

Lenovo P360 Tower

Version: 1.0 | 03/22/2022

Downloads

Hardware Maintenance Manual	TBD
Drivers & Software	TBD
Available Whitepapers	TBD

SECTION I: Platform Overview

Description	Experience the power of a workstation at the price of a desktop with the ThinkStation P360 Tower. Built for mission-critical tasks that require superior reliability and powerful performance, the ThinkStation P360 leads on both counts and does it with exceptional all-around value.
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CPU

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

Operating Systems

Preloaded	Windows 11 Pro Windows 11 Home Windows 10 Pro 64-bit Windows 10 IOT LTSC Ubuntu 20.04 LTS
Supported	Ubuntu 22.04 LTS Ubuntu 20.04 LTS Red Hat Enterprise Linux 8.6

Memory

Slots	Up to 4 DIMMs
Channels	Supports up to 4 DIMM Sockets, 2 Channels
Type	288-Pin, 1866/2133/2400/2666/2933/3200/4800 MHz ECC and non-ECC UDIMM
ECC Support	Yes, CPU Dependent
Speed	Up to 4800MHz
Max DIMM Size	32GB DDR5 UDIMM
Max System Memory	128GB

Storage

Total Bays/Size	2 x 3.5" 2 x 2.5"
SATA	3 x SATA Connectors, Gen 3
PCIe	2 x M.2 PCIe Connector, Gen 4 Onboard Additional M.2 NVMe Drive Supported by Single Adapter
eSATA	1 x eSATA Connector, Gen 3
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, Full Height, Full Length, 75W, With Latch
Slot 2	PCIe 3.0 x1, Full Height, Half Length, 25W
Slot 3	PCIe 4.0 x4, Full Height, Half Length, 25W, With Latch
Slot 4	PCIe 3.0 x1, Full Height, Half Length, 25W
Disclaimers	1. PCIe Slot 3 is a x16 mechanical slot, x4 electrical slot.

Front I/O

USB	2 x USB 3.2 Gen 2 Type-A 10Gb/s 2 x USB 3.2 Gen 1 Type-A 5Gb/s 1 x USB 3.2 Gen 2 Type-C 10Gb/s
Audio	1 x Audio Jack (3.5mm) 1x Microphone Jack (3.5mm)
Media Card Reader	Optional: Front 3-in-1 Media Card Reader (USB 2.0)
Flex Bay	One 3.5" Flex Bay, Supports the Following: - Flex storage enclosure - Front-access storage enclosure
Disclaimers	Note: Actual USB throughout will vary depending on the type and quantity of USB devices used.

Rear I/O

USB	4 x USB 3.2 Gen 1 Type-A 5Gb/s (w/ Smart power on)
Audio	1 x Rear (Line Out); Retaskable to 5.1
DisplayPort	2 x Standard (CPU dependent) Optional 1 x Rear Port (CPU dependent)
HDMI	1 x Standard Optional 1 x Rear Port (CPU dependent)
Type-C	Optional 1 x Rear Port (CPU dependent)
VGA Port	Optional 1 x Rear Port (CPU dependent)
Serial Port	1 x Standard Optional 1 x Rear Port
Ethernet	1 x 1GbE - RJ45
PS/2	Optional 2 x PS/2
Parallel Port	Option 1 x Rear Bracket
Optional USB Adapter	2-Port USB Expansion Card (USB3.0) PCIe1-HP/LP 4-Port Serial Expansion Card PCIe X1-HP/LP Rear USB 3.2 Gen2x2 Type C PCIe4 Adapter
Optional Network Adapter	Bitland BN8E88 Single Port Gigabit Ethernet Adapter Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter
Disclaimers	Note: Actual USB throughout will vary depending on the type and quantity of USB devices used.

