

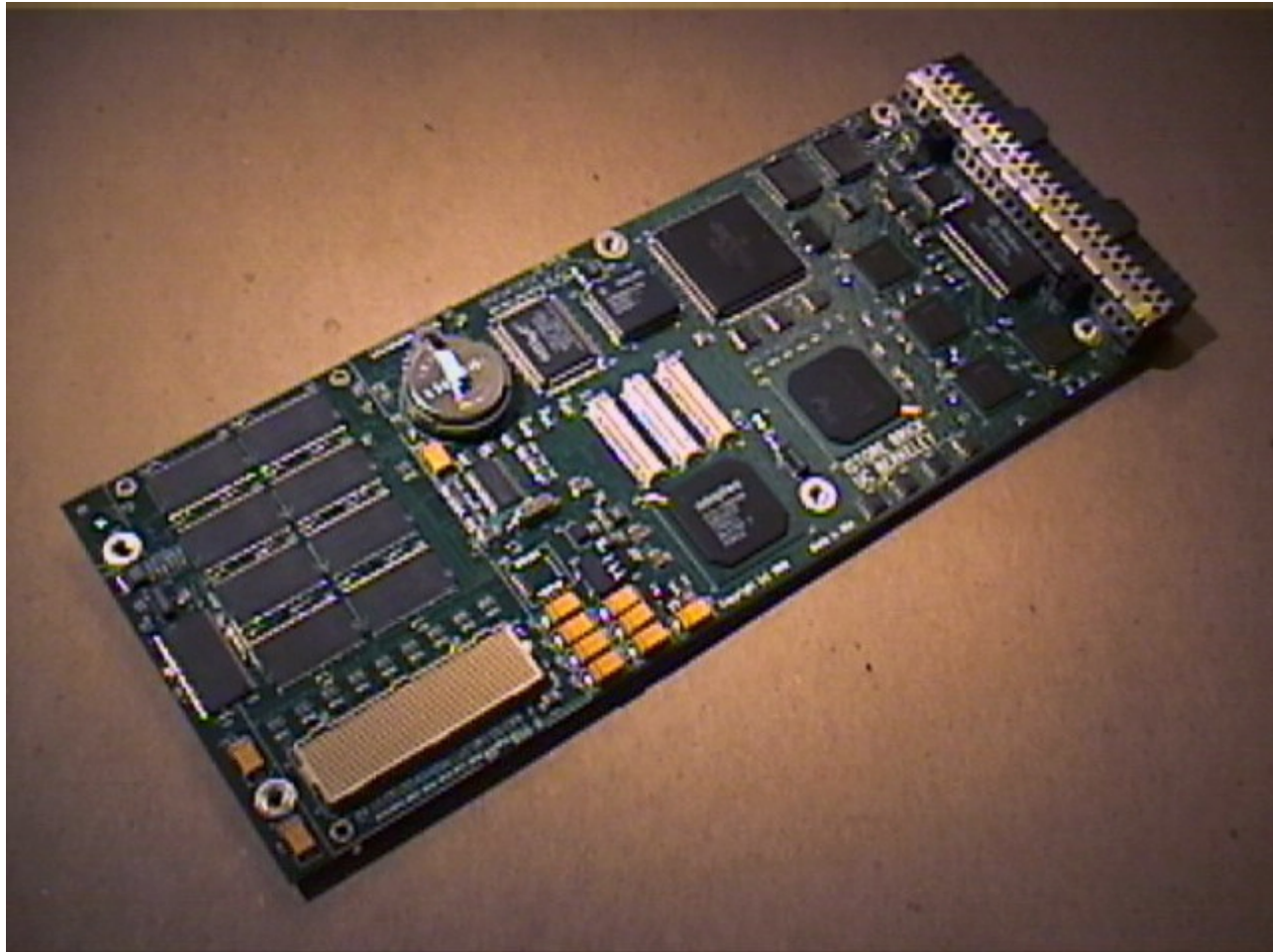
# ISTORE Hardware Status Update

James Beck 1/12/2000



