Lenovo PX

Version: 1.0 | 03/09/2023

SECTION I: Platform Overview

Description	Ultimate desktop to data center flexibility The pinnacle of Lenovo technology, the ThinkStation PX goes beyond the limits of desktop performance to enable even the most extreme workflows. Featuring a thermally advanced, rack-optimized chassis co-designed with Aston Martin, this workstation powerhouse runs the most complex computing workloads seamlessly—whether desk-side or in a data center.

CPU

Processor Support	Dual 4th Generation Intel Xeon Scalable Processors
Socket Type	Socket-E (LGA-4677)
Disclaimers	

Operating Systems

Preloaded	Windows 11 Pro 64-bit for Workstation Windows 10 Pro 64-bit for Workstation Windows 10 IOT Ubuntu 22.04 LTS (configuration specific)
Supported	Windows 10 Enterprise Edition Red Hat Enterprise Linux 9.x Ubuntu 22.04 LTS
Disclaimers	

Memory

Slots	Up to 16 DIMMS (8 DIMMs per CPU)
Channels	8 Memory Channels per CPU

Type	DDR5, 288-Pin, ECC RDIMM and 3DS RDIMM*
ECC Support	Yes
Speed	Up to 4800MHz
Max DIMM Size	64GB DDR5 ECC RDIMM 128GB DDR5 ECC 3DS-RDIMM
Max System Memory	2TB
Disclaimers	*Actual Memory Speed is dependent on the CPU.

Storage

Total Bays/Size	Up to 4
SATA	3 x SFF-8680 Receptacles 1 x SATA 3.0 Connectors
PCIe (M.2)	3 x M.2 NVMe 2280 PCIe Connectors Onboard 4 x M.2 NVMe 2280 Front Accessible Drives
Disclaimers	*See Storage Whitepaper for details on the available usage options.

Video

Integrated Graphics	Not Available
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 (CPU 2)
Slot 2	PCIe 4.0 x16, Full Height, Full Length, 75W (CPU 2)
Slot 3	PCIe 5.0 x16, Full Height, Full Length, 75W (CPU 2)
Slot 4	PCIe 5.0 x16, Full Height, Full Length, 75W (CPU 2)
Slot 5	PCIe 4.0 x8, Full Height, Full Length, 25W, Open Ended (CPU 2)
Slot 6	PCIe 5.0 x16, Full Height, Full Length, 75W (CPU 1)
Slot 7	PCIe 4.0 x16, Full Height, Full Length, 75W (CPU 1)
Slot 8	PCIe 5.0 x16, Full Height, Full Length, 75W (CPU 1)
Slot 9	PCIe 4.0 x16, Full Height, Full Length, 75W (CPU 1)
Disclaimers	

Front I/O

USB	1 x USB-A 3.2 Gen 2 (10Gbps) 1 x USB-A 3.2 Gen 2 (10Gbps) (with Always On Charging) 2 x USB-C 3.2 Gen 2 (10Gbps)
Audio	1 x 3.5mm Global Headset Jack (Headphone + Mic in)
Media Card Reader	N/A
Flex Bay	3 x Front access drive bay Rear Flex Storage Enclosure (Shared with 2nd PSU Bay)
Disclaimers	Note: Actual USB throughout will vary depending on the type and quantity of USB devices used.

Rear I/O

USB	2 x USB-A 2.0 (480Mbps) 4 x USB-A 3.2 Gen 1 (5Gbps) 1 x USB-C 3.2 Gen 2x2 (20Gbps)
Audio	2 x Rear (Line Out, Line In retasked as Mic)
DisplayPort	As Supported by GPU
HDMI	As Supported by GPU
Serial Port	Optional 1x Rear Port
Ethernet	1 x 1GbE – RJ45 1 x 10GbE – RJ45
PS/2	Optional PS/2 (2 port) PCIe adapter
Optional Network Adapter	Bitland RTL8168H 1000M PCIe Ethernet Adapter Intel I210-T1 Single Port Gigabit PCIe Ethernet Adapter Intel I350-T2 Dual Port Gigabit PCIe Ethernet Adapter Intel I350-T4 Quad Port Gigabit PCIe Ethernet Adapter Intel AX210 WIFI PCIe Adapter with Internal Antennas
Disclaimers	Note: Actual USB throughout will vary depending on the type and quantity of USB devices used.

