Power Configurator

Lenovo ThinkStation P3 Ultra SFF Gen 2

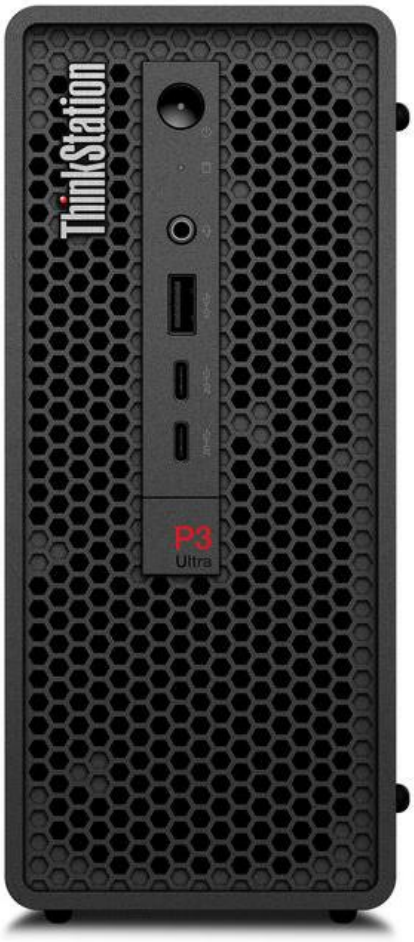


Table of Contents

Overview

The ThinkStation P3 Ultra SFF Gen 2 platform is the new desktop workstation that is the successor to the P3 Ultra SFF in the ThinkStation family.

Same as the P360 and P3 Ultra SFF platforms, P3 Ultra SFF Gen 2 does not have an internal power supply. Instead, it is powered by an external power adapter, like that from a ThinkPad or ThinkStation Tiny computer. There are three different power adapters available for P3 Ultra SFF Gen 2, each with a different power rating (Watts): 170W, 230W, and 330W.

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

Section 1 – Key Architectural Design

As mentioned above, the P3 Ultra SFF Gen 2 is powered by an external power adapter that is connected to the rear of the system. Each of the three available power adapters are rated at 100-240V AC input with 20V DC output. The power cord connector is 20V, shared with some ThinkPad systems. The P3 Ultra SFF Gen 2's rear 20V connector is shown in Figure 1:

