Power Configurator

Lenovo ThinkStation P3 Tower

Table of Contents

Overview

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

P3 Tower PSU options: 500W / 750W / 1100W

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

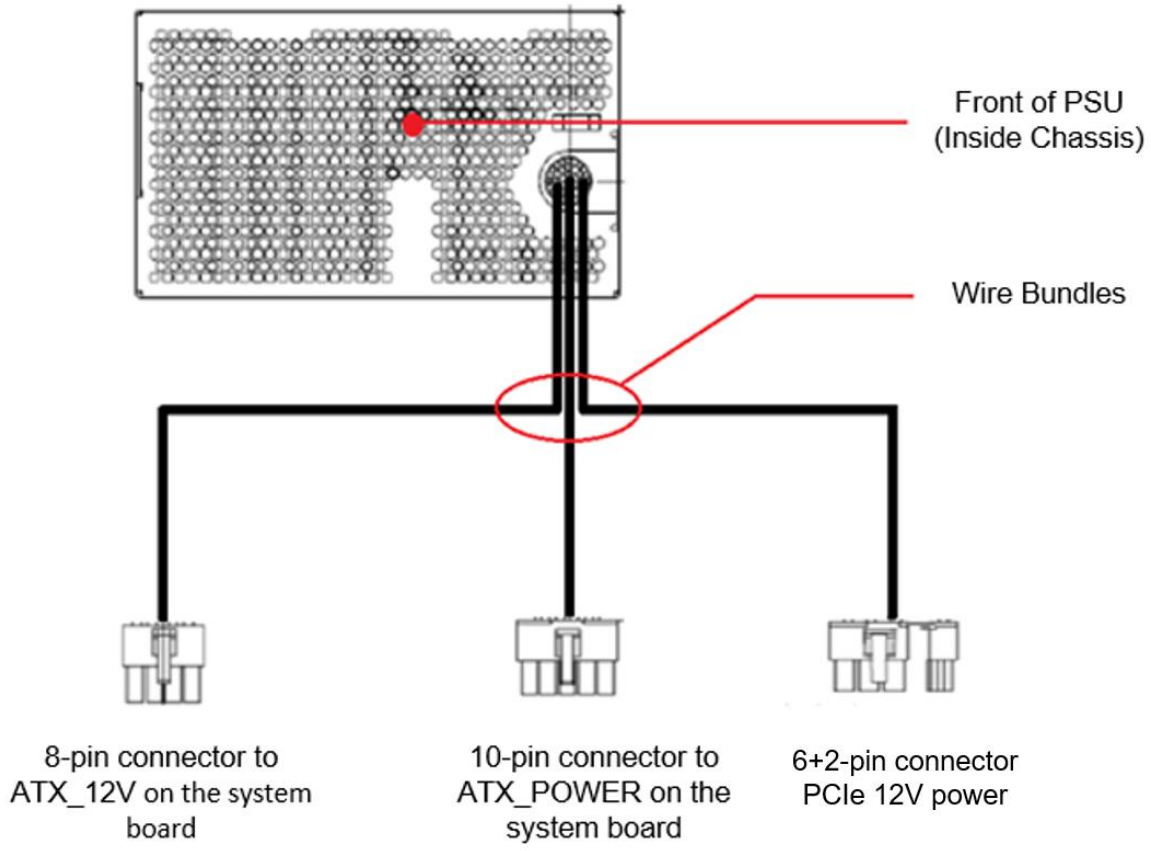
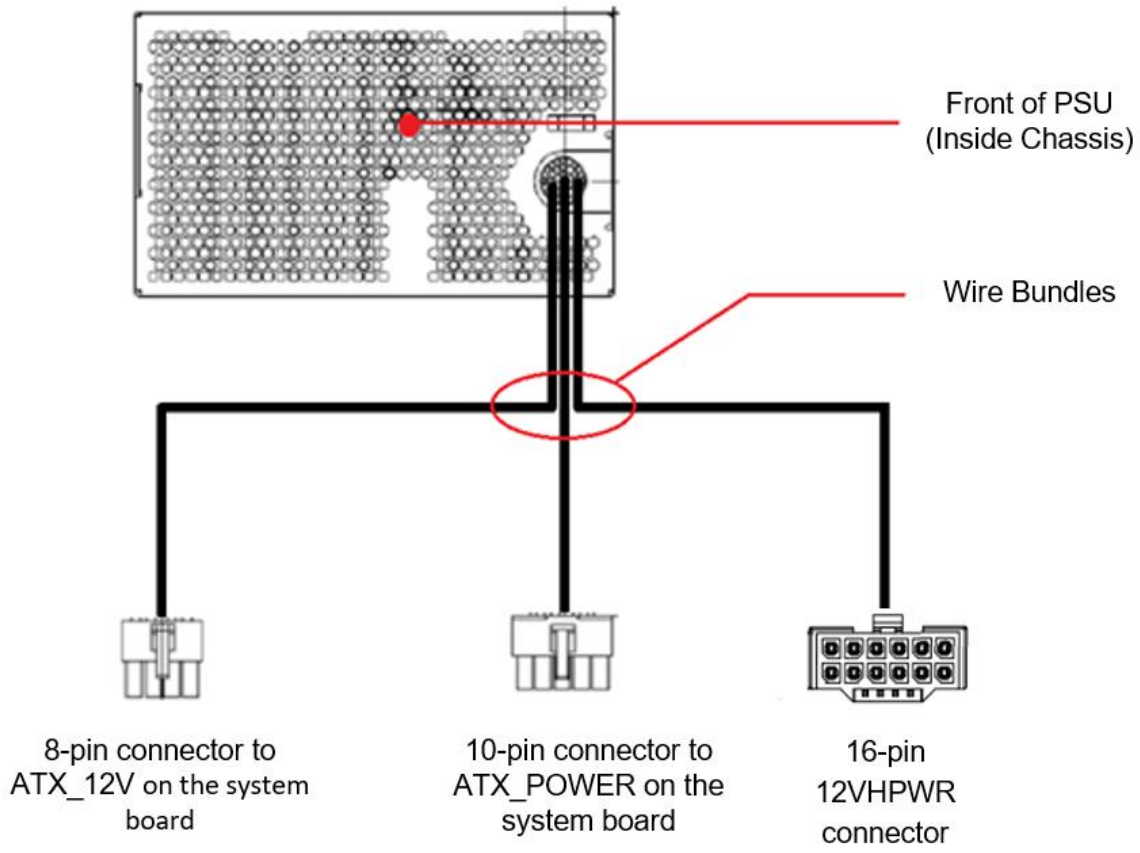
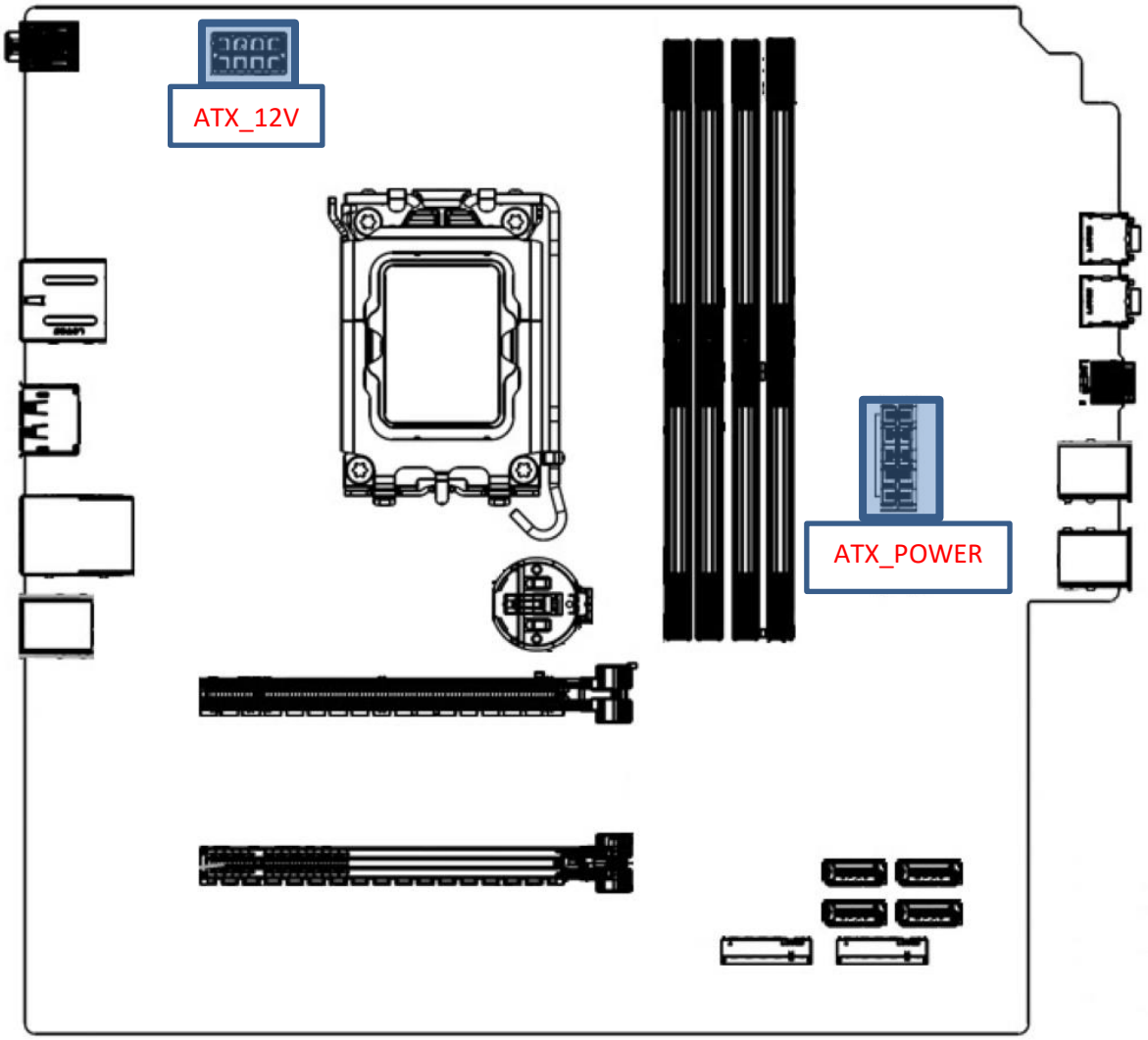


