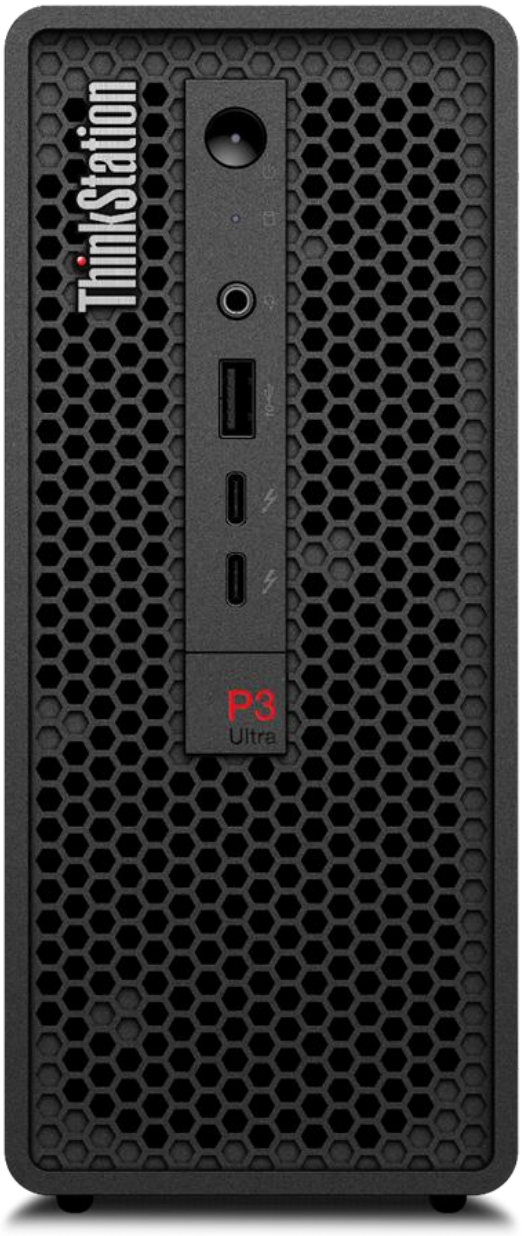
# Power Configurator

Lenovo ThinkStation P3 Ultra SFF



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# Overview

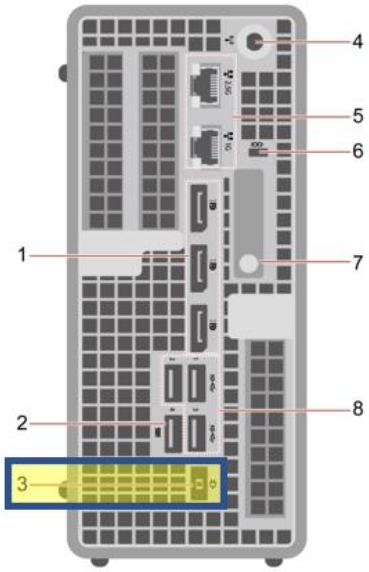
The ThinkStation P3 Ultra SFF platform is the new desktop workstation that is the successor to the P360 Ultra in the ThinkStation family.

Same as the P360 Ultra, the P3 Ultra 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, 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 (PCIe x4 electrically).

