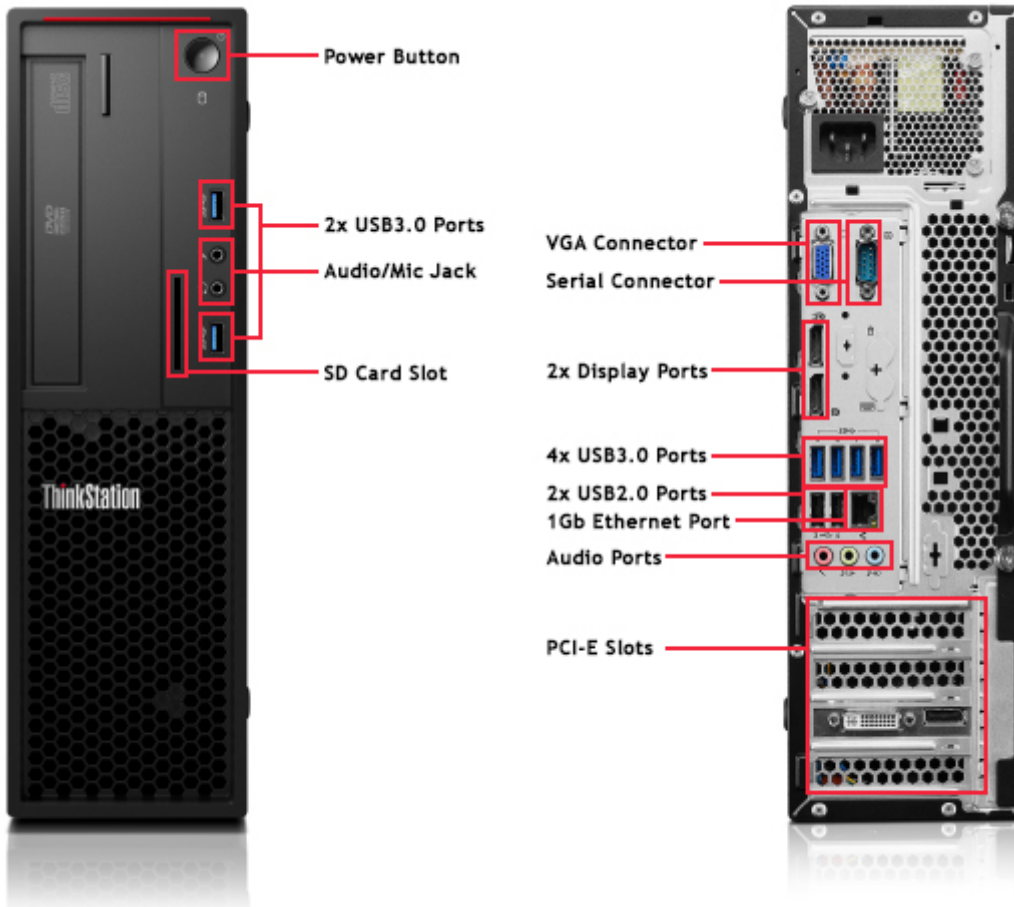
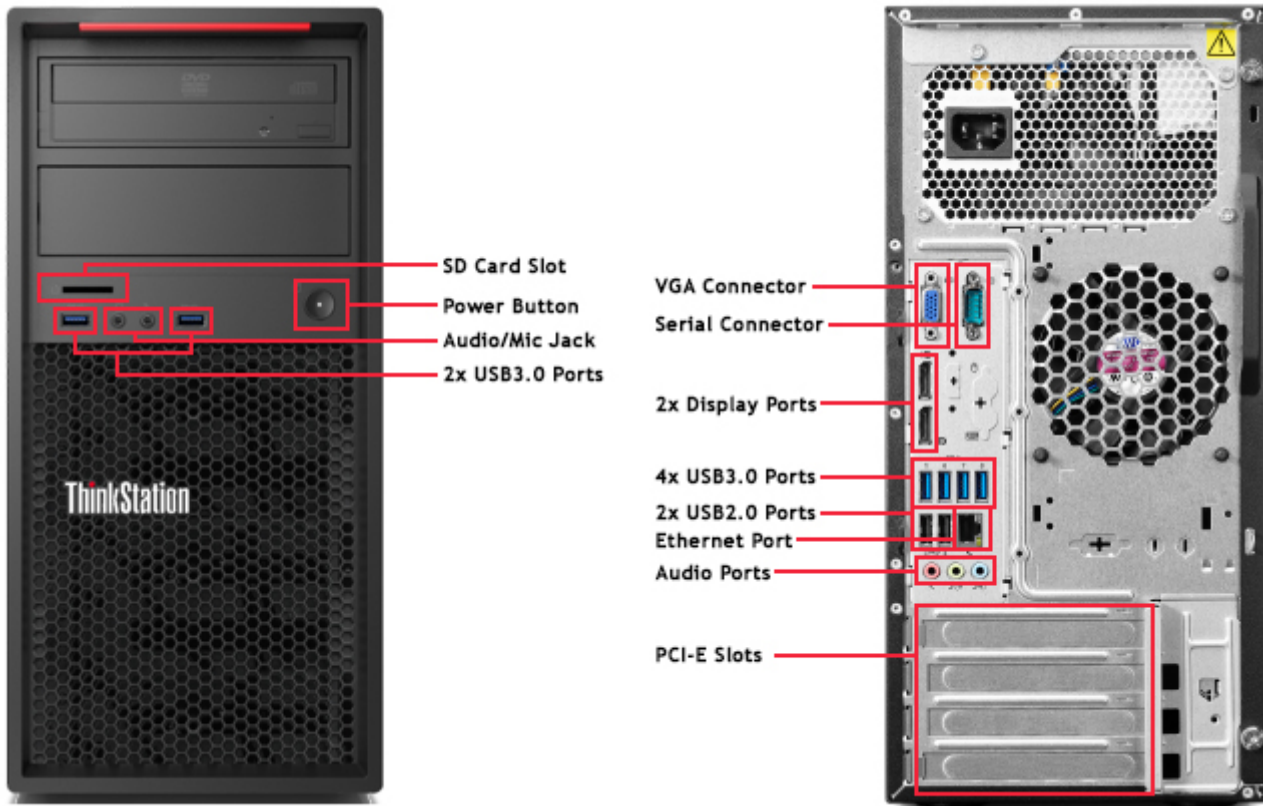




PDF

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## THINKSTATION P300



### System Overview

The single-processor P300 workstation uses a Micro Advanced Technology Extended (MATX) motherboard, both 280 watt (W), and an optional 450 watt (W) power supply unit (PSU) for Tower and a 240 watt (W) for the Small Form Factor (SFF). The motherboard chipset consists of the Intel® PCH supporting error-correcting code (ECC) Double Data Rate 3 (DDR3). Maximum memory supported is 32GB for UDIMMs. The processor socket is an Intel® LGA1150 GA-C2 level with support for dual core, quad core, processors from the Intel® Xeon line (E3-1200V3 family of processors).

