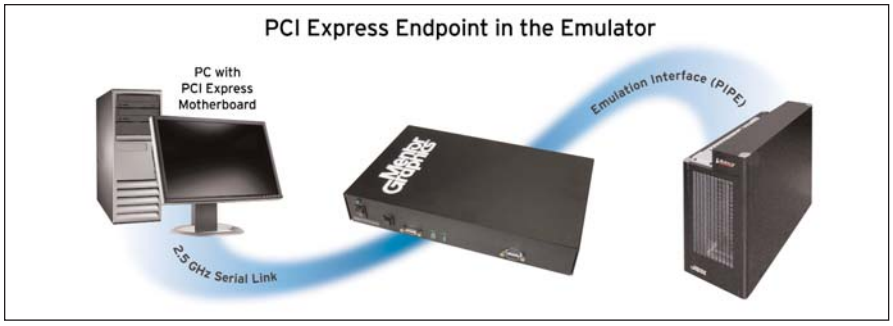
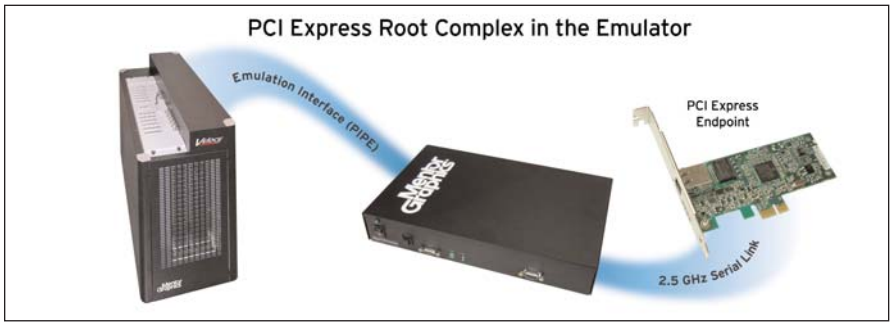
iSolve PCI Express

Hardware-Based Functional Verification

D A T A S H E E T





The iSolve PCI Express speed adapter provides the ability to verify a PCI Express endpoint, root complex, switch, or bridge design using full-speed, standard PCI Express compliant devices and a Mentor Graphics emulator.

System Verification Using a Direct PCI Express to PCI Express Interface

The Mentor Graphics® iSolve™ PCI Express speed adapter provides a connection between full-speed 2.5 GHz PCI Express traffic and the PCI Express port of a design mapped into a Mentor Graphics hardware emulator, enabling verification of complex PCI Express designs. The iSolve PCI Express speed adapter allows emulation users to perform system-level verification using actual PCI Express hardware and the application software and drivers on a PCI Express PC. As a result, corner-case bugs in both hardware and software can be identified and fixed, and design teams can address the very important interoperability and compliance issues that occur with standard bus protocols.

The combination of iSolve PCI Express with Mentor Graphics hardware emulators delivers a 1,000 to 10,000X speed improvement over software simulation, saving weeks or months of regression test time. This level of performance enables verification of the design under test (DUT) in a real-world environment using its target operating system.

Plug-and-Play

The iSolve PCI Express speed adapter provides a rapid route towards system verification. Because it is plug-and-play, the user simply connects the full-speed PCI Express port to an appropriate PCI Express PC and connects the emulation-speed port to the emulator.

Major product features:

- Direct PCI Express to PCI Express speed adapter
- Compliant with PCI Express 1.1 and 2.0 standards
- Supports verification of all PCI Express device types:
  – Endpoint
  – Root complex
  – Switch
  – Bridge
- Supports x1, x2, x4, and x8 lane (PIPE) operations
- Direct connection to PCI Express PC
- Automated lane negotiation
- Emulation speed clock (PIPE clock) provided as input to the hardware chassis
- Supports memory, I/O, configuration, and message transactions
- Interleaved packets across multiple lanes
- LED status indicators
- 8/16-bit PIPE parallel interface to emulator
- Physical switch to disable scrambling
- Flashing of the on-board FPGA facilitates easy product upgrades

Reverse and Forward Configurations

The iSolve PCI Express speed adapter is available as either a forward or a reverse speed adapter. In the forward configuration, the full-speed PCI Express traffic is upstream (toward the root complex) and the emulation-speed traffic is downstream (toward the endpoint). The reverse configuration is just the opposite. The speed adapter is available with either x1, x2, x4, or x8 lane emulation-speed PCI Express ports.

A forward speed adapter is used to verify a PCI Express endpoint. A PCI Express PC drives the speed adapter, which results in emulation speed PCI Express signaling to the design in the hardware emulator. This would typically be an endpoint, switch, or bridge. The PC forms the root complex from which the PCI Express traffic communicates with the fast side of the speed adapter. iSolve PCI Express converts the 2.5 GHz speed traffic to emulation speed traffic, on the slow side of the speed adapter. This establishes communication with the design mapped into the emulator. The user can then access the design in the emulator through PC software, which uses either standard or user-specific PCI Express drivers.

A reverse speed adapter is used to verify a root complex design. The root complex is inside the emulator, and the speed adapter provides the connection to a full speed endpoint, switch, or bridge.

Industry Standard PIPE Interface to the Emulator

The iSolve PCI Express speed adapter supports an emulation speed PIPE interface on either the downstream port (forward) or the upstream port (reverse). The PIPE is the Intel defined PHY Interface for the PCI Express (PIPE) architecture specification.

iSolve PCI Express Deliverables:

- Complete hardware chassis assembly containing the speed adapter board and cables for direct connection to the emulator
- All solutions include a PCI Express PC
- User guide with reference training and initialization sequences
- Full hardware diagnostics
  – Emulator PIPE interface
  – SERDES connections

Visit our web site at www.mentor.com/emulation for more information.

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