

Lenovo P360 Ultra

Version: 5.0 | 06/05/2024

Product Name	P360
Product Display Name	ThinkStation P360 Ultra Small Form Factor
Information Date	1-Sep-22
Hardware Maintenance Manual	P360 Ultra HMM
Drivers & Software	P360 Ultra Drivers & Software

SECTION I: Platform Overview

Description	The new ThinkStation® P360 Ultra features a revolutionary form factor that redefines the power of small—delivering superior performance and flexibility in a chassis less than four liters in total volume.
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CPU

Processor Support	Intel Alder Lake-S Core Series
Socket Type	Socket V (LGA 1700)

Operating Systems

Preloaded	Windows 11 Pro Windows 11 Home Ubuntu 20.04 LTS
Supported	Ubuntu 22.04 LTS Ubuntu 20.04 LTS Red Hat Enterprise Linux 8.6

Memory

Slots	Up to 4 SODIMMs
Channels	Supports up to 4 SODIMM Sockets, 2 Channels
Type	262-pin, 4000MHz ECC and non-ECC SODIMM
ECC Support	Yes, CPU Dependent
Speed	Up to 4000MHz
Max DIMM Size	32GB DDR5 UDIMM
Max System Memory	128GB

Storage

Total Bays/Size	1 x 2.5"
SATA	1 x SATA Connectors, Gen 3
PCIe	2 x M.2 PCIe Connector, Gen 4 Onboard
Disclaimers	1. Additional parts/enclosures may be required for some configurations.

Video

Integrated Graphics	Intel Integrated UHD Graphics 770
Discrete Graphics	PCIe Add-In-Card, Details in Section Below
Multi-GPU Support	Yes
Type	PCIe Add-In-Card
Bus Interface	PCIe x16

Slots

Slot 1	PCIe 4.0 x16, Low Profile, Full Length, 75W
Slot 2	PCIe 3.0 x8 (x4 Lanes), Low Profile, Half Length, 25W

Front I/O

USB	1 x USB 3.2 Gen 2 Type-A 10Gb/s 2 x Thunderbolt 4 Type-C 40Gb/s
Audio	1 x Combo Audio/Microphone Jack (3.5mm)
Disclaimers	Note: Actual USB throughput will vary depending on the type and quantity of USB devices used.

Rear I/O

USB	4 x USB 3.2 Gen 2 Type-A 10Gb/s
DisplayPort	3 x Standard (CPU dependent)
Ethernet	1 x 2.5GbE – RJ45 1 x 1GbE – RJ45
Optional USB Adapter	Rear USB 3.2 Gen2x2 Type-C PCIe x4 Adapter – LP 2-Port USB Expansion Card (USB3.0) PCIe x1 – LP 4-Port Serial Expansion Card PCIe x1- LP
Optional Network Adapter	Intel I350-T2 Dual Port Gigabit Ethernet Adapter
Disclaimers	Note: Actual USB throughput will vary depending on the type and quantity of USB devices used.

Ethernet

Vendor	Intel I225 Intel I210
Speeds	10/100/1000/2500Mbps
Functions	PXE, ASF, WOL, Jumbo Frames, Teaming

Connectors	2 x RJ45
Disclaimers	Note: Ethernet speeds is port dependent.

Audio

Vendor	Realtek
Type	HD (5.1)
Internal Speaker	Yes
Connectors	1 x Front 3.5mm Jack (Mic & Headphone)
Chipset	ALC897Q
Number of Channels	2 Channels (5.1 via driver selection)
Number of Bits/Audio Resolution	6 Channel DAC supports 16/20/24 bit PCM format for 5.1 audio selection 2 Stereo ADC supports 16/20 bit PCM format

Thermal

Temp Sensors	Ambient Sensor Storage (M.2) Sensor DIMM Sensor
Fans	1 x CPU Fan 1 x M.2 Fan 1 x Graphics MXM Fan