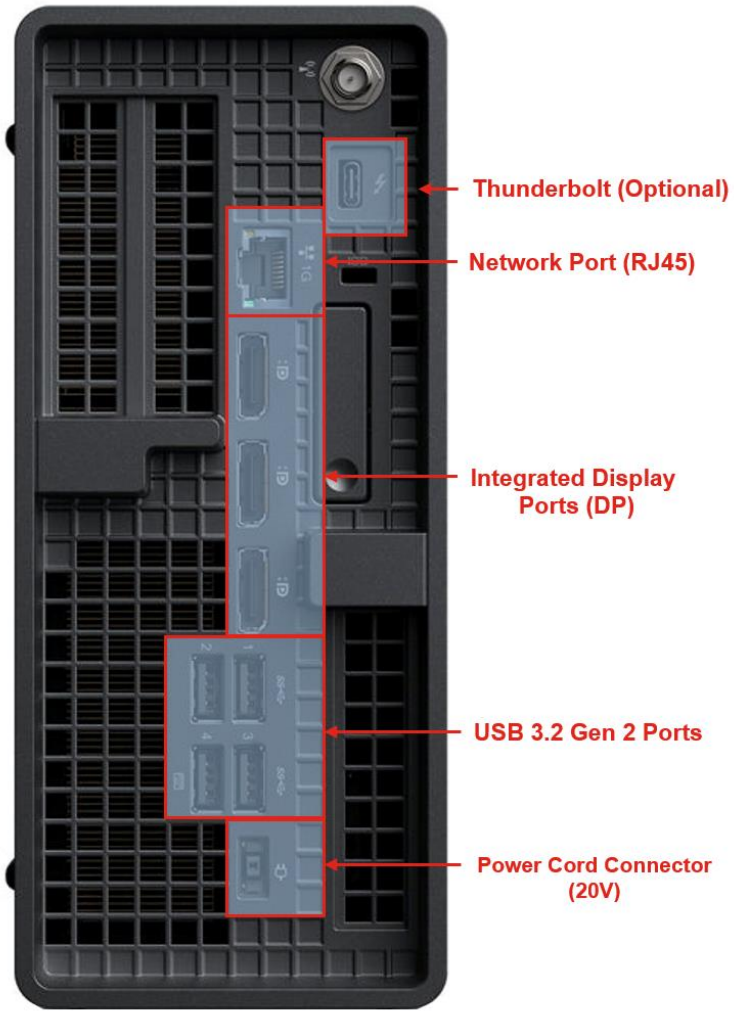


Figure 1, Rear view

Another design feature of the P3 Ultra SFF Gen 2 is that it has PCIe connectors on both the top and bottom of the system motherboard. As shown in the Figure 2 below, the top of the board contains a Mobile PCI Express Module (MXM) x16 slot and the bottom has a PCIe x8 slot (PCIe x4 electrically).

Figure 2, P3 Ultra SFF Gen 2 Motherboard (CPU side)

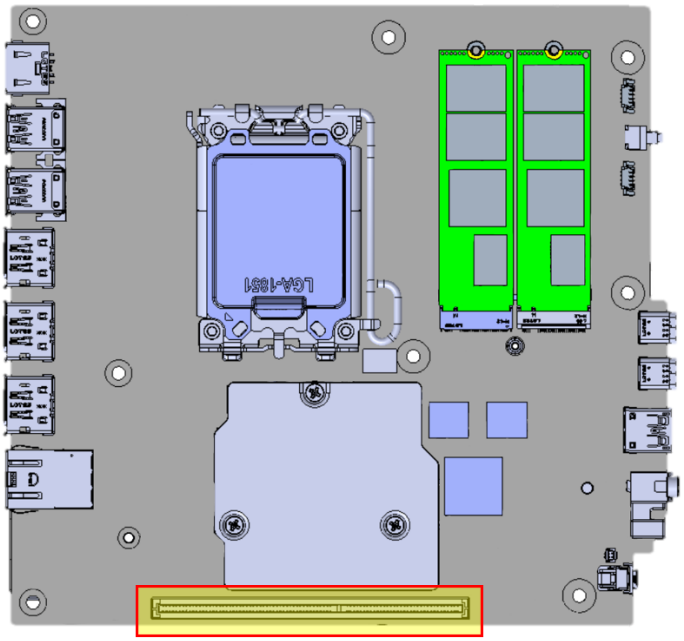
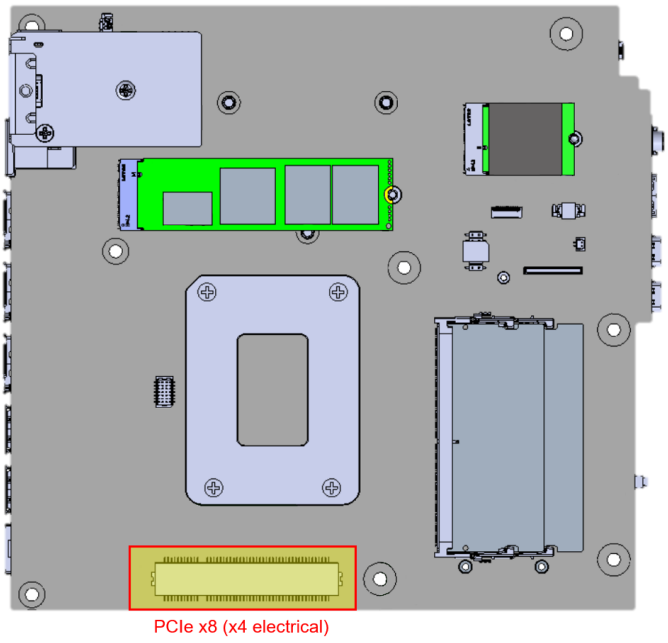


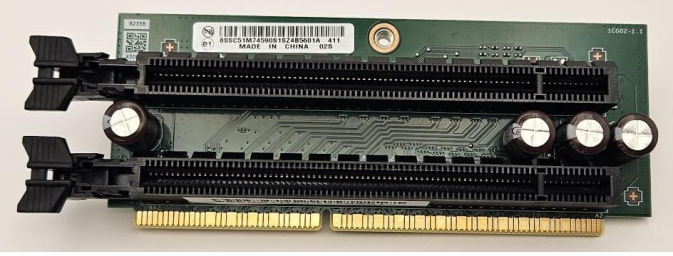
Figure 3, P3 Ultra SFF Gen 2 Motherboard (RAM side)



The MXM slot on the CPU side of the board, in some configurations, requires using a single x16 riser card (FRU# 5C51D95675) or double riser (FRU# 5C51M21374) that positions the PCIe card(s) parallel to the motherboard.

