Rambus Unveils Micro-Threading in DRAM Cores

April 5 2005

Delivers up to 4x Performance Improvement in 3D Graphics and Other Applications

Rambus Inc., one of the world's premier technology licensing companies specializing in high-speed chip interfaces, today unveiled an architectural breakthrough of applying micro-threading to DRAM cores. This innovation significantly increases memory subsystem efficiency, resulting in up to four times greater performance when compared to a traditional DRAM in applications such as 3D graphics, advanced video imaging, and network routing and switching.

Micro-threading increases memory system efficiency by enabling DRAMs to provide more usable data bandwidth to requesting memory controllers. A single core operation of a typical mainstream DRAM provides a larger amount of data than needed by many applications. As a result, large amounts of memory bandwidth are used to deliver a small amount of relevant data. Micro-threading enables the DRAM to provide several smaller relevant pieces of data in place of a single larger piece of data, resulting in higher memory bandwidth efficiency while minimizing power consumption.

"By applying micro-threading to a DRAM core, we are continuing our tradition of innovation by designing and developing advanced technologies to improve the bandwidth between DRAMs and their associated memory controllers," said Laura Stark, vice president of Platform Solutions at Rambus. "We look forward to working with our

various DRAM partners to bring this exciting new technology to the market in high-volume applications."

With the application of micro-threading to a DRAM core, separate addresses are provided to different DRAM core partitions, enabling the requesting controller to generate multiple micro-RAS and micro-CAS operations in the same time it would take to generate a single RAS or CAS command to a standard DRAM. Simultaneously accessible banks allow for concurrent retrieval of data, which are then bundled into a single transmission.

Realistic interactive 3D applications such as games and visualization software require more complex scenes, composed of increasingly smaller textured polygons or triangles. A Rambus analysis showed that a standard GDDR SDRAM being used in a 3D application can deliver between 50 and 125 million triangles per second. If the same GDDR SDRAM were to be enhanced with micro-threading, the rate of delivered triangles would increase to between 100 and 500 million triangles per second. By enabling higher triangle rendering rates, micro-threading, as it is applied to a DRAM core, benefits the end user experience by providing richer visuals.

Micro-threading may be applied to existing DRAM cores with relatively low incremental cost. To benefit from the performance increase, DRAM controllers interfacing with micro-threaded DRAMs need to be optimized for the new technology. This patent pending micro-threading technology is available for licensing today.