Power Specifications

Power Supply	170W	230W	300W
Power Efficiency	90% Efficient @ 50% Load	90% Efficient @ 50% Load	90% Efficient @ 50% Load
Main	20V DC Jack, yellow	20V DC Jack, yellow	20V DC Jack, yellow
Operating Voltage Range	100 – 240V	100 – 240V	100 – 240V
Rated Voltage Range	90-264VAC	90-264VAC	90-264VAC
Rated Line Frequency	47Hz / 63Hz	47Hz / 63Hz	47Hz / 63Hz
Operating Line Frequency Range	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz
Rated Input Current	8.5A	11.5A	15A
Power Supply Fan	No	No	No
ENERGY STAR® Qualified (config dependent)	Yes	Yes	Yes
Aux Power Drop	No	No	No

BIOS

Vendor	AMI
Self-Healing BIOS	Yes

Chassis Information

Color	Raven Black
PSU	170W, 230W, and 300W Available, Autosensing
Thermal Solutions	One CPU FAN, One M.2 Fan, and One MXM Graphics Fan
Dimensions	205mm/8.07" H 223mm/8.78" D 87mm/3.43" W
Weight	3.60kg / 7.94lbs

Packaging Dimensions

Height (mm/in)	202mm / 7.95"
Width (mm/in)	87mm / 3.43"
Depth (mm)	223mm / 8.78"
Weight (kgs/lbs)	3.6 kg / 7.94 lbs

Security & Serviceability

TPM	Infineon SLB9670 TPM 2.0
Asset ID	Yes, 1024 x 8bit
vPro	Intel vPro for WS (AMT 16.x)
Cable Lock Support	Yes, Optional Kensington Cable Lock
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes
Power-On Password	Yes
Setup Password	Yes
NIC LEDs (integrated)	Yes
Access Panel Key Lock	No
Boot Sequence Control	Yes
Padlock Support	Yes
Boot without keyboard and/or mouse	Yes
Access Panel	Tool-less Cover Removal
Optical Drive	No
Hard Drives	Tool-less
Expansion Cards	Retained With Screws
Processor Socket	Tool-less
Color coded User Touch Points	Yes
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Retained With Screws
Restore CD/DVD/USB Set	Not Included, Restore Media Available via Lenovo Customer Support Center

Operating Environment

Air Temperature	Operating: 10°C to 35°C (50°F to 95°F)
Storage	Storage: -40°C to 60°C (-40°F to 140°F) in Original Shipping Carton Storage: -10°C to 60°C (14°F to 140°F) Without Carton
Humidity	Relative Humidity Operating: 20% to 80% (non-condensing) Relative Humidity Storage/Transit: 10% to 90% (non-condensing)
Altitude	Operating: -15.2m to 3048m (-50ft to 10000ft) Storage: -15.2m to 12192m (-50ft to 40000ft)
Vibration	Package Vibration: Three axes in use orientation (X, Y & Z-axis), 1.04Grms, 2-200Hz, 15mins/axis, random, packaged for shipment Operating Vibration: Random Vibration; 5 to 500 Hz, 0.27 G rms; 30 min/axis, X, Y, Z axes Non-Operating Vibration:Random Vibration; 2 to 200 Hz, 1.04 G rms; 15 min/face, 6 faces
Shock	Operation Shock: Half-sine wave, 15G/3ms(X,Y), 30G/3ms(Z) Non-operating Shock: Trapezoidal wave, 45G/11ms

SECTION II: Platform Detail

Board Size	7.24" x 7.69" (184.0mm x 195.5mm)
Layout	Custom

Motherboard Core

Processor Support	Intel Alder Lake-S Core Series
Socket Type	Socket V (LGA 1700)
Memory Support	DDR5 up to 4000MHz SODIMM Memory (ECC and non-ECC)
Voltage Regulator	125W TDP Capable
Chipset (PCH)	Intel W680 Chipset
Flash	32MB
Super I/O	Nuvoton NCT6692D
Clock	Intel Native isCLK
Audio	Realtek ALC897Q Codec
Ethernet	Intel I225LM Intel I210AT