Ethernet

Vendor	Aquantia 10 GbE AQC113C-B1-C Intel 1 GbE I219 (Vpro, AMT)
Speeds	10/100/1000/10000Mbps Aquantia AQC113C 10/100/1000Mbps Intel I219
Functions	PXE, WOL, Jumbo Frames ASF, Teaming (Intel only)
Connectors	2 x RJ45
Disclaimers	Note: Network speeds listed are theoretical.

Audio

Vendor	Realtek
Type	HD (2.0)
Internal Speaker	1 x 1.5 watt 4 ohm
Connectors	2 x Rear 3.5mm Jacks (Line Out, Line In retasked as Mic) 1 x Front 3.5mm Global Headset Jack (Headphone + Mic in)
Chipset	Realtek ALC897Q Codec (rear) Realtec ALC4032 (front)
Number of Channels	Rear Audio: 2 Channels Front Audio: 2 Channels
Number of Bits/Audio Resolution	Rear Codec: 10 Channel DAC Supports 16/20/24-bit PCM 2 Stereo ADC Supports 16/20/24-bit PCM Front Codec: One stereo DAC supports 8/16/22.05/24/32/44.1/48/96/176.4/192KHz Sample Rate, 16/24-bit One stereo ADC supports 8/16/22.05/24/32/44.1/48/96KHz Sample Rate, 16/24-bit
Disclaimers	*Note: Audio Codec ALC897Q can support 7.1 channel, but motherboard only has 2 rear jacks – MIC in and Line out, only 2 channel for Line out.

Thermal

Temp Sensors	Ambient Cabled Sensor – Thermistor, MB Header cabled to chassis front bezel PCIe Zone 1 Sensor – Thermistor PCIe Zone 2 Sensor – Thermistor PCIe Zone 3 Sensor – Thermistor PCIe Zone 4 Sensor – Thermistor M.2 Zone 1 Sensor – Thermistor M.2 Zone 2 Sensor – Thermistor MISC Sensor – Thermistor HDD 1 Sensor – I2C Temp Sensor HDD 2 Sensor – I2C Temp Sensor HDD 3 Sensor – I2C Temp Sensor PSU Bay 2 (HDD) Sensor – I2C Temp Sensor
Fans	2 x Front Fans (FRONT_FAN1) – 6-pin blind connect 1 Connector per 2 Fans 1 x Front Fan (FRONT_FAN2) – 4-pin blind connect 1 Connector per 1 Fans 1 x Front Fan (FRONT_FAN3) – 4-pin blind connect 1 Connector per 1 Fans 2 x Rear Fans (REAR_FAN1) – 6-pin blind connect 1 Connector per 2 Fans 1 x CPU 1 Fan (CPU1_FAN) – 4-pin header with 3-pin key 1 x CPU 2 Fan (CPU2_FAN) – 4-pin header with 3-pin key 1 x PSU HDD Fan (PSU_HDD_FAN) – PSU Edge Connector 3 x HDD Fans (HDD_FAN_X) – 4-pin header with 3-pin key 2 x PSU1 Fans – internal of PSU 2 x PSU2 Fans – internal of PSU 1 x CPU1 Memory Fan – CPU1_Pump_DDR – 4-pin header with 3-pin key 1 x CPU2 Memory Fan – CPU2_Pump_DDR – 4-pin header with 3-pin key
Disclaimers	