## SECTION I: SYSTEM OVERVIEW

### Operating Systems

#### Preloaded

Genuine Windows 7® Professional 64-bit  
 Genuine Windows 7® Professional 32-bit  
 Genuine Windows 8.1® Professional 64-bit  
 Genuine Windows 8.1® 64-bit  
 Genuine Windows 8.1® 64-bit China

#### Supported

Red Hat Enterprise Linux 6.4

### Motherboard - P300

**Table 1.** P300 Motherboard Summary

P300 Motherboard Summary	
Form Factor	
Board Size	9.6" x 9.6" (244mm x 244mm)
Layout	Custom ATX
Motherboard Core	
Processor Support	Intel® Xeon™ E3-1200V3 (Haswell Refresh) Intel® i7™ Quad Core Intel® i5™ Quad Core Intel® i3™ Dual Core
Socket Type	(1) x Intel Socket (LGA1150)
Memory Support	1600/1333/1066 MHz
Voltage Regulator	87W TDP
Chipset (PCH)	Denlow (Intel C226)
HW Monitor	N/A
Super I/O	IT8731F
Audio	ALC662VC1-GR/ALC662VD-GR (co-lay)
Ethernet	Intel L217LM Clarkville
Memory	
Slots	4
Channels	2

Type	DDR3 Unbuffered DRAM (UDIMM)	
ECC Support	Yes	
Speed	Up to PC3-12800 (1600MHz)	
Max DIMM Size	8GB UDIMM	
Max System Memory	Up to 32GB UDIMM (w/8GB)	
Ethernet		
Vendor	Intel	
Count		1
EEPROM	None (part of SPI flash)	
Speeds	10/100/1000 Mbps	
Functions	PXE WOL AMT	
Connectors	(1) x RJ45 on Rear I/O	
Audio		
Vendor	Realtek	
Type	Integrated Audio	
Internal Speaker	Yes	
Connectors	(3) x Rear 3.5mm Jacks (Line In, Line Out, Microphone In) (2) x Front 3.5mm Jacks (Headphone out, Microphone In) One 14-pin connector cut pin 14	
Chipset	ALC662	
Stereo Conversion	24-bit DAC and 24-bit ADC	
High Definition Stereo Support	✓	
Number of Channels		6
Number of Bits/Audio Resolution	6 channels of DAC support 16/20/24-bit PCM format for 5.1 audio solution 2 stereo ADC support 16/20-bit PCM format	
Sampling Rate (recording/playback)	Support 44.1K/48K/96K sample rate	
Signal to Noise Ratio	DAC SNR>98dBFS, ADC SNR>90dBFS	
Wavetable Voices	32-voice wavetable(For XP only)	
Analog Audio	✓	
Dolby Digital	None	
THX	None	
Digital Out (S/PDIF)	None	
Speaker Power Rating	Int Speaker (1.5W) / Ext 2.0 Speaker (4W) - Tower	

**Video**

Onboard	Supported
Type	Integrated
Bus Interface	Processor onboard
Display Interface	VGA/DP/DP
Video Resolution (max)	VGA/DP: 2560×1600@60Hz DVI/HDMI: 1920×1200@60Hz
Graphics Cover Name	Intel HD Graphics P4600
Adapter	(1) x PCI-E 3.0 16-lane Slot (1) x PCI-E 3.0 16 lane Slot (x4 electrical)

**Storage**

Floppy	None
IDE	None
SATA	(2) x SATA Connectors, Gen. 2 (AHCI)(2) x SATA Connectors, Gen. 3 (AHCI)(1) x eSATA Connector, Gen. 2 (eSATA bracket) SATA RAID 0,1, supported natively via Intel Controller
eSATA	(1) x eSATA Connector, Gen. 2, cabled to slot via bracket

**Slots****PCI**

Available Slots	1 Full Height, 1 Low Profile (SFF)
PIN Count	120 pins connectors
Data Bus Width	32bit /33MHz; 133MB/s
Voltage	3.3V

**PCI Express x4 (physical x16)**

Available Slots	1 Full Height, 1 Low Profile (SFF)
PIN Count	164 pins connectors
Data Bus Width	8GB/s per Direction; duplex 16GB/s
Voltage	12V
Power (Max)	75W, 45W (SFF)

**PCI Express x1**

Available Slots	1 Full Height, 1 Low Profile (SFF)
PIN Count	36 pins connectors
Data Bus Width	500MB/s per Direction ; duplex 1GB/s
Voltage	12V
Power (Max)	25W

**PCI Express x16**

Available Slots	1 Full Height, 1 Low Profile (SFF)
PIN Count	164 pins connectors

Data Bus Width	8GB/s per Direction; duplex 16GB/s
12V	75W, 45W (SFF)
<b>Rear I/O</b>	
COM	(1) x Serial Port (COM1), (1) x optional
eSATA	(1) x eSATA Port (Gen. 2), optional via bracket
LPT	None
Video	1 VGA 2 Display Port
Audio	Microphone-In, Line In, Line Out
Ethernet	(1) x RJ45
USB 2.0	(2) x USB 2.0 Ports
USB 3.0	(4) x USB 3.0 Ports
<b>Front I/O</b>	
USB 3.0	(2) x USB 3.0 Ports
Headphone	(1) x Headphone Line Out
Microphone	(1) x Microphone-in
<b>Internal I/O</b>	
USB 2.0	· Front Panel USB Header (2 ports) · Media Card Reader Header · Internal USB connector
PS/2	(1) x 2-port PS/2 Header, ports optional via bracket
Audio	(1) x Front Panel Mic & Line-Out Header
COM2	(1) x Serial Port (COM2)
Clear CMOS	3-Pin Clear CMOS Header
Speaker	2-Pin Internal Speaker Header
Chassis Intrusion	2-Pin Chassis Intrusion Switch Header
<b>Thermal</b>	
Fans Headers	(1) x 4-Wire CPU Fan (1) x 4-Wire Rear Fan (1) x 3-Wire Front PCI Fan
<b>Power Connectors</b>	
Main	(1) 14-Pin (2×7) ATX Standard
VRM	(1) 4-Pin (2×2) ATX 12V Standard
<b>Security</b>	
Nuvoton	Nuvoton NPCT421LA0WX / STMicro ST33ZP24AR28PVQC (co-lay)
Asset ID	Rohm BUL08-1FJ-W/FVJ-W / NXP PCA24508AD

vPro vPro for WS (AMT 9.x)

BIOS

Vendor AMI

## Ethernet

The E32 motherboard implements onboard gigabit Ethernet via one Intel L217LM Clarkville controller. This integrated solution has support for the industry standard functions of Wake on LAN (WOL) and Preboot Execution Environment (PXE). Additionally, for Manageability features, Clarkville will support AMT.