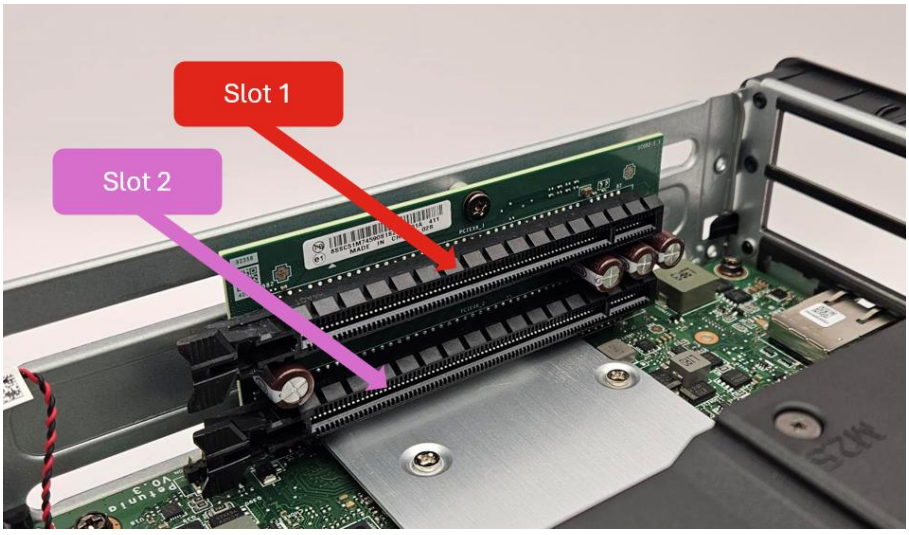
Figure 4, Single x16 Riser Card (FRU# 5C51D95675).

Figure 5, Double Riser Card (FRU# 5C51M21374).



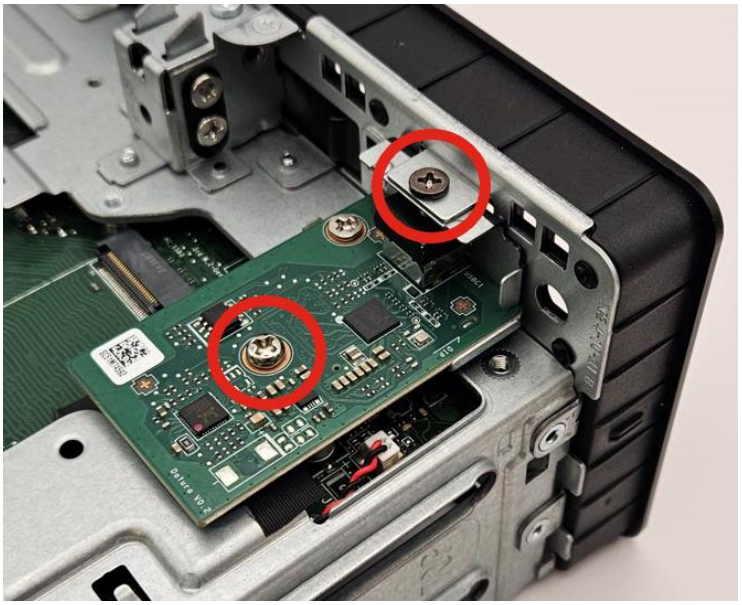
The double riser splits the PCIe x16 signal from the MXM slot into two separate PCIe x8 slots, which are x16 mechanically. Whenever a single-wide GPU and PCIe device are installed in the double riser, the GPU should go in the top slot, labeled Slot 1 (PCIEX8_1).

Figure 6, P3 Ultra Gen 2 SFF Double Riser Slot numbers



One new feature of P3 Ultra SFF Gen 2 is an optional rear Thunderbolt 4 port via an internal Board-to-Board (BTB) connector, capable of up to 15W of power delivery. Below is a picture of the TBT BTB card secured in the chassis with one captive screw (left) and one loose M3x4 screw (right).

Figure 7, P3 Ultra SFF Gen 2 Thunderbolt BTB Installed with Screws



Similar to its predecessors, P3 Ultra SFF Gen 2 supports two heatsinks. The 65W heatsink is used for any supported 65W or 35W CPUs, and the 125W heatsink is used for any supported 125W CPUs.

The next page shows a visual comparison between the two heatsinks. The cooling fins are highlighted red underneath their fan shrouds for improved clarity.

