td> <td>700:1</td> <td>45%</td> <td>170°</td> </tr> <tr> <td>14.0"</td> <td>FHD (1920x1080) Low Power</td> <td>IPS</td> <td>Anti-glare</td> <td>400 nits</td> <td>16:9</td> <td>800:1</td> <td>72%</td> <td>170°</td> </tr> <tr> <td>14.0"</td> <td>FHD (1920x1080) ThinkPad Privacy Guard</td> <td>IPS</td> <td>Anti-glare</td> <td>400 nits</td> <td>16:9</td> <td>1000:1</td> <td>72%</td> <td>170°</td> </tr> <tr> <td>14.0"</td> <td>WQHD (2560x1440) HDR, Dolby Vision™</td> <td>IPS</td> <td>Glossy</td> <td>500 nits</td> <td>16:9</td> <td>1500:1</td> <td>100% Adobe</td> <td>170°</td> </tr> </tbody> </table>	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	14.0"	FHD (1920x1080)	IPS	Anti-glare	250 nits (non-touch) 300 nits (multi-touch)	16:9	700:1	45%	170°	14.0"	FHD (1920x1080) Low Power	IPS	Anti-glare	400 nits	16:9	800:1	72%	170°	14.0"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	170°	14.0"	WQHD (2560x1440) HDR, Dolby Vision™	IPS	Glossy	500 nits	16:9	1500:1	100% Adobe	170°	<p><b>Monitor cable (optional)</b> <i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter <i>Optional:</i> ThinkPad Ethernet Extension Adapter Gen 2</p> <p><b>Bundled Accy</b> <i>Optional:</i> ThinkPad Ethernet Extension Adapter Gen 2</p> <p><b>Camera</b> <i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus</p> <p><b>Audio support</b> HD Audio, Realtek® ALC3287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack</p>
Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle																																						
14.0"	FHD (1920x1080)	IPS	Anti-glare	250 nits (non-touch) 300 nits (multi-touch)	16:9	700:1	45%	170°																																						
14.0"	FHD (1920x1080) Low Power	IPS	Anti-glare	400 nits	16:9	800:1	72%	170°																																						
14.0"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	170°																																						
14.0"	WQHD (2560x1440) HDR, Dolby Vision™	IPS	Glossy	500 nits	16:9	1500:1	100% Adobe	170°																																						
<p><b>Multi-touch (opt)</b> On-cell touch, supports 10-finger gesture (FHD only)</p>																																														
<p><b>Storage</b></p> <ul style="list-style-type: none"> <li>• M.2 2280 SSD / SATA 6.0Gb/s</li> <li>• M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>• M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>• Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</li> </ul> <p><b>Optical</b> None</p>	<p><b>Keyboard</b> 6-row, spill-resistant, multimedia Fn keys, optional LED backlight <b>UltraNav™</b> TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad</p> <p><b>Security</b> Power-on password, hard disk password, supervisor password, security keyhole <b>Security chip</b> Discrete TPM 2.0, TCG Certified <b>System Mgt (opt)</b> Intel vPro Technology <b>Fingerprint reader</b> <i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest <b>NFC (optional)</b> Near Field Communication</p>																																													
<p><b>Ethernet</b> Native Intel Ethernet Connection I219-V (<i>Non-vPro</i>) or I219-LM (<i>vPro</i>) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2</p>																																														
<p><b>WLAN + Bluetooth™ (optional)</b> <i>One of the following, configurable by model:</i></p> <ul style="list-style-type: none"> <li>• Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0</li> <li>• Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0</li> </ul>	<p><b>Battery</b> Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) <b>Max battery life</b> <i>MobileMark® 2014:</i> 20 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i> <b>AC adapter</b> 45W or 65W USB Type-C AC adapter</p>																																													
<p><b>WWAN (optional)</b> <i>One of the following, configurable by model:</i></p> <ul style="list-style-type: none"> <li>• Wireless WAN upgradable</li> <li>• Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)</li> <li>• Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> <p><i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i></p>	<p><b>Preload</b> Windows® 10 Home 64 or Windows 10 Pro 64</p> <p><b>Limited warranty</b> <i>One of the following, configurable by model:</i></p> <ul style="list-style-type: none"> <li>• 1-year depot repair service</li> <li>• 3-year/1-yr battery depot repair service</li> <li>• 3-year/1-yr battery limited onsite service</li> </ul>																																													
<p><b>SIM card (opt)</b> Nano-SIM card slot, optional Verizon LTE (US) SIM card</p>	<p><b>Mil-Spec test</b> MIL-STD-810G military testing</p> <p><b>Environment</b> EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant</p>																																													

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

Lenovo  
July 2019



AMD



AMD



AMD



AMD



AMD



AMD

# ThinkPad T495 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics									Dimensions WxDxH: 12.95" x 8.94" x 0.70"; 329mm x 227mm x 17.9mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller	Processor Graphics		
	Ryzen 3 Pro 3300U	4	4	2.1 GHz	3.5 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 6 Graphics		
	Ryzen 5 Pro 3500U	4	8	2.1 GHz	3.7 GHz	2MB L2 / 4MB L3		Radeon Vega 8 Graphics		
Ryzen 7 Pro 3700U	4	8	2.3 GHz	4.0 GHz	2MB L2 / 4MB L3	Radeon Vega 10 Graphics				
Graphics	AMD Radeon Vega 6, Vega 8, or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI; supports four independent displays; Max resolution: 5120x2880@60Hz (USB-C); 4096x2160@60Hz (HDMI)									Case color Black Case material Display cover: PPS / 50% GF; Bottom: PA / 50% GF
Chipset	AMD SoC (System on Chip) platform									
Memory	32GB 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 AMD limitation									
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	
	14.0"	HD (1366x768)	TN	Anti-glare	220 nits	16:9	400:1	45%	90°	
	14.0"	FHD (1920x1080)	IPS	Anti-glare	250 nits (non-touch) 300 nits (multi-touch)	16:9	700:1	45%	170°	
	14.0"	FHD (1920x1080) Low Power	IPS	Anti-glare	400 nits	16:9	800:1	72%	170°	
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)									Smart card reader Optional: Smart card reader Media reader MicroSD card reader Ports One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole * Depending on many factors, actual data transfer speed may be lower than theoretical speed Monitor cable (optional) HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter Bundled Accy None
Storage	<ul style="list-style-type: none"> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> </ul>									
Optical	None									
Ethernet	Realtek® RTL8111 Gigabit Ethernet connection									
WLAN	Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0									Camera (optional) One of the following, configurable by model: • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus Audio support HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack Keyboard 6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad Security Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified System Mgt DASH Management Fingerprint reader Optional: Touch style match on chip fingerprint reader on the palm rest NFC None Battery Integrated Li-ion 50Wh battery, supports Rapid Charge (charge up to 80% in 1hr) 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 Preload Windows® 10 Home 64 or Windows 10 Pro 64 Limited warranty One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service Mil-Spec test MIL-STD-810G military testing Environment EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter									
WWAN (optional)	One of the following, configurable by model: <ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> * 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									

