

Lenovo P15s Gen 1

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Hardware Maintenance Manual	P15s Hardware Maintenance Manual
Drivers & Software	P15s Drivers & Software

SECTION I: Platform Overview

Description	<p>ThinkPad P15s DESIGN THAT DELIVERS ON-THE-GO POWER AND PERFORMANCE A perfect mix of power and performance, the ThinkPad® P15s combines the latest Intel Core processors and NVIDIA Quadro professional graphics, all in a thin and light design. Perfect for work on the go, this ultra-mobile workstation ignites designers, engineers, and students to be creative anytime, anywhere. Built with an advanced, comprehensive suite of ThinkShield security features, the ThinkPad P15s has you protected from every angle — giving you the freedom to innovate fearlessly.</p>
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CPU

Processor Support	Commet Lake U Series Core i5/i7
Socket Type	BGA

Operating Systems

Preloaded	Windows 10 Pro 64 (19H2) Windows 10 Home 64 (19H2) Windows 10 Home Single Language 64(19H2) Windows 10 Home Chinese Language Edition 64(19H2)
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	Windows 10 CMIT Government Edition Ubuntu (Version20.04)
Supported	Windows 10 Pro 64 (19H2) Windows 10 Home 64 (19H2) Windows 10 Home Single Language 64(19H2) Windows 10 Home Chinese Language Edition 64(19H2) Windows 10 CMIT Government Edition Ubuntu (Version20.04) Red Hat Enterprise Linux (Certification support, Version8.2)

Memory

Number of DIMM Slots	1 soldered-down DIMM + 1 DIMM slot
Channels	Single Channel w/ 1 soldered DIMM Dual Channel w/ 1 soldered DIMM + 1 add-in DIMM
Type	DDR4
ECC Support	No
Speed	physical 3200 MHz operational 2666MHz
Max DIMM Size	32GB
Max System Memory	48GB
Min System Memory	8GB
Soldered Memory	8GB/16GB

Storage

Storage Slots	1 x M.2 2280
SATA	No
PCIe	Solid State Drive, OPAL2 PCIe-NVMe M.2 2280S3 - TLC (QLC for Hybrid SSD)
SAS	No
Interface	PCIe
Security	OPAL, Non-SED for Hybrid SSD
Optional Hard Disk Drive Controllers	No

Video

Integrated Graphics	Processor Graphics Intel® UHD Graphics 620
Discrete Graphics	NVIDIA Quadro P520
Adapter	None
Bus Interface	PEG

Display

Resolutions	FHD / UHD
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Camera

Resolution	HD 720p
Frames per Second	30 fps
Focus	Fixed 50cm
Camera Interface	USB 2.0
IR Camera	Yes (optional) (with WWAN co-existence), Hybrid Camera

Keyboard

Number of Keys	US : 105 / UK : 106 / JP : 110
Numpad	Yes
Size	100% ISO
Function Key Features	Yes
Backlit	Yes
Keyboard size	CS20 KYB with numberpad
Key stroke	1.8mm
Key pitch	19.05mm
Keyboard backlight	Standard
Keyboard thickness	Standard

Touchpad / Fingerprint Reader

TrackPoint Details	COMO TrackPoint module (t5.5mm)
Finger Print Reader Model	Synaprics Metallica 8x8 FPR, MoC
Multi-Touch	Yes
Resolution	1000 ppi
TouchPad/Trackpad thickness	3.3mm
TouchPad/Trackpad type	3 BCP
Trackpad size	100mm x 69 mm
Trackpad material/finish	Mylar surface

I/O – Ports and Connectors

USB	2x USB-A 3.2 (Gen 1) (1 powered)+1 USB-C 3.2 (Gen 1) (DP1.2/PD)
Thunderbolt	1 Thunderbolt 3
HDMI	1x HDMI (2.0) DP1.4
Audio Combo Jack	1x Microphone & Headphone Combo Jack (3.5mm)
Media Card Reader	Dedicated microSD Card Reader (UHS-I) (MMC,SD,SDHC SDXC)
Smart Card Reader	Yes (optional)
Power Connector	DC-In
Docking Port	Docking Via Thunderbolt 3 / USB-C
VirtualLink	None
Network adapter	Gigabit Ethernet (RJ45)

Power Connector

Main	DC-In
USB-C	1x Thunderbolt 3 (USB-C/DP/PD)

