

# Power Configurator

Lenovo ThinkStation P620



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## Overview

The ThinkStation P620 is the first AMD CPU powered workstation in the Lenovo ThinkStation portfolio. It offers processors with up to 64 cores, PCIe Gen 4 support, both Nvidia Quadro RTX and AMD Radeon Pro GPUs, and up to 1TB of system memory to support the most demanding workstation applications.

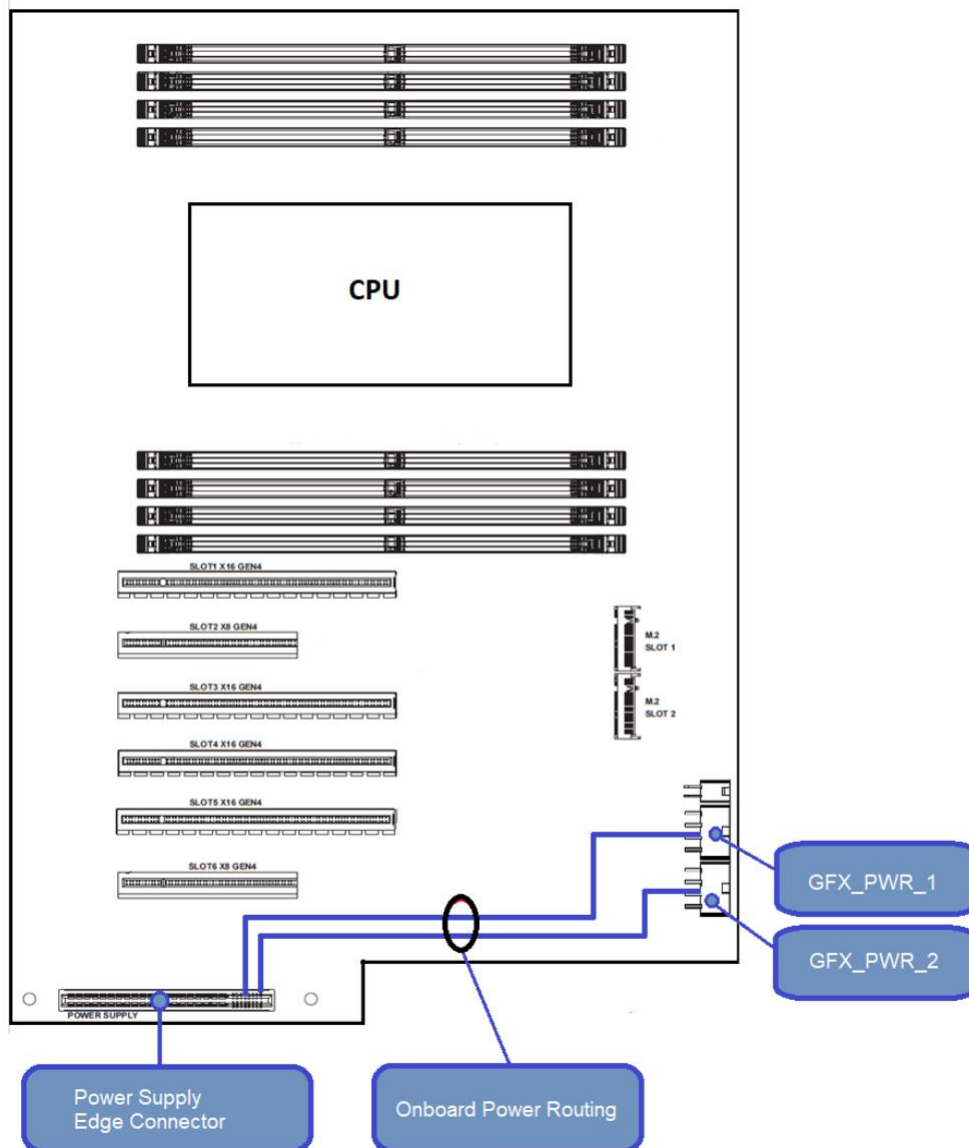
The purpose of this document is to highlight system power requirements so that users can make informed decisions on how to maximize component configuration while remaining within the P620 power budget.

## Section 1 – Key Architectural Design

The ThinkStation P620 has a power subsystem design that is very similar to that of the P520 ThinkStations. The power supply (PSU) for P620 is the same 1000W supply that is used in P520.

The PSU is connected to the motherboard via an edge connector at the bottom of the motherboard (see Figure 1 below). The PSU also has an integrated latch that locks the PSU into place both mechanically and electrically when it is inserted into the chassis and mated with the edge connector on the motherboard.