Power Specifications

Power Supply	1850 watts
Power Efficiency	92% Efficient @ 50% Load
Main	C20
Operating Voltage Range	100 – 240V (autosensing)
Rated Voltage Range	90-264VAC
Rated Line Frequency	47Hz / 63Hz
Operating Line Frequency Range	50Hz / 60Hz
Rated Input Current	13 – 20A
Graphics	Up to 8 x 8-pin (6+2) PCIe*
Power Supply Fan	Yes
ENERGY STAR® Qualified (config dependent)	Yes
80 PLUS Compliant	Yes
Built-in Self Test (BIST) LED	Yes
Disclaimers	*Quantity of Graphics power cables is configuration dependent *See Power Configuration Whitepaper for additional details.

BIOS

Vendor	AMI
Disclaimers	

Chassis Information

Color	Storm Gray
PSU	One Fixed 1850W, Autosensing, 92% PSU, 80 PLUS Platinum Qualified Optional: 2nd 1850W, Autosensing, 92% PSU, 80 PLUS Platinum Qualified
Thermal Solutions	2 Rear Fans 4 Front Fans 1 Fan per storage bay 1 Fan per CPU 2 Fans per PSU Memory Fans (configuration dependent)
Dimensions	434.4mm/17.1″ H (without feet) 440.4mm/17.3″ H (with feet) 575mm/22.6″ D 220mm/8.7″ W
Weight	35.6 kg / 78.48 lbs
Disclaimers	

Packaging Dimensions

Height (mm/in)	658mm / 25.91″
Width (mm/in)	397mm / 15.63″
Depth (mm/in)	802mm / 31.57″
Weight (kgs/lbs)	40.135 kg / 88.48 lbs
Disclaimers	

Security & Serviceability

TPM	Infineon SPI TPM SLB9672 TPM 2.0
Asset ID	Yes, 1024 x 8bit
vPro	Yes
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	Yes
Boot Sequence Control	Yes
Padlock Support	No
Boot Without Keyboard and/or Mouse	Yes
Access Panel	Tool-less Side Cover Removal
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 Download Recovery Service or available through Lenovo Support.
Disclaimers	*Note: CPU Heatsink assembly requires a T30 bit.

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: 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	Upper limits decrease 1°C (1.8°F) per 300 m (1000 ft) above sea level
Vibration	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: X,Y axis: +- 15G/3ms Z axis: +- 30G/3ms Operating (Rack mounted): X,Y,Z axis: +- 15G/3ms Non-operating target: Trapezoidal shock, 35g average, 11ms
Disclaimers	

SECTION II: Platform Detail

Board Size	16.26" x 15.43" (413mm x 392mm)
Layout	Lenovo Custom Extended ATX
Disclaimers	

Motherboard Core

Processor Support	Intel Sapphire Rapids – Xeon Scalable Processors (Platinum, Gold, Silver)
Socket Type	Socket E (LGA 4677)
Memory Support	DDR5 up to 4800MHz RDIMM / 3DS RDIMM Memory
CPU-CPU Interconnect	Intel UPI v2.0, 3 links, x24, at speeds 12.8GT/s, 14.4GT/S and 16GT/s
Voltage Regulator	Intel VR14.0 – 400W TDP Capable
Chipset (PCH)	Intel Emmitsburg (Intel C741 Series)
Flash	2 x 64MB
Super I/O	2 x MEC1723(176 pin)
Clock	External Clock
Audio	Rear Codec: Realtek ALC897Q (Rear I/O) Front Codec: Realtek ALC4032 (FPIO)
Ethernet	Aquantia 10Gb AQC113C-B1-C

	Intel 1Gb I219

Supported Components

Processor Level	Intel Xeon Platinum
Processor	Intel XEON Sapphire Rapids Platinum 8490H Intel XEON Sapphire Rapids Platinum 8468
Memory Type	RDIMMs – 4800MHz, CPU Dependent
Memory	16GB DDR5 ECC RDIMM PC5-4800 32GB DDR5 ECC RDIMM PC5-4800 64GB DDR5 ECC RDIMM PC5-4800
Disclaimers	Additional CPU SKUs certified