## Audio

The ALC662-VD chip from Realtek provides E32 with stereo audio capability that meets Windows7 Premium performance requirements. HD 5.1 audio is supported via jack remapping. There are 2 front analog jacks, and 3 rear color-coded (per MS Vista Logo Specification SYSFUND-0041) analog jacks.

## Chassis Summary

E32 Chassis is a 25-liter ATX-form factor tower mechanical with 2 external 5.25" drive bays, 1 external 3.5" drive bay, and 2 internal 3.5" drive bays.

The other E32 chassis is a 12.9-liter ATX-form factor tower mechanical with 1 external 5.25" drive bays, 1 external 3.5" drive bay, 1 internal 3.5" drive bays and 1 optional internal 2.5" drive bay

## Chassis Info:

### Chassis Info:

	Tower	SFF
Color	Raven Black paint	Raven Black paint
Form Factor	Tower	SFF
Volume (Approximate)	25L	12.9L
Orientation	Vertical	Vertical or horizontal
Kensington slot	Yes	Yes
Padlock loop	Yes	No
Intrusion switch	Yes	Yes
Handles	No (Front lip and rear shelf)	No
5.25" to 3.5" HDD Conversion Kit, 325BT(with 1to 2 power converter cable)	Yes	No
50mm 1 to 2 fan power converter cable	Yes	No
Q4000 bracket 325BT	Yes	No

### Chassis Dimensions

Height (mm)	425.2	338
-------------	-------	-----

Height (inch)	16.74	13.31
Width (mm)	175	102
Width (inch)	6.89	4.02
Depth (mm)	431	375
Depth (inch)	16.97	14.76
Weight (kgs)	12.5	7.8
Weight (lbs)	27.56	17.2

NOTE: HxWxD(mm) are based on maximum length, which include: PCI holder, plastic foot

#### Packaging Parameters without External Speaker

Height (mm)	510	505
Height (inch)	20.08	19.88
Width (mm)	310	215
Width (inch)	12.2	8.46
Depth (mm)	540	530
Depth (inch)	21.26	20.87
Weight (kgs)	14	9.23
Weight (lbs)	30.86	20.34

### 1P Thermal Solution

The E32 1P system will utilize a single fansink solution supporting 87W, 69W, 77W, 55W, and 65W CPUs. In addition to the CPU fansink, the E32 1P system will contain a rear system fan, an optional front PCI fan (to be used only with inactive powered graphics adapters).

### Security & Serviceability

#### Physical Security and Serviceability

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	Tool-less
Green Color Power LED on Front of Computer	Yes
Restore CD/DVD Set	Restore system to original factory shipping image - Can be obtained via Lenovo Support
Cable Lock Support	Yes, Optional Kensington Cable Lock



Serial, USB, Audio, Network, Enable/Disable Port Control	Yes
Power-On Password	Yes
Setup Password	Yes
NIC LEDs (integrated)	Yes
Security Chip	Yes
Boot Sequence Control	Yes
Padlock Support	Yes, loop in rear for optional padlock, prevents side panel removal E32 SFF do not support it.
Boot without keyboard and/or mouse	Yes

## OPERATING ENVIRONMENT

### Temperature

Operating Temperature	10 degrees C - 35 degrees C (50F to 95F)
Non-operating Temperature	(-40 degrees C - 60 degrees C) (50F to 140F)
Wet bulb temperature	25 degrees C (max)(Operating) 40 degrees C (max) (Non-Operating)

### Humidity

Operating Humidity	20% - 80% (non-condensing)
Non-Operating	20% - 90%(non-condensing)

Heat Maximum: 955 Btu/hr / 280 W

### Altitude

Operating	-15.2 to 3048 m (-50 to 10,000 ft)
Storage	-15.2 to 10,668 m (-50 to 35,000 ft)

### Vibration

With Package	1.04 G at 2 to 200 Hz at 1 octave/min
Without package	
Operating	0.27 G at 5 to 500 Hz at 0.5 octave/min, Random(without LCD panel)
Non-Operating	1.04 G at 2 to 200 Hz at 1 octave/min
Shock	
Without package	Bottom half-sine pulse with a change in velocity of 37.4 cm/sec (14.7 inches/sec)
Operating	45-G faired square wave with a velocity change of 441 cm/sec (173.7 inches/sec)

## Regulations and Standards

### EMC & Safety

FCC DoC for North America	Yes
---------------------------	-----

VCCI certification for Japan	Yes
BSMI certification for Taiwan	Yes
EU/EFTA CE Mark & DoC	Yes
UL/CUL	Yes
TUV-GS	Yes
IEC60950-1 CB Report/Certificate	Yes
Saudi Arabia ICCP(SASO)	Yes
China CCC Mark	Yes
Hong Kong SAR (CB report)	Yes
Argentina S-mark	Yes
Singapore - PSB	Yes
South Africa - SABS	Yes
Russia-GOST	Yes
Mexico-NOM	Yes
Kazakhstan -GOST-K	Yes
Belarus-certificate	Yes
Croatia-certificate	Yes
Serbia - KVALITET	Yes
Ukraine - UKrCEPRO	Yes
Energy Star 5.0/5.2	Yes
PEP(Internal Certification)	Yes
China RoHS	Yes
EU RoHS	Yes
EU WEEE	Yes
Japan J-Moss	Yes
California RoHS	Yes
USA Chemical Emission Test	Yes
New York RoHS	Yes
Japan Energy Saving	Yes

## Energy Star

All E32 systems are designed to with the premise of maximizing energy efficiency. The latest version of the Energy Star standard is still being defined. Pending ratification of the newest Energy Star spec, the Development team will assess which models will be able to be Energy Star compliant.

## EPEAT™

E32 models which are Energy Star compliant (pending ratification of latest Energy Star spec) will also qualify for the EPEAT™ Gold rating.

## EuP Lot-6 2012

E32 systems are complaint with the EuP Lot-6 2012 standard for low power consumption. This is enabled by default for all systems shipping to EMEA, and can be toggled on or off in the system BIOS.

