Memory Configuration for Supermicro X12 Series Motherboards

based on

The 3rd Gen Intel® Xeon Scalable Processors

USER'S GUIDE

Revision 1.0c

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Manual Revision 1.0c

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Memory Support for the X12 Series Motherboards

This document provides the user with an easy-to-use guide for proper memory configuration and installation for the X12 Series motherboards utilizing 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 (288-pin) ECC memory with speeds of 3200/2933/2666 memory modules. (See Note 1 and Note 2 below.)

Note 1: This memory configuration user's guide is written for Supermicro X12UP/DP/MP motherboards based on the 3rd Gen Intel® Xeon Scalable (83xx/63xx/53xx/4314 Series) processors. Memory support information for the X12ST Series motherboards is not included in this user's guide since these motherboards are not built upon the processors indicated above.

Note 2: DDR4 3200 MHz memory is supported by the 3rd Gen Intel Xeon Scalable 83xx/63xx Series Processors only.

To ensure proper memory installation, please carefully follow the information and instructions provided in this user's guide.

1. ESD Precautions

Electrostatic Discharge (ESD) can damage electronic components including memory modules. To avoid damaging your DIMM modules, it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Handle the memory module by its edges only.
- Put the memory modules into the antistatic bags when not in use.
- Check the Supermicro website for recommended memory modules

2. Introduction to Intel® Optane™ Persistent Memory (PMem) 200 Series

The Intel® Optane™ Persistent Memory (PMem) 200 Series technology is supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) Processors. PMem offers data persistence with higher capacity at similar latencies to the existing memory modules and provides hyper-speed storage capability for high performance computing platforms with flexible configuration options.

3. Memory Installation Sequence

To maximize memory capacity, the rule of thumb is to populate all DIMM slots available on the motherboard, including all blue slots and black slots. However, there are exceptions to this general rule. Good examples of exceptions include the X12DPi-N(T)6 and X12DPT-B6 motherboards, for these motherboards do not require onboard DIMM slots to be populated to the fullest capacity in order to achieve optimal memory performance.

Memory modules for the X12 Series motherboards (**Note below**) are populated using the "Fill First" method. The blue memory slot of each channel is considered the "first DIMM module" of the channel, and the black slot, the second module of the channel. When installing memory modules, be sure to populate the blue memory slots first and then populate the black slots. Using unbalanced memory topology such as populating two DIMMs in one channel while populating one DIMM in another channel on the same motherboard will result in reduced memory performance.

Note: The memory population information listed below is intended for Supermicro X12UP/DP/MP motherboards, excluding the X12ST Series motherboards.

4. General Memory Population Requirements

1. Be sure to use the memory modules of the same type and speed on the motherboard. Mixing of memory modules of different types and speeds is not allowed.

2. Populating memory slots with a pair of DIMM modules of the same type and size will result in interleaved memory, which will improve memory performance.

DDR4 Memory Support for the 3rd Gen Intel Xeon Scalable Processors

DDR4 Memory Support for the 3rd Gen Intel Xeon Scalable Processors					
Type	Ranks Per DIMM & Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slots Per Channel (SPC) and DIMMs Per Channel (DPC)	
				1DPC (1-DIMM Per Channel)	2DPC (2-DIMM Per Channel)
		8Gb	16Gb	1.2 V	1.2 V
RDIMM	SRx8	8GB	16GB	3200	3200
	SRx4	16GB	32GB		
	DRx8	16GB	32GB		
	DRx4	32GB	64GB		
RDIMM 3Ds	(4R/8R) X4	2H- 64 GB 4H-128 GB	2H- 128 GB 4H-256 GB		
LRDIMM	QRx4	64GB	128GB	3200	3200
LRDIMM - 3Ds	(4R/8R) X4	4H-128 GB	2H- 128 GB 4H-256 GB	3200	3200

5. DIMM Population Guidelines for Optimal Performance

For optimal memory performance, follow the instructions listed in the tables below when populating memory modules.

5.1 Key Parameters for DIMM Configuration

Key Parameters for DIMM Configurations	
Parameters	**Possible Values**
Number of Channels	8
Number of DIMMs per Channel	1DPC (1 DIMM Per Channel) or 2DPC (2 DIMMs Per Channel)
DIMM Type	RDIMM (w/ECC), 3DS RDIMM, LRDIMM, 3DS LRDIMM
DIMM Construction	non-3DS RDIMM Raw Cards: A/B (2Rx4), C (1Rx4), D (1Rx8), E (2Rx8) 3DS RDIMM Raw Cards: A/B (4Rx4) non-3DS LRDIMM Raw Cards: D/E (4Rx4) 3DS LRDIMM Raw Cards: A/B (8Rx4)

5.2 Memory Population Tables for the X12UP Motherboards

For your system memory to work properly, please follow the memory population tables below to install your memory modules on the X12UP motherboard (Note below). These memory population tables were created based on the general memory population guidelines provided by Intel to support Supermicro X12UP motherboards, excluding the X12ST Series motherboards.

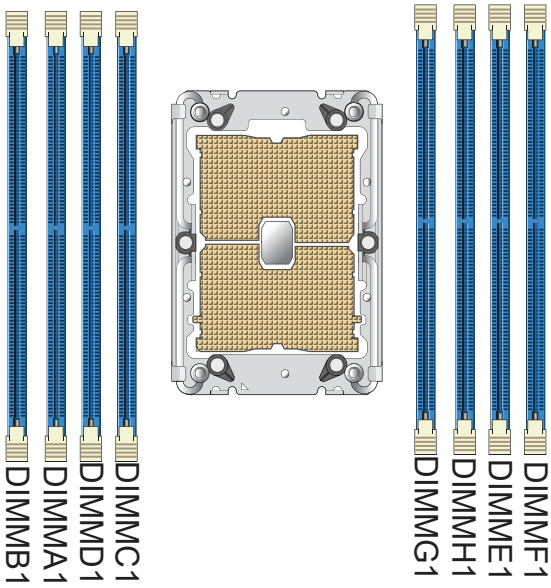
Note: The memory support information provided in this section is for the X12UP Series motherboards that are based on the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) processors only. The memory population tables listed below are not applicable to the X12ST Series motherboards.