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

Lenovo  
July 2019



AMD



AMD



AMD



AMD



AMD



AMD

# ThinkPad T495s Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics									Dimensions	<i>WxDxH (FHD / Privacy Guard):</i> 12.95" x 8.90" x 0.66"; 329.0mm x 226.15mm x 16.7mm			
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller	Processor Graphics			<i>WxDxH (Low Power):</i> 12.94" x 8.89" x 0.63"; 328.8mm x 225.8mm x 16.1mm			
Graphics	AMD Radeon Vega 8 or Vega 10 Graphics in processor; supports external digital monitor via USB-C or HDMI; supports three independent displays; Max resolution: 4096x2304@60Hz (USB-C); 4096x2160@24Hz (HDMI)									Weight	Models	FHD	FHD Low Power	FHD Privacy Guard
	Ryzen 5 Pro 3500U	4	8	2.1 GHz	3.7 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 8 Graphics			Weight	2.92 lb / 1.33 kg	2.76 lb / 1.25 kg	2.89 lb / 1.31 kg
Chipset Memory	AMD SoC (System on Chip) platform 8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets <i>* Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation</i>									Case color	Black			
	Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut		Viewing Angle	Case material	<i>Display cover:</i> CFRP Hybrid; <i>Bottom:</i> Magnesium/Aluminum	
14.0"		FHD (1920x1080)	IPS	Anti-glare	250 nits (non-touch) 300 nits (multi-touch)	16:9	700:1	45%	170°	Smart card reader	Optional: Smart card reader			
14.0"	FHD (1920x1080) Low Power	IPS	Anti-glare	400 nits	16:9	800:1	72%	170°	Media reader		MicroSD card reader			
14.0"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	170°		Ports	One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, microSD card reader, side docking connector, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>			
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)										Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter		
Storage	M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4									Bundled Accy		USB-C to VGA: Lenovo USB-C to VGA Adapter		
Optical	None										Camera	Optional: ThinkPad Ethernet Extension Adapter Gen 2		
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2									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		
WLAN (optional) Bluetooth™	Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter										Keyboard	HD Audio, Realtek® ALC3287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack		
WWAN (optional)	One of the following, configurable by model: • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>									UltraNav™		6-row, spill-resistant, multimedia Fn keys, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad		
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card										Security	Power-on password, hard disk password, supervisor password, security keyhole		
										Security chip System Mgt		Discrete TPM 2.0, TCG Certified DASH Management		
											Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest		
										Battery		None		
											Max battery life	Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) MobileMark® 2014: 16.4 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>		
										AC adapter		45W or 65W USB Type-C AC adapter		
											Preload	Windows® 10 Home 64 or Windows 10 Pro 64		
										Limited warranty		One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service		
											MIL-Spec test	MIL-STD-810G military testing		
										Environment		EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant		

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

Lenovo  
July 2019



# ThinkPad T580 Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i5 Processor							Dimensions Weight	<i>WxDxH:</i> 14.40" x 9.95" x 0.79-0.80"; 365.8mm x 252.8mm x 19.95-20.2mm <i>Integrated model:</i> starting at 4.29 lb / 1.95 kg; <i>Discrete model:</i> starting at 4.39 lb / 1.99 kg														
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types			Processor Graphics													
	i5-7200U	2	4	2.5 GHz	3.1 GHz	3MB	DDR4-2133	Intel HD Graphics 620															
	i5-7300U			2.6 GHz	3.5 GHz	3MB																	
	or 8th Generation Intel Core i5 / i7 Processor							Smart card reader Media reader Ports	<i>Optional:</i> Smart card reader 4-in-1 reader (MMC, SD, SDHC, SDXC) 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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>														
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types			Processor Graphics													
	i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB	DDR4-2400	Intel UHD Graphics 620															
	i5-8350U			1.7 GHz	3.6 GHz	6MB																	
	i7-8550U			1.8 GHz	4.0 GHz	8MB																	
	i7-8650U			1.9 GHz	4.2 GHz	8MB																	
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)							Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter														
Chipset Memory	Intel SoC (System on Chip) platform 32Gb max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>							Camera (optional)	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus														
Display	<i>Some:</i> 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle <i>Some:</i> 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							Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack														
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)							Keyboard UltraNav™	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad														
Storage	<i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i> <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s <i>Some:</i> 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN							Security Security chip vPro (optional)	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology														
Optane™ memory Optical	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2 None							Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology														
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)							NFC (optional)	Near Field Communication														
WLAN + Bluetooth™	Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card <i>* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS</i>							Battery	Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery														
WWAN (optional)	<i>One of the following, configurable by model:</i> • 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 <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>							Max battery life (MobileMark® 2014)	<table border="1"> <thead> <tr> <th>Models</th> <th>24Wh</th> <th>48Wh</th> <th>72Wh</th> <th>32Wh + 24Wh</th> <th>32Wh + 48Wh</th> <th>32Wh + 72Wh</th> </tr> </thead> <tbody> <tr> <td><i>Max battery life</i></td> <td>5.8 hr</td> <td>12.5 hr</td> <td>18.1 hr</td> <td>13.8 hr</td> <td>20.3 hr</td> <td>26.1 hr</td> </tr> </tbody> </table> <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>	Models	24Wh	48Wh	72Wh	32Wh + 24Wh	32Wh + 48Wh	32Wh + 72Wh	<i>Max battery life</i>	5.8 hr	12.5 hr	18.1 hr	13.8 hr	20.3 hr	26.1 hr
Models	24Wh	48Wh	72Wh	32Wh + 24Wh	32Wh + 48Wh	32Wh + 72Wh																	
<i>Max battery life</i>	5.8 hr	12.5 hr	18.1 hr	13.8 hr	20.3 hr	26.1 hr																	
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card							AC adapter	45W or 65W USB Type-C AC adapter														
								Preload	Windows® 10 Home 64 or Windows 10 Pro 64														
								Limited warranty	<i>One of the following, configurable by model:</i> • 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® 6.1; RoHS-compliant														

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

Lenovo  
July 2019



# ThinkPad T590 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor									Dimensions Weight Case color Case material	<i>WxDxH:</i> 14.40" x 9.76" x 0.75"; 365.8mm x 248mm x 19.1mm <i>FHD model:</i> 3.87 lb / 1.75 kg; <i>UHD model:</i> 3.86 lb / 1.75 kg Black <i>Display cover:</i> PPS / 50% GF; <i>Bottom:</i> PA / 50% GF
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics			
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	DDR4-2400	Intel UHD Graphics 620			
	i5-8365U			1.6 GHz	4.1 GHz	6MB					
	i7-8565U			1.8 GHz	4.6 GHz	8MB					
i7-8665U	1.9 GHz			4.8 GHz	8MB						
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)									Smart card reader Media reader Ports	<i>Optional:</i> Smart card reader MicroSD card reader 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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
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									Monitor cable (optional) Bundled Accy	<i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter (NOT available in EMEA) <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter (NOT available in EMEA) None
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	Camera (optional) Audio support	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>• HD720p camera with ThinkShutter camera privacy, fixed focus</li> <li>• IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus</li> </ul> HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack
	15.6"	FHD (1920x1080)	IPS	Anti-glare	250 nits	16:9	700:1	45%	170°		
	15.6"	UHD (3840x2160) HDR, Dolby Vision™	IPS	Anti-glare	500 nits	16:9	1200:1	100% Adobe	170°		
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)									Keyboard UltraNav™	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
Storage	<ul style="list-style-type: none"> <li>• M.2 2280 SSD / SATA 6.0Gb/s</li> <li>• M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>• M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>• Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</li> </ul>									Security Security chip System Mgt (opt) Fingerprint reader NFC (optional)	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology <i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest Near Field Communication
Optical	None									Battery	Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)									Max battery life	<i>MobileMark® 2014:</i> 14.98 hr (9.5 hr for UHD model with discrete graphics) <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>
WLAN (optional) Bluetooth™	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter									AC adapter	45W or 65W USB Type-C AC adapter
WWAN (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>• Wireless WAN upgradable</li> <li>• Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)</li> <li>• Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>									Preload	Windows® 10 Home 64 or Windows 10 Pro 64
SIM card	Nano-SIM card slot, optional Verizon LTE (US) SIM card									Limited warranty	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>• 1-year depot repair service</li> <li>• 3-year/1-yr battery depot repair service</li> <li>• 3-year/1-yr battery limited onsite service</li> </ul>
										Mil-Spec test	MIL-STD-810G military testing
										Environment	EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant

