

Power Configurator

Lenovo ThinkStation P5



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Overview

The purpose of this document is to provide ThinkStation P5 users with overview of the power configurations available with the P5. Additionally, information provided here will cover the available combinations of PSU, CPU, and GPU to ensure users can build their maximum ideal system configuration while remaining within the approved power budget of the system.

Section 1 – Key Architecture Design

The ThinkStation P5 offers two PSU sizes. The 750W PSU is a more traditional PSU that attaches to the motherboard via cabling, while the 1000W PSU connects to the motherboard via a Power Distribution Board (PDB). The PSU and CPU combination will determine what GPUs can be supported.

Both power supplies mount to the inside of the chassis in the same location. Power for the GPUs comes from an 8-pin PCIE GPU power cable on the 750W PSU. When using a 1000W PSU the GPU power comes from up to two 12VHPWR power plugs on the PDB. See Figures 1 and 2 below for more detail on the 1000W PSU configuration and Figure 3 below for more information on the 750W PSU.

Figure 1 – 1000W Toolless PSU, PDB, and 12VHPWR connections

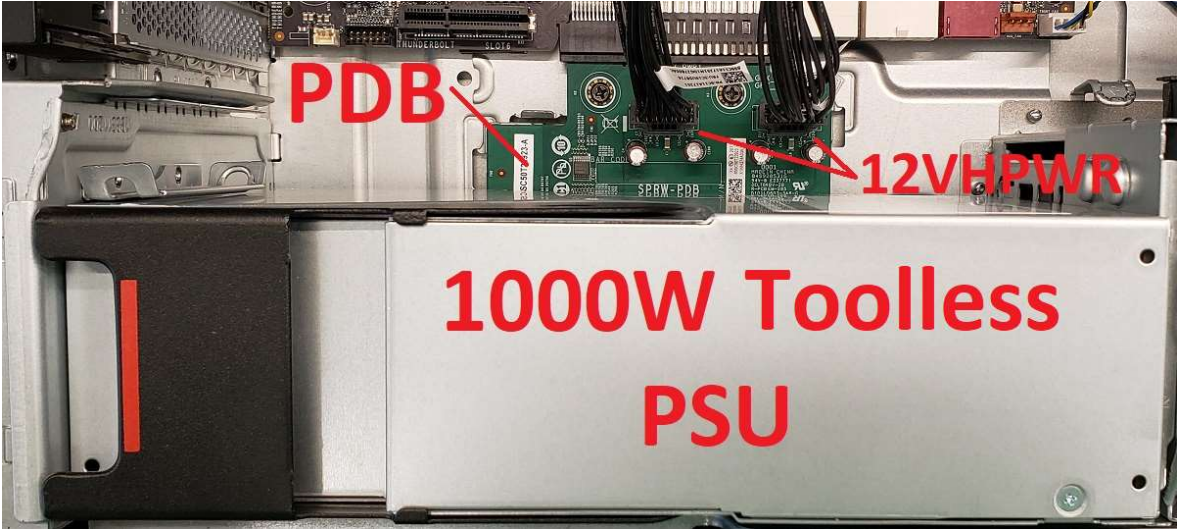


Figure 2 – 12VHPWR connections to dual GPUs

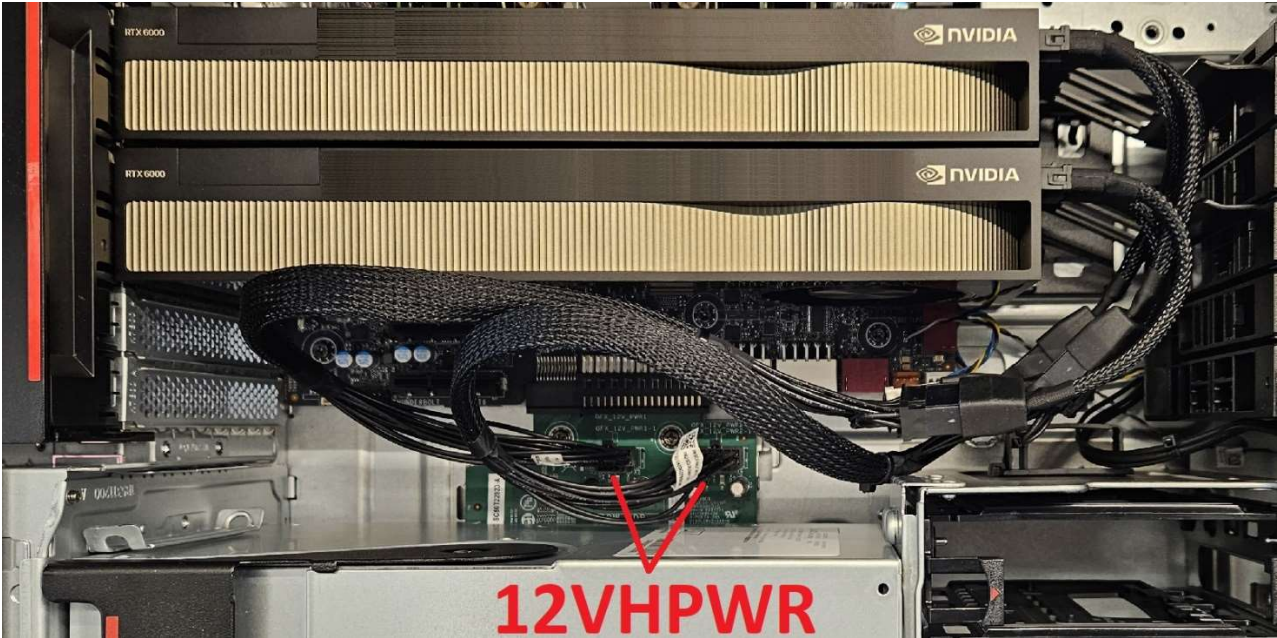
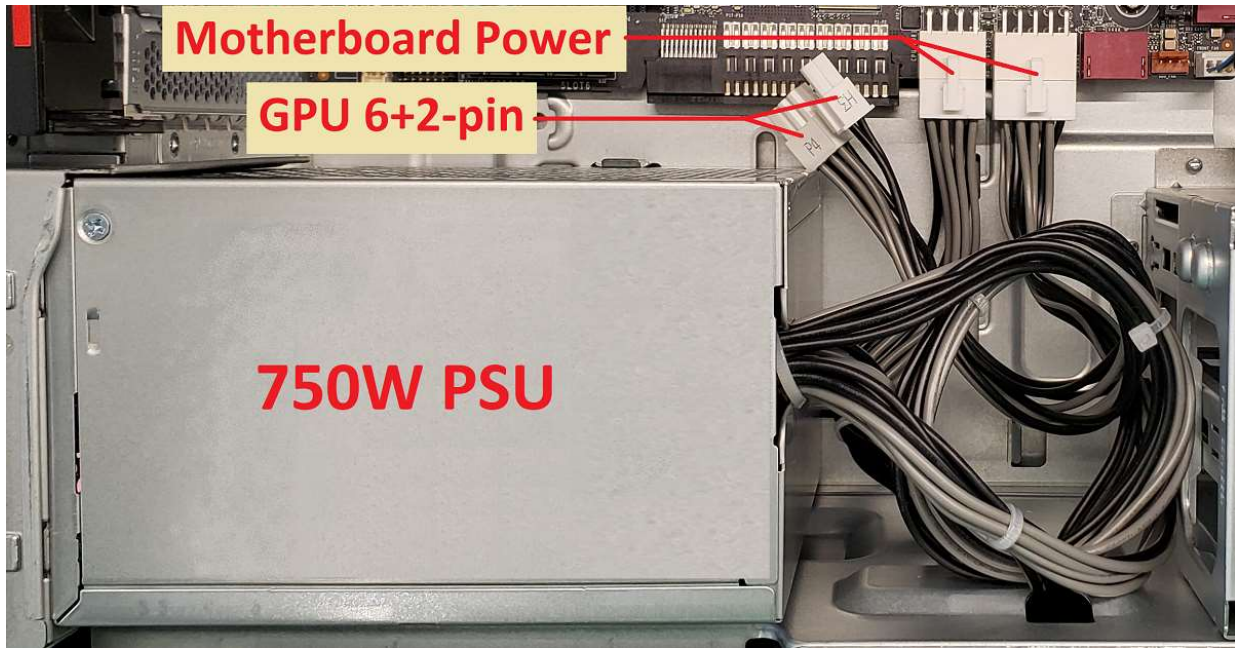