Memory Population for the X12UP Motherboards (with 8 Slots)

Note: The memory table below supports the X12UP motherboards with 8 DIMM memory slots onboard, such as X12SPi-TF, X12SPW-F/TF, X12SPO-F/NTF, X12SPM-LN4F/LN6TF/TF, and X12SPL-F/LN4F.

DDR4 Memory Population Table for X12UP 8-DIMM Motherboards	
DIMM Counts	**Memory Population Sequence**
1 DIMM	DIMMA1
2 DIMMs	DIMMA1/DIMME1
4 DIMM (Note)	DIMMA1/DIMME1/DIMMC1/DIMMG1
6 DIMMs	DIMMA1/DIMME1/DIMMC1/DIMMG1/DIMMB1/DIMMF1
8DIMMs (Note)	DIMMA1/DIMME1/DIMMC1/DIMMG1/DIMMB1/DIMMF1/DIMMD1/DIMMH1

Note: This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.



Memory Population on X12UP 8-DIMM Motherboards

PMem 200 Series Population Table for X12UP Motherboards

Note: PMem 200 Series are supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) Processors.

PMem 200 Series Population Table for X12UP 8-DIMM Motherboards									
DDR4+PMem	**Mode**	**DIMMA1**	**DIMMB1**	**DIMMC1**	**DIMMD1**	**DIMME1**	**DIMMF1**	**DIMMG1**	**DIMMH1**
4+4	**AD MM**	DDR4	***PMem***	DDR4	***PMem***	DDR4	***PMem***	DDR4	***PMem***
		PMem	DDR4	***PMem***	DDR4	***PMem***	DDR4	***PMem***	DDR4
6+1	**AD**	***PMem***	DDR4	**DDR4**	DDR4	-	DDR4	DDR4	DDR4
		DDR4	***PMem***	DDR4	DDR4	DDR4	-	DDR4	DDR4
		DDR4	DDR4	***PMem***	DDR4	DDR4	DDR4	-	DDR4
		DDR4	DDR4	DDR4	***PMem***	DDR4	DDR4	DDR4	-
		-	DDR4	DDR4	DDR4	***PMem***	DDR4	DDR4	DDR4
		DDR4	-	DDR4	DDR4	DDR4	***PMem***	DDR4	DDR4
		DDR4	DDR4	-	DDR4	DDR4	DDR4	***PMem***	DDR4
		DDR4	DDR4	DDR4	-	DDR4	DDR4	DDR4	***PMem***

Legend (for the table above)	
DDR4 Type and Capacity	
DDR4	See Validation Matrix (DDR4 DIMMs validated with PMem)
Capacity	
PMem	Any Capacity (Uniformly for all channels for a given configuration)

- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:8. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual population, different PMem rearrangements among channels are permitted so long as the configuration doesn't break X12UP Memory population rules.
- Ensure the same DDR4 DIMM type and capacity are used for each DDR4 + PMem population.
- If the system detects an unvalidated configuration, then the system issues a BIOS warning. The CLI functionality is limited in non-POR configurations, and select commands will not be supported.

Validation Matrix (DDR4 DIMMS with PMem 200 Series)			
DIMM Type	**Ranks Per DIMM & Data Width (Stack)**	**DIMM Capacity (GB)**	
		DRAM Density	
		8Gb	**16Gb**
RDIMM (up to 3200)	1Rx8	N/A	N/A
	1Rx4	16GB	32GB
	2Rx8	16GB	32GB
	2Rx4	32GB	64GB
RDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	128GB
	8Rx4 (4H)	NA	256GB
LRDIMM (up to 3200)	4Rx4	64GB	128GB
LRDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	N/A
	8Rx4 (4H)	128GB	256GB

5.3 Memory Population Tables for the X12DP Motherboards

For your system memory to work properly, please follow the memory population tables below to install the memory modules on your motherboard. These memory population tables were created based on the general memory population guidelines provided by Intel to support Supermicro X12DP motherboards.

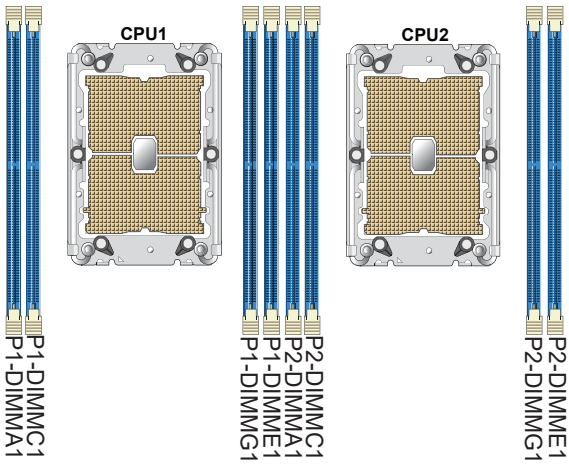
5.3.1 Memory Population for the X12DP Motherboards with 8 DIMM Slots Onboard

Note: The memory table below supports the X12DP motherboards with 8 DIMM memory slots onboard, such as X12DPL-i6/NT6.

Memory Population Table (with 8 DIMM Slots)

DDR4 Memory Population Table for X12DP 8-DIMM Motherboards	
When 1 CPU is used:	***Memory Population Sequence***
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1
1 CPU & 4 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1
When 2 CPUs are used:	***Memory Population Sequence***
2 CPUs & 2 DIMMs (Note)	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 8 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1

Note: This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.