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

Lenovo  
July 2019



# ThinkPad X1 Carbon (5<sup>th</sup> Gen) Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th Generation Intel® Core™ i5 / i7 Processor (EMEA has only i5-6300U and i7-6600U)								Smart card reader	None									
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Media reader	MicroSD card reader, supports UHS-II microSD card									
	i5-6200U	2	4	2.3 GHz	2.8 GHz	3MB	LPDDR3-1866	Intel HD Graphics 520	Ports	Two USB 3.1 Gen 1 (USB 3.0, 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									
	i5-6300U			2.4 GHz	3.0 GHz	3MB			* Depending on many factors, actual data transfer speed may be lower than theoretical speed										
	i7-6500U			2.5 GHz	3.1 GHz	4MB													
	i7-6600U			2.6 GHz	3.4 GHz	4MB													
	or 7th Generation Intel Core i5 / i7 Processor								WiGig dock (opt)	ThinkPad WiGig dock									
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter									
	i5-7200U	2	4	2.5 GHz	3.1 GHz	3MB	LPDDR3-1866	Intel HD Graphics 620	Bundled Accy	Optional: ThinkPad Ethernet Extension Cable									
	i5-7300U			2.6 GHz	3.5 GHz	3MB													
	i7-7500U			2.7 GHz	3.5 GHz	4MB													
	i7-7600U			2.8 GHz	3.9 GHz	4MB													
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)								Camera (optional)	720p: HD720p resolution, fixed focus IR & 720p: IR camera and HD720p camera									
Chipset	Intel SoC (System on Chip) platform								Audio support	HD Audio, Conexant® CX11871 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack									
Memory	8GB or 16GB / 1866MHz LPDDR3 / soldered to systemboard, no sockets								Keyboard	6-row, spill-resistant, multimedia Fn keys, LED backlight									
Display	Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 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, 170° viewing angle								UltraNav™	TrackPoint® pointing device and buttonless Glass surface multi-touch touchpad									
Multi-touch	None								Security	Power-on password, hard disk password, supervisor password, security keyhole									
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)								Security chip vPro (optional)	Discrete TPM 2.0, TCG Certified									
Optical	None								Fingerprint reader	Intel vPro Technology Touch style match on chip fingerprint reader on the palm rest									
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Cable								NFC (optional)	Near Field Communication									
WLAN	One of the following, configurable by model (WiGig can coexist 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								Battery	Integrated Li-Polymer 3-cell (57Wh) RapidCharge battery									
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter * Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS								Max battery life	MobileMark® 2014: 15.5 hr * Battery life varies significantly with settings, usage, & other factors									
WWAN (optional)	Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)								AC adapter	45W or 65W USB Type-C AC adapter									
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card								RapidCharge	<table border="1"> <tr> <td>AC adapter</td> <td>45W USB-C</td> <td>65W USB-C</td> </tr> <tr> <td>Charge to 80%</td> <td>Not support</td> <td>1.0 hr</td> </tr> <tr> <td>Charge to 100%</td> <td>Not support</td> <td>2.5 hr</td> </tr> </table>	AC adapter	45W USB-C	65W USB-C	Charge to 80%	Not support	1.0 hr	Charge to 100%	Not support	2.5 hr
AC adapter	45W USB-C	65W USB-C																	
Charge to 80%	Not support	1.0 hr																	
Charge to 100%	Not support	2.5 hr																	
Dimensions	WxDxH: 12.74" x 8.55" x 0.63"; 323.5mm x 217.1mm x 15.95mm								Preload	Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 • Lenovo Solution Center • Lenovo PowerEngage • ThinkVantage Product Recovery • ThinkVantage System Update • Adobe® Reader® • Microsoft® Office preloaded; purchase a product key to activate • McAfee® LiveSafe™ (30-day trial)									
Weight	Starting at 2.49 lb / 1.13 kg								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									
Case color	Black or Silver (silver is NOT available in EMEA)								Mil-Spec test	MIL-STD-810G military testing									
Case material	Display cover: CFRP/GFRP hybrid; Bottom: magnesium alloy hybrid								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant									



# ThinkPad X1 Carbon (6<sup>th</sup> Gen) Platform Specifications

Product Specifications Reference (PSREF)

Processor	7th Generation Intel® Core™ i5 Processor								Dimensions Weight Case color Case material	<i>WxDxH:</i> 12.74" x 8.55" x 0.63"; 323.5mm x 217.1mm x 15.95mm Starting at 2.49 lb / 1.13 kg Black or Silver (silver case is NOT available in EMEA) <i>Display cover:</i> CFRP/GFRP hybrid; <i>Bottom:</i> magnesium alloy / PPS hybrid
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		
	i5-7300U	2	4	2.6 GHz	3.5 GHz	3MB	LPDDR3-1866	Intel HD Graphics 620		
	or 8th Generation Intel Core i5 / i7 Processor									
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		
	i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB	LPDDR3-2133	Intel UHD Graphics 620	Smart card reader None Media reader MicroSD card reader, supports UHS-II Ports Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet extension connector, nano-SIM card slot (WWAN models), headphone / microphone combo jack, microSD card reader, side docking connector, security keyhole <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>	
	i5-8350U			1.7 GHz	3.6 GHz	6MB				
	i7-8550U			1.8 GHz	4.0 GHz	8MB				
	i7-8650U			1.9 GHz	4.2 GHz	8MB				
Graphics	Intel HD Graphics 620 or Intel UHD Graphics 620 in processor; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 5120x2880@60Hz (USB Type-C); 4096x2160@30Hz (HDMI)								Monitor cable <i>(optional)</i> Bundled Accy	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter <i>Optional:</i> ThinkPad Ethernet Extension Adapter Gen 2
Chipset	Intel SoC (System on Chip) platform								Camera <i>(optional)</i>	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus
Memory	8GB or 16GB / 2133MHz LPDDR3 / soldered to systemboard, no sockets <i>* System clocks down for processors with lower memory controller</i>								Audio support	HD Audio, Realtek® ALC3286 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby® Atmos™ via headphones
Display	<i>One of the following, configurable by model:</i> • 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle • 14.0" (355mm) WQHD (2560x1440), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 72% gamut, 170° viewing angle • 14.0" (355mm) HDR WQHD (2560x1440) with Dolby Vision™, glossy, LED backlight, IPS, 500 nits, 16:9 aspect ratio, 1500:1 contrast ratio, 100% gamut, 170° viewing angle								Keyboard UltraNav™	6-row, spill-resistant, multimedia Fn keys, LED backlight TrackPoint® pointing device and buttonless Glass surface multi-touch touchpad
Multi-touch <i>(opt)</i>	On-cell touch, supports 10-finger gesture (FHD only)								Security Security chip vPro <i>(optional)</i> Fingerprint reader	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified Intel vPro Technology Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology
Storage	<i>One of the following, configurable by model:</i> • 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)								NFC <i>(optional)</i>	Near Field Communication
Optane™ memory	None								Battery	Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter
Optical	None								Max battery life	<i>MobileMark® 2014:</i> 19.3 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>
Ethernet	Native Intel Ethernet Connection I219-V ( <i>Non-vPro</i> ) or I219-LM ( <i>vPro</i> ) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2								AC adapter	45W or 65W USB Type-C AC adapter
WLAN + Bluetooth™	Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 card <i>* Intel 8265ac card supports BT4.2 but is limited to BT4.1 by Windows OS</i>								Preload	Windows® 10 Home 64 or Windows 10 Pro 64
WWAN <i>(optional)</i>	Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>								Limited warranty	<i>One of the following, configurable by model:</i> • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service
SIM card <i>(opt)</i>	Nano-SIM card slot, optional Verizon LTE (US) SIM card								Mil-Spec test	MIL-STD-810G military testing
									Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant



