

**Lenovo** ThinkPad Laptops

# PSREF



**Product Specifications Reference**

Version 542, May 2019

**EMEA**

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# Summary of Changes

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This section describes the technical changes made in this edition.

This edition might also include minor corrections and editorial changes which are not identified.

## May 15, 2019 - Version 542

### Additions in this update

► **New product(s)**

ThinkPad E495 models announced April 2019

ThinkPad E595 models announced April 2019

► **New model(s)**

ThinkPad E490 models announced April and May 2019

ThinkPad E590 models announced April and May 2019

ThinkPad L390 models announced April 2019

ThinkPad P1 models announced May 2019

ThinkPad P52 models announced April 2019

ThinkPad T480 models announced April 2019

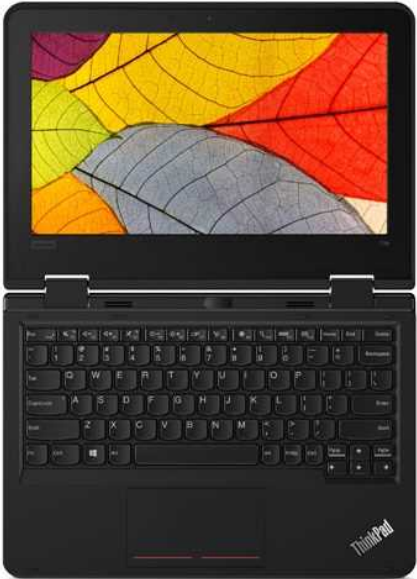
► **Others**

None

### Withdrawals in this update

► **Withdrawn product(s)**

None



# 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
								Weight	Starting at 2.99 lb (1.36 kg)
								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							Security chip	Discrete TPM 2.0, TCG Certified
	<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							vPro	None
Multi-touch	Capacitive-type multi-touch, supports 10-finger gesture (HD IPS only)							Fingerprint reader	None
Storage	eMMC flash memory on board or M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s							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
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 certification	
							Environment	EPEAT™ Silver; ENERGY STAR® 6.1; RoHS-compliant	



# 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														
<i>* Windows 7 is only supported by PRO A10-8730B and PRO A12-8830B</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 <i>USB-C to DP:</i> Lenovo USB-C to DisplayPort Adapter									
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)								Camera (optional)	HD720p resolution, fixed focus								
	Chipset	AMD SoC (System on Chip) platform								Audio support	HD Audio, Realtek ALC3268 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack							
Memory	16Gb max / 1866MHz DDR4, one DDR4 SO-DIMM socket								Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight								
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								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad								
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only, US only)								Security	Power-on password, hard disk password, supervisor password, security keyhole								
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 chip	<i>dTPM 1.2:</i> discrete TPM 1.2, TCG Certified <i>dTPM 2.0:</i> discrete TPM 2.0, TCG Certified								
Optical	None								Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest								
Ethernet	Realtek® RTL8111EPV Gigabit Ethernet connection								NFC	None								
WLAN	Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card								Internal battery	<i>Optional:</i> Integrated Li-ion or Li-Polymer 3-cell (23Wh)								
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter								External battery	Li-ion 3-cell (23Wh) or 6-cell (48Wh)								
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>								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															
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) SIM card								<i>* Battery life varies significantly with settings, usage, &amp; other factors</i>									
Dimensions	<i>WxDxH:</i> 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 certification								
Environment									EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant									

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

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# 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 (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	Discrete TPM 2.0, TCG Certified																										
Optical	None	Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest																										
Ethernet	Gigabit Ethernet connection via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2	NFC	None																										
WLAN	Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.2, M.2 card	Battery	Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter																										
Bluetooth™	Bluetooth 4.2 wireless, integrated in Wi-Fi + Bluetooth combo adapter	Max battery life	MobileMark® 2014: 10.55 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>																										
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>	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																										
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	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																										
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	Mil-Spec test	MIL-STD-810G military certification																										
Case color	Black	Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																										
Case material	Display cover: Carbon Fiber (FHD non-touch model) or PPS (HD & FHD multi-touch model); Bottom: Magnesium/Aluminum																												

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

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April 2019



# ThinkPad A475 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD PRO A-Series APUs							Smart card reader Media reader Ports	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										
	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™	6-row, spill-resistant, multimedia Fn keys, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad										
Chipset Memory	AMD SoC (System on Chip) platform 32GB max / 1866MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets							Security Security chip	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										
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							Fingerprint reader NFC	Optional: Touch style match on chip fingerprint reader on the keyboard bezel None										
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only, US only)							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> * Battery life varies significantly with settings, usage, & other factors	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															
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)										
Ethernet	Realtek® RTL8111EPV Gigabit Ethernet connection																		
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																		
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																		
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	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	
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 Case material	Black Display cover: Magnesium Hybrid or PPS (Magnesium Hybrid for US only); Bottom: Glass-Fiber Reinforced Plastic							Mil-Spec test	MIL-STD-810G military certification										
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant										

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

Lenovo  
April 2019



# ThinkPad A485 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ PRO Mobile Processors with Radeon™ Vega Graphics <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	Smart card reader <i>Optional</i> : Smart card reader Media reader 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I 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, 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> Monitor cable( <i>opt</i> ) <b>HDMI to VGA:</b> Lenovo HDMI to VGA Monitor Adapter <b>USB-C to DP:</b> Lenovo USB-C to DisplayPort Adapter
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 ( <i>optional</i> ) <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, fixed focus</li> </ul>																										
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	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>	Keyboard 6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																										
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 Power-on password, hard disk password, supervisor password, security keyhole Security chip Discrete TPM 2.0, TCG Certified Fingerprint reader <i>Optional</i> : Touch style match on chip fingerprint reader on the keyboard bezel NFC None																										
Multi-touch ( <i>opt</i> )	On-cell touch, supports 10-finger gesture (FHD only)	Battery Integrated Li-ion 24Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery																										
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	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> <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>	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																						
Optical	None	AC adapter 45W or 65W USB Type-C AC adapter																										
Ethernet	Realtek® RTL8111GUL Gigabit Ethernet connection	Preload Windows® 10 Home 64 or Windows 10 Pro 64																										
WLAN	Realtek RTL8822BE, Wi-Fi 2x2 802.11ac + Bluetooth 4.1, M.2 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>																										
Bluetooth™	Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter	Mil-Spec test MIL-STD-810G military certification																										
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>	Environment EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																										
SIM card ( <i>opt</i> )	Nano-SIM card slot, optional Verizon LTE (US) SIM card																											
Dimensions	<i>WxDxH:</i> 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm																											
Weight	<table border="1"> <thead> <tr> <th>Models</th> <th>24Wh or 24Wh + 24Wh</th> <th>48Wh, 72Wh, or 24Wh + 48Wh / 72Wh</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>4.08 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																		
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.

