

Memory Configurator

Lenovo ThinkStation P5



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Overview

The purpose of this document is to provide high-level guidance for users to be able to identify the memory components of the system as well as optimally configure their system memory in the ThinkStation P5 platform to yield best performance.

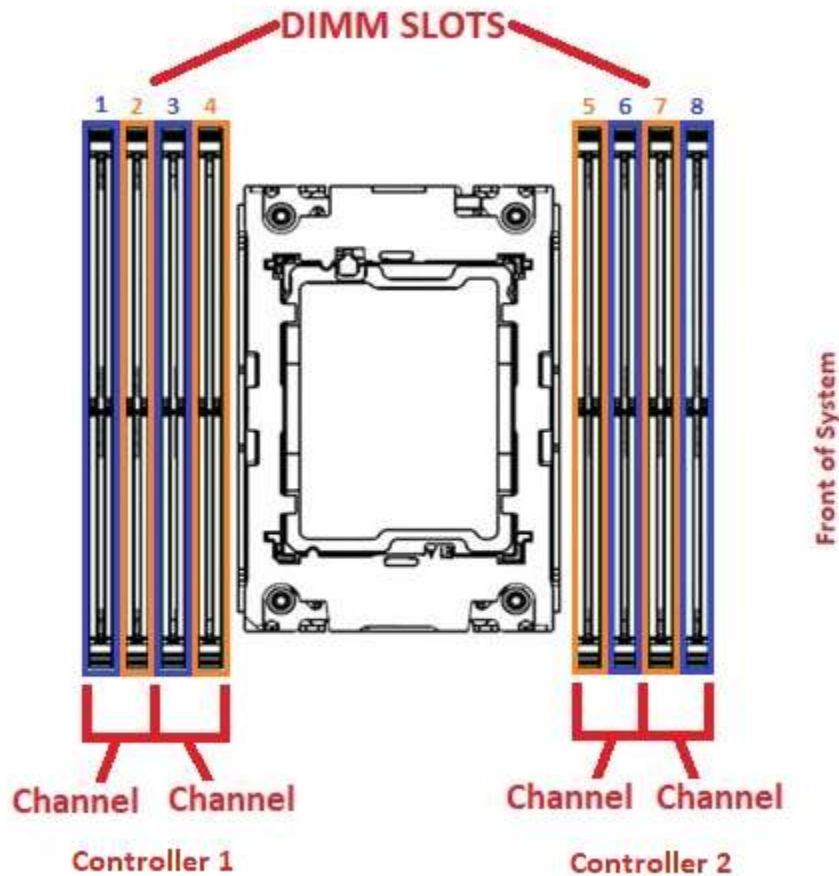
Section 1 – Platform Memory Architecture

The launch of the latest Intel platform introduces support for the DDR5 memory DIMMs. The P5 system offers eight DIMM slots with quad channel architecture. DDR5 memory offers a variety of key design features. The most obvious of these features is that when utilizing the right processor and memory combination, the system has the ability to reach higher memory bandwidth speeds than the previous generation. When using an Intel Sapphire Rapids processor, the P5 can reach speeds of up to 4800 MT/s. Maximum speeds are reached when using the system in a single DIMM per channel (4 DIMMs) configuration and is dependent upon the CPU and memory configuration. The following sections detail how to reach the maximum speed available.

Section 2 – P5 Memory Layout Visual

The below diagram in Figure 1 shows a high-level visual layout of the memory DIMM slots in the ThinkStation P5 platform. Slots 1-4 utilize memory controller 1 while slots 5-8 utilize memory controller 2. Each adjacent Blue and Orange DIMM slot make up a single channel. For example, slots 1 and 2 share a channel. Blue slots will be populated first. Additionally, See Section 4 for the Memory Fill Order.

Figure 1 – P5 Motherboard DIMM Layout with Slot, Channel, and Controller Identification



