# Power Configurator

Lenovo ThinkStation P3 Ultra

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# Overview

The ThinkStation P3 Ultra platform is the new desktop workstation that replaces the P360 Ultra in the Lenovo ThinkStation family. As a successor of ThinkStation P360 Ultra, the P3 Ultra does not have an internal power supply. Instead, it is powered by an external power adapter, similar to that from a ThinkPad or ThinkStation Tiny computer. There are three different power adapters available for P3 Ultra, each with a different power rating (Watts): 170W, 230W, and 300W.

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 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 a standard 20V connector, available on many mobile WorkStation notebook computers. The P3 Ultra rear 20V connector is shown in Figure 1:
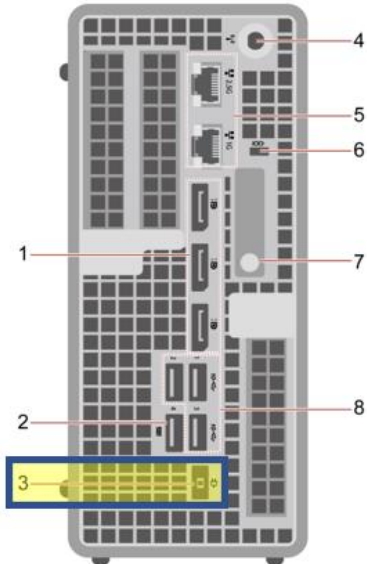


| 1. DisplayPort™ out connectors | 2. USB 3.2 connector Gen 2 (with smart power-on feature) |
| --- | --- |
| 3. Power cord connector | 4. Wi-Fi® antenna slot |
| 5. Ethernet connectors | 6. Security-lock slot |
| 7. Chassis latch | 8. USB 3.2 connectors Gen 2 |

*Figure 1, Rear view*

Another design feature of the P3 Ultra 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 have a PCIe x8 slot (limited to x4 electrically).
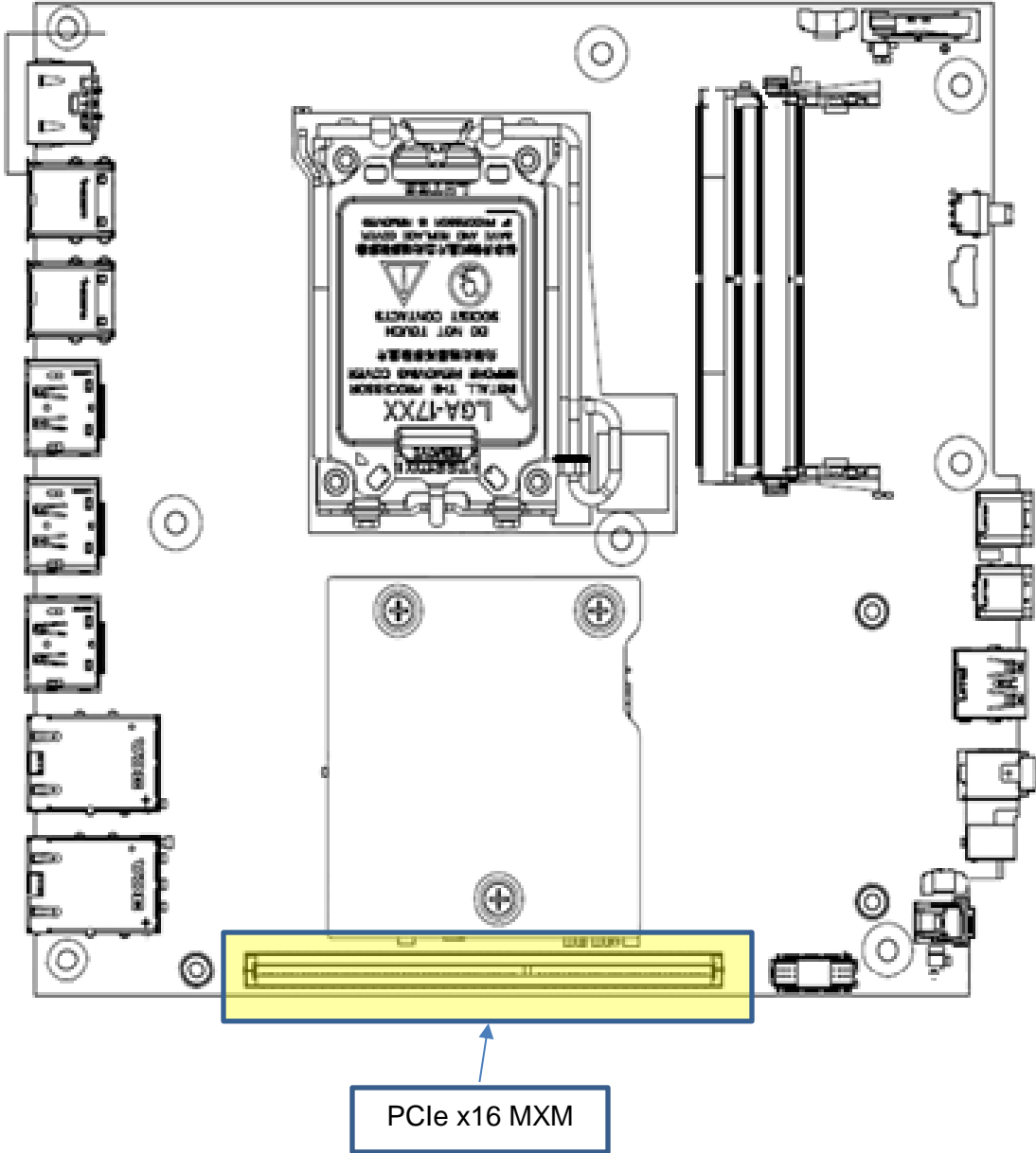


