

Memory Configurator

Lenovo ThinkStation P2 Tower Gen 2



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Overview

The ThinkStation P2 Tower Gen 2 Intel Arrow Lake platform is the new replacement desktop workstation for the ThinkStation P2 Tower Gen 1 platform.

The purpose of this document is to highlight the major differences between the different memory platform architectures from the previous platforms and to help guide users to optimally configure their memory configuration in the ThinkStation P2 Tower Gen 2 platform.

Section 1 – P2 Tower Gen 2 Memory Architectural Design

The ThinkStation P2 Tower Gen 2 platform supports DDR5 memory with higher top memory bus speeds of 5600MHz, depending on the system processor and number of DIMMs per channel. This platform offers a dual memory channel design based on Intel Alder Lake and Arrow Lack processors. There is a total of four memory DIMM slots, allowing the P2 Tower Gen 2 to take full advantage of supporting a two DIMM per channel design.

Figure 1 – P2 Tower Motherboard Layout

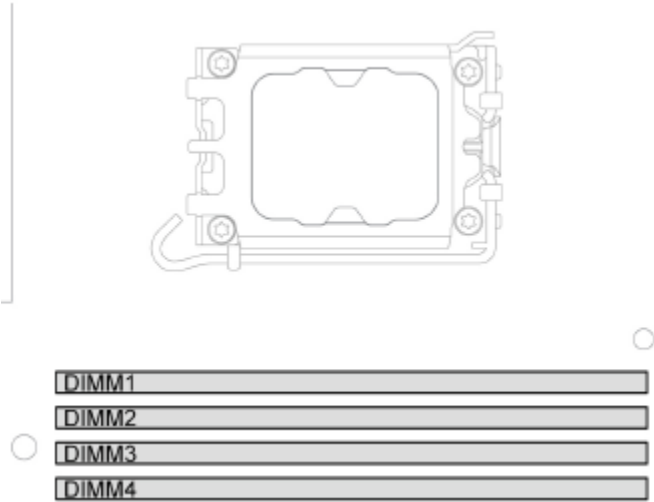
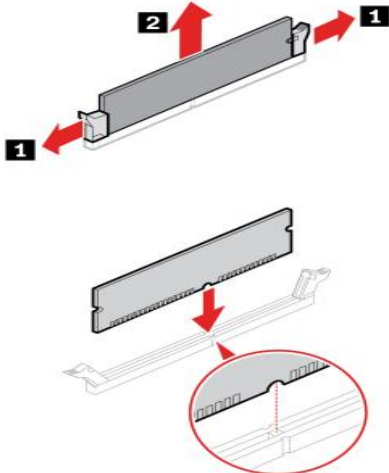


Figure 2 – P2Tower Memory Install and Removal



Section 2 – P2 Tower Gen 2 Memory Configurations

The ThinkStation P2 Tower Gen 2 platform presents a complex environment for configuring memory to achieve optimal system performance. This section outlines recommended guidelines designed to maximize memory bandwidth and overall system efficiency.

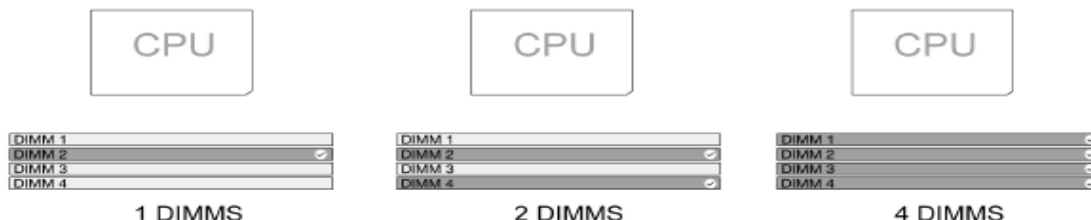
- Install DIMM slots in multiples of two to fully take advantage of both memory channels. Utilizing one DIMM per channel (DPC) will allow for full maximum memory bandwidth performance.
- DIMM slots should be filled in the order listed in *Figure 2*.
- UDIMMs are only supported on the P2 Tower Gen 2 platform.
- Mixing ECC and non-ECC memory UDIMMs are not supported.
- Lenovo does not recommend installing three (3) DIMMs resulting in an unbalanced memory channel configuration.
- Lenovo does not recommend mixing memory DIMM vendors within a DIMM channel.
- Recommend the Same part number and parameters when multiple memory is Filled.
- Lenovo does not recommend mixing different memory DIMM capacities.
- Lenovo does not recommend mixing single rank (1R) and dual rank (2R) memory DIMMs.