Memory Population on X12DP 8-DIMM Motherboards

Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

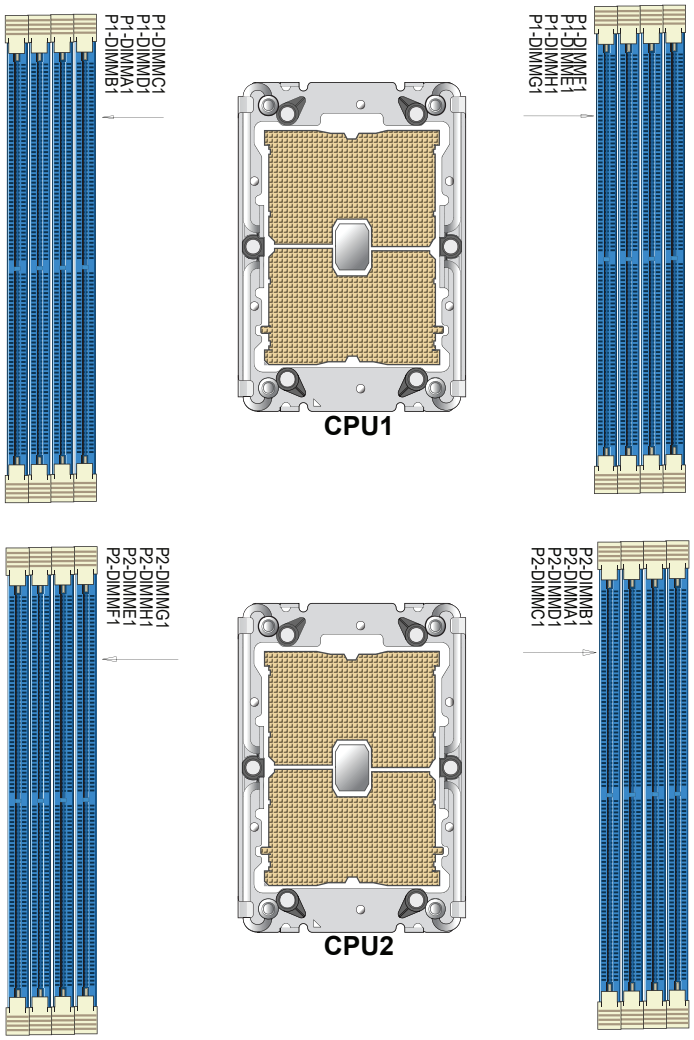
5.3.2 Memory Population for the X12DP Motherboards with 16 DIMM Slots Onboard

Note: The following memory population table supports Supermicro X12DP motherboards with 16 DIMM memory slots onboard, such as X12DPFR-AN6, X12DPD-L/M256, X12DAi-N6, X12DPG-QT6, X12DDW-A6, and X12DPT-PT6.

Memory Population Table (with 16 Slots)

DDR4 Memory Population Table for X12DP 16-DIMM Motherboards	
When 1 CPU is used:	***Memory Population Sequence***
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1
1 CPU & 4 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1
1 CPU & 6 DIMM	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1
1 CPU & 8 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1
When 2 CPUs are used:	***Memory Population Sequence***
2 CPUs & 2 DIMMs (Note)	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 8 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 10 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 12 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 14 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 16 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1

Note: This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.



Memory Population on X12DP 16-DIMM Motherboards

Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

PMem 200 Series Population Table for X12DP Motherboards (with 16 Slots)

Note: The Intel® Optane™ Persistent Memory (PMem) 200 Series are supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) Processors.

PMem 200 Series Population Table for X12DP 16-DIMM Motherboards (within 1 CPU socket)										
DDR4+PMem	**Mode**	**AD Interleave**	**P1-DIMMF1**	**P1-DIMME1**	**P1-DIMMH1**	**P1-DIMMG1**	**P1-DIMMC1**	**P1-DIMMD1**	**P1-DIMMA1**	**P1-DIMMB1**
4+4	**AD MM**	**One - x4**	***PMem***	DDR4	***PMem***	DDR4	DDR4	***PMem***	DDR4	***PMem***
		One - x4	DDR4	***PMem***	DDR4	***PMem***	***PMem***	DDR4	***PMem***	DDR4
6+1	**AD**	**One - x1**	DDR4	DDR4	-	DDR4	DDR4	***PMem***	DDR4	DDR4
			-	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	***PMem***
			DDR4	DDR4	***PMem***	DDR4	DDR4	-	DDR4	DDR4
			PMem	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	-
			DDR4	DDR4	DDR4	-	***PMem***	DDR4	DDR4	DDR4
			DDR4	-	DDR4	DDR4	DDR4	DDR4	***PMem***	DDR4
			DDR4	DDR4	DDR4	***PMem***	-	DDR4	DDR4	DDR4
			DDR4	***PMem***	DDR4	DDR4	DDR4	DDR4	-	DDR4

Legend (for the table above)	
DDR4 Type and Capacity	
DDR4	See Validation Matrix (DDR4 DIMMs validated with PMem)
Capacity	
PMem	Any Capacity (Uniformly for all channels for a given configuration)

- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:16. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual population, different PMem rearrangements among channels are permitted so long as the configuration doesn't break X12DP Memory population rules.
- Ensure the same DDR4 DIMM type and capacity are used for each DDR4 + PMem population.
- If the system detects an unvalidated configuration, then the system issues a BIOS warning. The CLI functionality is limited in non-POR configurations, and select commands will not be supported.

Validation Matrix (DDR4 DIMMS with PMem 200 Series)			
DIMM Type	**Ranks Per DIMM & Data Width (Stack)**	**DIMM Capacity (GB)**	
		DRAM Density	
		8Gb	**16Gb**
RDIMM (up to 3200)	1Rx8	N/A	N/A
	1Rx4	16GB	32GB
	2Rx8	16GB	32GB
	2Rx4	32GB	64GB
RDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	128GB
	8Rx4 (4H)	NA	256GB
LRDIMM (up to 3200)	4Rx4	64GB	128GB
LRDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	N/A
	8Rx4 (4H)	128GB	256GB