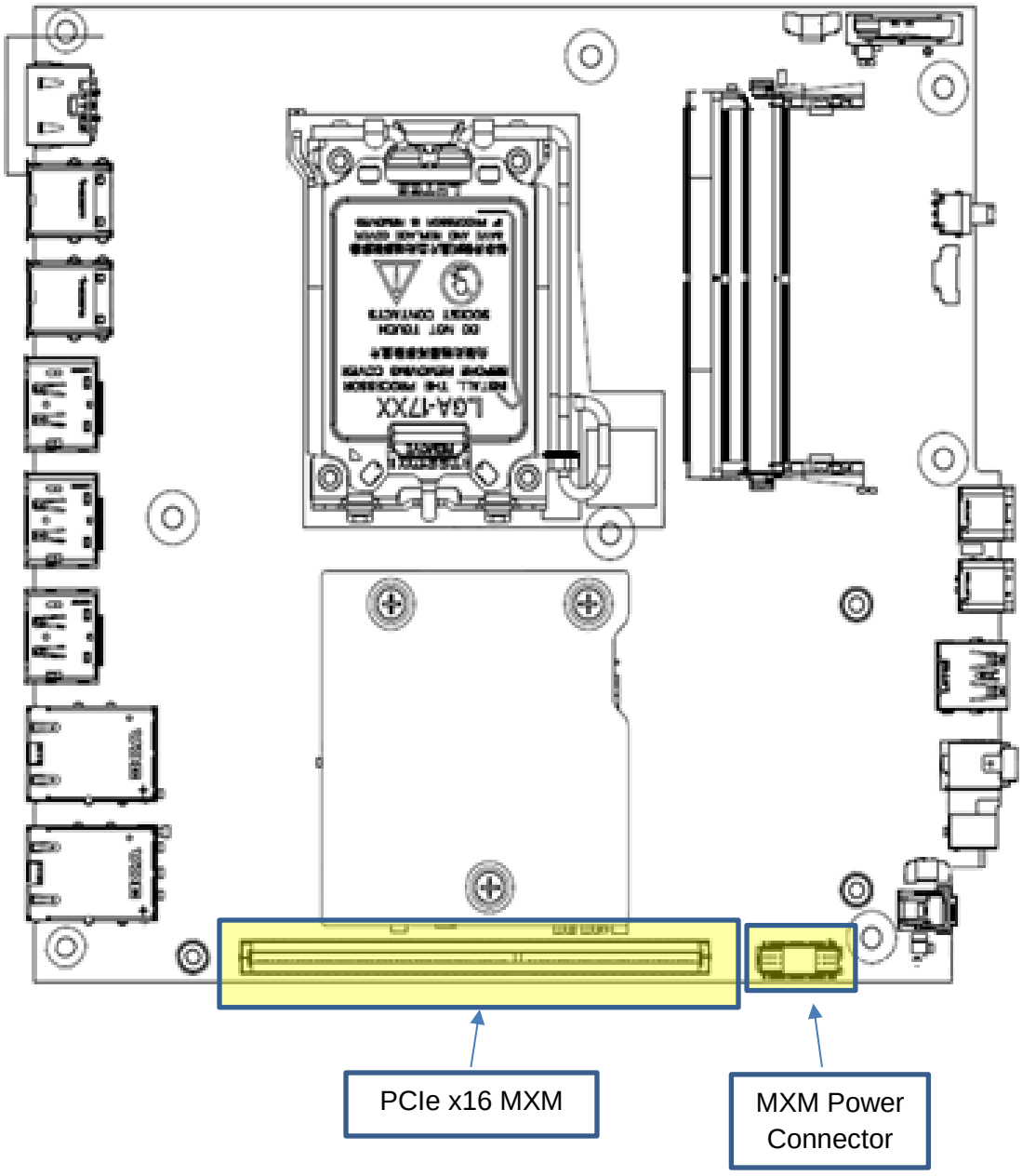



*Figure 2, P3 Ultra Motherboard (CPU side)*

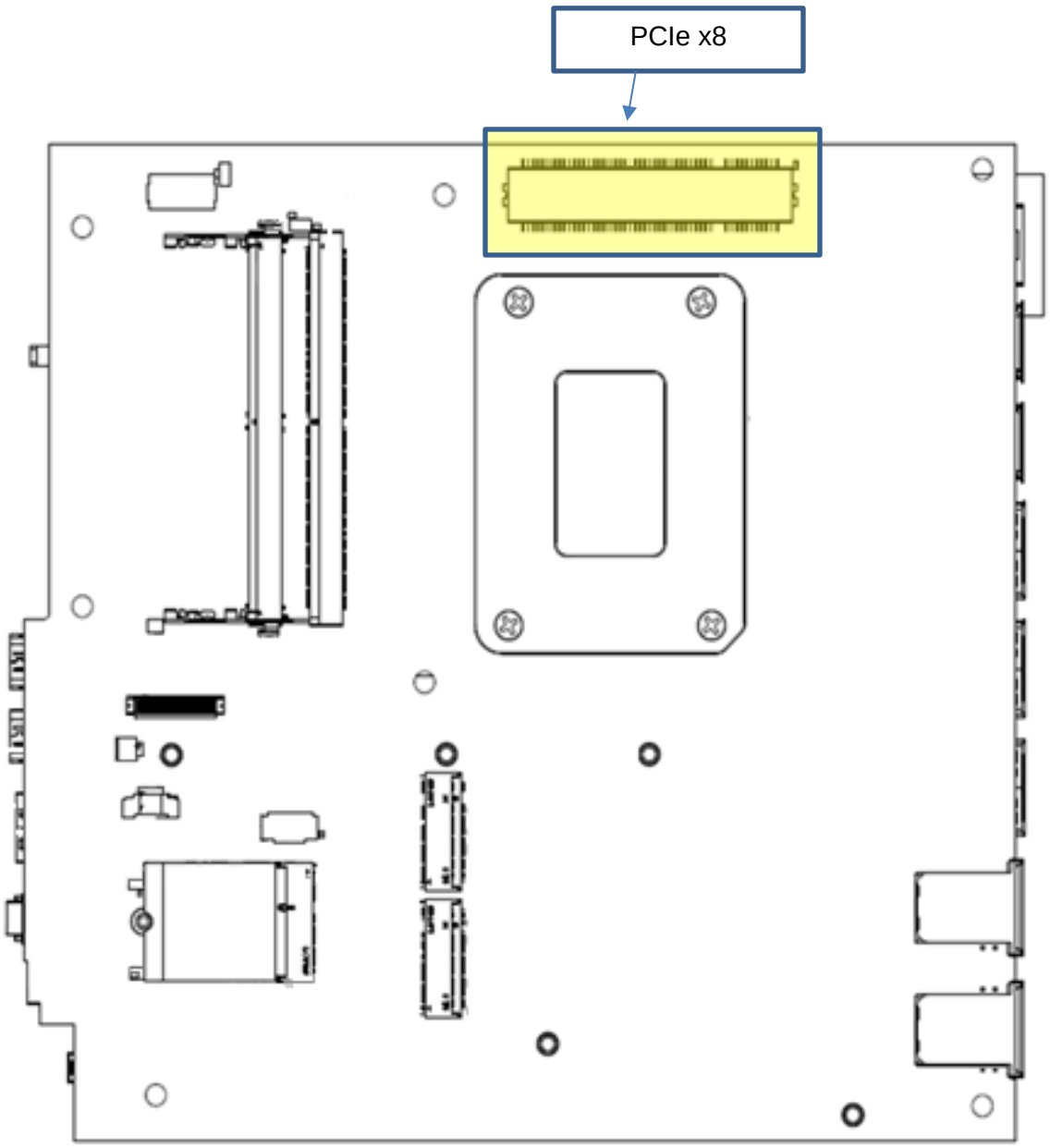



*Figure 3, P3 Ultra Motherboard (M.2 SSD side)*

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):

