

16Gbit DRAM Cheat Sheet

At the beginning of Q4 2019, DRAM semiconductor suppliers started introducing the next generation high density DRAM for DDR4. This means that DRAM is transitioning from 8Gbit to 16Gbit technology.

Based on new wafer lithography (below 20nm), these new components;

- Double the RAM density available
- Allow higher capacity memory modules to be created
- Provide lower power usage (per Gigabyte)

DRAM differences between Gbit and GB:

Gbit (Gigabit)



- This measures the density of the chip within a DRAM module
- The density of a DRAM chip is measured in Gigabits (Gbit)
- A bit is the smallest unit measured in computing
- A 16Gbit DRAM chip can hold 16 billion bits of data

GB (Gigabyte)



- The capacity of a memory module is measured in Gigabytes (GB)
- A Byte is made of 8 bits
- A 16GB Memory module can hold 16 billion Bytes of data, or 128 billion bits

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How we can build the same capacity with different density chips



8GB DRAM Module:

200000003

8Gbit DRAM Chip (1024x8) in 1 Rank



16Gbit DRAM Chip (1024x16) in 1 Rank



Module Types with 16Gbit DRAM

- 8GB Unbuffered DIMM / SODIMM (1Rx16)
- 16GB Unbuffered DIMM / SODIMM (1Rx8)
- 32GB Unbuffered DIMM / SODIMM (2Rx8)
- 16GB ECC Unbuffered DIMM / SODIMM (1Rx8)
- 32GB ECC Unbuffered DIMM / SODIMM (2Rx8)
- 16GB ECC Registered DIMM (1Rx8)
- 32GB ECC Registered DIMM (2Rx8)
- 32GB ECC Registered DIMM (1Rx4)
- 64GB ECC Registered DIMM (2Rx4)

Whilst this transition provides many benefits to server and computing power, not all platforms are supported with this new technology, so here is a guide to the key things to remember:

Intel

Server	Speed	16Gbit
2020 Intel Server Platform	3200	Yes
Purley w/ Cascade Lake (Xeon x2xx Series)	2933	Yes
Purley w/ Skylake (Xeon x1xx Series)	2666	No
High end-Desktop / Workstation	Speed	16Gbit
Cascade Lake-X (X299X / C621)	2933	Yes
Skylake-X (X299)	2666	No

Client (Desktop / Mobile)	Speed	16Gbit
Next Gen 2020 Intel Desktop/Mobile	3200	Yes
Comet Lake (400 Series)	2933	Yes
Coffee Lake (300 Series)	2666	Yes
Coffee Lake / Kabylake (200 Series)	2400	*
Skylake / Kabylake (100 Series)	2133	No

*Check with system or motherboard manufacturer for an updated BIOS to support 16Gbit DRAM

AMD

Server	Speed	16Gbit	Desktop	Speed	16Gbit
EPYC 7xx2 Series (ROME)	3200	Yes	Ryzen 3rd Gen (Matisse) X570	3200	Yes
EPYC 7xx1 Series (NAPLES)	2666	Yes	Ryzen 2nd Gen (Pinnacle Ridge) X470	2666	Yes
High end-Desktop / Workstation	Speed	16Gbit	Ryzen 1st Gen (Summit Ridge) X370	2400	Yes
Ryzen Threadripper "3900" Series	3200 Ves		Ryzen 1st Gen (Raven Ridge) X370	2400	Yes
TRX40/80, WRX80 (Castle Peak)	5200 123	Mobile	Speed	16Gbit	
Ryzen Threadripper 2900 Series X399 (Colfax)	2666	Yes	Ryzen 3rd Gen Mobile (TBA)	3200	Yes
Ryzen Threadripper 1900 Series X399 (Whitehaven)	2666	Yes	Ryzen 2nd Gen (Picasso)	2666	Yes
			Ryzen 1st Gen (Raven Ridge)	2400	Yes

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Alternatively, our Configurator tool can help you select the right DRAM for your customers: www.kingston.com/en/memory



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*Information is correct as of September 2020 and is subject to change.