Ethernet

Vendor	Intel Jacksonville I219-LM (W/ AMT)
Speeds	10/100/1000Mbps
Functions	PXE, ASF, WOL, Jumbo Frames, Teaming
Connectors	1 x RJ45

Audio

Vendor	Realtek
Type	HD (5.1)
Internal Speaker	Yes
Connectors	2 x Front 3.5mm Jacks (Mic & Headphone) 1 x Rear 3.5mm Jacks (Line Out)
Chipset	ALC897Q-CG
Number of Channels	2 Channels (5.1 via driver selection)
Number of Bits/Audio Resolution	6 channels of DAC support 16/20/24-bit PCM 2 stereo ADC support 16/20-bit PCM

Thermal

Temp Sensors	Ambient Sensor VR Sensor Graphics Card Sensor (if applicable)
Fans	1 x CPU Fan 1 x Front Fan 1 x Rear Fan(optional) 1 x Power Supply Fan (inside PSU)

Power Specifications

Power Supply	750W	500W
Power Efficiency	90% Efficient @ 50% Load	92% Efficient @ 50% Load
Main	C14	C14
Operating Voltage Range	100 - 240V	100 - 240V
Rated Voltage Range	90-264VAC	90-264VAC
Rated Line Frequency	47Hz / 63Hz	47Hz / 63Hz
Operating Line Frequency Range	50Hz / 60Hz	50Hz / 60Hz
Rated Input Current	10A	7A
Graphics	1 x 8 pin	1 x 8 pin
Power Supply Fan	Yes	Yes
ENERGY STAR® Qualified (config dependent)	Yes	Yes
80 PLUS Compliant	Yes	Yes
Built-in Self Test (BIST) LED	No	No
Aux Power Drop	Yes	Yes

BIOS

Vendor	AMI
Self-Healing BIOS	Yes

Chassis Information

Color	Raven Black
PSU	750W and 500W Available, Autosensing, 80 PLUS Platinum Qualified for 750w and 500w
Thermal Solutions	Two System Fans Standard (1 front, 1 rear), One Fan per CPU, One PSU Fan
Dimensions	376mm/14.8" H 315.4mm/12.4" D 170mm/6.7" W
Weight	9.4kg / 20.7lbs

Packaging Dimensions

Height (mm/in)	540mm / 21.26"
Width (mm/in)	280mm / 11.02"
Depth (mm)	420mm / 16.54"
Weight (kgs/lbs)	11.76kg / 25.92 lbs

Security & Serviceability

TPM	Infineon SLB9672 TPM 2.0
Asset ID	Yes, 1024 x 8bit
vPro	Intel vPro for WS (AMT 14.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	Yes

and/or mouse	
Access Panel	Tool-less Side Cover Removal
Optical Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
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: 5°C to 40°C (41°F to 104°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: 10% to 80% (non-condensing) Relative Humidity Storage/Transit: 10% to 90% (non-condensing) Wet Bulb Temperature Operating: 25°C (77°F) max Wet Bulb Temperature Non-operating: 40°C (104°F) max
Altitude	Operating: -15.2m to 3048m (-50ft to 10000ft) Storage: -15.2m to 10668m (-50ft to 35000ft)
Vibration	Package Vibration: Random,1.04G at 2-200 Hz, 15 Minutes XYZ 6 faces Operating Vibration: Random,0.27G at 5-500 Hz, 30 Minutes Per Surface (X,Y,Z) Non-Operating Vibration: Random,1.04G at 2-200 Hz, 15 Minutes Per Surface (±X,±Y,±Z)
Shock	Operation Shock: 3ms (15G) for 4 Axis (+X, -X, +Y,-Y) 3ms (30G) for 2 Axis (+Z, -Z), Half-sine Wave, Each Side Will do One Time Rack Operation Shock: 5ms (15G) for 6 Axis (+X, -X, +Y,-Y,+Z, -Z), Half-sine Wave, Each Side Will do One Time Non-operating Shock: Trapezoidal Wave, 45G, 11ms, 6 Sides (+X, -X, +Y,-Y, +Z ,-Z), Filter 300Hz, Each Side Shock One Time

SECTION II: Platform Detail

Board Size	10.51" x 9.72" (267mm x 247mm)
Layout	Custom ATX

Motherboard Core

Processor Support	Intel Alder Lake Core Series
Socket Type	Socket V (LGA 1700)
Memory Support	DDR5 up to 4000MHz UDIMM 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-CG Codec
Ethernet	Intel Jacksonville I219LM