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April 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	Starting at 3.87 lb / 1.75kg		
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	Case color	Black or silver																										
	<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	Case material	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																						
i3-8130U	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																								
		Smart card reader	None																										
		Media reader	MicroSD card reader																										
		Ports	One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole * Depending on many factors, actual data transfer speed may be lower than theoretical speed																										
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, Conexant® 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																										
Optical	None	vPro	None																										
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS	Fingerprint reader	Optional: Touch style fingerprint reader on the palm rest																										
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	NFC	None																										
WWAN	None	Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter																										
SIM card	None	Max battery life	MobileMark® 2014: 13.51 hr * Battery life varies significantly with settings, usage, & other factors																										
		AC adapter	45W or 65W USB Type-C AC adapter																										
		Preload (optional)	Windows® 10 Home 64 or Windows 10 Pro 64																										
		Limited warranty	1-year depot repair service																										
		Mil-Spec test	MIL-STD-810G military certification																										
		Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																										

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

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# 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  
April 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 Starting at 3.87 lb / 1.75 kg Case color Black or silver Case material <i>Display cover:</i> Aluminum or PC/ABS plastic; <i>Bottom:</i> PC/ABS plastic
Chipset	Intel 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 Intel limitation</i>								
Display	Size / Resolution	Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Multi-touch	
	14.0" HD (1366x768)	Anti-glare	TN	220 nits	16:9	400:1	90°	Non-touch	
	14.0" FHD (1920x1080)	Anti-glare	IPS	250 nits	16:9	600:1	170°	Non-touch	
Multi-touch	None								Smart card reader None
Storage	<i>Up to two drives (one M.2 SSD and one HDD)</i> • HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ • M.2 SSD / SATA 6.0Gb/s • M.2 SSD / PCIe NVMe, PCIe 3.0 x 2								Media reader MicroSD card reader
Optane™ memory	<i>Optional:</i> 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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
Optical	None								Monitor cable None Bundled Accy None
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								Camera HD720p camera, fixed focus
WLAN + Bluetooth™	<i>One of the following, configurable by model:</i> • 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								Audio support HD Audio, Conexant® CX11880 codec / stereo speakers, 1.5W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack
WWAN	None								Keyboard 6-row, spill-resistant, multimedia Fn keys, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
									Security Power-on password, hard disk password, supervisor password, security keyhole
									Security chip <i>Integrated model:</i> discrete TPM 2.0, TCG Certified <i>Discrete model:</i> firmware TPM 2.0 integrated in chipset
									System Mgt None
									Fingerprint reader <i>Optional:</i> 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 <i>MobileMark® 2014:</i> 13 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i>
									AC adapter 45W or 65W USB Type-C AC adapter
									Preload ( <i>optional</i> ) Windows® 10 Home 64 or Windows 10 Pro 64
									Limited warranty 1-year depot repair service
									Mil-Spec test MIL-STD-810G military certification
									Environment EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo  
May 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, Conexant® 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 Intel limitation</i>									
Display	Size / Resolution		Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle		Multi-touch
	14.0" HD (1366x768)		Anti-glare	TN	220 nits	16:9	400:1	90°	Non-touch	
	14.0" FHD (1920x1080)		Anti-glare	IPS	250 nits	16:9	600:1	170°	Non-touch	
Multi-touch	None								Keyboard 6-row, spill-resistant, multimedia Fn keys UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad	
Storage	Up to two drives (one M.2 SSD and one HDD) • HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ • M.2 SSD / PCIe NVMe, PCIe 3.0 x 2 or PCIe 3.0 x 4									
Optane™ memory	None									
Optical	None									
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								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	
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									
									Preload (optional) Windows® 10 Home 64 or Windows 10 Pro 64	
									Limited warranty 1-year depot repair service	
									Mil-Spec test None	
									Environment EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant	

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

Lenovo  
April 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> • 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
	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> • 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
	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								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
Chipset Memory	Intel SoC (System on Chip) platform 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * System clocks down for processors with lower memory controller								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
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								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
Multi-touch	None								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
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								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
Optical	None								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								WLAN + Bluetooth™ <i>One of the following, configurable by model:</i> • 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
* i3-7130U is NOT available in US and EMEA									
Media reader: MicroSD card reader									
Ports: One USB 2.0, two USB 3.1 Gen 1 (one Always On), one USB 3.1 Type-C Gen 2 (with the function of Power Delivery and DisplayPort), HDMI 1.4b, Ethernet (RJ-45), headphone / microphone combo jack, microSD card reader, security keyhole * Depending on many factors, actual data transfer speed may be lower than theoretical speed									
Camera: HD720p camera, fixed focus									
Audio support: HD Audio, Conexant® CX11852 codec / stereo speakers, 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 certification									
Environment: EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant									

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

Lenovo  
April 2019





# ThinkPad 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, Conexant® 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  
April 2019



# ThinkPad E590 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i3 / i5 / i7 Processor								Dimensions	<i>WxDxH:</i> 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	<i>Display cover:</i> Aluminum;	
i7-8565U	1.8 GHz			4.6 GHz	8MB	<i>Bottom:</i> PC/ABS plastic					
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)								Smart card reader	None	
Chipset	Intel SoC (System on Chip) platform								Media reader	MicroSD 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>								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>	
Display	Size / Resolution		Surface	Type	Brightness	Aspect Ratio	Contrast Ratio	Viewing Angle	Multi-touch	Monitor cable	None
	15.6" HD (1366x768)		Anti-glare	TN	220 nits	16:9	400:1	90°	Non-touch	Bundled Accy	None
	15.6" FHD (1920x1080)		Anti-glare	IPS	250 nits	16:9	600:1	170°	Non-touch	Camera	HD720p camera, fixed focus
Multi-touch	None								Audio support	HD Audio, Conexant® CX11880 codec / stereo speakers, 2W x 2, Dolby® Advanced Audio / dual array microphone, headphone / microphone combo jack	
Storage	Up to two drives (one M.2 SSD and one HDD) • HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ • M.2 SSD / SATA 6.0Gb/s • M.2 SSD / PCIe NVMe, PCIe 3.0 x 2								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight	
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								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	<i>Integrated model:</i> discrete TPM 2.0, TCG Certified <i>Discrete model:</i> firmware TPM 2.0 integrated in chipset	
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								System Mgt	None	
WWAN	None								Fingerprint reader	<i>Optional:</i> 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	<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	MIL-STD-810G military certification	
									Environment	EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant	

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

Lenovo  
May 2019



# ThinkPad E595 Platform Specifications

Product Specifications Reference (PSREF)

Processor	AMD Ryzen™ Mobile Processors with Radeon™ Vega Graphics								Dimensions	WxDxH: 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	Display cover: Aluminum; Bottom: 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 Intel 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, Conexant® 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 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		
Optane™ memory	None								Security	Power-on password, hard disk password, supervisor password, security keyhole		
Optical	None								Security chip	Discrete TPM 2.0, TCG Certified		
Ethernet	Gigabit Ethernet Connection, Realtek R8111GUS								Fingerprint reader	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								NFC	None		
WWAN	None								Battery	Integrated Li-ion 45Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter		
									Max battery life	MobileMark® 2014: 10.3 hr <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™ Bronze; ENERGY STAR® 7.0; RoHS-compliant		

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

Lenovo  
April 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 <i>Bottom:</i> GFRP	
i5-7200U			2.5 GHz	3.1 GHz	3MB			Smart card reader	None		
8th Generation Intel Core i5 / i7 Processor									Media reader	MicroSD card reader	
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	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		
i3-8130U	2	4	2.2 GHz	3.4 GHz	4MB	DDR4-2400	Intel UHD Graphics 620	Monitor cable (optional)	* Depending on many factors, actual data transfer speed may be lower than theoretical speed		
i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB				HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter		
i5-8350U			1.7 GHz	3.6 GHz	6MB				USB-C to VGA: Lenovo USB-C to VGA Adapter		
i7-8550U			1.8 GHz	4.0 GHz	8MB				USB-C to DP: Lenovo USB-C to DisplayPort Adapter		
								Bundled Accy	Optional: 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	Intel SoC (System on Chip) platform							Audio support	HD Audio, Realtek ALC3287 codec / stereo speakers, 2W x 2, Dolby® 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	<i>Some:</i> 13.3" (338mm) HD (1366x768), anti-glare, LED backlight, 250 nits, 16:9 aspect ratio, 500:1 contrast ratio							UltraNav™	TrackPoint® pointing device and buttonless Mylar surface touchpad, multi-touch		
	<i>Some:</i> 13.3" (338mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle							Security	Power-on password, hard disk password, supervisor password, security keyhole		
	<i>Some:</i> 13.3" (338mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 800:1 contrast ratio, 170° viewing angle, on-cell touch							Security chip	Discrete TPM 2.0, TCG Certified		
Multi-touch (opt)	on-cell touch, supports 10-finger gesture							vPro (optional)	Intel vPro Technology		
Storage	<i>One of the following, configurable by model:</i>							Fingerprint reader	Optional: Touch style fingerprint reader on the keyboard bezel, anti-spoofing technology		
	<ul style="list-style-type: none"> <li>M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)</li> <li>M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)</li> </ul>							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	MobileMark® 2014: 16.1 hr * Battery life varies significantly with settings, usage, & other factors		
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via optional ThinkPad Ethernet Extension Cable							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	None							Limited warranty	<i>One of the following, configurable by model:</i>		
SIM card	None								<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 certification		
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant		

