



Memory Guide

Cisco UCS AMD M8 Memory Guide

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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
- C225 M8 Racks servers
- X215C M8 Compute Node

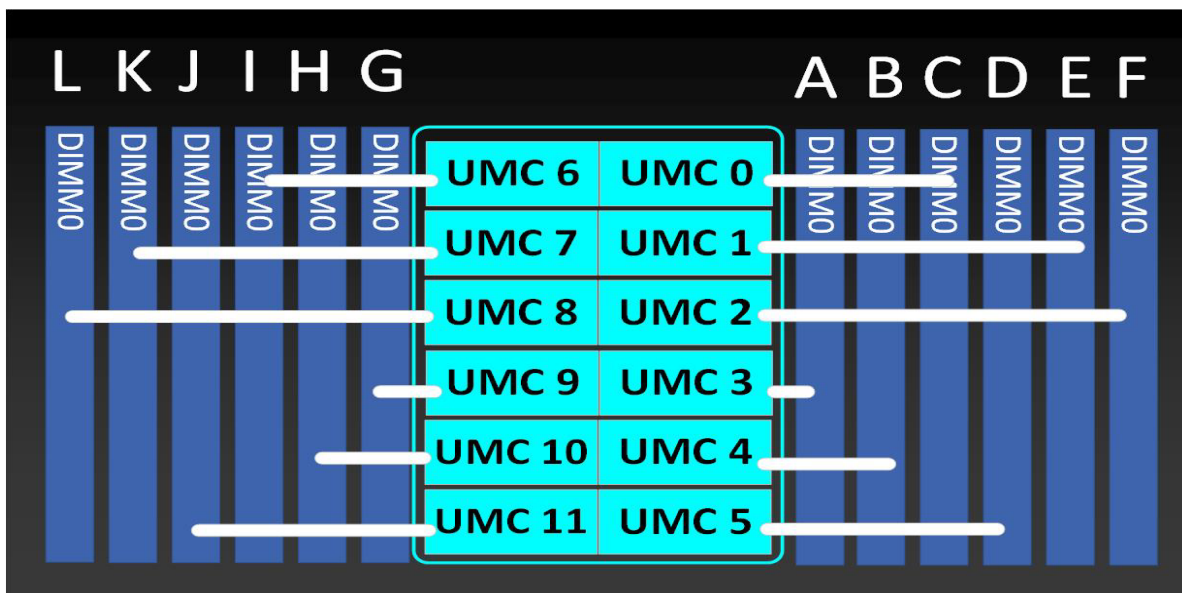
CHAPTER 1 MEMORY ORGANIZATION CAPABILITIES AND FEATURE

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 | X215c M8 | C245 M8 | C225 M8 |
|---|---|---------|------------------|
| CPU Sockets | 1S or 2S | | 1S Only |
| DDR5 memory clock speed | 4th Gen. AMD EPYC™ CPUs: 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) | | Up to 12 |
| DRAM DIMM Densities and Ranks | 16GB 1Rx8, 32GB 1Rx4, 64GB 2Rx4, 128GB 4Rx4 | | |
| | 256GB 8Rx4 | | N/A |
| | 48GB 1Rx4, 96GB 2Rx4 | | |
| Maximum system capacity (DRAM DIMMs only) | 6TB (24x256GB) | | 1.5TB (12x128GB) |

Figure 1 12-channel Memory Organization (1-CPU)



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 M8 server models are DDR5-5600 PIDs, although the memory will operate at the maximum speed of the 4th Gen. AMD EPYC™ CPUs memory controller, up to 4800 MT/s. Check Table 5 for CPU SKUs definition and maximum memory speed.
- Review the appropriate platform spec sheets for additional 256GB DIMM usage conditions.



CAUTION:

- On C245 M8, 256GB DIMMs cannot be combined with GPU cards and the ambient temperature shall be limited to a maximum of 28°C.