Supported Components

Processor Level	Intel Alder Lake - Core
Processor	i9-12900K i9-12900 i7-12700K i7-12700 i5-12600K i5-12600 i5-12500 i5-12400 i3-12300 i3-12100
Memory Type	ECC/non-ECC UDIMMs - 4000MHz
Memory	16GB DDR5 ECC UDIMM PC4-4000 32GB DDR5 ECC UDIMM PC4-4000 8GB DDR5 non-ECC UDIMM PC4-4000 16GB DDR5 non-ECC UDIMM PC4-4000 32GB DDR5 non-ECC UDIMM PC4-4000

Storage

3.5" SATA Hard Disk Drive (HDD)	1TB SATA HDD 7200rpm, 6Gb/s, 3.5" 2TB SATA HDD 7200rpm, 6Gb/s, 3.5" 4TB SATA HDD 7200rpm, 6Gb/s, 3.5" (enterprise class)
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

RAID

RAID Levels and Requirements	NVMe Drives Support RAID 0/1 SATA Drives Support RAID 0/1/5/10
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 0/1/5/10.

Optical Drive/Removable Media

DVD-ROM Drive	Slim DVD-ROM Drive
DVD Burner/CD-RW Drive	Slim DVD Burner/CD-RW Drive
Blu-Ray Burner Drive	Slim Blu-Ray ODD DVD Burner
Media Card Reader Specifications	Optional Front 3-in-1 USB 2.0 Media Card Reader

Keyboard and Pointing Devices

Keyboard	Calliope USB Keyboard Traditional USB Keyboard Traditional PS/2 Keyboard
Pointing Devices	Calliope USB Mouse PS/2 Optical Mouse Fingerprint USB Mouse

PCIe Adapters

Network	Bitland BN8E88 Single Port Gigabit Ethernet Adapter Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter
Thunderbolt	Rear Thunderbolt PCIe Adapter
USB	Rear Dual Port USB 3.2 Gen 2 Type-C PCIe Adapter Rear Dual Port USB 3.0 PCIe Adapter
WiFi Cards	Intel PCIe WiFi Card With BT External Antenna Kit (AX201)
PCIe to M.2 Adapter Card	PCIe x4 to M.2 Adapter – Gen3 (for NVMe SSD)

SECTION III: Supported Component Detail

CPU Specifications

CPU	Intel Core i9-12900K	Intel Core i7-12700K	Intel Core i5-12600K	Intel Core i9-12900	Intel Core i7-12700	Intel Core i5-12600
# of Cores	16c	12c	10c	16c	12c	6c
# of Threads	32	20	16	24	20	12
Processor Base Frequency	3.2GHz	3.6GHz	3.7Ghz	2.4GHz	2.1GHz	3.3GHz
Max Turbo Frequency	5.2GHz	5.0GHz	4.9Ghz	5.1GHz	4.9GHz	4.8GHz
Cache	30M	25M	20M	30M	25M	18M
TDP	125W	125W	125W	65W	65W	65W

CPU Specifications

CPU	Intel Core i5-12500	Intel Core i5-12400	Intel Core i3-12300	Intel Core i3-12100
# of Cores	6c	6c	4c	4c
# of Threads	12	12	8	8
Processor Base Frequency	3.0GHz	2.5GHz	3.5GHz	3.5GHz
Max Turbo Frequency	4.6GHz	4.4GHz	4.4GHz	4.3GHz
Cache	18M	18M	12M	12M
TDP	65W	65W	60W	65W

HDD Specifications

Drive	1TB SATA – 7200rpm, 6Gb/s, 2.5"	1TB SATA – 7200rpm, 6Gb/s, 3.5"	1TB SATA – 7200rpm, 6Gb/s, 3.5" Enterprise	2TB SATA – 7200rpm, 6Gb/s, 3.5"	4TB SATA – 7200rpm, 6Gb/s, 3.5"	6TB SATA – 7200rpm, 6Gb/s, 3.5"
3.5" SATA Hard Disk Drive (HDD)	Not Available	Yes	Yes	Yes	Yes	Yes
2.5" SATA Hard Disk Drive (HDD)	Yes	Not Available	Not Available	Not Available	Not Available	Not Available
Connector	SATA	SATA	SATA	SATA	SATA	SATA
Transfer Rate (Gb/sec)	160MB/s OD Read	Average Data Rate, Read/Write 156MB/s		Average Data Rate, Read/Write 156MB/s	Sustained Data Transfer Rate 216-226MB/s	Sustained Data Transfer Rate 216-226MB/s
Spindle Speed (RPM)	7,200	7,200	7,200	7,200	7,200	7,200
Power Off to Spindle Stop (sec)	NA	NA	NA	NA	NA	NA
DC Power to Drive Ready (sec)	3.5	<10.0	<17.0	<17.0	<17.0	<17.0
Average Latency (msec)	4.2	4.16	4.16	4.16	4.16	4.16
Input (VDC)	5	5	5	5	5	5

