

Power Configurator

Lenovo ThinkStation P7



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Overview

ThinkStation P7 is a single processor, 39L tower added to the Lenovo workstation portfolio in the spring of 2023. The P7's processing capability is provided by Intel Xeon W processors and the W790 chipset. The P7 supports a wide array of memory, storage, and PCIe device configurations -- all of which are powered by a custom form factor power supply.

There are two power supply options, 1000W and 1400W, and this document will help you evaluate your system configuration and size your power supply choice appropriately.

Section 1 – Key System Power Design Points

The ThinkStation P7 system power is provided by a single, internal custom power supply unit (PSU). The PSU has a toolless service design that connects to the system motherboard via a single card edge connector. The edge connector provides the power transmission and signal line interface between the PSU and motherboard. The PSU is available in two options, 1000W and 1400W, with the following basic specifications:

1000W 92% efficiency, with 15A C14 AC input (via std C13 power cord)

1400W 92% efficiency, with 15A C14 AC input (via std C13 power cord)

To accommodate system expansion options, P7 provides seven full length¹, full height PCIe slots. Additionally, P7 provides auxiliary power for expansion cards via 3 onboard 12VHPWR connectors, an example of which is shown in *Figure 1*.

Figure 1 – 12VHPWR Connector



For PCIe graphics cards that require aux power, Lenovo provides either a 12VHPWR to Dual PCIe cable or a 12VHPWR to CPU cable, depending on the requirements of the card. Details about both of these cables can be found in the Appendix at the end of this document.

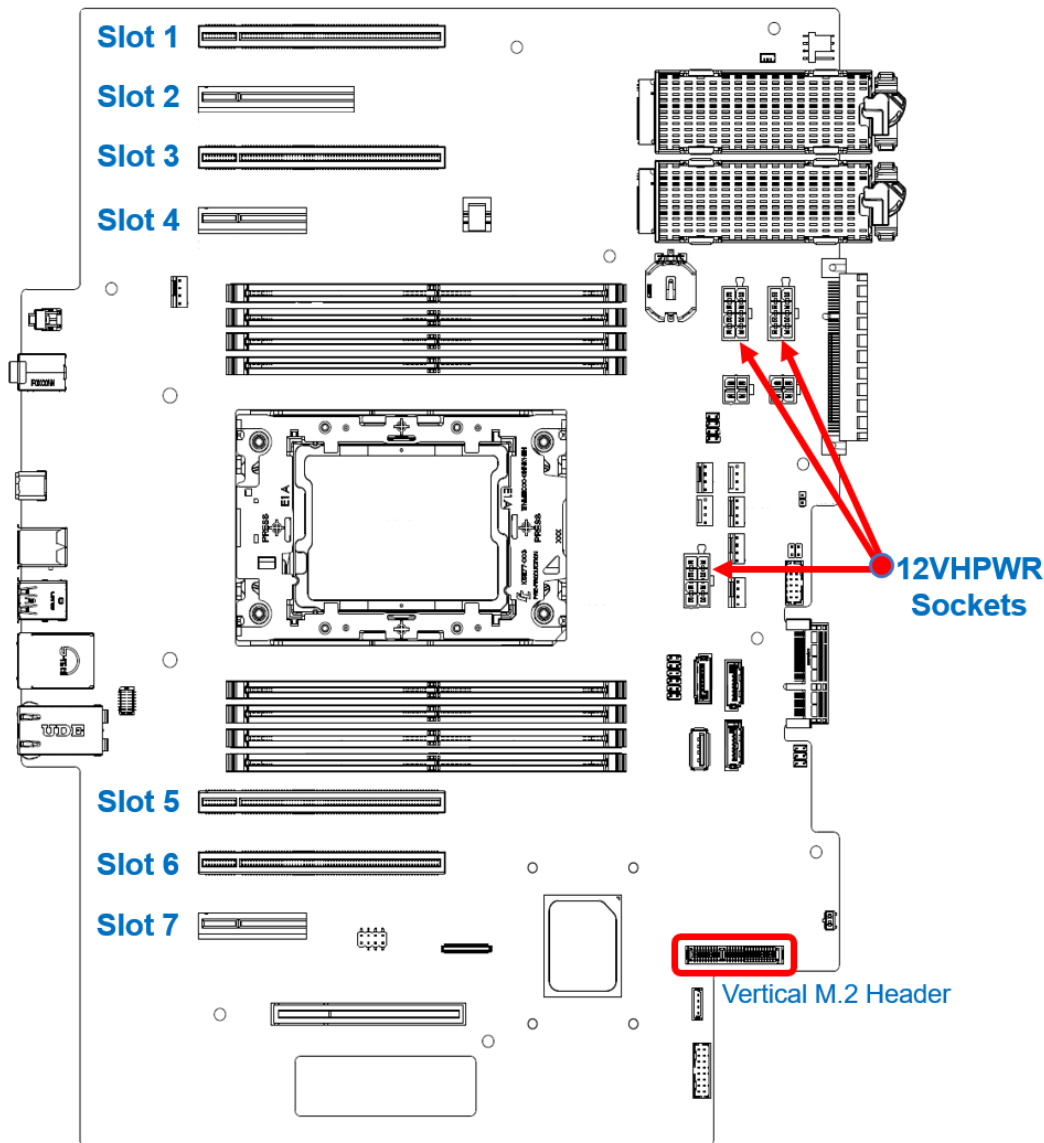
¹ PCIe Slot 7 is limited to half-length when the vertical M.2 option is selected. The vertical M.2 header is highlighted in *Figure 2* to show where it would interfere with a full length PCIe card.