Figure 8, P3 Ultra SFF Gen 2 with 65W heatsink (fins highlighted red)

Figure 9, P3 Ultra SFF Gen 2 with 125W heatsink (fins highlighted red)

Section 2 – Power Ratings for Key System Components

To fully understand the power capabilities of the ThinkStation P3 Ultra SFF Gen 2, it is important to know the power ratings of the individual system components.

Note: All CPUs supported on P3 Ultra SFF Gen 2 have integrated graphics.

Table 1 - Arrow Lake CPUs Power Rating

CPU Name	CPU Power	Additional CPU information
Intel Ultra 9 285K	125W	3.7 GHz, 24 cores, DDR5-6400
Intel Ultra 7 265K	125W	3.9 GHz, 20 cores, DDR5-6400
Intel Ultra 5 245K	125W	4.2 GHz, 14 cores, DDR5-6400
Intel Ultra 9 285	65W	2.5 GHz, 24 cores, DDR5-6400
Intel Ultra 7 265	65W	2.4 GHz, 20 cores, DDR5-6400
Intel Ultra 5 235	65W	3.4 GHz, 14 cores, DDR5-6400
Intel Ultra 5 225	65W	3.3 GHz, 10 cores, DDR5-6400
Intel Ultra 9 285T	35W	1.4 GHz, 24 cores, DDR5-6400
Intel Ultra 7 265T	35W	1.5 GHz, 20 cores, DDR5-6400
Intel Ultra 5 225T	35W	2.5 GHz, 10 cores, DDR5-6400

Table 2 below lists the power ratings for the various PCIe add-in cards supported on P3 Ultra SFF Gen 2.

Table 2 - GPU Power Ratings

Max Power Rating	Card Name	Card Type	Slot Location
70W	RTX 4000 Ada SFF (20GB) RTX 2000 Ada (16GB)	Graphics Card (Double-Wide)	PCIe x16 MXM with riser card
50W	A1000 (8GB) A400 (4GB)	Graphics Card (Single-Wide)	PCIe x16 MXM with riser card or PCIe x8*
Varies	Other PCIe cards	Miscellaneous (Single-Wide)	Configuration dependent

**PCIe x4 electrically*

Section 3 – P3 Ultra SFF Gen 2 Power Configurations

P3 Ultra SFF Gen 2 supports 170W, 230W, and 330W power adapters, 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 per power supply.

330W PSU:

- 125W CPU only supported with 330W PSU. No PCIe riser/cards(single or double) can be installed at the same time as the 125W CPU heatsink.
- Can support up to 3x PCIe cards with 35W or 65W CPU.
- For 2x single-wide GPUs, first must be installed in PCIe x16 slot, and second installed in PCIe x8 slot.
    - 2x single-wide GPUs cannot be supported in double riser.
- With double riser, can support 1x single-wide GPU + 1x PCIe device at the same time. GPU must be installed in double riser's upper slot (See *Figure 6* above).

Table 3 – 330W PSU GPU Support

330W PSU - GPU Support			
GPU	35W CPU	65W CPU	125W CPU
RTX 4000 Ada SFF (Double-Wide)	1		Not Supported
RTX 2000 Ada (Double-Wide)			
RTX A1000 (Single-Wide)	2		1
RTX A400 (Single-Wide)			

230W PSU:

- Can support up to 3x PCIe cards with 35W or 65W CPU.
- With double riser, cannot support 1x single-wide GPU + 1x PCIe device at the same time.

Table 4 – 230W PSU GPU Support

230W PSU - GPU Support			
GPU	35W CPU	65W CPU	125W CPU
RTX 4000 Ada SFF (Double-Wide)	1	Not Supported	
RTX 2000 Ada (Double-Wide)			
RTX A1000 (Single-Wide)			
RTX A400 (Single-Wide)			

170W PSU:

- At the time of this writing, the following is a review of support with a 170W PSU:
  - Discrete GPU not supported
  - PCIe devices not supported
  - 3.5” HDD supported