# It's Done

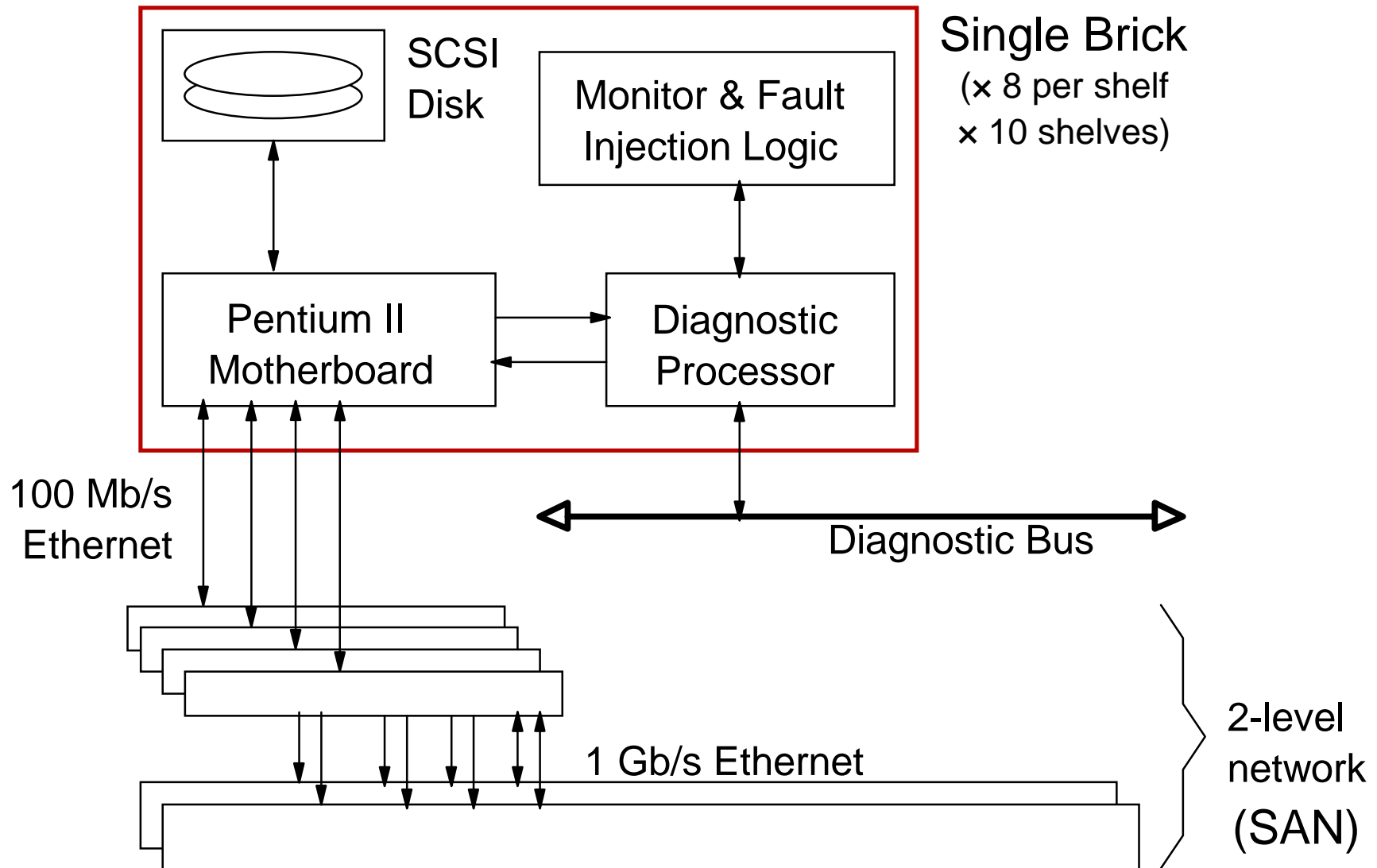
(to 1<sup>st</sup> order)