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

Lenovo  
April 2019





# ThinkPad 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)	None
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	One of the following, configurable by model: <ul style="list-style-type: none"> <li>M.2 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> </ul>								Security	Power-on password, hard disk password, supervisor password, security keyhole
Optane™ memory	None								Security chip	Discrete TPM 2.0, TCG Certified
Optical	None								System Mgt	None
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via optional ThinkPad Ethernet Extension Cable or Lenovo USB-C to Ethernet Adapter								Fingerprint reader	Optional: Touch style fingerprint reader on the palm rest
WLAN	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card								NFC (optional)	Near Field Communication
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter								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: 14.61 hr * Battery life varies significantly with settings, usage, & other factors
Dimensions	WxDxH: 12.67" x 8.83" x 0.74"; 321.8mm x 224.2mm x 18.8mm								AC adapter	45W or 65W USB Type-C AC adapter
Weight	Starting at 3.22 lb / 1.46 kg								Preload	Windows® 10 Home 64 or Windows 10 Pro 64
Case color	Black or Silver								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>
Case material	Display cover: Aluminum Bottom: GFRP								Mil-Spec test	MIL-STD-810G military certification
									Environment	EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo  
May 2019



# ThinkPad L470 Platform Specifications

Product Specifications Reference (PSREF)

Processor	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>
	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			
	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			
* i7 processor is NOT available in EMEA									
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)								
Chipset	Intel SoC (System on Chip) platform								
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * System clocks down for processors with lower memory controller								
Display	Some: 14.0" (355mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 500:1 contrast ratio Some: 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle								
Multi-touch	None								
Storage	System has one HDD slot or one M.2 2280 slot exclusively for storage Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm or 9.5mm high, Active Protection System™ Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN								
Optical	None								
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)								
WLAN	One of the following, configurable by model: <ul style="list-style-type: none"> <li>Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</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								
Dimensions	WxDxH: 13.35" x 9.25" x 0.94"; 339mm x 235mm x 23.9mm								
Weight	Models		3-cell		6-cell				
	Integrated model		4.13 lb / 1.87 kg		4.45 lb / 2.02 kg				
	Discrete model		4.16 lb / 1.89 kg		4.48 lb / 2.03 kg				
Case color	Black								
Case material	PC/ABS plastic								
Smart card reader	Optional: Smart card reader								
Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC)								
Ports	Three USB 3.1 Gen 1 (USB 3.0, one Always On), VGA, Mini DisplayPort, Ethernet (RJ-45), Dock connector * Depending on many factors, actual data transfer speed may be lower than theoretical speed								
Camera (optional)	HD720p resolution, fixed focus								
Audio support	HD Audio, Realtek ALC3268 codec / stereo speakers, 1W x 2 / dual array microphone, combo audio/microphone jack								
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								
vPro (optional)	Intel vPro Technology								
Fingerprint reader	Optional: Swipe style fingerprint reader on the keyboard bezel								
NFC	None								
Battery	Li-ion 3-cell (24Wh) or 6-cell (48Wh or 72Wh)								
Max battery life <sup>10</sup> (MobileMark® 2014)	Models		3-cell		6-cell 48Wh		6-cell 72Wh		
	Integrated model		7.24 hr		14.48 hr		21.72 hr		
	Discrete model		4.34 hr		8.68 hr		13.02 hr		
* Battery life varies significantly with settings, usage, & other factors									
AC adapter	45W or 65W 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 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>				<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 certification								
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



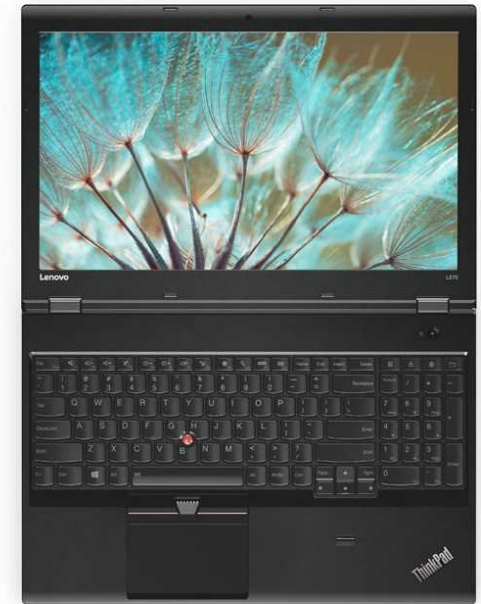
# ThinkPad L480 Platform Specifications

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								
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>								
	SIM card (opt)								
	Dimensions Weight Case color Case material								
	<i>WxDxH:</i> 13.19" x 9.25" x 0.89"; 335mm x 235mm x 22.5mm Starting at 3.71 lb / 1.68 kg Black PC/ABS plastic								
	Smart card reader Media reader Ports								
	<i>Optional:</i> Smart card reader MicroSD card reader 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> <i>HDMI to VGA:</i> Lenovo HDMI to VGA Monitor Adapter <i>USB-C to VGA:</i> Lenovo USB-C to VGA Adapter								
	Monitor cable (optional)								
	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 UltraNav™								
	6-row, spill-resistant, multimedia Fn keys, optional LED backlight TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad								
	Security Security chip vPro (optional)								
	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified 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 certification								
	Environment EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant								

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

Lenovo  
April 2019



# ThinkPad 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	
	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							ExpressCard (opt) One slot (ExpressCard/34) Smart card reader <i>Optional:</i> Smart card reader Media reader 4-in-1 reader (MMC, SD, SDHC, SDXC) Ports Four USB 3.1 Gen 1 (USB 3.0, one Always On), VGA, Mini DisplayPort, Ethernet (RJ-45), Dock connector <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i> Monitor cable <i>Optional:</i> Lenovo Mini-DisplayPort to DisplayPort Monitor Cable (MiniDP to DP)
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		
	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>							Camera (optional) HD720p resolution, fixed focus Audio support HD Audio, Realtek® ALC3245 codec / stereo speakers, 1.5W x 2 / dual array microphone, combo audio/microphone jack
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)							Keyboard 6-row, spill-resistant, multimedia Fn keys, numeric keypad UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad
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>							Security chip Discrete TPM 2.0, TCG Certified vPro (optional) Intel vPro Technology Fingerprint reader <i>Optional:</i> Swipe style fingerprint reader on the palm rest NFC None
Display	<i>Some:</i> 15.6" (396mm) HD (1366x768), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 350:1 contrast ratio <i>Some:</i> 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, 220 nits, 16:9 aspect ratio, 400:1 or 500:1 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, 160° viewing angle							Battery Li-ion 6-cell (48Wh) Max battery life <i>MobileMark® 2014:</i> 14.8 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i> AC adapter 45W slim tip AC adapter
Multi-touch	None							Preload 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 <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>
Storage	<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							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>
Optical (optional)	DVD-ROM or DVD burner, 9mm high, fixed, not removable, tray-in							Mil-Spec test MIL-STD-810G military certification
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)							Environment EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
WLAN	<i>One of the following, configurable by model:</i> <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™ 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>							