Figure 3 – 750W PSU, motherboard power connections and 6+2-pin PCIe GPU power plug



Note: See [Appendix](#) section for detailed drawings and additional information on the GPU cables and adapters.

Section 2 – Power Ratings for Key System Components

It is important to know the power ratings for various internal components used to fully understand the power capabilities within the ThinkStation P5 platform. See Table 1 for CPU power ratings and Table 2 for PCIe add-in GPU ratings.

Table 1 – CPU Power Ratings

Intel Xeon 4th Gen Intel Xeon W-series Processors

CPU Name	CPU Base Power	Additional CPU Information
W7-2495X	225W	2.5GHz, 24 cores, 45MB Cache, DDR5-4800
W7-2475X	225W	2.6GHz, 20 cores, 37.5MB Cache, DDR5-4800
W5-2465X	200W	3.1GHz, 32 cores, 33.75MB Cache, DDR5-4800
W5-2455X	200W	3.2GHz, 12 cores, 30MB Cache, DDR5-4800
W5-2445	175W	3.1GHz, 10 cores, 26.25MB Cache, DDR5-4800
W3-2435	165W	3.1GHz, 8 cores, 22.5MB Cache, DDR5-4800
W3-2425	130W	3.0GHz, 6 cores, 15MB Cache, DDR5-4400
W3-2423	120W	2.1GHz, 6 cores, 15MB Cache, DDR5-4400

Table 2 – Add-in Card Power Ratings

Max Power Rating	Card Name	Card Type	Aux Power Connectors on GPU (if any)	Lenovo Aux Power Cables Required (if any)
300W¹	RTX A6000 (48GB)	Graphics Card (Dual Slot)	8-pin (EPS)	12VHPWR to EPS 8pin*
230W	RTX A5500 (24GB)	Graphics Card (Dual Slot)	8-pin (PCIe)	12VHPWR to Dual PCIe 8pin*
200W	RTX A4500 (20GB)	Graphics Card (Dual Slot)	8-pin (PCIe)	12VHPWR to Dual PCIe 8pin*
200W	GeForce 3060Ti (8GB)	Graphics Card (Triple Slot)	8-pin (PCIe)	12VHPWR to Dual PCIe 8pin*
140W	RTX A4000 (16GB)	Graphics Card (Single Slot)	6-pin (PCIe)	12VHPWR to Dual PCIe 8pin ^{2*}
75W³ Max	RTX A2000 (12GB)	Graphics Card (Dual Slot)	None	None
	T1000(8GB) T400(8GB)	Graphics Cards (Single Slot)	None	None
	Quadro Sync II	Graphics Sync Card (Single Slot)	SATA Power	SATA power to 4-pin*
	Other PCIe Cards	Other PCIe Cards	None	None

* See [Appendix](#) section for detailed drawings and additional cabling information.

Note 1: Even though the new RTX 6000 Ada GPUs are also 300W, they utilize the power differently than the RTX A6000 GPUs. Support for the Ada GPUs has yet to be determined and may be different from earlier 300W GPUs.

Note 2: When using dual RTX 4000 cards with a 750W PSU, an 8-pin to dual 6-pin splitter is required. See Appendix for example.