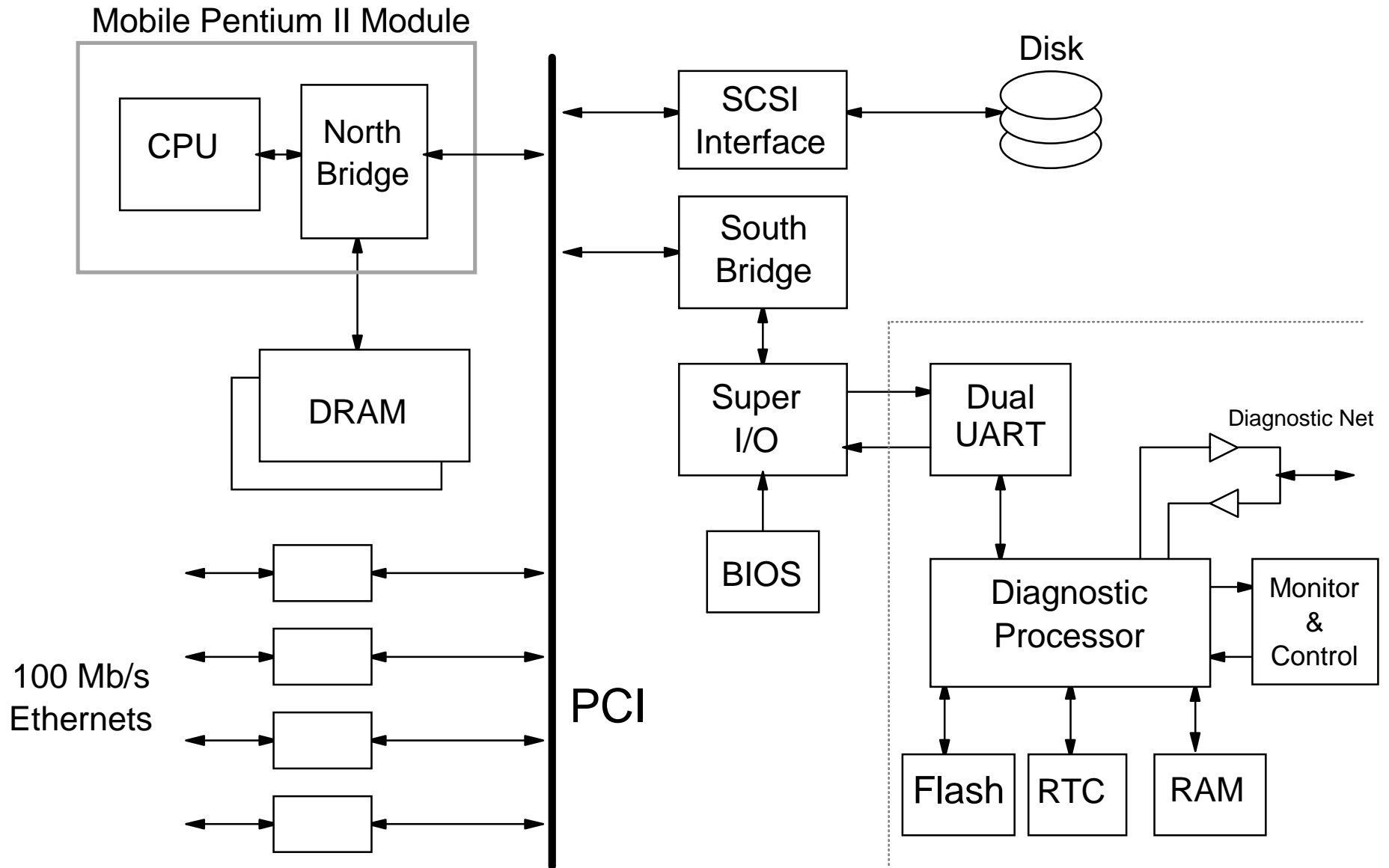
# Talk Outline

- ◆ Review
- ◆ Status
- ◆ Stories

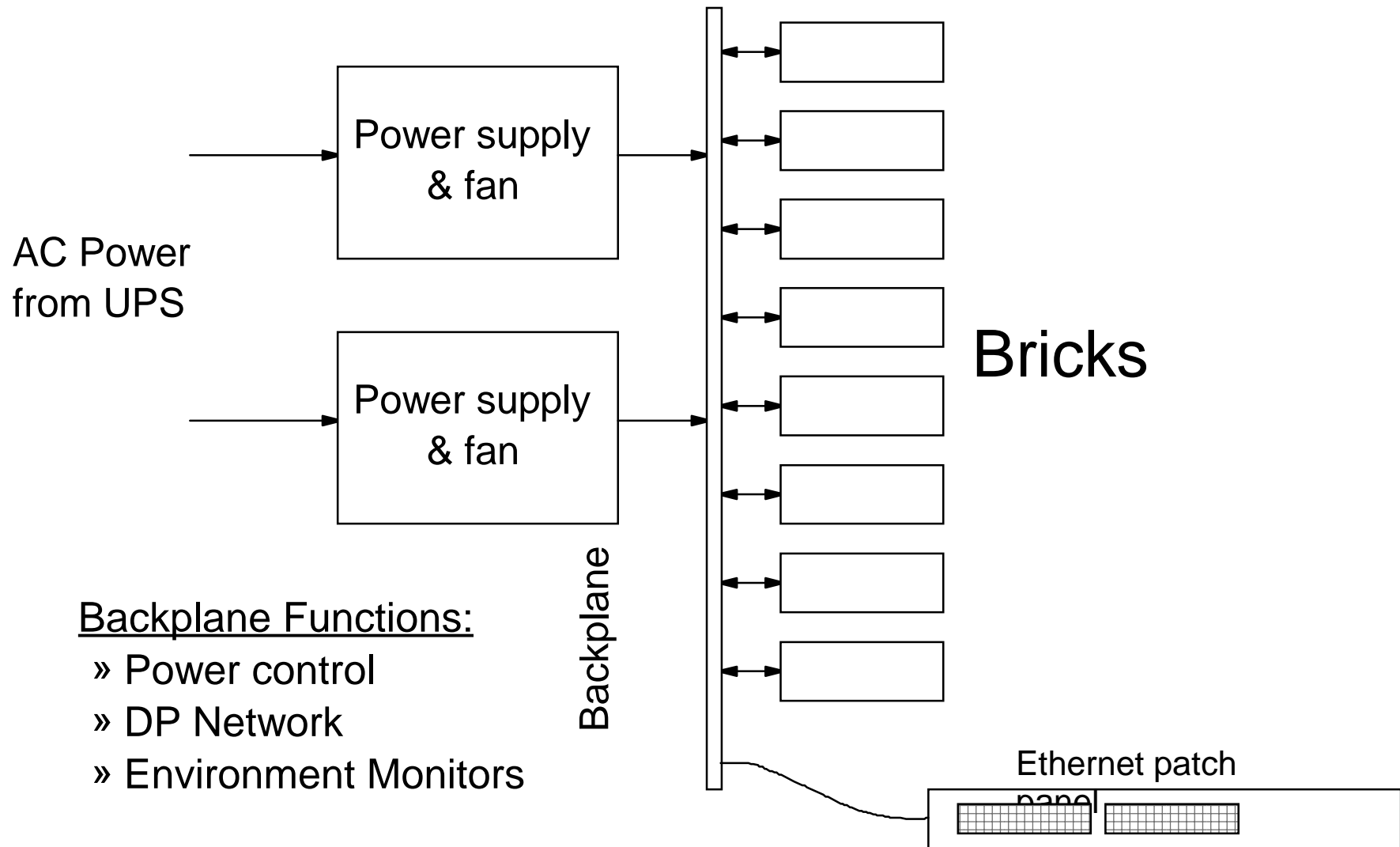
# System Block Diagram



# Brick Block Diagram



# Shelf Block Diagram



# Diagnostic Processor Sensors

- ◆ Per brick:
  - 3 thermometers
  - 4 voltage monitors
  - Intrusion detector
  - Battery warning
  - Accelerometer on disk drive
- ◆ Per shelf:
  - 3 thermometers
  - Fan stall detector
  - Humidity sensor

# DP Fault Insertion

- ◆ Power supply shutdown:
  - ◆ Disk power
  - ◆ Pentium II
  - ◆ Entire brick
- ◆ Force interrupt to Pentium
- ◆ Generate errors:
  - ◆ SCSI
  - ◆ Memory
  - ◆ Ethernet



# Board Status

1/12/00

Designed

Built

Debugged

Designed	Built	Debugged	
✓	✓	✗	Brick
✓	✓	✗	IDE Interface
✓	✓		SCSI Interface
✗			Shelf Backplane
			Power Supply Adapter
✗			Ethernet Patch Panel

# Brick Board Working

- ◆ BIOS & PCI bus
- ◆ Memory
- ◆ IDE Disk
- ◆ Com 1 & 2
- ◆ Ethernet fault injection
- ◆ 1 Ethernet port @ 100 Mb/s
- ◆ Brick boots Windows
- ◆ Runs NT Server