Table 1 and Figure 2 give details about the PCIe slots and auxiliary power connectors on the P7 motherboard.

Table 1 – PCIe Slot Information

PCIe Slot Number	Slot Width	Generation	Installation Priority
Slot 1	x16	Gen 5	3
Slot 2	x8	Gen 4	5
Slot 3	x16	Gen 5	1
Slot 4	x4	Gen 4	6
Slot 5	x16	Gen 5	2
Slot 6	x16	Gen 4	4
Slot 7	x4	Gen 5	7

Figure 2 – PCIe Slots and Aux Power Connectors



Section 2 – Power Ratings of Key System Components

To understand the overall power demand of your P7, it is important to know the power needs of each individual system component. This section contains a summary of several of these key individual components.

Table 2 lists the power requirements for each of the supported CPUs.

Table 2 – CPU power ratings

CPU Name (Intel Xeon W)	CPU Power	Additional CPU Information
W9-3595X	385W	2.0GHz, 60 Cores, 112.5MB, DDR5-4800
W9-3575X	340W	2.2GHz, 44 Cores, 97.5MB, DDR5-4800
W9-3495X	350W	1.9GHz, 56 Cores, 105MB, DDR5-4800
W9-3475X	300W	2.2GHz, 36 Cores, 82.5MB, DDR5-4800
W7-3565X	335W	2.5GHz, 32 Cores, 82.5MB, DDR5-4800
W7-3555	325W	2.7GHz, 28 Cores, 75MB, DDR5-4800
W7-3545	310W	2.7GHz, 24 Cores, 67.5MB, DDR5-4800
W7-3465X	300W	2.5GHz, 28 Cores, 75MB, DDR5-4800
W7-3455	270W	2.5GHz, 24 Cores, 67.5MB, DDR5-4800
W7-3445	270W	2.6GHz, 20 Cores, 52.5MB, DDR5-4800
W5-3535X	300W	2.9GHz, 20 Cores, 52.5MB, DDR5-4800
W5-3525	290W	3.2GHz, 16 Cores, 45MB, DDR5-4800
W5-3435X	270W	3.1GHz, 16 Cores, 45MB, DDR5-4800
W5-3433	220W	2.0GHz, 16 Cores, 45MB, DDR5-4400
W5-3425	270W	3.2GHz, 12 Cores, 30MB, DDR5-4800
W5-3423	220W	2.1GHz, 12 Cores, 30MB, DDR5-4400