Figure 2 – P3 Power Design 1100W



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



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

Power Rating	Card Name	Card Width	Aux Power Connectors on GPU (if any)
425W	GeForce RTX 4090D (24GB) *	Quad Slot	12VHPWR
320W	GeForce RTX 4080 (16GB)*	Quad Slot	12VHPWR
	GeForce RTX 3080 (10GB)*	Triple Slot	Dual 8-pin (PCIe)
250W	RTX 5000 Ada (32GB)	Dual Slot	12VHPWR
230W	RTX A5500 (24GB)	Dual Slot	8-pin (PCIe)
	RTX A5000 (24GB)*	Dual Slot	8-pin (PCIe)
210W	RTX 4500 Ada (24GB)	Dual Slot	12VHPWR
200W	RTX A4500 (20GB)	Dual Slot	8-pin (PCIe)
	GeForce RTX 4070 (12GB)*	Triple Slot	8-pin (PCIe)
170W	GeForce RTX 3060 (12GB)*	Dual Slot	8-pin (PCIe)
140W	RTX A4000 (16GB)	Single Slot	6-pin (PCIe)
130W	RTX 4000 Ada (20GB)	Single Slot	12VHPWR
120W	GeForce 1660 Ti (6GB)*	Dual Slot	8-pin (PCIe)
115W	GeForce RTX 4060 (8GB)*	Dual Slot	8-pin (PCIe)
75W max	A400 (4GB) A1000 (8GB) T400 (4GB) T1000 (8GB)	Single Slot	None
	RTX A2000 (12GB) RTX 2000 Ada (16GB) RTX 3050 (6GB) *	Dual Slot	None
	Other PCIe Cards	Single Slot	None

*Availability dependent on geographic region

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

Table 4 lists the power cable adapters required for the various GPU cards supported in the P3 Tower based on PSU. For more detailed information refer to Appendix.

Table 4 - GPU power cable adapter requirements

<table>
<tr><th rowspan="2">Card Name</th><th colspan="3">Power Cable Adapters for PSU</th></tr>
<tr><th>1100W (12VHPWR)</th><th>750W (PCIe 6+2)</th><th>500W (PCIe 6+2)</th></tr>
<tr><td>RTX 4090D (24GB)</td><td rowspan="5">No adapter required</td><td rowspan="2"></td><td rowspan="15">Not Supported</td></tr>
<tr><td>RTX 4080 (16GB)</td></tr>
<tr><td>RTX 5000 Ada (32GB)</td><td rowspan="3">8-pin PCIe to 12HPWR[1]</td></tr>
<tr><td>RTX 4500 Ada (24GB)</td></tr>
<tr><td>RTX 4000 Ada (20GB)</td></tr>
<tr><td>RTX 3080 (10GB)</td><td rowspan="10">12VHPWR to dual 6+2-pin[2]</td><td>8-pin to dual 8-pin PCIe[3]</td></tr>
<tr><td>RTX A5500 (24GB)</td><td rowspan="10">No adapter required</td></tr>
<tr><td>RTX A5000 (24GB)</td></tr>
<tr><td>RTX A4500 (20GB)</td></tr>
<tr><td>RTX 4070 (12GB)</td></tr>
<tr><td>RTX 3060 (12GB)</td></tr>
<tr><td>RTX A4000 (16GB)</td></tr>
<tr><td>RTX 1660 Ti (6GB)</td></tr>
<tr><td>RTX 4060 (8GB)</td></tr>
<tr><td>A400 (4GB)
A1000 (8GB)
T400 (4GB)
T1000 (8GB)
RTX A2000 (12GB)
RTX 2000 Ada (16GB)
RTX 3050 (6GB)</td><td colspan="3">No adapter required
(PCIe slot powered only)</td></tr>
</table>

[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.