Storage

3.5″ SATA Hard Disk Drive (HDD)	2TB SATA – 7200rpm, 6Gb/s, 3.5″ 6TB SATA – 7200rpm, 6Gb/s, 3.5″ (Enterprise Class) 12TB SATA – 7200rpm, 6Gb/s, 3.5″ (Enterprise Class)
M.2 PCIe Solid State Drive (SSD)	512GB M.2 PCIe – SSD, 2280, Gen4 (x4), NVMe, TLC, OPAL2.0 1024GB M.2 PCIe – SSD, 2280, Gen4 (x4), NVMe, TLC, OPAL2.0 2048GB M.2 PCIe – SSD, 2280, Gen4 (x4), NVMe, TLC, OPAL2.0 4096GB M.2 PCIe – SSD, 2280, Gen4 (x4), NVMe, TLC, OPAL2.0
Disclaimers	Additional Storage devices certified.

RAID

RAID Requirements	M.2 and SATA RAID via Intel VROC Controller
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.
Intel VROC	Intel Virtual RAID On CPU (VROC) – Basic, Supports 0/1/10 Intel Virtual RAID On CPU (VROC) – Premium, Supports 0/1/5/10
Disclaimers	*NOTE: Some features available after launch
Disclaimers	

Keyboard and Pointing Devices

Keyboard	USB Traditional Keyboard PS/2 Tradition Keyboard Smart Card Keyboard USB Calliope Keyboard

Pointing Devices	USB Fingerprint Mouse USB Calliope Mouse PS/2 Black Optical Mouse
Disclaimers	

Expansion Bays

5.25" External Access Bays	3 x Front access drive bays 1 x Rear PSU bay storage enclosure (Utilizes 2nd PSU bay)*
Disclaimers	See Storage Configuration whitepaper for detailed usage *Only available on single PSU configurations

PCIe Adapters

Network	Bitland RTL8168H 1000M PCIE Ethernet Adapter Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter Intel I350-T4 Quad Port Gigabit Ethernet Adapter
WiFi Cards	Intel PCIe WiFi Card With BT Internal Antenna Kit (AX210 6E)
PS/2	PS/2 (2-Port) PCIe adapter
Com port	Serial COM port cable with 5V transceiver

SECTION III: Supported Component Detail

CPU Specifications

CPU	Xeon Platinum 8490H	Xeon Platinum 8468	Xeon Gold 6430	Xeon Gold 5420+	Xeon Gold 5416S	Xeon Silver 4416+	Xeon Silver 4410Y	Xeon Silver 4410T
# of Cores	60	48	32	28	16	20	12	10
# of Threads	120	64	56	32	40	24	20	
Processor Base Frequency	1.9GHz	2.10GHz	2.10GHz	2.00GHz	2.00Ghz	2.00GHz	2.0GHz	2.70GHz
Max Turbo Frequency	3.50GHz	3.80GHz	3.40GHz	4.10GHz	4.00Ghz	3.90GHz	3.90GHz	4.0GHz
Cache	112.5MB	105MB	60MB	52.5MB	30MB	37.5MB	30MB	26.25MB
TDP	350W	350W	270W	205W	150W	165W	150W	150W

Intel ARK Spec Link	Xeon Platinum 8490H	Xeon 8468	Xeon Gold 6430	Xeon Gold 5420+	Xeon Gold 5416S	Xeon Silver 4416+	Xeon Silver 4410Y	Xeon Silver 4410T
Disclaimers								