Typical (Watts)	1.9	6.19	10.09	6.7	11.33	1318
Idle (Watts)	0.7	4.6	4.86	4.5	5.45	6.21
Physical Dimensions	69.85mm x 100.34mm x 7mm	101.6mm x 146.99mm x 19.88mm	101.85mm x 147mm x 26.1mm	101.6mm x 146.99mm x 26.1mm	101.85mm x 147mm x 26.1mm	101.85mm x 147mm x 26.1mm
Weight (grams)	90	420	620	535	650	716
Operating (C) Ambient	0 to 60	0 to 60	5 to 60	0 to 60	5 to 60	5 to 60
Operating (C) Base Casting	60	60	60	60	60	60
Non-Operating (C) Ambient	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)
Gradient (C per Hour)	20	20	20	20	20	20
Operating (Gs @ 2ms)	400	70	Read 70 Gs / Write 40 Gs	80	Read 70 Gs / Write 40 Gs	Read 70 Gs / Write 40 Gs
Non-Operating (Gs @ 2ms)	1000	350	300	300	300	250

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	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	0 to 55°C
Endurance Rating (Lifetime Writes)	150 TB	300 TB	600 TB	2400TB
Mean Time Between Failures (MTBF)	2.0M POH	2.0M POH	2.0M POH	1.5M POH
Hardware Encryption	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit

Optical Drive Specifications

Description	9mm Slim DVD ROM Drive (SATA)	9mm Slim DVD Burner/CD-RW Drive	9mm Slim Blu-Ray ODD DVD Burner
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		(SATA)	(SATA)
Interface Type	SATA 1.5 Gb/s	SATA 1.5 Gb/s	SATA 1.5 Gb/s
Dimensions	128±0.4×9.0 ±0.4×127±0.4(Max) Unit:mm (Without Bezel-W x H x D)	128±0.4×9.0 ±0.4×127±0.4(Max) Unit:mm (Without Bezel-W x H x D)	128±0.4×9.0 ±0.4×127±0.4(Max) Unit:mm (Without Bezel-W x H x D)
Disc Capacity	NA	NA	NA
Type	DVDROM	DVDWriter	BD Rambo
External Dimensions	NA	NA	NA
Speed	NA	NA	NA
Bay Type	9.0mm Tray	9.0mm Tray	9.0mm Tray
Color	Business Black or without bezel	Business Black or without bezel	Business Black or without bezel
Removable	No	No	No
Internal Buffer Size	0.5MB Min	0.5MB Min	4MB
Writes	NA	8XDVD+R / 8XDVD+RW / 6XDVD+R DL 8XDVD-R / 6XDVD- RW / 6XDVD-R DL 24XCD-R / 16XCD-RW	6x BD-R / 2x BD-RE 8XDVD+R / 8XDVD+RW / 6XDVD+R DL 8XDVD-R / 6XDVD- RW / 6XDVD-R DL 5XDVD-RAM 24XCD-R / 16XCD-RW
Reads	8XDVD-ROM / 24XCD-ROM	8XDVD-ROM / 24XCD-ROM	6x BD-ROM /8x DVD- ROM / 5x DVD-RAM / 24x CD-ROM
Source	DC Power 5V	DC Power 5V	DC Power 5V
DC Power Requirements	+5V±5%	+5V±5%	+5V±5% Ripple less than 100mVp-p
DC Current	Max 2.5A@5v	Max 2.5A@5v	Max 2A@5v
Operating Systems Supported	Windows OS/Linux	Windows OS/Linux	Windows OS/Linux
Temperature	Operating: 5°C to 45 °C Non-Operating:-30°C to 60°C	Operating: 5°C to 45 °C Non-Operating:-30°C to 60°C	Operating: 5°C to 45 °C Non-Operating:-30°C to 60°C
Relative Humidity	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportatio n> 10 % to 80 % (Non- Condensing)	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportatio n> 10 % to 80 % (Non- Condensing)	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportatio n> 10 % to 80 % (Non- Condensing)

