

Lenovo P3 Tower

Version: 3.0 | 11/03/2023

Downloads

Hardware Maintenance Manual	P3 Tower HMM
Drivers & Software	P3 Tower Drivers & Software
Available Whitepapers	Power Configurator Memory Configurator Storage Configurator Windows 11/Windows 10 Installation Red Hat Enterprise Linux 9 Installation Ubuntu Linux 22.04 LTS Installation

SECTION I: Platform Overview

CPU

Processor Support	Intel Raptor Lake Core Series
Socket Type	Socket-V (LGA 1700)
Preloaded	Windows 11 Pro Windows 11 Home Windows 10 Pro 64-bit Ubuntu 22.04 LTS
Supported	Red Hat Enterprise Linux 9.1

Memory

Slots	Up to 4 DIMMs
-------	---------------

Channels	Supports up to 4 DIMM Sockets, 2 Channels
Type	DDR5 ECC and non-ECC UDIMM
ECC Support	Yes, CPU Dependent
Speed	Up to 4400MHz
Max DIMM Size	32GB DDR5 UDIMM
Max System Memory	128GB
Disclaimers	*Memory speed impacted by number and type of DIMMs installed. *Memory speed can be dependent on the individual CPU capabilities.

Storage

Total Bays/Size	Up to 4 x 3.5"
SATA	3 x SATA Connectors, Gen 3
PCIe	2 x M.2 2240/2280/22110 PCIe Connector, Gen 4 Onboard Additional M.2 2280 NVMe Drive Supported by Single Adapter, Gen 3
eSATA	1 x eSATA Connector, Gen 3
Disclaimers	A configuration with four (4) 3.5" HDDs will block both onboard M.2 drive connectors. Additional parts/enclosures may be required for some configurations. Refer to storage whitepaper for more details.

Video

Integrated Graphics	Intel Integrated UHD Graphics 770 (CPU dependent) Intel Integrated UHD Graphics 730 (CPU dependent)
Discrete Graphics	PCIe Add-In-Card, Details in Section 3 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, Full 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	PCIe Slot 3 is a x16 mechanical slot, x4 electrical slot.

Front I/O

USB	2 x USB-A 3.2 Gen 2 (10Gb/s) 2 x USB-A 3.2 Gen 1 (5Gb/s) 1 x USB-C 3.2 Gen 2 (10Gb/s)
Audio	1 x Headphone Jack (3.5mm) 1 x 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 one of the following: - Flex storage enclosure - Front-access storage enclosure
Disclaimers	Actual USB throughput will vary depending on the type and quantity of USB devices used.

Rear I/O

USB	4 x USB-A 3.2 Gen 1 (5Gb/s)
Audio	1 x Line Out
DisplayPort	2 x Standard DP 1.4 Optional 1 x DP 1.2 (CPU dependent), via flexible I/O port card
HDMI	1 x Standard HDMI 2.0 Optional 1 x HDMI 1.4 (CPU dependent), via flexible I/O port card
Type-C	Optional 1 x USB-C 3.1 Gen 1 (CPU dependent), via flexible I/O port card
VGA Port	Optional 1 x VGA Port (CPU dependent), via flexible I/O port card
Serial Port	Optional 1 x Serial Port
Ethernet	1 x 1GbE - RJ45
PS/2	Optional PS/2 (2 Port)
Optional USB Adapter	Rear USB-C 3.2 Gen 2 PCIe x4 Adapter 2-Port USB 3.0 Adapter
Optional Network Adapter	Bitland RTL8168H Single Port Gigabit Ethernet Adapter Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter Broadcom 5720 Dual Port Gigabit Ethernet Adapter Broadcom 5719 Quad Port Gigabit Ethernet Adapter Intel PCIe WiFi Card With BT External Antenna Kit (AX211)
Disclaimers	Actual USB throughput will vary depending on the type and quantity of USB devices used.