PCIe x16 MXM

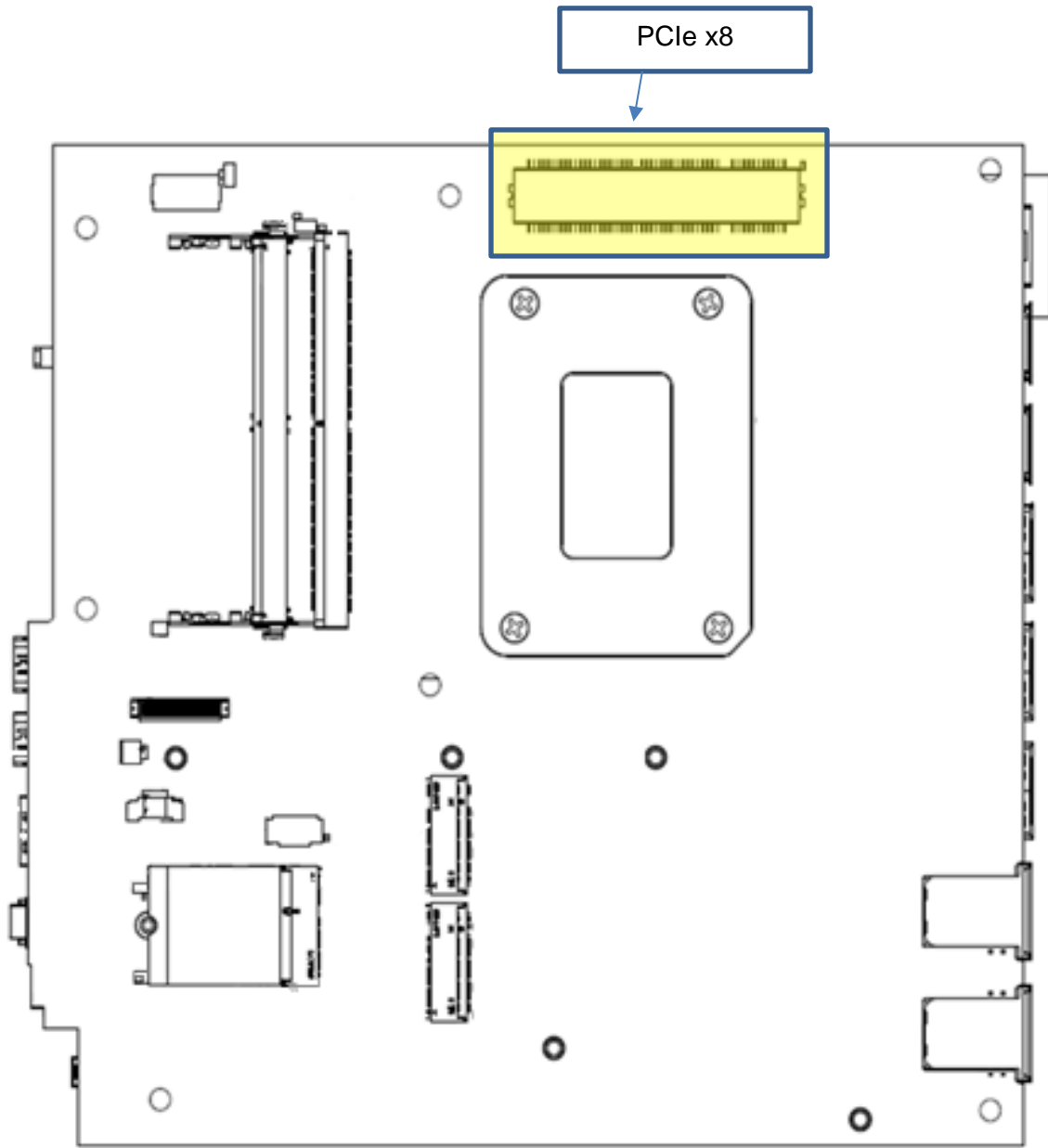*Figure 2, P3 Ultra Motherboard (CPU side)*

