LENOVO THINKSTATION

P920 AND P720 POWER CONFIGURATOR

Contents

OVERVIEW

SECTION 1 – KEY ARCHITECTURAL CHANGES

SECTION 2 – POWER RATINGS FOR KEY SYSTEM COMPONENTS

SECTION 3 – P920 POWER CONFIGURATIONS

SECTION 4 – P720 POWER CONFIGURATIONS

SECTION 5 – APPENDIX

SECTION 6 – DOCUMENT REVISION HISTORY

Overview

The ThinkStation P920 and P720 platforms are built using a similar system power design that was originally introduced in the predecessor P-series platforms. There are some unique changes to the P920 and P720 power design that make support for various components within the systems easier for the end user. The purpose of this document is to outline the overall power design for the ThinkStation P920 and P720 platforms and set forth the supported hardware configurations associated with each.

Section 1 – Key Architectural Changes

While the overall power design of the P720 platform is similar to its predecessors, there are some important changes that should be noted when configuring the P720 power. In the P700 and P710 series, the power supply had two methods to deliver power to the components within the system:

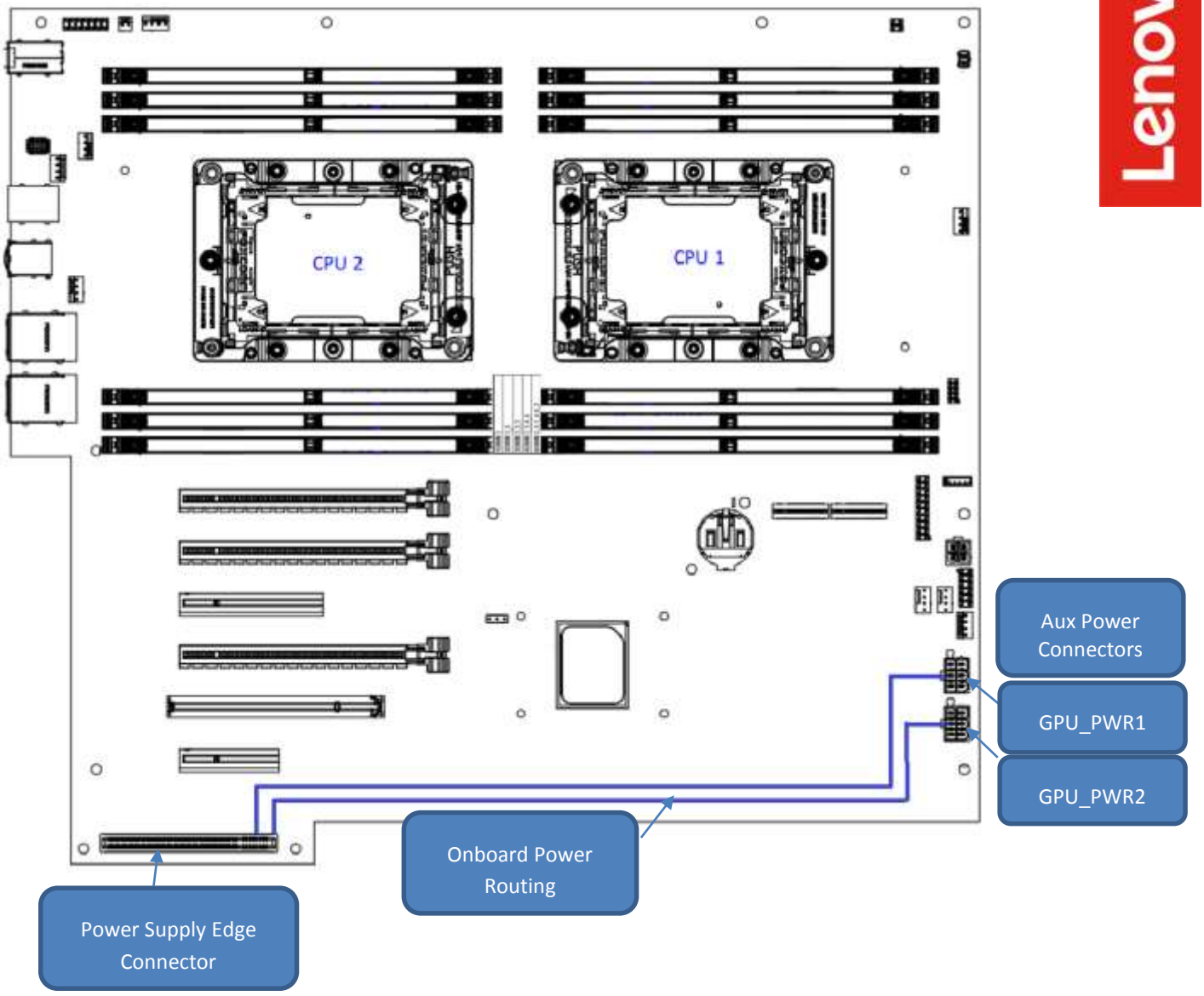
- A printed circuit board (PCB) “edge” style connector that provided power to the motherboard
- A cable connection that allowed for power to be distributed to add in cards, such as auxiliary power for GPUs.