Ethernet

Vendor	Intel Jacksonville I219-LM (w/ AMT 16.x)
Speeds	10/100/1000 Mbps
Functions	PXE, ASF, WOL, Jumbo Frames, Teaming
Connectors	1 x RJ45

Audio

Vendor	Realtek
Type	Integrated Audio
Internal Speaker	Yes, 2W (8 ohms)
Connectors	2 x Front 3.5mm Jacks (Microphone & Headphone) 1 x Rear 3.5mm Jack (Line Out)
Chipset	ALC897Q-CG
Number of Channels	2
Number of Bits/Audio Resolution	2 channels of DAC support 16/20/24-bit PCM format

Thermal

Temp Sensors	Ambient Sensor
Fans	1 x CPU Fan 1 x Front Fan 1 x Rear Fan 2 x Side Panel Fans (optional) 1 x Power Supply Fan (inside PSU)

Power Specifications

Power Supply	1100W	750W	500W
Power Efficiency	92% Efficient @ 50% Load	92% Efficient @ 50% Load	92% Efficient @ 50% Load
Main	C14	C14	C14
Operating Voltage Range	100 - 240V	100 - 240V	100 - 240V
Rated Voltage Range	90-264VAC	90-264VAC	90-264VAC
Rated Line Frequency	50Hz / 60Hz	47Hz / 63Hz	47Hz / 63Hz
Operating Line Frequency Range	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz
Rated Input Current	15A	10A	7A
Graphics	1 x 12VHPWR (16-pin)	1 x 8 pin (6+2)	1 x 8 pin (6+2)
Power Supply Fan	Yes	Yes	Yes
ENERGY STAR® Qualified (config dependent)	Yes	Yes	Yes
80 PLUS Compliant	Yes	Yes	Yes
Built-in Self Test (BIST) LED	No	No	No
Aux Power Drop	Yes	Yes	Yes

BIOS

Vendor	AMI
Self-Healing BIOS	Yes

Chassis Information

Color	Raven Black
PSU	1100W, 750W and 500W Available, Autosensing, 80 PLUS Platinum Qualified for 1100w, 750w and 500w
Dimensions	415mm/16.34" H 370mm/14.57" D 180mm/7.09" W
Weight	13.61 kg / 30.00 lbs

Packaging Dimensions

Height (mm/in)	570mm / 22.44"
Width (mm/in)	315mm / 12.40"
Depth (mm)	500mm / 19.69"
Weight (kgs/lbs)	16.54 kg / 36.46 lbs

Security & Serviceability

TPM	Infineon SLB9672 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 Side Cover Removal
Optical Drive	N/A
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) Non-Operating: -10°C to 65°C (14°F to 149°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 90% (Humidity+EELP)
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	Operating Shock: Half-sine wave, 15G/3ms(X,Y), 30G/3ms(Z) Rack Operating Shock: Half-sine wave, 15G/5ms Non-operating Shock: Trapezoidal wave, 45G/11ms

SECTION II: Platform Detail

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

Motherboard Core

Processor Support	Intel Raptor Lake Core Series
Socket Type	Socket-V (LGA 1700)
Memory Support	DDR5 up to 4400MHz UDIMM Memory (ECC or non-ECC)
Voltage Regulator	125W TDP Capable
Chipset (PCH)	Intel W680 Chipset
Flash	2 x 32MB
Super I/O	Nuvoton NCT6692D
Clock	Intel Native isCLK
Audio	Realtek ALC897Q-CG Codec
Ethernet	Intel Jacksonville I219LM

Supported Components

Processor Level	Intel Raptor Lake – Core
Processor	i9-13900K i9-13900 i7-13700K i7-13700 i5-13600K i5-13600 i5-13500 i5-13400 i3-13100
Memory Type	ECC/non-ECC UDIMMs – 4400MHz
Memory	16GB DDR5 ECC UDIMM PC4-4400 32GB DDR5 ECC UDIMM PC4-4400 8GB DDR5 non-ECC UDIMM PC4-4400 16GB DDR5 non-ECC UDIMM PC4-4400 32GB DDR5 non-ECC UDIMM PC4-4400
Disclaimers	Memory speed dependent on CPU support.

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) 6TB SATA HDD 7200rpm, 6Gb/s, 3.5" (enterprise class)
2.5" SATA Hard Disk Drive (HDD)	1TB SATA HDD 7200rpm, 6Gb/s, 2.5" (FIPS certified) 1TB SATA HDD 7200rpm, 6Gb/s, 2.5" (non-FIPS certified)
M.2 PCIe Solid State Drive (SSD)	256GB M.2 PCIe SSD, Gen 4 x4, NVMe, OPAL 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 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.