## SECTION II: SUPPORTED COMPONENTS

### CPU Specifications

E3-1280V3 ( 3.60GHz / 4C / 8M / 1600 / 82w / T / 0GT )

E3-1270V3 ( 3.50GHz / 4C / 8M / 1600 / 80w / T / 0GT )

E3-1240V3 ( 3.40GHz / 4C / 8M / 1600 / 80w / T / 0GT )

E3-1230V3 ( 3.30GHz / 4C / 8M / 1600 / 80w / T / 0GT )

E3-1220V3 ( 3.10GHz / 4C / 8M / 1600 / 80w / T / 0GT )

E3-1275V3 ( 3.50GHz / 4C / 8M / 1600 / 84w / T / 2GT )

E3-1245V3 ( 3.40GHz / 4C / 8M / 1600 / 84w / T / 2GT )

E3-1225V3 ( 3.20GHz / 4C / 8M / 1600 / 84w / T / 2GT )

Haswell i7-4770 ( 3.40GHz / 4C / 8M / 1600 / 84w / T / 2GT )

Haswell i5-4670 ( 3.40GHz / 4C / 6M / 1600 / 84w / T / 2GT )

Haswell i5-4570 ( 3.20GHz / 4C / 6M / 1600 / 84w / T / 2GT )

Haswell i3-4340 (3.6GHz / 2C / 4M / 1600 / 54W / 2GT)

Haswell i3-4330 (3.5GHz / 2C / 4M / 1600 / 54W / 2GT)

Haswell i3-4130 (3.4GHz / 2C / 3M / 1600 / 54W / 2GT)

Haswell Pentium G3430 (3.3GHz / 2C / 3M / 1600 / 53W / 1GT)

Haswell Pentium G3420 (3.2GHz / 2C / 3M / 1600 / 53W / 1GT)

Haswell Pentium G3220 (3.0GHz / 2C / 3M / 1333 / 53W / 1GT)

Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families.

Quad, Dual core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.

64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations

## Memory

UDIMMs (non-ECC)

4GB PC3-12800 1600MHz DDR3 UDIMM

8GB PC3-12800 1600MHz DDR3 UDIMM

UDIMMs (ECC)

2GB PC3-12800E 1600MHz DDR3 ECC-UDIMM for  
China Market Only

4GB PC3-12800E 1600MHz DDR3 ECC-UDIMM

8GB PC3-12800E 1600MHz DDR3 ECC-UDIMM

## Storage - HDD/SSD

3.5" SATA Hard Disk Drive (HDD)

500GB SATA - 7200 rpm, 6 Gb/s, 3.5"

1TB SATA - 7200 rpm, 6 Gb/s, 3.5"

2TB SATA - 7200 rpm, 6 Gb/s, 3.5"

3TB SATA - 7200 rpm, 6Gb/s 3.5"

4TB SATA - 7200 rpm, 6Gb/s 3.5"

3.5" SATA Hybrid Hard Disk Drive (HDD)

1TB SATA - 7200rpm, (8G Flash) 6Gb/s, 3.5" Hybrid

2TB SATA - 7200rpm, (8G Flash) 6Gb/s, 3.5" Hybrid

2.5" SATA Solid State Drive (SSD)

180GB SATA SSD, 6Gb/s, OPAL, 2.5"

240GB SATA SSD, 6Gb/s, OPAL, 2.5"

480GB SATA SSD, 6Gb/s, OPAL, 2.5"

128GB SATA SSD, 6Gb/s, 2.5" Non-OPAL

256GB SATA SSD, 6Gb/s, 2.5" OPAL

256GB SATA SSD, 6Gb/s, 2.5" Non-OPAL

512GB SATA SSD, 6Gb/s, 2.5" Non-OPAL

1 TB SATA SSD , 6Gb/s, 2.5" Non-OPAL, Micron

## RAID

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.

RAID levels and requirements:

- RAID 0 (striping) provides increased performance by writing data across multiple drives.
- RAID 1 (mirroring) provides fault tolerance by writing the data on two drives.
- RAID 5 (striping with parity) uses distributed parity data to provide fault tolerance more efficiently than RAID 1.

## Storage - Optical Drive/Removable Media

### Storage - Half High Optical Drive

DVD-ROM Drive - 16x/48x  
(SATA)

DVD Burner/CD-RW Rambo  
8 (SATA)

Blu-Ray DVD Burner (SATA)

### Storage - Slim Optical Drive

Slim ODD Rambo(SATA)

Slim ODD DVD ROM(SATA)

Slim Blu-Ray ODD DVD  
Burner(SATA)

DVD Burner/CD-RW Rambo  
Drive (9.5mm Slim SATA)

### Storage - Removable Media

9 in 1 SD Media Card  
Reader

29 in 1 media card reader  
Kit for 5.25" Multi-purpose  
I/O Bay

## Keyboard

Preferred Pro Fullsize Keyboard (USB)

Chicony KUF1256 fingerprint KB Win8

Lenovo Slim New F5 USB Keyboard For win 8

Preferred Pro Fullsize PS/2 Keyboard

Smart Card KYB

## Pointing Devices

Optical Wheel Mouse (1000 DPI), USB - red wheel

Lenovo USB Laser Mouse

Optical Wheel Mouse (PS/2)

## Graphics Cards

### P300

NVIDIA NVS310 (DP,DP) - 512MB GDDR3

NVIDIA NVS315 (DMS-59) - 1GB GDDR3 (ATX) with DMS-59 to Dual DVI (single link) Dongle

NVIDIA NVS315 (DMS-59) - 1GB GDDR3 (ATX) with DMS-59 to Dual Display Port Dongle

NVIDIA Quadro 410(DVI-I-DL,DP) - 512M GDDR3

NVIDIA 510 (mini DP x 4) -2GB GDDR3

Nvidia Quadro K420 (DVI, DP) - 1 GB DDR3- ATX

NVIDIA Quadro K600 (DVI-I-DL,DP) -1GB GDDR3

Nvidia Quadro K620 (DVI, DP) - 2GB DDR3 ATX

NVIDIA Quadro K2000 (DVI-D-DL+DP+DP) - 2GB GDDR5

NVIDIA Quadro K2000D (DVI-D-DL+DVI-I-DL+ miniDP ) - 2GB GDDR5

Nvidia Quadro K2200(DVI/2DP)-4GB DDR5- ATX

NVIDIA Quadro K4000(DVI-I-DL,DP,DP,Stereo 3D) -3GB GDDR5

Nvidia Quadro K4200 (2xDP+DVI) - 4GB DDR5 ATX with short extender

### P300 SFF

NVIDIA NVS310 (DP,DP) - 512MB GDDR3 LP

NVIDIA NVS315 (DMS-59) - 1GB GDDR3 (LP) with DMS-59 to Dual DVI (single link) Dongle

