Option Design Using The TURBOchannel Interface ASIC (TcIA)

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Jim Crapuchettes

Digital's TRI/ADD Program

Overview

- Objectives for the TcIA Test Board
- Test Board characteristics
- Functionality Testing
- Developer's Kit

Objectives for TcIA Test Board

- Test complete functionality of the TcIA
- Test operation of the TcIA with variable clock speeds
- Establish performance characteristics of the TcIA
- Verify the TcIA Specification
- Alternative strategy to an embedded design

Architecture of the Test Board

Functional blocks

- **The TcIA**
- **Transmit engine**
- **Receive engine**
- **Oscillator**
- **ROM**
- **RAM**
- **Arbitration engine**
- **PIO**
- **LEDS**

Test Board Characteristics

Physical

- Dimensions
- TcIA Layout

Important definitions

- **Transmit** is the movement of data **from** the **system to** the **option**, as to a serial line. Thus a transmit DMA operation uses TURBOchannel DMA read transactions.
- **Receive** is the movement of data **from** the **option to** the **system**, as from a serial line. Thus a receive DMA operation uses TURBOchannel DMA write transactions.
- Simple DMA is data transfer to or from sequential memory locations with addresses supplied by the TcIA
- Intelligent DMA is data transfer to or from memory locations by options that supply DMA addresses to the TcIA
- A word is 32 bits wide.
- A half-word is 16 bits wide.

Transmit Functionality Testing

- Simple DMA
- Intelligent DMA
- Scatter/Gather
- Data sizes
- Unaligned transfers
- Modes of operation
- Page Sizes and Boundaries

Receive Functionality Testing

- Simple DMA
- Intelligent DMA
- Scatter/Gather
- Data sizes
- Unaligned transfers
- Modes of operation
- Page Sizes and Boundaries

Concurrency Testing

- PIO and DMA
- Transmit and receive
- Restriction (Pass 2 silicon)

Test Code

- ROM based
- Menu driven
- Written in "C"
- Code structure

Developer's Kit

- Contents
- Availability

Conclusions

- Found Pass 1 design flaws
- Verified TcIA Specification
- Documented DMA performance
- Exercised all functions
- Achievements

Availability

Information on the TcIA and the Test Board is available from:

Integrated Test Solutions
2352 Main Street, Suite 201
Concord Office Park
Concord, MA 01742

Telephone: (508) 897-0028
FAX: (508) 897-0171