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
Optical	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> 12 hr <i>* Battery life varies significantly with settings, usage, &amp; other factors</i> AC adapter 45W or 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)							Preload Windows® 10 Home 64 or Windows 10 Pro 64
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>							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 certification
								Environment EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
April 2019



# ThinkPad 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, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole
	i7-8850H			2.6 GHz	4.3 GHz	9MB			* Power Delivery only supports power-out for charging peripherals	
	E-2176M			2.7 GHz	4.4 GHz	12MB			* Depending on many factors, actual data transfer speed may be lower than theoretical speed	
Graphics	Intel UHD Graphics 630 in processor and NVIDIA® Quadro® P1000 or P2000, 4GB GDDR5 memory; supports external digital monitor via HDMI or Thunderbolt™; supports four independent displays; Max resolution: 5120x2880@30Hz (Thunderbolt); 4096x2160@60Hz (HDMI)								Monitor cable ( <i>optional</i> )	HDMI to VGA: Lenovo HDMI to VGA Monitor 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> )	One of the following, configurable by model:
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	<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® 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	Up to 2 drives (two M.2 SSD) 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>Discrete mode</i> : 7.36 hr; <i>Hybrid mode</i> : 13.87 hr
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								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	One of the following, configurable by model:
Case color	Black								Limited warranty	One of the following, configurable by model:
Case material	<i>Display cover</i> : CFRP/GFRP hybrid; <i>Bottom</i> : Aluminum alloy									<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 certification
									Environment	EPEAT™ Gold; ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
April 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	<i>Models</i>	<i>4-cell</i>	<i>6-cell</i>								
	i7-6820HQ	4	8	2.7 GHz	3.6 GHz	8MB	DDR4-2133	Intel HD Graphics 530		<i>Non-touch</i>	5.6 lb / 2.55kg	5.9 lb / 2.67kg								
	E3-1505M v5			2.8 GHz	3.7 GHz			Intel HD Graphics P530	<i>Multi-touch</i>	6.2 lb / 2.82kg	6.4 lb / 2.90kg									
	i7-7700HQ			2.8 GHz	3.8 GHz	6MB	DDR4-2400	Intel HD Graphics 630	Case color	Black										
	i7-7820HQ			2.9 GHz	3.9 GHz			Intel HD Graphics P630	Case material	<i>Display cover:</i> Glass-Fiber Reinforced Plastic; <i>Bottom:</i> Magnesium/Aluminum										
	E3-1505M v6			3.0 GHz	4.0 GHz	8MB	DDR4-2400	Intel HD Graphics P630	Smart card reader	<i>Optional:</i> Smart card reader										
E3-1535M v6	3.1 GHz			4.2 GHz	ExpressCard			One slot (ExpressCard/34)												
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)							Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card											
Chipset	Mobile Intel CM238 Chipset							Ports	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>											
Memory	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>							Camera (optional)	HD720p resolution, 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, 160° viewing angle <i>Some:</i> 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							Audio support	HD Audio, Realtek® ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack											
Multi-touch (opt)	Capacitive-type multi-touch, supports 10-finger gesture, 220 nits (FHD only)							Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight											
Pen (optional)	ThinkPad Pen Pro, active pen for multi-touch display							UltraNav™	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	Power-on password, hard disk password, supervisor password, security keyhole											
RAID (optional)	RAID 0/1 support							Security chip	Discrete TPM 2.0, TCG Certified											
Optical	None							vPro (optional)	Intel vPro Technology											
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)							Fingerprint reader	Touch style match on chip fingerprint reader on the palm rest											
WLAN	<i>One of the following, configurable by model:</i> • 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							Color calibration	<i>Optional:</i> Pantone® color calibrator by X-Rite® color calibration sensor in palm rest											
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>							NFC	None											
WWAN (optional)	<i>One of the following, configurable by model:</i> • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card							Battery	Lithium Polymer 4-cell (66Wh) or 6-cell (90Wh)											
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card							Max battery life <sup>10</sup>	<table border="1"><thead><tr><th>Model</th><th>4-cell</th><th>6-cell</th></tr></thead><tbody><tr><td><i>Discrete Graphics</i></td><td>4.5 hr</td><td>6.1 hr</td></tr><tr><td><i>Hybrid Graphics</i></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	<i>Discrete Graphics</i>	4.5 hr	6.1 hr	<i>Hybrid Graphics</i>	6.5 hr	8.9 hr
Model	4-cell	6-cell																		
<i>Discrete Graphics</i>	4.5 hr	6.1 hr																		
<i>Hybrid Graphics</i>	6.5 hr	8.9 hr																		
								AC adapter	170W slim tip AC adapter											
								Preload	<i>One of the following, configurable by model:</i> • Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 • Windows® 10 Home 64 • Windows 10 Pro 64 • Windows 10 Pro 64 for Workstations											
								Limited warranty	<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 certification											
								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 P51s Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th Generation Intel® Core™ i7 Processor								Dimensions Weight	WxDxH: 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		Models	4 + 3-cell	6-cell	4 + 6-cell		
	i7-6500U	2	4	2.5 GHz	3.1 GHz	4MB	DDR4-2133	Intel HD Graphics 520	Non-touch model	4.39 lb / 1.99 kg	4.80 lb / 2.18 kg	4.80 lb / 2.18 kg			
	i7-6600U			2.6 GHz	3.4 GHz	4MB			Multi-touch model	4.44 lb / 2.01 kg	4.85 lb / 2.20 kg	4.85 lb / 2.20 kg			
	or 7th Generation Intel Core i5 / i7 Processor								Case color	Black					
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Case material	Display cover: Glass-Fiber Reinforced Plastic (PPS); Bottom: Glass-Fiber Reinforced Plastic					
	i5-7300U	2	4	2.6 GHz	3.5 GHz	3MB	DDR4-2133	Intel HD Graphics 620	Smart card reader	Optional: Smart card reader					
	i7-7500U			2.7 GHz	3.5 GHz	4MB			Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I					
	i7-7600U			2.8 GHz	3.9 GHz	4MB			Ports	Three USB 3.1 Gen 1 (USB 3.0, one Always On), USB 3.1 Type-C Gen 2 / Thunderbolt 3, HDMI 1.4b, Ethernet (RJ-45), Dock connector					
Graphics	Intel HD Graphics 520 or 620 in processor and NVIDIA Quadro® M520, 2GB 2.5GHz GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 3840x2160@30Hz (HDMI)								WiGig dock (opt)	* Depending on many factors, actual data transfer speed may be lower than theoretical speed ThinkPad WiGig dock					
Chipset	Intel SoC (System on Chip) platform								Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to VGA: Lenovo USB-C to VGA Adapter					
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets * System clocks down for processors with lower memory controller								Camera (optional)	720p: HD720p resolution, fixed focus IR & 720p: IR camera and HD720p camera (mutually exclusive with WiGig)					
Display	Some: 15.6" (396mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 170° viewing angle Some: 15.6" (396mm) 4K (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® ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack					
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight UltraNav™					
Storage	System has one HDD slot or one M.2 2280 slot exclusively for storage Some: HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™ Some: SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD) Some: M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s Some: 128GB M.2 SSD / SATA 6.0Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN and WiGig								Security	Power-on password, hard disk password, supervisor password, security keyhole					
Optical	None								Security chip	Discrete TPM 2.0, TCG Certified					
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)								vPro (optional)	Intel vPro Technology					
WLAN	One of the following, configurable by model (WiGig can coexist with WWAN): • Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card								Fingerprint reader	Optional: Touch style match on chip fingerprint reader on the palm rest					
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								NFC (optional)	Near Field Communication					
WWAN (optional)	One of the following, configurable by model (WWAN can coexist with WiGig): • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card • Integrated Mobile Broadband 4G LTE, Intel XMM™ 7160 (Fibocom L831-EAU), M.2 card (EMEA only)								Internal battery	Optional: Integrated Li-Polymer 4-cell (32Wh)					
SIM card (opt)	Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card								External battery	Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh or 72Wh)					
									Max battery life (MobileMark® 2014)	Models	4 + 3-cell	6-cell 48Wh	6-cell 72Wh	4 + 6-cell 48Wh	4 + 6-cell 72Wh
										Max battery life	13.8 hr	12.5 hr	18.5 hr	20.0 hr	26.8 hr
										* Battery life varies significantly with settings, usage, & other factors					
									AC adapter	65W slim tip AC adapter or 65W USB Type-C 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				
										• Lenovo Solution Center	• Lenovo Companion				
										• Lenovo PowerEngage	• Lenovo Setting				
										• ThinkVantage Product Recovery	• Microsoft Office preloaded; purchase a product key to activate				
										• ThinkVantage System Update					
										• Adobe® Reader®					
										• Microsoft® Office preloaded; purchase a product key to activate					
										• McAfee® LiveSafe™ (30-day trial)					
									Limited warranty	One of the following, configurable by model:					
										• 1-year depot repair service					
										• 3-year/1-yr battery depot repair service					
										• 3-year/1-yr battery limited onsite service					
									Mil-Spec test	MIL-STD-810G military certification					
									Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant					