HDD Specifications

Drive	2TB SATA – 7200rpm, 6Gb/s, 3.5″	Enterprise 6TB SATA – 7200rpm, 6Gb/s, 3.5″	Enterprise 12TB SATA – 7200rpm, 6Gb/s, 3.5″
3.5″ SATA Hard Disk Drive (HDD)	Yes	Yes	Yes
2.5″ SATA Hard Disk Drive (HDD)	Not Available		
Connector	SATA		
Transfer Rate (Gb/sec)	Average data rate, read/write 156MB/s		
Spindle Speed (RPM)	7,200		
DC Power to Drive Ready (sec)	<17.0		
Average Latency (msec)	4.16		
Input (VDC)	5		
Typical (Watts)	6.7		
Idle (Watts)	4.5		
Physical Dimensions	101.6mm x 146.99mm x 26.1mm		
Weight (grams)	535		
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)	80		
Non-Operating (Gs @ 2ms)	300		
Disclaimers			

Solid State Storage Specifications

Drive	512GB NVMe M.2 SSD TLC	1024GB NVMe M.2 SSD TLC	2048GB NVMe M.2 SSD TLC	4096GB NVMe M.2 SSD TLC
Dimensions Millimeters (W x D x H)	22 x 80 x 2.3	22 x 80 x 2.3	22 x 80 x 2.3	22 x 80 x 2.3
Interface Type	PCIe Gen 4.0 x4 NVMe	PCIe Gen 4.0 x4 NVMe	PCIe Gen 4.0 x4 NVMe	PCIe Gen 4.0 x4 NVMe
Power Active (AVG)	5W	5W	5W	5W

Power Idle	50mW	50mW	50mW	50mW
Typical Sequential Read	6000MB/s		6400 MB/s	
Typical Sequential Write	3200MB/s		3800MB/s	
Burst Random Read (4K Queue Depth 32/8 thread);	500K IOPS		550K IOPS	
Burst Random Write (4K Queue Depth 32/8 thread)	370K IOPS		400K IOPS	
Operating Temperature Range	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Endurance Rating (Lifetime Writes)	150TB		300TB	
Mean Time Between Failures (MTBF)	2.0M POH	2.0M POH	2.0M POH	2.0M POH
Hardware Encryption	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit
Disclaimers	SSD performance measured with Crystal Disk Mark version 6.0.2 with the default 1000 MB data set. Sequential measurements are with 1 Thread, Queue-Depth 32. Random measurements are with 4 threads and queue-depth 32.			

HDD Controllers

PCI Bus	PCH Integrated
PCI Modes	SATA 3.0
RAID Levels	0/1/5/10
Data Transfer Rates	6Gb/s
Internal Connectors	2 x MiniSAS HD (2 ports each) + 3 x SATA
Disclaimers	

Optical Drive Specifications

Operating Systems Supported	Windows 10 Pro for Workstations (Preload) Windows 7 Pro 64 Red Hat Enterprise Linux 7.3 Ubuntu 16.04 and 18.04.2
Temperature	10° – 35°C (50° – 95°F)
Relative Humidity	10%-80% (non-condensing)
Maximum Wet Bulb Temperature	25°C max
Disclaimers	
Disclaimers	