Supported Components

Processor Level	Intel Alder Lake-S – Core
Processor	i9-12900K i9-12900 i9-12900T i7-12700K i7-12700 i7-12700T i5-12600K i5-12600 i5-12500 i5-12400 i5-12400T

	i3-12300 i3-12100
Memory Type	ECC/non-ECC SODIMMs – 4000MHz
Memory	16GB DDR5 ECC SODIMM PC4-4000 8GB DDR5 non-ECC SODIMM PC4-4000 16GB DDR5 non-ECC SODIMM PC4-4000 32GB DDR5 non-ECC SODIMM PC4-4000

Storage

2.5" SATA Hard Disk Drive (HDD)	1TB 2.5" SATA HDD 7200rpm, 6Gb/s, 2.5" (FIPS certified) 1TB SATA 2.5" SATA HDD 7200rpm, 6Gb/s, 2.5" (non-FIPS certified)
M.2 PCIe Solid State Drive (SSD)	512GB M.2 PCIe SSD, Gen 4 x4, NVMe, OPAL 1024GB M.2 PCIe SSD, Gen 4 x4, NVMe, OPAL 2048GB M.2 PCIe SSD, Gen 4 x4, NVMe, OPAL 4096GB M.2 PCIe SSD, Gen 4 x4, NVMe, OPAL

RAID

RAID Levels and Requirements	NVMe Drives Support RAID 0/1
Notes	Supported RAID levels for a system will vary from the stated capabilities of the RAID controller due to dependencies on the number and capacity of physical disks in the system and on customer requirements for performance, fault tolerance, or data redundancy. Max supported RAID 0/1.

Keyboard and Pointing Devices

Keyboard	Calliope USB Keyboard Traditional USB Keyboard
Pointing Devices	Calliope USB Mouse Fingerprint USB Mouse

PCIe Adapters

Network	Intel I350-T2 Dual Port Gigabit Ethernet Adapter
USB	Rear USB 3.2 Gen2x2 Type-C PCIe x4 Adapter – LP 2-Port USB Expansion Card (USB3.0) PCIe x1 – LP 4-Port Serial Expansion Card PCIe x1- LP
WiFi Cards	Intel PCIe WiFi Card with BT External Antenna Kit (Intel AX201 non-vPro) Intel PCIe WiFi Card with BT External Antenna Kit (Intel AX211 vPro)

SECTION III: Supported Component Detail

CPU Specifications Part 1

CPU	Intel Core i9 12900T (X.XGHz / 16C / 24T / 30M / DDR4 3200 DDR5 4800 / 35W / Turbo / GT32)	Intel Core i5 12400T (X.XGHz / 6C / 12T / 18M / DDR4 3200 DDR5 4800 / 35W / Turbo / GT24)	Intel Core i7 12700T (X.XGHz / 12C / 20T / 25M / DDR4 3200 DDR5 4800 / 35W / Turbo / GT32)	Intel Core i9 12900 (2.4GHz / 16C / 24T / 30M / DDR4 3200 DDR5 4800 / 65W / Turbo / GT32)	Intel Core i7 12700 (2.1GHz / 12C / 20T / 25M / DDR4 3200 DDR5 4800 / 65W / Turbo / GT32)
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# of Cores	16c	6c	12c	16c	12c
# of Threads	24	12	20	24	20
Processor Base Frequency	1.40 GHz	1.8GHz	1.4GHz	2.4GHz	2.1GHz
Max Turbo Frequency	4.9GHz	4.2GHz	4.7GHz	5.1GHz	4.9GHz
Cache	30M	18M	25M	30M	25M
TDP	35W	35W	65W	65W	65W