# ThinkPad P52 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i7 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
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	<i>Non-touch model:</i> starting at 5.4 lb (2.45kg); <i>Multi-touch model:</i> starting at 6.4 lb (2.9kg)
	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			Case material	<i>Display cover:</i> PPS; <i>Bottom:</i> Magnesium/Aluminum
	i9-8950HK			2.9 GHz	4.8 GHz	12MB		Intel UHD Graphics P630	Smart card reader	<i>Optional:</i> Smart card reader
E-2176M	2.7 GHz			4.4 GHz	12MB	ExpressCard			None	
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	4-in-1 reader (MMC, SD, SDHC, SDXC), supports UHS-II SD card
Chipset	Mobile Intel CM246 Chipset								Ports	Three USB 3.1 Gen 1 (one Always On), two USB Type-C / Thunderbolt 3 (with the function of Power Delivery and DP), Mini DisplayPort 1.4, HDMI 2.0, Ethernet (RJ-45), nano-SIM card slot (WWAN models), headphone / microphone combo jack, optional smart card reader, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole <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> <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)	Capacitive-type multi-touch, supports 10-finger gesture (4K only)								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, LED backlight
Pen	Supports pen accessory, please see the accessory compatibility for details								UltraNav™	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	Power-on password, hard disk password, supervisor password, security keyhole
Optane™ memory	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								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 palm rest
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								Color calibration	None
WLAN	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0, M.2 card								NFC (optional)	Near Field Communication
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Battery	Li-ion 90Wh battery
WWAN (optional)	Integrated Mobile Broadband 4G LTE-A, Intel XMM™ 7360 (Fibocom L850-GL), M.2 card								Max battery life	<i>Discrete mode:</i> 6.1 hr; <i>Hybrid mode:</i> 8.9 hr <i>(MobileMark® 2014)</i> * Battery life varies significantly with settings, usage, & other factors
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card								AC adapter	170W 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 certification
									Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

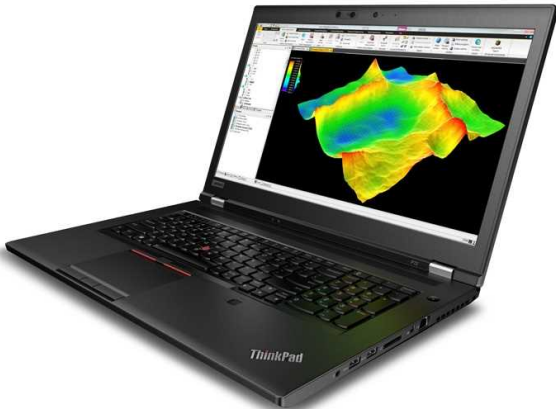
Lenovo  
April 2019



# ThinkPad P52s Platform Specifications

Product Specifications Reference (PSREF)

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			1.8 GHz	4.0 GHz	8MB			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																						
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)								Smart card reader	<i>Optional:</i> Smart card reader																	
Chipset	Intel SoC (System on Chip) platform								Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC)																	
Memory	32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets <i>* System clocks down for processors with lower memory controller</i>								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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>																	
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								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																	
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)								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																	
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								Audio support	HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack																	
Optane™ memory	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight																	
Optical	None								UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																	
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)								Security	Power-on password, hard disk password, supervisor password, security keyhole																	
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>								Security chip	Discrete TPM 2.0, TCG Certified																	
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>								vPro (optional)	Intel vPro Technology																	
									Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest anti-spoofing technology																	
									NFC (optional)	Near Field Communication																	
									Battery	Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery																	
									Max battery life (MobileMark® 2014)	<table border="1"> <thead> <tr> <th>Models</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>12.2 hr</td> <td>18.5 hr</td> <td>13.5 hr</td> <td>20.1 hr</td> <td>26.3 hr</td> </tr> </tbody> </table>						Models	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
Models	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																						
									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 certification																	
									Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																	



# 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 certification
									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></p> <p><b>WxDxH:</b> 13.25" x 9.15" x 0.79"; 336.6mm x 232.5mm x 19.95mm</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>Weight</b></p> <p><b>Case color</b> Black</p> <p><b>Case material</b> 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
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<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> Optional: Smart card reader</p> <p><b>Media reader</b> 4-in-1 reader (MMC, SD, SDHC, SDXC), supports SD 3.0, UHS-I</p> <p><b>Ports</b> 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</p> <p><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</p> <p><b>Monitor cable</b> Optional: Lenovo USB-C to VGA Adapter</p> <p><b>Camera (optional)</b> 720p: HD720p resolution, fixed focus IR &amp; 720p: IR camera and HD720p camera (mutually exclusive with WiGig)</p> <p><b>Audio support</b> HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack</p>					
Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics																															
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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>Keyboard</b> 6-row, spill-resistant, multimedia Fn keys, optional LED backlight</p> <p><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</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 keyboard bezel</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> 32GB max / 2400MHz DDR4, dual-channel capable, two DDR4 SO-DIMM sockets</p> <p><i>* System clocks down for processors with lower memory controller</i></p>	<p><b>Internal battery</b> Optional: Integrated Li-Polymer 3-cell (24Wh)</p> <p><b>External battery</b> 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>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</p> <p><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</p> <p><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>AC adapter</b> 45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter</p>																																					
<p><b>Storage</b></p> <p><i>System has one HDD slot or one M.2 2280 slot exclusively for storage</i></p> <p><i>Some:</i> HDD / SATA 6.0Gb/s, 2.5" wide, 7mm high, Active Protection System™</p> <p><i>Some:</i> SSD / SATA 6.0Gb/s, 2.5" wide, 7mm high (e.g. xxxGB SSD)</p> <p><i>Some:</i> M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s</p> <p><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>Preload</b> Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64</p> <p><i>Some:</i> Windows 10 Home 64</p> <p><i>Some:</i> Windows 10 Pro 64</p> <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>																																					
<p><b>Optical</b> None</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>WLAN</b></p> <p><i>One of the following, configurable by model (WiGig can coexist with WWAN):</i></p> <ul style="list-style-type: none"> <li>• Realtek® RTL8822BE, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</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> <li>• Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card</li> </ul> <p><b>Bluetooth™</b> Bluetooth 4.1 wireless, integrated in Wi-Fi + Bluetooth combo adapter</p> <p><i>* Intel 8265ac / 18265ac card support BT4.2 but is limited to BT4.1 by Windows OS</i></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>WWAN (optional)</b> <i>One of the following, configurable by model (WWAN can coexist with WiGig):</i></p> <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>	<p><b>Mil-Spec test</b> MIL-STD-810G military certification</p>																																					
<p><b>SIM card (opt)</b> Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card</p>	<p><b>Environment</b> EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</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	<i>Some:</i> 14.0" (355mm) FHD (1920x1080), anti-glare, LED backlight, IPS, 250 nits, 16:9 aspect ratio, 700:1 contrast ratio, 160° viewing angle <i>Some:</i> 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	<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)								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	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> 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	<i>One of the following, configurable by model (WiGig is mutually exclusive with WWAN):</i> • 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	<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
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 certification
WWAN (optional)	<i>One of the following, configurable by model (mutually exclusive with WiGig):</i> • Wireless WAN upgradable • Integrated Mobile Broadband 4G LTE-A, Qualcomm® Snapdragon™ X7 LTE-A (Sierra Wireless EM7455), M.2 card								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant
SIM card (opt)	• Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card									