Discrete Graphics Adapter

Adapter	T400	T1000	RTX A2000	RTX A4000	RTX A4500	RTX A5000	RTX A5500	RTX A6000
Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 4.0 x16	PCIe 4.0 x16	PCIe 4.0 x16	PCIe 4.0 x16	PCIe 4.0 x16	
Display Interface	3 x mDP 1.4	4 x mDP 1.4	4 x DP 1.4a	4 x DP 1.4a	4 x DP 1.4	4 x DP 1.4a	4 x DP 1.4a	
Graphics Chipset	Turing	Turing	Ampere	Ampere	Ampere	Ampere	Ampere	
Memory Clock Frequency (MHz)	2000MHz							
Memory Size	2GB GDDR6	4GB GDDR6	6GB/12 GB GDDR6	16GB GDDR6	20GB GDDR6	24GB GDDR6	48GB GDDR6	
Memory Interface	64-bit	128-bit	192-bit	256-bit	320-bit	384-bit	384-bit	
Memory Bandwidth	80GB/s	160GB/s	288GB/s	448 GB/s	640GB/s	Up to 768GB/s	Up to 768GB/s	
GPU Cores	CUDA Cores: 384	CUDA Cores: 896	CUDA Cores: 3328 Tensor Cores: 104 RT Cores: 26	CUDA Cores: 6411 Tensor Cores: 192 RT Cores: 48	CUDA Cores: 7,168 Tensor Cores: 224 RT Cores: 56	CUDA Cores: 8,192 Tensor Cores: 256 RT Cores: 64	CUDA Cores: 10,752 Tensor Cores: 336 RT Cores: 84	
Maximum Power Consumption	30W	50W	70W	140W	200W	230W	300W	
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	4 x 4096×2160 @ 120Hz 4 x 5120×2880 @ 60Hz 2 x 7680×4320 @ 60Hz	4 x 4096×2160 @ 120Hz 4 x 5120×2880 @ 60Hz 2 x 7680×4320 @ 60Hz	4 x 4096×2160 @ 120Hz 4 x 5120×2880 @ 60Hz 2 x 7680×4320 @ 60Hz	4 x 4096×2160 @ 120Hz 4 x 5120×2880 @ 60Hz 2 x 7680×4320 @ 60Hz	4 x 4096×2160 @ 120Hz 4 x 5120×2880 @ 60Hz 2 x 7680×4320 @ 60Hz			
Thermal Solution	Active	Active	Active	Active	Active	Active	Active	
Dimension	2.7" H x 6.1" L Single Slot	2.7" H x 6.1" L Single Slot	2.7" H x 6.6" L, Dual slot	4.4" H x 9.5" L Single Slot	4.4" H x 10.5" L Dual Slot, Full Height	4.4" H x 10.5" L Dual Slot, Full Height	4.4" H x 10.5" L Dual Slot, Full Height	
Advanced Display	Not Available	SYNC 2	SYNC 2	SYNC 2	SYNC 2			
SLI/NVLink Support	Not Available	NVLink	NVLink	NVLink				
Disclaimers								

Intel® Ethernet Specifications

Card	Intel I210-T1 Single	Intel I350-T2 Dual	Intel I350-T4 Quad	Intel X550-T2 Dual	Intel X710-DA2	Intel Ethernet SFP+ SR	Intel AX210 Wifi 6E

	Port Gigabit Ethernet Adapter (Springville)	Port Gigabit Ethernet Adapter (Stony Lake T2)	Port Gigabit Ethernet Adapter (Stony Lake T4)	Port Copper 10Gb Ethernet Adapter	Dual Port Fiber 10Gb Ethernet Adapter	Optics Module	
Supplier PN	I210T1, MM# 941033	I350T2G1P20, MM# 928941		I350T4G1P20, MM# 928942	MM# 952103	MM#: 941243	
Data Rates Supported	10/100/1000 Mbps copper	10/100/1000 Mbps (Copper), 1000Mbps (Fiber)		10/100/1000 Mbps (Copper), 1000Mbps (Fiber)	1GbE/10GbE Optical fiber 10GbE Direct Attach (DAC)	Not Available	
Controller Details	Intel® Ethernet Controller I210	Intel Ethernet Controller I350		Intel Ethernet Controller I351	Intel Ethernet Controller X710-AM2	Not Available	
Controller Bus Architecture	PCIe 2.1 (5GT/s)	PCIe 2.1 (5GT/s)		PCIe 2.1 (5GT/s)	PCIe 3.0 (8GT/s)	Not Available	
Data Transfer Mode	Ethernet	Ethernet		Ethernet	Ethernet	Not Available	
Power Consumption	0.81W	Copper: I350-T2 V2= 4.4W Fiber: I350-F2= 5.5W		Copper: I350T4V2= 5W LC-Fiber: I350F4= 6W	Dual-port 10GBASE-SR= 4.3W typ/4.8W max Dual-port 1000BASE-SX= 4W typ/4.3W max Dual-port 10GBASE-LR= 4.5W typ/ 5.1W max Dual-port Direct Attach (Twinax)= 3.3W typ/3.7W max	Not Available	
IEEE Standards Compliance	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T		IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T	IEEE 802.3 1/1010GBASE-SR/LR, SFF-8431 10GSFP+DAC	Not Available	
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	PXE boot, Intel iSCSI Remote Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI	Not Available	