CPU Specifications Part 2

CPU	Intel Core i5 12600 (3.3GHz / 6C / 12T / 18M / DDR4 3200 DDR5 4800 / 65W / Turbo / GT32)	Intel Core i3 12300 (3.5GHz / 4C / 8T / 12M / DDR4 3200 DDR5 4800 / 65W / Turbo / GT24)	Intel Core i9 12900K(3.2GHz / 16C / 24T / 30M / DDR4 3200 DDR5 4800 / 125W / Turbo / GT32)	Intel Core i7 12700K(3.6GHz / 12C / 20T / 25M / DDR4 3200 DDR5 4800 / 125W / Turbo / GT32)	Intel Core i5 12600K(3.7GHz / 10C / 16T / 20M / DDR4 3200 DDR5 4800 / 125W / Turbo / GT32)
# of Cores	6c	4c	16c	12c	10c
# of Threads	12	8	32	20	16
Processor Base Frequency	3.3GHz	3.5GHz	3.2GHz	3.6GHz	3.7Ghz
Max Turbo Frequency	4.8GHz	4.4GHz	5.2GHz	5.0GHz	4.9Ghz
Cache	18M	12M	30M	25M	20M
TDP	65W	60W	125W	125W	125W

CPU Specifications Part 3

CPU	Intel Core i3 12100(3.3GHz / 4C / 8T / 12M / DDR4 3200 DDR5 4800 / 60W / Turbo / GT24)	Intel Core i5 12400 (2.5GHz / 6C / 12T / 18M / DDR4 3200 DDR5 4800 / 65 W / Turbo / GT24)	Intel Core i5 12500 (3.0GHz / 6C / 12T / 18M / DDR4 3200 DDR5 4800 / 65W / Turbo / GT32)
# of Cores	4c	6c	6c
# of Threads	8	12	12
Processor Base Frequency	3.5GHz	2.5GHz	3.0GHz
Max Turbo Frequency	4.3GHz	4.4GHz	4.6GHz
Cache	12M	18M	18M
TDP	60W	65W	65W

HDD Specifications

Drive	1TB SATA 2.5" HDD HDD 7200 rpm, 6Gb/s
3.5" SATA Hard Disk Drive (HDD)	Not Available
2.5" SATA Hard Disk Drive (HDD)	Yes
Connector	SATA
Transfer Rate (Gb/sec)	160MB/s OD Read
Spindle Speed (RPM)	7,200
Power Off to Spindle Stop (sec)	NA
DC Power to Drive Ready (sec)	3.5

Average Latency (msec)	4.2
Input (VDC)	5
Typical (Watts)	1.9
Idle (Watts)	0.7
Physical Dimensions	69.85mm x 100.34mm x 7mm
Weight (grams)	90
Operating (C) Ambient	0 to 60
Operating (C) Base Casting	60
Non-Operating (C) Ambient	(-40 to 70)
Gradient (C per Hour)	20
Operating (Gs @ 2ms)	400
Non-Operating (Gs @ 2ms)	1000

Solid State Storage Specifications

Drive	NVMe 2280 M.2 512GB PCIe SSD (OPAL)	NVMe 2280 M.2 1TB PCIe SSD (OPAL)	NVMe 2280 M.2 2TB PCIe SSD (OPAL)	NVMe 2280 M.2 4TB PCIe SSD (OPAL)
Dimensions Millimeters (W x D x H)	22 x 80 x 2.38	22 x 80 x 2.38	22 x 80 x 2.38	22 x 80 x 2.38
Interface Type	PCIe Gen 4x4	PCIe Gen 4x4	PCIe Gen 4x4	PCIe Gen 4x4
Power Active (AVG)	5.8W	5.8W	5.8W	?
Power Idle	35 mW	35 mW	50mW	50mW
Typical Sequential Read	6000 MB/s	6400 MB/s	6400 MB/s	6400 MB/s
Typical Sequential Write	3200 MB/s	3800 MB/s	5000 MB/s	5000 MB/s
Burst Random Read (4K Queue Depth 32/8 thread);	500K IOPS	550K IOPS	550K IOPS	650K IOPS
Burst Random Write (4K Queue Depth 32/8 thread)	370K IOPS	400K IOPS	400K IOPS	450K IOPS
Operating Temperature Range	0 to 55°C	0 to 55°C	0 to 55°C	?
Endurance Rating (Lifetime Writes)	150 TB	300 TB	600 TB	?
Mean Time Between Failures (MTBF)	2.0M POH	2.0M POH	2.0M POH	?
Hardware Encryption	AES 256 bit	AES 256 bit	AES 256 bit	?

