Lenovo ThinkPad P1 Gen 1

Version: 1 | 10/29/2019

DOWNLOADS

Hardware Maintenance Manual	P1 Gen1 HMM
Drivers & Software	P1 Gen1 Drivers & Software

SECTION I: Platform Overview

Description	The ThinkPad® P1 is the right solution for a wide variety of users looking for the perfect combination of style and power; putting an end to the compromise between a thin and light machine or one that delivers the performance they need. For architects, interior designers, creative directors, producers and beyond, the ThinkPad® P1 offers a workhorse that is also sleek and professional.

CPU

Processor Support	Intel 8th gen Coffee Lake H Series Core i7 Intel 8th gen Coffee Lake H Series Xeon
Socket Type	BGA

Operating Systems

Preloaded	Windows 10 Pro 64-bit for Workstations Windows 10 Pro 64-bit Windows 10 Home 64-bit Windows 10 Single Language Home 64-bit Ubuntu 64-bit

	No Operating System
Supported	Windows 10 Pro 64-bit for Workstations Windows 10 Pro 64-bit Windows 10 Home 64-bit Windows 10 Single Language Home 64-bit Ubuntu & RedHat Linux 64-bit No Operating System

Memory

Number of DIMM Slots	Up to 2 DIMM sockets
Channels	Single Channel w/ 1DIMM Dual Channel w/ 2DIMMs
Type	DDR4, SO-DIMM, ECC non-ECC
ECC Support	Yes
Speed	Up to 2666 MHz
Max DIMM Size	32GB
Max System Memory	64GB
Min System Memory	8GB
Soldered Memory	None

Storage

Storage Slots	2 x M.2 2280
SATA	None
PCIe	Solid State Drive, 2x OPAL2 PCIe-NVMe M.2 2280-S3 – TLC
SAS	None
Interface	SATA/PCIE
Security	OPAL2 for NVMe SSD
Optional Hard Disk Drive Controllers	None
Integrated Graphics	For Intel® i5-8400H Processor Graphics Intel® UHD Graphics 630 Utilized via "Hybrid Mode" in BIOS For Intel® i7-8750H Processor Graphics Intel® UHD Graphics 630 Utilized via "Hybrid Mode" in BIOS For Intel® i7-8850H Processor Graphics Intel® UHD Graphics 630 Utilized via "Hybrid Mode" in BIOS For Intel® Xeon® E-2176M Processor Processor Graphics Intel® UHD Graphics P630 Utilized via "Hybrid Mode" in BIOS
Discrete Graphics	NVIDIA Quadro P1000 & P2000
Adapter	None
Bus Interface	PEG

Display

Resolutions	FHD / UHD

Camera

Resolution	HD 720p / IR Camera
Frames per Second	30 fps
Focus	Fixed 50cm
Camera Interface	USB 2.0
IR Camera	Yes

Keyboard

Number of Keys	US : 84 / UK : 85 / JP :89
Numpad	No
Size	100% ISO
Function Key Features	Yes
Backlit	Yes
Keyboard size	Como 2018 Full size KB without NumPad (Bottom loading)
Key stroke	1.8mm
Key pitch	19.05 mm(Vertical & Horizontal)
Keyboard backlight	100%
Keyboard thickness	4.55mm

Touchpad / Fingerprint Reader

TrackPoint Details	COMO TrackPoint module (t5.55mm)
Finger Print Reader Model	Synaptics Metallica 8x8 FPR, MoC
Multi-Touch	Yes
Resolution	1000 ppi
TouchPad/Trackpad thickness	3.3 +0.2/- 0.25mm
TouchPad/Trackpad type	2 Buttons Clickpad
Trackpad size	100mm x 69mm
Trackpad material/finish	Glass surface

Trackpad material/finish	Glass surface

I/O – Ports and Connectors

USB	2x USB-A 3.1 (Gen 1) (1 powered)
Thunderbolt	2x Thunderbolt 3 (USB-C/DP/PD)
HDMI	1x HDMI (2.0)
Audio Combo Jack	1x Microphone & Headphone Combo Jack (3.5mm)
Media Card Reader	1x 4-in-1 Media Card Reader (MMC,SD,SDHC SDXC)
Smart Card Reader	1x Smart Card Reader
Power Connector	DC-In
Docking Port	Docking Via Thunderbolt 3 / USB-C
VirtualLink	None
Network adapter	1x Mini Ethernet Connector (Convert RJ-45 by dongle)