5.3.3 Memory Population for the X12DP Motherboards with 18 DIMM Slots Onboard

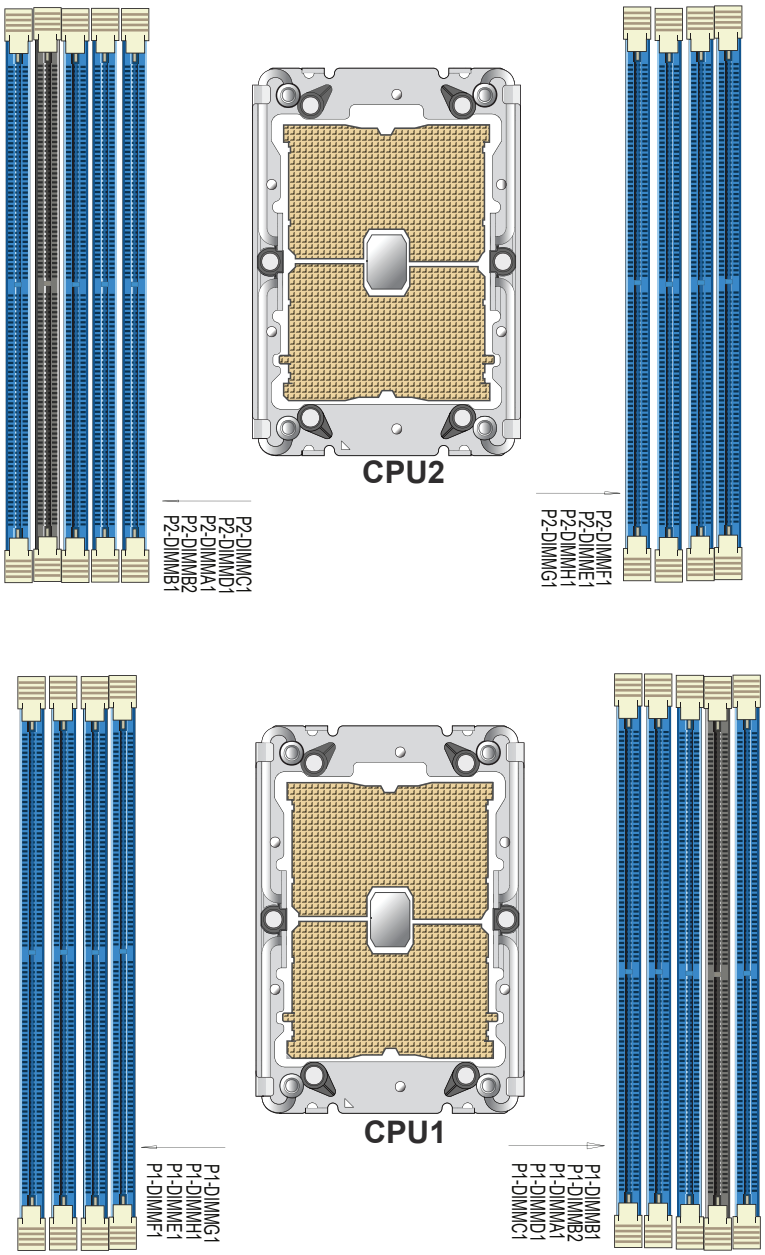
Note: The following memory population table supports Supermicro X12DP motherboards with 18 DIMM memory slots onboard, such as X12DPi-N(T)6.

Memory Population Table (with 18 Slots)

DDR4 Memory Population Table for X12DP 18-DIMM Motherboards	
When 1 CPU is used:	***Memory Population Sequence***
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1
1 CPU & 4 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1
1 CPU & 6 DIMM	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1
1 CPU & 8 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1
1 CPU & 9 DIMMs (Note 1) & (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 + ***(P1-DIMMB2: Reserved for PMem 200 Series only)***
When 2 CPUs are used:	***Memory Population Sequence***
2 CPUs & 2 DIMMs (Note 2)	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 8 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 10 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 12 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 14 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF
2 CPUs & 16 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1
2 CPUs & 18 DIMMs (Note 1) & (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 + ***(P1-DIMMB2: Reserved for PMem 200 Series only)*** CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1 + ***(P2-DIMMB2: Reserved for PMem 200 Series only)***

Note 1: P1-DIMMB2 and P2-DIMMB2 are reserved for Intel® Optane™ PMem 200 Series only.

Note 2: This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.



Memory Population on X12DP 18-DIMM Motherboards

Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

PMem 200 Series Population table for X12DP Motherboards (with 18 Slots)

Note: The Intel® Optane™ Persistent Memory (PMem) 200 Series are supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) Processors.

PMem 200 Series Population Table for X12DP 18-DIMM Motherboards (within 1 CPU socket)											
DDR4+PMem	Mode	AD Interleave	P1-DIMMF1	P1-DIMME1	P1-DIMMH1	P1-DIMMG1	P1-DIMMC1	P1-DIMMD1	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1
4+4	AD	One - x4	*PMem*	DDR4	*PMem*	DDR4	DDR4	*PMem*	DDR4	-	*PMem*
	MM	One - x4	DDR4	*PMem*	DDR4	*PMem*	*PMem*	DDR4	*PMem*	-	DDR4
6+1	AD	One - x1	DDR4	DDR4	-	DDR4	DDR4	*PMem*	DDR4	-	DDR4
			-	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	-	*PMem*
			DDR4	DDR4	*PMem*	DDR4	DDR4	-	DDR4	-	DDR4
			PMem	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	-	-
			DDR4	DDR4	DDR4	-	*PMem*	DDR4	DDR4	-	DDR4
			DDR4	-	DDR4	DDR4	DDR4	DDR4	*PMem*	-	DDR4
			DDR4	DDR4	DDR4	*PMem*	-	DDR4	DDR4	-	DDR4
			DDR4	*PMem*	DDR4	DDR4	DDR4	DDR4	-	-	DDR4
8+1	AD	One - x1	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	*PMem*	DDR4

Legend (for the table above)	
DDR4 Type and Capacity	
DDR4	See Validation Matrix (DDR4 DIMMs validated with PMem)
Capacity	
PMem	Any Capacity (Uniformly for all channels for a given configuration)

- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:16. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual population, different PMem rearrangements among channels are permitted so long as the configuration doesn't break X12DP Memory population rules.
- Ensure the same DDR4 DIMM type and capacity are used for each DDR4 + PMem population.
- If the system detects an unvalidated configuration, then the system issues a BIOS warning. The CLI functionality is limited in non-POR configurations, and select commands will not be supported.