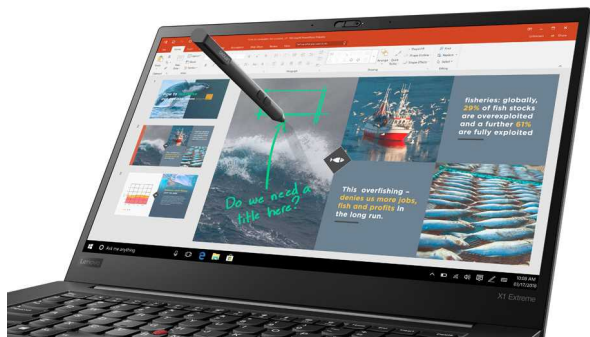
# ThinkPad X1 Carbon (7<sup>th</sup> Gen) Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor									Dimensions WxDxH: 12.74" x 8.55" x 0.59"; 323.5mm x 217.1mm x 14.9mm Weight Starting at 2.4 lb / 1.09 kg Case color Black paint or black weave Case material Display cover: Carbon Fiber; Bottom: magnesium alloy
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics		
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	LPDDR3-2133	Intel UHD Graphics 620		
	i5-8365U			1.6 GHz	4.1 GHz	6MB				
	i7-8565U			1.8 GHz	4.6 GHz	8MB				
i7-8665U	1.9 GHz			4.8 GHz	8MB					
Graphics	Intel UHD Graphics 620 in processor; supports external digital monitor via HDMI or USB Type-C / Thunderbolt; supports three independent displays; Max resolution: 4096x2304@60Hz (Thunderbolt); 4096x2160@24Hz (HDMI)									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 Optional: Lenovo HDMI to VGA Monitor Adapter Bundled Accy Optional: ThinkPad Ethernet Extension Adapter Gen 2 Camera (optional) One of the following, configurable by model: Audio support HD Audio, Realtek® ALC3286 codec / Dolby® Atmos™ speaker system, 2W x 2, 0.8 x 2 / 4 array far-field microphones, headphone / microphone combo jack Keyboard 6-row, spill-resistant, multimedia Fn keys, LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad Security Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified System Mgt (opt) Intel vPro Technology Fingerprint reader Touch style match on chip fingerprint reader on the palm rest NFC (optional) Near Field Communication Battery Integrated Li-ion 51Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter Max battery life MobileMark® 2014: 18.3 hr * Battery life varies significantly with settings, usage, & other factors AC adapter 45W or 65W USB Type-C AC adapter Preload Windows® 10 Home 64 or Windows 10 Pro 64 Limited warranty One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service Mil-Spec test MIL-STD-810G military testing Environment EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant
Chipset Memory	Intel SoC (System on Chip) platform 8GB or 16GB / 2133MHz LPDDR3 / soldered to systemboard, no sockets									
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	
	14.0"	FHD (1920x1080) Multi-touch	IPS	Anti-glare	300 nits	16:9	700:1	72%	170°	
	14.0"	FHD (1920x1080) Low Power	IPS	Anti-glare	400 nits	16:9	800:1	72%	170°	
	14.0"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	170°	
	14.0"	WQHD (2560x1440)	IPS	Anti-glare	300 nits	16:9	700:1	72%	170°	
	14.0"	UHD (3840x2160) HDR 400, Dolby Vision™	IPS	Glossy	500 nits	16:9	1400:1	90%	170°	
Multi-touch (opt)	Capacitive-type multi-touch, supports 10-finger gesture (FHD only), anti-reflection (AR), anti-smudge coating									
Storage	One of the following, configurable by model: • M.2 2280 SSD / SATA 6.0Gb/s • M.2 2280 SSD / PCIe NVMe 3.0 x 4 • Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4 • Intel Optane SSD, M.2 2280, PCIe NVMe 3.0 x 2									
Optical	None									
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2									
WLAN Bluetooth™	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter									
WWAN (optional)	One of the following, configurable by model: • 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									

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

Lenovo  
July 2019



# ThinkPad X1 Extreme Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor								Smart card reader	Optional: Smart card reader	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Media reader	SD Card reader (SD, SDHC, SDXC), supports UHS-II SD card	
	i5-8300H	4	8	2.3 GHz	4.0 GHz	8MB	DDR4-2666	Intel UHD Graphics 630	Ports	Two USB 3.1 Gen 1 (one Always On), two USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, headphone / microphone combo jack, optional smart card reader, SD card reader, security keyhole	
	i5-8400H			2.5 GHz	4.2 GHz						
	i7-8750H	6	12	2.2 GHz	4.1 GHz	9MB					SD card reader, security keyhole
	i7-8850H			2.6 GHz	4.3 GHz						
Graphics	Intel UHD Graphics 630 in processor and NVIDIA® GeForce® GTX 1050 Ti Max-Q, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)								Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter	
Chipset	Mobile Intel CM246 Chipset								Bundled Accy	Optional: ThinkPad Ethernet Extension Cable	
Memory	64GB max / 2666MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets								Camera (optional)	One of the following, configurable by model: • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus	
Display	<i>Some:</i> 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 <i>Some:</i> 15.6" (396mm) HDR 4K (3840x2160) with Dolby Vision™, anti-glare, LED backlight, IPS, 400 nits, 16:9 aspect ratio, 1200:1 contrast ratio, 100% gamut, 170° viewing angle, multi-touch, anti-reflection (AR)								Audio support	HD Audio, Realtek® ALC3286 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack, Dolby Atmos® headphone	
Multi-touch (opt)	Capacitive-type multi-touch, supports 10-finger gesture (4K only)								Keyboard	6-row, spill-resistant, multimedia Fn keys, LED backlight	
Pen	Supports pen accessory, please see the accessory compatibility for details								UltraNav™	TrackPoint® pointing device and buttonless glass surface multi-touch touchpad	
Storage	Up to 2 drives (two M.2 SSD) • M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2) • M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)								Security	Power-on password, hard disk password, supervisor password, security keyhole	
Optane™ memory	None								Security chip	Discrete TPM 2.0, TCG Certified	
RAID (optional)	RAID 0/1 support								vPro (optional)	Intel vPro Technology	
Optical	None								Fingerprint reader	Touch style match on chip fingerprint reader on the keyboard bezel	
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Cable								Color calibration	None	
WLAN	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card								NFC	None	
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Battery	Integrated Li-ion 80Wh battery, supports Rapid Charge (charge up to 80% in 1hr)	
WWAN	None								Max battery life	Discrete mode: 9.5 hr; Hybrid mode: 14.9 hr	
SIM card	None								(MobileMark 2014)	* Battery life varies significantly with settings, usage, & other factors	
Dimensions	<i>WxDxH (non-touch):</i> 14.24" x 9.67" x 0.72"; 361.8mm x 245.7mm x 18.4mm <i>WxDxH (multi-ouch):</i> 14.24" x 9.67" x 0.74"; 361.8mm x 245.7mm x 18.7mm								AC adapter	135W slim tip AC adapter	
Weight	<i>Non-touch model:</i> starting at 3.76 lb (1.7 kg); <i>Multi-touch model:</i> starting at 4.06 lb (1.8 kg)								Preload	Windows® 10 Home 64 or Windows 10 Pro 64	
Case color	Black								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	
Case material	<i>Display cover:</i> CFRP/GFRP hybrid; <i>Bottom:</i> Aluminum alloy								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  
July 2019