# 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)	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 2, 16Gb/s Some: 128GB M.2 SSD / PCIe NVMe, PCIe 3.0 x 2, 16Gb/s, in WWAN slot as 2nd Storage, mutually exclusive with WWAN							NFC (optional)	Near Field Communication						
Optane™ memory	Optional: 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	Integrated model	7.2 hr	14.4 hr	21.8 hr	14.4 hr	21.8 hr	29.0 hr
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	Discrete model	6.6 hr	13.2 hr	19.8 hr	13.6 hr	19.8 hr	26.4 hr
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	* Battery life varies significantly with settings, usage, & other factors 45W or 65W USB Type-C AC adapter						
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card							Mil-Spec test	Windows® 10 Home 64 or Windows 10 Pro 64						
								Environment	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-STD-810G military certification						
									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 certification
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant

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

Lenovo  
April 2019



# ThinkPad T490 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor								Dimensions Weight	WxDxH: 12.95" x 8.94" x 0.74"; 329mm x 227mm x 18.9mm		
	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	Black		
	i7-8565U			1.8 GHz	4.6 GHz	8MB			Case material	Display cover: PPS / 50% GF; Bottom: PA / 50% GF		
	i7-8665U			1.9 GHz	4.8 GHz	8MB			Smart card reader	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) Dolby Vision™ HDR	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> </ul>								Max battery life	MobileMark® 2014: 16.11 hr * Battery life varies significantly with settings, usage, & other factors		
Optane™ memory	Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2								AC adapter	45W or 65W USB Type-C AC adapter		
Optical	None								Preload	Windows® 10 Home 64 or Windows 10 Pro 64		
Ethernet	Non-vPro model: Intel Ethernet Connection I219-V (Jacksonville) vPro model: Intel Ethernet Connection I219-LM (Jacksonville)								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 (optional)	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0								Mil-Spec test	MIL-STD-810G military certification		
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter								Environment	EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant		
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, Fibocom L830-EB, M.2 card (EMEA only)</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L850-GL, M.2 card</li> <li>Integrated Mobile Broadband 4G LTE-A, Fibocom L860-GL, MIMO 4x4, M.2 card</li> </ul> * For non-WWAN model, it means the model is NOT WWAN upgradable											

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

Lenovo  
May 2019





# 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> 12.94" x 8.90" x 0.66"; 328.8mm x 226.15mm x 16.7mm <i>WxDxH (black with FHD Low Power / WQHD):</i> 12.95" x 8.89" x 0.63"; 329.0mm 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																																									
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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 only; 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) Dolby Vision™ HDR</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) Dolby Vision™ HDR	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) Dolby Vision™ HDR	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>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>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> </ul>	<p><b>Security</b> Power-on password, hard disk password, supervisor password, security keyhole <b>Security chip</b> Discrete TPM 2.0, TCG Certified</p>																																													
<p><b>Optane™ memory</b> <i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2 <b>Optical</b> None</p>	<p><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>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></p>																																													
<p><b>WLAN (optional)</b> <i>One of the following, configurable by model:</i> • Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0 • Intel Wireless-AX 22260, Wi-Fi 2x2 802.11ax + Bluetooth 5.0</p>	<p><b>AC adapter</b> 45W or 65W USB Type-C AC adapter</p>																																													
<p><b>Bluetooth™</b> Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter</p>	<p><b>Preload</b> Windows® 10 Home 64 or Windows 10 Pro 64</p>																																													
<p><b>WWAN (optional)</b> <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 <i>* For non-WWAN model, it means the model is NOT WWAN upgradable</i></p>	<p><b>Limited warranty</b> <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>Mil-Spec test</b> MIL-STD-810G military certification</p> <p><b>Environment</b> EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant</p>																																													

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

Lenovo  
May 2019



# ThinkPad T570 Platform Specifications

Product Specifications Reference (PSREF)

Processor	6th Generation Intel® Core™ i5 / i7 Processor							Dimensions Weight Case color Case material	<i>WxDxH:</i> 14.40" x 9.95" x 0.79-0.80"; 365.8mm x 252.8mm x 19.95-20.2mm Starting at 4.34 lb / 1.97 kg Black <i>Display cover:</i> Glass-Fiber Reinforced Plastic (PPS); <i>Bottom:</i> Glass-Fiber Reinforced Plastic																		
	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																					
	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), 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>																		
	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 only, or Intel HD Graphics 520 or 620 in processor and NVIDIA GeForce® 940MX, 2GB 2.5GHz GDDR5 memory; supports external digital monitor via HDMI or USB Type-C; supports three independent displays; Max resolution: 4096x2304@60Hz (USB Type-C); 4096x2160@24Hz (HDMI)							Camera ( <i>optional</i> )	720p: HD720p resolution, fixed focus IR & 720p: IR camera and HD720p camera (mutually exclusive with WiGig)																		
Chipset	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>							Audio support	HD Audio, Realtek ALC3268 codec / stereo speakers, 2W x 2 / dual array microphone, combo audio/microphone jack																		
Memory								Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight																		
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, 700:1 contrast ratio, 170° viewing angle <i>Some:</i> 15.6" (396mm) 4K (3840x2160), anti-glare, LED backlight, IPS, 300 nits, 16:9 aspect ratio, 1000:1 contrast ratio, 72% gamut, 170° viewing angle							UltraNav™	TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																		
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	<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							vPro ( <i>optional</i> )	Discrete TPM 2.0, TCG Certified Intel vPro Technology																		
Optical	None							Fingerprint reader	<i>Optional:</i> Touch style match on chip 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 ( <i>optional</i> )	Near Field Communication																		
WLAN	<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 (US only) • Intel Dual Band Wireless-AC 8260, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Dual Band Wireless-AC 8265, Wi-Fi 2x2 802.11ac + BT4.1, M.2 card • Intel Tri-Band Wireless-AC 18265, WiGig 802.11ad + Wi-Fi 2x2 802.11ac + BT4.1, M.2 card							Internal battery	<i>Optional:</i> Integrated Li-Polymer 4-cell (32Wh)																		
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>							External battery	Li-Polymer 3-cell (24Wh) or Li-ion 6-cell (48Wh or 72Wh)																		
WWAN ( <i>optional</i> )	<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)							Max battery life ( <i>MobileMark® 2014</i> )	<table border="1"> <thead> <tr> <th>Models</th> <th>4 + 3-cell</th> <th>6-cell 48Wh</th> <th>6-cell 72Wh</th> <th>4 + 6-cell 48Wh</th> <th>4 + 6-cell 72Wh</th> </tr> </thead> <tbody> <tr> <td><i>Integrated</i></td> <td>13.8 hr</td> <td>12.5 hr</td> <td>18.5 hr</td> <td>20.3 hr</td> <td>27.1 hr</td> </tr> <tr> <td><i>discrete</i></td> <td>13.8 hr</td> <td>12.5 hr</td> <td>18.5 hr</td> <td>20.0 hr</td> <td>26.8 hr</td> </tr> </tbody> </table>	Models	4 + 3-cell	6-cell 48Wh	6-cell 72Wh	4 + 6-cell 48Wh	4 + 6-cell 72Wh	<i>Integrated</i>	13.8 hr	12.5 hr	18.5 hr	20.3 hr	27.1 hr	<i>discrete</i>	13.8 hr	12.5 hr	18.5 hr	20.0 hr	26.8 hr
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<i>discrete</i>	13.8 hr	12.5 hr	18.5 hr	20.0 hr	26.8 hr																						
SIM card ( <i>opt</i> )	Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card							<i>* Battery life varies significantly with settings, usage, &amp; other factors</i>																			
								AC adapter	45W or 65W slim tip AC adapter, 45W or 65W USB Type-C AC adapter																		
								Preload	Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64 • Lenovo Solution Center • Lenovo PowerEngage • ThinkVantage Product Recovery • ThinkVantage System Update • Adobe® Reader® • Microsoft® Office preloaded; purchase a product key to activate • McAfee® LiveSafe™ (30-day trial) <i>Some:</i> Windows 10 Home 64 <i>Some:</i> Windows 10 Pro 64 • Lenovo Companion • Lenovo Setting • Microsoft Office preloaded; purchase a product key to activate																		
								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 certification																		
								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																		