Integrated Graphics Adapter

Type	Intel® UHD Graphics770/730
Bus Interface	Processor onboard

Display Interface	DP/DP/HDMI/DP or HDMI or Type-C or VGA(1 of 4 optional)
Video Resolution (max)	8K60 or 5K60 HDR max(2* 5K60 HDR or 4* 4K60 HDR)

Discrete Graphics Adapter

Adapter	Quadro T400 - 2GB GDDR6	Quadro T400 - 4GB GDDR6	Quadro T600	Quadro T1000- 4GB GDDR6	Quadro T1000 - 8GB GDDR6	NVIDIA Quadro A2000(D P x4) - 6GB GDDR6
Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCI Express 4.0x16
Display Interface	3 x mDP 1.4a	3 x mDP 1.4a	4 x mDP 1.4a	4 x mDP 1.4a	4 x mDP 1.4a	4 x mDP 1.4a
Graphics Chipset	TU117-825	TU117-850	TU117-850	TU117-875	TU117-875	GP106-850
Memory Clock Frequency (MHz)	5001MHz	5001MHz	5001MHz	5001MHz	5001MHz	6001MHz
Memory Size	2GB GDDR6	4GB GDDR6	4GB GDDR6	4GB GDDR6	8GB GDDR6	6GB GDDR6
Memory Interface	64-bit	64-bit	128-bit	128-bit	128-bit	192-bit
Memory Bandwidth	Up to 80GB/s	Up to 80GB/s	Up to 160GB/s	Up to 160GB/s	Up to 160GB/s	Up to 288GB/s
GPU Cores	CUDA Cores: 384	CUDA Cores: 384	CUDA Cores: 640	CUDA Cores: 896	CUDA Cores: 896	N/A
GPU Core Frequency (MHz)	2100MHz	420MHz (base)/2100MHz (max boost)	2100MHz	2100MHz	1065MHz (base)/2100MHz (max boost)	1493MHz
Maximum Power Consumption	30W	30W	40W	50W	50W	70W
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	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	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) HDPC: 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	Ultra-quiet Active Fansink	Ultra-quiet Active Fansink	Ultra-quiet 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	2.713" H x 6.137" L Single Slot, Low Profile	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	Not Available	Not Available
SLI/NVLink Support	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Disclaimers						

Discrete Graphics Adapter

Adapter	NVIDIA Quadro A2000(D P x4) - 12GB GDDR6	Quadro RTX A4000	Quadro RTX A5000	Quadro RTX A4500	RTX 3060	RTX 3070Ti
Bus Interface	PCI Express 4.0x16	PCIe 4.0 x16	PCIe 4.0 x16	PCI Express 4.0x16	PCIe 4.0 x16	PCI Express 4.0x16
Display Interface	4 x mDP 1.4a	4 x DP 1.4a	4 x DP 1.4a	DP *4	HDMI*1: 7680*4320@60Hz DP*3: 5120*2880@60Hz	DP *3 + HDMI *1
Graphics Chipset	GP106-850	GA104-875	GA102-850	PG132 SKU 510	GP104-400-A1	
Memory Clock Frequency (MHz)	6001MHz	7000MHz	8001MHz	8001MHz	8000MHz	9500MHz
Memory Size	12GB GDDR6	16GB GDDR6	24GB GDDR6	20GB GDDR6	12GB GDDR6	8GB GDDR6
Memory Interface	192-bit	256-bit	384-bit	320-bit	192-bit	256-bit
Memory Bandwidth	Up to 288GB/s		Up to 448GB/s		up to 768 GB/s	
GPU Cores	N/A					
GPU Core Frequency (MHz)	1493MHz	2100MHz	2100MHz	1065MHz (base)/2100 MHz (max boost)	1575MHz (base)/1770 MHz (max boost)	
Maximum Power Consumption	70W	140W	230W	200W	170W	290W
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	DP1.4a: 7680*4320*24bpp/	7680 x 4320 x 24bpp @	7680 x 4320 x 24bpp @	DP1.4a: 7680*4320*24bpp/	HDMI*1: 7680*4320@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	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	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	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	DP*3: 5120*2880@60Hz	120Hz (Requires two DisplayPort 1.4a links and DSC compression) HDMI2.1: 7680*4320*24bpp YUV420 or DSC at 60Hz (Requires two DisplayPort 1.4a links and DSC compression)
Thermal Solution	Active Fansink	Active Fansink	Active Fansink	Active Fansink	Active Fansink	Active Fansink
Dimension	6.6 inches, HHHL double-slot	4.4" H x 9.5" L Single Slot	4.4 inches x 10.5 inches, Double wide	9.5 inches, double-slot	4.3 inches*8.9 inches, double-slot	4.37 inches*10.57 inches, 2.5-slot
Advanced Display	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
SLI/NVLink Support	Not Available	Not Available	Yes	?	Not Available	Not Available