With the P720, all power is now delivered to the system in a single connection via the PCB edge connector. Instead of using a separate cable connection for auxiliary powered devices, power for those devices is now cabled directly off the motherboard.

This becomes particularly advantageous when considering the upgradability of the P720 power supply. For previous P7XX platforms, upgrading the power supply to one with higher wattage also meant upgrading the auxiliary power cabling associated with that supply. This was a bit of a daunting task as the auxiliary cabling was routed underneath the motherboard requiring technicians to disassemble a large portion of the system to fully upgrade the power supply and cabling. With this new design, upgrading a power supply is as simple as installing the new power supply unit, and attaching any auxiliary power cable updates directly to the top of the motherboard. No system disassembly/reassembly is necessary. Figure 1 below shows the basis of this new design.

The P920 platform very closely follows the power delivery design of its predecessors with the main difference being a higher capacity (wattage) power supply.

Figure 1 - P720 Power Design



Section 2 – Power Ratings for Key System Components

In order to fully understand the power capabilities of the ThinkStation P920 and P720 platforms, it's important to understand the defined power ratings for the various internal components used within the system. Figure 2 below describes the power ratings for the various CPUs supported on the P920 and P720.

Figure 2 - CPU Power Ratings

CPU Name (Xeon Processor Scalable)	CPU Power	Additional CPU Information
Platinum 8180	205W	2.5GHz, 28 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8180M	205W	2.5GHz, 28 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8176	165W	2.1GHz, 28 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8176M	165W	2.1GHz, 28 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8170	165W	2.1GHz, 26 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8170M	165W	2.1GHz, 26 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8168	205W	2.7GHz, 24 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8164	150W	2.0GHz, 26 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8160	150W	2.1GHz, 24 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8160M	150W	2.1GHz, 24 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8160T	150W	2.1GHz, 24 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8158	150W	3.0GHz, 12 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8156	105W	3.6GHz, 4 cores, DDR4-2666, Turbo, Hyper-threading
Platinum 8153	125W	2.0GHz, 16 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6154	200W	3.0GHz, 18 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6152	140W	2.1GHz, 22 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6150	165W	2.7GHz, 18 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6148	150W	2.0GHz, 20 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6142	150W	2.6GHz, 16 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6142M	150W	2.6GHz, 16 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6140	140W	2.3GHz, 18 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6140M	140W	2.3GHz, 18 cores, DDR4-2666, Turbo, Hyper-threading

Gold 6138	125W	2.0GHz, 20 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6138T	125W	2.0GHz, 20 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6136	150W	3.0GHz, 12 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6134	130W	3.2GHz, 8 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6134M	130W	3.2GHz, 8 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6132	140W	2.6GHz, 14 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6130	125W	2.1GHz, 16 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6130T	125W	2.1GHz, 16 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6128	115W	3.4GHz, 6 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6126	125W	2.6GHz, 12 cores, DDR4-2666, Turbo, Hyper-threading
Gold 6126T	125W	2.6GHz, 12 cores, DDR4-2666, Turbo, Hyper-threading
Gold 5122	105W	3.6GHz, 4 cores, DDR4-2666, Turbo, Hyper-threading
Gold 5120	105W	2.2GHz, 14 cores, DDR4-2400, Turbo, Hyper-threading
Gold 5120T	105W	2.2GHz, 14 cores, DDR4-2400, Turbo, Hyper-threading
Gold 5118	105W	2.3GHz, 12 cores, DDR4-2400, Turbo, Hyper-threading
Gold 5115	85W	2.4GHz, 10 cores, DDR4-2400, Turbo, Hyper-threading
Silver 4116	85W	2.1GHz, 12 cores, DDR4-2400, Turbo, Hyper-threading
Silver 4114	85W	2.2GHz, 10 cores, DDR4-2400, Turbo, Hyper-threading
Silver 4112	85W	2.6GHz, 4 cores, DDR4-2400, Turbo, Hyper-threading
Silver 4110	85W	2.1GHz, 8 cores, DDR4-2400, Turbo, Hyper-threading
Silver 4109T	70W	2.0GHz, 8 cores, DDR4-2400, Turbo, Hyper-threading
Silver 4108	85W	1.8GHz, 8 cores, DDR4-2400, Turbo, Hyper-threading
Bronze 3106	85W	1.7GHz, 8 cores, DDR4-2133
Bronze 3104	85W	1.7GHz, 6 cores, DDR4-2133

Note: Not all CPU SKUs are supported on P720

Note: Some CPUs are only available as certs only. See Technical Solutions Team for usage.