Figure 1: P620 power design



As illustrated in Figure 1, auxiliary power for certain add-in cards is routed to two connectors on the lower righthand corner of the board (labeled GFX\_PWR\_1 and GFX\_PWR\_2). Each of these connectors is populated with a wire harness that terminates into two connectors, one 6-pin and one 8-pin (the 8-pin connector is technically a 6+2-pin connector, which can be inserted into either a 6-pin or 8-pin connector on an add-in card). Examples of each of these connectors can be found in the Appendix at the end of this document.



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## Section 2 – Power Ratings for Key System Components

To fully understand the power capabilities of the ThinkStation P620 platform, it's important to understand the defined power ratings for the various internal components used within the system. Figure 3 shows the power ratings for all CPUs supported on the P620 platforms.

*Figure 3 - CPU Power Ratings*

CPU Name (Threadripper Pro)	CPU Power	Additional CPU Information
<b>3945WX</b>	280W	4.0GHz, 12 cores, 64M L3 cache, 3200MHz
<b>3955WX</b>	280W	3.9GHz, 16 cores, 64M L3 cache, 3200MHz
<b>3975WX</b>	280W	3.5GHz, 32 cores, 128M L3 cache, 3200MHz
<b>3995WX</b>	280W	2.7GHz, 64 cores, 256M L3 cache, 3200MHz

Figure 4 lists the power ratings for the various add-in cards supported on the P620 platform.

Figure 4 - Add-in Card Power Ratings



Max Power Rating	Card Name	Card Type	Aux Power Connectors Required (if any)
<b>320W</b>	GeForce RTX 3080	Graphics Card (2.5 Slot)	Dual 8-pin (PCIe)
<b>300W</b>	RTX A6000	Graphics Card (Dual Slot)	8-pin (EPS) to dual 8-pin (PCIe)
<b>295W</b>	RTX 6000, RTX 8000	Graphics Card (Dual Slot)	8-pin + 6-pin (PCIe)
<b>265W</b>	RTX 5000	Graphics Card (Dual Slot)	8-pin + 6-pin (PCIe)
<b>250W</b>	GeForce RTX 2080 Super	Graphics Card (2.5 Slot)	8-pin + 6-pin (PCIe)
<b>250W</b>	GV100	Graphics/Compute Card (Dual Slot)	8-pin (PCIe)
<b>230W</b>	RTX A5000	Graphics Card (Dual Slot)	8-pin (PCIe)
	Radeon Pro VII	Graphics Card (Dual Slot)	8-pin + 6-pin (PCIe)
<b>205W</b>	Radeon Pro W5700	Graphics Card (Dual Slot)	8-pin + 6-pin (PCIe)
<b>200W</b>	GeForce RTX 3060Ti	Graphics Card (2.5 Slot)	8-pin (PCIe)
<b>160W</b>	RTX 4000	Graphics Card (Single Slot)	8-pin (PCIe)
<b>140W</b>	RTX A4000	Graphics Card (Single Slot)	6-pin (PCIe)
<b>130W</b>	Radeon Pro W5500	Graphics Card (Single Slot)	6-pin (PCIe)
<b>75W (or less)</b>	T1000, T600, P620, P1000, P2200 Radeon Pro WX3200	Graphics Card (Single Slot)	None
	Aquantia 10G	Networking (Single Slot)	None
	Thunderbolt	High Speed Bus (Single Slot)	None

## Section 3 – P620 Power Configurations

P620 supports a single 1000W power supply, which allows for many different GPU configurations. The following tables show allowable GPU configurations for both Nvidia and AMD cards.

### General Rules

- Nvidia and AMD graphics cards cannot be mixed
- Different models of AMD graphics cards cannot be mixed

### Nvidia GPU Configurations

- Both onboard power connections are active (GFX\_PWR1 and GFX\_PWR2).
- Includes dual 8-pin + 6-pin drop cables for powering GPUs or other cards.
- Provides 2 dedicated 12V rails.
- Some supported GPU configurations might require additional cabling (See Appendix).

CPU (280W)

All RDIMM Memory

No Storage Limitations

#### GPU Support

320W (2.5 Slot) x 1  
OR  
300W (Dual Slot) x 1  
OR  
295W (Dual Slot) x 2  
OR  
265W (Dual Slot) x 2  
OR  
250W (2.5 Slot) x 1  
OR  
230W (Dual Slot) x 2

OR

[250W (Dual Slot) x 2  
and up to  
75W (Single Slot) x 1]

OR

[250W (Dual Slot) x 1  
and up to  
75W (Single Slot) x 2]

