



Architecture

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Clipper

Alphaserver ES40

- **CLIPPER Architecture**
 - System Features
 - System Layout
 - Bus Bandwidths

- **Quad Processor EV6, EV67 with High Memory Bandwidth**
- **Point-to-Point CPU Interface**
 - 4 Processors
 - No duplicate TAG store - All CPU's are probed
- **Four Memory Arrays**
 - Two 256-bit memory buses - eight Dchips
 - 32GB Max memory capacity
 - Low Latency SDRAMs (CAS latency = 2)
- **Two 64-bit 33MHz PCI buses - two Pchips**
 - Highly Configurable
 - Ten Slots
 - No built in Graphics, Ethernet or Disk controllers
- **Remote Management Console (RMC)**

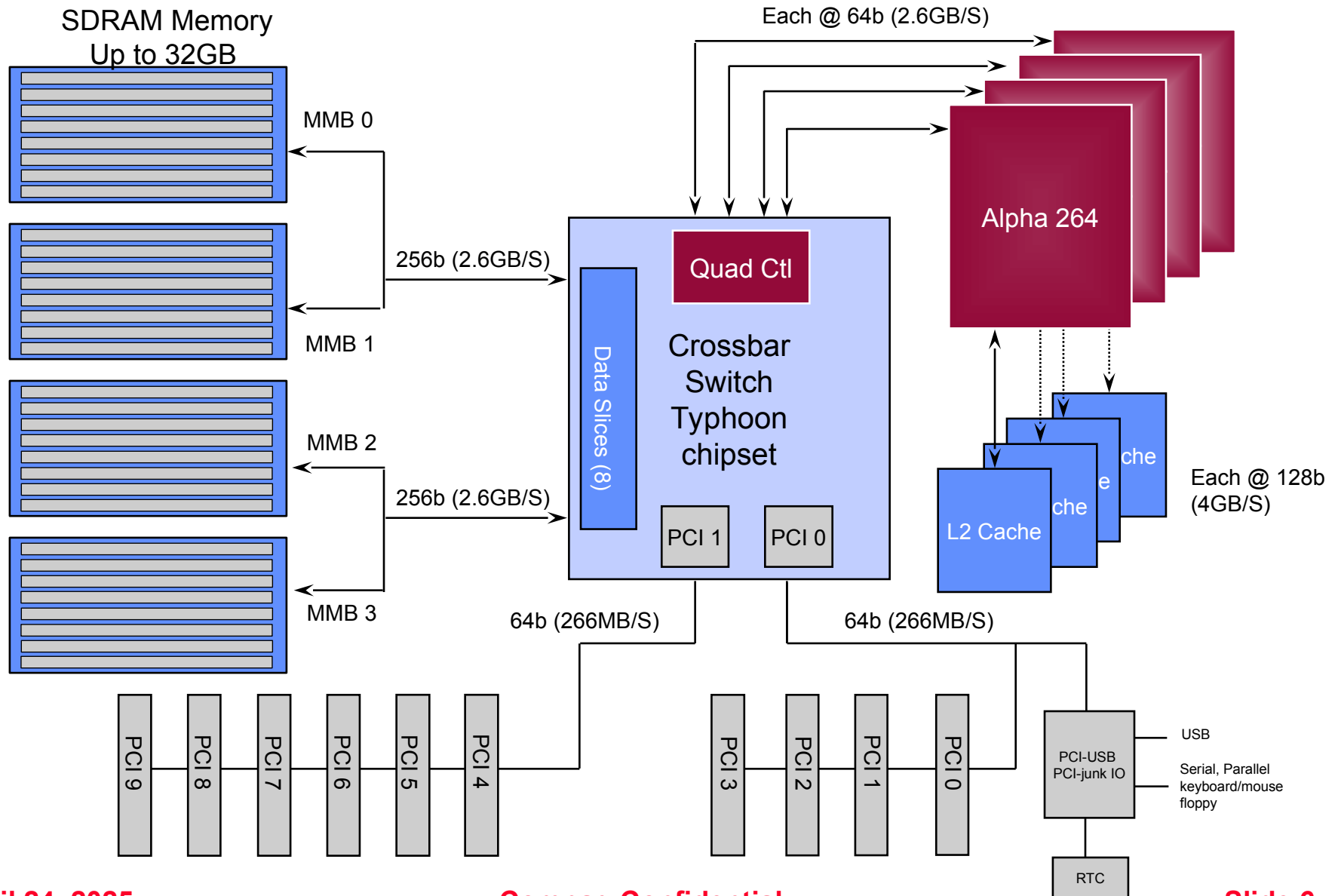
System Availability

- **Hot Swap Power Supplies**
- **N+1 Redundancy Power Supplies**
- **Hot Swap and Redundant Fans**
 - **Operating System Alerted if Fan stops**
- **ECC Memory and Cache**
- **CPU Failover**
 - **Primary = first good CPU**