Optical Drive/Removable Media

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

Expansion Bays

PCIe Adapters

Network	Bitland RTL8168H Single Port Gigabit Ethernet Adapter Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter Broadcom 5720 Dual Port Gigabit Ethernet Adapter Broadcom 5719 Quad Port Gigabit Ethernet Adapter
Thunderbolt	Rear Thunderbolt PCIe Adapter
USB	USB-C 3.2 Gen 2 PCIe x4 Adapter (Dual Port) USB 3.0 PCIe x1 Adapter (Dual Port)
WiFi Cards	Intel PCIe WiFi Card With BT External Antenna Kit (AX211)
Serial Card	4-Port Serial Expansion Card
PCIe to M.2 Adapter Card	PCIe x4 to M.2 Adapter

SECTION III: Supported Component Detail

CPU Specifications

CPU	Intel Core i9-13900K	Intel Core i7-13700K	Intel Core i5-13600K	Intel Core i9-13900	Intel Core i7-13700	Intel Core i5-13600	Intel Core i5-13500	Intel Core i5-13400	Intel Core i3-13100	Intel Core i3-12100
# of Cores	24c	16c	14c	24c	16c	14c	14c	10c	4c	4c
# of Threads	32	24	20	32	24	20	20	16	8	8
Processor Base Frequency	3.0G Hz	3.4G Hz	3.5G Hz	2.0G Hz	2.1GHz	2.7G Hz	2.5G Hz	2.5G Hz	3.4G Hz	3.5G Hz
Max Turbo Frequency	5.8G Hz	5.4G Hz	5.1GHz	5.6G Hz	5.2G Hz	5.0G Hz	4.8G Hz	4.6G Hz	4.5G Hz	4.3G Hz
Cache	36	30M	24M	36M	30M	24M	24M	20M	12M	12M
TDP	125W	125W	125W	65W	65W	65W	65W	65W	65W	65W

HDD Specifications

Drive	1TB SATA - 7200rpm, 6Gb/s, 2.5"	1TB SATA - 7200rpm, 6Gb/s, 3.5"	2TB SATA - 7200rpm, 6Gb/s, 3.5"	2TB SATA 7200 RPM 6Gb/s 3.5" Enterprise	4TB SATA - 7200rpm, 6Gb/s, 3.5" Enterprise	6TB SATA - 7200rpm, 6Gb/s, 3.5" Enterprise
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/Wri te 156MB/s	Average Data Rate, Read/Wri te 156MB/s	Sustained Data Transfer Rate 215MB/s	Sustained Data Transfer Rate 216-226MB/s	Sustained Data Transfer Rate 216-226MB/s
Spindle Speed (RPM)	7,200	7,200	7,200	7200	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	23(typical)/30(max)	<17.0	<17.0
Average Latency (msec)	4.2	4.16	4.16	4.16	4.16	4.16
Input (VDC)	5	5	5	12/5	5	5
Typical (Watts)	1.9	6.19	6.7	9.19	11.33	1318

Idle (Watts)	0.7	4.6	4.5	4.94	5.45	6.21
Physical Dimensions	69.85mm x 100.34mm x 7mm	101.6mm x 146.99mm x 19.88mm	101.6mm x 146.99mm x 26.1mm	101.6mm x 147mm x 26.1mm	101.85mm x 147mm x 26.1mm	101.85mm x 147mm x 26.1mm
Weight (grams)	90	420	535	620	650	716
Operating (C) Ambient	0 to 60	0 to 60	0 to 60	5 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	80	Read 70 Gs / Write 40 Gs	Read 70 Gs / Write 40 Gs	Read 70 Gs / Write 40 Gs
Non-Operating (Gs @ 2ms)	1000	350	300	300 Gs	300	250

