Digital Design

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A PCI/PCI-X Test Card for I/O System Verification

As I/O systems become large and more complex, the task to validate a system with one or more newly designed bridge components becomes increasingly challenging. In current industry standard I/O system verification, there exists a detrimental absence of a connection between the test environments of presilicon software simulations and postsilicon hardware diagnostic testing. Verification engineers are currently using disparate, ad hoc methods of building system environments for software tests and hardware tests. This makes it difficult to recreate hardware bugs in simulation or to run realistic system tests before the hardware is manufactured. A synthesizable dual-mode PCI/PCI-X card has been developed to be used in both presilicon and postsilicon verification stages of a server I/O system with a newly developed PCI/PCI-X bridge ASIC. This test card has been successfully tested for functionality and timing requirements. The test card has enabled common system platform development for hardware bring-up and testing as well as system software simulations.

6.111 Gate Array PC Board

Currently, MIT course 6.111 is taught using the aid of a circuit board connected to each student lab kit, with each circuit board mounting several Complex Programmable Logic Devices (CPLDs). Each of these devices can be programmed using VHDL to simulate larger and more complex digital systems than would be possible for a student to wire on the breadboards of the lab kit alone.

The MIT 6.111 Gate Array PC Board is a further refinement of the original 6.111 CPLD PC Boards. Instead of using four CPLDs, these boards will use a pair of Field Programmable Gate Arrays (FPGAs). Th FPGAs will be programmable using VHDL, and have been chosen to counteract a number of common problems students dealt with when using the CPLD boards: the number of accessible I/O pins, the ability to assign signals to pins freely, the size and complexity of digital logic capable of being simulated, and the accessibility of programming resources in the 6.111 laboratory.
Presentations


Publications


Accepted for Publication


Proceedings of Refereed Conferences


Invited Lectures


Theses