OR

160W (Single Slot) x 4

OR

75W (Single Slot) x 4

Dual 8 + 6 pin  
Power Drop



## AMD GPU Configurations

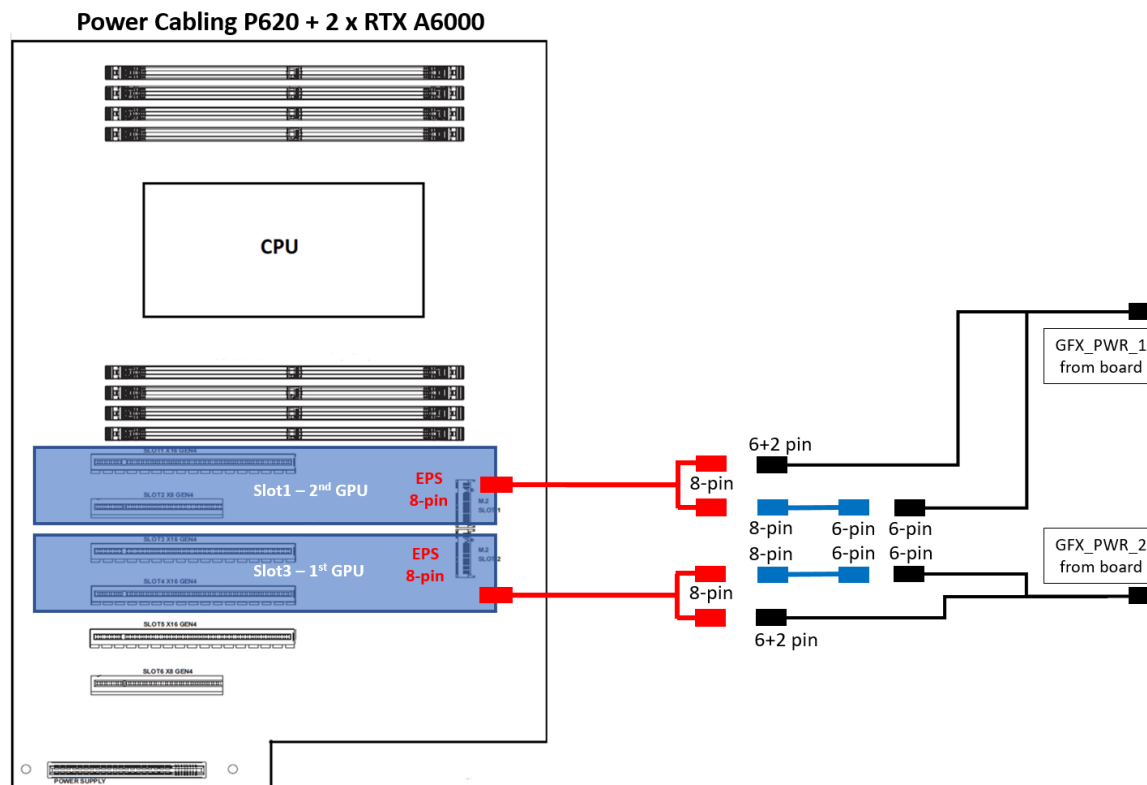
- Both onboard power connections are active (GFX\_PWR1 and GFX\_PWR2).
- Includes dual 8-pin + 6-pin drop cables for powering GPUs or other cards.
- Provides 2 dedicated 12V rails.
- Some supported GPU configurations might require additional cabling (See Appendix).

CPU (280W)	All RDIMM Memory	No Storage Limitations	<p><b>GPU Support</b></p> <p>230W (Dual Slot) x 2 OR 205W (Dual Slot) x 1 OR 130W (Single Slot) x 4 OR 75W (Single Slot) x 4</p> <p>Dual 8 + 6 pin Power Drop</p>
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- **For configurations that are not listed above but appear to be feasible, please work with the Technical Solutions Team to have the configuration validated/vetted.**
- Officially supported configurations could still be limited by additional factors not defined within this document.

## Section 4 – P620 with dual RTX A6000

Use the following diagram to assist with configuring P620 with dual RTX A6000 adapters.



### Notes:

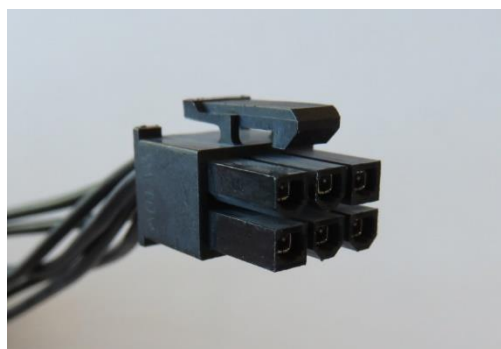
1. The RTX A6000 adapter has an EPS12V 8-pin connector, not to be confused with a PCIe 8-pin connector. This card ships with the EPS 8-pin to dual PCIe 8-pin splitter cable (**Red Cable**) listed above.
2. Part numbers for the other cable listed above:  
**Blue Cable**, PCIe 8-pin to PCIe 6-pin (100mm): FRU 00XL159

