The IRAM Demo Board

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Why Build Demo Hardware?

- Good proof of correct design
- Puts constraints on chip designers
- Best way to discover some things
- System design teaching tool
- Gee-whiz factor
- PR
What is it?
Many Requirements, Little Consensus

- Chip Testbed
- Media Benchmark Cruncher
- CHI* Demonstrator
- Simple Array Computer
- PDA Proof-of-Concept

* Or HCI
Chip Testbed

- Socketed IRAM
- Easy probing
- Debug signals available
- Adjustable frequency
- Adjustable voltage
- Thermal control
- Dull demo
Media Benchmark Cruncher

- MPEG test sequences
- Speech recognition kernels
- Graphics rendering
- Non-realtime
- No human interface
CHI Demonstrator

- Audio I/O
- Realtime video I/O
- Dedicated display
- Large disk
- Ethernet

- Non-portable
- Not IRAM-specific
Simple Array Computer

- Easy network interconnect
- Dense packaging (DIMMs)

- Heat removal
- Not interactive
PDA Proof-of-Concept

- Standalone device
- Touch screen
- Microphone & speaker
- Internal camera

- Oversize packaging
- External battery
Common Requirements

- Direct debug access to IRAM
  - JTAG-based
  - Connected to host PC
  - For code, data & control

- Standard MIPs bus
- Unified develop/test/debug software environment
Many Requirements, Three Solutions

- Chip Testbed
- Media Benchmark Cruncher
- CHI Demonstrator

- Simple Array Computer

- Handheld Proof-of-Concept
Who Does What?

- **SCOREboard**: BRASS
- **Smart DIMM**: IRAM
- **SpeechCorder**: ICSI
IRAM Demo Board

- IRAM
- NEC Bridge
- PCI Connector
- Xilinx Virtexes
- Daughter card
Data Paths
Why Use the SCOREboard?

- NEC Bridge chip is our 1st choice
- Daughter card allows expansion
- Virtexes don't get in the way
- Hardware effort already underway
- Shared effort for software
- Economies of scale 😊
Why **Not** Use the SCOREboard?

- Hardware overkill
- Constrains IRAM pinout
What Goes Around...

IRAM purchases NEC demo board

SCOREboard used in IRAM Demo system

BRASS uses for SCOREboard prototype

IRAM Pinout compatible with MIPs R5000
Demo Boards Schedule
Provisional

- SCOREboard: 3/00
- Tapeout IRAM: 4/00
- Fab IRAM: 6/00
- Smard DIMM: Q3/00
- SpeechCorder: Q4/00