# 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	Case color Case material	Black <i>Display cover:</i> Glass-Fiber Reinforced Plastic (PPS); <i>Bottom:</i> Glass-Fiber Reinforced Plastic																						
	i5-7200U	2	4	2.5 GHz	3.1 GHz	3MB	DDR4-2133	Intel HD Graphics 620	Smart card reader		<i>Optional:</i> Smart card reader																						
	i5-7300U			2.6 GHz	3.5 GHz	3MB				Media reader	4-in-1 reader (MMC, SD, SDHC, SDXC)																						
or 8th Generation Intel Core i5 / i7 Processor													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 <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	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																								
i5-8250U	4	8	1.6 GHz	3.4 GHz	6MB	DDR4-2400	Intel UHD Graphics 620		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																							
i5-8350U			1.7 GHz	3.6 GHz	6MB			Audio support		HD Audio, Realtek® ALC3287 codec / stereo speakers, 2W x 2, Dolby® Audio™ Premium / dual array microphone, headphone / microphone combo jack																							
i7-8550U			1.8 GHz	4.0 GHz	8MB					Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight UltraNav™ TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad																						
i7-8650U			1.9 GHz	4.2 GHz	8MB						Security	Power-on password, hard disk password, supervisor password, security keyhole Discrete TPM 2.0, TCG Certified																					
Graphics													Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest, anti-spoofing technology																			
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)														NFC (optional)	Near Field Communication																		
Chipset													Battery		Optional integrated Li-ion 32Wh battery and external Li-ion 24Wh, 48Wh, or 72Wh battery																		
Memory														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>						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
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																											
Display													AC adapter	45W or 65W USB Type-C AC adapter																			
<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														Preload	Windows® 10 Home 64 or Windows 10 Pro 64																		
Multi-touch (opt)													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																		
Storage														Mil-Spec test	MIL-STD-810G military certification																		
<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													Environment		EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant																		
Optane™ memory																																	
Optical																																	
Ethernet																																	
WLAN + Bluetooth™																																	
WWAN (optional)																																	
SIM card (opt)																																	

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

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# ThinkPad T590 Platform Specifications

Product Specifications Reference (PSREF)

Processor	8th Generation Intel® Core™ i5 / i7 Processor									Dimensions	<i>WxDxH:</i> 14.40" x 9.76" x 0.79"; 365.8mm x 248.0mm x 19.95mm
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Weight	<i>FHD model:</i> 3.87 lb / 1.75 kg; <i>UHD model:</i> 3.86 lb / 1.75 kg	
	i5-8265U	4	8	1.6 GHz	3.9 GHz	6MB	DDR4-2400	Intel UHD Graphics 620	Case color	Black	
	i5-8365U			1.6 GHz	4.1 GHz	6MB			Case material	<i>Display cover:</i> PPS / 50% GF; <i>Bottom:</i> PA / 50% GF	
	i7-8565U			1.8 GHz	4.6 GHz	8MB			Smart card reader	<i>Optional:</i> Smart card reader	
i7-8665U	1.9 GHz			4.8 GHz	8MB	Media reader			MicroSD card reader		
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)									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 <i>* Depending on many factors, actual data transfer speed may be lower than theoretical speed</i>
Chipset	Intel SoC (System on Chip) platform									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	48GB max / 2400MHz DDR4, dual-channel capable, 8GB or 16GB memory soldered to systemboard, one DDR4 SO-DIMM socket <i>* Installed memory is actually 2666MHz but run at 2400MHz due to Intel limitation</i>									Bundled Accy	None
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	250 nits	16:9	700:1	45%	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
	15.6"	UHD (3840x2160) Dolby Vision™ HDR	IPS	Anti-glare	500 nits	16:9	1200:1	100% Adobe	170°	Keyboard	6-row, spill-resistant, multimedia Fn keys, numeric keypad, optional LED backlight
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only)									UltraNav™	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> </ul>									Security	Power-on password, hard disk password, supervisor password, security keyhole
Optane™ memory	<i>Optional:</i> Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2									Security chip	Discrete TPM 2.0, TCG Certified
Optical	None									System Mgt (opt)	Intel vPro Technology
Ethernet	<i>Non-vPro model:</i> Intel Ethernet Connection I219-V (Jacksonville) <i>vPro model:</i> Intel Ethernet Connection I219-LM (Jacksonville)									Fingerprint reader	<i>Optional:</i> Touch style match on chip fingerprint reader on the palm rest
WLAN (optional)	Intel Wireless-AC 9560, Wi-Fi 2x2 802.11ac + Bluetooth 5.0									NFC (optional)	Near Field Communication
Bluetooth™	Bluetooth 5.0 wireless, integrated in Wi-Fi + Bluetooth combo adapter									Battery	Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr)
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>									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>
										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 certification
										Environment	EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant

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

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May 2019





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

Product Specifications Reference (PSREF)