PCIe x8

*Figure 3, P3 Ultra Motherboard (M.2 SSD side)*

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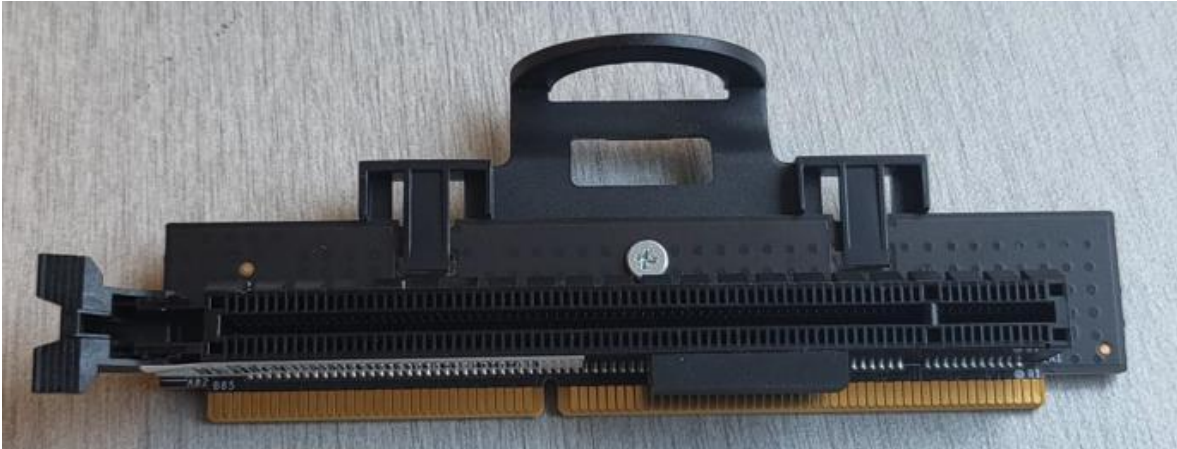


*Figure 4, x16 riser card (FRU# 5C51D95675).*

Here is a view of the rear of the system with the Nvidia T1000 installed (with a riser card):
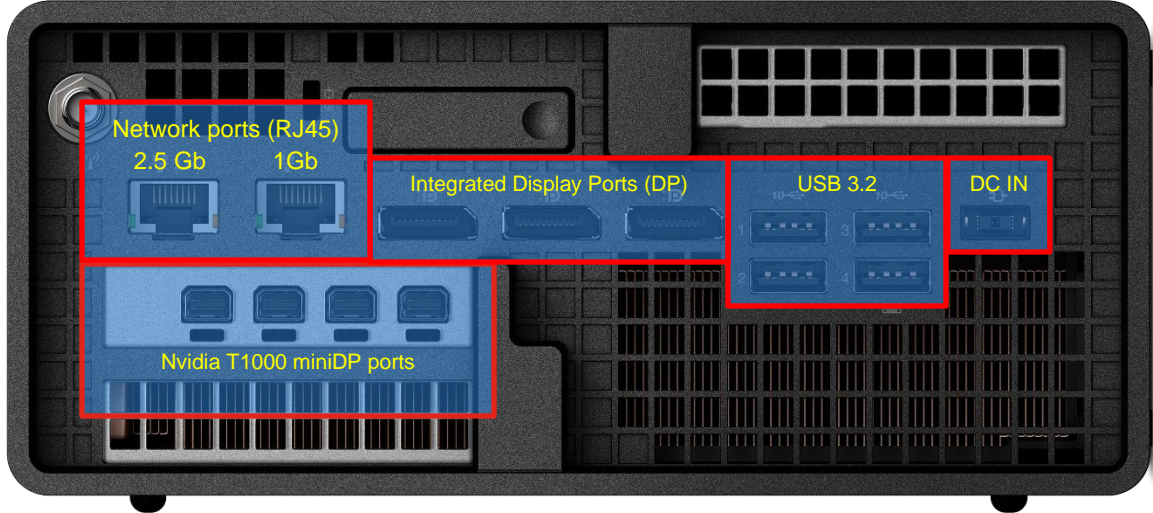


*Figure 5, View of the rear of the system with Nvidia T1000 installed and integrated ports.*

Please refer to the P3 Ultra Hardware Maintenance Manual for detailed PCIe card installation instructions.