Validation Matrix (DDR4 DIMMS with PMem 200 Series)			
DIMM Type	Ranks Per DIMM & Data Width (Stack)	DIMM Capacity (GB)	
		DRAM Density	
		8Gb	16Gb
RDIMM (up to 3200)	1Rx8	N/A	N/A
	1Rx4	16GB	32GB
	2Rx8	16GB	32GB
	2Rx4	32GB	64GB
RDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	128GB
	8Rx4 (4H)	NA	256GB
LRDIMM (up to 3200)	4Rx4	64GB	128GB
LRDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	N/A
	8Rx4 (4H)	128GB	256GB

5.3.4 Memory Population for the X12DP Motherboards with 20 DIMM Slots Onboard

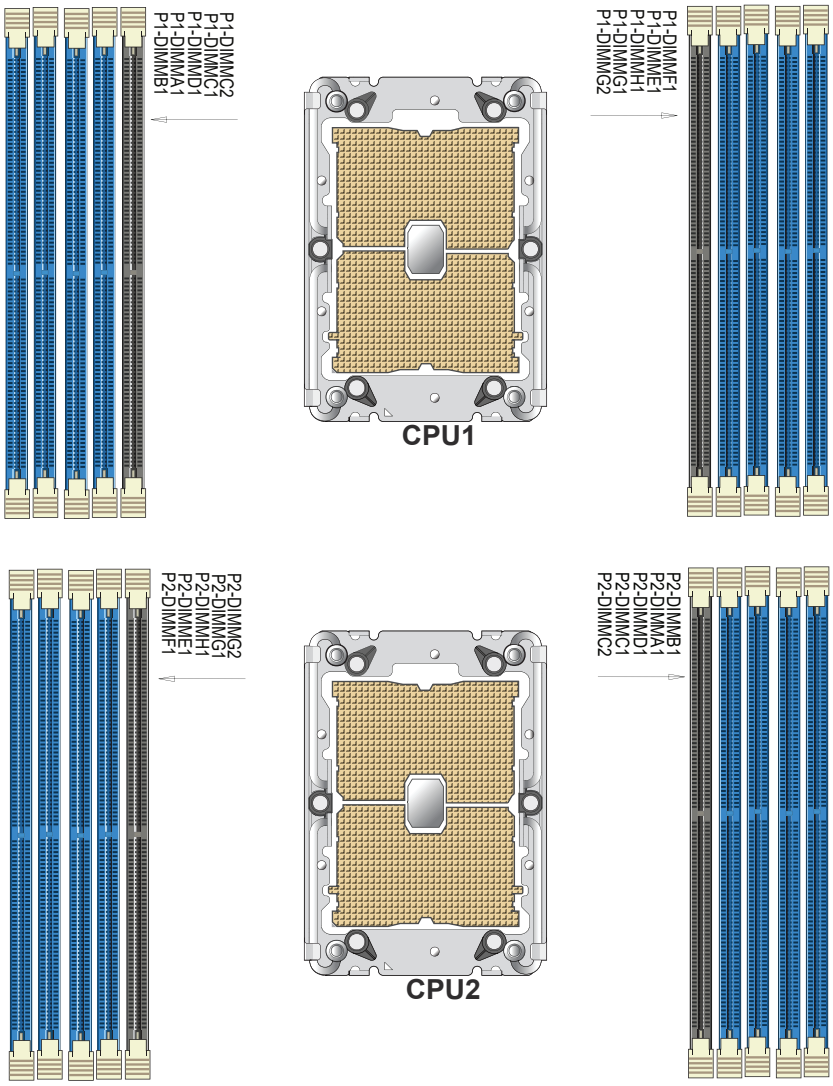
Note: The memory table below supports the X12DP motherboards with 20 DIMM memory slots, such as X12DPT-B6.

Memory Population Table (with 20 Slots)

DDR4 Memory Population Table for X12DP 20-DIMM Motherboards	
When 1 CPU is used:	**Memory Population Sequence**
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1
1 CPU & 4 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1
1 CPU & 6 DIMM	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1
1 CPU & 8 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1
1 CPU & 9 DIMMs (Note 1) & (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 + ***(P1-DIMMC2: Reserved for PMem 200 Series only)***
When 2 CPUs are used:	**Memory Population Sequence**
2 CPUs & 2 DIMMs (Note2)	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 8 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 10 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 12 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 14 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 16 DIMMs (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1
2 CPUs & 18 DIMMs (Note 1) & (Note2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1 + ***(P1-DIMMC2 & P1-DIMMG2: Reserved for PMem 200 Series only)***

Note 1: P1-DIMMC2 and P1-DIMMG2 are reserved for Intel® OptaneTM PMem 200 Series only.

Note 2: This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.



Memory Population on X12DP 20-DIMM Motherboards

Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

PMem 200 Series Population table for X12DP Motherboards

Note: The Intel® Optane™ Persistent Memory (PMem) 200 Series are supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) Processors.

PMem 200 Series Population Table for X12DP 20-DIMM Motherboards (within 1 CPU socket)											
DDR4+PMem	Mode	AD Interleave	P1-DIMMF1	P1-DIMME1	P1-DIMMH1	P1-DIMMG1	P1-DIMMC2	P1-DIMMC1	P1-DIMMD1	P1-DIMMA1	P1-DIMMB1
4+4	AD MM	One - x4	***PMem***	DDR4	***PMem***	DDR4	-	DDR4	***PMem***	DDR4	***PMem***
		One - x4	DDR4	***PMem***	DDR4	***PMem***	-	***PMem***	DDR4	***PMem***	DDR4
6+1	AD	One - x1	DDR4	DDR4	-	DDR4	-	DDR4	***PMem***	DDR4	DDR4
			-	DDR4	DDR4	DDR4	-	DDR4	DDR4	DDR4	***PMem***
			DDR4	DDR4	***PMem***	DDR4	-	DDR4	-	DDR4	DDR4
			PMem	DDR4	DDR4	DDR4	-	DDR4	DDR4	DDR4	-
			DDR4	DDR4	DDR4	-	-	***PMem***	DDR4	DDR4	DDR4
			DDR4	-	DDR4	DDR4	-	DDR4	DDR4	***PMem***	DDR4
			DDR4	DDR4	DDR4	***PMem***	-	-	DDR4	DDR4	DDR4
			DDR4	***PMem***	DDR4	DDR4	-	DDR4	DDR4	-	DDR4
8+1	AD	One - x1	DDR4	DDR4	DDR4	DDR4	***PMem***	DDR4	DDR4	DDR4	DDR4
			DDR4	DDR4	DDR4	DDR4	--	DDR4	DDR4	DDR4	DDR4

Legend (for the table above)	
DDR4 Type and Capacity	
DDR4	See Validation Matrix (DDR4 DIMMs validated with PMem)
Capacity	
PMem	Any Capacity (Uniformly for all channels for a given configuration)

- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:16. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual population, different PMem rearrangements among channels are permitted so long as the configuration doesn't break X12DP Memory population rules.
- Ensure the same DDR4 DIMM type and capacity are used for each DDR4 + PMem population.
- If the system detects an unvalidated configuration, then the system issues a BIOS warning. The CLI functionality is limited in non-POR configurations, and select commands will not be supported.