Figure 3 below lists the power ratings for the various add-in cards supported across P920 and P720. Note that not all cards are supported on both platforms.

Max Power Rating	Card Name	Card Type	Aux Power Connectors Required (if any)
250W	P6000	Graphics Card	8-pin (PCIe)
250W	GV100	Graphics/Compute Card	8-pin (PCIe)
235W	GP100	Graphics/Compute Card	8-pin (PCIe)
180W	P5000, GTX 1080	Graphics Card	8-pin (PCIe)
150W	GTX 1070	Graphics Card	8-pin (PCIe)
140W	WX7100	Graphics Card	6-pin (PCIe)
120W	GTX 1060	Graphics Card	6-pin (PCIe)
105W	P4000	Graphics Card	6-pin (PCIe)
75W (or less)	NVS810, NVS510, NVS315, NVS310 P2000, P1000, P600, P400 P620	Graphics Card	None
	W5100, W4100, W2100 FirePro 2270 WX3100, WX4100, WX5100	Graphics Card	None
	Teradici 2240 Teradici 2220	Remote Display Adapter	None
	Broadcom 9460-8i Broadcom 9440-8i	Storage Controller	None
	I210-T1, I350-T2, I350-T4, Bitland BN8E88, 7260 Wifi, X540-T2 X710-DA2, Aquantia 5G,	Networking	None
	Thunderbolt	High Speed Bus	None

Figure 3 - Add-in Card Power Ratings

Section 3 – P920 Power Configurations

P920 has a single 1400W power supply that is designed to support a fully loaded system. The power supply for the P920 is unique, and it cannot be used in other platforms.

1400 Watt PSU – Full Power

- System always comes with Quad Drop Power Cable
- Supports all CPUs (max = 205W) + all memory types + all storage options with several aux power adapter options.

Dual CPU (max = 205W)

Support for LRDIMM or RDIMM (no mixing)

No Storage Limitations

GPU Support

250W x 3
OR
235W x 3
OR
180W x 3
OR
150W x 3
OR
140W x 4
OR
120W x 4

Quad Drop Power Cable

1400 Watt PSU restricted to 1125W

- Power supply automatically limits to 1125W output if system input voltage is 100-110V
- This mode of the 1400W PSU is country specific
- System always comes with Quad Drop Power Cable

Dual CPU (up to 165W)

Support for LRDIMM or RDIMM (no mixing)

No Storage Limitations

GPU Support

180W x 1
OR
150W x 1
OR
120W x 2

Quad Drop Power Cable

GPU Support

250W x 1
OR
235W x 1
OR
180W x 2
OR
150W x 2
OR
140W x 4
OR
120W x 4

Quad Drop Power Cable

P920 Power Supply Configuration Notes:

- To utilize slots 6, 7, and 8, dual CPUs must be installed.
- There are 3 dedicated 12V rails for auxiliary power (2 intended for the lower PCIe slots, 1 intended for the upper PCIe slots).
- Quad drop power cable consists of four connectors:
  - 6-pin + 8-pin (6+2) for use in the upper PCIe x16 slots
  - Dual 8-pin (6+2) for use in the lower PCIe x16 slots
- 1400W PSU is mechanically unique to the P920 chassis and cannot be used in other platforms.
- PSU will automatically operate in 1125W (restricted) mode if the system line input is 100-110V. For other supported system line input voltages, the PSU will operate at the full 1400W.
- **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.**
- Officially supported configurations could still be limited by additional factors not defined within this document.
- List of restricted mode (1125W) countries with 100-110V input
  - Anguilla
  - Belize[1]
  - Colombia
  - Cuba[1]
  - Guam
  - Haiti
  - Jamaica
  - Japan
  - Saba
  - Sint Eustatius[1]
  - Sint Maaten
  - Saint Vincent and the Grenadines[2]
  - Taiwan
  - Virgin Islands (British)
  - Virgin Islands (USA)

[1] Officially listed as 110V and 220V

[2] Officially listed as 110V and 230V

Section 4 – P720 Power Configurations

P720 has two available power supply capacities in 690W and 900W formats.

900 Watt PSU

- Both onboard 6-pin aux power connections are active.
- Includes dual 8-pin (6+2) drop cables for powering GPUs or other cards.
- Provides 2 dedicated 12V rails.
- Higher density GPU configurations can be achieved with single CPU. See TSET team for validation.

Dual CPU (up to 165W)

Dual CPU (up to 150W)

Support for RDIMM and LRDIMM (no mixing)

SATA /M.2 Only (no SAS)

GPU Support
250W x 1
OR
235W x 1
OR
180W x 2
OR
150W x 2
OR
140W x 2
OR
120W x 2

690 Watt PSU

- Only single 6-pin aux power connection is active (GFX_PWR1). See Figure 1.
- Includes single 8-pin (6+2) drop cable for powering GPUs or other cards.
- Provides single dedicated 12V rail.
- If dual CPUs rated 120W-150W are used, then no auxiliary powered cards are supported.

