Power Configurator

Lenovo ThinkStation P3 Tower

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Overview

The ThinkStation P3 Tower platform is the latest entry level ThinkStation. The following power supply (PSU) options are available for P3 Tower:

<p align="center" style="color:red">P3 Tower PSU options: 500W / 750W / 1100W</p>

These power supplies allow the P3 platform to support an expanded configuration of system components, notably the Intel Raptor Lake CPU family and GPUs.

The goal of this document is to highlight the specifications of the system components with the highest power demand and allow users to make the best decisions when choosing the correct PSU for their hardware configuration.

Section 1 – Key Architectural Design

The P3 utilizes a standard approach to powering system components. All onboard components and standard peripherals are powered through the system board power delivery. However, some add-in cards can require additional power provided by cable connections directly from the power supply (PSU). The diagrams in Figure 1 show a high-level design of how the power supply connects directly to the system board and add-in cards.

Note: In configurations without aux-powered GPUs, the unused aux power cable is bundled up and the 6+2 (12VHPWR for 1100W) pin connector is secured behind the front panel.

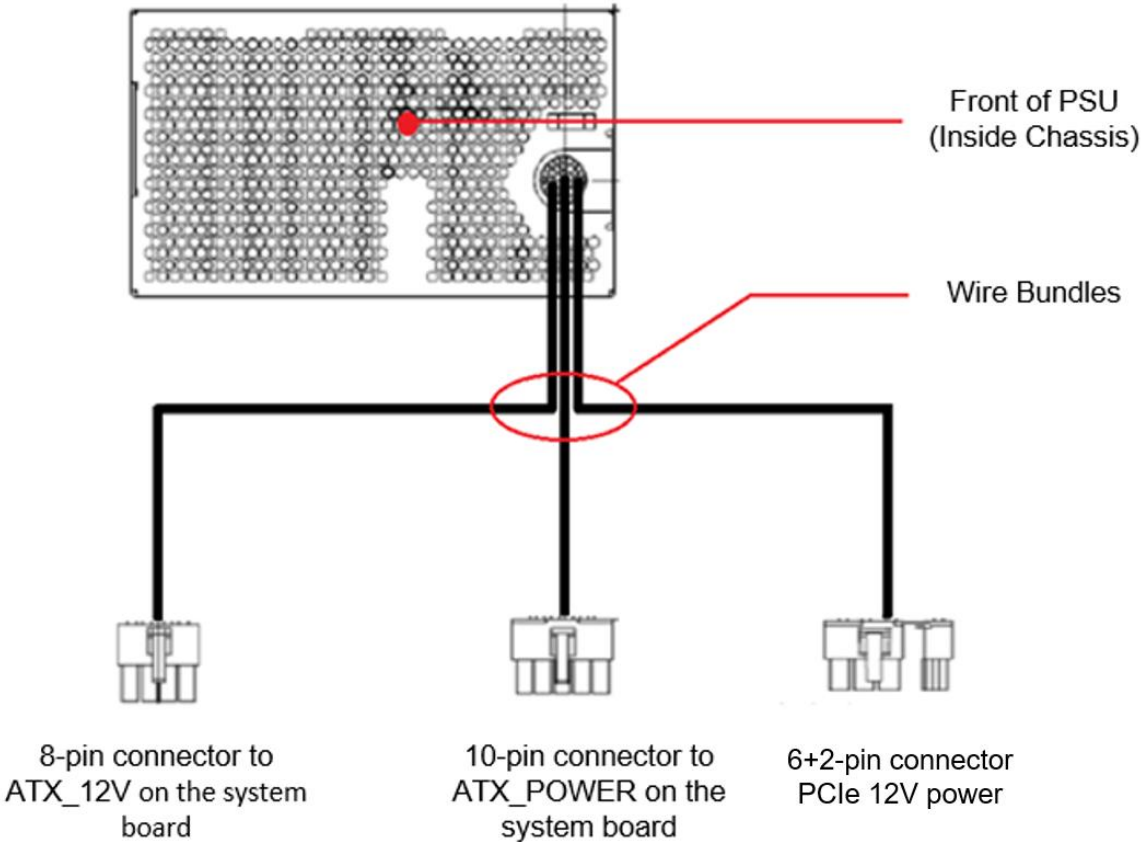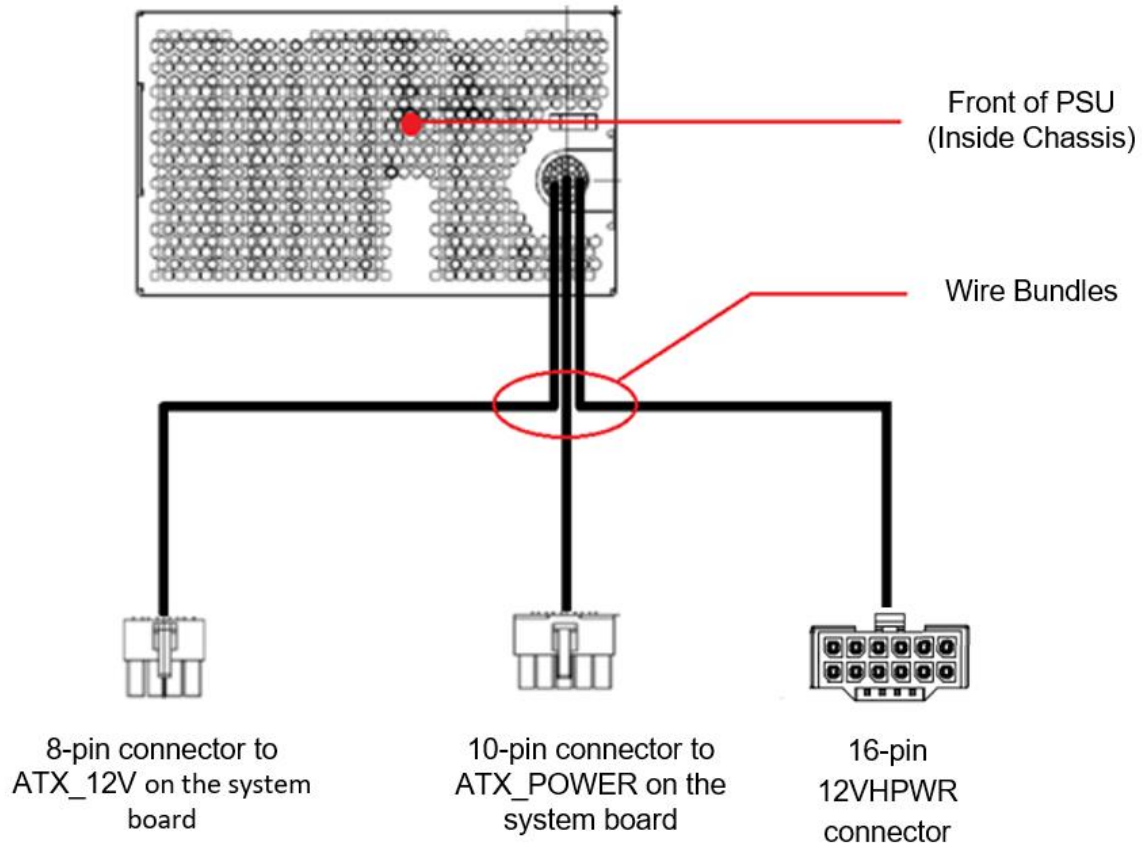*Figure 1 – P3 Power Design 500W, 750W*