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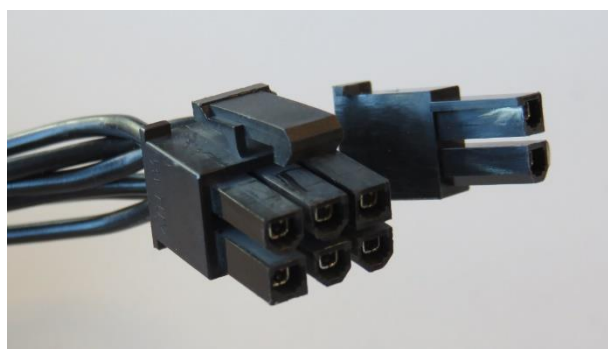
## Section 5 – Appendix

This section contains additional useful information about the hardware used to power adapter cards in ThinkStation systems.

### *PCIe Power Connectors*



***6-pin PCIe Power Connector***

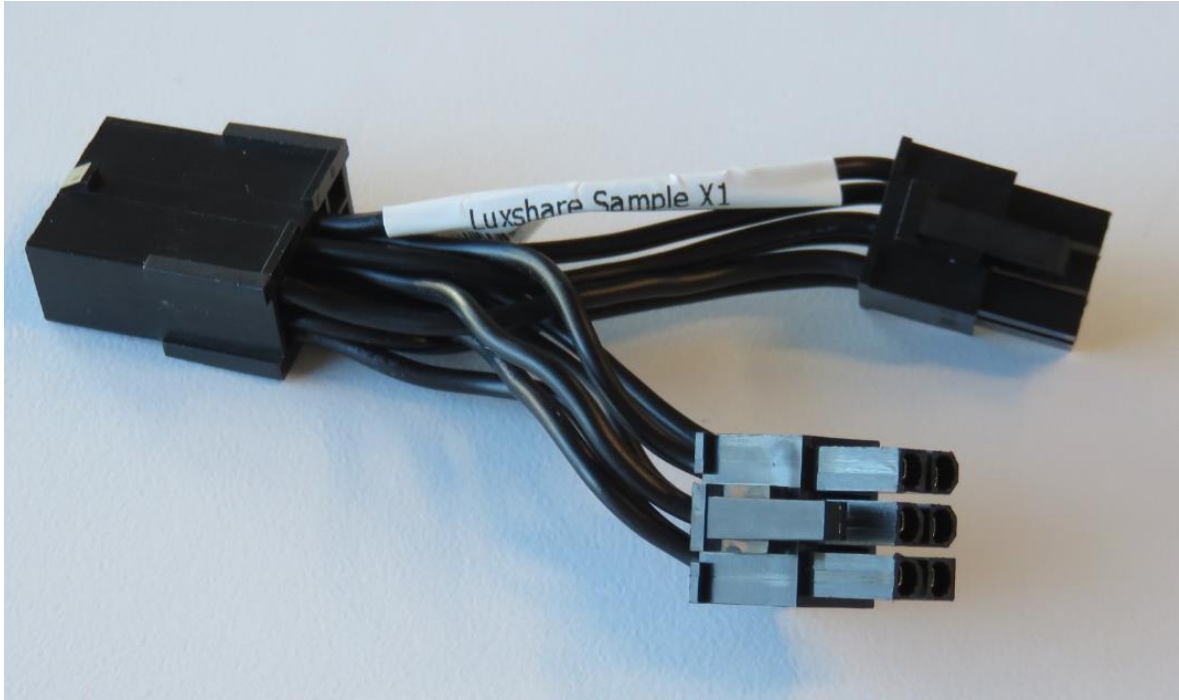


***6+2 pin PCIe Power Connector***

### *Supported PCIe Power Cable Adapters*



***6-pin PCIe to 8-pin PCIe Converter, 100mm (FRU = 00XL159)***



**8-pin to dual 6-pin PCIe Splitter, 50mm (FRU = 04X2387)**



**EPS 8-pin to dual PCIe 8-pin**

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## Section 6 – Revision History

Version	Date	Author	Changes/Updates
1.2	8/25/2021	Jim Pfaltzgraff	Added new GPUs to matrix Added section for dual RTX A6000 config Added some new cable pictures in the Appendix
1.1	6/6/2021	Jim Pfaltzgraff	Added new GPUs to matrix
1.0	7/15/2020	Jim Pfaltzgraff	Initial launch release