

# Lenovo ThinkStation P620

Version: 2.0 | 03/08/2022

## Downloads

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Hardware Maintenance Manual	<a href="#">P620 HMM</a>
Drivers & Software	<a href="#">P620 Drivers &amp; Software</a>

## SECTION I: Platform Overview

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Description	Introducing the new ThinkStation P620. The first ever AMD Ryzen Threadripper PRO powered workstation offers stunning performance with up to 64 cores and up to 4.0GHz. Perfect for those who demand more power for today's multithreaded applications, the P620 combines Lenovo's legendary reliability and customer driven innovation with professional manageability and enterprise-class support.
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## CPU

Processor Support	AMD Castle Peak Workstation Processor
Socket Type	Socket-SP3 (SM-LGA)
Disclaimers	Threadripper Pro CPUs support AMD vendor lock.

## Operating Systems

Preloaded	Windows 10 Pro 64-bit Ubuntu 20.04 LTS (configuration specific)
Supported	Ubuntu 20.04 LTS Red Hat Enterprise Linux 8.3

Disclaimers

Note: 1TB of system memory is not currently supported with AMD Threadripper Pro 5000 series CPU's.

## Memory

Slots	Up to 8 DIMMs
Channels	Supports up to 8 DIMM Sockets, 8 Channels
Type	288-Pin, 3200MHz ECC RDIMM
ECC Support	Yes
Speed	Up to 3200MHz
Max DIMM Size	128GB
Max System Memory	1TB

## Storage

Total Bays/Size	4 x 3.5"
SATA	6 x SATA Connectors, Gen 3
PCIe	2 x M.2 PCIe Connectors Onboard, Gen 4 Additional M.2 NVMe Drives Supported by Single Adapters
eSATA	1 x eSATA Connector, Gen 3
Disclaimers	Additional parts/enclosures may be required for some configurations

## 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, Without Latch
Slot 2	PCIe 4.0 x8, Full Height, Full Length, 25W, Open-Ended
Slot 3	PCIe 4.0 x16, Full Height, Full Length, 75W, With Latch
Slot 4	PCIe 4.0 x16, Full Height, Full Length, 75W, With Latch
Slot 5	PCIe 4.0 x16, Full Height, Full Length, 75W, With Latch

Slot 6

PCIe 4.0 x8, Full Height, Full Length, 25W, Open-Ended

## Front I/O

USB	2 x USB 3.2 Gen 2 Type-C (15W) 20Gb/s 1 x USB 3.2 Gen 2 Type-A (11W) 10Gb/s 1 x USB 3.2 Gen 2 Type-A 10Gb/s
Audio	1 x Front Stereo + MIC Headset
Media Card Reader	Optional: Front 15-in-1 Media Card Reader supporting SD-UHS-II (requires Flex module)
Flex Bay	Flex Bay: Supports One 5.25" Flex Bay With Several Options Integrated <ul style="list-style-type: none"> <li>• Up to One 5.25" Slim ODD Cages</li> <li>• Up to One 5.25" Slim ODD and HDD Cage (FBSE)</li> <li>• Up to One Front Access Storage Enclosure (FASE)</li> <li>• Up to One Flex Module for One or More of the Following Options: <ul style="list-style-type: none"> <li>- 9.0mm Optical/15-in-1 USB 3.1 Gen 1 Reader/Front USB 3.1 Gen 1 Type-C/Front eSATA</li> </ul> </li> </ul> Note: <ol style="list-style-type: none"> <li>1. Only one 15-in-1 media card reader can be supported.</li> <li>2. Only one USB 3.1 Gen 1 Type-C cable can be supported.</li> <li>3. Only one front eSATA cable can be supported.</li> </ol>
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 2 x USB 2.0 Type-A 480Mb/s
Audio	3 x Rear (Line Out, Line In, MIC); Retaskable to 5.1
DisplayPort	As Supported by GPU
HDMI	As Supported by GPU
DVI	As Supported by GPU
VirtualLink	As Supported by GPU
VGA Port	As Supported by GPU
Serial Port	Optional 1 x Rear Port
Ethernet	1 x 10GbE - RJ45
PS/2	2 x PS/2
IEEE 1394	Not Available
eSATA	Optional PCIe Bracket
Parallel Port	Not Available
Optional USB Adapter	Not Available
Optional Network Adapter	Aquantia Single Port 10G Ethernet Adapter PCI-E 1 x WiFi Card With BT HP External Antenna Kit (9260 AC)
Disclaimers	Note: Actual USB throughput will vary depending on the type and quantity of USB devices used.