Ethernet

Vendor	Intel
Count	x1
EEPROM	SPI ROM (Merge with BIOS/MEFW)
Speeds	10/100/1000 Mbps
Functions	Wake On LAN MAC Address Pass Through PXE Boot Flash Over LAN
Connectors	RJ45

WWAN

Model	Fibocom L850-GL LTE CAT9 Fibocom L860-GL LTE CAT16
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Near Field Communications

Model	Yes, optional
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Audio

Vendor	Realtek
Type	High Definition Audio Codec
Internal Speaker	Yes, dual speakers
Connectors	Microphone & Headphone Combo Jack (3.5mm)
Chipset	ALC3287
Number of Channels	4-channel DAC, 4-channel ADC
Number of Bits/Audio Resolution	16/20/24-bit PCM format
Sampling Rate (Recording/Playback)	n
Signal to Noise Ratio	90dB Signal-to-Noise Ratio (A-weighting) for ADC input. 100dB Signal-to-Noise Ratio (A-weighting) for DAC output
Analog Audio	None
Dolby Digital	Yes
Digital Out (S/PDIF)	No
Speaker Power Rating	2W@4ohm/ch

Power adapter

Type	65W AC Adapter	
Dimensions	142cc (28.5 x 46 x 108 mm) 65W (*0)	
Input Voltage	100-240V	210g(Adapter), 62g(Power Code) (*1)

Security

TPM	Yes, TPM2.0
Asset ID	Yes
vPro	Yes on vPro model

Chassis Information

Color	Black
Thermal Solutions	Internal Single FAN, Intelligent Cooling
Dimensions	Length 14.40 inches 365.8 millimeters Width 9.76 inches

	248 millimeters Height 0.75 inches (Thickest 0.78 inches, Thinnest 0.53 inches) 19.1 millimeters (Thickest 19.95mm, Thinnest 13.37mm)
Weight	with 3 Cell 57WHr Battery, Min 3.87lbs/1.75kg, Max

Packaging Parameters

Height (mm)	330
Height (inch)	13.0
Width (mm)	448
Width (inch)	17.6
Depth (mm)	80
Depth (inch)	3.1
Weight (kgs)	0.372kg
Weight (lbs)	0.8184lbs

Security & Serviceability

Self Healing BIOS	No
Access Panel	Removeable bottom cover
Number of Screws	8
Swappable Components	Base cover assembly, TrackPoint pointing stick, Lenovo factory recovery USB key, Power cord, ac power adapter (65W)
Storage Slots	1 storage slot
Memory	1 soldered down RAM + 1 SODIMM slot
System Board	1190 System Board. No self-service CRU.
Restore CD/DVD/USB Set	None. Purchase via Lenovo Customer Support Center
Cable Lock Support	Security-lock slot
Power-On Password	Yes
Hard Disk Password	Yes; User and Master hard disk password
Supervisor Password	Yes
NIC LEDs (integrated)	Yes (if it means the LED for Ethernet)
Security Chip	Yes (for TMP 2.0)
Access Panel Key Lock	Bottom Cover Tamper Detection
Boot Sequence Control	Yes

Operating Environment

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Operating - Air Temperature	At altitudes up to 2438 m (8000 ft) - Operating: 5°C to 35°C (41°F to 95°F)
Non Operating - Air Temperature	At altitudes up to 2438 m (8000 ft) - Storage: 5°C to 43°C (41°F to 109°F)
Humidity	Operating: 8% to 95% at wet-bulb temperature 23°C (73°F) Storage: 5% to 95% at wet-bulb temperature 27°C (81°F)
Corrosive Gas	G1
Particulates	P1

SECTION II: Platform Detail

Supported Components

Processor	Intel® Core™ i5-10210U (4C) Intel® Core™ i5-10310U (4C), vPro Intel® Core™ i7-10510U (4C) Intel® Core™ i7-10610U (4C), vPro Intel® Core™ i7-10710U (6C) Intel® Core™ i7-10810U (6C), vPro
Memory Support	DDR4 2666MHz SO-DIMM
Chipset (PCH)	Integrated Soc
Size of BIOS Flash	16 MB
Clock	Crystal
Audio	Realtek High Definition Audio
Ethernet	Non-vPro model: Intel® Ethernet Connection I219-V (Jacksonville) vPro model: Intel® Ethernet Connection I219-LM (Jacksonville)