Validation Matrix (DDR4 DIMMS with PMem 200 Series)			
DIMM Type	Ranks Per DIMM & Data Width (Stack)	DIMM Capacity (GB)	
		DRAM Density	
		8Gb	16Gb
RDIMM (up to 3200)	1Rx8	N/A	N/A
	1Rx4	16GB	32GB
	2Rx8	16GB	32GB
	2Rx4	32GB	64GB
RDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	128GB
	8Rx4 (4H)	NA	256GB
LRDIMM (up to 3200)	4Rx4	64GB	128GB
LRDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	N/A
	8Rx4 (4H)	128GB	256GB

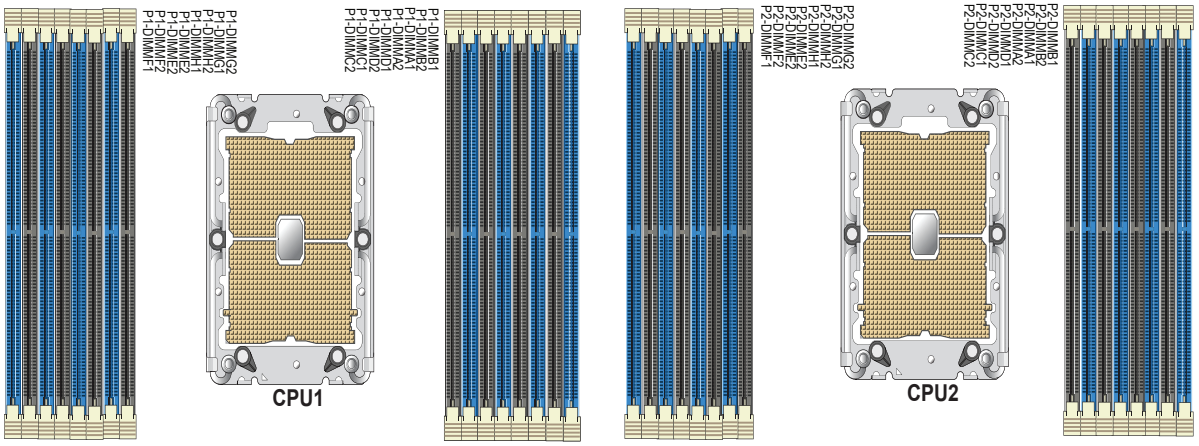
5.3.5 Memory Population for the X12DP Motherboards with 32 DIMM Slots

Note: The memory table below supports the X12DP motherboards with 32 DIMM memory slots, such as X12DPU-6, X12DGO-6, and X12DPG-OA6.

Memory Population Table (with 32 Slots)

DDR4 Memory Population Table for X12DP 32-DIMM Motherboards	
When 1 CPU is used:	***Memory Population Sequence***
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1
1 CPU & 4 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1
1 CPU & 6 DIMM	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1
1 CPU & 8 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1
1 CPU & 12 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMA2/P1-DIMME2/ P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2
1 CPU & 16 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/ P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2
When 2 CPUs are used	***Memory Population Sequence***
2 CPUs & 2 DIMMs (Note)	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 8 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 10 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 12 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 14 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 16 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1
2 CPUs & 18 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMA2/P1-DIMME2/ P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 20 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMA2/P1-DIMME2/ P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1
2 CPUs & 22 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/ P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 24 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/ P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1
2 CPUs & 28 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/ P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1/ P2-DIMMA2/P2-DIMME2/P2-DIMMC2/P2-DIMMG2
2 CPUs & 32 DIMMs (Note)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/ P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1/ P2-DIMMA2/P2-DIMME2/P2-DIMMC2/P2-DIMMG2/P2-DIMMB2/P2-DIMMF2/P2-DIMMD2/P2-DIMMH2

Note: This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.



Memory Population on X12DP 32-DIMM Motherboards

Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

PMem 200 Series Population table for X12DP Motherboards (with 32 Slots)

Note: The Intel® Optane™ Persistent Memory (PMem) 200 Series are supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314 Series) Processors.

PMem 200 Series Population Table for X12DP 32-DIMM Motherboards (within 1 CPU socket)