# ThinkPad X270 Platform Specifications

Product Specifications Reference (PSREF)

<p><b>Processor</b> 6th Generation Intel® Core™ i3 / i5 / i7 Processor</p> <table border="1"> <thead> <tr> <th>Processor Number</th> <th># of Cores</th> <th># of Threads</th> <th>Base Frequency</th> <th>Max Turbo Frequency</th> <th>Cache</th> <th>Memory Types</th> <th>Processor Graphics</th> </tr> </thead> <tbody> <tr> <td>i3-6006U</td> <td rowspan="6">2</td> <td rowspan="6">4</td> <td>2.0 GHz</td> <td>-</td> <td>3MB</td> <td rowspan="6">DDR4-2133</td> <td rowspan="6">Intel HD Graphics 520</td> </tr> <tr> <td>i3-6100U</td> <td>2.3 GHz</td> <td>-</td> <td>3MB</td> </tr> <tr> <td>i5-6200U</td> <td>2.3 GHz</td> <td>2.8 GHz</td> <td>3MB</td> </tr> <tr> <td>i5-6300U</td> <td>2.4 GHz</td> <td>3.0 GHz</td> <td>3MB</td> </tr> <tr> <td>i7-6500U</td> <td>2.5 GHz</td> <td>3.1 GHz</td> <td>4MB</td> </tr> <tr> <td>i7-6600U</td> <td>2.6 GHz</td> <td>3.4 GHz</td> <td>4MB</td> </tr> </tbody> </table> <p>or 7th Generation Intel Core i3 / i5 / i7 Processor</p> <table border="1"> <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>i3-7100U</td> <td rowspan="6">2</td> <td rowspan="6">4</td> <td>2.4 GHz</td> <td>-</td> <td>3MB</td> <td rowspan="6">DDR4-2133</td> <td rowspan="6">Intel HD Graphics 620</td> </tr> <tr> <td>i5-7200U</td> <td>2.5 GHz</td> <td>3.1 GHz</td> <td>3MB</td> </tr> <tr> <td>i5-7300U</td> <td>2.6 GHz</td> <td>3.5 GHz</td> <td>3MB</td> </tr> <tr> <td>i7-7500U</td> <td>2.7 GHz</td> <td>3.5 GHz</td> <td>4MB</td> </tr> <tr> <td>i7-7600U</td> <td>2.8 GHz</td> <td>3.9 GHz</td> <td>4MB</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i3-6006U	2	4	2.0 GHz	-	3MB	DDR4-2133	Intel HD Graphics 520	i3-6100U	2.3 GHz	-	3MB	i5-6200U	2.3 GHz	2.8 GHz	3MB	i5-6300U	2.4 GHz	3.0 GHz	3MB	i7-6500U	2.5 GHz	3.1 GHz	4MB	i7-6600U	2.6 GHz	3.4 GHz	4MB	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i3-7100U	2	4	2.4 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620	i5-7200U	2.5 GHz	3.1 GHz	3MB	i5-7300U	2.6 GHz	3.5 GHz	3MB	i7-7500U	2.7 GHz	3.5 GHz	4MB	i7-7600U	2.8 GHz	3.9 GHz	4MB	<p><b>Dimensions</b> <i>WxDxH:</i> 12.03" x 8.21" x 0.80"; 305.5mm x 208.5mm x 20.3mm</p> <table border="1"> <thead> <tr> <th>Models</th> <th>No + 3-cell</th> <th>3-cell + 3-cell</th> <th>3 + 6-cell</th> </tr> </thead> <tbody> <tr> <td><i>Weight</i></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> <p><b>Case color</b> Black  <b>Case material</b> <i>Display cover:</i> Glass-Fiber Reinforced Plastic;  <i>Bottom:</i> Glass-Fiber Reinforced Plastic</p> <p><b>Smart card reader</b> Optional: Smart card reader</p> <p><b>Media reader</b> 4-in-1 reader (MMC, SD, SDHC, SDXC)</p> <p><b>Ports</b> Two USB 3.1 Gen 1 (USB 3.0, one Always On),  USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort),  HDMI 1.4b, Ethernet (RJ-45), Dock connector  <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i></p> <p><b>WiGig dock (opt)</b> ThinkPad WiGig dock, mutually exclusive with WWAN (US only)</p> <p><b>Monitor cable (optional)</b> <i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter  <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter  <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter</p> <p><b>Camera (optional)</b> HD720p resolution, fixed focus</p> <p><b>Audio support</b> HD Audio, Realtek ALC3268 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack</p>	Models	No + 3-cell	3-cell + 3-cell	3 + 6-cell	<i>Weight</i>	2.79 lb / 1.27 kg	2.98 lb / 1.36 kg	3.33 lb / 1.52 kg
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																																																																						
i3-6006U	2	4	2.0 GHz	-	3MB	DDR4-2133	Intel HD Graphics 520																																																																						
i3-6100U			2.3 GHz	-	3MB																																																																								
i5-6200U			2.3 GHz	2.8 GHz	3MB																																																																								
i5-6300U			2.4 GHz	3.0 GHz	3MB																																																																								
i7-6500U			2.5 GHz	3.1 GHz	4MB																																																																								
i7-6600U			2.6 GHz	3.4 GHz	4MB																																																																								
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																																																																						
i3-7100U	2	4	2.4 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620																																																																						
i5-7200U			2.5 GHz	3.1 GHz	3MB																																																																								
i5-7300U			2.6 GHz	3.5 GHz	3MB																																																																								
i7-7500U			2.7 GHz	3.5 GHz	4MB																																																																								
i7-7600U			2.8 GHz	3.9 GHz	4MB																																																																								
Models			No + 3-cell	3-cell + 3-cell	3 + 6-cell																																																																								
<i>Weight</i>	2.79 lb / 1.27 kg	2.98 lb / 1.36 kg	3.33 lb / 1.52 kg																																																																										
<p><b>Graphics</b> 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)</p>	<p><b>Keyboard</b> 6-row, spill-resistant, multimedia Fn keys, optional LED backlight  UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad</p> <p><b>Security</b> Power-on password, hard disk password, supervisor password, security keyhole</p> <p><b>Security chip</b> Discrete TPM 2.0, TCG Certified</p> <p><b>vPro (optional)</b> Intel vPro Technology</p> <p><b>Fingerprint reader</b> Optional: Touch style match on chip fingerprint reader on the palm rest</p> <p><b>NFC (optional)</b> Near Field Communication</p>																																																																												
<p><b>Chipset</b> Intel SoC (System on Chip) platform</p> <p><b>Memory</b> 16GB max / 2400MHz DDR4, one DDR4 SO-DIMM socket  <i>* System clocks down for processors with lower memory controller</i></p>	<p><b>Internal battery</b> Optional: Integrated Li-ion or Li-Polymer 3-cell (23Wh)</p> <p><b>External battery</b> Li-ion 3-cell (23Wh) or 6-cell (48Wh or 72Wh)</p> <table border="1"> <thead> <tr> <th>Models</th> <th>No + 3-cell</th> <th>3-cell + 3-cell</th> <th>3-cell + 6-cell 48Wh</th> <th>3-cell + 6-cell 72Wh</th> </tr> </thead> <tbody> <tr> <td><i>Max battery life (MobileMark® 2014)</i></td> <td>6.52 hr</td> <td>13.04 hr</td> <td>20.1 hr</td> <td>26.9 hr</td> </tr> </tbody> </table> <p><i>* Battery life varies significantly with settings, usage, &amp; other factors</i></p> <p><b>AC adapter</b> 45W slim tip AC adapter or 45W USB Type-C AC adapter</p>	Models	No + 3-cell	3-cell + 3-cell	3-cell + 6-cell 48Wh	3-cell + 6-cell 72Wh	<i>Max battery life (MobileMark® 2014)</i>	6.52 hr	13.04 hr	20.1 hr	26.9 hr																																																																		
Models	No + 3-cell	3-cell + 3-cell	3-cell + 6-cell 48Wh	3-cell + 6-cell 72Wh																																																																									
<i>Max battery life (MobileMark® 2014)</i>	6.52 hr	13.04 hr	20.1 hr	26.9 hr																																																																									
<p><b>Display</b> <i>Some:</i> 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio  <i>Some:</i> 12.5" (317.5mm) HD (1366x768), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle  <i>Some:</i> 12.5" (317.5mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle</p> <p><b>Multi-touch (opt)</b> On-cell touch, supports 10-finger gesture (FHD only)</p>	<p><b>Preload</b> Windows® 7 Professional 64 preinstalled through downgrade rights in  Windows 10 Pro 64  <ul style="list-style-type: none"> <li>• Lenovo Solution Center</li> <li>• Lenovo PowerEngage</li> <li>• ThinkVantage Product Recovery</li> <li>• ThinkVantage System Update</li> <li>• Adobe® Reader®</li> <li>• Microsoft® Office preloaded; purchase a product key to activate</li> <li>• McAfee® LiveSafe™ (30-day trial)</li> </ul> <i>Some:</i> Windows 10 Home 64  <ul style="list-style-type: none"> <li>• Windows 10 Pro 64</li> <li>• Lenovo Companion</li> <li>• Lenovo Setting</li> <li>• Microsoft Office preloaded; purchase a product key to activate</li> </ul> </p>																																																																												
<p><b>Storage</b> <i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i>  <i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™  <i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)  <i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s  <i>Some:</i> 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN and WiGig</p> <p><b>Optical</b> None</p>	<p><b>Limited warranty</b> <i>One of the following, configurable by model:</i>  <ul style="list-style-type: none"> <li>• 1-year depot repair service</li> <li>• 3-year/1-yr battery depot repair service</li> <li>• 3-year/1-yr battery limited onsite service</li> </ul> </p> <p><b>Mil-Spec test</b> MIL-STD-810G military testing</p>																																																																												
<p><b>Ethernet</b> <i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville)  <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)</p>	<p><b>Environment</b> EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</p>																																																																												
<p><b>WLAN</b> <i>One of the following, configurable by model (WiGig is mutually exclusive with WWAN):</i>  <ul style="list-style-type: none"> <li>• Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1</li> <li>• Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1</li> <li>• Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1</li> <li>• Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1 (US only)</li> </ul> </p> <p><b>Bluetooth™</b> Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter  <i>* Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS</i></p>	<p><b>WWAN (optional)</b> <i>One of the following, configurable by model (mutually exclusive with WiGig):</i>  <ul style="list-style-type: none"> <li>• Wireless WAN upgradable</li> <li>• Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455)</li> <li>• Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU) (EMEA only)</li> </ul> </p>																																																																												
<p><b>SIM card (opt)</b> Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card</p>																																																																													