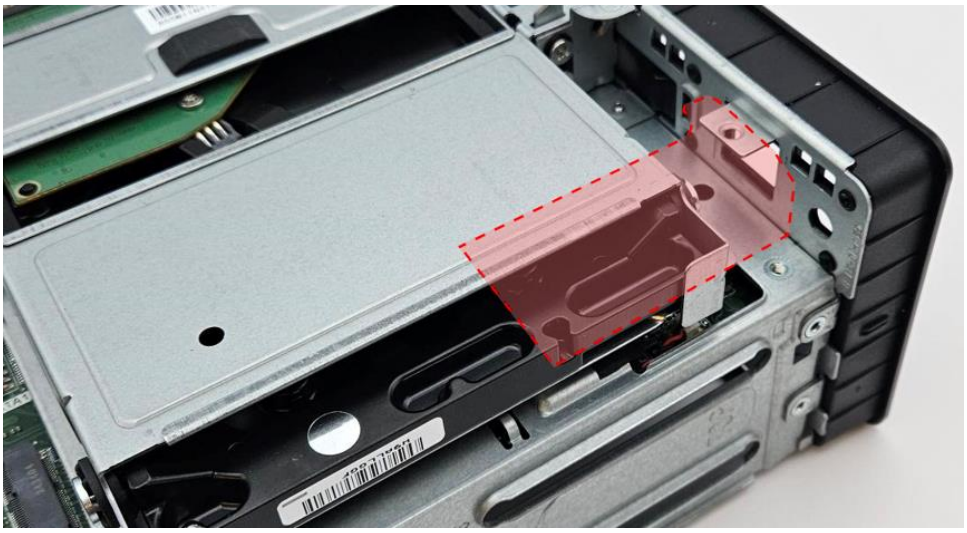
Table 5 – 170W PSU GPU Support

170W PSU - GPU Support			
GPU	35W CPU	65W CPU	125W CPU
RTX 4000 Ada SFF (Double-Wide)	Not Supported		
RTX 2000 Ada (Double-Wide)			
RTX A1000 (Single-Wide)			
RTX A400 (Single-Wide)			

General Notes:

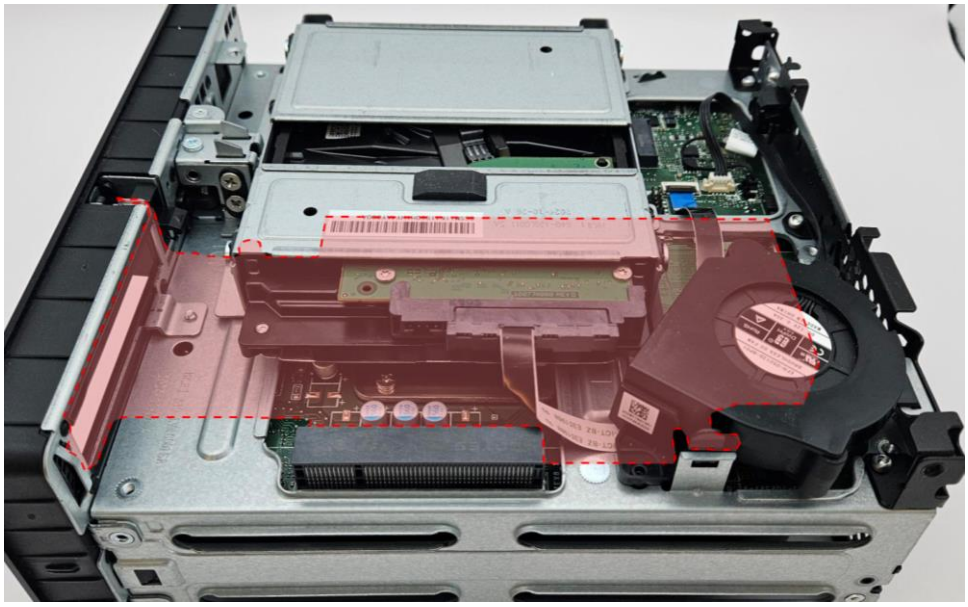
- PCIe cards are length-limited due to the compact chassis design.
- The TBT BTB card and the 3.5” HDD enclosure cannot be installed at the same time due to a mechanical interference (see *Figure 10* below).

Figure 10, P3 Ultra SFF Gen 2 HDD & TBT interference (TBT in red)



- 3.5” HDD supported when no GPU or PCIe device installed in PCIe x8 slot (see *Figure 11* below).