## Ethernet

Vendor	Marvell AQC107 10G Ethernet
Speeds	10G/5G/2.5G/1G/100Mbps
Functions	PXE, ASF, WOL, Jumbo Frames, Teaming
Connectors	1 x RJ45

## Audio

Vendor	Realtek
Type	HD (5.1)
Internal Speaker	Yes
Connectors	3 x Rear 3.5mm Jacks (Line In, Line Out, Microphone In)
Chipset	ALC4050
Number of Channels	6 (rear) + 2 (front)
Number of Bits/Audio Resolution	6 Channel DAC supports 16/20/24 bit PCM Stereo ADC supports 16/20 bit PCM

## Thermal

Temp Sensors	CPU VR Sensor - Thermal Diode - Connected to Super I/O PCI Zone 1 Sensor - Thermal Thermistor - Connected to Super I/O PCI Zone 2/Chipset Sensor - Thermal Thermistor - Connected to Super I/O PCI Zone 3 Sensor - Thermal Diode - Connected to Super I/O M.2 Sensor - Thermal Thermistor - Connected to Super I/O Ambient Cabled Sensor - Thermal Diode - Connected to Super I/O PSU Thermal Sensor - Thermal Thermistor - Connected to Super I/O
Fans	2 x CPU Fan 4-pin Header With 3-pin Key 1 x Rear System Fan 4-pin Header With 3-pin Key 1 x Front System Fan 4-pin Header With 3-pin Key 2 x ODD Bay Fan 4-pin Header With 3-pin Key (optional) 2 x Memory Fan 4-pin Header with 3-pin Key 1 x PSU Fan Main PSU Power Connector

## Power Specifications

Power Supply	1000W
Power Efficiency	92% Efficient @ 50% Load
Main	C14
Operating Voltage Range	100 - 240V
Rated Voltage Range	90-264VAC
Rated Line Frequency	47Hz / 63Hz

Operating Line Frequency Range	50Hz / 60Hz
Rated Input Current	9A-15A
Graphics	2 x 8 pin (6+2) 2 x 6 pin
Power Supply Fan	Yes
ENERGY STAR® Qualified (config dependent)	Yes
80 PLUS Compliant	Yes
Built-in Self Test (BIST) LED	Yes
Aux Power Drop	Yes

## BIOS

Vendor	AMI
Self-Healing BIOS	Yes

## Chassis Information

Color	Graphite Black
PSU	1000W Available, Autosensing, 92% PSU, 80 PLUS Platinum Qualified
Thermal Solutions	Two System Fans Standard (1 front, 1 rear), One PSU Fan, Two CPU Fans, Two MEM Fans
Dimensions	440mm/17.3" H 460mm/18.1" D 165mm/6.5" W
Weight	24kg / 52.9lbs

## Packaging Dimensions

Height (mm/in)	575mm / 22.64"
Width (mm/in)	302mm / 11.89"
Depth (mm)	580mm / 22.83"
Weight (kgs/lbs)	27.48kg / 60.58lbs
Disclaimers	Note: Actual Weight of the packaging will depend on the system configuration.