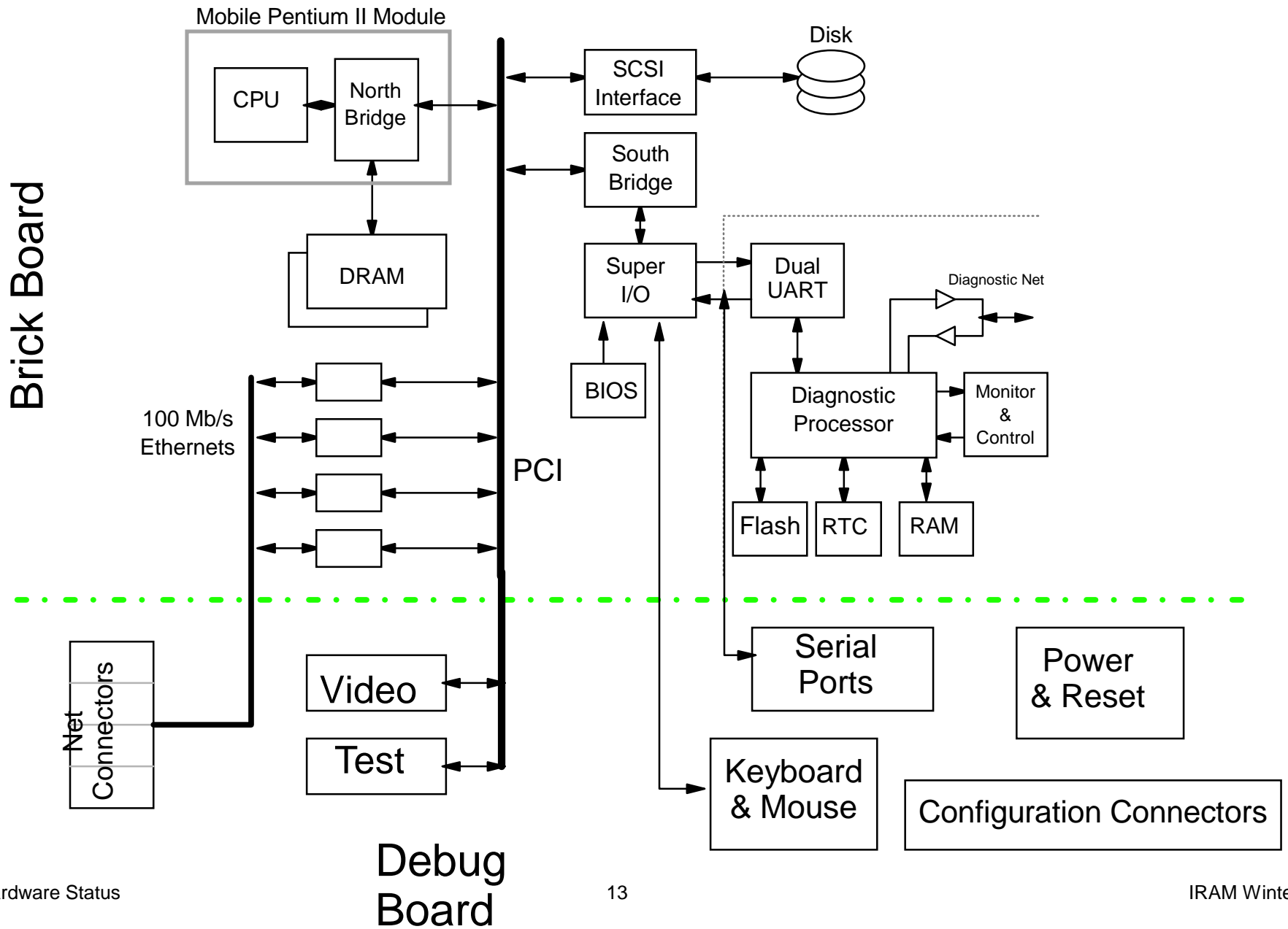
# Brick Board Untested

- ◆ 3 Ethernet ports
- ◆ Verification test suite
- ◆ Diagnostic processor
- ◆ Speed switching PAL
- ◆ SCSI interface board
- ◆ UCB BIOS mods