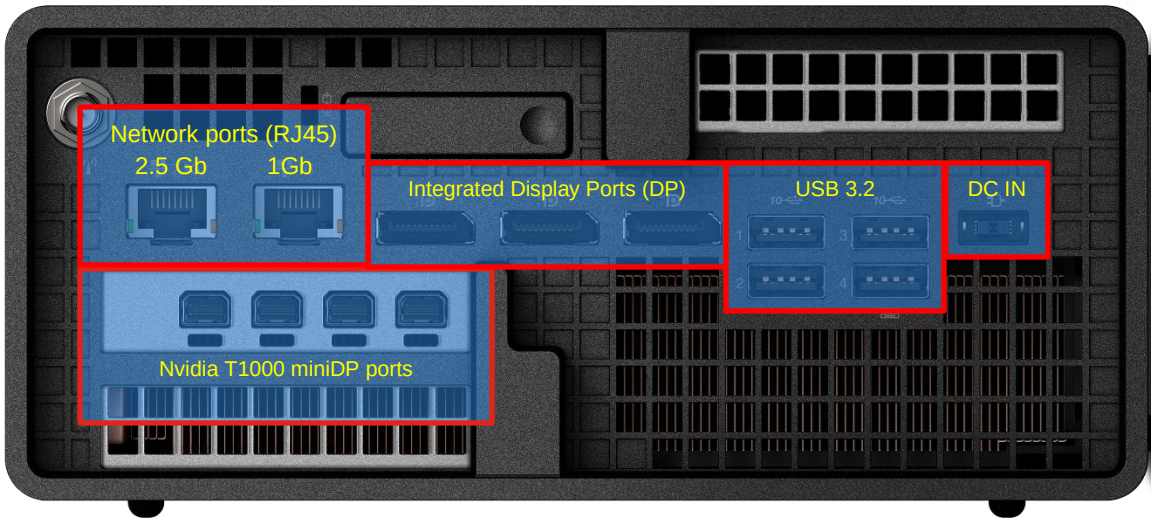



*Figure 5, View of the rear of the system with Nvidia T1000 installed and integrated ports.*

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

# 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.

Tables 1-3 below shows the power ratings for the various CPUs supported on P3 Ultra, organized by Intel Core generation.

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

*Table 1 - Alder Lake CPUs Power Rating*

| CPU Name | CPU Power | Additional CPU information |
|---|---|---|
| **Intel Core i9-12900 vPro** | 65W | 2.4 GHz, 16 cores, DDR5-4800 |
| **Intel Core i7-12700 vPro** | 65W | 2.1 GHz, 12 cores, DDR5-4800 |
| **Intel Core i5-12500 vPro** | 65W | 3.0 GHz, 6 cores, DDR5-4800 |

*Table 2 - Raptor Lake CPUs Power Rating*

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

*Table 3 - Raptor Lake Refresh CPUs Power Rating*

| CPU Name | CPU Power | Additional CPU information |
|---|---|---|
| **Intel Core i9-14900K vPro** | 125W | 3.0 GHz, 24 cores, DDR5-5600 |
| **Intel Core i7-14700K vPro** | 125W | 3.4 GHz, 20 cores, DDR5-5600 |
| **Intel Core i5-14600K vPro** | 125W | 3.5 GHz, 14 cores, DDR5-5600 |
| **Intel Core i9-14900 vPro** | 65W | 2.0 GHz, 24 cores, DDR5-5600 |
| **Intel Core i7-14700 vPro** | 65W | 2.1 GHz, 20 cores, DDR5-5600 |
| **Intel Core i5-14600 vPro** | 65W | 2.7 GHz, 14 cores, DDR5-5600 |
| **Intel Core-i3 14100** | 60W | 3.5 GHz, 4 cores, DDR5-4800 |
| **Intel Core i9-14900T vPro** | 35W | 1.1 GHz, 24 cores, DDR5-5600 |
| **Intel Core i7-14700T vPro** | 35W | 1.3 GHz, 20 cores DDR5-5600 |
| **Intel Core i5-14400T vPro** | 35W | 1.4 GHz, 10 cores, DDR5-4800 |

Table 4 below lists the power ratings for the various PCIe add-in cards supported on P3 Ultra.

**Notes:**

- PCIe cards are length-limited due to the compact chassis design.
- Stated Max Power Rating of GPUs may vary from specifications given by vendors or other online sources.

*Table 4 - GPU Power Ratings*

| Max Power Rating | Card Name | Card Type | Slot Location |
|---|---|---|---|
| **115W** | RTX A5500 Mobile (16GB)<br>RTX A5000 Mobile (16GB) | Graphics Card (Double-Wide, MXM) | PCIe x16 MXM |
| **80W** | RTX A3000 Mobile (12GB) | Graphics Card (Double-Wide, MXM) | PCIe x16 MXM |
| **75W max** | RTX A2000 (12GB)<br>RTX 2000 Ada (16GB)<br>RTX 4000 Ada SFF (20GB) | Graphics Card (Double-Wide) | PCIe x16 MXM with riser card |
| | A1000 (8GB)<br>A400 (4GB)<br>T1000 (8GB)<br>T400 (4GB) | Graphics Card (Single-Wide) | PCIe x16 MXM with riser card or PCIe x8* |
| | Intel Arc Pro A40 (6GB)** | Graphics Card (Single-Wide) | PCIe x8* |
| | Other PCIe cards | Miscellaneous (Single-Wide) | Configuration dependent |