Dual CPU (120W to 150W)

Dual CPU (115W or less)

No Storage Limitations

GPU Support

Bus Powered Cards Only! (75W or less)

GPU Support

180W x 1
OR
150W x 1
OR
140W x 1
OR
120W x 1

P720 Power Supply Configuration Notes:

- In order to utilize Slot 1 (white), dual CPUs must be installed.
- The 900W supply has 2 dedicated 12V rails and both onboard ports (GFX_PWR1 and GFX_PWR2) are active. See Figure 1.
- The 690W supply has a single dedicated 12V rail, and only one onboard port (GFX_PWR1) is active. See Figure 1.
- For the 690W supply, if dual CPUs rated 120W-150W are used, then no auxiliary powered cards can be supported (only bus powered cards of 75W or less are supported).
- P720 supports either the 690W or 900W power supply.
- **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.**
- Officially supported configurations could still be limited by additional factors not defined within this document.

Section 5 – Appendix

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

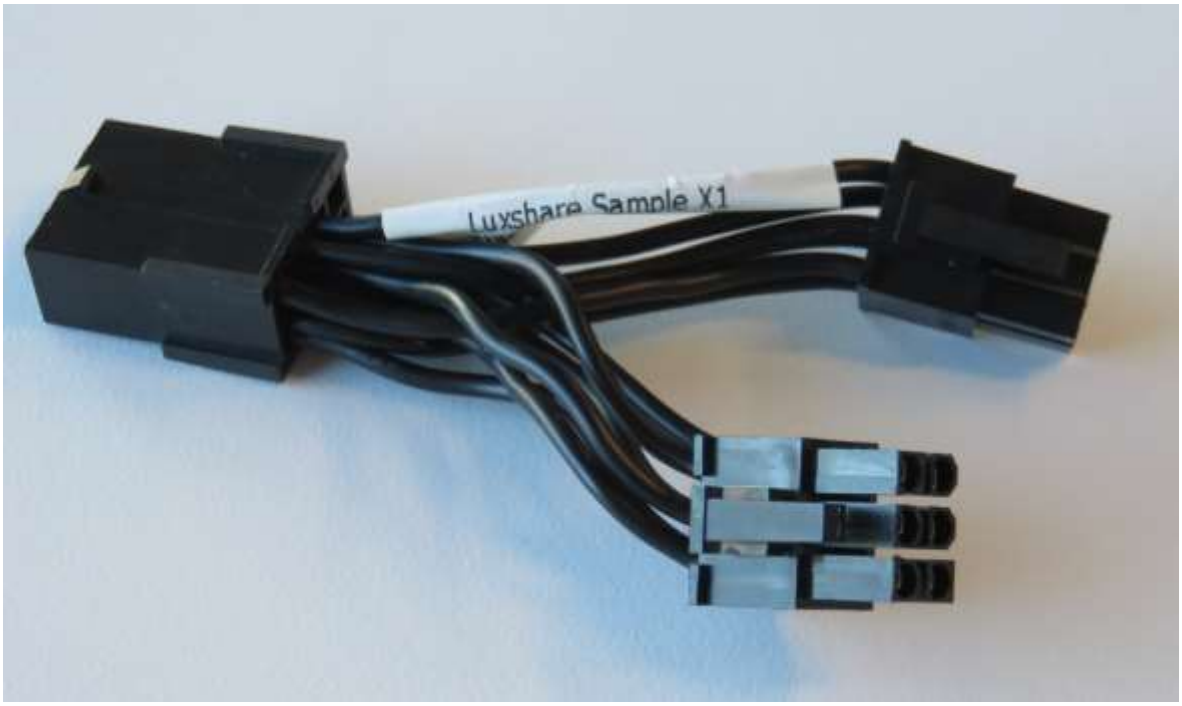
PCIE POWER CONNECTORS

6-pin PCIe Power Connector

6+2 pin PCIe Power Connector

SUPPORTED PCIE POWER CABLE ADAPTERS

6-pin PCIe to 8-pin PCIe Converter, 100mm (FRU = 00XL159)



8-pin to dual 6-pin PCIe Splitter, 50mm (FRU = 04X2387)

Section 6 – Revision History

Version	Date	Author	Changes/Updates
1.0	11/8/2017	Cory Chapman	Initial launch release
1.1	12/11/2017	Cory Chapman	Updated CPU chart for Figure 2 to add more CPU detail.
1.2	2/12/2018	Cory Chapman	Updated P720 with 900W PSU info to match new power spec (v1.5). Added GV100 and P620 to adapter list in Figure 3.