Table 3 lists the power requirements for the add-in cards supported on P7

Table 3 – Add-in card power ratings

Max Power	Card Name (Memory)	Card Type	Aux Power Connectors on GPU(if any)	Lenovo Aux Power Cables Required (if any)
320W	RTX 4080 (16GB) *	Graphics Card (Quad Slot)	12VHPWR	12VHPWR to 12VHPWR R/A ²
300W	RTX 6000 Ada (48GB)	Graphics Card (Dual Slot)	12VHPWR	12VHPWR to 12VHPWR
	RTX A6000 (48GB)	Graphics Card (Dual Slot)	8-pin (EPS)	12VHPWR to EPS 8pin
285W	RTX 5880 Ada (48GB) ³	Graphics Card (Dual Slot)	12VHPWR	12VHPWR to 12VHPWR
250W	RTX 5000 Ada (32GB)	Graphics Card (Dual Slot)	12VHPWR	12VHPWR to 12VHPWR
230W	RTX A5500 (24GB) RTX A5000 (24GB)	Graphics Card (Dual Slot)	8-pin (PCIe)	12VHPWR to Dual PCIe 8pin
210W	RTX 4500 Ada (24GB)	Graphics Card (Dual Slot)	12VHPWR	12VHPWR to 12VHPWR
200W	RTX 4070 (12GB) * RTX 3060Ti (8GB) *	Graphics Card (Triple Slot)	8-pin (PCIe)	12VHPWR to Dual PCIe 8pin
	RTX A4500 (20GB)	Graphics Card (Dual Slot)	8-pin (PCIe)	12VHPWR to Dual PCIe 8pin
140W	RTX A4000 (16GB)	Graphics Card (Single Slot)	6-pin (PCIe)	12VHPWR to Dual PCIe 8pin
130W	RTX 4000 Ada (20GB)	Graphics Card (Single Slot)	12VHPWR	12VHPWR to 12VHPWR
75W	RTX A2000 (12GB) RTX 2000 Ada (16GB)	Graphics Card (Dual Slot)	None	None
75W max	T1000 (8GB), T400 (4GB) RTX A400 (4GB) RTX A1000 (8GB) Radeon Pro W6400 (4GB)	Graphics Card (Single Slot)	None	None
	Quadro Sync II	Graphics Sync Card (Single Slot)	SATA power	SATA power to 4-pin
	Other PCIe Cards	Other PCIe Cards (Single Slot)	None	None

* GeForce cards are only available via Special Bid

² R/A = Right Angle connector on the GPU end

³ RTX 5880 is available outside of China only via Special Bid

Table 4 lists the number of aux power cables that will be included in a system built with the indicated GPUs.

Table 4 – Quantity of Derived Cables

GPU	Qty	Lenovo Aux Power Cables Derived				
		12VHPWR to Dual PCIe 6+2pin, 270mm	12VHPWR to Dual PCIe 6+2pin, 375mm	12VHPWR to CPU 8pin, 270mm	12VHPWR to 12VHPWR, 270mm	12VHPWR to 12VHPWR R/A, 450mm
None	0	1	0	0	0	0
RTX 4080 (16GB)	1	1	0	0	0	1
RTX 6000 Ada (48GB)	1	1			1	
RTX 5880 Ada (48GB)	2	1	0	0	2	0
RTX 5000 Ada (32GB)	3	0			3	
RTX 4500 Ada (24GB)						
RTX 4000 Ada (20GB)						
RTX A6000 (48GB)	1	1		1		
	2	1	0	2	0	0
	3	0		3		
RTX A5500 (24GB)	1	2				
RTX A5000 (24GB)	2	3	0	0	0	0
RTX A4500 (20GB)	3	3				
RTX 4070 (12GB)	1	1	1	0	0	0
RTX 3060Ti (8GB)	1	2	0	0	0	0
RTX A4000 (16GB)	1	2				
	2	3	0	0	0	0
	3	3				
	4	3				
Non-Aux GPUs	Up to 4	1	0	0	0	0

