Cisco UCS AMD M8 Memory Guide

CISCO SYSTEMS

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Introduction

The AMD M8 Memory guide provides the detailed specifications of the AMD M8 memory DIMMs including:

- Memory DIMMs features
- Cisco PID's description
- Memory DIMMs guidelines, mixing rules and populations
- All AMD M8 supported DIMM configurations

The AMD M8 Memory Guide document applies to the following Cisco AMD M8 generation servers:

- C245 M8 Racks servers

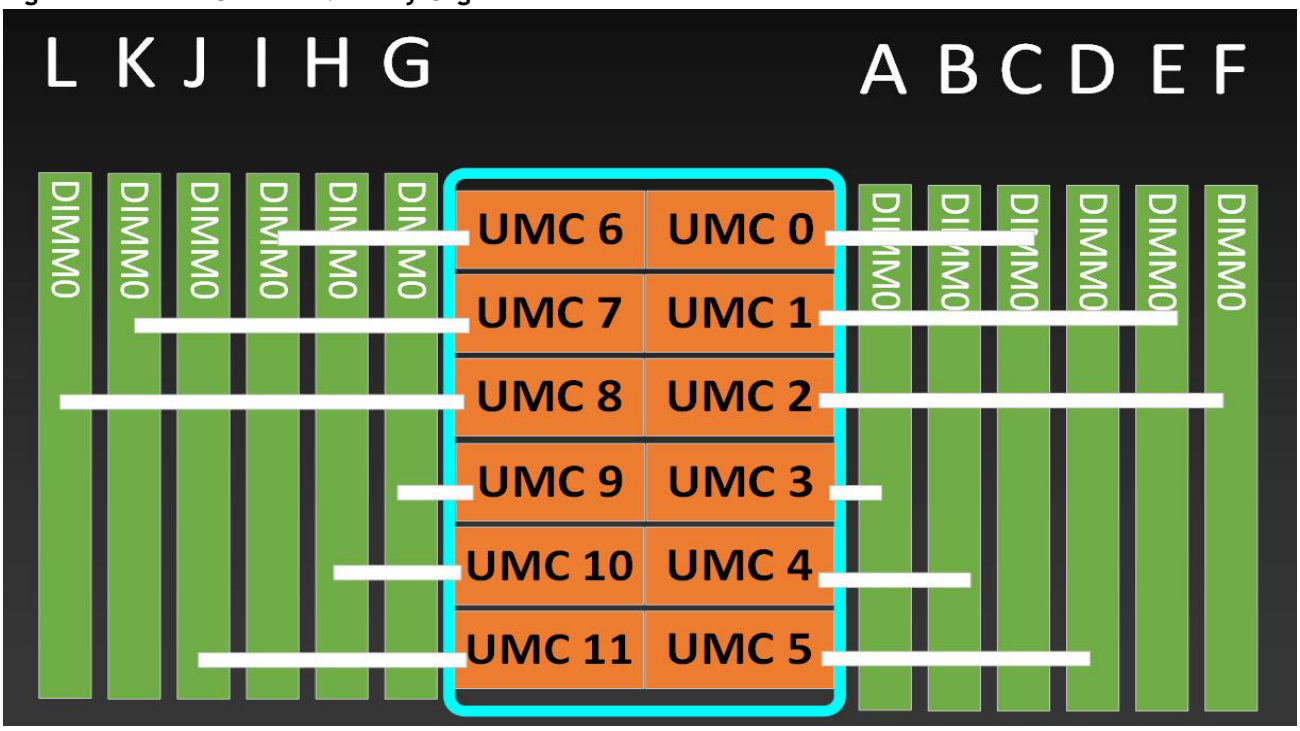
CHAPTER 1 MEMORY ORGANIZATION CAPABILITIES AND FEATURE

The *Table 1* below describes the main memory DIMM features supported on Cisco UCS AMD M8 servers.

Table 1 Main Memory Features

AMD M8 Memory DIMM server technologies	C245 M8
CPU Sockets	**1S or 2S**
DDR5 memory clock speed	4th Gen. CPU: Up to 4800 MT/s 1DPC
Operational voltage	1.1 Volts
DRAM fab density	16Gb and 24Gb
DRAM DIMM type	RDIMM (Registered DDR5 DIMM)
Memory DIMM organization	Twelve memory DIMM channels per CPU; 1 DIMMs per channel only
Maximum number of DRAM DIMM per server	Up to 24 (2-Socket)
DRAM DIMM Densities and Ranks	16GB 1Rx8, 32GB 1Rx4, 64GB 2Rx4, 128GB 4Rx4, 256GB 8Rx8
	48GB 1Rx4, 96GB 2Rx4
Maximum system capacity (DRAM DIMMs only)	6TB (24x256GB)

Figure 1 12-Channel Memory Organization



CHAPTER 2 MEMORY OPTIONS

- The available memory devices for UCS AMD M8 are listed in *Table 2*
- The memory PID decoder for AMD M8 Memory PIDs are shown in *Table 3*