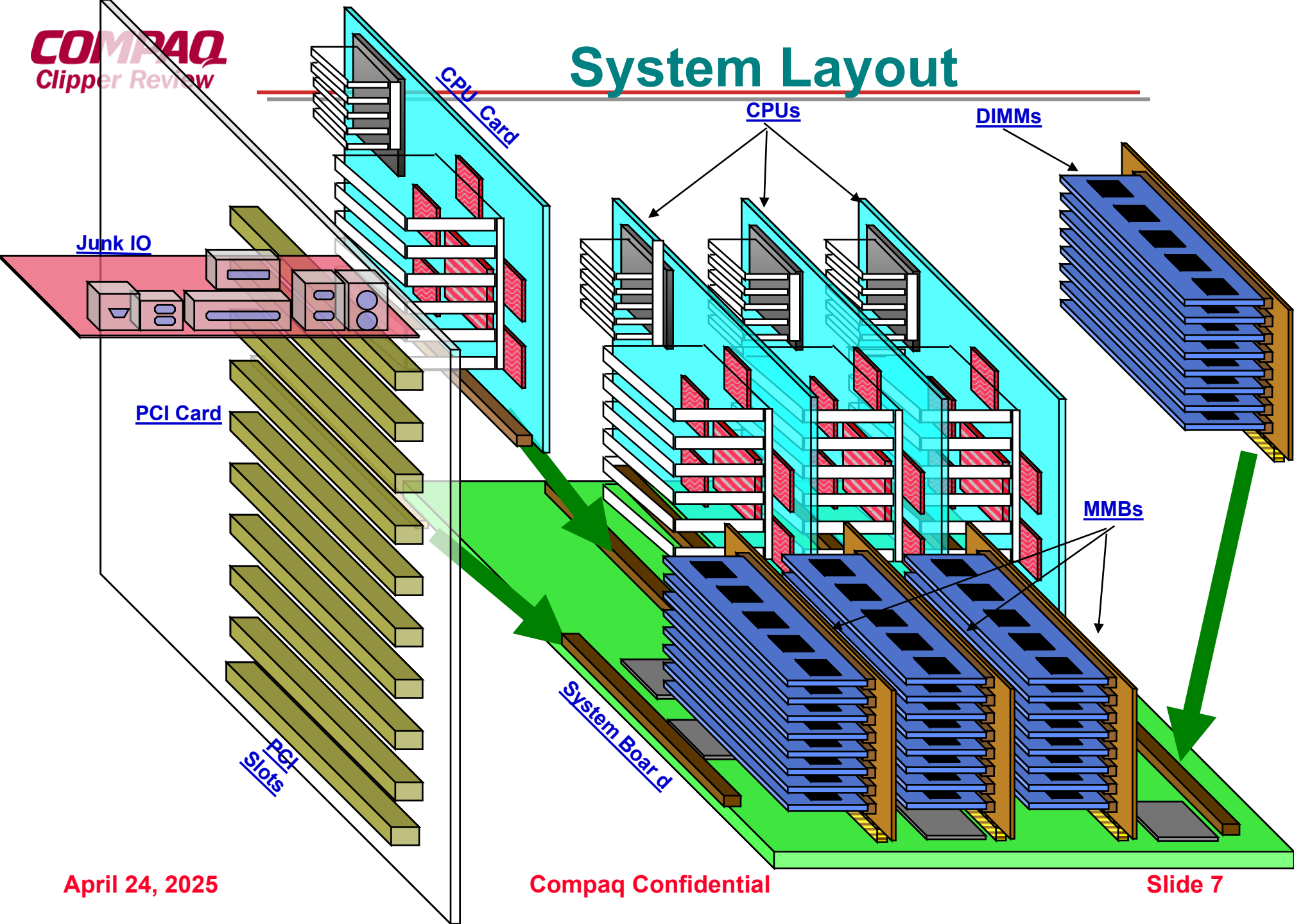
Diagnose before Dispatch

- All Errors Logged
- Compaq Analyze determines FRU
- Compaq Analyze writes failing syndrome to FRU
- All FRUs (<\$40) contain EEPROMs for info and syndrome
- RMC takes soft copy of all EEPROMS on power-up
- RMC's copy available remotely