Section 3 – P7 Power Configuration Tables

As mentioned previously, P7 supports a single 1000W or 1400W power supply, both of which provide power for many different GPU configurations. The tables on the following pages show allowable PCIe card configurations for different environments. The tables are arranged by PSU wattage, input AC voltage, and memory type. Use the links below to navigate to the appropriate tables for your application. Please

The output power of the 1400W supply can vary depending on the input AC voltage, as shown in Table 5. Table 6 lists typical AC line voltage by country/region (note that this is not an exhaustive list and is intended solely for quick reference).

Table 5 – Input Voltage vs. Output Power

Power Supply	True Output Power @		
	100-110V	115-127V	200-240V
1000W PSU	1000W	1000W	1000W
1400W PSU	1125W	1250W	1400W

Table 6 – Country/Region Line Voltage

	100-110V	115-127V	200-240V
Country/Region	Japan Taiwan Some Caribbean	USA Canada LA Some Caribbean Columbia Ecuador Panama Costa Rica	EMEA

1400W PSU Configuration Tables

100 – 110VAC with [RDIMM memory](#) or [3DS memory](#)

115 – 127VAC with [RDIMM memory](#) or [3DS memory](#)

200 – 240VAC with [RDIMM memory](#) or [3DS memory](#)

1000W PSU Configuration Tables

100 – 240VAC with [RDIMM memory](#) or [3DS memory](#)

1400W PSU Configurations

100 - 110VAC Input Voltage

Table 7 – 1400W PSU w/ **RDIMM** Memory

Supported Configurations for 1400W PSU w/ RDIMM Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	1	1	1	1	1	1	1	1	1	2
A6000 (300W)	1	1	1	1	1	1	1	1	1	2
5880 Ada (285W)	1	1	1	1	1	1	1	1	1	2
5000 Ada (250W)	1	1	2	2	2	2	2	2	2	3
A5500 (230W)	1	2	2	2	2	3	3	3	3	3
A5000 (230W)	1	2	2	2	2	3	3	3	3	3
4500 Ada (210W)	2	3	3	3	3	3	3	3	3	3
4070 (200W)	1	1	1	1	1	1	1	1	1	1
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	2	3	3	3	3	3	3	3	3	3
A4000 (140W)	3	3	3	3	3	3	3	3	3	3
4000 Ada (130W)	3	3	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1400W PSU Configurations

100 - 110VAC Input Voltage

Table 8 – 1400W PSU w/ **3DS** Memory

Supported Configurations for 1400W PSU w/ 3DS Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	0	1	1	1	1	1	1	1	1	2
A6000 (300W)	0	1	1	1	1	1	1	1	1	2
5880 Ada (285W)	0	1	1	1	1	1	1	1	1	2
5000 Ada (250W)	1	1	1	1	1	1	1	2	2	3
A5500 (230W)	1	1	1	1	1	2	2	2	2	3
A5000 (230W)	1	1	1	1	1	2	2	2	2	3
4500 Ada (210W)	1	2	2	2	2	2	3	3	3	3
4070 (200W)	1	1	1	1	1	1	1	1	1	1
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	1	2	2	2	3	3	3	3	3	3
A4000 (140W)	3	3	3	3	3	3	3	3	3	3
4000 Ada (130W)	3	3	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1400W PSU Configurations

115 - 127VAC Input Voltage

Table 9 – 1400W PSU w/ **RDIMM** Memory

Supported Configurations for 1400W PSU w/ RDIMM Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	1	2	2	2	2	2	2	2	3	3
A6000 (300W)	1	2	2	2	2	2	2	2	3	3
5880 Ada (285W)	1	2	2	2	2	2	2	2	3	3
5000 Ada (250W)	2	3	3	3	3	3	3	3	3	3
A5500 (230W)	2	2	2	2	2	3	3	3	3	3
A5000 (230W)	2	2	2	2	2	3	3	3	3	3
4500 Ada (210W)	3	3	3	3	3	3	3	3	3	3
4070 (200W)	1	1	1	1	1	1	1	1	1	1
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	3	3	3	3	3	3	3	3	3	3
A4000 (140W)	3	3	3	3	3	3	3	3	3	3
4000 Ada (130W)	3	3	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1400W PSU Configurations