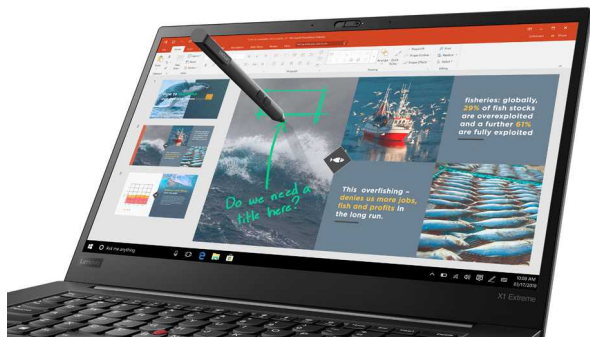
Processor	6th Generation Intel® Core™ i5 / i7 Processor (EMEA has only i5-6300U and i7-6600U)								Smart card reader	None									
	Processor Number	# of Cores	# of Threads	Base Frequency	Max Turbo Frequency	Cache	Memory Types	Processor Graphics	Media reader	MicroSD card reader, supports UHS-II microSD 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 certification									
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		
	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)								Smart card reader Media reader Ports Monitor cable (optional) Bundled Accy	None MicroSD card reader, supports UHS-II 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> HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter USB-C to DP: Lenovo USB-C to DisplayPort Adapter Optional: ThinkPad Ethernet Extension Adapter Gen 2
Chipset Memory	Intel SoC (System on Chip) platform 8GB or 16GB / 2133MHz LPDDR3 / soldered to systemboard, no sockets <i>* System clocks down for processors with lower memory controller</i>								Camera (optional) Audio support	<i>One of the following, configurable by model:</i> • HD720p camera with ThinkShutter camera privacy, fixed focus • IR camera and HD720p camera, fixed focus 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 (opt)	On-cell touch, supports 10-finger gesture (FHD only)								Security Security chip vPro (optional) 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 (optional)	Near Field Communication
Optane™ memory Optical	None None								Battery Max battery life AC adapter	Integrated Li-ion 57Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 65W USB Type-C AC adapter <i>MobileMark® 2014: 19.3 hr</i> <i>* Battery life varies significantly with settings, usage, &amp; other factors</i> 45W or 65W USB Type-C AC adapter
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2								Preload	Windows® 10 Home 64 or Windows 10 Pro 64
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>								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)	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>								Mil-Spec test	MIL-STD-810G military certification
SIM card (opt)	Nano-SIM card slot, optional Verizon LTE (US) SIM card								Environment	EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant



# 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, 4-in-1 reader (MMC, SD, SDHC, SDXC), security keyhole
	i5-8400H			2.5 GHz	4.2 GHz					
	i7-8750H	6	12	2.2 GHz	4.1 GHz	9MB				
	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)	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: <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>
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	<i>Up to 2 drives (two M.2 SSD)</i> <ul style="list-style-type: none"> <li>• M.2 SSD / SATA 6.0Gb/s (e.g. xxxGB SSD M.2)</li> <li>• M.2 SSD / PCIe NVMe, PCIe 3.0 x 4, 32Gb/s (e.g. xxxGB SSD M.2 PCIe NVMe)</li> </ul>								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 (MobileMark 2014)	Discrete mode: 9.5 hr; Hybrid mode: 14.9 hr
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 <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)								AC adapter	135W slim tip AC adapter
Weight									Preload	Windows® 10 Home 64 or Windows 10 Pro 64
Case color	Black								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>
Case material	<i>Display cover:</i> CFRP/GFRP hybrid; <i>Bottom:</i> Aluminum alloy								Mil-Spec test	MIL-STD-810G military certification
									Environment	EPEAT™ Gold (US only); ENERGY STAR® 7.0; RoHS-compliant

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

Lenovo  
April 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
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<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</p> <p><b>UltraNav™</b> TrackPoint® pointing device and buttonless Mylar surface multi-touch touchpad</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>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>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>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																																																																		
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<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>Preload</b> Windows® 7 Professional 64 preinstalled through downgrade rights in Windows 10 Pro 64  <i>Some:</i> Windows 10 Pro 64</p> <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>																																																																												
<p><b>Optical</b> None</p>	<p>• Lenovo Solution Center</p> <p>• Lenovo PowerEngage</p> <p>• ThinkVantage Product Recovery</p> <p>• ThinkVantage System Update</p> <p>• Adobe® Reader®</p> <p>• Microsoft® Office preloaded; purchase a product key to activate</p> <p>• McAfee® LiveSafe™ (30-day trial)</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>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>WLAN</b> <i>One of the following, configurable by model (WiGig is mutually exclusive with WWAN):</i></p> <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><b>Mil-Spec test</b> MIL-STD-810G military certification</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>Environment</b> EPEAT™ Gold (US only); ENERGY STAR® 6.1; RoHS-compliant</p>																																																																												
<p><b>WWAN (optional)</b> <i>One of the following, configurable by model (mutually exclusive with WiGig):</i></p> <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><b>SIM card (opt)</b> Micro-SIM card slot, opt Verizon LTE (US) or Lenovo® Connect (EMEA) SIM card</p>																																																																													





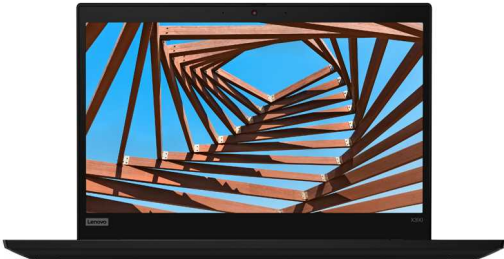
# ThinkPad X280 Platform Specifications

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	2	4	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			HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter	
	i7-8550U			1.8 GHz	4.0 GHz	8MB			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	Bundled Accy	Optional: ThinkPad Ethernet Extension Adapter Gen 2			
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)							Monitor cable (optional)	HDMI to VGA: Lenovo HDMI to VGA Monitor Adapter	
Chipset	Intel SoC (System on Chip) platform							Camera (optional)	One of the following, configurable by model:	
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							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	
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							Keyboard	6-row, spill-resistant, multimedia Fn keys, optional LED backlight	
Multi-touch (opt)	On-cell touch, supports 10-finger gesture (FHD only) * FHD non-touch model is NOT available in US							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 (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	
Optical	None							vPro (optional)	Intel vPro Technology	
Ethernet	Native Intel Ethernet Connection I219-V (Non-vPro) or I219-LM (vPro) via bundled or optional ThinkPad Ethernet Extension Adapter Gen 2							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: • 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							Battery	Integrated Li-ion 48Wh battery, supports Rapid Charge (charge up to 80% in 1hr) with 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							Max battery life	MobileMark® 2014: 16.6 hr * Battery life varies significantly with settings, usage, & other factors	
								AC adapter	45W or 65W USB Type-C AC adapter	
								Preload	Windows® 10 Home 64 or Windows 10 Pro 64	
								Limited warranty	One of the following, configurable by model: • 1-year depot repair service • 3-year/1-yr battery depot repair service • 3-year/1-yr battery limited onsite service	
								Mil-Spec test	MIL-STD-810G military certification	
								Environment	EPEAT™ 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" data-bbox="268 183 1045 358"> <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" data-bbox="1228 159 1984 277"> <thead> <tr> <th>Models</th> <th>FHD Non-touch</th> <th>HD / FHD Multi-touch</th> </tr> </thead> <tbody> <tr> <td>Carbon Fiber</td> <td>311.9mm x 217.0mm x 16.5mm 12.28" x 8.54" x 0.65"</td> <td>-</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>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" data-bbox="1228 282 1984 358"> <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
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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" data-bbox="268 537 1045 740"> <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>300:1</td> <td>45%</td> <td>170°</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>1200:1 (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	300:1	45%	170°	13.3"	FHD (1920x1080)	IPS	Anti-glare	300 nits	16:9	1200:1 (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																			
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<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> </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>Optane™ memory</b> Optional: Intel Optane memory, PCIe NVMe, PCIe 3.0 x 2 <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>System Mgt (opt)</b> Intel vPro Technology																																																							
<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>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 certification <b>Environment</b> EPEAT™ Bronze; ENERGY STAR® 7.0; RoHS-compliant																																																							

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

Lenovo  
April 2019

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

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

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**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.

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