Front of PSU
(Inside Chassis)

Wire Bundles

8-pin connector to ATX_12V on the system board

10-pin connector to ATX_POWER on the system board

6+2-pin connector PCIe 12V power

Figure 2 – P3 Power Design 1100W

Front of PSU
(Inside Chassis)

Wire Bundles

8-pin connector to
ATX_12V on the system
board

10-pin connector to
ATX_POWER on the
system board

16-pin
12VHPWR
connector
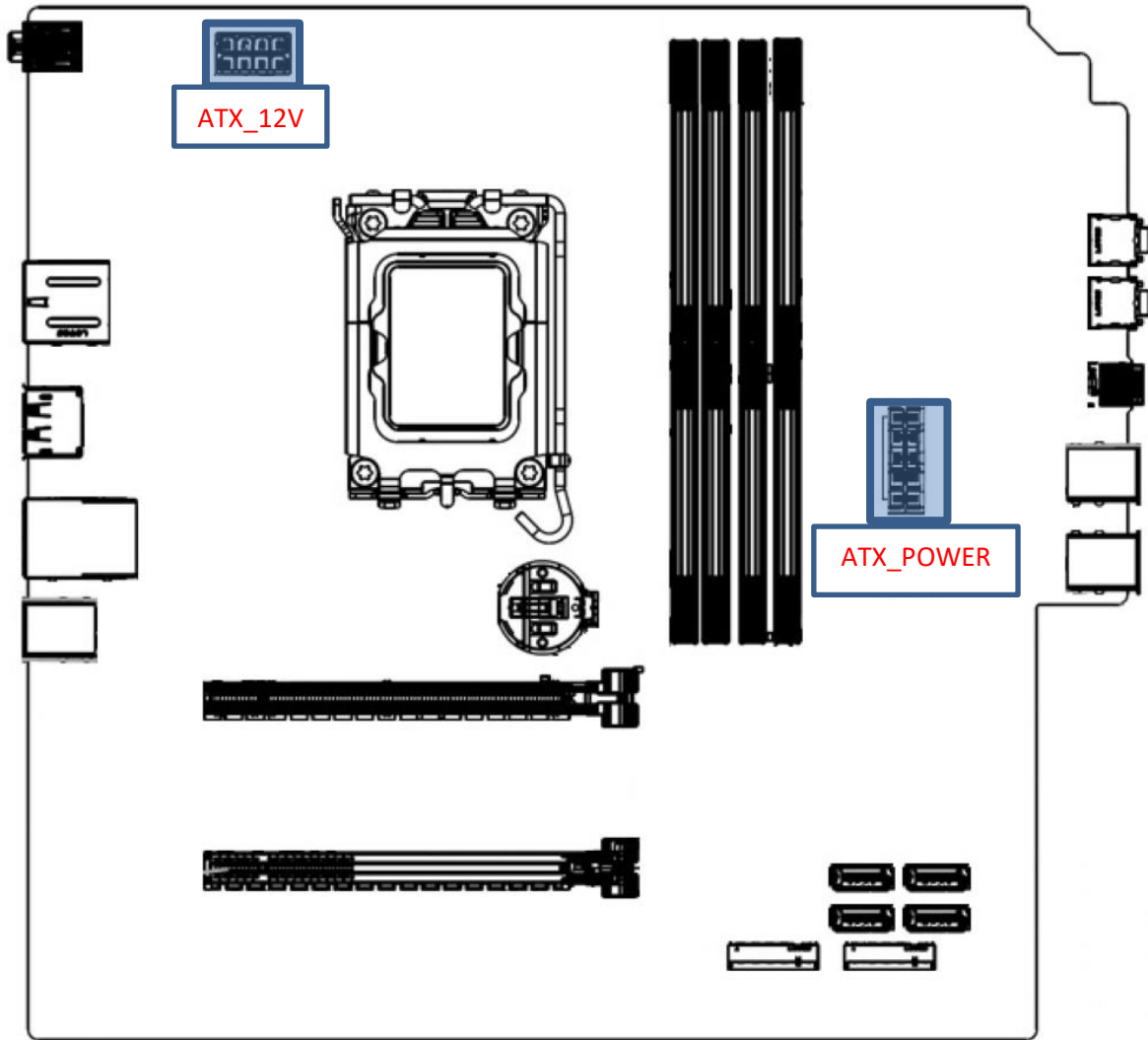
Note: In configurations with the 1100W PSU, the GPU power plug is a 12VHPWR connector instead of the traditional PCIe 6+2 pin connectors.

Figure 3 – P3 Tower Motherboard

ATX_12V

ATX_POWER

Section 2 – Power Ratings for Key System Components

To fully understand the power capabilities of the ThinkStation P3 Tower, it is important to know the power ratings of the individual system components.

Table 1 and 2 shows the power ratings for the various CPUs supported on P3 Tower.

Table 1 - Raptor Lake CPU Power Ratings

CPU Name	CPU Power	Additional CPU Information
Core i9-13900K	125W	3.0 GHz, 24 cores, DDR5-5600
Core i7-13700K	125W	3.4 GHz, 16 cores, DDR5-5600
Core i5-13600K	125W	3.5 GHz, 14 cores, DDR5-5600
Core i9-13900	65W	2.0 GHz, 24 cores, DDR5-5600
Core i7-13700	65W	2.1 GHz, 16 cores, DDR5-5600
Core i5-13600	65W	2.7 GHz, 14 cores, DDR5-5600
Core i5-13500	65W	2.5 GHz, 14 cores, DDR5-5600
Core i5-13400	65W	2.5 GHz, 10 cores, DDR5-5600
Core i3-13100	60W	3.4 GHz, 4 cores, DDR5-4800

Table 2 - Raptor Lake Refresh CPU Power Ratings

CPU Name	CPU Power	Additional CPU Information
Core i9-14900K	125W	3.2 GHz, 24 cores, DDR5-5600
Core i7-14700K	125W	3.4 GHz, 20 cores, DDR5-5600
Core i5-14600K	125W	3.5 GHz, 14 cores, DDR5-5600
Core i9-14900	65W	2.0 GHz, 24 cores, DDR5-5600
Core i7-14700	65W	2.1 GHz, 20 cores, DDR5-5600
Core i5-14600	65W	2.7 GHz, 14 cores, DDR5-5600
Core i5-14500	65W	2.6 GHz, 14 cores, DDR5-5600
Core i5-14400	65W	2.5 GHz, 10 cores, DDR5-5600
Core i3-14100	60W	3.5 GHz, 4 cores, DDR5-4800

Note: All CPUs supported on P3 Tower have integrated GPU.