Intel® Ethernet Specifications

Card	Intel I210-T1 Single Port Gigabit Ethernet Adapter (Springville)	Intel I350-T2 Dual Port Gigabit Ethernet Adapter (Stony Lake T2)	Intel I350-T4 Quad Port Gigabit Ethernet Adapter (Stony Lake T4)	Bitland BN8E88 1000M PCIe1 noASF - FH/LP	2 x 2 AX WiFi with BT (M.2) vPro AX201-TWR/SFF
Supplier PN	I210T1, MM# 941033	I350T2G1P20, MM# 928941	I350T4G1P20, MM# 928942	1218-00934/1218-00933	-
Data Rates Supported	10/100/1000 Mbps copper	10/100/1000 Mbps (Copper), 1000Mbps (Fiber)	10/100/1000 Mbps (Copper), 1000Mbps (Fiber)	10M, 100M, and 1000M	-
Controller Details	Intel® Ethernet Controller I210	Intel Ethernet Controller I350	Intel Ethernet Controller I351	REALTEK RTL8168E-VB-CG	-
Controller Bus Architecture	PCIe 2.1 (5GT/s)	PCIe 2.1 (5GT/s)	PCIe 2.1 (5GT/s)	PCI Express 1.1 2.5GT/s	-
Data Transfer Mode	Ethernet	Ethernet	Ethernet	Ethernet	Ethernet

Power Consumption	0.81W	Copper: I350-T2 V2= 4.4W Fiber: I350-F2= 5.5W	Copper: I350T4V2= 5W LC-Fiber: I350F4= 6W	RTL8168E=0 .53W	-
IEEE Standards Compliance	IEEE 802.3/10BA SE-T, 100BASE- TX, 1000BASE-T	IEEE 802.3/10BA SE-T, 100BASE- TX, 1000BASE-T	IEEE 802.3/10BA SE-T, 100BASE- TX, 1000BASE-T	IEEE 802.1P Layer 2 Priority Encoding IEEE 802.1Q VLAN tagging IEEE 802.3az Draft 3.2 (EEE)	-
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	PXE boot, Intel iSCSI Remote Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI	Supported	-
Network Transfer Mode (Full/Half Duplex)	Supported	Supported	Supported	Supported	-
Network Transfer Rate	1,000Mbps Full Duplex	1,000Mbps Full Duplex	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	Windows 7/8/10, Linux, Free BSD, XEN,Vmware	Win10	-
Manageability	Supported	Supported	Supported	Supported	-
Manageability Capabilities Alerting	Supported	Supported	Supported	Supported	-
TDP	Firmware Based Thermal Managemen t	Firmware Based Thermal Managemen t	Firmware Based Thermal Managemen t	Not Available	-
Operating Temperature Range	0°C to 55°C (32°F to 131°F)	0°C to 55°C (32°F to 131°F)	0°C to 55°C (32°F to 131°F)	0 °C, 50 °C (32 ° F to 122 ° F)	-
# of Ports	1	2	4	1	-
Data Rate Per Port	10/100/1000 Mbps (copper)	10/100/1000 Mbps (copper), 1000Mbps (fiber)	10/100/1000 Mbps (copper), 1000Mbps (fiber)	10M, 100M, and 1000M	-
System Interface Type	PCIe Gen 2.1	PCIe Gen 2.1	PCIe Gen 2.1	PCI Express 1.1	-
NC Sideband Interface	Not Available	Not Available	Not Available	Not Available	-

