

Tektronix Logic Analyzers

800 Mbit/sec Using Virtex FPGAs

Tektronix chose the Virtex XCV300 device specifically for its TLA 700 Rambus adapter, based upon its flexibility and overall performance.



by Tamara Snowden
Corporate PR Manager, Xilinx
tamaras@xilinx.com

Technology leader Tektronix, headquartered in Wilsonville, Oregon, recently announced its new suite of instruments designed for the most challenging leading-edge digital design applications. The integrated tool set is composed of new performance-leading instruments: the TLA 714/720 portable and benchtop logic analyzers, the TDS694C digital storage oscilloscope (DSO), and complementary connection devices. The instruments were designed to work together to provide specialized features and optimized performance.

An Integrated Solution

“A digital design engineer operates in an environment of accelerating technological change under extreme time-to-market conditions,” said Steve Jennings, director of marketing of the Tektronix’ Measurement Business Division. “This new integrated solution provides superior measurement and analysis capabilities for even the most challenging design areas like Rambus memory systems and next-generation microprocessors.”

Choosing an Upgradable FPGA Solution

“The Virtex FPGA provides the flexibility necessary to implement protocol detection and reorganize the data for a delightful presentation to the Logic Analyzer and in so doing, delighting the customer,” said Brainard Brauer, a Tektronix design engineer. “An ASIC was not an option in this design. The Virtex FPGA provides field upgradeability.”

ty of the code, which is critical in this fast moving, cutting-edge application.”

“Virtex FPGAs have allowed Tektronix to de-serialize the Rambus data bus,” said Brauer. Virtex devices accept Rambus data after presampling logic has converted the serial channel from 26 bits on both edges at 800Mbit/sec to 56 single edge signals to 400Mbits/sec. “Tektronix has been successful at using the Virtex FPGA to accept this 400MBits/sec data directly into the Virtex device.” This was achieved by providing multi-phase clocks to the device (four phases). Each clock was connected to a different global clock input, routed over its own internal global route with separate DLLs (Delay Locked Loops).

“The device achieves a setup/hold specification better than 1.2ns worst case across temperature and at any pin of the device,” said Brauer. “It is critical to verify that the tools have routed each data input to an IOB (Input/Output Block). In the Tektronix implementation, four input pins were consumed for each data line. As a result, four IOBs were required (one for each clock phase). The package loading must be carefully understood and compensated for to avoid signal slew rate issues.

Choosing a Software Solution

Brauer used the Xilinx Alliance Series software to design the TMS810 Rambus interface adapter, which provides the crucial front end interface between Rambus and the TLA700 logic analyzer. The Alliance Series is the industry’s leading open systems software that provides the flexibility to select the best EDA design environment for a specific application. Combining the advanced implementation technology of Xilinx with the strengths of its partners provides a powerful overall design solution, the highest clock performance and the highest densities in the industry.

A New Family of Logic Analyzers

The new family of logic analyzers, the TLA 714 and the TLA 720, are replacing the original TLA 704/711. They offer an industry-leading combination of acquisition speed, channel width and memory depth, all of which are essential for supporting next-generation microprocessor designs. Now offering up to 16M, the TLA 714/720 have the deepest memory configuration in the industry plus an innovative hardware-assisted display system to simplify the management of such a large memory.

“High register count is a key to our bus decoding implementation, once deserialized into a wide parallel pipe line architecture. The Virtex device provided the lower power consumption we needed with much higher useable register densities than previous devices,” said Brauer.

The new TLA 700 features an easy-to-use Windows 98 user interface and a PC platform with expanded openness in response to customers’ strong acceptance of the original TLA 700’s open platform. Tektronix built in an industry-standard computer and operating system to provide the user with a familiar interface. Because it works just like any other PC-based software, the user can focus on the problem, rather than the tool. Tektronix has also created the Embedded Systems Tools Partners Program to deliver development and debug solutions for the TLA 700 Series. The solutions range from providing software, analysis tools and physical processor connections, to disassembly software that runs on the logic analyzer.

“AN ASIC WAS NOT AN OPTION IN THIS DESIGN. THE VIRTIX FPGA PROVIDES FIELD UPGRADEABILITY OF THE CODE, WHICH IS CRITICAL IN THIS FAST MOVING, CUTTING-EDGE APPLICATION.”

About Tektronix

Tektronix is a portfolio of measurement, color printing, and video and networking businesses dedicated to applying technology excellence to customer challenges. Headquartered in Wilsonville, Oregon, Tektronix has operations in 26 countries outside the United States. Founded in 1946, the company had revenues of \$2.1 billion in fiscal 1998.

For more information, visit the website at www.tek.com.

At the heart of all of the TLA 700 Series logic analyzer modules is a breakthrough called MagniVu™ acquisition technology, a super-high-speed sampling architecture that dramatically changes the way logic analyzers work and what functionality they offer. All incoming data is oversampled at a 2GHz rate, regardless of how the logic analyzer is being used. The oversampled data is then processed in real time to perform timing acquisition, state acquisition, and triggering without missing the slightest piece of crucial timing information on any channel.