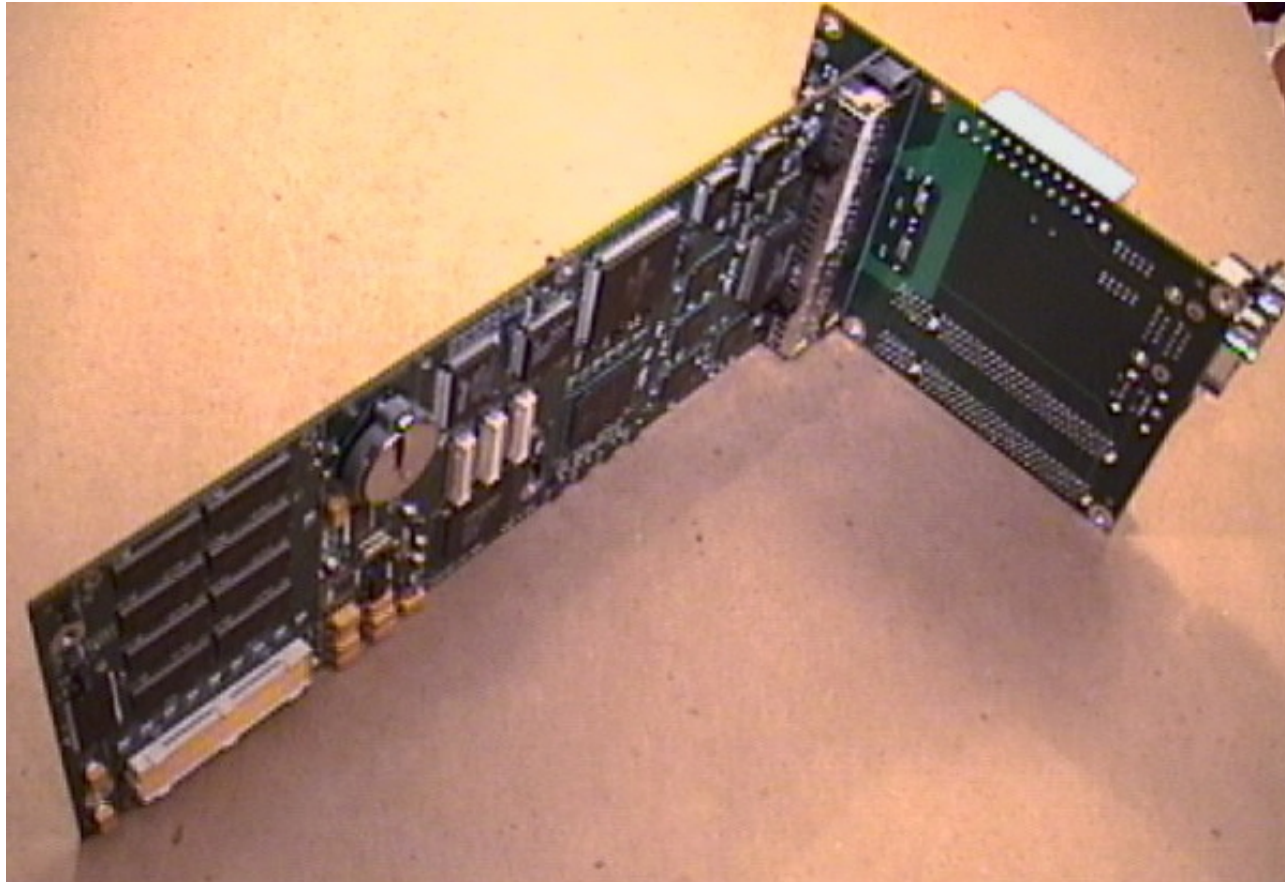
# Brick Board Not Working

- ◆ IDE interface board
- ◆ Ring detect on serial ports
- ◆ SCSI controller

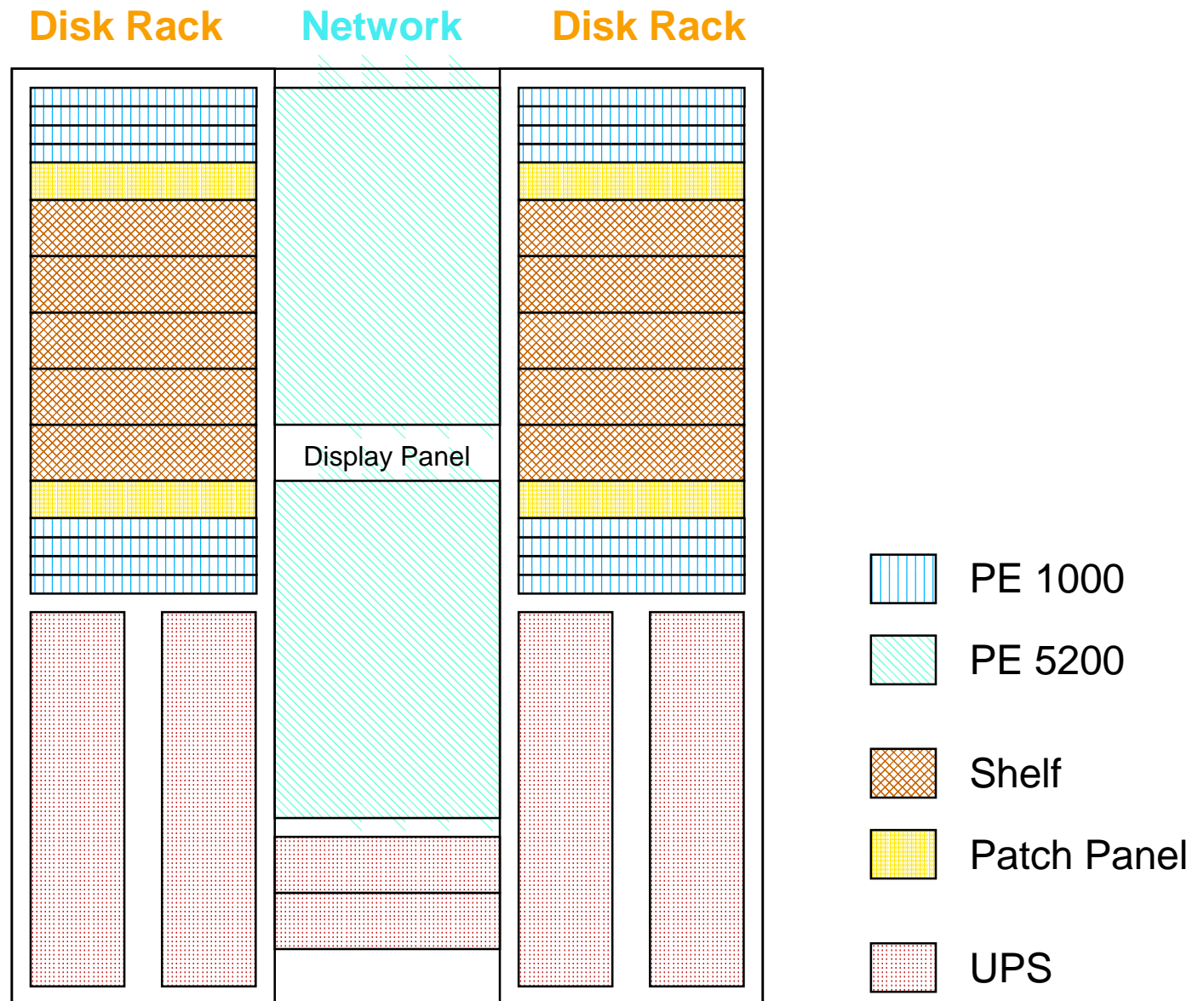
# Development System Diagram



# "L" PC

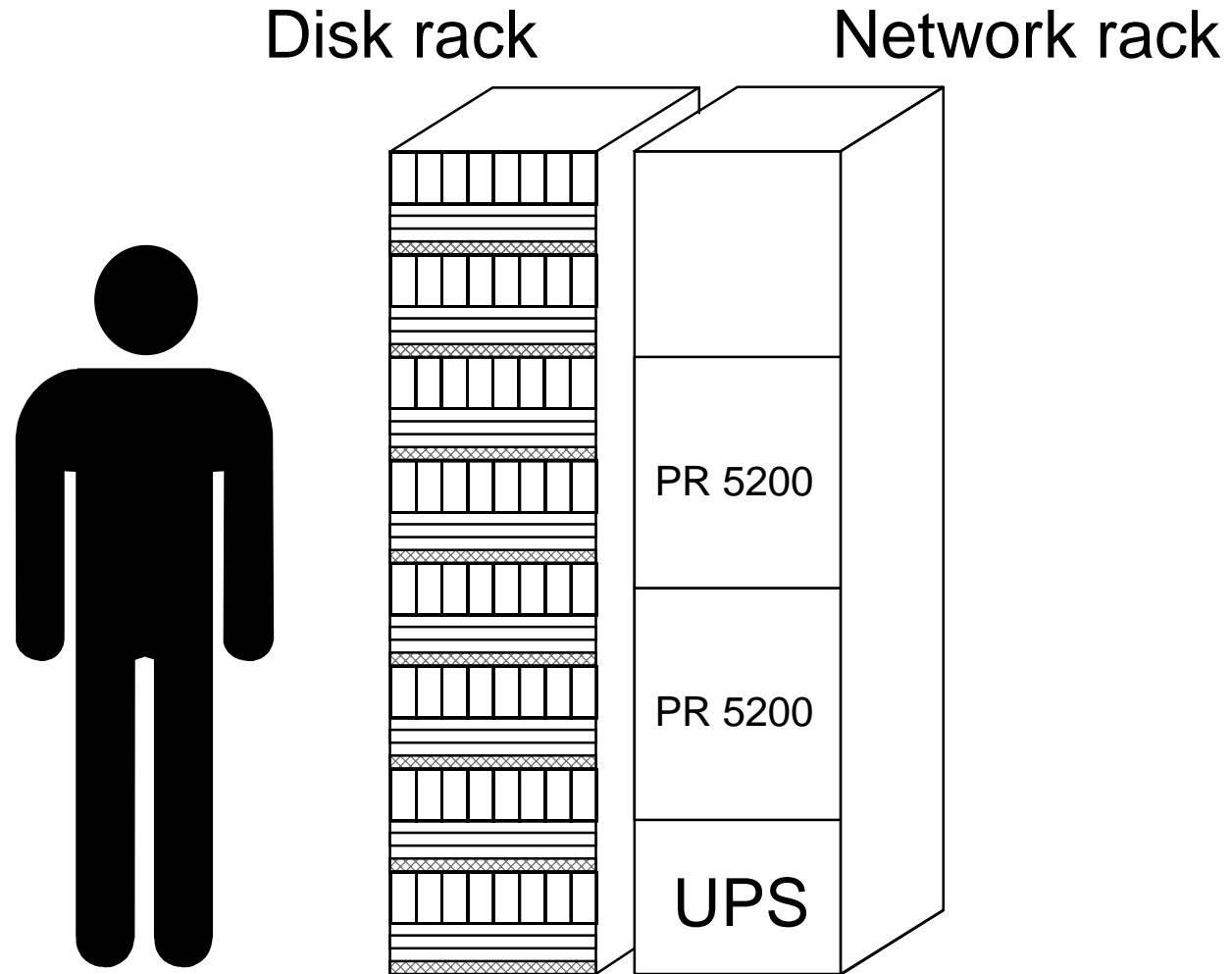


# ISTORE System Layout



# ISTORE System

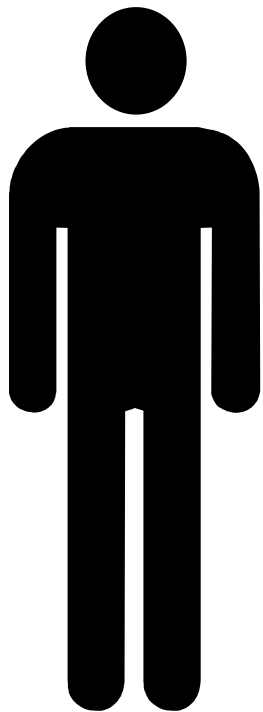
From 6/21/99 retreat





# ISTORE Actual Racks

530 Soda



# Future Status

- ◆ Anigma's started layout for SCSI fix
- ◆ Rev B boards expected by 3/00
- ◆ 2 Rev A boards at UC on 1/14/00
- ◆ PE5200s installed next week

# What ISTORE's Not

or, good ideas left out

- ◆ VxWorks
- ◆ Gigabit Ethernet
- ◆ MIPS-compatible CPU
- ◆ Fiber Channel
- ◆ (SO)DIMMs
- ◆ RS-232 Control