Graphics cards should not be mixed in dual-GPU configs. Some supported GPU configurations might require additional cabling (See Appendix)

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.

500 Watt PSU

- Single 6+2 pin PCIe auxiliary power drop*

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

CPU - up to 125W	All UDIMM Memory	No Storage Limitations	GPU Support[1]
			75W x 2 No AUX-powered discrete GPUs supported.

750 Watt PSU

- Single 6+2 pin PCIe auxiliary power drop
- Provides single dedicated 12V rail
- Comes with a side fan assembly

**Cannot support RTX 4090D or 4080*

CPU - up to 125W	All UDIMM Memory	No SATA Bay 4[2]	GPU Support[1]
			320W* through 140W x 1 or 75W x 2

1100 Watt PSU

- Single 16-pin 12VHPWR auxiliary power drop
- Provides single dedicated 12V rail
- Comes with a side fan assembly

CPU - up to 125W	All UDIMM Memory	No SATA Bay 4[2]	GPU Support[1]
			425W through 140W x 1 or 75W x 2

[1]For additional considerations refer to Table 5

[2]SATA Bay 4 is not supported for 750W and 1100W PSUs due to side fan assembly interference.

Table 5 provides additional configuration considerations based on CPU and PSU combinations.

Table 5 – CPU-Based Limitations

<table>
<tr><th>CPU Name</th><th>1100W PSU</th><th>750W PSU</th><th>500W PSU</th></tr>
<tr><td>Intel Core i9-14900K</td><td colspan="2" rowspan="4">No GPU limitations</td><td rowspan="4">No support for any discrete GPU</td></tr>
<tr><td>Intel Core i7-14700K</td></tr>
<tr><td>Intel Core i9-13900K</td></tr>
<tr><td>Intel Core i7-13700K</td></tr>
<tr><td>Intel Core i9-14900</td><td rowspan="4"></td><td rowspan="2">Only <u>one</u> Nvidia 2000 Ada can be supported</td><td rowspan="4">Only <u>one</u> 75W GPU can be supported</td></tr>
<tr><td>Intel Core i7-14700</td></tr>
<tr><td>Intel Core i9-13900</td><td rowspan="2"></td></tr>
<tr><td>Intel Core i7-13700</td></tr>
</table>

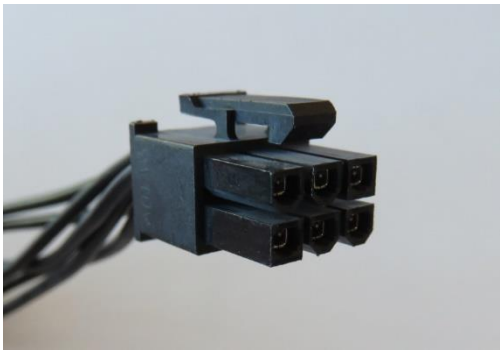
P3 Tower Power Supply Configuration Notes:

- 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.**

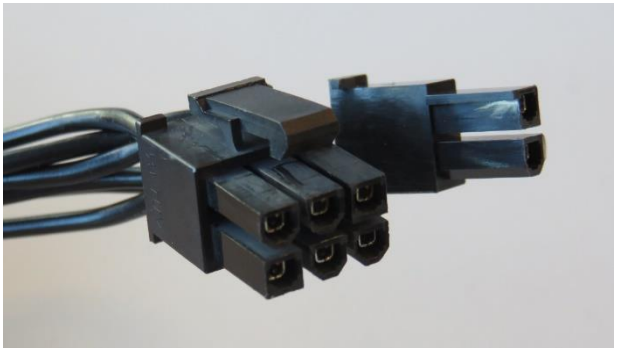
Section 4 – Appendix

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

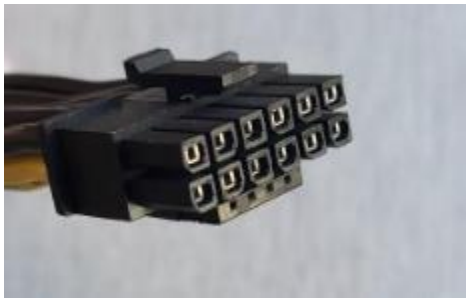
Power Connectors:



6-pin PCIe Power Connector



6+2 pin PCIe Power Connector



12HPWR Connector

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

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

8-pin (female) to 12VHPWR (male) Power Cable Adapter (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
1.4	10/3/2024	Chris C.	Updated supported parts