DDR2 Memory

The next-generation memory technology

DDR2 is the next-generation evolution of DDR memory technology. DDR2 memory features faster speeds, higher data bandwidths, lower power consumption, and enhanced thermal performance.

In 2004, DDR2 will be launched for use in desktops, servers, notebooks, telecommunications/networking and other platforms in the following form-factors:

• Unbuffered DIMMs, ECC or non-ECC
• Registered ECC DIMMs
• SO-DIMMs
• MicroDIMMs
• Mini Registered DIMMs
• Custom Modules

Naming conventions

DDR2 memory was developed by JEDEC, the memory industry's standards organization of which Kingston® is a member company. DDR2 memory chips and modules use a naming convention similar to that used for the current DDR memory:

Memory Speed	Memory Chip Classification	Module Classification	Module Bandwidth	Dual-Channel DDR2 System Bandwidth
400 MHz	DDR2-400	PC2-3200	3.2 GB/sec	6.4 GB/sec
533 MHz	DDR2-533	PC2-4300	4.3 GB/sec	8.6 GB/sec
667 MHz	DDR2-667	PC2-5300	5.3 GB/sec	10.6 GB/sec

Memory modules

240-pin DDR2 DIMM

DIMM module key must match socket

184-pin DDR DIMM
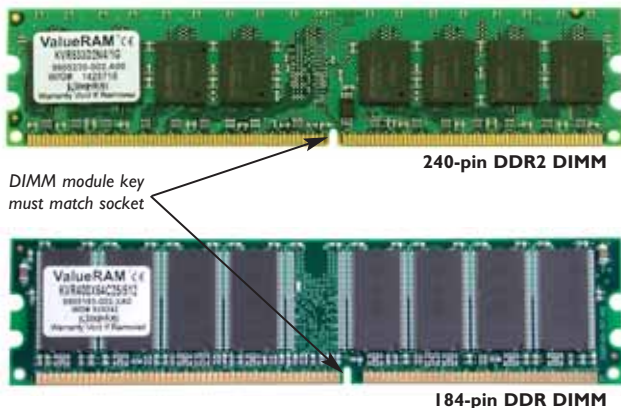
DDR2 memory modules share the same module dimensions as DDR memory modules, but are not backward-compatible due to incompatible module connections (number of pins), voltage, and DRAM technology. DDR2 memory modules have a different key or notch than same-sized DDR modules to prevent their insertion into an incompatible memory socket.

	DDR2	DDR
Unbuffered DIMMs	240-pin 1.8 V	184-pin 2.5 V
Registered DIMMs	240-pin 1.8 V	184-pin 2.5 V
SO-DIMMs	200-pin 1.8 V	200-pin 2.5 V
Mini Registered DIMMs	244-pin 1.8 V	—
MicroDIMMs	214-pin 1.8 V	172-pin 2.5 V

Memory chips

DDR memory chips are made with the familiar black resin Thin Small Outline Package (TSOP) as well as other chip types. DDR2 memory can no longer be manufactured into TSOP chips, and are only specified to be FBGA (Fine-pitch Ball Grid Array) chips. TSOP and FBGA chips are shown below:

Most common SDRAM and DDR memory chips – TSOP chips

DDR2 memory in FBGA chips only
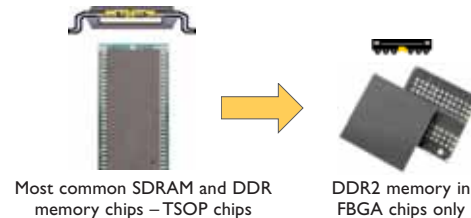
DDR2 chips are also internally different from DDR memory chips. For example, DDR2 memory chips feature:

• 1.8-V operation, delivering over 50 percent less power usage as well as generating less heat compared to DDR
• Memory signal termination inside the memory chip ("On-Die Termination") to prevent reflected signal transmission errors
• Operational enhancements to increase memory performance, efficiency, and timing margins
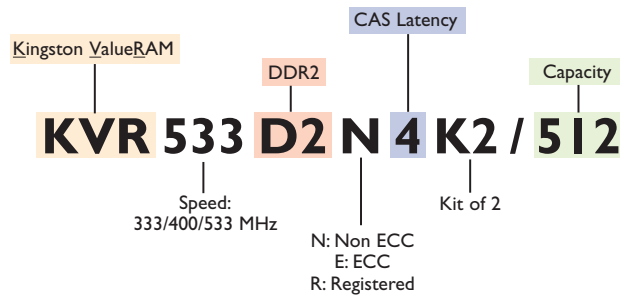• DDR2 CAS Latencies: 3, 4, and 5

ValueRAM DDR2 Decoder

This reference guide is designed to help you identify our new ValueRAM™ DDR2 memory modules by specification. While this is a representation of a majority of our generic DDR2 modules, naming conventions may vary as necessary.

DDR2

KVR 533 D2 N 4 K2 / 512

- Kingston ValueRAM
- DDR2
- CAS Latency
- Capacity
- Speed: 333/400/533 MHz
- N: Non ECC E: ECC R: Registered
- Kit of 2

KINGSTON DDR2 MEMORY MODULES:

DIMM	Part Number	Density	Module Config.	Latency	IC Pkg
DesktopDDR2 Unbuffered Non-ECC 240-Pin DIMM					
single	KVR533D2N4/512	512 MB	64M X 64	4-4-4	FBGA
single	KVR533D2N4/1G	1 GB	128M X 64	4-4-4	FBGA
kit	KVR533D2N4K2/512	2 X 256 MB	32M X 64	4-4-4	FBGA
kit	KVR533D2N4K2/1G	2 X 512 MB	64M X 64	4-4-4	FBGA
kit	KVR533D2N4K2/2G	2 X 1 GB	128M X 64	4-4-4	FBGA
Desktop/Workstation DDR2 Unbuffered ECC 240-Pin DIMM					
single	KVR533D2E4/512	512 MB	64M X 72	4-4-4	FBGA
single	KVR533D2E4/1G	1 GB	128M X 72	4-4-4	FBGA
kit	KVR533D2E4K2/512	2 X 256 MB	32M X 72	4-4-4	FBGA
kit	KVR533D2E4K2/1G	2 X 512 MB	64M X 72	4-4-4	FBGA
kit	KVR533D2E4K2/2G	2 X 1 GB	128M X 72	4-4-4	FBGA
Server DDR2 Registered 240-Pin DIMM					
single	KVR400D2R3/512	512 MB	64M X 72	3-3-3	FBGA
single	KVR400D2R3/1G	1 GB	128M X 72	3-3-3	FBGA
kit	KVR400D2R3K2/512	2 X 256 MB	32M X 72	3-3-3	FBGA
kit	KVR400D2R3K2/1G	2 X 512 MB	64M X 72	3-3-3	FBGA
kit	KVR400D2R3K2/2G	2 X 1 GB	128M X 72	3-3-3	FBGA