Table 2 Memory Options for UCS M8 servers with 4th Gen. AMD EPYC™ CPUs

| AMD M8 Memory DIMM Densities & Cisco PIDs | C245 M8 | C225 M8 | X215c M8 |
|---|----------------|-----------------------------|------------------------------|
| 16GB | UCS-MRX16G1RE3 | UCS-MRX16G1RE3 | UCSX-MRX16G1RE3 |
| 32GB | UCS-MRX32G1RE3 | UCS-MRX32G1RE3 | UCSX-MRX32G1RE3 |
| 48GB | UCS-MRX48G1RF3 | UCS-MRX48G1RF3 ¹ | UCSX-MRX48G1RF3 ¹ |
| 64GB | UCS-MRX64G2RE3 | UCS-MRX64G2RE3 | UCSX-MRX64G2RE3 |
| 96GB | UCS-MRX96G2RF3 | UCS-MRX96G2RF3 | UCSX-MRX96G2RF3 |
| 128GB | UCS-MR128G4RE3 | UCS-MR128G4RE3 | UCSX-MR128G4RE3 |
| 256GB ² | UCS-MR256G8RE3 | N/A | UCSX-MR256G8RE3 |

Notes:

1. Available in Q4CY24
2. Available in Q3CY24

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 UCSX | 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-CPU¹ 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. AMD EPYC™ CPUs)² | | | | |
| 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. C225, a 1-CPU server, supports up to 12 DIMMs.
2. 1DPC support only.

■ DIMM Population Rules:

- When populating memory on a server powered by one or more 4th Gen. AMD EPYC™ CPUs:
 - All memory DIMMs must be RDIMM (16GB, 32GB, 48GB, 64GB, and 96GB) or RDIMM 3DS (128GB, and 256GB) module types.
 - All memory DIMMs must be Cisco DDR5-5600 memory PIDs, although the memory will operate at the maximum speed of the 4th Gen. AMD EPYC™ CPUs 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 AMD M8 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 (Blue) ² |
| 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. 256GB supported on C245 and x215c only
2. 1DPC support only for all densities.

■ 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 M8 server models are DDR5-5600 PIDs, although the memory will operate at the maximum speed of the 4th Gen. AMD EPYC™ CPUs memory controller, up to 4800 MT/s. Check [Table 6](#) for CPU SKUs definition and maximum memory speed.

- For best performance, observe the following....

Table 6 Maximum Memory Frequency - 4th Gen. AMD EPYC™ CPUs - 1 DIMM Per Channel only

| 4th Gen. AMD EPYC™ CPUs 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 EPYC™ CPUs

| DIMM Total System Capacity | | Capacity Per CPU | Total DIMMs Per CPU |
|----------------------------|---------|---------------------|---------------------|
| 1-CPU | 2-CPU | Blue 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 |

Table 7 Supported Memory Configurations for 4th Gen. AMD EPYC™ CPUs

| DIMM Total System Capacity | | Capacity Per CPU | Total DIMMs Per CPU |
|----------------------------|---------|---------------------|---------------------|
| 1-CPU | 2-CPU | Blue Slots A1 to H1 | |
| 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 |
| 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.

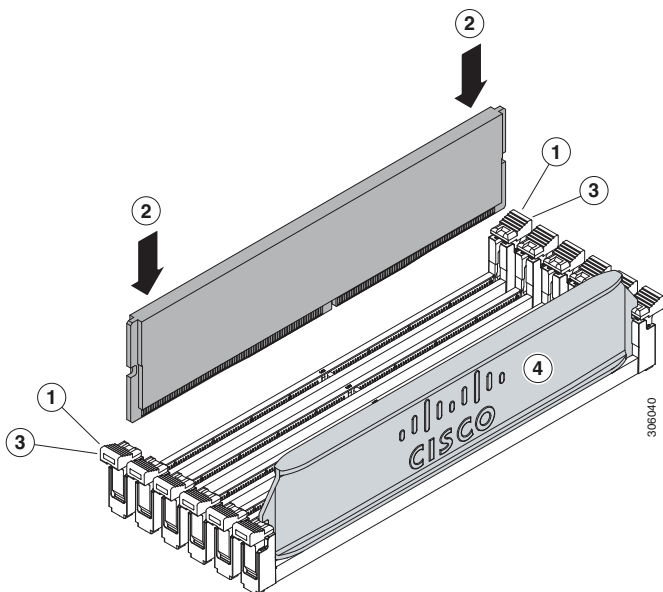
Step 2 Press evenly on both ends of the DIMM until it clicks into place in its slot

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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