Note 3: GPUs and Other PCIe Cards that are ≤75W receive power from the PCIe slot and do not need any Aux Power Cables. The Quadro Sync II card occupies a slot on the system board but only receives power from the SATA power to 4-pin Aux Power Cable. See Appendix for example.

Table 3 – Quantity of Cables

GPU	GPU Quantity	Lenovo Aux Power Cables Derived	
		12VHPWR 2x6+4pin to Dual PCIe 6+2pin, 270mm	12VHPWR 2x6+4pin to CPU 8pin, 270mm
None	0	1	0
RTX A6000 (48GB)	1	1	1
	2	0	2
RTX A5500 (24GB) or RTX A4500 (20GB)	1	2	0
	2	2	
GeForce RTX 3060Ti (8GB)	1	2	0
RTX 4000 (16GB)	1	2	0
	2	2	
Non-Aux GPUs	Up to 2	1	0



Section 3 – P5 Power Configurations

The ThinkStation P5 platform can support either a 1000W power supply or a 750W power supply. Support of individual, as well as dual GPU configurations are dependent upon which CPU and PSU combination is installed in the system. The following tables show general guidance for allowable GPU configurations based on the PSU and CPU in use.

Table 4 – GPU Availability with a 1000W PSU

1000W limit 100-240VAC input						
GPU	Processor Base Power (W)					
	225	200	175	165	130	120
RTX A6000 (300W)	2					
RTX A5500 (250W)						
RTX A4500 (200W)						
RTX A4000 (140W)						
RTX A2000 (≤75W)						
T1000/T400 (≤75W)						
Non-aux GPU (≤75W)						

Note: Due to the GeForce 3060Ti (200W) occupying 3 slots, the system can only support 1 of these GPUs

Table 5 – GPU Availability with a 750W PSU

750W limit 100-240VAC input						
GPU	Processor Base Power (W)					
	225	200	175	165	130	120
RTX A6000 (300W)	Not Supported					
RTX A5500 (250W)						
RTX A4500/ GeForce 3060Ti (200W)	1					
RTX A4000 (140W)	2					
RTX A2000 (≤75W)						
T1000/T400 (≤75W)						
Non-aux GPU (≤75W)						

Note: The 750W PSU provides one line of 8-pin (6+2-pin) PCIe GPU power coming directly from the PSU