System Block Diagram



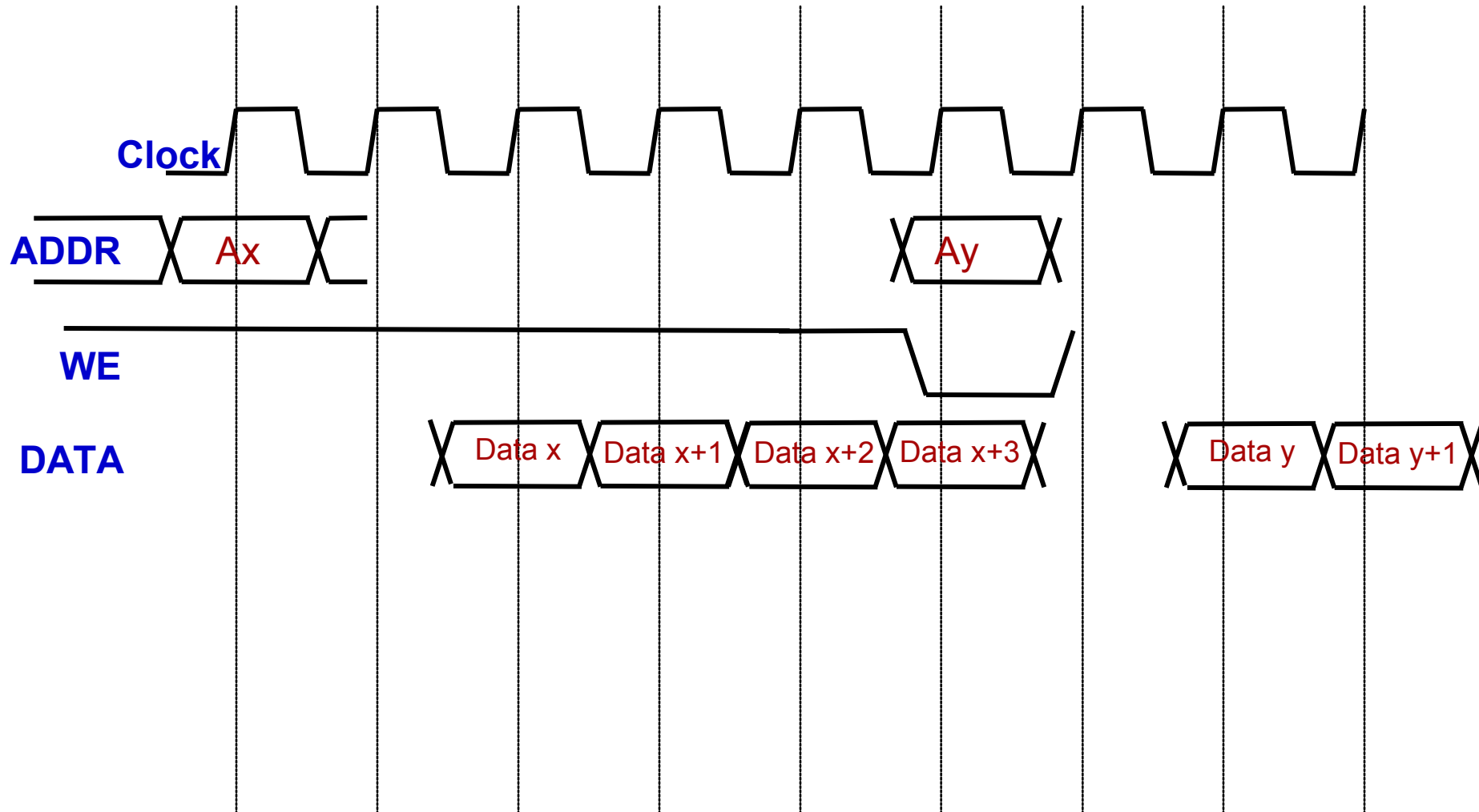
System Layout



- CPU = 500 MHz
- Cache - Late Write
 - Command/Address
 - 200 MHz pipelined
 - Data
 - 200 MHz
 - 144 Bits
 - 4 GBytes/sec max