Network Transfer Mode (Full/Half Duplex)	Supported	Supported	Supported	Supported	Not Available
Network Transfer Rate	1,000Mbps Full Duplex	1,000Mbps Full Duplex	1,000Mbps Full Duplex	1,000Mbps Full Duplex	Not Available
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	Windows 2008, 2012; RHEL 6.5/7.0, FreeBSD 9/10, Vmware ESXi 5.x	Not Available
Manageability	Supported	Supported	Supported	Supported	Not Available
Manageability Capabilities Alerting	Supported	Supported	Supported	Supported	Not Available
TDP	Firmware Based Thermal Managemen t	Firmware Based Thermal Managemen t	Firmware Based Thermal Managemen t	Not Available	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 to 55°C (32°F to 131°F)	Not Available
# of Ports	1	2	4	2	Not Available
Data Rate Per Port	10/100/1000 Mbps (copper)	10/100/1000 Mbps (copper), 1000Mbps (fiber)	10/100/1000 Mbps (copper), 1000Mbps (fiber)	1Gbps, 10Gbps	Not Available
System Interface Type	PCIe Gen 2.1	PCIe Gen 2.1	PCIe Gen 2.1	PCIe 3.0	Not Available
NC Sideband Interface	Not Available	Not Available	Not Available	Yes	Not Available
Jumbo Frames Supported	Yes	Yes	Yes	Yes	Not Available
1000Base-T	Yes	Yes	Yes	Not Available	Not Available
IEEE 1588	Supported	Supported	Supported	Supported	Not Available
Supported Under vPro	Not Available	Not Available	Not Available	Not Available	Not Available
Disclaimers					

Ethernet

Model	i210-T1	Dual Port Copper= I350-T2V2 Dual Port LC-Fiber= I350-F2	Dual Port Copper= I350-T4 V2 Dual Port LC-Fiber= I350-F4	X710-DA2	AC 7260 NGW
Connector	RJ-45 Copper	2 x Ports RJ-45 Copper	4 x Ports RJ-45	2 x SFPs Receptable	2 x Antennas

		or 2 x Ports LC-Fiber	Copper or 4 x Ports LC-Fiber		
Website	i210 T1	i350 T2/F2	i350 T4/F4	x710 DA2	7260 NGW
Auto-Negotiation	IEEE* 802.3* Auto-negotiaton	IEEE* 802.3* Auto-negotiaton	IEEE* 802.3* Auto-negotiaton	IEEE* 802.3* Auto-negotiaton	Not Available
Intel® vPro™	Not Available	Not Available	Not Available	Not Available	Supported
Intel® Standard Manageablity	Supported	Supported	Supported	Supported	Not Available
Power Optimizer Platform Low-power Management Systems	Supported	Supported	Supported	Supported	Supported
Energy Efficient Ethernet	Supported	Supported	Supported	Supported	Not Available
TCP/UDP Checksum and Segmentation Offload (IPv4 and IPv6)	Supported	Supported	Supported	Supported	Not Available
Receive Side Scaling	Supported	Supported	Supported	Supported	Not Available
Dual Tx and Rx Queues	Yes	Yes	Yes	Yes	Not Available
Jumbo Frames (up to 9KB)	Supported	Supported	Supported	Supported	Not Available
Teaming	Not Available	Supported	Supported	Supported	Not Available
Wake from Deep Sx	Supported	Supported	Supported	Not Available	Not Available
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	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware	Windows 2008, 2012; RHEL 6.5/7.0, FreeBSD 9/10, Vmware ESXi 5.x	Not Available
Network Proxy/ARP Support	Supported	Supported	Supported	Supported	Not Available
Disclaimers					

