A proof of concept for IEEE P1581

P1581 Demo Board discussion and demonstration

Heiko Ehrenberg, GOEPEL Electronics
IEEE P1581 WG chair
Objective

- Background Information on IEEE P1581
- Introduction of P1581 Demo Board
- Compare Test Methods
- Solicit Feedback

Disclaimer: P1581 Working Group may or may not agree with content.
P1581 – A quick review

• Simple Test Logic Implementation for Memory Devices (and possibly other complex, slave-type components)

• No extra pins required

• Not relying on complex Memory Access Cycles

• Fast test execution, small test vector set

• Usable with any access methodology (BScan, functional, even ICT)
P1581 Concept

Normal Mode

controlling device (e.g. Boundary Scan)

Data Bus
Address Bus
Control Signals

P1581 Circuitry

/CE

Memory
P1581 Concept

P1581 Test Mode

controlling device (e.g. Boundary Scan)

Data Bus
Address Bus
Control Signals

Logic

P1581 Circuitry

Memory

/CE
P1581 Demo Board

[Image of the P1581 Demo Board]
Demo Board Features

- Boundary Scan Device for Memory Access
- FPGA for P1581 Emulation
- Serial PROM for FPGA configuration
- PCI and DIMM Slot for Memory Modules
- Connectors for non-Boundary Scan control
- DIP Switches for Fault Simulation
Block Diagram

- **BScan TAP**
  - XH500

- **Memory Controller (FPGA)**
  - U500

- **P1581 Emulator (FPGA)**
  - U202

- **sEEprom**
  - U200

- **Fault Simulation Switches**
  - S300

- **Memory Module**
  - XH301
  - XH302
  - XH303
  - XH304
  - XH300

For alternative access to memory device pins.
P1581 Demo Board Layout
P1581 Demo Board

Memory Controller (BScan Device)

Memory Module (holding SRAM)

Fault Switches
Test applications

- Memory Access Test from Boundary Scan device
- P1581 Continuity Test
- P1581 Device ID verification
- In-System Programming for P1581 Emulator
- Standard Boundary Scan tests for board tests (Infrastructure, Interconnect)
Results

• Test Time
• Test Development (complexity)
• Number of DRShifts
• Test Program Size
• Diagnostics
Results

- BScan Memory Access Test (with Diagnostics)
- BScan Memory Access Test (without Diagnostics)
- P1581 Continuity Test (with Diagnostics)

{Less is better in all four graphs.}
Outlook

- IEEE P1581 provides real benefits
- P1581 Demo Board usable for other Memory Types (e.g. FLASH)
- Demo Board documentation available
- Test Community needs to plead case to Memory Device Manufacturers

http://grouper.ieee.org/groups/1581