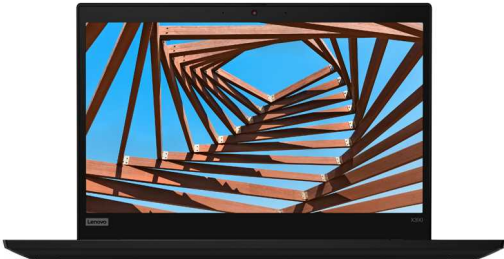
# ThinkPad X280 Platform Specifications

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							Dimensions	WxDxH: 12.11" x 8.26" x 0.69-0.70"; 307.7mm x 209.8mm x 17.4-17.8mm		
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	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	
	i3-7130U	2	4	2.7 GHz	-	3MB	DDR4-2133	Intel HD Graphics 620	Case color	Black	
	i5-7200U			2.5 GHz	3.1 GHz	3MB			Case material	Display cover: Carbon Fiber (FHD non-touch model) or Glass Fiber (HD & FHD multi-touch model);	
	i5-7300U			2.6 GHz	3.5 GHz	3MB			Bottom:	Magnesium/Aluminum	
	or 8th Generation Intel Core i3 / i5 / i7 Processor							Smart card reader	Optional: Smart card reader		
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Media reader	MicroSD card reader, in the combo slot with nano-SIM card	
	i3-8130U	4	8	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	Ports	Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet extension connector, combo slot of nano-SIM card (WWAN models) and microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole	
	i5-8250U			1.6 GHz	3.4 GHz	6MB			* Depending on many factors, actual data transfer speed may be lower than theoretical speed		
	i5-8350U			1.7 GHz	3.6 GHz	6MB			Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter	
	i7-8550U			1.8 GHz	4.0 GHz	8MB			Bundled Accy	USB-C to VGA: Lenovo USB-C to VGA Adapter	
	i7-8650U	1.9 GHz	4.2 GHz	8MB		USB-C to DP: Lenovo USB-C to DisplayPort Adapter					
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)							Camera (optional)	One of the following, configurable by model: • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus		
Chipset	Intel SoC (System on Chip) platform							Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack		
Memory	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							Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight		
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							UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad		
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only) * FHD non-touch model is NOT available in US							Security	Power-on password, hard disk password, supervisor password, security keyhole		
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)							Security chip vPro (optional)	Discrete TPM 2.0, TCG Certified		
Optane™ memory	None							Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology		
Optical	None							NFC (optional)	Near Field Communication		
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2							Battery	Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter		
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							Max battery life	MobileMark® 2014: 16.6 hr * Battery life varies significantly with settings, usage, & other factors		
WWAN (optional)	One of the following, configurable by model: • Integrated Mobile Broadband 4G LTE, Intel XMM™ 7262 (Fibocom L830-EB), M.2 card (EMEA only) • Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card * For non-WWAN model, it means the model is NOT WWAN upgradable							AC adapter	45W or 65W USB Type-C AC adapter		
SIM card (opt)	Nano-SIM card slot, in the combo slot with microSD card reader, optional Verizon LTE (US) SIM card							Preload	Windows® 10 Home 64 or Windows 10 Pro 64		
								Limited warranty	One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service		
								Mil-Spec test	MIL-STD-810G military testing		
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant		

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

Lenovo  
April 2019



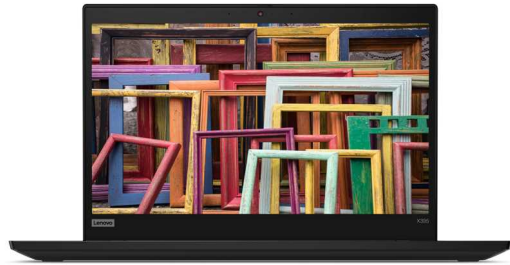
# ThinkPad X390 Platform Specifications

Product Specifications Reference (PSREF)