Media Card Reader

Disclaimers	

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
FW Resiliency 2.0	Compliant With NIST 800-193, EC Root of Trust providing 'protection', 'detection', and 'recovery' of UEFI code and data, EC FW, TPM FW and CSME FW.
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 Password, System Management Password and Power-On Password can Protect Boot and ROM-based Setup – Support Electronic Lock – Enhanced Tamper Protection – UEFI Secure Boot Support – HDD Password Can Protect HDD Data – BIOS signing with Hardware Security Module (HSM). – Intel BIOS Guard and Boot Guard support – Windows UEFI Firmware Update Support – Certificate Based Bios Authentication & Management use certificate-based authentication to replace current use of SVP for authentication, it is also called "passwordless" mode. – BIOS Modification and Event Log defines the BIOS setup configuration and boot tracking metrics and measurements that are required to provide insight into the health of a device – System Deployment mode

	– Subscription Certificate Storage provides a security interface for uses to store their certificates. – Odometer can provide includes some metrics that are defined by each component to indicate its current status or history. – Secure Wipe can secure erease HDD data. – Support HTTPS boot – Secure Boot Key Management Allows user to customize Secure Boot Keys. – Optional Access Panel Lock, Kensington Lock, and Pad Lock
BIOS Initialization to Factory	Support BIOS Setup option to initialize overall BIOS storage to the manufacturing default state, including all BIOS settings and internal data.
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 11 Ready	Supports Windows 11 Requirements for Secure Flash, UEFI v 2.6 Device Guard Support Spec

Industry Standard Specification Support

UEFI	Unified Extensible Firmware Interface v2.9
UEFI PI	UEFI Platform Initialization Specification 1.7A
ACPI (Advanced Configuration and Power management Interface)	Advanced Configuration and Power Interface v6.4
ASF 2.0	DMTF Alert Standard Format Specification v2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6)
CD Boot	El 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 Revision 5.0, Version 1.0
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
SMBIOS	DMTF System Management Spec v3.3
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	• 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), hydrochlorofluorcarbons (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/cmÂ²/week REACH Article 33 information about substances in articles is available at: http://www.lenovo.com/social_responsibility/us/en/ThinkGreen_products.html#environment
Batteries	Not Available
Safety, EMC Connection to the Telephone Network and Labeling	Not Applicable, no Connection to a Telephone Network

Acoustic Noise Emissions Declaration

Safety, EMC Connection to the Telephone Network and Labeling

Regulations & Standards

EMC & Safety	US/CANADA FCC/IC DoC Japan VCCI Taiwan BSMI AS/NZS RCM EU CE DoC UK UKCA DoC US/CANADA UL/CUL German UL-GS IEC62368-1 CB Report/Certificate Suadi Arabia SIRC Kuwait KUCAS UAE EQM China CCC Singapore PSB South Africa LOA Russia-EAC Morocco-CM Mexico-NOM Kazakhstan-EAC Belarus-EAC Serbia KVALITET Ukraine UKrCEPRO

	India-BIS USA Chemical Emission Test

Environmentals

Energy Star	ENERGY STAR® v8.0
EPEAT	EPEAT Gold
Greenguard	Yes
RoHS	RoHS Compliant
ErP Lot-3 2013	Yes
Hazardous Substances	• 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), hydrochlorofluorcarbons (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/cm_/week
Disclaimers	EPEAT registered where applicable. EPEAT registration varies by country. See www.epeat.net for registration status by country.