NVIDIA NVS315 (DMS-59) - 1GB GDDR3 (LP) with DMS-59 to Dual Display Port Dongle

NVIDIA Quadro 410(DVI-I-DL,DP) - 512M GDDR3 LP

NVIDIA 510 (mini DP x 4) -2GB -2GB GDDR3 LP

Nvidia Quadro K420 (DVI, DP) - 1 GB DDR3 - LP

NVIDIA Quadro K600 (DVI-I-DL,DP) -1GB GDDR3 LP

Nvidia Quadro K620 (DVI, DP) - 2GB DDR3 LP

Nvidia Quadro K1200(4miniDP) - 4GB DDR5 LP

## PCI/PCIe Adapters

### 1394 Adapter

IEEE 1394 (Firewire) PCI Express x1 Adapter with internal port  
-with 1 internal port, 1 external port

IEEE 1394 (Firewire) PCI Express x1 Adapter with internal port (LP)  
-with 1 internal port, 1 external port

### USB 3.0 Add-in Card

USB 3.0 Add-in Card High-profile-R1

USB 3.0 Add-in Card Low-profile-R1

### Parallel port Card

Sunix PCI to Parallel port Card(Chip update) - (FH)

Sunix PCI to Parallel port Card(Chip update) - (LP)

### LAN Adapter

Bitland 88E8070@1000M PCIE ASF NIC FH(R )

Bitland 88E8070@1000M PCIE ASF NIC LP®

Intel ® 1Gbps ET Dual Port Server Adapter

Intel® 1Gbps Ethernet I340 Quad Port Server Adapter

Intel 82574L Gigabit CT2 Desktop Ethernet Adapter

Intel® Ethernet Server Adapter I350-T2

Intel® 1Gbps Ethernet I350-T4 Quad Port Gigabit Ethernet Adapter

#### Wifi/BlueTooth

PCI-E 1X Wifi Card ATX Kit (Wilkin Peak 2 7260 BN) support win7 and win8.1

PCI-E 1X Wifi Card LP Kit(Wilkin Peak 2 7260 BN) support win7 and win8.1

#### Miscellaneous

L1-5.25" Flex module

L1-5.25" Flex module for SFF

Front 1394a Cable for 5.25" Multi-purpose I/O Bay

Front eSATA Cable for 5.25" Multi-purpose I/O Bay

## SECTION III: SYSTEM TECHNICAL SPECIFICATIONS

### Power Supply Specifications

DC Power Supply -Wattage	450W 92plus Single output	280W 85plus Single output	240W 92plus Single output	240W 85plus Single output
Power Efficiency	92%	85%	92%	85%
Manual / Auto-sensing	Auto-sensing	Auto-sensing	Auto-sensing	Auto-sensing
Type	115/230V(50/60Hz)	115/230V(50/60Hz)	115/230V(50/60Hz)	115/230V(50/60Hz)
Wattage	450W	280W	240W	240W
AC Input Voltage Range	100-127v/200-240v	100-127v/200-240v	100-127v/200-240v	100-127v/200-240v
AC Input Current (low ac range/high AC range)	8A/4A	8A/4A	8A/4A	8A/4A
AC Input Frequency	50/60HZ	50/60HZ	50/60HZ	50/60HZ
AC Holdup Time (50% load)	17MS	17MS	17MS	17MS
Minimum Efficiency	0.89	0.82	0.89	0.82
PFC (Active)	ACTIVE	ACTIVE	ACTIVE	ACTIVE
80 PLUS compliant	Yes - Platinum	Yes - Silver	Yes - Platinum	Yes - Silver
Power Supply Cable Length				
Cable 1(SATA Power Cable 200mm + 200mm)	Yes		No	
Cable 2(SATA Power Cable 400mm for ODD)	No		Yes	
Cable 3(SATA Power Cable 200mm for HDD)	No		Yes	
Cable 4(SATA Power Cable 210mm + 170mm + 180mm)	Yes		No	
Cable 1 (2*7 Pin P1 main connector for MB)	280mm	250mm	230mm	
Cable 2 (2*2 Pin P2 for CPU )	230mm	230mm	280mm	
Cable 3 (2*3 PIN,P3 for Gfx card)	400mm	NA	NA	
<b>DC Parameters</b>				
+3.3v Output	NA	NA	NA	NA

+5.0v Output	NA	NA	NA	NA
+12.0v Output	12V1/16A, 12V2/18A,12V3/12A	12V1/16A, 12V2/16A	12V1/12A, 12V2/16A	12V1/12A, 12V2/16A
+5.0v Auxiliary Output	3A	2.5A	1A	2.5A
-12.0v Output	0.2A	0.2A	0.2A	0.2A
Max Total Power	450W	280W	240W	240W
Max Combined +3.3v/+5.0v Power	NA	NA	NA	NA
Max Combined 12.0v Power	435W	270W	233W	233W
19.5V Output	NA	NA	NA	NA
Power Supply Meets Requirements of:				
Energy Star 4.0 Compliant Power Supply	Yes	Yes	Yes	Yes
Energy Star 5.0 Compliant Power Supply	Yes	Yes	Yes	Yes
Blue Angel Compliant	Yes	Yes	Yes	Yes
UL Certified	Yes	Yes	Yes	Yes

## ThinkStation Power Calculator

[Click here to access the ThinkStation Power Calculator.](#)

## BIOS Specifications

### Features

WMI Support	Compliant with Microsoft WBEM and the DMTF Common Information Model
ROM-Based Setup Utility (F1)	System Configuration Setup program available at power-on with F1 key
Bootblock Recovery	Recovers system BIOS when Flash ROM corrupted.
Replicated Setup	Saves System Configuration settings to file that can then be used replicated 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 event of decrease in system memory
Thermal Alert	Power-on Error message in event of fan failure
Asset Tag	Support ability to set SMBIOS Type 2 Baseboard Asset Tag field.
System/Emergency ROM Flash Recovery with Video	Support process to recover system BIOS when Flash ROM corrupted
Remote Wakeup/Remote Shutdown	System admin can power on/off a client computer from remote location to provide maintenance
Quick Resume time	Support 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	Fans dynamically controlled by system BIOS based on temperature.
Security	User and Administrator passwords can protect boot and ROM-base Setup. Chassis intrusion detection protect
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 base attacks.
Memory modes	Supports mirroring, lock step, and sparing memory modes
Windows 8 ready	Supports Windows 8 requirements - Secure flash, UEFI v 2.3.1 spec