NOTE: Cisco Memory DIMM PIDs used on C245 M8 server models are DDR5-5600 PIDs, although the memory will operate at the maximum speed of the AMD 4th Gen. CPU memory controller, up to 4800 MT/s. Check Table 5 for CPU SKUs definition and maximum memory speed

Table 2 Memory Options for UCS AMD M8

AMD M8 Memory DIMM Densities & Cisco PIDs	C245 M8
16GB	UCS-MRX16G1RE3
32GB	UCS-MRX32G1RE3
48GB[1]	UCS-MRX48G1RF3
64GB	UCS-MRX64G2RE3
96GB	UCS-MRX96G2RF3
128GB	UCS-MR128G4RE3
256GB[1]	UCS-MR256G8RE3

Notes:

1. Available in Q2'24.

Table 3 Memory PID Decoder

Identifier#1	Identifier#2	Identifier#3	Identifier#4	Identifier#5	Identifier#6	Identifier#7
Cisco Product Family	**Memory DIMM Type**	**DIMM Capacity (GB)**	**DIMM Org. (Rank)**	**DDR Generation & DRAM Density**	**DIMM Speed (Mega Transfers per second)**	**Option/Spare DIMM**
UCS	**MR:** RDIMM	X16G X32G X48G X64G X96G 128G 256G	**1R:** Single-Rank **2R:** Dual-rank **4R:** Quad-rank **8R:** Octa-rank	**E:** DDR5/16Gb **F:** DDR5/24Gb	**3:** 5600 MT/s	**Blank:** Option **=:** Spare

CHAPTER 3 DRAM GUIDELINES

GOLDEN RULE: Memory on every CPU socket shall be configured identically. Therefore, the memory configuration of CPU-1 will be identical to CPU-2 for a 2-Socket system. Unbalanced populations are unsupported.

- DIMM Count Rules:

Table 4 Allowed DIMM Count for 1-CPU and 2-CPU

Allowed DIMM Count rules	Minimum Count	Maximum Count	Allowed Count	Not Allowed Count
16GB, 32GB, 48GB, 64GB, 96GB, 128GB, 256GB (4th Gen. CPUs)[1]				
DIMM count for 1 CPU	1	12	1,2,4,6,8,10,12	3,5,7,9,11
DIMM count for 2-CPU	2	24	2,4,8,12,16,20,24	6,10,14,18, 22

Notes:

1. 1DPC support only.

- DIMM Population Rules:
  - When populating memory on a server powered by one or more 4th AMD EPYC processors:
    - All memory DIMMs must be RDIMM or RDIMM 3DS module types, DDR5 generation
    - All memory DIMMs must be Cisco DDR5-5600 memory PIDs, although the memory will operate at the maximum speed of the AMD 4th Gen. CPU memory controller, up to 4800 MT/s.
    - Balanced memory configurations maximize memory bandwidth by optimizing memory interleaving. To obtain a balanced memory configuration:
      - Populate each socket with 1, 2, 4, 6, 8, 10, or 12 memory channels.
      - Use the same memory configuration in all populated memory channels. No DIMM density mixing across channel is allowed.
      - Use the same DIMM configuration for each processor socket, on a 2-socket configuration.
      - No DIMM mixing within a channel is possible as C245 server supports only 1DPC.

Table 5 M8 DIMM population order for 16GB, 32GB, 48GB, 64GB, 96GB, 128GB, 256GB

#DIMMs per CPU	DIMM Population - 16GB, 32GB, 48GB, 64GB, 128GB, 256GB[1]
	Slot 1 (Black)
1	A1
2	A1, G1
4	A1, C1, G1, I1
6	A1, B1, C1, G1, H1, I1
8	A1, B1, C1, E1, G1, H1, I1, K1
10	A1, B1, C1, D1, E1, G1, H1, I1, J1, K1
12	A1, B1, C1, D1, E1, F1, G1, H1, I1,J1, K1, L1

Notes:

1. 1DPC support only.

- Memory Limitations:
  - Memory on every CPU socket shall be configured identically.
  - Refer to *Table 5* for DIMM population and DIMM mixing rules.
  - Cisco Memory DIMM PIDs used on C245 M8 server models are DDR5-5600 PIDs, although the memory will operate at the maximum speed of the AMD 4th Gen. CPU memory controller, up to 4800 MT/s. Check Table 5 for CPU SKUs definition and maximum memory speed.
- For best performance, observe the following:

Table 6 Maximum Memory Frequency - 4th Gen. CPU - 1 DIMM Per Channel only

4th Gen. CPU Memory Speed	DIMM	DIMM
	Rank	Max Speed
RDIMM	One Rank	4800 MT/s
	Two Rank	4800 MT/s
	Four Rank	4800 MT/s
	Eight Rank	4800 MT/s

CHAPTER 4 SUPPORTED DRAM DIMM CONFIGURATIONS

- *Table 7* below shows the supported DIMM configurations with 1, 2, 4, 6, 8 and 12 DIMMs per CPU.
- The rows highlighted in yellow are recommended for the best performance at a given capacity (Performance measurement is Work In Progress).