Power Connector

Main	DC-In
USB-C	2x 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	1x Mini Ethernet Connector (Convert RJ-45 by dongle)

WWAN

Model	No WWAN Supported

Near Field Communications

Model	No NFC Support

Audio

Vendor	Realtek
Type	Intel High Definition Audio (2 channel)
Internal Speaker	2 channel
Connectors	Microphone & Headphone Combo Jack (3.5mm)
Chipset	ALC3286
Number of Channels	4-channel DAC, 4-channel ADC
Number of Bits/Audio Resolution	16/20/24-bit PCM format
Sampling Rate (Recording/Playback)	44.1K/48K/96K/192KHz sample rate
Signal to Noise Ratio	Mic In: 95dB FSA Headphone Out@32ohm: 100dB FSA
Analog Audio	None
Dolby Digital	Dolby ATMOS
Digital Out (S/PDIF)	No
Speaker Power Rating	2W@4ohm/ch

Power adapter

Type	135W AC Adapter
Dimensions	200cc (118 x 77 x 22)
Input Voltage	100-240V

Security

TPM	Version 2.0
Asset ID	Yes
vPro	Intel vPro for WS

Chassis Information

Format	Thin-Light
Color	Midnight Black
Thermal Solutions	Internal Dual FAN, Intelligent Cooling

Dimensions	Length 14.24 inches 361.8 millimeters Width 9.67 inches 245.7 millimeters Height Non-Touch 0.72 inches 18.4 millimeters Touch 0.74 inches 18.7 millimeters
Weight	Non-Touch Model: 4 Cell Battery 1.70kg/3.74lbs Touch Model: 4 Cell Battery 1.83kg/4.04lbs

Packaging Parameters

Height (mm)	325
Height (inch)	12.8
Width (mm)	507
Width (inch)	20.0
Depth (mm)	80
Depth (inch)	3.1
Weight (kgs)	Standard:2.9kgs / Retail:3.4kgs
Weight (lbs)	Standard:6.4lbs / Retail:7.5lbs

Security & Serviceability

Self Healing BIOS	No
Access Panel	Removeable bottom cover
Number of Screws	7
Swappable Components	Bottom cover, memory module, M.2 solid-state drive, speaker assembly, coin-cell battery, TrackPoint pointing cap
Storage Slots	2 slots
Memory	2 SODIMM slots
System Board	1130 System Board. No self-service CRU.
Restore CD/DVD/USB Set	None, Restore Media available via Lenovo Customer Support Center
Cable Lock Support	Security-lock slot, Optional Kensington Cable Lock
Power-On Password	Yes
Hard Disk Password	Yes; User and Master hard disk password
Supervisor Password	Yes
NIC LEDs (integrated)	None
Security Chip	Yes (for TMP 2.0)

Access Panel Key Lock	Bottom Cover Tamper Detection
Boot Sequence Control	Yes

Operating Environment

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™ i5-8400H Intel® Core™ i7-8750H Intel® Core™ i7-8850H Intel® Xeon™ E-2176M
Memory Support	DDR4 2666MHz SO-DIMM
Chipset (PCH)	Mobile Intel® CM246 Chipset
Size of BIOS Flash	8MB for Non-vPro model, 16MB for vPro model
Super I/O	None
Clock	Crystal
Audio	Realtek High Definition Audio
Ethernet	Intel® Ethernet Connection I219

Memory

System Capacity Options	8GB 16GB 32GB 64GB
non-ECC	8GB DDR4 2666 SoDIMM 16GB DDR4 2666 SoDIMM 32GB DDR4 2666 non-ECC SoDIMM
Brand of non-ECC Memory	Samsung