Memory

System Capacity Options	i5 non-vPro & vPro: 8GB soldered-down + 8/16/32GB i7 4C non-vPro & vPro: 8/16GB soldered-down + 8/16/32GB i7 6C non-vPro & vPro: 16GB soldered-down + 8/16/32GB
non-ECC	8GB DDR4 3200 SDRAM/SoDIMM (operational 2666MHz) 16GB DDR4 3200 SDRAM/SoDIMM (operational 2666MHz) 32GB DDR4 3200 SoDIMM (operational 2666MHz)
Brand of non-ECC Memory	Samsung SK Hynix Micron Ramaxel
ECC	None
Brand of ECC Memory	N/A
Memory clock frequency(MHz)	Operational Speed: 2666 MHz

Storage

2.5" SAS Hard Disk Drive (HDD)	None
2.5" SATA Hard Disk Drive (HDD)	None
2.5" SATA Solid State Drive (SSD)	None
M.2 (NGFF) PCIe Solid State Drive (SSD)	256GB Opal 2 PCIe NVMe M.2 2280 512GB Opal 2 PCIe NVMe M.2 2280 32GB Optane + 512GB QLC M.2 2280-SBO 1TB Opal 2 PCIe NVMe M.2 2280 2TB Opal 2 PCIe NVMe M.2 2280
2.5" PCIe Solid State Drive (SSD)	None
Brand of Drive	Samsung UnionMem Toshiba WD
Intel Optane Storage Technology	Yes
RAID	Not Supported

Removeable Media

Media Card Reader Specifications	UHS-I
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SECTION III: Supported Component Detail

CPU Specifications

CPU	Intel® Core™ i5-10210U (4C)	Intel® Core™ i5-10310U (4C), vPro	Intel® Core™ i7-10510U (4C)	Intel® Core™ i7-10610U (4C), vPro	Intel® Core™ i7-10710U (6C)	Intel® Core™ i7-10810U (6C), vPro
Integrated Graphics	Intel® UHD Graphics 620	Intel® UHD Graphics 620	Intel® UHD Graphics 620	Intel® UHD Graphics 620	Intel® UHD Graphics 620	Intel® UHD Graphics 620
# of Cores	4	4	4	4	6	6
# of Threads	8	8	8	8	12	12
Processor Base Frequency	1.6GHz	1.6GHz	1.8GHz	1.8GHz	1.1GHz	1.1GHz
Max Turbo Frequency	4.1GHz		4.6GHz		4.6GHz	

Cache	6MB	6MB	8MB	8MB	12MB	12MB
TDP	15W-25W	15W-25W	15W-25W	15W-25W	15W-25W	15W-25W
Intel ARK Spec Link	Intel® Core™ i7-8365U	Intel® Core™ i7-8565U	Intel® Core™ i7-8665U	-	-	-

Display Specifications

Model	FHD	FHD w/oncell touch	UHD
Resolution	1920 x 1080	1920 x 1080	3840 x 2160
Diagonal	15.6"	15.6"	15.6"
Aspect Ratio	Ratio 16:9	Ratio 16:9	Ratio 16:9
Backlight	LED	LED	LED
PPI	141 (Pixel Pitch: 0.17925mm x 0.17925mm)	141 (Pixel Pitch: 0.17925mm x 0.17925mm)	282 (Pixel Pitch: 0.09mm x 0.09mm)
Active Area	344.16 X 193.59	344.16 X 193.59	344.22 X 193.62
Refresh Rate	48 / 60 Hz	48 / 60 Hz	60Hz
Contrast Ratio	800:1 (TYP)	800:1 (TYP)	1400:1 (TYP)
Viewing Angle	85/85/85/85 degree	85/85/85/85 degree	85/85/85/85 degree
Color gamut	45% NTSC	45% NTSC	100% Adobe
Brightness	250nit	300nit	600nit, HDR 400
Contrast	Ratio 800:1	Ratio 800:1	Ratio 1400:1
Color Depth	Native 262K (RGB 6-bit data driver)	16M	1064M
Interface	eDP 1.2	eDP 1.2	eDP 1.4
Panel ID Recognition	EDID in BIOS Table	EDID in BIOS Table	EDID in BIOS Table
Weight	max 370g	max 360g	max 300g
Color Calibrator	None	None	X-Rite Factory Color Calibration
Panel Technology	IPS, Anti-Glare	IPS, Anti-Glare	IPS, Anti-Glare
Touch Panel	None	YES	None

SSD Specifications

2.5" SATA Solid State Drive (SSD)	
M.2 (NGFF) PCIe Solid State Drive (SSD)	1x M.2 2280 PCIe
2.5" PCIe Solid State Drive (SSD)	
Intel Optane Storage Technology	