115 - 127VAC Input Voltage

Table 10 – 1400W PSU w/ **3DS** Memory

Supported Configurations for 1400W PSU w/ 3DS Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	1	1	1	1	2	2	2	2	2	3
A6000 (300W)	1	1	1	1	2	2	2	2	2	3
5880 Ada (285W)	1	1	1	1	2	2	2	2	2	3
5000 Ada (250W)	2	2	2	2	3	3	3	3	3	3
A5500 (230W)	2	2	2	2	2	2	2	3	3	3
A5000 (230W)	2	2	2	2	2	2	2	3	3	3
4500 Ada (210W)	3	3	3	3	3	3	3	3	3	3
4070 (200W)	1	1	1	1	1	1	1	1	1	1
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	3	3	3	3	3	3	3	3	3	3
A4000 (140W)	3	3	3	3	3	3	3	3	3	3
4000 Ada (130W)	3	3	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1400W PSU Configurations

200 - 240VAC Input Voltage

Table 11 – 1400W PSU w/ **RDIMM** Memory

Supported Configurations for 1400W PSU w/ RDIMM Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	2	3	3	3	3	3	3	3	3	3
A6000 (300W)	2	2	2	2	2	3	3	3	3	3
5880 Ada (285W)	2	3	3	3	3	3	3	3	3	3
5000 Ada (250W)	3	3	3	3	3	3	3	3	3	3
A5500 (230W)	2	2	2	2	2	3	3	3	3	3
A5000 (230W)	2	2	2	2	2	3	3	3	3	3
4500 Ada (210W)	3	3	3	3	3	3	3	3	3	3
4070 (200W)	1	1	1	1	1	1	1	1	1	1
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	3	3	3	3	3	3	3	3	3	3
A4000 (140W)	3	3	3	3	3	3	3	3	3	3
4000 Ada (130W)	3	3	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1400W PSU Configurations

200 - 240VAC Input Voltage

Table 12 – 1400W PSU w/ **3DS** Memory

Supported Configurations for 1400W PSU w/ 3DS Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	2	3	3	3	3	3	3	3	3	3
A6000 (300W)	2	2	2	2	2	2	2	3	3	3
5880 Ada (285W)	2	3	3	3	3	3	3	3	3	3
5000 Ada (250W)	3	3	3	3	3	3	3	3	3	3
A5500 (230W)	2	2	2	2	2	2	2	3	3	3
A5000 (230W)	2	2	2	2	2	2	2	3	3	3
4500 Ada (210W)	3	3	3	3	3	3	3	3	3	3
4070 (200W)	3	3	3	3	3	3	3	3	3	3
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	1	1	1	1	1	1	1	1	1	1
A4000 (140W)	3	3	3	3	3	3	3	3	3	3
4000 Ada (130W)	3	3	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1000W PSU Configurations

100 – 240VAC Input Voltage

Table 13 – 1000W PSU w/ **RDIMM** Memory

Supported Configurations for 1000W PSU w/ RDIMM Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	1	1	1	1	1	1	1	1	1
6000 Ada (300W)	0	0	0	0	0	1	1	1	1	1
A6000 (300W)	0	0	0	0	0	1	1	1	1	1
5880 Ada (285W)	0	0	0	0	0	1	1	1	1	1
5000 Ada (250W)	0	0	1	1	1	1	1	1	1	2
A5500 (230W)	0	1	1	1	1	1	1	1	1	1
A5000 (230W)	0	1	1	1	1	1	1	1	1	1
4500 Ada (210W)	0	1	1	1	1	1	1	1	2	3
4070 (200W)	0	1	1	1	1	1	1	1	1	1
3060Ti (200W)	0	1	1	1	1	1	1	1	1	1
A4500 (200W)	1	1	1	1	1	1	1	1	1	2
A4000 (140W)	1	2	2	2	2	2	2	2	2	3
4000 Ada (130W)	2	2	3	3	3	3	3	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

