



By Pat Hart

CompactPCI & AdvancedTCA

StarFabric picks up the pace

With the resurgence in the worldwide economy, the pace of StarFabric design wins and shipments has accelerated. The amount of coverage in the engineering press dedicated to advances in serial interconnects and the emergence of PCI Express technology will no doubt help this positive trend continue. In this column Pat gives an overview on several of the application areas that have contributed to the continuing StarFabric success.

While PCI Express has targeted early adoption in PCs and related peripherals, Switched PCI is the concept of passing PCI traffic through a point-to-point, switched serial interconnect to break through the limitations in scalability of connections and physical distance presented by the parallel bus approach. Since PCI has been so widely adopted in all classes of embedded computing and communication hardware, there is a great need to extend this investment in software and legacy hardware to meet the increasing demands of tomorrow's systems. Using StarFabric to extend the size and reach of the tree topology of a PCI bus or bridged PCI bus is a well-designed solution that requires no changes to application software, OS, or device drivers. StarFabric, in address routing mode, will be totally transparent to any OS with support for PCI bridging. In addition, the PCI bus scan recognizes all connected devices at system start-up. These additional buses appear as bridged PCI devices and can be on the same board, in the same chassis, or cabled to the upstream bus through up to 11 m of inexpensive CAT5e cable. The low cost and extended distance offered by this cabling solution will not be possible with PCI Express, thus providing a key advantage to StarFabric in PCI expansion applications. The simple plug-and-play approach with StarFabric is adequate for many applications, but the capabilities of the technology are far greater.

A Software Development Kit (SDK), and example code from StarGen accelerate the process of employing advanced StarFabric features, such as path routing and multiple classes of service. These advanced StarFabric features are beyond the scope of the device set up for PCI devices and are accomplished through the StarFabric-aware device driver software. Drivers for Windows 2000 and XP as well as Linux are available from StarGen as part of the Evaluation Board Kit products. Source code for Windows, Linux, and VxWorks are available in the StarFabric SDK, and a driver for the Green Hills Software INTEGRITY RTOS has recently been added to the StarGen product set. Solflower Computer is supporting the Solaris market with hardware and device drivers. Using the SDK, an engineer can develop a driver for any operating environment.

For critical functions, quality of service and failover redundancy are necessary to ensure real-time results and guaranteed uptime. Many of the designs using these features are in military applications for the obvious reasons, but more industrial and commercial applications are requiring extended performance, reliability, and availability. Such applications include enterprise networking and storage systems as well as video systems that require

in-order data streams and guaranteed bandwidth. StarFabric has excelled in advanced systems where multiple hosts are required to handle the complex acquisition, processing, and display tasks in digital imaging systems. These StarFabric features and this level of performance have led to a number of design wins in this space.

Advantest, a leader in the automated test of semiconductor components, recently revealed that several of its latest automated test equipment machines are using StarFabric as the interconnect between the central processor and the remote test head containing the electronics that interface to the unit under test. The high-speed serial nature of StarFabric and its ability to span rack to room scale distances allow this test head to be at a considerable distance from the central computer. This arrangement increases configuration flexibility and the ability to interface with a variety of automated handling equipment. Additionally, Advantest engineers appreciated the smooth PCI-StarFabric integration and were able to shorten development cycles accordingly, while significantly improving the design process.

In another recent announcement, CONTEC, an international industrial computer and automation leader, announced a line of expansion PCI chassis with a built-in StarFabric interface, CardBus, and PCI StarFabric cards to expand PCI buses from a notebook or other computer. Figure 1 shows the CONTEC PCard StarFabric adapter and PCI Expansion chassis. CONTEC chose StarFabric for its new extended adapter for bus extension system solution because of its 2.5 Gbps serial interconnect, reconfigurable fabric features, 100 percent backward compatibility to PCI, and ability to enable an external interconnect up to 40 feet over CAT5e cable. The use of the CardBus form factors is unique and ideal for industrial and instrumentation applications and for providing a complete PCI expansion solution. Interest in this solution has been very encouraging.

Industrial computing has not been the only active market for StarFabric designs. Military electronics suppliers have made great use of StarFabric in a number of different applications. In previous issues, this column has detailed StarFabric products from



Figure 1

Dy 4 Systems, now part of Curtiss-Wright Controls Embedded Computing, Synergy Microsystems, also now part of Curtiss-Wright Controls Embedded Computing, and Innovative Integration. Texas Memory Systems has been the most recent military electronics manufacturer to announce a StarFabric product. It manufactures high-performance Digital Signal Processors and solid state disk storage systems. The SAM-650 DSP Supercomputer boasts 192 GFLOPS of processing power and has been upgraded to include StarFabric I/O. With this increased performance, the SAM-650 DSP eliminates most DSP performance bottlenecks that are often associated with processing high bandwidth signals. It was designed specifically for a government agency customer and will likely be designed into multiple, military-grade embedded systems requiring extremely high performance and reliability. Micro Memory has also announced VME carrier cards with two StarFabric ports and two 64 bit/66 MHz PMC sites. Figure 2 is the MM-6450D *Othello* real-time data acquisition and signal processing system board from Micro Memory. *Othello* rates buffer data between I/O streams and StarFabric.

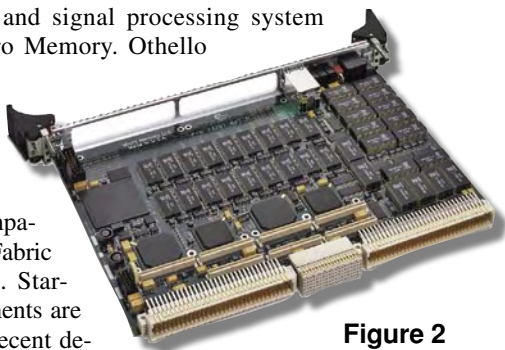


Figure 2

More than 75 companies now use StarFabric in their products. StarFabric port shipments are at 250,000, and recent design wins suggest the run rate is accelerating. With many of these designs now moving to volume production, shipments will ramp up for a number of years. Recent design wins will start generating significant volumes later in the year and in 2005, and many of these products have very long lives.

As new serial interconnect technologies, such as PCI Express and Advanced Switching Interconnect are introduced, StarFabric offers embedded OEMs the benefits today that the emerging switch technologies promise in the future. As a cost-effective, expandable *switched PCI* solution, StarFabric is a suitable interconnect technology for embedded computing applications, including industrial control, semiconductor manufacturing and automated testing, medical imaging, video distribution, and a range of high-performance military applications. 🌐

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