## Security & Serviceability

TPM	Infineon SLB9670 TPM 2.0
Asset ID	Yes, 1024 x 8bit
vPro	NA
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	Unique Key Lock Kit - Optional Common Key Lock Kit - Optional
Boot Sequence Control	Yes
Padlock Support	Not Supported
Boot without keyboard and/or mouse	Yes
Access Panel	Tool-less Side Cover Removal
Optical Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Retained With Screws
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: 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 ( $\pm X, \pm Y, \pm Z$ )
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, 35G, 11ms, 6 Sides (+X, -X, +Y,-Y, +Z, -Z), Filter 300Hz, Each Side Shock One Time

## SECTION II: Platform Detail

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Board Size	13.44" x 9.96" (341.5mm x 253mm)
Layout	Custom ATX

## Motherboard Core

Processor Support	AMD Castle Peak Workstation processor
Socket Type	Socket-SP3 (SM-LGA)
Memory Support	DDR4 up to 3200MHz RDIMM Memory
CPU-CPU Interconnect	N/A
Voltage Regulator	IR35204MTRPBF+TDA21475 IR35201MTRPBF+TDA21475
Chipset (PCH)	AMD 2019 Premium Chipset BXB-B
Flash	32MB
Super I/O	Nuvoton NCT6686D-L
Clock	AMD Integrated Clock
Audio	Realtek ALC4050H Codec on Motherboard Realtek ALC4050 on Front Panel I/O
Ethernet	Marvell AQC10710Gb DASH

## Supported Components

Processor Level	Castlepeak	Chagall
Processor	AMD Threadripper Pro 3945WX 4.0GHz/12C/64M/3200/280W AMD Threadripper Pro 3955WX 3.9GHz/16C/64M/3200/280W AMD Threadripper Pro 3975WX 3.5GHz/32C/128M/3200/280W	AMD Ryzen Threadripper Pro 5945WX 4.1GHz/12C/64M/3200/280W AMD Ryzen Threadripper Pro 5955WX 4.0GHz/16C/64M/3200/280W AMD Ryzen Threadripper Pro

	AMD Threadripper Pro 3995WX 2.7GHz/64C/256M/3200/280W	5965WX 3.8GHz/24C/128M/3200/280W AMD Ryzen Threadripper Pro 5975WX 3.6GHz/32C/128M/3200/280W AMD Ryzen Threadripper Pro 5995WX 2.7GHz/64C/256M/3200/280W
Memory Type	RDIMMs - 3200MHz	-
Memory	16GB DDR4 ECC RDIMM PC4-3200 32GB DDR4 ECC RDIMM PC4-3200 64GB DDR4 ECC RDIMM PC4-3200 128GB DDR4 ECC 3DS RDIMM PC4-3200	-
Disclaimers	P620 fully supports AMD's PSB (Platform Secure Boot) security feature. As a result of this, Threadripper Pro CPUs used in P620 are fused to Lenovo's BIOS signing key and will only work in Lenovo platforms.	P620 fully supports AMD's PSB (Platform Secure Boot) security feature. As a result of this, Threadripper Pro CPUs used in P620 are fused to Lenovo's BIOS signing key and will only work in Lenovo platforms.

## 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)
M.2 PCIe Solid State Drive (SSD)	"256GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL 512GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL 1024GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL 2048GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL 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	M.2 RAID via AMD CPU - supports RAID 0, 1 SATA RAID via Onboard AMD SATA Controller - supports 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	DVD-ROM, 9.0mm Slim, SATA
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DVD Burner/CD-RW Drive	DVD Burner/CD-RW Rambo, 9.0mm Slim, SATA
Blu-Ray Burner Drive	Blu Ray Burner w/AACS encryption, 9.0mm Slim, SATA
Media Card Reader Specifications	Optional Front USB 3.0 15-in-1 Media card reader supporting SD UHS-II (requires Flex module)

## Keyboard and Pointing Devices

Keyboard	Traditional USB Keyboard Traditional PS/2 Keyboard Smart Card USB Keyboard Calliope USB Keyboard
Pointing Devices	Calliope USB Mouse Lenovo USB Laser Mouse Fingerprint USB Mouse PS/2 Optical Mouse