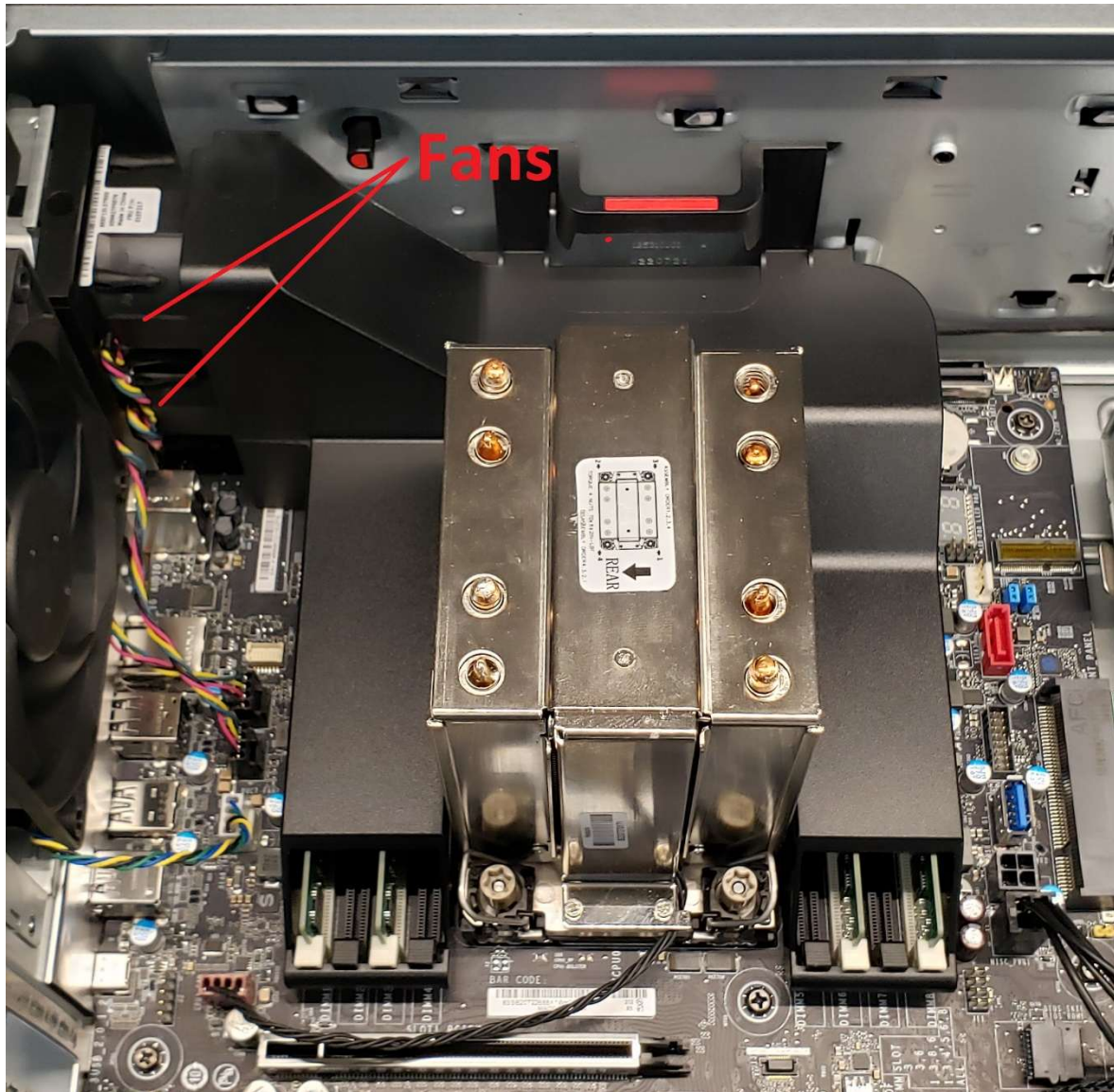
Section 3 – P5 Memory Configurations

The ThinkStation P5 platform has 4-channels for 8 DIMM slots with a maximum of 512GB of system memory. The Lenovo ThinkStation P5 supports 16/32/64GB DDR5 RDIMMs for the Intel Sapphire Rapids 4th Gen Xeon W-series Processors.

The following guidelines are recommended by Lenovo for obtaining the best memory bandwidth from the ThinkStation P5 platform.

- UDIMMs are not supported.
- DIMMs must be of the same type and capacity. DIMMs sharing a channel must be identical.
- Regardless of the number of DIMMs installed, there are two DIMM fans mounted to the rear of the system that use a DIMM slot cover to draw air over the DIMM slots and push the air out the rear of the system. See Figure 2 below for reference.
- Currently the P5 platform has both 4800 MT/s and 5600 MT/s DIMMs tested and certified. However, the maximum capability of a P5 Sapphire Rapids CPU is 4800 MT/s. When there are four or less DIMMs properly installed, each DIMM has a dedicated channel, and the system is capable of running at a maximum speed of up to 4800 MT/s, depending on the installed CPU. If the system is utilizing 6 or 8 DIMMs, the system will run with 2 DIMMs per channel. When there are 2 DIMMs per channel the system is capable of running at a maximum speed of up to 4400 MT/s regardless of the memory used.
- Maximum running speed is dependent on the processor and memory combination used.

Figure 2 – P5 DIMM Slots Cover and Fans



Section 4 – P5 Memory Fill Order

It is important to make sure the proper memory fill order is being utilized to get the best possible memory performance from the ThinkStation P5 workstation. Table 1 below shows the recommended fill order based on the number of DIMMs being used.

Table 1 – P5 DIMM Slot Fill Order Recommendations

Quantity of DIMMs	DIMM Slot Installation Order	Maximum Speed
1 DIMM	DIMM Slot 3	Up to 4800 MT/s
2 DIMMs	DIMM Slots 3, 6	Up to 4800 MT/s
3 DIMMs	Not Supported ¹	
4 DIMMs	DIMM Slots 1, 3, 6, 8	Up to 4800 MT/s
5 DIMMs	Not Supported ¹	
6 DIMMs	DIMM Slots 1, 3, 4, 5, 6, 8	Up to 4400 MT/s ²
7 DIMMs	Not Supported ¹	
8 DIMMs	DIMM Slots 1 – 8 (Fully Populated)	Up to 4400MT/s ²

Note 1: Certain configurations with an odd total number of DIMMs can adversely affect performance and are therefore not supported.

Note 2: The P5 workstation is designed with 4 memory channels for the CPU. When there are 4 or less DIMMs properly installed in the system each DIMM has a dedicated channel, and the system is capable of running at a maximum speed of up to 4800 MT/s depending on the installed CPU. A configuration with 6 or 8 DIMMs requires utilizing 2 DIMMs per channel. When there are 2 DIMMs per channel, all of the memory runs at a maximum speed of up to 4400 MT/s.

Revision History

Version	Date	Author	Changes/Updates
1.0	4/19/23	Scott C	Initial release
1.1	4/10/25	Scott C	Updated for Intel CPU refresh
1.2	9/5/25	Scott C	Updated