# Section 2 – Power Ratings for Key System Components

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

The Table 1 below shows the power ratings for the various CPUs supported on P3 Ultra.

*Table 1 CPU Power Ratings*

| CPU Name | CPU Power | Additional CPU information |
|---|---|---|
| Intel Core i9 13900K vPro | 125W | 3 GHz, 24 cores, DDR5-5600 |
| Intel Core i7 13700K vPro | 125W | 3.4GHz, 16 cores, DDR5-5600 |
| Intel Core i5 13600K vPro | 125W | 3.5GHz, 14 cores, DDR5-5600 |
| Intel Core i9 13900 vPro | 65W | 2.0GHz, 24 cores, DDR5-5600 |
| Intel Core i7 13700 vPro | 65W | 2.1GHz, 16 cores, DDR5-5600 |
| Intel Core i5 13600 vPro | 65W | 2.7GHz, 14 cores, DDR5-4800 |
| Intel Core i9 12900 vPro* | 65W | 2.4GHz, 16 cores, DDR5-4800 |
| Intel Core i7 12700 vPro* | 65W | 2.1GHz, 12 cores, DDR5-4800 |
| Intel Core i5 12500 vPro* | 65W | 3.0GHz, 6 cores, DDR5-4800 |
| Intel Core i3-13100 | 60W | 3.4GHz, 4 cores, DDR5-4800 |
| Intel Core i9 13900T vPro | 35W | 1.1GHz, 24 cores, DDR5-5600 |
| Intel Core i7 13700T vPro | 35W | 1.4GHz, 16 cores, DDR5-5600 |
| Intel Core i5 13400T | 35W | 1.3GHz, 10 cores, DDR5-4800 |

*Intel Alder Lake CPUs

**Note:** All CPUs supported on P3 Ultra have integrated graphics.

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

**Note:** PCIe cards are length-limited due to the compact chassis design.

*Table 2 Add-in Card Power Ratings*

| Max Power Rating | Card Name | Card Type |
|---|---|---|
| **165W** | RTX A5500 mobile | Graphics Card (MXM) |
| **75W max** | RTX A2000(12GB) | Graphics Card (Double Wide) |
| | T400(4GB), T1000(8GB), Radeon Pro W6400, Intel Arc Pro A40 Graphics | Graphics Card (Single Wide) |
| | Other PCIe cards | Miscellaneous (Single Wide) |

# Section 3 – P3 Ultra Power Configurations

As mentioned previously, P3 Ultra supports 170W, 230W and 300W 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 with either power supply.

**Note:** See Table 2 for supported single-wide and double-wide GPUs referenced in the diagrams below.

## 170 Watt Adapter

- Single graphics card configs only
- Provides single dedicated 12V rail
- If ordered without discrete GPU the riser card will not be present

CPU - up to 65W

All SoDIMM Memory

No Storage Limitations

**GPU Support**

**1x Single Wide GPU\***

## 230 Watt Adapter

- Single graphics card configs only
- Provides single dedicated 12V rail

CPU - up to 65W

All SoDIMM Memory

No Storage Limitations

**GPU Support**

**1x Single Wide GPU**

**or**

**1x Double Wide GPU**

## 300 Watt Adapter ≤ 65W CPU

- Single graphics card configs only
- Provides single dedicated 12V rail
- If MXM GPU is selected,
  the riser card <u>will not</u> be present

**CPU up to 65W**

**All SoDIMM Memory**

**No Storage Limitations**

**GPU Support**

**1x Single Wide GPU**

**or**

**1x Double Wide GPU**

## 300 Watt Adapter w/125W CPU

- GPU support limited by
  CPU heatsink size*
- Single graphics card configs only
- Provides single dedicated 12V rail

\* GPU can only be installed in PCIE x8 Slot

\*\* If GPU/other PCIe devices are selected,
no SATA support

**CPU – 125W**

**All SoDIMM Memory**

**No SATA support\*\***

**GPU Support**

**1x Single Wide GPU**

**Note:** See <u>Table 2</u> for supported single-wide and double-wide GPUs referenced in the diagrams below.

P3 Ultra Power Supply Configuration Notes:

- Officially supported configurations could still be limited by additional factors not defined within this document.
- PCIe cards are length-limited due to the compact chassis design.
- **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.**

# Revision History

| Version | Date | Author | Changes/Updates |
|---------|-----------|-------------|------------------------|
| 1.0 | 5/23/2023 | A.Panteleev | Initial launch release |
| | | | |