## Expansion Bays

5.25" External Access Bays	<p>Flex Bay: Supports One 5.25" Flex Bay With Several Options Integrated</p> <ul style="list-style-type: none"> <li>• Up to One 5.25" Slim ODD Cages</li> <li>• Up to One 5.25" Slim ODD and HDD Cage (FBSE)</li> <li>• Up to One Front Access Storage Enclosure (FASE)</li> <li>• Up to One Flex Module for One or More of the Following Options: <ul style="list-style-type: none"> <li>- 9.0mm Optical/15-in-1 USB 3.1 Gen 1 Reader/Front USB 3.1 Gen 1 Type-C/Front eSATA</li> </ul> </li> </ul> <p>Note:</p> <ol style="list-style-type: none"> <li>1. Only one 15-in-1 media card reader can be supported.</li> <li>2. Only one USB 3.1 Gen 1 Type-C cable can be supported.</li> <li>3. Only one front eSATA cable can be supported.</li> </ol>
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## PCIe Adapters

Network	Marvell 10G Ethernet Adapter (single port) Intel X550-T2 10G Ethernet Adapter (dual port) Intel I350-T4 1G Ethernet Adapter (quad port)
Thunderbolt	Rear Thunderbolt PCIe Adapter
WiFi Cards	Intel PCIe WiFi Card With BT (9260 AC)
PCIe to M.2 Adapter Card	Single M.2 PCIe Adapter Quad M.2 PCIe Adapter

## SECTION III: Supported Component Detail

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### CPU Specifications

CPU	Ryzen Threadrip per PRO 3995WX	Ryzen Threadrip per PRO 3975WX	Ryzen Threadrip per PRO 3955WX	Ryzen Threadrip per PRO 3945WX	Ryzen Threadrip per PRO 5995WX	Ryzen Threadrip per PRO 5975WX
# of Cores	64	32	16	12	64	32
# of Threads	128	64	32	24	128	64
Processor Base Frequency	2.7GHz	3.5GHz	3.9GHz	4.0GHz	2.7GHz	3.6GHz
Max Turbo Frequency	4.2GHz	4.2GHz	4.3GHz	4.3GHz	4.5GHz	4.5GHz
Cache	256MB	128MB	64MB	64MB	256MB	128MB
TDP	280W	280W	280W	280W	280W	280W
Disclaimers	Threadrip per Pro CPUs support AMD vendor lock.	Threadrip per Pro CPUs support AMD vendor lock.	Threadrip per Pro CPUs support AMD vendor lock.	Threadrip per Pro CPUs support AMD vendor lock.	Threadrip per Pro CPUs support AMD vendor lock.	Threadrip per Pro CPUs support AMD vendor lock.

### CPU Specifications

CPU	Ryzen Threadripper PRO 5965WX	Ryzen Threadripper PRO 9555WX	Ryzen Threadripper PRO 5945WX
# of Cores	24	16	12
# of Threads	48	32	24
Processor Base Frequency	3.8GHz	4.0GHz	4.1GHz
Max Turbo Frequency	4.5 GHz	4.5GHz	4.5GHz
Cache	128MB	64MB	64MB
TDP	280W	280W	280W
Disclaimers	Threadripper Pro CPUs support AMD vendor lock.	Threadripper Pro CPUs support AMD vendor lock.	Threadripper Pro CPUs support AMD vendor lock.

### HDD Specifications

Drive	500GB SATA - 7200rpm, 6Gb/s, 2.5"	1TB SATA - 7200rpm, 6Gb/s, 3.5"	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
2.5" SATA Hard Disk Drive (HDD)	Yes	Not Available	Not Available	Not Available	Not Available
Connector	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
Power Off to Spindle Stop (sec)	NA	NA	NA	NA	NA
DC Power to Drive Ready (sec)	3.5	<10.0	<17.0	<17.0	<17.0
Average Latency (msec)	4.2	4.16	4.16	4.16	4.16
Input (VDC)	5	5	5	5	5
Typical (Watts)	1.9	6.19	6.7	7.35	8.13
Idle (Watts)	0.7	4.6	4.5	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	101.85mm x 147mm x 26.1mm	101.85mm x 147mm x 26.1mm
Weight (grams)	90	420	535	680	705
Operating (C) Ambient	0 to 60	0 to 60	0 to 60	5 to 60	5 to 60
Operating (C) Base Casting	60	60	60	60	60
Non-Operating (C) Ambient	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)
Gradient (C per Hour)	20	20	20	20	20
Operating (Gs @ 2ms)	400	70	80	Read 70 Gs / Write 40 Gs	Read 70 Gs / Write 40 Gs
Non-Operating (Gs @ 2ms)	1000	350	300	300	250