DDR4+ PMem	Mode	AD Inter-leave	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMH1	P1-DIMMH2	P1-DIMMG1	P1-DIMMG2	P1-DIMMC2	P1-DIMMC1	P1-DIMMD2	P1-DIMMD1	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1
4+4	AD MM	One - x4	*PMem*	-	DDR4	-	*PMem*	-	DDR4	-	-	DDR4	-	*PMem*	-	DDR4	-	*PMem*
		One - x4	DDR4	-	*PMem*	-	DDR4	-	*PMem*	-	-	*PMem*	-	DDR4	-	*PMem*	-	DDR4
6+1	AD	One - x1	DDR4	-	DDR4	-	-	-	DDR4	-	-	DDR4	-	*PMem*	-	DDR4	-	DDR4
			-	-	DDR4	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	DDR4	-	*PMem*
			DDR4	-	DDR4	-	*PMem*	-	DDR4	-	-	DDR4	-	-	-	DDR4	-	DDR4
			PMem	-	DDR4	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	DDR4	-	-
			DDR4	-	DDR4	-	DDR4	-	-	-	-	*PMem*	-	DDR4	-	DDR4	-	DDR4
			DDR4	-	-	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	*PMem*	-	DDR4
			DDR4	-	DDR4	-	DDR4	-	*PMem*	-	-	-	-	DDR4	-	DDR4	-	DDR4
			DDR4	-	*PMem*	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	-	-	DDR4
8+1	AD	One - x1	DDR4	-	DDR4	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	*PMem*	DDR4	-	DDR4
			DDR4	-	DDR4	-	DDR4	-	DDR4	-	*PMem*	DDR4	-	DDR4	-	DDR4	-	DDR4
			DDR4	-	DDR4	*PMem*	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	DDR4	-	DDR4
			DDR4	-	DDR4	-	DDR4	-	DDR4	*PMem*	-	DDR4	-	DDR4	-	DDR4	-	DDR4
			DDR4	-	DDR4	-	DDR4	-	DDR4	-	-	DDR4	*PMem*	DDR4	-	DDR4	-	DDR4
			DDR4	-	DDR4	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	DDR4	*PMem*	DDR4
			DDR4	*PMem*	DDR4	-	DDR4	-	DDR4	-	-	DDR4	-	DDR4	-	DDR4	-	DDR4
			DDR4	-	DDR4	-	DDR4	*PMem*	DDR4	-	-	DDR4	-	DDR4	-	DDR4	-	DDR4
8+4	AD MM	One - x4	DDR4	-	DDR4	*PMem*	DDR4	-	DDR4	*PMem*	*PMem*	DDR4	-	DDR4	*PMem*	DDR4	-	DDR4
		Two - x2	DDR4	-	DDR4	*PMem*	DDR4	*PMem*	DDR4	-	-	DDR4	*PMem*	DDR4	*PMem*	DDR4	-	DDR4
		Two - x2	DDR4	*PMem*	DDR4		DDR4	-	DDR4	*PMem*	*PMem*	DDR4	-	DDR4	-	DDR4	*PMem*	DDR4
		One - x4	DDR4	*PMem*	DDR4	-	DDR4	*PMem*	DDR4	-	-	DDR4	*PMem*	DDR4	-	DDR4	*PMem*	DDR4
8+8	AD, MM,	One - x8	DDR4	*PMem*	DDR4	*PMem*	DDR4	*PMem*	DDR4	*PMem*	*PMem*	DDR4	*PMem*	DDR4	*PMem*	DDR4	*PMem*	DDR4
12+2	AD	One - x2	*PMem*	-	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	-	*PMem*
			DDR4	DDR4	DDR4	DDR4	*PMem*	-	DDR4	DDR4	DDR4	DDR4	-	*PMem*	DDR4	DDR4	DDR4	DDR4
			DDR4	DDR4	*PMem*	-	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	-	*PMem*	DDR4	DDR4
			DDR4	DDR4	DDR4	DDR4	DDR4	DDR4	*PMem*	-	-	*PMem*	DDR4	DDR4	DDR4	DDR4	DDR4	DDR4

Legend (for the table above)	
DDR4 Type and Capacity	
DDR4	See Validation Matrix (DDR4 DIMMs validated with PMem)
Capacity	
PMem	Any Capacity (Uniformly for all channels for a given configuration)

- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:16. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual population, different PMem rearrangements among channels are permitted so long as the configuration doesn't break X12DP Memory population rules.
- Ensure the same DDR4 DIMM type and capacity are used for each DDR4 + PMem population.
- If the system detects an unvalidated configuration, then the system issues a BIOS warning. The CLI functionality is limited in non-POR configurations, and select commands will not be supported.

Validation Matrix (DDR4 DIMMS with PMem 200 Series)			
DIMM Type	Ranks Per DIMM & Data Width (Stack)	DIMM Capacity (GB)	
		DRAM Density	
		8Gb	16Gb
RDIMM (up to 3200)	1Rx8	N/A	N/A
	1Rx4	16GB	32GB
	2Rx8	16GB	32GB
	2Rx4	32GB	64GB
RDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	128GB
	8Rx4 (4H)	NA	256GB
LRDIMM (up to 3200)	4Rx4	64GB	128GB
LRDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	N/A
	8Rx4 (4H)	128GB	256GB

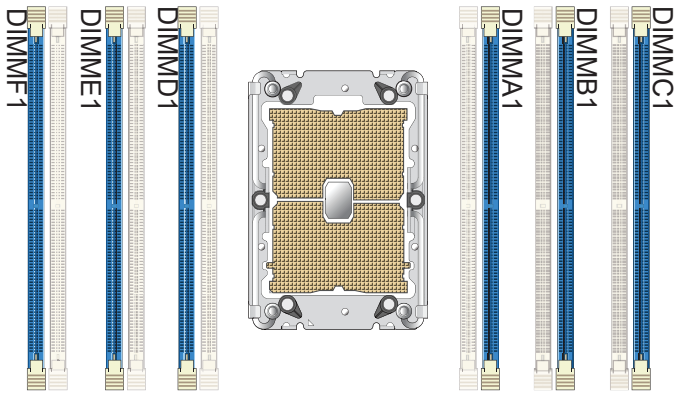
5.4 Memory Population Tables for the X12MP Motherboards based on the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx Series) Processors

For your system memory to work properly, please follow the memory population tables below to install your memory modules on the X12MP (4-way) motherboards based on the Intel Xeon Scalable-SP platform. All memory population tables included in this user guide were created based on the general memory population guidelines provided by Intel to support Supermicro X12MP motherboards.

5.4.1 Memory Population for the 4-way Motherboard with Half Memory Configuration Support based on the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx Series) Processors

Memory Population Table for the 4-Way X12MP Motherboards (w/Half Memory Configuration Support) (with 24 DIMM Slots Installed)

DDR4 Memory Population Table for the 4-way X12MP Motherboards with Half Memory Configuration Support (with 4 CPUs & 24 DIMMs Installed)	
4 CPUs & 24 DIMMs (6 DIMMs per CPU)	**Memory Population Sequence**
CPU1 + 6 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1
CPU2 + 6 DIMMs	CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
CPU3 + 6 DIMMs	CPU3: P3-DIMMC1/P3-DIMMB1/P3-DIMMA1/P3-DIMMD1/P3-DIMME1/P3-DIMMF1
CPU4 + 6 DIMMs	CPU4: P4-DIMMC1/P4-DIMMB1/P4-DIMMA1/P4-DIMMD1/P4-DIMME1/P4-DIMMF1