### Industry Standard Specification Support

UEFI	Unified Extensible Firmware Interface v2.3.1
ACPI (Advanced Configuration and power Management Interface)	Advanced Configuration and Power Interface v4.0
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, Version 1.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	PCI Local Bus v3.0 PCI Firmware Specification 3.0
PCI Express	PCI Express Base Specification 3.0
SATA	Serial ATA Revision 3.0 Specification
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Universal Serial Bus v2.0 Universal Serial Bus v3.0
SMBIOS	DMTF System Management Spec v2.7.1

## Social and Environmental Responsibility

### Quality Control

The company 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), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide

Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation

Products do not contain more than 0.1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP

Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5

microgram/cm<sup>2</sup>/week

REACH Article 33 information about substances in articles is available at:

[http://www.lenovo.com/social\\_responsibility/us/en/ThinkGreen\\_products.html#environment](http://www.lenovo.com/social_responsibility/us/en/ThinkGreen_products.html#environment)

### Batteries

If the product contains a battery or an accumulator, it is labeled with the disposal symbol and if it contains more than 0.0005% of mercury (for button cells only) by weight, or more than 0.004% of lead, it shall be marked with the chemical symbol for the metal concerned, Hg or Pb. Information on proper disposal is provided in user manual

Button cells used in the product do not contain more than 2% by weight of mercury. Other batteries or accumulators do not contain more than 0.0005% of mercury or 0.002% of cadmium

Batteries and accumulators are easily removable by either users or service providers (as dependent on the design of the product). Exception: Batteries that are permanently installed for safety, performance, medical or data integrity reasons do not have to be “easily removable

### Safety, EMC connection to the telephone network and labeling

The product complies with legally required safety standards as specified

The product complies with legally required standards for electromagnetic compatibility

If product is intended for connection to a public telecom network or contains a radio transmitter, it complies with legally required standards for radio and telecommunication devices

The product is labeled to show conformance with applicable legal requirements

### Product packaging

Packaging and packaging components do not contain more than 0.01% lead, mercury, cadmium and hexavalent chromium by weight of these together.

Plastic packaging material is marked according to ISO 11469 referring ISO 1043

The product packaging material is free from ozone depleting substances as specified in the Montreal Protocol

For more information on Lenovo social environmental practices visit:

[http://www.lenovo.com/social\\_responsibility/us/en/ThinkGreen\\_products.html#environment](http://www.lenovo.com/social_responsibility/us/en/ThinkGreen_products.html#environment)

## Manageability

### Industry Standard Specifications

This product meets the following industry standard specifications for manageability functionality:

- Intel LAN with AMT

### Remote Manageability Software Solutions

Lenovo ThinkStation is supported on the following remote manageability software consoles:

- Lenovo ThinkManagement Console
- [LANDesk Management Suite for ThinkVantage Technologies \(www.landesk.com/lenovo\)](http://www.landesk.com/lenovo)
- Microsoft System Center Configuration Manager

### System Software Manager

Lenovo ThinkStation supports software management tools from the ThinkVantage System Update suite:

- System Update
- Update Retriever
- Thin Installer

### Service, Support, and Warranty

On-site Warranty and Service: Three-years, limited warranty and service offering delivers on-site, next business-day service for parts and labor and includes free telephone support 8am - 5pm. Global coverage ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering.

Go to [www.lenovo.com/support](http://www.lenovo.com/support) and [www.lenovo.com/warranty](http://www.lenovo.com/warranty) for more details

## SECTION IV: TECHNICAL SPECIFICATIONS

### HDD Specifications

#### 3.5" SATA Hard Disk Drive (HDD)

500GB SATA - 7200 rpm, 6 Gb/s, 3.5"

1TB SATA - 7200 rpm, 6 Gb/s, 3.5"

2TB SATA - 7200 rpm, 6 Gb/s, 3.5"

3TB SATA - 7200 rpm, 6Gb/s 3.5"

4TB SATA - 7200 rpm, 6Gb/s 3.5"

#### 3.5" SATA Hybrid Hard Disk Drive (HDD)

1TB SATA - 7200rpm,(8G Flash) 6Gb/s, 3.5" Hybrid

2TB SATA - 7200rpm, (8G Flash) 6Gb/s, 3.5" Hybrid

	3.5" 7200 RPM	3.5" Hybrid
Connector	SATA	SATA
Transfer Rate (Gb/sec)	600MB/sec	600MB/sec
<b>Performance</b>		
Spindle Speed(RPM)	7200	7200
Power off to Spindle Stop(sec)	11 max	11 max
DC Power to Drive Ready(sec)	17 max	<1
Receipt of Start Unit Command to Drive Ready(sec)	17 max	<1
Average Latency(msec)	4.16	4.16
<b>Power Management</b>		
Input(VDC)	+5v +- 5%+12v +- 5%	+5v +- 5%+12v +- 5%
Typical(Watts)	8 max	6.7 max
Idle(Watts)	0.75	0.75

**Dimensions**

Height(mm - Max)	26.11	26.11
Width(mm)	101.6	101.6
Depth(mm - Max)	146.99	146.99
Weight(grams)	626 max	535 max

**Temperature**

Operating(C) Ambient	0 to 60	0 to 60
Operating(C) Base Casting		
Non-Operating(C) Ambient	-40 to 70	-40 to 70
Gradient(C per Hour)	30 max	30 max

**Shock**

Operating(Gs @ 2ms)	80 max	80 max
Non-Operating(Gs @ 2ms)	350 max	350 max

**2.5" SATA Solid State Drive (SSD)**

180GB SATA SSD. 6Gb/s. OPAL.2.5"

240GB SATA SSD, 6Gb/s,OPAL. 2.5"

480GB SATA SSD, 6Gb/s,OPAL. 2.5"