## Solid State Storage Specifications

Drive	1024GB M.2 SSD, NVMe, Opal, GEN4x4 TLC,2280	512GB M.2 SSD, NVMe, Opal, GEN4x4 TLC,2280	256GB M.2 SSD, NVMe, Opal, GEN4x4 TLC,2280	256GB NVMe M.2 SSD TLC	512GB NVMe M.2 SSD TLC	1024GB NVMe M.2 SSD TLC	2048GB 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 4x4 NVMe	PCIe Gen 4x4 NVMe	PCIe Gen 4x4 NVMe	PCIe Gen 3 x4 NVMe	PCIe Gen 3 x4 NVMe	PCIe Gen 3 x4 NVMe	PCIe Gen 3 x4 NVMe
Power Active (AVG)	-	-	-	5W	5W	5W	5W

Power Idle	-	-	-	50mW	50mW	50mW	50mW
Typical Sequential Read	6400 MB/s	6000 MB/s	5000 MB/s	3000M B/s	3200MB /s	3200MB /s	3500MB /s
Typical Sequential Write	3800 MB/s	3200 MB/s	1600 MB/s	1300MB /s	1600MB /s	1600MB /s	3000M B/s
Burst Random Read (4K Queue Depth 32/8 thread);	550K IOPS	500K IOPS	250K IOPS	-	-	-	-
Burst Random Write (4K Queue Depth 32/8 thread)	400K IOPS	370K IOPS	200K IOPS	-	-	-	-
Operating Temperature Range	-	-	-	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Endurance Rating (Lifetime Writes)	-	-	-	85TB	150TB	300TB	600TB
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	AES 256-bit	AES 256-bit	AES 256-bit

## HDD Controllers

PCI Bus	PCIe Gen4
PCI Modes	RAID, AHCI
RAID Levels	0, 1, 5, 10, Volume and RAIDable
Data Transfer Rates	AMD RAIDXpert2 (OS) RAID and PD operations in BIOS
PCI Card Type	SATA 6Gbs NVMe 16Gbs
PCI Voltage	Onboard AMD controller (Bixby)
Disclaimers	SATA, M.2 NVMe

## Optical Drive Specifications

Description	9.0mm Slim DVD ROM	9.0mm Slim DVD Writer
	SATA 1.5 Gb/s	SATA 1.5 Gb/s
Interface Type	See External Dimensions	See External Dimensions
Dimensions	NA	NA
Disc Capacity	DVDROM	DVDWriter
Type	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)
External Dimensions	see Writes & Reads line	see Writes & Reads line
Speed	9.0mm Tray	9.0mm Tray
Bay Type	Business Black or without bezel	Business Black or without bezel

Color	No	No
Removable	0.5MB Max	0.5MB Max
Internal Buffer Size	DVDROM have no write function	8xDVD+R / 8xDVD+RW / 6xDVD+R DL 8xDVD-R / 6xDVD-RW / 6xDVD-R DL 24xCD-R / 16xCD-RW
Writes	8xDVD / 24xCD	8xDVD / 24xCD
Reads	DC Power 5V	DC Power 5V
Source	+5V±5% Ripple less than 100mVp-p	+5V±5% Ripple less than 100mVp-p
DC Power Requirements	Max 1.5A@5v	Max 1.5A@5v
DC Current	All Windows OS	All Windows OS
Operating Systems Supported	Operating: Read: 5 to 50 °c Write: 5 to 45 °C Storage/Transportation -40 to 60 °C	Operating: Read: 5 to 50 °c Write: 5 to 45 °C Storage/Transportation -40 to 60 °C
Temperature	Operating : Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation: 10 % to 80 % (Non-Condensing)	Operating : Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation: 10 % to 80 % (Non-Condensing)
Relative Humidity	NA	NA