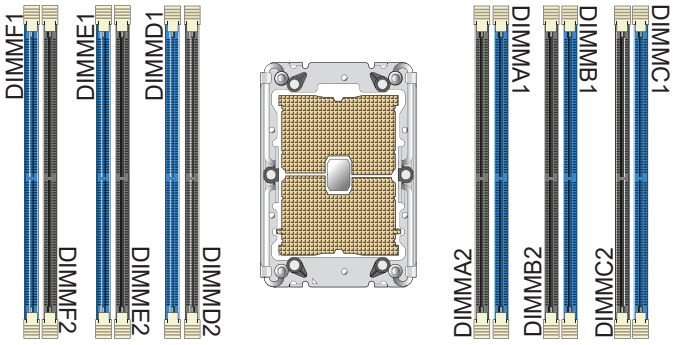


Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

5.4.2 Memory Population for the 4-way Motherboard with Full Memory Configuration Support based on the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx Series) Processors

Memory Population Table for the 4-Way X12MP Motherboards (with Full Memory Configuration Support) (with 48 DIMM Slots Installed)

DDR4 Memory Population Table for the 4-way X12MP Motherboards with Full Memory Configuration Support (with 4 CPUs & 48 DIMMs Installed)	
4 CPUs & 48 DIMMs (12 DIMMs per CPU board)	**Memory Population Sequence**
CPU1 + 12 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1
CPU2 + 12 DIMMs	CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF2/P2-DIMMF1
CPU3 + 12 DIMMs	CPU3: P3-DIMMC1/P3-DIMMC2/P3-DIMMB1/P3-DIMMB2/P3-DIMMA1/P3-DIMMA2/ P3-DIMMD2/P3-DIMMD1/P3-DIMME2/P3-DIMME1/P3-DIMMF2/P3-DIMMF1
CPU4 + 12 DIMMs	CPU4: P4-DIMMC1/P4-DIMMC2/P4-DIMMB1/P4-DIMMB2/P4-DIMMA1/P4-DIMMA2/ P4-DIMMD2/P4-DIMMD1/P4-DIMME2/P4-DIMME1/P4-DIMMF2/P4-DIMMF1



Note: The drawing above shows DIMM module population for each CPU board installed on the motherboard. Please install your processors starting with CPU Socket 1.

5.5 PMem 200 Series Population Tables for the X12MP Motherboards based on the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx Series) Processors

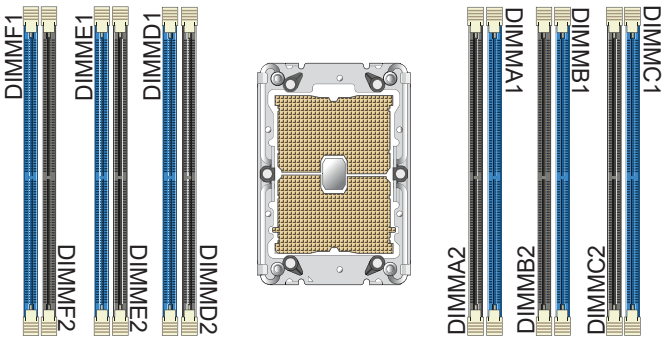
For your system memory to work properly, please follow the memory population tables below to install your memory modules on the X12MP (4-way) motherboards with the 3nd Gen Intel Xeon Scalable Processors. All memory population tables included in this user guide were created based on the general memory population guidelines provided by Intel to support Supermicro X12MP motherboards with the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx Series) Processors.

PMem 200 Series Population for the X12 4-way Motherboards with 48-DIMM Support based on the 3rd Gen Intel Xeon Scalable Processors

Note: The following memory population table supports Supermicro X12MP 4-way motherboards.

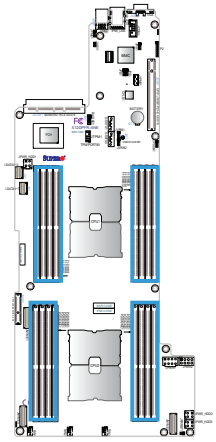
PMem 200 Series Population Table for the 4-Way X12MP Motherboards with 48 DIMM Support (with 48 DIMM Slots Installed)

Symmetric Population												
2-2-2	(For Channel Configuration: 2-2-2)											
Modes												
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1
AD	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1
AD	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1
AD	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1
AD	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	*PMem*	DRAM1	*PMem*	DRAM1	*PMem*	DRAM1



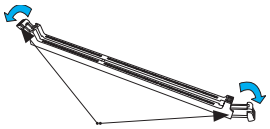
Note: The drawing above shows DIMM module population for each CPU installed on the motherboard. Please install your processors starting with CPU Socket 1.

DIMM Installation

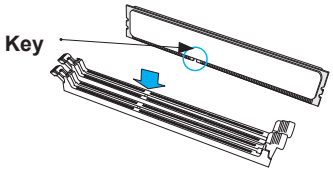


1. Insert the desired number of DIMMs into the memory slots based on the recommended DIMM population tables in the previous section. Locate DIMM memory slots on your motherboard. Please note that all graphics shown in this guide are for illustration only. Your motherboard may look different from the drawing on the right.

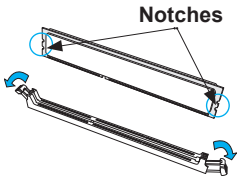
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.



3. Align the key of the DIMM module with the receptive point on the memory slot.

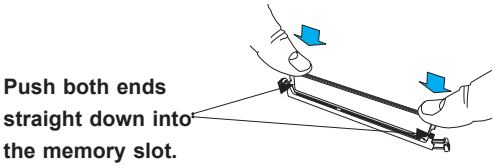


4. Align the notches on both ends of the module against the receptive points on the ends of the slot.



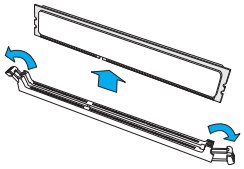
5. Push both ends of the module straight down into the slot until the module snaps into place.

6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



DIMM Removal

Press both release tabs on the ends of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.



Warning! Please do not use excessive force when pressing the release tabs on the ends of the DIMM socket to avoid causing any damage to the DIMM module or the DIMM socket. Please handle DIMM modules with care. Carefully follow all the instructions given on Page 1 of this chapter to avoid ESD-related damages done to your memory modules or components.