

# Memory Configurator

Lenovo ThinkStation P2 Tower



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## Overview

The ThinkStation P2 Intel Alder Lake /RPL-S Refresh platform is the new replacement desktop workstation for the ThinkStation P358 AMD AM4 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 platform.

# Section 1 – P2 Tower Memory Architectural Design

The ThinkStation P2 Tower platform supports DDR5 memory with higher top memory bus speeds of 4800MHz, 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 RPL–Reflash processors. There is a total of four memory DIMM slots, allowing the P2 to take full advantage of supporting a two DIMM per channel design.

Figure 1 – P2 Tower Motherboard Layout

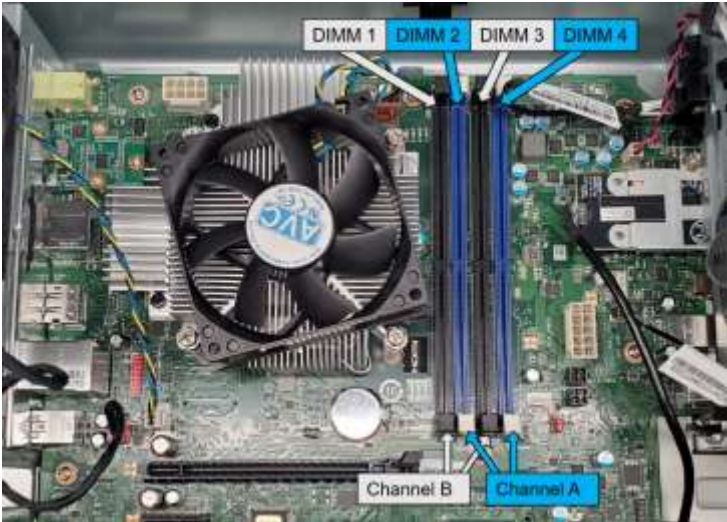
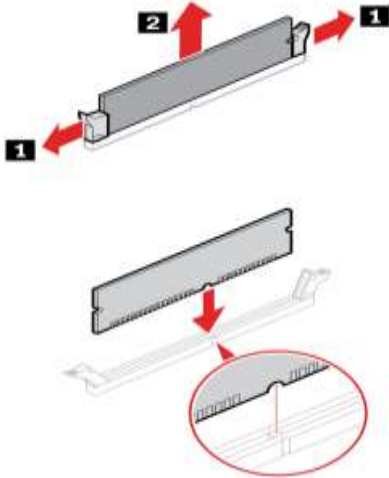


Figure 2 – P2Tower Memory Install and Removal



## Section 2 – P2 Tower Memory Configurations

The ThinkStation P2 Tower platform can be a bit overwhelming on trying to figure out how to optimally configure memory for best overall system performance. The following recommended guidelines will help obtain the best overall memory bandwidth from the P2 Tower system.

- 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 platform.
- Mixing ECC and non-ECC memory UDIMMs are not supported.
- ~~Registered DIMMs (RDIMMs) are not supported in the P2 platform.  
(Remove this item for later)~~
- 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 2 – P2 Tower Slot Fill Order Recommendations

# of DIMMs	DIMM slots used
1 DIMM	DIMM slot 2
2 DIMMs	DIMM slot 2, DIMM slot 4
3 DIMMs <sup>1</sup>	Unsupported
4 DIMMs	DIMM slot 2, DIMM slot 4, DIMM slot 1, DIMM slot 3

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

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- Memory Slot: **4 DIMM Slots, 2SPC design**
- Memory Module Physical Capacity: **4800Mhz or 5600Mhz, DDR5, ECC and Non ECC**
- Maximum Actual Operating Speed: **4400Mhz for both module**
- Maximum Capacity: **128G**
- Intel Core i3-13100 do not support ECC memory.
- Configuration choice:
  1. 8GB, 1 x 8GB, DDR5, 4400MHz, Non-ECC
  2. 16GB, 2 x 8GB, DDR5, 4400MHz, Non-ECC
  3. 32GB, 2 x 16GB, DDR5, 4400MHz, Non-ECC
  4. 64GB, 2 x 32GB, DDR5, 4400MHz, Non-ECC
  5. 32GB, 4 x 8GB, DDR5, 4000MHz, Non-ECC
  6. 64GB, 4 x 16GB, DDR5, 4000MHz, Non-ECC
  7. 128GB, 4 x 32GB, DDR5, 3600MHz, Non-ECC
  8. 16GB, 1 x 16GB, DDR5, 4400MHz, ECC
  9. 32GB, 2 x 16GB, DDR5, 4400MHz, ECC
  10. 64GB, 2 x 32GB, DDR5, 4400MHz, ECC
  11. 64GB 4 x 16GB, DDR5, 4000MHz, ECC
  12. 128GB 4 x 32GB, DDR5, 3600MHz, ECC

Figure 3 – 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
8GB		1R			4400 MHz
8GB		1R		1R	4400 MHz
8GB	1R	1R	1R	1R	4000 MHz
16GB		1R			4400 MHz
16GB		1R		1R	4400 MHz
16GB	1R	1R	1R	1R	4000 MHz
32GB		2R			4400 MHz
32GB		2R		2R	4400 MHz
32GB	2R	2R	2R	2R	3600 MHz

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# Revision History

Version	Date	Author	Changes/Updates
0.1	1/8/2024	Zhu Zheng	Initial draft.
1.0	10/30/2024	Zhu Zheng	Initial Release