Brand of non-ECC Memory	Samsung SK Hynix Micron
ECC	8GB DDR4 2666 ECC SoDIMM 16GB DDR4 2666 ECC SoDIMM 32GB DDR4 2666 ECC SoDIMM
Brand of ECC Memory	SK Hynix Samsung
Memory clock frequency(MHz)	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 SATA (M.2 2280) 256GB Opal 2 PCIe TLC NVMe 3X2 (M.2 2280) 512GB Opal 2 PCIe TLC NVMe 3X2 (M.2 2280) 512GB Opal 2 PCIe MLC NVMe 3X2 (M.2 2280) 1TB Opal 2 PCIe TLC NVMe 3X2 (M.2 2280) 2TB Opal 2 PCIe TLC NVMe 3X2 (M.2 2280)
2.5" PCIe Solid State Drive (SSD)	None
Brand of Drive	Samsung Toshiba Intel
Intel Optane Storage Technology	None
RAID	Optional, Selectable in BIOS
RAID Level and Requirements	RAID-0/1

Removeable Media

Media Card Reader Specifications	UHS-II

SECTION III: Supported Component Detail

CPU Specifications

CPU	Intel® Core™ i5-8400H (2.5 GHz/4 Core/8M/V-Pro)	Intel® Core™ i7-8750H processor (2.2 GHz/6 Core/9M)	Intel® Core™ i7-8850H vPro processor (2.6 GHz/6 Core/9M/V-Pro)	Intel® Xeon™ E-2176M v7 vPro processor (2.7 GHz/6 Core/12M/V-Pro)
Integrated Graphics	Intel® UHD Graphics 630	Intel® UHD Graphics 630	Intel® UHD Graphics 630	Intel® UHD Graphics 630
# of Cores	4	6	6	6
# of Threads	8	12	12	12
Processor Base Frequency	2.50 GHz	2.20 GHz	2.60 GHz	2.70 GHz
Max Turbo Frequency	4.20 GHz	4.10 GHz	4.30 GHz	4.40 GHz
Cache	8 MB	9 MB	9 MB	12 MB
TDP	35 – 45W	35 – 45 W	35 – 45 W	35 – 45 W
Intel ARK Spec Link	Intel® Core™ i5-8400H			
	Intel® Core™ i7-8750H			
	Intel® Core™ i7-8850H			
	Intel® Xeon™ E-2176M			

Display Specifications

Model	FHD	UHD with Touch
Resolution	FHD (1920 x 1080)	4K UHD (3840 x 2160)
Diagonal	15.6"	15.6"
Aspect Ratio	Ratio 16:9	Ratio 16:9
Backlight	LED	LED
PPI	FHD : 141	UHD : 282
Active Area	FHD : 344.16mm x 193.59mm	UHD : 344.2176mm x 193.6224
Refresh Rate	Max 60Hz	Max 60Hz
Contrast Ratio	FHD : Typ 750	UHD : Typ 1200
Viewing Angle	FHD: 85/85/85/85 degree	UHD: 85/85/85/85 degree
Color gamut	FHD 72% NTSC; UHD 100% Adobe	FHD 72% NTSC; UHD 100% Adobe
Brightness	300 nits for FHD w/o touch	360 nits for UHD w/ touch (LCD itself brightness is 400 nits)
Color Depth	FHD: 16M (RGB 6-bit + FRC)	UHD: Native 16M (RGB 8-bit data driver)
Interface	FHD: eDP 1.2	UHD: eDP
Panel ID Recognition	EDID in BIOS Table	EDID in BIOS Table
Weight	FHD: 304g	UHD: 320g
Color Calibrator	None	None

SSD Specifications

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

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 2280
Interface Type	PCIe NVMe
Read/Write IOPS Specifications	Read: 250K (512GB/1TB/2TB), 200K (256GB) Write: 240K (512GB/1TB/2TB), 190K (256GB) IOPS, 4K Random, 32 q depth, 4 threads
Bandwidth Performance	PCIe Gen3x4 (8Gb/S)
Power Consumption (Max)	5.0W
Active(AVG)	5.0W (Sequential read)
Idle	5mW (Low power state)
Min MTBF	2,000,000 (h)
Min Sequential Read	3000MB/s (512GB/1TB/2TB), 2900MB/s (256GB)
Min Sequential Write	1600MB/s (512GB/1TB/2TB), 900MB/s (256GB)
Hardware Encryption	Yes