Table 3 lists the power ratings for the various add-in cards supported in P3 Tower.

Table 3 - Add-in Card Power Ratings

Max Power Rating	Card Name	Card Type	Aux Power Connectors on GPU (if any)
320W	RTX 4080 (16GB)	Graphics Card (Quad Slot)	12VHPWR
	RTX 3080 (10GB)	Graphics Card (Triple Slot)	Dual 8-pin (PCIe)
250W	RTX 5000 Ada (32GB)	Graphics Card (Dual Slot)	12VHPWR
230W	RTX A5500 (24GB)	Graphics Card (Dual Slot)	8-pin (PCIe)
	RTX A5000 (24GB)	Graphics Card (Dual Slot)	8-pin (PCIe)
210W	RTX 4500 Ada (24GB)	Graphics Card (Dual Slot)	12VHPWR
200W	RTX A4500 (20GB)	Graphics Card (Dual Slot)	8-pin (PCIe)
	RTX 4070 (12GB)	Graphics Card (Triple Slot)	8-pin (PCIe)
170W	RTX 3060 (12GB)	Graphics Card (Dual Slot)	8-pin (PCIe)
140W	RTX A4000 (16GB)	Graphics Card (Single Slot)	6-pin (PCIe)
130W	RTX 4000 Ada (20GB)	Graphics Card (Single Slot)	12VHPWR
115W	RTX 4060 (8GB)	Graphics Card (Dual Slot)	8-pin (PCIe)
75W max	T400 (4GB) T1000 (8GB)	Graphics Card (Single Slot)	None
	RTX A2000 (12GB) RTX 2000 Ada (16GB)	Graphics Card (Dual Slot)	None
	Other PCIe Cards	Other PCIe Cards (Single Slot)	None

Note: Stated Max Power Rating of GPUs may vary from specifications given by vendors or other online sources.

Table 4 lists the power cables required for the various GPU cards supported in the P3 Tower based on PSU.

Table 4 - GPU power cable requirements

Card Name	Power Cables for 1100W (12VHPWR)	Power Cables for 750W (6+2)	Power Cables for 500W (6+2)
RTX 4080 (16GB)	No adapter required	Not supported	Not supported
RTX 5000 Ada (32GB)	No adapter required	8-pin PCIe to 12HPWR[1]	Not supported
RTX 4500 Ada (24GB)	No adapter required	8-pin PCIe to 12HPWR[1]	Not supported
RTX 4000 Ada (20GB)	No adapter required	8-pin PCIe to 12HPWR[1]	Not supported
RTX 3080 (10GB)	12VHPWR to dual 6+2-pin[2]	8-pin to dual 8-pin PCIe[3]	Not supported
RTX A5500 (24GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
RTX A5000 (24GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
RTX A4500 (20GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
RTX 4070 (12GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
RTX 3060 (12GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
RTX A4000 (16GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
RTX 4060 (8GB)	12VHPWR to dual 6+2-pin[2]	No adapter required	Not supported
T400 (4GB) T1000 (8GB)	No adapter required (PCIe slot powered only)		
RTX A2000 (12GB) RTX 2000 Ada (16GB)	No adapter required (PCIe slot powered only)		

For more detailed information refer to [Appendix](#).

For more detailed information refer to [P3 Tower Power Configurations](#).

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[1] 8-pin PCIe to 12VHPWR – FRU# 5C10U58768
[2] 12VHPWR to dual 6+2-pin – FRU# 5C10U58750 (included in option kit 4XF1M24241)
[3] 8-pin to dual 8-pin PCIe – FRU# 5C10U58353 (included in option kit 4XF1M24241)

Section 3 – P3 Tower Power Configurations

P3 Tower supports 500W, 750W and 1100W power supplies, which allow customers to tailor their system to best meet the requirements of the components they intend to support. The following diagrams and notes show allowable hardware configurations for systems with any of the above power supplies.

Note: While the 500W power supply has a functional 6+2pin PCIe auxiliary power connector, auxiliary-powered GPUs are not supported for use with this power supply by Lenovo at the time of this writing. Please refer to P3 Tower Power Supply Configuration Notes.