Figure 11, P3 Ultra SFF Gen 2 HDD & x8 slot interference (A400 in red)

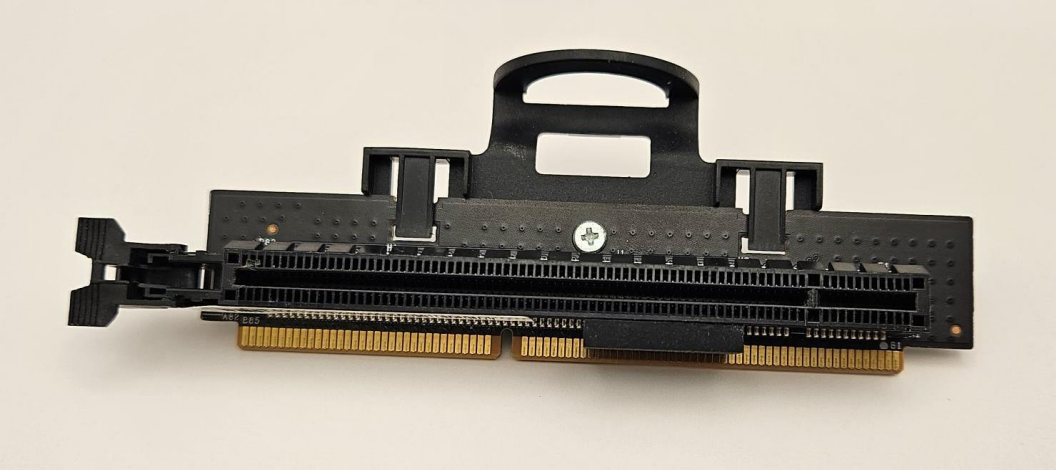


- Double-wide GPUs are only supported with single x16 riser.
- Due to mechanical interference, the following cards can only be installed in the PCIe x8 slot:
    - Nvidia ConnectX-6 25G Card
    - Intel I350-T4 5G Card
    - Intel X710-T2L 10G Card
    - 4-Port Serial Expansion Card
    - PCIe Single M.2 Adapter Card
    - BMC Controller (due to BMC port on RAM-side of motherboard)

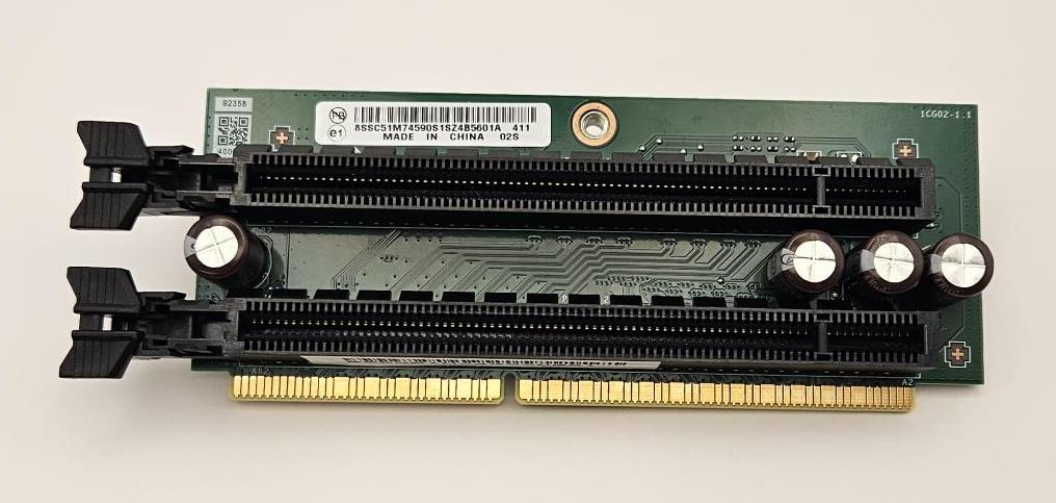
Please refer to the P3 Ultra SFF Gen 2 Hardware Maintenance Manual for detailed PCIe card installation instructions, available at Lenovo's support site: https://pcsupport.lenovo.com/us/en/

Appendix

This section contains additional useful information about the relevant hardware used in P3 Ultra SFF Gen 2 systems.



MXM PCIe Riser (FRU# 5C51D95675)



Double Riser (FRU# 5C51M21374, requires additional M3x4 screw)

	
230W AC Adapter (US/Canada/…)	330W AC Adapter (US/Canada/…)
4X21L38738*	5A10V03267*

*Option Kit P/N will differ based on region.

Product	Description	Part Number
	RTX 4000 Ada SFF	4X61Q50293
	RTX 2000 Ada	4X61P69962
	RTX A1000	4X61Q73041
	RTX A400	4X61Q73040

Revision History

Version	Date	Author	Changes/Updates
1.0	6/23/25	Chris C.	Initial launch release