Integrated Graphics Adapter

Type	Intel® UHD Graphics 770
Display Interface	3 x DP 1.2
Video Resolution (max)	7680 x 4320 @ 60Hz (DP)

Discrete Graphics Adapter

Adapter	Quadro T400 – 4GB GDDR6	Quadro T1000 – 8GB GDDR6	NVIDIA Quadro A2000(DP x4) – 12GB GDDR6	Nvidia RTX A5000 mobile,16GB, 4miniDP,GDDR6
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Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCI Express 4.0x16	PCI Express 4.0x16
Display Interface	3 x mDP 1.4a	4 x mDP 1.4a	4 x mDP 1.4a	4 x mDP 1.4a
Graphics Chipset	TU117-850	TU117-875	GP106-850	QN20-E5
Memory Clock Frequency (MHz)	5001MHz	5001MHz	6001MHz	1750MHZ
Memory Size	4GB GDDR6	8GB GDDR6	12GB GDDR6	16GB GDDR6
Memory Interface	64-bit	128-bit	192-bit	256-bit
Memory Bandwidth	Up to 80GB/s	Up to 160GB/s	Up to 288GB/s	Up to 224GB/s
GPU Cores	CUDA Cores: 640	CUDA Cores: 896	???	???
GPU Core Frequency (MHz)	420MHz (base)/2100MHz (max boost)	1065MHz (base)/2100MHz (max boost)	1493MHz	900MHz
Maximum Power Consumption	30W	50W	75w (Board Power)	115w (Board Power)
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	7680 x 4320 x 24 bpp @ 120Hz 7680 x 4320 x 24 bpp @ 60Hz 7680 x 4320 x 36 bpp @ 60Hz 5120 x 3200 x 24 bpp @ 60Hz 5120 x 2880 x 24 bpp @ 60Hz	7680 x 4320 x 24 bpp @ 120Hz 7680 x 4320 x 24 bpp @ 60Hz 7680 x 4320 x 36 bpp @ 60Hz 5120 x 3200 x 24 bpp @ 60Hz 5120 x 2880 x 24 bpp @ 60Hz	DP1.4a: 7680*4320*24bpp/120Hz (Requires two DisplayPort 1.4a links and DSC compression) HDCP: 2.2 7680 x 4320 x 24 bpp @ 60Hz 7680 x 4320 x 36 bpp @ 60Hz 5120 x 3200 x 24 bpp @ 60Hz 5120 x 2880 x 24 bpp @ 60Hz	DP1.4a: 7680*4320*24bpp/120Hz (Requires two DisplayPort 1.4a links and DSC compression) HDCP: 2.2 7680 x 4320 x 24 bpp @ 60Hz 7680 x 4320 x 36 bpp @ 60Hz 5120 x 3200 x 24 bpp @ 60Hz 5120 x 2880 x 24 bpp @ 60Hz
Thermal Solution	Ultra-quiet Active Fansink	Ultra-quiet Active Fansink	Active Fansink	Active Fansink
Dimension	2.713" H x 6.137" L Single Slot, Low Profile		2.713" H x 6.137" L Single Slot, Low Profile	
			6.6 inches, HHHL double-slot	
Advanced Display	Not Available	Not Available	Not Available	Not Available
SLI/NVLink Support	Not Available	Not Available	Not Available	Not Available

Intel® Ethernet Specifications

Card	Intel I350-T2 Dual Port Gigabit Ethernet Adapter (Stony Lake T2)	Intel I350-T4 Quad Port Gigabit Ethernet Adapter (Stony Lake T4)	2 x 2 AX WiFi with BT (M.2) vPro AX201-TWR/SFF
Supplier PN	I350T2G1P20, MM# 928941		I350T4G1P20, MM# 928942
Data Rates Supported	10/100/1000Mbps (Copper), 1000Mbps (Fiber)		10/100/1000Mbps (Copper), 1000Mbps (Fiber)
Controller Details	Intel Ethernet Controller I350		Intel Ethernet Controller I351
Controller Bus Architecture	PCIe 2.1 (5GT/s)		PCIe 2.1 (5GT/s)
Data Transfer Mode	Ethernet		Ethernet
Power Consumption	Copper: I350-T2 V2= 4.4W Fiber: I350-F2= 5.5W		Copper: I350T4V2= 5W LC-Fiber: I350F4= 6W
IEEE Standards Compliance	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T		IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T
Boot ROM Support	PXE boot, Intel iSCSI Remote Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI		PXE boot, Intel iSCSI Remote Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI
Network Transfer Mode (Full/Half Duplex)	Supported		Supported