128GB SATA SSD, 6Gb/s, 2.5" Non-OPAL

256GB SATA SSD, 6Gb/s, 2.5" OPAL

256GB SATA SSD, 6Gb/s, 2.5" Non-OPAL

512GB SATA SSD, 6Gb/s, 2.5" Non-OPAL

1 TB SATA SSD , 6Gb/s, 2.5" Non-OPAL,Micron

	180GB SATA SSD. 6Gb/s. OPAL.2.5"	240GB SATA SSD, 6Gb/s,OPAL. 2.5"	480GB SATA SSD, 6Gb/s,OPAL. 2.5"	128GB SATA SSD, 6Gb/s, 2.5" Non-OPAL	256GB SATA SSD, 6Gb/s, 2.5" OPAL	256GB SATA SSD, 6Gb/s, 2.5" Non-OPAL	512GB SATA SSD, 6Gb/s, 2.5" Non-OPAL	1 TB SATA SSD , 6Gb/s, 2.5" Non-OPAL
Min Sequential Read	540 MB/s	540 MB/s	540 MB/s	510 MB/s	520 MB/s	520 MB/s	520 MB/s	560 MB/s
Min. Sequential Write	490 MB/s	490 MB/s	490 MB/s	300 MB/s	280 MB/s	280 MB/s	460 MB/s	510 MB/s
Min. Random Read (8GB Span)	48000 IOPS	48000 IOPS	48000 IOPS	85000 IOPS	90000 IOPS	90000 IOPS	96000 IOPS	100,000 IOPS
Min. Random Write (8GB Span)	80000 IOPS	80000 IOPS	80000 IOPS	65000 IOPS	80000 IOPS	80000 IOPS	80000 IOPS	88,000 IOPS
Min. Power - Active	165 mW	165 mW	165 mW	120 mW	120 mW	120 mW	120 mW	150 mW
Min. Power - Idle	55 mW	55 mW	55 mW	80 mW	50 mW	50 mW	50 mW	70 mW
Min. MTBF	1.2 M hours	1.2 M hours	1.2 M hours	1.5 M	1.5M hours	1.5M hours	1.5M hours	1.5M hours

				hours				
Min. Hardware Encryption	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit
Lithography	16 nm	16 nm	16 nm					

## OPTICAL DRIVES SPECIFICATIONS

### CD - RW Rambo Drive

HH DVD Recorder	Yes	Yes
Type		
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	146±0.5×41.5±0.5×175(Max)	
	Unit:mm	
Speed	16x/40x Max	
Bay Type	Half-Height	
Color	Business Black	
Removable	No	
Interface Type and Speed	SATA 1.5 Gb/s	
Weight (max) POUNDS/KILOGRAMS	1Kg	
Internal Buffer Size	0.75MB Min	
Access Times (typical)	140 ms	
Rates		
Writes	16x DVD+/-R / 8x DVD+RW/ 6x DVD-RW/5x DVD-RAM	
	40x CD-R / 24x CD-RW	
Reads	40XCD-ROM/16XDVD-ROM	
Power Source		
DC Power Requirements	(+5V±5%; 12V±10%)	
DC Current	Max 2.5A@12V	
	Max 2.0A@5v	

### DVD - ROM Drive

Type	DVD-ROM
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	146±0.5×41.5±0.5×175(Max)
	Unit:mm
Speed	16x/48x Max
Bay Type	Half-Height
Color	Business Black
Removable	No
Interface Type and Speed	SATA 1.5 Gb/s
Weight (max) POUNDS/KILOGRAMS	1Kg

Internal Buffer Size	196KB Min
Access Times (typical)	140 ms
Rates	
Writes	NA
Reads	48XCD-ROM/16XDVD-ROM
Power Source	
DC Power Requirements	(+5V±5%; 12V±10%)
DC Current	Max 2.0A@12V Max 1.5A@5v

### Blu-Ray Burner Drive w/ AACS encryption

HH Blu-ray Recorder	Yes	Yes
Type	Blu-ray Recordable	
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	146±0.5×41.5 +0.5/-0.7×184.7±0.5(Max)	
	Unit:mm	
Speed	6x Max	
Bay Type	Half-Height	
Color	Business Black	
Removable	No	
Interface Type and Speed	SATA 1.5 Gb/s	
Weight (max) POUNDS/KILOGRAMS	1Kg	
Internal Buffer Size	2MB Min	
Access Times (typical)	180 ms	
Rates		
Writes	6x BD-R / 2x BD-RE 16XDVD +R / 8XDVD+RW / 4XDVD+R DL 16XDVD-R / 6XDVD-RW / 4XDVD-R DL 5XDVD-RAM 40XCD-R / 24XCD-RW	
Reads	6x BD-ROM 16XDVD-ROM, 40XCD-ROM	
Power Source		
DC Power Requirements	+5V±5%; 12V±10%	
DC Current	Max 3.0A@12V, Max 1.9A@5v	

#### Disclaimer

As Blu-Ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-Ray titles to play, they may require a DVI or HDMI digital

connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

## SLIM DVD Recorder:

Slim DVD Recorder	(SFF Support Only)
Type	DVD Recordable
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	126.5±0.4×12.7±0.4×128±0.4(Max)
	Unit:mm
Speed	8x Max
Bay Type	12.7mm Slim
Color	Business Black
Removable	No
Interface Type and Speed	SATA 1.5 Gb/s
Weight (max) POUNDS/KILOGRAMS	0.2Kg
Internal Buffer Size	0.5MB Min
Access Times (typical)	160s
Rates	
Writes	8x DVD+/-R / 6x DVD+/-RW/5x DVD-RAM 24x CD-R / 16x CD-RW
Reads	8XDVD-ROM / 24XCD-ROM
Power Source	
DC Power Requirements	+5V±5%
DC Current	Max 2.5A@5v
Slim DVD ROM	
Slim DVD ROM	(SFF Support Only)
Type	DVD ROM
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	126.5±0.4×12.7±0.4×128±0.4(Max)
	Unit:mm
Speed	8x Max
Bay Type	12.7mm Tray
Color	Business Black
Removable	No
Interface Type and Speed	SATA 1.5 Gb/s
Weight (max) POUNDS/KILOGRAMS	0.2Kg
Internal Buffer Size	0.5MB Min
Access Times (typical)	160s

Rates	
Writes	NA
Reads	8XDVD-ROM / 24XCD-ROM
Power Source	
DC Power Requirements	+5V±5%
DC Current	Max 2.5A@5v
Slim - ODD Rambo:	
Slim ODD Rambo	(SFF Support Only)
Type	BD Rambo
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	126.5±0.4×12.7 ±0.4×128±0.4(Max)
	Unit:mm
Speed	6x Max
Bay Type	12.7mm Tray
Color	Business Black
Removable	No
Interface Type and Speed	SATA 1.5 Gb/s
Weight (max) POUNDS/KILOGRAMS	0.2Kg
Internal Buffer Size	2MB Min
Access Times (typical)	160s
Rates	
Writes	6x BD-R / 2x BD-RE  8XDVD +R / 8XDVD+RW / 4XDVD+R DL  8XDVD-R / 6XDVD-RW / 4XDVD-R DL  5XDVD-RAM  24XCD-R / 16XCD-RW
Reads	6XBD-ROM / 8XDVD-ROM / 24XCD-ROM
Power Source	
DC Power Requirements	+5V±5%
DC Current	Max 2.5A@5v
Slim Blu-ray recorder:	
Slim Blu-ray Recorder	(SFF Support Only)
Type	DVD ROM
External Dimensions INCHES/CENTIMETERS (Of Actual Drive Without Bezel-W x H x D)	126.5±0.4×12.7 ±0.4×128±0.4(Max)
	Unit:mm
Speed	8x Max