Solid State Storage Devices

Supported Types	M.2
Dimensions inches/centimeters (W x D x H)	22.0 (+-0.15) x 80.0 (+-0.15) x 2.3 (max)
Size	M.2 2280S3
Interface Type	PCIe NVMe
Read/Write IOPS Specifications	Read: 250K (2TB, 1TB, 512GB), 200K (256GB), 320K (512GB Hybrid) Write: 240K (2TB, 1TB, 512GB), 190K (256GB), 250K (512GB Hybrid) Burst 4K Random IOPS , Measured by Crystal Disk Mark (QD32T1, Data size set 1GB)
Bandwidth Performance	PCIe Gen3x4 (8Gb/S) PCIe Gen3x2x2 for Hybrid SSD
Power Consumption (Max)	3.0A (duration for 10 us)
Active(AVG)	5W
Idle	5mW (L1.2)
Min MTBF	2,000,000 (h)
Min Sequential Read	3000MB/s (2TB, 1TB, 512GB), 2900MB/s (256GB), 1550MB/s (512GB Hybrid) 128KB Seq for hybrid
Min Sequential Write	1600MB/s (2TB, 1TB/512GB), 900MB/s (256GB), 990MB/s (512GB Hybrid) 128KB Seq for hybrid
Hardware Encryption	Yes

Discrete Graphics Adapter

GPU Name	Quadro P520
CUDA Processing Cores	384
GPU Memory	2 GB
Memory Bandwidth	48 GBps
Memory Type	GDDR5
Memory Interface	64-bit
TGP Max Power Consumption	18W
Display Port	1.4
OpenGL	4.5
Shader Model	5.1
DirectX	12.1
PCIe Generation	3
Floating-Point Performance	1.1
VR Ready	No

Simultaneous Multi-Projection	No
NVIDIA FXAA/TXAA Antialiasing	Yes
NVIDIA nView Display Management Technology	Yes
GPU Direct for Video	No
Vulkan Support	Yes
NVIDIA Optimus	Yes

WLAN

Model	1) Intel Wi-Fi 6 AX201 2*2ax+BT5.0 Non-vPro PCIE M.2 1216 Module (CNVi) 2) Intel Wi-Fi 6 AX201 2*2ax+BT5.0 vPro PCIE M.2 1216 Module (CNVi)
Connector: Main, Aux/GNSS, GNSS	ANT1:AUX WiFi + BT; ANT2: Main WiFi
Antenna Diversity	Supported
MIMO	Supported
GNSS Bian	N/A
Radio ON/OFF Control	Supported
Connector interface	CNVi
Operating Temperature (Adapter Shield)	0c to +80c
Humidity Non-Operating	50%~90% Rh non condensing (at temperatures of 25c to 35c)
Operating Systems	Microsoft Windows 7*, Microsoft Windows 8.1*, Microsoft Windows 10*, Linux* (limited feature support), Android
Wi-Fi Alliance	Wi-Fi CERTIFIED* a/b/g/n/ac, WMM*, WMM-PS*, WPA*, WPA2*, WPS2*, Protected Management Frames, Wi-Fi Direct* for peer to peer device connections, Wi-Fi Miracast* as Source.
IEEE WLAN Standard	IEEE 802.11a/b/g/n/ac, 802.11d, 802.11e, 802.11h, 802.11i, 802.11w; 802.11r, 802.11k, 802.11v pending OS support; Fine Timing Measurement based on 802.11REVmc
Roaming	Support seamless roaming between access points
Bluetooth*	Dual Mode Bluetooth® 5.0, BLE
Authentication	WPA and WPA2, 802.1X (EAP-TLS, TTLS, PEAP, LEAP, EAP-FAST), EAP-SIM, EAP-AKA, EAP-AKA
Authentication Protocols	PAP, CHAP, TLS, MS-CHAP*, MS-CHAPv2
Encryption	64-bit and 128-bit WEP, 128-bit AES-CCMP
Regulatory	For a list of country approvals, please contact your local Intel representatives.
US Government	FIPS10, FISMA
Product Safety	UL,C-UL,CB (IEC 60950-1)