Network Transfer Rate	1,000Mbps Full Duplex	1,000Mbps Full Duplex
Operating System Driver Support	Windows 7/8/10, Linux, Free BSD, XEN,Vmware	Windows 7/8/10, Linux, Free BSD, XEN,Vmware
Manageability	Supported	Supported
Manageability Capabilities Alerting	Supported	Supported
TDP	Firmware Based Thermal Management	Firmware Based Thermal Management
Operating Temperature Range	0°C to 55°C (32°F to 131°F)	0°C to 55°C (32°F to 131°F)
# of Ports	2	4
Data Rate Per Port	10/100/1000Mbps (copper), 1000Mbps (fiber)	10/100/1000Mbps (copper), 1000Mbps (fiber)
System Interface Type	PCIe Gen 2.1	PCIe Gen 2.1
NC Sideband Interface	Not Available	Not Available
Jumbo Frames Supported	Yes	Yes
1000Base-T	Yes	Yes
IEEE 1588	Supported	Supported
Supported Under vPro	Not Available	Not Available
Disclaimers		

Ethernet

Model	i350-T2	i350-T4	2 x 2 AX WiFi with BT (M.2) vPro AX201-TWR/SFF
Connector	2 x Ports RJ-45 Copper	4 x Ports RJ-45 Copper	
Website	i350 T2	i350 T4	
Auto-Negotiation	IEEE* 802.3* Auto-negotiaton	IEEE* 802.3* Auto-negotiaton	
Intel® vPro™	Not Available	Not Available	
Intel® Standard Manageability	Supported	Supported	
Power Optimizer Platform Low-power Management Systems	Supported	Supported	
Energy Efficient Ethernet	Supported	Supported	
TCP/UDP Checksum and Segmentation Offload (IPv4 and IPv6)	Supported	Supported	
Receive Side Scaling	Supported	Supported	
Dual Tx and Rx Queues	Yes	Yes	
Jumbo Frames (up to 9KB)	Supported	Supported	
Teaming	Supported	Supported	
Wake from Deep Sx	Supported	Supported	
Server Operating System Support	Windows Server 2008, 2012, 2016, 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016, 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware	
Network Proxy/ARP Support	Supported	Supported	

Media Card Reader

Description	Not Available
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BIOS Specifications

WMI Support	Compliant with Microsoft WBEM and the DMTF common information model
ROM-Based Setup Utility (F1)	System configuration setup program (text/graphic interface) available at power-on with F1 key
Bootblock Recovery	Recovers system BIOS if the flash ROM is corrupted
Replicated Setup	Saves system configuration settings to a file that can then be used to replicate the settings to other systems
Boot Control	Boot control available through ROM-based setup utility or with F12 key at power-on
Memory Change Alert	Power-on error message in the event of a decrease in system memory
Thermal Alert	Power-on error message in the event of a fan failure
Asset Tag	Supports ability to set SMBIOS type 2 baseboard asset tag field
System/Emergency ROM Flash Recovery with Video	Supports process to recover the system BIOS if the flash ROM is corrupted
Remote Wakeup/Remote Shutdown	System admin can power on/off a client computer from a remote location to provide maintenance
Quick Resume Time	Supports low power S3 (suspend to RAM) and prompt resume times
ROM Revision Level	System UEFI (BIOS) version reported in SMBIOS type 0 structure and in BIOS setup
Keyboard-less Operation	System can be booted without a keyboard
Per-port Control	Allows I/O ports to be individually enabled/disabled through ROM-based setup or WMI interface
Adaptive Cooling	Offers multiple settings for fan control ranging between better performance and better acoustics
Security	Supervisor, user and power-on passwords can protect boot and ROM-based setup <ul style="list-style-type: none">- Chassis Intrusion Detection- UEFI Secure Boot Support- HDD Password Can Protect HDD Data- Windows UEFI Firmware Update Support- Device Guard Support- BIOS Guard, Boot Guard Support
Intel(R) AMT (includes ASF 2.0)	Allows system to be supported from a remote location
Intel(R) TXT	Intel(R) trusted execution technology provides a security foundation to build protections against software based attacks
Memory Modes	Supports mirroring, lock step, and sparing memory modes
Windows 10 Ready	Supports Windows 10 requirements for secure flash, UEFI v 2.7 device guard support spec