<b>Processor</b> 8th Generation Intel® Core™ i3 / i5 / i7 Processor <table border="1"> <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 rowspan="5">DDR4-2400</td> <td rowspan="5">Intel UHD Graphics 620</td> </tr> <tr> <td>i5-8265U</td> <td rowspan="4">4</td> <td rowspan="4">8</td> <td>1.6 GHz</td> <td>3.9 GHz</td> <td>6MB</td> </tr> <tr> <td>i5-8365U</td> <td>1.6 GHz</td> <td>4.1 GHz</td> <td>6MB</td> </tr> <tr> <td>i7-8565U</td> <td>1.8 GHz</td> <td>4.6 GHz</td> <td>8MB</td> </tr> <tr> <td>i7-8665U</td> <td>1.9 GHz</td> <td>4.8 GHz</td> <td>8MB</td> </tr> </tbody> </table>	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	i5-8365U	1.6 GHz	4.1 GHz	6MB	i7-8565U	1.8 GHz	4.6 GHz	8MB	i7-8665U	1.9 GHz	4.8 GHz	8MB	<b>Dimensions</b> <table border="1"> <thead> <tr> <th>Models</th> <th>FHD Non-touch</th> <th colspan="2">HD / FHD Multi-touch</th> </tr> </thead> <tbody> <tr> <td>Carbon Fiber</td> <td>311.9mm x 217.0mm x 16.5mm 12.28" x 8.54" x 0.65"</td> <td colspan="2">-</td> </tr> <tr> <td>PPS</td> <td>312.0mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"</td> <td colspan="2">312mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"</td> </tr> </tbody> </table> <b>Weight</b> <table border="1"> <thead> <tr> <th>Models</th> <th>FHD Non-touch</th> <th>HD</th> <th>FHD Multi-touch</th> </tr> </thead> <tbody> <tr> <td>Carbon Fiber</td> <td>2.70 lb / 1.22 kg</td> <td>-</td> <td>-</td> </tr> <tr> <td>PPS</td> <td>2.85 lb / 1.29 kg</td> <td>2.93 lb / 1.33 kg</td> <td>2.84 lb / 1.28 kg</td> </tr> </tbody> </table>	Models	FHD Non-touch	HD / FHD Multi-touch		Carbon Fiber	311.9mm x 217.0mm x 16.5mm 12.28" x 8.54" x 0.65"	-		PPS	312.0mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"	312mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"		Models	FHD Non-touch	HD	FHD Multi-touch	Carbon Fiber	2.70 lb / 1.22 kg	-	-	PPS	2.85 lb / 1.29 kg	2.93 lb / 1.33 kg	2.84 lb / 1.28 kg
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																																																				
i3-8145U	2	4	2.1 GHz	3.9 GHz	4MB	DDR4-2400	Intel UHD Graphics 620																																																				
i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB																																																						
i5-8365U			1.6 GHz	4.1 GHz	6MB																																																						
i7-8565U			1.8 GHz	4.6 GHz	8MB																																																						
i7-8665U			1.9 GHz	4.8 GHz	8MB																																																						
Models	FHD Non-touch	HD / FHD Multi-touch																																																									
Carbon Fiber	311.9mm x 217.0mm x 16.5mm 12.28" x 8.54" x 0.65"	-																																																									
PPS	312.0mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"	312mm x 217.2mm x 16.9mm 12.28" x 8.55" x 0.67"																																																									
Models	FHD Non-touch	HD	FHD Multi-touch																																																								
Carbon Fiber	2.70 lb / 1.22 kg	-	-																																																								
PPS	2.85 lb / 1.29 kg	2.93 lb / 1.33 kg	2.84 lb / 1.28 kg																																																								
<b>Graphics</b> 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)	<b>Case color</b> Black <b>Case material</b> Display cover: Carbon Fiber (FHD non-touch only) or PPS; Bottom: Magnesium/Aluminum																																																										
<b>Chipset</b> Intel SoC (System on Chip) platform <b>Memory</b> 8GB, 16GB or 32GB / 2400MHz DDR4 / soldered to systemboard, no sockets * Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation	<b>Smart card reader</b> Optional: Smart card reader <b>Media reader</b> MicroSD card reader, in the combo slot with nano-SIM card <b>Ports</b> Two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 1 (with the function of Power Delivery and DisplayPort), one USB 3.1 Type-C Gen 2 / Thunderbolt 3 (with the function of PD and DP), HDMI 1.4b, Ethernet extension connector, combo slot of nano-SIM card (WWAN models) and microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole * Depending on many factors, actual data transfer speed may be lower than theoretical speed																																																										
<b>Display</b> <table border="1"> <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"</td> <td>HD (1366x768)</td> <td>TN</td> <td>Anti-glare</td> <td>250 nits</td> <td>16:9</td> <td>500:1</td> <td>45%</td> <td>90°</td> </tr> <tr> <td>13.3"</td> <td>FHD (1920x1080)</td> <td>IPS</td> <td>Anti-glare</td> <td>300 nits</td> <td>16:9</td> <td>800:1 (non-touch) 700:1 (multi-touch)</td> <td>72%</td> <td>170°</td> </tr> <tr> <td>13.3"</td> <td>FHD (1920x1080) ThinkPad Privacy Guard</td> <td>IPS</td> <td>Anti-glare</td> <td>400 nits</td> <td>16:9</td> <td>1000:1</td> <td>72%</td> <td>178°</td> </tr> </tbody> </table>	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	13.3"	HD (1366x768)	TN	Anti-glare	250 nits	16:9	500:1	45%	90°	13.3"	FHD (1920x1080)	IPS	Anti-glare	300 nits	16:9	800:1 (non-touch) 700:1 (multi-touch)	72%	170°	13.3"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	178°	<b>Monitor cable (optional)</b> 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 <b>Bundled Accy</b> Optional: ThinkPad Ethernet Extension Adapter Gen 2																						
Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle																																																			
13.3"	HD (1366x768)	TN	Anti-glare	250 nits	16:9	500:1	45%	90°																																																			
13.3"	FHD (1920x1080)	IPS	Anti-glare	300 nits	16:9	800:1 (non-touch) 700:1 (multi-touch)	72%	170°																																																			
13.3"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	178°																																																			
<b>Multi-touch (opt)</b> On-cell touch, supports 10-finger gesture (FHD only)	<b>Camera (optional)</b> One of the following, configurable by model: <ul style="list-style-type: none"> <li>HD720p camera with ThinkShutter camera privacy, fixed focus</li> <li>IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus</li> </ul>																																																										
<b>Storage</b> <ul style="list-style-type: none"> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> <li>M.2 2242 SSD / PCIe NVMe, PCIe 3.0 x 2</li> <li>Intel Optane™ Memory H10 with Solid State Storage, M.2 2280, PCIe NVMe 3.0 x 4</li> </ul>	<b>Audio support</b> HD Audio, Realtek® ALC3287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack																																																										
<b>Optical</b> None	<b>Keyboard</b> 6-row, spill-resistant, multimedia Fn keys, optional LED backlight <b>UltraNav™</b> TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																																																										
<b>Ethernet</b> Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2	<b>Security</b> Power-on password, hard disk password, supervisor password, security keyhole <b>Security chip</b> Discrete TPM 2.0, TCG Certified																																																										
<b>WLAN (optional)</b> One of the following, configurable by model: <ul style="list-style-type: none"> <li>Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0</li> <li>Intel Wi-Fi 6 AX200, Wi-Fi 2x2 802.11ax + Bluetooth 5.0</li> </ul>	<b>System Mgt (opt)</b> Intel vPro Technology <b>Fingerprint reader</b> Optional: Touch style match on chip fingerprint reader on the palm rest <b>NFC (optional)</b> Near Field Communication																																																										
<b>Bluetooth™</b> Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter	<b>Battery</b> Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter																																																										
<b>WWAN (optional)</b> One of the following, configurable by model: <ul style="list-style-type: none"> <li>Integrated Mobile Broadband 4G LTE, Fibocom L830-EB, M.2 card (EMEA only)</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> * For non-WWAN model, it means the model is NOT WWAN upgradable	<b>Max battery life</b> MobileMark® 2014: 17.6 hr * Battery life varies significantly with settings, usage, & other factors <b>AC adapter</b> 45W or 65W USB Type-C AC adapter																																																										
	<b>Preload</b> Windows® 10 Home 64 or Windows 10 Pro 64																																																										
	<b>Limited warranty</b> One of the following, configurable by model: <ul style="list-style-type: none"> <li>1-year depot repair service</li> <li>3-year/1-yr battery depot repair service</li> <li>3-year/1-yr battery limited onsite service</li> </ul>																																																										
	<b>Mil-Spec test</b> MIL-STD-810G military testing																																																										
	<b>Environment</b> EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant																																																										