Table 7 Supported Memory Configurations for 4th Gen. AMD Processors

DIMM Total System Capacity		Capacity Per CPU	Total DIMMs Per CPU
1-CPU	2-CPU	Black Slots A1 to H1	
16GB RDIMMs			
16 GB	32 GB	1x16GB	1
32 GB	64 GB	2x16GB	2
64 GB	128 GB	4x16GB	4
96 GB	192 GB	6x16GB	6
128 GB	256 GB	8x16GB	8
160 GB	320 GB	10x16GB	10
182 GB	364 GB	12x16GB	12
32GB RDIMMs			
32 GB	64 GB	1x32GB	1
64 GB	128 GB	2x32GB	2
128 GB	256 GB	4x32GB	4
192 GB	384 GB	6x32GB	6
256 GB	512 GB	8x32GB	8
320 GB	640 GB	10x32GB	10
384 GB	768 GB	12x32GB	12
48GB RDIMMs			
48 GB	96 GB	1x48GB	1
96 GB	192 GB	2x48GB	2
192 GB	384 GB	4x48GB	4
288 GB	576 GB	6x48GB	6
384 GB	768 GB	8x48GB	8
480 GB	960 GB	10x48GB	10
576 GB	1152 GB	12x48GB	12
64GB RDIMMs			
64 GB	128 GB	1x64GB	1
128 GB	256 GB	2x64GB	2
256 GB	512 GB	4x64GB	4
384 GB	768 GB	6x64GB	6

Table 7 Supported Memory Configurations for 4th Gen. AMD Processors

DIMM Total System Capacity		Capacity Per CPU	Total DIMMs Per CPU
1-CPU	2-CPU	Black Slots A1 to H1	
512 GB	1024 GB	8x64GB	8
640 GB	1280 GB	10x64GB	10
768 GB	1536 GB	12x64GB	12
96GB RDIMMs			
96 GB	192 GB	1x96GB	1
192 GB	384 GB	2x96GB	2
384 GB	768 GB	4x96GB	4
576 GB	1152 GB	6x96GB	6
768 GB	1536 GB	8x96GB	8
960 GB	1920 GB	10x96GB	10
1152 GB	2304 GB	12x96GB	12
128GB RDIMMs			
128 GB	256 GB	1x128GB	1
256 GB	512 GB	2x128GB	2
512 GB	1024 GB	4x128GB	4
768 GB	1536 GB	6x128GB	6
1024 GB	2048 GB	8x128GB	8
1280 GB	2560 GB	10x128GB	10
1536 GB	3072 GB	12x128GB	12
256GB RDIMMs			
256 GB	512 GB	1x256GB	1
512 GB	1024 GB	2x256GB	2
1024 GB	2048 GB	4x256GB	4
1536 GB	3072 GB	6x256GB	6
2048 GB	4096 GB	8x256GB	8
2560 GB	5120 GB	10x256GB	10
3072 GB	6144 GB	12x256GB	12

CHAPTER 5 INSTALLING a DIMM or DIMM BLANK

To install a DIMM or a DIMM blank into a slot on the blade server, follow these steps.

Procedure

Step 1 Open both DIMM connector latches.

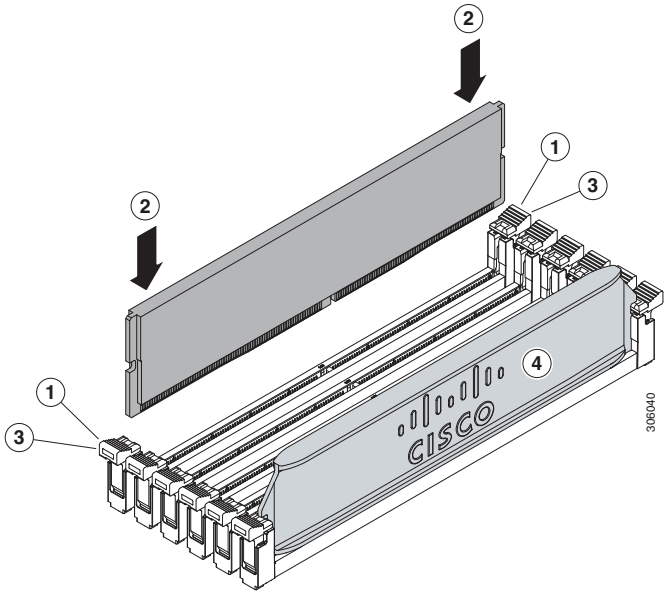
Step 2 Press evenly on both ends of the DIMM until it clicks into place in its slot

Note: Ensure that the notch in the DIMM aligns with the slot. If the notch is misaligned, it is possible to damage the DIMM, the slot, or both.

Step 3 Press the DIMM connector latches inward slightly to seat them fully.

Step 4 Populate all slots with a DIMM or DIMM blank. A slot cannot be empty.

Figure 2 Installing Memory



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