Bay Type	12.7mm Slim
Color	Business Black
Removable	No
Interface Type and Speed	SATA 1.5 Gb/s
Weight (max) POUNDS/KILOGRAMS	0.2Kg
Internal Buffer Size	1MB Min
Access Times (typical)	160s
Rates	
Writes	NA
Reads	8XDVD-ROM / 24XCD-ROM
Power Source	
DC Power Requirements	+5V±5%
DC Current	Max 2.5A@5v

## 29-in-1 and 9-in-1 Media Card Readers

MEDIA CARD READER	9 in 1	29 in 1
	Description	Description
	The device connects to a 2x5 two channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported.	The Media card reader mounts into our FLEX module which fits into a standard 5.25" Optical bay
	Interface Type	Interface Type
	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)
	Disc Formats	Disc Formats
	SD	xD-H
	SDHC	xD-M
	SDXC	Micro SD
	Mini SD	Micro SDHC
	Mini SDHC	SD
	Micro SD*	SDHC
	Micro SDHC*	SDXC
	Micro SDXC*	Mini SD
	RS-MMC	Mini SDHC
	MMC	MultiMediaCard (MMC)

MMC Micro	Reduced Size MultiMediaCard (RS MMC)
MMC Mobile	(MMC Plus)
MMC Plus	(MMC Mobile)
M2	CompactFlash Card Type I (CF Type 1)
	CF Type 2
	MicroDrive (MD)
	Memory Stick (MS)
	Memory Stick Select
	MS Duo
	MS PRO
	MS PRO DuMS PRO-HG Duo
	MS XS Duo
	MS XC-HG Duo
	MS HG Micro*
	MS XC Micro*
	MS XC-HG Micro*
	MMC Micro
	Memory Stick Micro (M2)*

\*Available with adapter

\*Available with adapter

## Graphics Cards

BOARD FEATURES	Quadro K4200	Quadro K2200	Quadro K1200	Quadro K620	Quadro K420
Memory Size	4GB GDDR5	4GB GDDR5	4GB GDDR5	2GB DDR3	1GB DDR3
Memory Interface	256-bit	128-bit	128-bit	128-bit	128-bit
Memory Bandwidth	173 GBps	80 GBps	80 GBps	29 GBps	29 GBps
NVIDIA® CUDA™ Parallel Processor Cores	1344	640	512	384	192
Max Power Consumption	108W	60W	45W	41W	41W
Power Connector	1 x 6-pin				
Number of slots	1	1	1	1	1
# Simultaneous Displays <sup>2</sup>	4	4	4	4	4
Display Connectors	DVI-I	DVI-I	mDP	DVI-I	DVI-I
	DP	DP	mDP	DP	DP
	DP	DP	mDP		
	3-pin Stereo <sup>1</sup>		mDP		



OpenGL	4.5 7	4.5 7	4.5 7	4.5 7	4.5 7
Shader Model		5	5	5	5
DirectX	12 8	12 8	12 8	12 8	12 8
NVIDIA 3D Vision®Pro	✓✓	✓	✓	✓	✓
NVIDIA® Mosaic Technology	✓✓	✓	✓	✓	✓
Multi-Display Synchronization	Quadro Sync				
NVIDIA SLI® Support5	✓✓				
NVIDIA® nView® Desktop Management Technology	✓✓	✓	✓	✓	✓
High-Performance Video I/O6	✓✓				

1 Optional

2 Includes directly attached displays and displays connected through DisplayPort 1.2 hubs

5 On SLI Certified Platforms

6 Supported via GPUDirect for Video enabled 3rd party I/O boards

7 Product is based on a published Khronos Specification, and is expected to pass the Khronos Conformance Testing Process when available. Current conformance status can be found at [www.khronos.org/conformance](http://www.khronos.org/conformance)

8 GPU supports DX 12 API, Hardware Feature Level 11\_0

9 GPU supports DX 12 API, Hardware Feature Level 12\_1

- See more at: <http://www.nvidia.com/object/compare-quadro-gpus.html#sthash.injul7hK.dpuf>

	NVS 300	NVS 315	NVS 310
Bus Interface	PCI Express x16	PCI Express x16	PCI Express x16
	PCI Express x1		
Memory Size	512 MB DDR3	1024 MB DDR3	512 MB DDR3
Memory Interface	64-bit	64-bit	64-bit
Memory Bandwidth	12.6 GB/s	14 GB/s	14 GB/s
Form Factor	HH	HH	HH
CUDA Processor Cores	16	48	48
Display Connectors	DMS59	DMS59	DisplayPort (2)
Max. Displays per Board	2	2	2
Max Digital Display Support	2560×1600 (DisplayPort)	2560×1600 (DisplayPort)	2560×1600
	1920×1200 (DVI-I)	1920×1200 (DVI-I)	
Max Analog Display Support	2048×1536 (VGA)	2048×1536 (VGA)	1920×1200
OpenGL	3.3	4.1	4.1
DirectX	10.1	11	11
Shader Model	4	5	5
CUDA enabled	Yes	Yes	Yes

Power & Cooling	17.5W - Passive	19.5W - Active5	19.5W - Active5
nView Enabled	Yes	Yes	Yes
DisplayPort Links	26	26	2
DVI Links	27	27	24
Analog Displays VGA	28	28	29
DisplayPort 1.2 Support	No	Yes	Yes
Max Displays in DP 1.2 MST node	N/A	2	2
Max Displays in DP 1.2 Stream Cloning mode	N/A	8	8

2 Through VHDCI to Quad DisplayPort dongle

3 Through VHDCI to Quad DVI-D (Single Link) dongle

4 Through DisplayPort to DVI-D industry standard cables

5 High reliability, variable speed fansink

6 Using DMS59 to DisplayPort Cable Adaptor

7 Using DMS59 to DVI-I Cable Adaptor

8 Using DMS59 to VGA Cable Adaptors

9 Through DisplayPort to VGA industry standard cables

- See more at: <http://www.nvidia.com/object/nvs-compare-product-specs.html#sthash.uexqazcZ.dpuf>