**PCIe x4 electrically*

***Only available with 125W CPU*

# 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 4 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<br>or<br>1x Double-Wide GPU |

### 300 Watt Adapter with ≤65W CPU

- Provides single dedicated 12V rail
- If MXM GPU is selected, the riser card will not be present

❖ Dual single-wide GPU support*
  - 2x T400
  - 2x T1000
  - 2x A400

CPU up to 65W

All SODIMM Memory

No Storage Limitations

**GPU Support**

1x Single-Wide GPU

or

2x Single-Wide GPUs*

or

1x Double-Wide GPU

### 300 Watt Adapter with 125W CPU

- GPU support limited by CPU heatsink size
- Single graphics card configs only, must install in PCIe x8 Slot
- If GPU/other PCIe devices selected, no SATA support
- Provides single dedicated 12V rail

CPU – 125W

All SODIMM Memory

No SATA support

**GPU Support**

1x Single-Wide GPU

*Dual single-wide GPU support dependent on motherboard revision. Older versions (SB20T22734 and SB20T22734) can only support dual T400.

**Note:** See Table 4 for supported single-wide and double-wide GPUs referenced in the diagrams above.

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.**

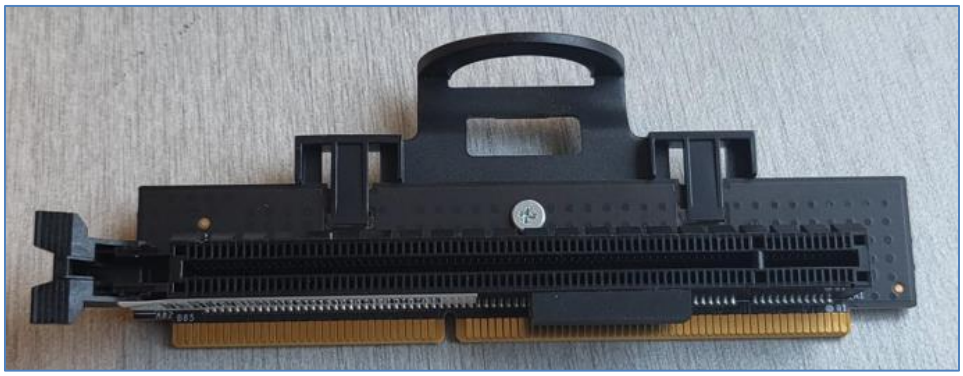
# Appendix

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

[4XF1M24241] “ThinkStation Cable Kit for Graphics Card - P3 TWR/P3 Ultra” contains the following parts:

- 8-pin (female) to dual 8-pin (male) power splitter cable
- 12VHPWR (female) to dual 6+2 pin (male) power cable
- A2000 bracket for P3 Ultra
- Various screws

The components in this kit applicable to P3 Ultra are marked in red. Other parts are unused and are applicable to P3 Tower.



MXM PCIe Riser (FRU# 5C51D95675)

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| | |
|---|---|
|  |  |
| 230W AC Adapter (US/Canada/…) | 300W AC Adapter (US/Canada/…) |
| 4X21L38738* | 4X21L18243* |

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

| Product | Description | Part Number |
|---|---|---|
|  | RTX 4000Ada SFF* | 4X61Q50293* |
|  | RTX A2000* | 4X61J52232* |
|  | RTX A1000 | 4X61Q73041 |
|  | RTX A400 | 4X61Q73040 |
|  | Nvidia T1000 | 4X61J52233 |
|  | Nvidia T400 | 4X61J52234 |

*Needs support bracket included in 4XF1M24241 cable kit listed above.

# Revision History

| Version | Date | Author | Changes/Updates |
|---|---|---|---|
| 1.0 | 1/25/2023 | A.Panteleev | Initial launch release |
| 1.1 | 4/8/2024 | A.Panteleev | Added new parts<br>Removed AMD GPU support |
| 1.2 | 9/25/24 | Chris C. | Updated GPU support |