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

Lenovo  
July 2019



AMD



AMD



AMD



AMD



AMD



AMD

# ThinkPad X395 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics									Dimensions WxDxH: 12.28" x 8.55" x 0.67"; 311.9mm x 217.2mm x 16.9mm	
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Controller	Processor Graphics			Weight
	Ryzen 3 Pro 3300U	4	4	2.1 GHz	3.5 GHz	2MB L2 / 4MB L3	DDR4-2400	Radeon Vega 6 Graphics			Models
	Ryzen 5 Pro 3500U	4	8	2.1 GHz	3.7 GHz	2MB L2 / 4MB L3		Radeon Vega 8 Graphics			HD / FHD multi-touch
Ryzen 7 Pro 3700U	4	8	2.3 GHz	4.0 GHz	2MB L2 / 4MB L3	Radeon Vega 10 Graphics		FHD non-touch			
										FHD Privacy Guard	
										Weight	
										2.91 lb / 1.32 kg	
										2.82 lb / 1.28 kg	
										3.01 lb / 1.37 kg	
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)									Case color	
Chipset	AMD SoC (System on Chip) platform									Case material	
Memory	8GB or 16GB / 2400MHz DDR4 / soldered to systemboard, no sockets * Installed memory is actually 2666MHz but run at 2400MHz due to AMD limitation									Display cover:	
Display	Size	Resolution	Type	Surface	Brightness	Aspect Ratio	Contrast Ratio	Color Gamut	Viewing Angle	Bottom:	
	13.3"	HD (1366x768)	TN	Anti-glare	250 nits	16:9	300:1	45%	90°	Magnesium/Aluminum	
	13.3"	FHD (1920x1080)	IPS	Anti-glare	300 nits	16:9	800:1 (non-touch) 700:1 (multi-touch)	72%	170°		
	13.3"	FHD (1920x1080) ThinkPad Privacy Guard	IPS	Anti-glare	400 nits	16:9	1000:1	72%	178°		
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)									Smart card reader	
Storage	<ul style="list-style-type: none"> <li>M.2 2280 SSD / SATA 6.0Gb/s</li> <li>M.2 2280 SSD / PCIe NVMe, PCIe 3.0 x 4</li> </ul>									Media reader	
Optical	None									Ports	
Ethernet	Native Realtek® RTL8153 Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2									MicroSD card reader, in the combo slot with nano-SIM card	
WLAN (optional)	Intel Wireless-AC 9260, Wi-Fi 2x2 802.11ac + Bluetooth 5.0									One USB 3.1 Gen 1 (Always On), one USB 3.1 Gen 2, two USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 2.0, Ethernet extension connector, combo slot of nano-SIM card (WWAN models) and microSD card reader, headphone / microphone combo jack, optional smart card reader, side docking connector, security keyhole	
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter									* Depending on many factors, actual data transfer speed may be lower than theoretical speed	
WWAN (optional)	<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>Wireless WAN upgradable</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> </ul> <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i>									HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter	
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card									USB-C to VGA: Lenovo USB-C to VGA Adapter	
										Optional: ThinkPad Ethernet Extension Adapter Gen 2	
										Camera (optional)	
										<i>One of the following, configurable by model:</i> <ul style="list-style-type: none"> <li>HD720p camera with ThinkShutter camera privacy, fixed focus</li> <li>IR camera and HD720p camera with ThinkShutter camera privacy, fixed focus</li> </ul>	
										Audio support	
										HD Audio, Realtek ALC3287 codec / stereo speakers, 1W x 2, Dolby® Audio™ Premium / dual array far-field microphone, headphone / microphone combo jack	
										Keyboard	
										6-row, spill-resistant, multimedia Fn keys, optional LED backlight	
										UltraNav™	
										TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad	
										Security	
										Power-on password, hard disk password, supervisor password, security keyhole	
										Security chip	
										Discrete TPM 2.0, TCG Certified	
										System Mgt	
										DASH Management	
										Fingerprint reader	
										Optional: Touch style match on chip fingerprint reader on the palm rest	
										NFC	
										None	
										Battery	
										Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter	
										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	
										Preload	
										Windows® 10 Home 64 or Windows 10 Pro 64	
										Limited warranty	
										<i>One of the following, configurable by model:</i>	
										• 1-year depot repair service	
										• 3-year/1-yr battery depot repair service	
										Mil-Spec test	
										MIL-STD-810G military testing	
										Environment	
										EPEAT™ Silver; ENERGY STAR® 7.1; RoHS-compliant	

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

Lenovo  
July 2019

This publication was developed for products and services offered in the North America, E.M.E.A and Asia & Pacific countries. Lenovo may not offer the products, services or features discussed in this document in other countries. Lenovo may withdraw an offering at any time. Information is subject to change without notice. Consult your local representative for information on offerings available in your area.

Lenovo reserves the right to change specifications or other product information without notice. Lenovo is not responsible for photographic or typographical errors.

LENOVO PROVIDES THIS PUBLICATION "AS IS," WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore this disclaimer may not apply to you.

**Availability:** All offers subject to availability. Lenovo reserves the right to alter product offerings and specifications at any time, without notice. Lenovo is not responsible for photographic or typographic errors.

**General:** Review key information provided by Microsoft that may apply to your system purchase, including details on Windows 10, Windows 8, Windows 7, and potential upgrades/downgrades. Lenovo makes no representation or warranty regarding third-party products or services.

**Trademarks:** Lenovo, ThinkPad, ThinkBook, ThinkCentre, ThinkStation, ThinkVision and the Lenovo logo are trademarks of Lenovo. Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation. Ultrabook, Celeron, Celeron Inside, Core Inside, Intel, Intel Logo, Intel Atom, Intel Atom Inside, Intel Core, Intel Inside, Intel Inside Logo, Intel vPro, Itanium, Itanium Inside, Pentium, Pentium Inside, vPro Inside, Xeon, Xeon Phi, and Xeon Inside are trademarks of Intel Corporation in the U.S. and/or other countries. Other company, product or service names may be trademarks or service marks of others.

**Warranty:** For a copy of applicable warranties, write to: Lenovo Warranty Information, 1009 Think Place, Morrisville, NC, 27560. Lenovo makes no representation or warranty regarding third party products or services. The Lenovo Limited Warranty applies only to Lenovo hardware products purchased for your own use, and does not transfer upon resale.

**Limited warranty:** Support unrelated to a warranty issue may be subject to additional charges.

#### **Lenovo Services:**

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

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

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

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

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

**International Warranty Service (IWS):** PC repair coverage for customers who require a critical warranty repair while travelling internationally. Visit [www.lenovo.com/internationalwarranty](http://www.lenovo.com/internationalwarranty) for details. Visit [www.lenovo.com/warranty](http://www.lenovo.com/warranty) for Lenovo Warranty Services terms and conditions for complete details and restrictions.

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

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

Visit <http://psref.lenovo.com/> for the latest version of Product Specifications Reference.

© Lenovo, 2019. All rights reserved.  
Lenovo 1009 Think Place Morrisville, NC 27560 U.S.A.