500 Watt PSU

- Single 6+2 pin PCIe auxiliary power drop*
- GPUs cannot be mixed in dual-GPU configs GPU
- For additional considerations refer to Table 5

CPU - up to 125W	All UDIMM Memory	No Storage Limitations	GPU Support
			75W x 2 no AUX powered discrete GPUs supported

PCIe power drop is functional, but Lenovo does not support using it to power GPUs at this time.

750 Watt PSU

- Single 6+2 pin PCIe auxiliary power drop
- Provides single dedicated 12V rail
- GPUs cannot be mixed in dual-GPU configs
- Some supported GPU configurations might require additional cabling (See Appendix)
- Comes with a side fan assembly
- For additional considerations refer to Table 5

*Cannot support Nvidia 4080 GPU

CPU - up to 125W	All UDIMM Memory	SATA bay 4 is not supported**	GPU Support
			320W x 1* or 300W x 1 or 250W x 1 or 230W x 1 or 200W x 1 or 140W x 1 or 75W x 2

1100 Watt PSU

- Single 16-pin 12VHPWR auxiliary power drop
- Provides single dedicated 12V rail
- GPUs cannot be mixed in dual-GPU configs
- Some supported GPU configurations might require additional cabling (See Appendix)
- Comes with a side fan assembly
- For additional considerations refer to Table 5

CPU - up to 125W	All UDIMM Memory	SATA bay 4 is not supported**	GPU Support
			320W x 1 or 300W x 1 or 250W x 1 or 230W x 1 or 200W x 1 or 140W x 1 or 75W x 2

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** SATA bay 4 is not supported for 750W and 1100W PSUs due to side fan assembly interference.

Table 5 provides additional GPU information based on CPU and PSU combinations.

Table 5 – Additional GPU information based on CPU and PSU combinations.

| CPU Name	1100W PSU	750W PSU	500W PSU
Intel Core i9-14900K	No GPU limitations		No support for any discrete GPU
Intel Core i7-14700K			
Intel Core i9-13900K			
Intel Core i7-13700K			
Intel Core i9-14900		Only one Nvidia 2000 Ada can be supported	Only one 75W GPU can be supported
Intel Core i7-14700			
Intel Core i9-13900			
Intel Core i7-13700			

P3 Tower Power Supply Configuration Notes:

- Officially supported configurations could still be limited by additional factors not defined within this document.
- Some supported GPU/add-in-card configurations might require additional cabling to be supported. See Appendix.
- **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.**
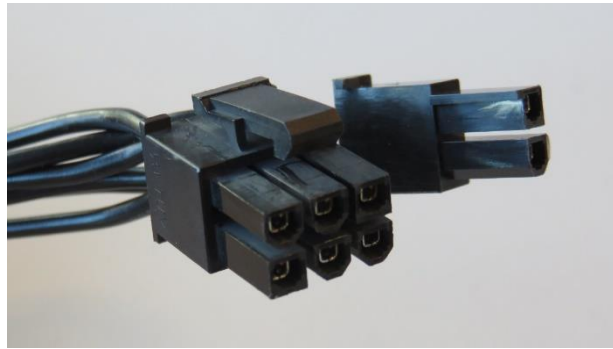
Section 4 – Appendix

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

Power Connectors:
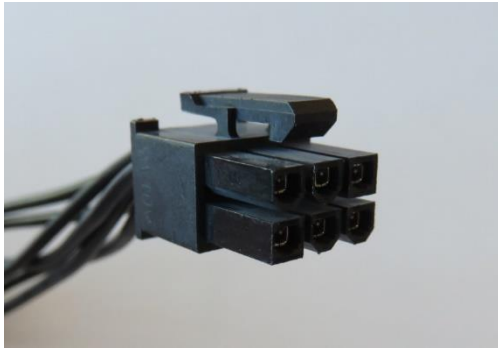
6-pin PCIe Power Connector

6+2 pin PCIe Power Connector

12HPWR Connector

8-pin (female) to dual 8-pin PCIe Power Cable (FRU# 5C10U58353, part of Option Kit 4XF1M24241)

12VHPWR (female) to dual 6+2-pin Power Cable (FRU# 5C10U58750, part of Option Kit 4XF1M24241)

8-pin (female) to 12VHPWR (male) Power Cable (FRU# 5C10U58768)

only for GPU ≤300W

Revision History

Version	Date	Author	Changes/Updates
1.0	6/12/2023	A. Panteleev	Initial launch release.
1.1	8/7/2023	A. Panteleev	Added RTX A4000 support.
1.2	10/31/2023	A. Panteleev	Added new parts.
1.3	4/10/2024	A. Panteleev	Added new parts