## Discrete Graphics Adapter

Adapter	Quadro P2200	T400	T600	T1000	Quadro RTX 4000	Quadro RTX 5000
Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16
Display Interface	4 x DP 1.4	3 x mDP 1.4	4 x mDP 1.4	4 x mDP 1.4	3 x DP 1.4 1 x VirtualLink	4 x DP 1.4 1 x VirtualLink
Graphics Chipset	Pascal	Turing	Turing	Turing	Turing	Turing
Memory Clock Frequency (MHz)	1251MHz		1625MHz		1750MHz	
Memory Size	5GB GDDR5X	4GB GDDR6	4GB GDDR6	4GB GDDR6/8GB GDDR6	8GB GDDR6	16GB GDDR6
Memory Interface	160-bit	64-bit	128-bit	128-bit	256-bit	256-bit
Memory Bandwidth	Up to 200GB/s	80GB/s	160GB/s	160GB/s	Up to 416GB/s	Up to 448GB/s
GPU Cores	CUDA Cores: 1280	CUDA Cores: 384	CUDA Cores: 640	CUDA Cores: 896	CUDA Cores: 2304 Tensor Cores:	CUDA Cores: 3072 Tensor Cores:

					288 RT Cores: 36	384 RT Cores: 48
GPU Core Frequency (MHz)	1000MHz		1005MHz		1620MHz	
Maximum Power Consumption	75W	30W	40W	50W	Total board power: 160W Total graphics power: 125W	Total board power: 265W Total graphics power: 230W
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz		3 x 4096x2160 @ 120Hz 3 x 5120x2880 @ 60Hz		4 x 3840x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 4 x 7680x4320 @ 60Hz	
Thermal Solution	Ultra-quiet Active Fansink	Active	Active	Active	Ultra-quiet Active Fansink	Ultra-quiet Active Fansink
Dimension	4.4" H x 7.9" L Single Slot	2.7" H x 6.1" L Single Slot	2.7" H x 6.1" L Single Slot	2.7" H x 6.1" L Single Slot	4.4" H x 9.5" L Single Slot	4.4" H x 10.5" L Dual Slot, Full Height
Advanced Display	Not Available	Not Available	Not Available	Not Available	SYNC 2	SYNC 2
SLI/NVLink Support	Not Available	Not Available	Not Available	Not Available	Not Available	NVLink

## Discrete Graphics Adapter

Adapter	Quadro RTX 6000	Quadro RTX 8000	RTX A2000	RTX A4000	RTX A4500	RTX A5000
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
Display Interface	4 x DP 1.4 1 x VirtualLink	4 x DP 1.4 1 x VirtualLink	4 x DP 1.4a	4 x DP 1.4a	4 x DP 1.4	4 x DP 1.4a
Graphics Chipset	Turing	Turing	Ampere	Ampere	Ampere	Ampere
Memory Clock Frequency (MHz)	1750MHz			1750MHz		
Memory Size	24GB GDDR6	48GB GDDR6	6GB/12GB GDDR6	16GB GDDR6	20GB GDDR6	24GB GDDR6
Memory Interface	384-bit	384-bit	192-bit	256-bit	320-bit	384-bit
Memory Bandwidth	Up to 672GB/s	Up to 672GB/s	288GB/s	448 GB/s	640GB/s	Up to 768GB/s
GPU Cores	CUDA Cores: 4608 Tensor Cores: 576	CUDA Cores: 4608 Tensor Cores: 576	CUDA Cores: 3328 Tensor Cores: 104	CUDA Cores: 6411 Tensor Cores: 192	CUDA Cores: 7,168 Tensor Cores: 224	CUDA Cores: 8,192 Tensor Cores: 256

	RT Cores: 72	RT Cores: 72	RT Cores: 26	RT Cores: 48	RT Cores: 56	RT Cores: 64
GPU Core Frequency (MHz)	1440MHz			1395MHz		
Maximum Power Consumption	Total board power: 295W Total graphics power: 260W	Total board power: 295W Total graphics power: 260W	70W	140W	200W	230W
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 3840 x 2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz
Thermal Solution	Ultra-quiet Active Fansink	Ultra-quiet Active Fansink	Active	Active	Active	Active
Dimension	4.4" H x 10.5" L Dual Slot, Full Height	4.4" H x 10.5" L Dual Slot, Full Height	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
Advanced Display	SYNC 2	SYNC 2	Not Available	SYNC 2	SYNC 2	SYNC 2
SLI/NVLink Support	NVLink	NVLink	Not Available	Not Available	NVLink	NVLink