Cache Read/Write Timing

200 MHz, Burst Length = 4

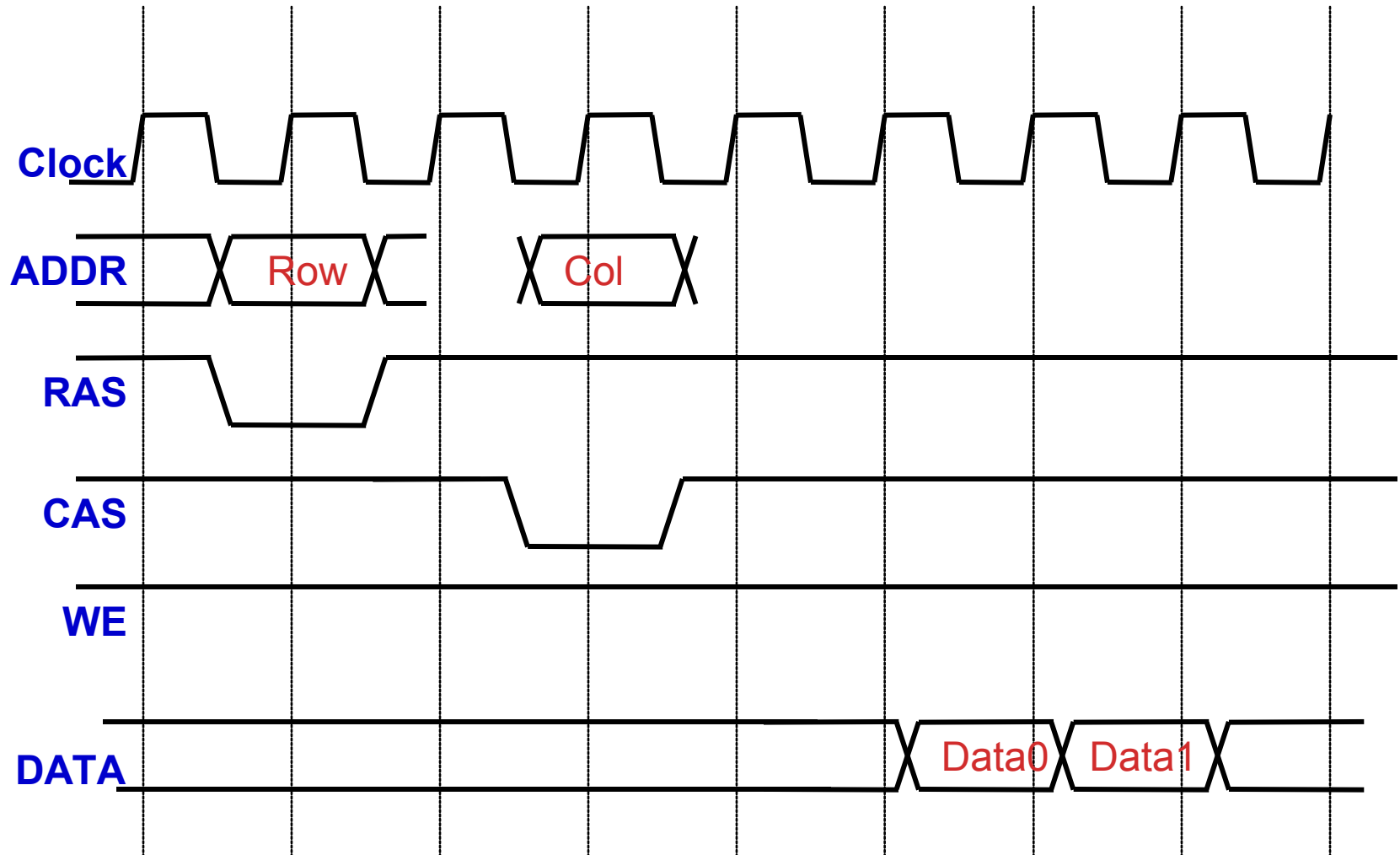


- **System Interface**
 - **Command/Address**
 - 333 MHz clock forwarded (4 data bits per System Clock)
 - Forwarded Clock = 166 MHz (transfer data on both edges)
 - 13 Bits - Time multiplexed = 52 bits total
 - Unidirectional = 166 MCommands/sec max
 - **Data**
 - 333 MHz clock forwarded (4 data bits per System Clock)
 - Forwarded Clock = 166 MHz (transfer data on both edges)
 - 72 Bits (bidirectional)
 - 2.6 GBytes/sec max
- **Typhoon Internal = 83 MHz**