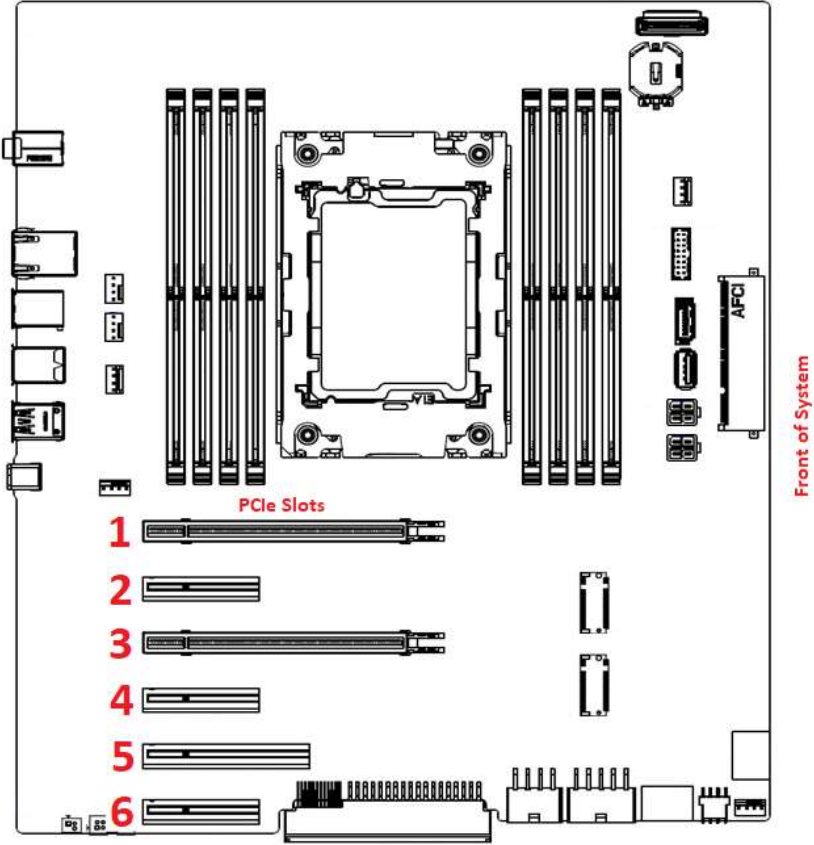
Section 4 – PCIe Slot Layout

Since the ThinkStation P5 platform introduces PCIe Gen 5 support, it is important to note the capability of each of the PCIe slots within the system. Table 5 below gives some detailed information about the PCIe slots in the P5 ThinkStation. Figure 4 below identifies the locations of the PCIe slots on the system board.

Table 6 – PCIe Slot Information

PCIe Slot Number	Slot Width	Generation	Installation Priority
PCIe Slot 1	x16	Gen 5	2
PCIe Slot 2	x4	Gen 4	4
PCIe Slot 3	x16	Gen 5	1
PCIe Slot 4	x4	Gen 4	5
PCIe Slot 5	x8	Gen 4	3
PCIe Slot 6	x4	Gen 4	6

Figure 4 – Location of PCIe Slots on the P5 Motherboard



Section 5 – Configuration Notes

There are a few items to note about power considerations in the ThinkStation P5.

- Mixed graphics card configurations are not supported.
- Both PSUs support the PCIe GPU 8(6+2)-pin power cables, but the 1000W PSU includes support for the new 12VHPWR GPU power cables which, depending on the implementation, do not need any adapters for some of the latest GPUs.
- The 750W and 1000W PSUs connect to the system using different methods. If upgrading a 750W PSU to a 1000W PSU, it will be necessary to install the Power Distribution Board (PDB) into the side of the motherboard first. The 1000W PSU will then insert into the PDB. Additionally, the GPU power cables are directly connected to the PDB and will need to be acquired separately.
- Officially supported configurations could still be limited by additional factors not defined within this document. **Please work with the Customer Solutions Team on any configurations that do not appear to be covered in this document!**

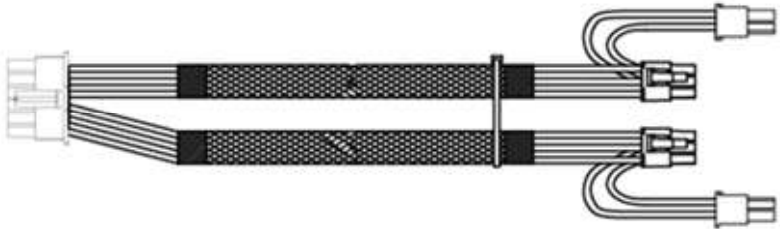
Appendix

Here are the auxiliary power cables used in the ThinkStation P5 platform. Unless otherwise noted, these are included in a system only when they are needed for a specific part.

1000W PSU Auxiliary Power Cables

12VHPWR to Dual PCIe 8-pin, 375mm (FRU# 5C10U58716)

At least one of these cables is provided in every 1000W system, even if there is no GPU that requires it.



12VHPWR to CPU 8-pin, 375mm (FRU# 5C10U58715)



750W PSU Auxiliary Power Cable

8-pin to Dual 6-pin Adapter (FRU# 5C10U58552)



PSU Independent Auxiliary Power Cable

SATA Power to 4-pin for Quadro Sync II Adapter (FRU# 5C10U58668)



Revision History

Version	Date	Author	Changes/Updates
1.0	4/19/2023	Scott C	Initial launch release