Discrete Graphics Adapter

GPU Name	Quadro P1000	Quadro P2000
CUDA Processing Cores	512	768
GPU Memory	4 GB	4 GB
Memory Bandwidth	96 GBps	96 GBps
Memory Type	GDDR5	GDDR5
Memory Interface	128-bit	128-bit
TGP Max Power Consumption	40W	50W

Display Port	1.4	1.4
OpenGL	4.5	4.5
Shader Model	5	5
DirectX	12	12
PCIe Generation	3	3
Floating-Point Performance	1.6	2.4
VR Ready	No	No
Simultaneous Multi-Projection	Yes	Yes
NVIDIA FXAA/TXAA Antialiasing	Yes	Yes
NVIDIA nView Display Management Technology	Yes	Yes
GPU Direct for Video	No	No
Vulkan Support	Yes	Yes
NVIDIA Optimus	Yes	Yes

WLAN

Model	Intel Wireless AC-9560 (2×2 11ac w/ 160MHz channels) and Bluetooth 5.0 vPro
Connector: Main, Aux/GNSS, GNSS	ANT1: Wi-Fi (chain A) + BT; ANT2: Wi-Fi (chain B)
Antenna Diversity	Supported
MIMO	Supported
GNSS Bian	N/A
Radio ON/OFF Control	Supported
Connector interface	M.2 CNVio
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 10*, Linux*(limited feature support), Chrome*
Wi-Fi Alliance	Wi-Fi CERTIFIED* a/b/g/n/ac with wave 2 features, WMM*, WMM-PS*, WPA*, WPA2*, WPS2*, Protected Management Frames, Wi-Fi Miracast* as Source, and Wi-Fi Direct (For Microsoft Windows* only)
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 802.11-2016
Roaming	Support seamless roaming between access points
Bluetooth*	BT5.0
Authentication	WPA* and WPA2*, 802.1X (EAP-TLS, TTLS, PEAP, EAP-SIM, EAP-AKA, EAP-AKA')
Authentication Protocols	PAP, CHAP, TLS, MS-CHAP*, MS-CHAPv2
Encryption	64-bit and 128-bit WEP, TKIP 128-bit AES-CCMP 128-bit and 256-bit

Encryption	64-bit and 128-bit WEP, TKIP, 128-bit AES-CCMP, 128-bit and 256-bit AES-GCMP
Regulatory	All compliance
US Government	FIPS12, FISMA
Product Safety	UL,C-UL,CB (IEC 60950-1)

Battery

Dimension	L: 70mm*W: 310mm*T 7.5mm
Weight	MAX 324g
Type (Chemistry and Cell)	Li-Polymer (4S1P), 4-cell
Voltage	15.36 V
Battery Life	Up to 10hrs (Condition: FHD/16GB DIMM one NVMe/Hybrid Graphics Mode
Battery Capacity	80.4 Wh
Charging Time	On Charge Time (0- 100%) * 136 min Off Charge Time (0 – 80%) ** 60 min Off Charge Time (0 – 100%) ** 115 min
Operating Temperature Range	between 10°C (50°F) and 35°C (95°F)
Warranty	1 Year / 3 Year Available
Coin Cell Battery (Model)	CR2016-MQ(MHLF)

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.
Discrete Mode	Yes
Asset Tag	Yes
Remote Wakeup/Remote Shutdown	Yes, if Remote wakeup is Wake on LAN from S4/S5. I don't know the Remote shutdown situation.

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

EMC & Safety

EMC	Published, Certified Existing Reports 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
Safety	To access the latest User Guide and Safety and Warranty Guide, go to: https://support.lenovo.com Low Halogen Declaration of Conformance TNOT-2017-0040 Section 9 – Low Halogen Scorecard Izod Test – EPEAT Compliant Homologation PCRB Compliant 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, Dijbouti, 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

Environmentals

Energy Star	ENERGY STAR® Version 7.0 For more information about ENERGY STAR, go to: https://www.energystar.gov
EPEAT	EPEAT Certification Available on select models

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:
Remote Manageability Software Solutions	Lenovo ThinkManagement Console Microsoft System Center Configuration Manager LANDesk Management Suite for Lenovo Vantage Technologies (www.landesk.com/lenovo)
System Software Manager	Lenovo ThinkStation supports software management tools from the ThinkVantage 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.