



Main Memory for Next Generation Servers

The Fully Buffered Dual in-line Memory Module (FB-DIMM) provides advanced performance for next-generation servers and adopts a Point-to-Point connection on the bus between the memory controller and the DIMM, as well as between the DIMMs themselves. FB-DIMMs were created to solve the performance limitations of Registered DIMMs that were the previous standard for server platforms. FB-DIMMs were designed to support next-generation processors and faster bus speeds.

Elpida Memory will continue to expand its FB-DIMM lineup and provide DRAM products for high-end systems.

Features of the Fully Buffered DIMM

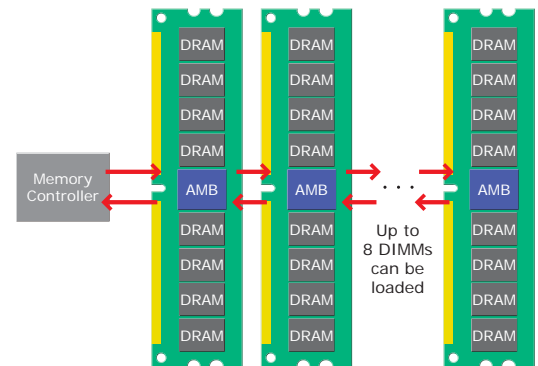
In the new FB-DIMM, all signals — clock, address, command and data — to and from the DRAM on the module are buffered at the high-speed Advanced Memory Buffer (AMB) chip located on the DIMM. This helps to secure the DRAM timing margins during high-speed operation with a much shorter signal path between the DRAM and the AMB.

The FB-DIMM also adopts a Point-to-Point connection on the bus between the memory controller and the DIMM, as well as between the DIMMs themselves. This allows increased bus speed with a shorter connection path. It also greatly improves the maximum number of DIMMs that can be loaded on the bus — up to eight 2-rank DIMMs — with less concern about signal degradation.

By comparison, existing standard Registered DIMMs have a stub-bus architecture along the memory bus between each DIMM and the memory controller. As the memory frequency increases, the controller must reduce the number of DIMMs loaded on the memory bus to secure the signal quality and the timing margin along the lengthy signal path between the DRAM devices on the module and the controller on the motherboard. This limitation has presented a bottleneck in achieving improved performance in server applications where both high-speed and high-density are essential.

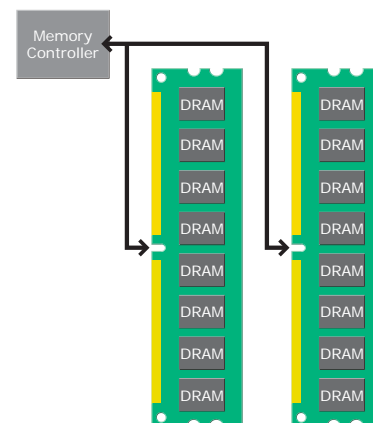
■ FB-DIMM

Point-to-Point architecture (Serial connection)



■ Standard DIMM

Stub-bus architecture (Parallel connection)





FULLY BUFFERED DIMM

ELPIDA

4GB Fully Buffered DIMMs

Deliver the Highest Performance, Highest Density and Thinner Module Design for Server Main Memory

Elpida Memory has volume production of 4GB FB-DIMMs that offer the industry's highest performance and density.

4GB FB-DIMMs offers data transfer rates of 667Mbps, which translates to peak throughput per channel of 8GB/s.

They apply sFBGA (stacked FBGA) package technology developed by Elpida, and they are built using 1Gb DDR2 SDRAM (36 pieces). The 240-pin DIMMs are compliant with the JEDEC standard.

Elpida's FB-DIMMs use our unique, stacked FBGA (sFBGA) packages to achieve much thinner modules - 6.7mm - compared to the JEDEC specification of 9.8mm (max.), and they feature Elpida's state-of-the-art heat spreader design which helps to meet the stringent thermal and reliability requirements of server platforms.

Elpida's FB-DIMMs range from 512MB to 4GB in our lineup, and they offer the best memory composition for servers.



4GB FB-DIMM Specifications

Density	4GB
Organization	256M words x 72-bits x 2 ranks
Module Speed Grade	PC2-5300F
DRAM Speed Grade	DDR2-667 (667Mbps)
FB-DIMM Channel Peak Throughput	8.0GB/s
Mounted Devices	1Gb DDR2 SDRAM x 36 pieces
Burst Length	4 or 8
Supply Voltage	1.8V±0.1V
Package	240-pin Fully Buffered DIMM 133.35mm x 30.35mm, Thin: 6.7mm (max.)

Product Line Up

Density	Mounted Devices	Module Speed Grade	DRAM Speed Grade	Module Bandwidth	FB-DIMM Channel Data Rate	FB-DIMM Channel Peak Throughput
4GB	1Gb DDR2	PC2-5300F	DDR2-667 (667Mbps)	5.3GB/s	4.0Gbps	8.0GB/s
2GB	512Mb DDR2					
1GB	512Mb DDR2					
512MB	512Mb DDR2					