- **MEMx Bus**
 - CAS Latency = 2
 - 83 MHz
 - 288 Data Bits
 - 2.6 GBytes/sec

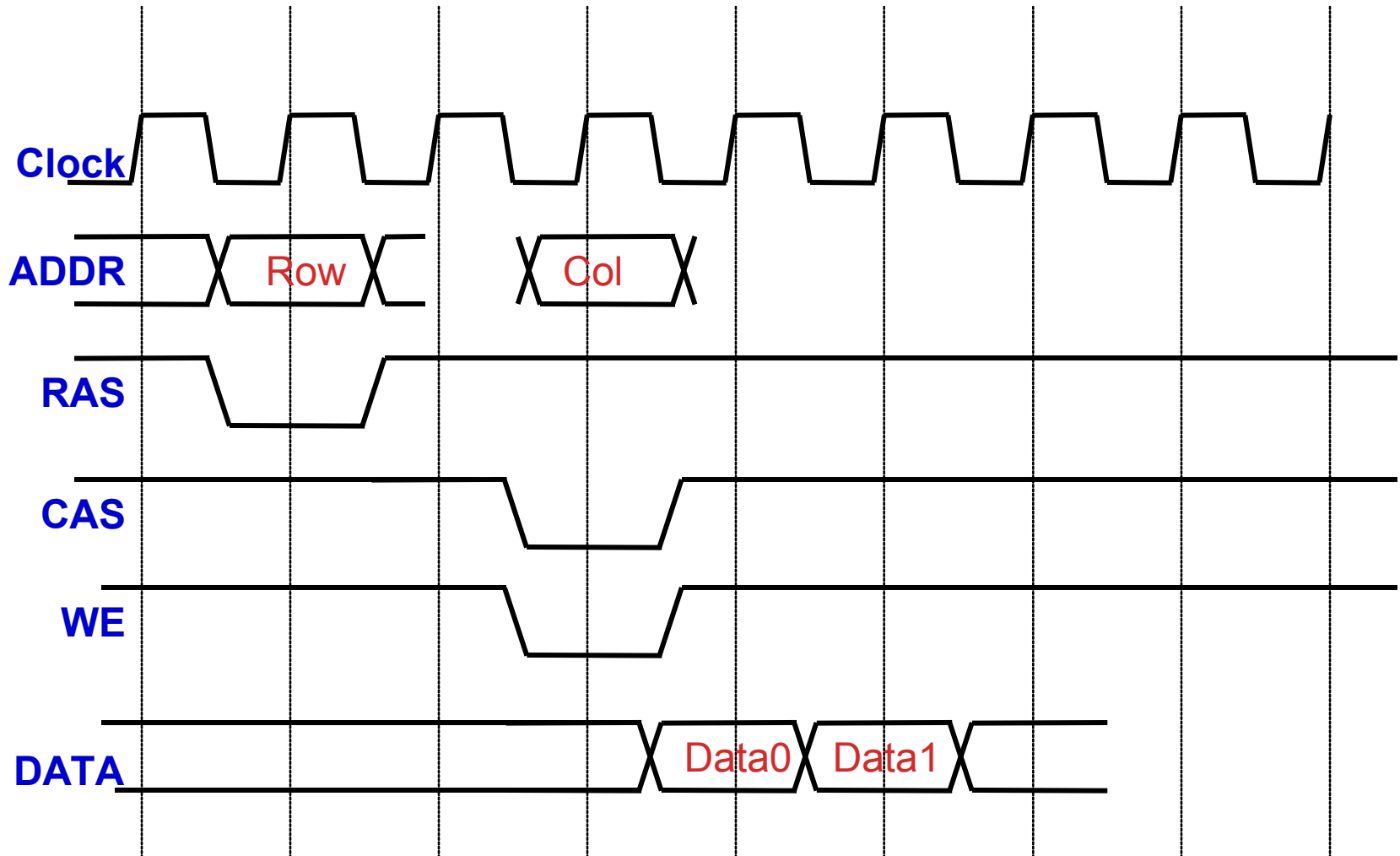
Memory Read Timing

83 MHz, CAS Latency = 2, Burst Length = 2



Memory Write Timing

83 MHz, CAS Latency = 2, Burst Length = 2



- **PADx Bus**
 - 83 MHz synchronous
 - 40 Bits - Time multiplexed (72 bits at 41.6 MHz)
 - 333 MBytes/sec

- **PCI Bus**
 - 33 MHz
 - 64 Data Bits
 - 266 MBytes/sec