1000W PSU Configurations

100 – 240VAC Input Voltage

Table 14 – 1000W PSU w/ **3DS** Memory

Supported Configurations for 1000W PSU w/ 3DS Memory										
GPU	CPU Power									
	385W	350W	340W	335W	325W	310W	300W	290W	270W	220W
4080 (320W)	0	0	0	0	0	1	1	1	1	1
6000 Ada (300W)	0	0	0	0	0	0	0	0	0	1
A6000 (300W)	0	0	0	0	0	0	0	0	0	1
5880 Ada (285W)	0	0	0	0	0	0	0	0	0	1
5000 Ada (250W)	0	0	0	0	0	0	0	1	1	1
A5500 (230W)	0	0	0	0	0	1	1	1	1	1
A5000 (230W)	0	0	0	0	0	1	1	1	1	1
4500 Ada (210W)	0	0	0	0	1	1	1	1	1	2
4070 (200W)	1	1	1	1	1	1	1	1	1	1
3060Ti (200W)	1	1	1	1	1	1	1	1	1	1
A4500 (200W)	0	0	0	0	1	1	1	1	1	2
A4000 (140W)	0	1	1	1	1	2	2	2	2	3
4000 Ada (130W)	0	1	1	1	2	2	2	3	3	3
2000 Ada (75W)	3	3	3	3	3	3	3	3	3	3
A2000 (75W)	3	3	3	3	3	3	3	3	3	3
Non-Aux (75W)	4	4	4	4	4	4	4	4	4	4
Notes: - GeForce cards only available via Special Bid - RTX 5880 Ada only available outside of China via Special Bid										

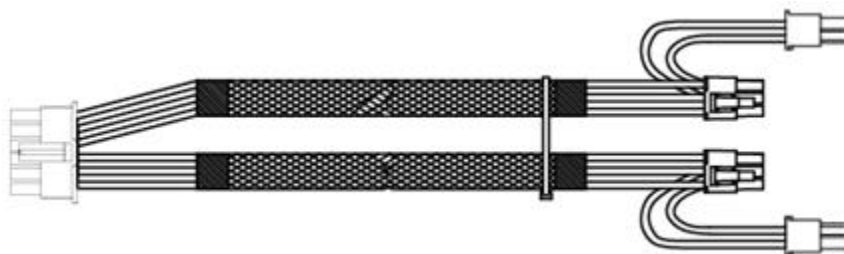
Section 4 – Configuration Notes

- P7 has a single 12V rail
- Mixed graphics card types are not supported in P7 standard models
- Due to thermal concerns, if two dual slot 200W, 250W, or 300W graphics cards are installed, only two onboard M.2 drives are allowed
- Officially supported configurations could still be limited by additional factors not defined within this document
- **For configurations that are not listed above but appear to be feasible, please work with the Workstation Technical Solutions Team to have the configuration validated/vetted**

Appendix

Details of the auxiliary power cables used in ThinkStation P7

12VHPWR 2x6+4pin to Dual PCIe 6+2pin, 270mm (FRU# 5C10U58708)



12VHPWR 2x6+4pin to CPU 8pin, 270mm (FRU# 5C10U58707)



SATA Power to 4-pin for Quadro Sync II Adapter (FRU# 5C10U58668)



**12VHPWR 2x6+4pin to 12VHPWR 2x6+4pin cable, 270mm (FRU#
5C10U58732)**

**12VHPWR 2x6+4pin to 12VHPWR 2x6+4pin R/A cable, 450mm (FRU#
5C10U58774)**



Revision History

Version	Date	Author	Changes/Updates
1.2	3/24/2025	JP	Added new CPUs Added new GPUs + rules Added output wattage table Added regional voltage table Updated supported config tables
1.1	9/5/2023	JP	Added new parts
1.0	4/26/2023	JP	Initial Version