Solid State Storage Specifications

Drive	NVMe 2280 M.2 Value 256GB M.2 NVMe OPAL	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	22 x 80 x 2.38
Interface Type	PCIe Gen 4x4	PCIe Gen 4x4	PCIe Gen 4x4	PCIe Gen 4x4	PCIe Gen 4x4
Power Active (AVG)	5.9W	5.8W	5.8W	5.8W	8W
Power Idle	100 mW	35 mW	35 mW	50mW	50mW
Typical Sequential Read	3100 MB/s	6000 MB/s	6400 MB/s	6400 MB/s	6400 MB/s
Typical Sequential Write	1400 MB/s	3200 MB/s	3800 MB/s	5000 MB/s	5000 MB/s
Burst Random Read (4K Queue Depth 32/8 thread);	330K IOPS	500K IOPS	550K IOPS	550K IOPS	650K IOPS
Burst Random Write (4K Queue Depth 32/8 thread)	280K IOPS	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	0 to 55°C
Endurance Rating (Lifetime Writes)	150 TB	150 TB	300 TB	600 TB	2400TB
Mean Time Between Failures (MTBF)	1.5M POH	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	AES 256 bit

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 – 4GB GDDR6	Quadro T1000 – 8GB GDDR6	NVIDIA RTX A2000(DP x4) – 12GB GDDR6	NVIDIA RTX A4000	NVIDIA RTX A4500	NVIDIA RTX A5500	Quadro RTX A4500
Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCI Express 4.0x16	PCIe 4.0 x16	PCI Express 4.0x16	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 DP 1.4a	DP *4	DP *4	DP *4
Graphics Chipset	TU117-850	TU117-875	GP106-850	GA104-875	PG132 SKU 510	GA102-860	PG132 SKU 510
Memory Clock Frequency (MHz)	5001MH z	5001MH z	6001MH z	7000M Hz	8001MH z	8001MH z	8001MH z
Memory Size	4GB GDDR6	8GB GDDR6	12GB GDDR6	16GB GDDR6	20GB GDDR6	24GB DDR6	20GB GDDR6
Memory Interface	64-bit	128-bit	192-bit	256-bit	320-bit	384-bit	320-bit
Memory Bandwidth	Up to 80GB/s		Up to 160GB/s		Up to 288GB/s		Up to 448GB/s
GPU Cores	CUDA Cores: 384			CUDA Cores: 896		N/A	
GPU Core Frequency (MHz)	420MHz (base)/2 100MHz (max boost)	1065MH z (base)/2 100MHz (max boost)	1493MH z	2100MH z	1065MH z (base)/2 100MHz (max boost)	1080MH z (base)/2 100MHz (max boost)	1065MH z (base)/2 100MHz (max boost)
Maximum Power Consumption	30W	50W	70W	140W	200W	230W	200W
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*43 20*24b pp/120H z (Require s two DisplayP ort 1.4a links and DSC compres sion) HDPC: 2.2 7680 x 4320 x 24 bpp @ 60Hz 7680 x 4320 x 36 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*43 20*24b pp/120H z (Require s two DisplayP ort 1.4a links and DSC compres sion) HDPC: 2.2 7680 x 4320 x 24 bpp @ 60Hz 7680 x 4320 x 36 bpp @ 60Hz	DP1.4a: 7680*43 20*24b pp/120H z (Require s two DisplayP ort 1.4a links and DSC compres sion) HDPC: 2.2	DP1.4a: 7680*43 20*24b pp/120H z (Require s two DisplayP ort 1.4a links and DSC compres sion) 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		5120 x 3200 x 24 bpp @ 60Hz 5120 x 2880 x 24 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	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, HHHH double-slot	4.4" H x 9.5" L Single Slot	9.5 inches, double-slot	10.5 inches, double-slot, 1049g	9.5 inches, double-slot
Advanced Display	Not Available	Not Available	Not Available	Not Available	SYNC 2	SYNC 2	SYNC 2
SLI/NVLink Support	Not Available	Not Available	Not Available	NVLink	NVLink	NVLink	NVLink
Disclaimers							

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	M.2 WiFi module - Intel Wi-Fi 6E AX211 2*2 (6GHz) +BT5.2-vPro CNVi
Supplier PN	I210T1, MM# 941033	I350T2G1P20, MM# 928941	I350T4G1P20, MM# 928942	I218-00934/I218-00933	AX211NGW
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	2.4 Gbps
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	M.2: CNVio2
Data Transfer Mode	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=0.53 W
IEEE Standards Compliance	IEEE 802.3/10BA SE-T, 100BASE-	IEEE 802.3/10BA SE-T, 100BASE-	IEEE 802.3/10BA SE-T, 100BASE-	IEEE 802.1P Layer 2 Priority Encoding	IEEE 802.11a, b, d, e, g, h, i, k, n, r, u, v, w, ac, ax;