- ◆ Commodity Hardware

# Chronology I

- ◆ 6/26/98, lunchtime - "Sysadmins outta control!"
- ◆ 6/28/98, 7:17 A.M. - DAP: "short task" email
- ◆ 8/3/98 - ISTORE fab account set up
  
- ◆ 1/14/99 - CPU changed from MIPS to x86
- ◆ 2/99 - Fault insertion mentioned in email
- ◆ 3/99 - Rich Martin solves DP riddle with CANbus

# Chronology II

- ◆ 5/11/99 - Design review: "Don't build hardware!"
- ◆ 5/24 - Last candidate design company turns us down
- ◆ 5/27 - Sent email to "friend of a friend" PC designer
- ◆ 6/1 - First contact with Anigma
- ◆ 6/12 - Wailing and tooth gnashing over what to build
- ◆ 6/15 - Anigma site visit; sign contract next week
- ◆ 6/22 - Project dumped on at retreat; global rethink
  
- ◆ 12/2 - Rack assembly started in 530 Soda
  
- ◆ 12/27 - Brick boots Windows

# Panic Attacks

- ◆ Design review: Too hard to build
- ◆ Anigma: Board will burn up
- ◆ Grad students: Goals all wrong
- ◆ Parlex: Wrong connector sex
- ◆ Beck: Smoked a disk cable
- ◆ Anigma: SCSI chip bus backwards

# Industry Partners

- ◆ Anigma - Brick board design & fab
- ◆ Packet Engines - Ethernet switches
- ◆ Micron - SDRAMs
- ◆ Adaptec - SCSI chips & expertise
- ◆ Andataco - Shelf enclosures
- ◆ Intel - Pentium II Mobile Modules & support chips
- ◆ IBM - SCSI disk drives
- ◆ Motorola - Diagnostic processors

# Pretty Big Numbers

80-node ISTORE

- ◆ 1.4 TB Disk storage
- ◆ 21 GHz aggregate PII clock rate
- ◆ 20 GB SDRAM
- ◆ 4 GB/s peak network bandwidth