Jumbo Frames Supported	Yes	Yes	Yes	Yes	-
1000Base-T	Yes	Yes	Yes	Yes	-
IEEE 1588	Supported	Supported	Supported	Not Available	-
Supported Under vPro	Not Available	Not Available	Not Available	Not Available	-
Disclaimers					

Ethernet

Model	i210-T1	I350-T2	I350-T4	Bitland BN8E88 1000M PCIex1 noASF - FH/LP	2 x 2 AX WiFi with BT (M.2) vPro AX201- TWR/SFF
Connector	RJ-45 Copper	2 x Ports RJ- 45 Copper	4 x Ports RJ-45 Copper	1 Port RJ-45	-
Website	i210 T1	i350 T2	i350 T4	IC Datasheet	-
Auto-Negotiation	IEEE* 802.3* Auto- negotiaton	IEEE* 802.3* Auto- negotiaton	IEEE* 802.3* Auto- negotiaton	Auto- Negotiation with Next Page capability	-
Intel® vPro™	Not Available	Not Available	Not Available	Not Available	-
Intel® Stable Image Platform Program (SIPP)	Not Available			-	
Intel® Standard Manageability	Supported	Supported	Supported	Not Available	-
Power Optimizer Platform Low-power Management Systems	Supported	Supported	Supported	Supported	-
Energy Efficient Ethernet	Supported	Supported	Supported	Supported	-
TCP/UDP Checksum and Segmentation Offload (IPv4 and IPv6)	Supported	Supported	Supported	-	-
Receive Side Scaling	Supported	Supported	Supported	Supported	-
Dual Tx and Rx Queues	Yes	Yes	Yes	Not Available	-
Jumbo Frames (up to 9KB)	Supported	Supported	Supported	Supported	-
Teaming	Not Available	Supported	Supported	Supported	-
Wake from Deep Sx	Supported	Supported	Supported	Supported	-
Server Operating System Support	Windows Server 2008, 2012, 2016, 2019 Linux (RHEL/SLES , Free BSD,	Windows Server 2008, 2012, 2016, 2019 Linux (RHEL/SLES , Free BSD,	Windows Server 2008, 2012, 2016, 2019 Linux (RHEL/SLES , Free BSD,	Windows Server 2008, 2012, 2016, 2019 Linux (RHEL/SLES , Vmware	-

	Xen, Vmware	Xen, Vmware	Xen, Vmware		
Network Proxy/ARP Support	Supported	Supported	Supported	Supported	-
Disclaimers					

Media Card Reader

Description	Media Card reader (3 in 1) TWR
Interface Type	USB2.0
Form Factor	USB 2.0 Mass Storage Device

SECTION IV: BIOS / Certifications / Standards / Environmental

BIOS Specifications

WMI Support	Compliant With Microsoft WBEM and the DMTF Common Information Model
ROM-Based Setup Utility (F1)	System Configuration Setup Program (text only interface) Available at Power-on With F1 Key
Bootblock Recovery	Recovers System BIOS if the Flash ROM Becomes 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 Becomes 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, SMP and Power-On Passwords Can Protect Boot and ROM-based Setup - Support Electronic Lock - Chassis Intrusion Detection - UEFI Secure Boot Support - HDD Password Can Protect HDD Data - Windows UEFI Firmware Update Support - Device Guard Support - Optional Access Panel Lock, Kensington Lock, and Pad Lock, BIOS Guard, Boot Guard - BIOS Self-Healing Gen 2 (RoT: EC) - Secure Wipe 2.0 - Subscription Certificate Storage
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 2.8 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	NA (No PCI slot)
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

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Quality Control	Lenovo is a member of an eco declaration system that enforces regular independent quality control
Hazardous Substances and Preparation	GDX Scip control
Batteries	UN38.3,MSDS
Safety, EMC Connection to the Telephone Network and Labeling	Not applicable

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 Brazil-INMETRO TUV-GS cTUVus IEC60950-1&IEC62368 CB Report/Certificate Saudi Arabia EQM Kuwait KUCAS China CCC Mark Singapore PSB 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