	TX, 1000BASE-T	TX, 1000BASE-T	TX, 1000BASE-T	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	Windows 11, 64-bit*, Windows 10, 64-bit*, Linux*, Chrome OS*
Manageability	Supported	Supported	Supported	Supported	
Manageability Capabilities Alerting	Supported	Supported	Supported	Supported	
TDP	Firmware Based Thermal Management	Firmware Based Thermal Management	Firmware Based Thermal Management	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)	0°C to 80°C
# of Ports	1	2	4	1	
Data Rate Per Port	10/100/1000Mb ps (copper)	10/100/1000Mb ps (copper), 1000Mbps (fiber)	10/100/1000Mb ps (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	M.2: CNVio2
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	Yes
Disclaimers					

Ethernet

Model	i210-T1	I350-T2	I350-T4	Bitland BN8E88	Broadco m 5720	Broadco m 5719	M.2 WiFi module
-------	---------	---------	---------	-------------------	-------------------	-------------------	--------------------

				1000M PClex1 noASF - FH/LP	2-Ports PClex1 Gigabit Ethernet Adapter	4-Ports PClex4 Gigabit Ethernet Adapter	- Intel Wi-Fi 6E AX211 2*2 (6GHz) +BT5.2- vPro CNVi
Connector	RJ-45 Copper	2 x Ports RJ-45 Copper	4 x Ports RJ-45 Copper	1 Port RJ- 45	2 Port RJ- 45	4 Port RJ- 45	
Website	i210 T1		i350 T2		i350 T4		IC Datasheet
Auto-Negotiation	IEEE* 802.3* Auto- negotia- tion	IEEE* 802.3* Auto- negotia- tion	IEEE* 802.3* Auto- negotia- tion	Auto- Negotia- tion with Next Page capability	IEEE* 802.3ab Auto- negotia- tion	IEEE* 802.3ab Auto- negotia- tion	
Intel® vPro™	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	
Intel® Stable Image Platform Program (SIPP)	Not Available		Not Available			Not Available	
Intel® Standard Manageability	Supporte d	Supporte d	Supporte d	Not Available	Not Available	Not Available	
Power Optimizer Platform Low-power Management Systems	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	
Energy Efficient Ethernet	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	
TCP/UDP Checksum and Segmentation Offload (IPv4 and IPv6)	Supported		Supported		Supported		Supported
Receive Side Scaling	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	
Dual Tx and Rx Queues	Yes	Yes	Yes	Not Available	Supporte d	Supporte d	
Jumbo Frames (up to 9KB)	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	
Teaming	Supported		Supported		Supported		Supported
Wake from Deep Sx	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	
Server Operating System Support	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SL ES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SL ES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SL ES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SL ES), Free BSD, Xen, Vmware	Windows 11, 64-bit, Windows 10, 64-bit, Linux	Windows 11, 64-bit, Windows 10, 64-bit, Linux	
Network Proxy/ARP Support	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	Supporte d	
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

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 -Certificate-based BIOS Authentication and Management – Phase 2 -BIOS Modification and Event Logging – Phase 1 -Customized BIOS Defaults -BIOS Settings in Intune Settings Catalog -Microsoft Modern (Cloud) Bare Metal Recovery “cBMR” -BIOS Initialization to Factory Default -FIDO2.0 supervised BIOS access
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 v2.78
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

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
--------------	--

Environmentals

Energy Star	ENERGY STAR 8.0
EPEAT	EPEAT Certification Available on Select Models
ErP Lot-3 2013	Yes
Hazardous Substances	GDX Scip control
Materials Used	System 95% PCC recycled plastic front bezel Packaging Carton: 90% Recycled and/or FSC

	certified content3 Cushion: 90% Recycled EPE
TCO Certification	9.0
Disclaimers	EPEAT registered where applicable. EPEAT registration varies by country. See www.epeat.net for registration status by country.