Industry Standard Specification Support

UEFI	Unified Extensible Firmware Interface v2.7
ACPI (Advanced Configuration and power Management Interface)	Advanced Configuration and Power Interface v6.2
ASF 2.0	DMTF Alert Standard Format Specification v2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6)
CD Boot	EI Torito Bootable CD-Rom Format Specification, v1.0

EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision v1.0
PCI	PCI Local Bus v3.0 PC Firmware Specification 3.1
PCI Express	PCI Express Base Specification v4.0
SATA	Serial ATA Revision 3.0 Specification
TPM	Trusted Computing Group TPM Specification v2.0
UHCI	Universal Host Controller Interface Design Guide, Revision v1.1
USB	Universal Serial Bus Revision v1.1 Universal Serial Bus v2.0 Universal Serial Bus v3.0 Universal Serial Bus v3.2
SMBIOS	DMTF System Management Spec v3.2.1
XHCI	XHCI SPEC Revision v1.2

Social and Environmental Responsibility

Quality Control	Lenovo is a member of an eco declaration system that enforces regular independent quality control
Hazardous Substances and Preparation	<ul style="list-style-type: none"> · Products do not contain more than; 0.1% lead, 0.01% cadmium, 0.1% mercury, 0.1% hexavalent chromium, 0.1% polybrominated biphenyls (PBB) or 0.1% polybrominated diphenyl ethers (PBDE). (See legal reference and Note B1) · Products do not contain Asbestos · Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide · Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation · Products do not contain more than 0.1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP · Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5 microgram/cm²/week <p>REACH Article 33 information about substances in articles is available at: https://www.lenovo.com/us/en/social_responsibility/social_responsibility_resources/</p>
Batteries	UN38.3,MSDS
Safety, EMC Connection to the Telephone Network and Labeling	Not applicable

Acoustic Noise Emissions Declaration

LWAd(bels) Idle	3.1
LWAd(bels) Oper	3.7

Safety, EMC Connection to the Telephone Network and Labeling

Industry Standard Specifications	not applicable
Remote Manageability Software Solutions	not applicable
System Software Manager	Lenovo ThinkStation supports software management tools by Lenovo Vantage.

Regulations & Standards

EMC & Safety	FCC/IC VCCI BSMI KC RCM TUV-GS cTUVus IEC60950-1&IEC62368 CB Report/Certificate Saudi Arabia EQM Kuwait KUCAS China CCC Mark South Africa SABS Russia/Belarus/Kazakhstan/Kyrgyzstan/Armenia-EAC Morocco-CM Mexico-NOM Serbia KVALITET Ukraine UKrCEPRO India-BIS China SRRC Indonesia-SDPPI Malaysia-SIRIM Philippines-NTC
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Environmentals

Energy Star	ENERGY STAR 8.0
EPEAT	EPEAT Certification Available on Select Models
ErP Lot-3 2013	Yes
Hazardous Substances	<ul style="list-style-type: none"> · Products do not contain more than; 0.1% lead, 0.01% cadmium, 0.1% mercury, 0.1% hexavalent chromium, 0.1% polybrominated biphenyls (PBB) or 0.1% polybrominated diphenol ethers (PBDE) · Products do not contain Asbestos · Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide · Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation · Products do not contain more than 0.1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP · Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5 microgram/cm₂/week
TCO Certification	9.0