## Discrete Graphics Adapter

Adapter	RTX A6000	Quadro GV100	AMD Radeon Pro WX3200	AMD Radeon Pro W5500	AMD Radeon Pro W5700
Bus Interface	PCIe 4.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 4.0 x16	PCIe 4.0 x16
Display Interface	4 x DP 1.4a	4 x DP 1.4	4 x mDP 1.4	4 x DP 1.4	5 x mDP 1.4
Graphics Chipset	Ampere	Volta	Polaris	RDNA	RDNA
Memory Clock Frequency (MHz)	2000MHz			858MHz	
Memory Size	48GB GDDR6	32GB HBM2	4GB GDDR5	8GB GDDR6	8GB GDDR6
Memory Interface	384-bit	4096-bit	128-bit	128-bit	256-bit
Memory Bandwidth	Up to 768GB/s	Up to 870GB/s	96GB/s	224 GB/s	448 GB/s
GPU Cores	CUDA Cores: 10,752 Tensor Cores: 336 RT Cores: 84	CUDA Cores: 5120 Tensor Cores: 640	640	1408	2304

GPU Core Frequency (MHz)	1132MHz				
Maximum Power Consumption	300W	250W	50W	125W	205W
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	4 x 1920x1080 @ 60Hz 4 x 3840x2160 @ 60Hz 2 x 5120x2880 @ 60Hz 1 x 7680x4320 @ 60Hz	4 x 1920x1080 @ 60Hz 4 x 3840x2160 @ 60Hz 2 x 5120x2880 @ 60Hz 2 x 7680x4320 @ 60Hz	6 x 1920x1080 @ 60Hz 6 x 3840x2160 @ 60Hz 3 x 5120x2880 @ 60Hz 3 x 7680x4320 @ 60Hz
Thermal Solution	Active			Ultra-quiet Active Fansink	
Dimension	4.4" H x 10.5" L Dual Slot, Full Height	4.4" H x 10.5" L Dual Slot, Full Height	2.7" H x 6.6" L Single Slot, Half Height	4.4" H x 9.5" L Single Slot, Full Height	4.4" H x 10.5" L Double Slot, Full Height
Advanced Display	SYNC 2	Not Available	Not Available	Not Available	Not Available
SLI/NVLink Support	NVLink	NVLink	Not Available	Not Available	Not Available

## Intel® Ethernet Specifications

Card	Intel I350-T4 Quad Port Gigabit Ethernet Adapter (Stony Lake T4)	Intel X710-DA2 Dual Port Fiber 10Gb Ethernet Adapter	Intel Ethernet SFP+ SR Optics Module
Supplier PN	I350T4G1P20, MM# 928942	MM# 952103	MM#: 941243
Data Rates Supported	10/100/1000Mbps (Copper), 1000Mbps (Fiber)	1GbE/10GbE Optical fiber 10GbE Direct Attach (DAC)	Not Available
Controller Details	Intel Ethernet Controller I351	Intel Ethernet Controller X710-AM2	Not Available
Controller Bus Architecture	PCIe 2.1 (5GT/s)	PCIe 3.0 (8GT/s)	Not Available
Data Transfer Mode	Ethernet	Ethernet	Not Available
Power Consumption	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 1/1010GBASE-SR/LR, SFF-8431 10GSFP+DAC	Not Available
Boot ROM Support	PXE boot, Intel iSCSI Remote Boot for Windows, Linux and	PXE boot, Intel iSCSI Remote Boot for Windows, Linux and	Not Available



	Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI	Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI	
Network Transfer Mode (Full/Half Duplex)	Supported	Supported	Not Available
Network Transfer Rate	1,000Mbps Full Duplex	1,000Mbps Full Duplex	Not Available
Operating System Driver Support	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	Not Available
Manageability Capabilities Alerting	Supported	Supported	Not Available
TDP	Firmware Based Thermal Management	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)	Not Available
# of Ports	4	2	Not Available
Data Rate Per Port	10/100/1000Mbps (copper), 1000Mbps (fiber)	1Gbps, 10Gbps	Not Available
System Interface Type	PCIe Gen 2.1	PCIe 3.0	Not Available
NC Sideband Interface	Not Available	Yes	Not Available
Jumbo Frames Supported	Yes	Yes	Not Available
1000Base-T	Yes		Not Available
IEEE 1588	Supported	Supported	Not Available
Supported Under vPro	Not Available	Not Available	Not Available

## Ethernet

Model	Dual Port Copper= I350-T4 V2 Dual Port LC-Fiber= I350-F4	X710-DA2
Connector	4 x Ports RJ-45 Copper or 4 x Ports LC-Fiber	2 x SFPs Receptable
Website	<a href="#">i350 T4/F4</a>	<a href="#">x710 DA2</a>

## Media Card Reader

Description	15 in 1 Media Card Reader
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# SECTION IV: BIOS / Certifications / Standards /

## Environmental

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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 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 Enabled/Disabled Through ROM-based Setup or WMI Interface* Some Limitations
Adaptive Cooling	Offers Multiple Settings for Fan Control Ranging Between Better Performance and Better Acoustics
Security	User and Administrator Passwords Can Protect Boot and ROM-based Setup <ul style="list-style-type: none"><li>- Support Electronic Lock</li><li>- Chassis Intrusion Detection</li><li>- UEFI Secure Boot Support</li><li>- HDD Password Can Protect HDD Data</li><li>- Windows UEFI Firmware Update Support</li><li>- Device Guard Support</li><li>- Optional Access Panel Lock, Kensington Lock, and Pad Lock</li></ul>
Intel(R) AMT (includes ASF 2.0)	N/A
Intel(R) TXT	N/a
Memory Modes	Supports Mirroring, Lock Step, and Sparing Memory Modes
Windows 10 Ready	Supports Windows 10 Requirements for Secure Flash, UEFI v 2.6 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 v6.1
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 v3.0
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 v3.2.1
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"> <li>• 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)</li> <li>• Products do not contain Asbestos</li> <li>• Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide</li> <li>• Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation</li> <li>• 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</li> <li>• Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5 microgram/cm<sup>2</sup>/week</li> </ul> <p>REACH Article 33 information about substances in articles is available at: <a href="http://www.lenovo.com/social_responsibility/us/en/ThinkGreen_products.html#environment">http://www.lenovo.com/social_responsibility/us/en/ThinkGreen_products.html#environment</a></p>
Batteries	Not Available
Safety, EMC Connection to the Telephone Network and Labeling	Not Applicable, no Connection to a Telephone Network

# Acoustic Noise Emissions Declaration

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## Safety, EMC Connection to the Telephone Network and Labeling

System Software Manager	Lenovo ThinkStation Supports Software Management Tools by Lenovo Vantage
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## Regulations & Standards

EMC & Safety	<p>FCC DoC for North America  VCCI Certification for Japan  BSMI Certification for Taiwan  EU/EFTA CE Mark &amp; DoC  UL/CUL(P920,P720,P520,P520c), cTUVus(P330)  UL-GS(P920,P720,P520,P520c), TUV-GS(P330)  IEC60950-1 CB Report/Certificate  Saudi Arabia SASO  Kuwait KUCAS  China CCC Mark  Hong Kong SAR (CB report)  Singapore PSB  South Africa SABS  Russia-EAC  Morocco-CM  Mexico-NOM  Kazakhstan-EAC  Belarus-EAC  Serbia KVALITET  Ukraine UKrCEPRO  India-BIS  USA Chemical Emission Test</p>
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## Environmentals

Energy Star	ENERGY STAR® v8.0
EPEAT	EPEAT Certification Available on Select Models
ErP Lot-3 2013	Yes
Hazardous Substances	<ul style="list-style-type: none"> <li>• 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)</li> <li>• Products do not contain Asbestos</li> <li>• Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide</li> <li>• Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation</li> <li>• 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</li> </ul>

• Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5 microgram/cm<sup>2</sup>/week