Figure 3 – P2 Tower Gen 2 Slot Fill Order Recommendations

# of DIMMs	DIMM slots used
1 DIMM	DIMM slot 2
2 DIMMs	DIMM slot 2, slot 4
3 DIMMs ¹	Unsupported
4 DIMMs	DIMM slot 2, slot 4, slot 1, slot 3

¹ Lenovo does not support or recommend this number of DIMM quantity as it results in an unbalanced memory configuration across the dual channels.

Figure 4 – P2 Tower Gen 2 Slot Fill Order Recommendations install order



¹ Lenovo does not support or recommend this number of DIMM quantities as it results in an unbalanced memory configuration across the dual channels.

- Memory Slot: **4 DIMM Slots, 2SPC design**
- Memory Module Physical Capacity: **5600MT/s or 6400MT/s, DDR5, ECC and Non ECC**
- Maximum Actual Operating Speed: **5600 MT/s for both modules**
- Maximum Capacity: **192GB(ECC)/256GB(Non-ECC)**
- Configuration choice:
 1. 8GB, 1 x 8GB, DDR5, 5600 MT/s, Non-ECC
 2. 16GB, 2 x 8GB, DDR5, 5600 MT/s, Non-ECC
 3. 32GB, 2 x 16GB, DDR5, 5600 MT/s, Non-ECC
 4. 64GB, 2 x 32GB, DDR5, 5600 MT/s, Non-ECC
 5. 32GB, 4 x 8GB, DDR5, 4800 MT/s, Non-ECC
 6. 64GB, 4 x 16GB, DDR5, 4800 MT/s, Non-ECC
 7. 128GB, 4 x 32GB, DDR5, 4400 MT/s, Non-ECC
 8. 192GB, 4 x 48GB, DDR5, 4400 MT/s, Non-ECC
 9. 256GB, 4 x 64GB, DDR5, 4400 MT/s, Non-ECC
 10. 16GB, 1 x 16GB, DDR5, 5600 MT/s, ECC
 11. 32GB, 2 x 16GB, DDR5, 5600 MT/s, ECC
 12. 64GB, 2 x 32GB, DDR5, 5600 MT/s, ECC
 13. 64GB 4 x 16GB, DDR5, 4800 MT/s, ECC
 14. 128GB 4 x 32GB, DDR5, 4400 MT/s, ECC
 15. 192GB, 4 x 48GB, DDR5, 4400 MT/s, ECC

Figure 5 – P2 Tower Gen 2 memory capacity and Type

DIMM capacity	DIMM Type
8 GB, 16 GB, 32 GB, or 48 GB	DDR5-5600 non-ECC UDIMM
16 GB, 32 GB, or 48 GB	DDR5-5600 ECC UDIMM
64 GB	DDR5-6400 non-ECC CUDIMM

Figure 6 – 1R (single rank) and 2R (dual rank) Memory Installation and Maximum Frequency

Single DIMM Size	Slot 1	Slot 2	Slot 3	Slot 4	Actual Speed (MT/s)
8GB		1R			5600
8GB		1R		1R	5600
8GB	1R	1R	1R	1R	4800
16GB		1R			5600
16GB		1R		1R	5600
16GB	1R	1R	1R	1R	4800
32GB		2R			5600
32GB		2R		2R	5600
32GB	2R	2R	2R	2R	4400
48 GB		2R			5600
48 GB		2R		2R	5600
48 GB	2R	2R	2R	2R	4400
64 GB*		2R			5600
64 GB*		2R		2R	5600
64 GB*	2R	2R	2R	2R	4400

Notes:

*64GB Memory for None-ECC only

The actual system memory speed of the memory modules varies depending on the microprocessor model.

For example, your computer comes with 5600 MT/s memory modules, but the microprocessor only supports up to 4400 MT/s memory modules. Then the system memory speed will be no faster than 4400 MT/s. For microprocessor models supported in your computer.

If you install memory modules at different speeds, the actual system memory speed will be set to the lowest speed of all the memory modules.

Revision History

Version	Date	Author	Changes/Updates
1.0	6/18/2025	Zhu Zheng	Initial Release