Battery

Dimension	266.6 mm x 86.6 mm x 5.45 mm
Weight	240g
Type (Chemistry and Cell)	Li-ion Polymer
Voltage	11.52V
Battery Life	Max >14 hours battery life
Battery Capacity	Integrated 3-cell 57Wh battery
Charging Time	0% to 100% 0% to 80% Battery [Wh] 57 57 Battery Charging Time (in-operation) 2.18 hr 1.31 hr Battery Charging Time (off) 1.85 hr 0.93 hr
Operating Temperature Range	between 10°C (50°F) and 35°C (95°F)
Warranty	1 Year / 3 Year Available
Coin Cell Battery (Model)	CR2032

SECTION IV: BIOS / Certifications / Standards / Environmental

BIOS Specifications

WMI Support	Yes, if it is BIOS Setup change by WMI.
ROM-Based Setup Utility (F1)	Yes
Bootblock Recovery	N/A
Replicated Setup	Yes, it supported with SRSETUP tool.
Boot Control	Yes, it means Boot order change.
Memory Change Alert	N/A
Thermal Alert	N/A
Asset Tag	Yes
System/Emergency ROM Flash Recovery with Video	N/A
Remote Wakeup/Remote Shutdown	Yes, if Remote wakeup is Wake on LAN from S4/S5.
Keyboard-less Operation	N/A
Per-port Control	Yes, if it is I/O port enable/disable by BIOS Setup.
Adaptive Cooling	Yes, if it is thermal & fan control.

Security	Yes, BIOS password / Hard disk password / Finger print
Intel(R) AMT (includes ASF 2.0)	Yes. If you select vPro model
Intel(R) TXT	Yes. If you select vPro model
Memory Modes	N/A

EMC & Safety

EMC	<p>Published, Certified Existing Reports</p> <p>EMC - Australia EMC - Belarus EMC - Canada EMC - China EMC - EU/EFTA EMC - Japan EMC - Kazakhstan EMC - New Zealand EMC - Russia EMC - South Korea EMC - Taiwan EMC - USA/Territories Not Applicable / Not Required EMC - Israel EMC - Moldova EMC - Serbia EMC - Turkey EMC - Uzbekistan EMC - Vietnam</p>
Safety	<p>To access the latest User Guide and Safety and Warranty Guide, go to: https://support.lenovo.com</p> <p>Low Halogen Declaration of Conformance TNOT-2017-0040 Section 9 - Low Halogen Scorecard Izod Test - EPEAT Compliant Homologation PCR B Compliant</p> <p>In the following countries: Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bermuda, Bolivia, Botswana, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Cayman Islands, Central African Republic, Chad, China, Colombia, Comoros, Congo, Costa Rica, Djibouti, Dominican Republic, Egypt, El Salvador, Eritrea, Ethiopia, EU/EFTA, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Haiti, Honduras, Hong Kong, India, Indonesia, Israel, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Laos, Lebanon, Liberia, Macau, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nepal, New Zealand, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Russia, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, South Africa, South Korea, Sri Lanka, Swaziland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, Uruguay, USA/Territories, Uzbekistan, Venezuela, Vietnam, Zambia, Zimbabwe, Brazil - Inmetro 170 Govt Bids, Guinea-Bissau, Lesotho</p>

Environmentals

Energy Star	<p>ENERGY STAR® Version 8.0 For more information about ENERGY STAR, go to: https://www.energystar.gov</p>
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EPEAT	EPEAT Declaration of Conformance For Machine Types: 20T4, 20T5
IT ECO declaration	The latest environmental information about Lenovo products is available at: https://www.lenovo.com/ecodeclaration
Hazardous Substances	The latest environmental information about Lenovo products is available at: https://www.lenovo.com/ecodeclaration European Union RoHS This Lenovo product, with included parts (cables, cords, and so on) meets the requirements of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("RoHS recast" or "RoHS 2"). For more information about Lenovo worldwide compliance on RoHS, go to: https://www.lenovo.com/rohs-communication

Manageability

Industry Standard Specifications	This product meets the following industry standard specifications for manageability functionality: Intel LAN with AMT
Remote Manageability Software Solutions	Lenovo ThinkManagement Console Microsoft System Center Configuration Manager LANDesk Management Suite for ThinkVantage Technologies (www.landesk.com/lenovo)
System Software Manager	Lenovo ThinkPad supports software management tools from the Lenovo Vantage System Update suite: System Update Update Retriever
Service, Support, and Warranty	On-site Warranty and Service: Three-years, limited warranty and service offering delivers on-site, next business-day service for parts and labor and includes free telephone support 8am to 5pm. Global coverage ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering.