

PDIUSB12 Features

- Integrated SIE, FIFO memory, transceiver and voltage regulator.
- High speed parallel interface with DMA support.
- Low cost 6MHz crystal oscillator with low EMI.
- Double buffering on main endpoint.
- *SoftConnect*™ and *GoodLink*™.
- DIP28, SO28 and TSSOP28 Packages

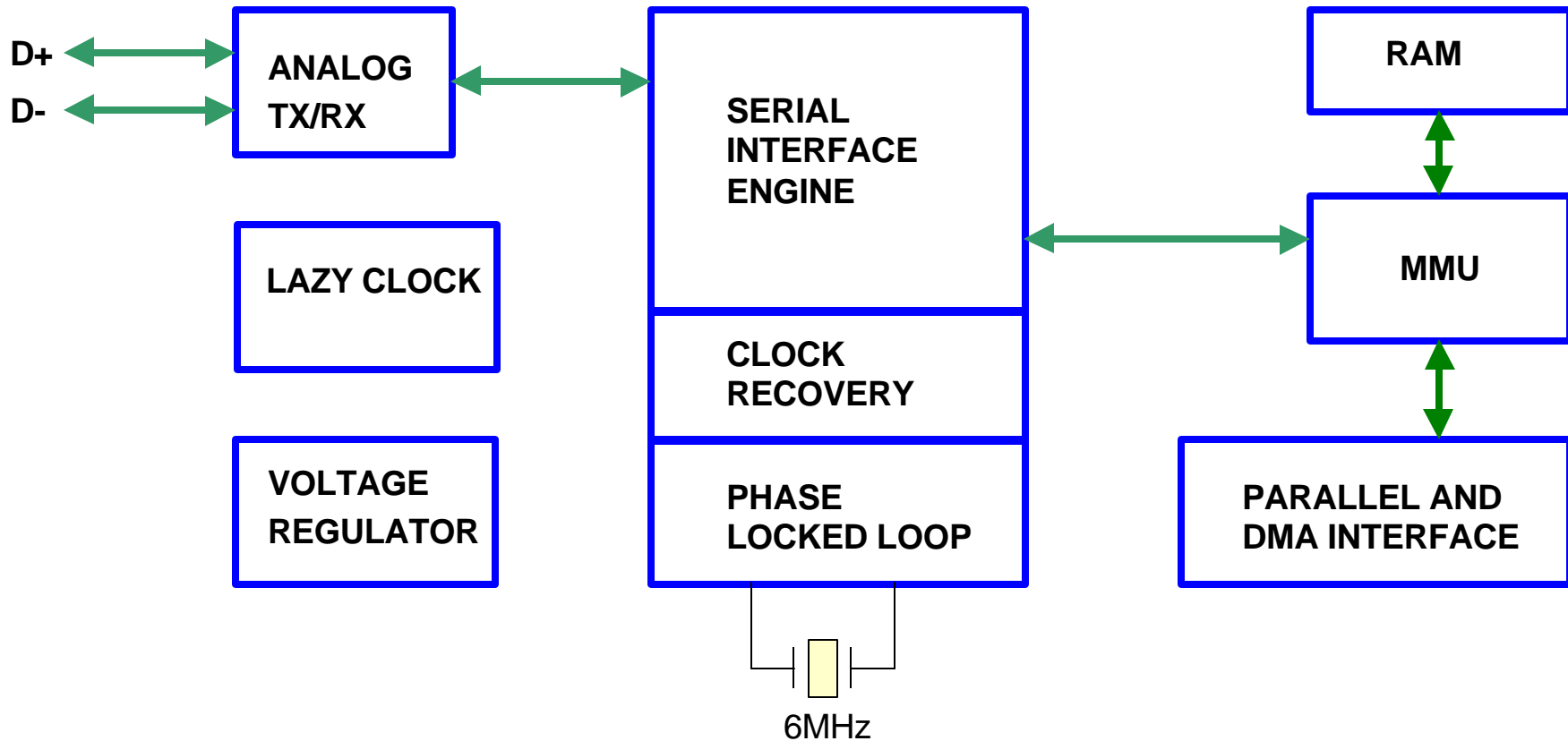
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Pin Description

- **Power and clock**
 - * **VCC, GND, VOUT3.3, XTAL1-2, CLKOUT**
- **USB interface and status**
 - * **D+, D-, SUSPEND, GL**
- **CPU interface**
 - * **DATA0-7, A0, ALE, CS, INT, RD, WR, RESET**
 - * **DMREQ, DMACK, EOT**

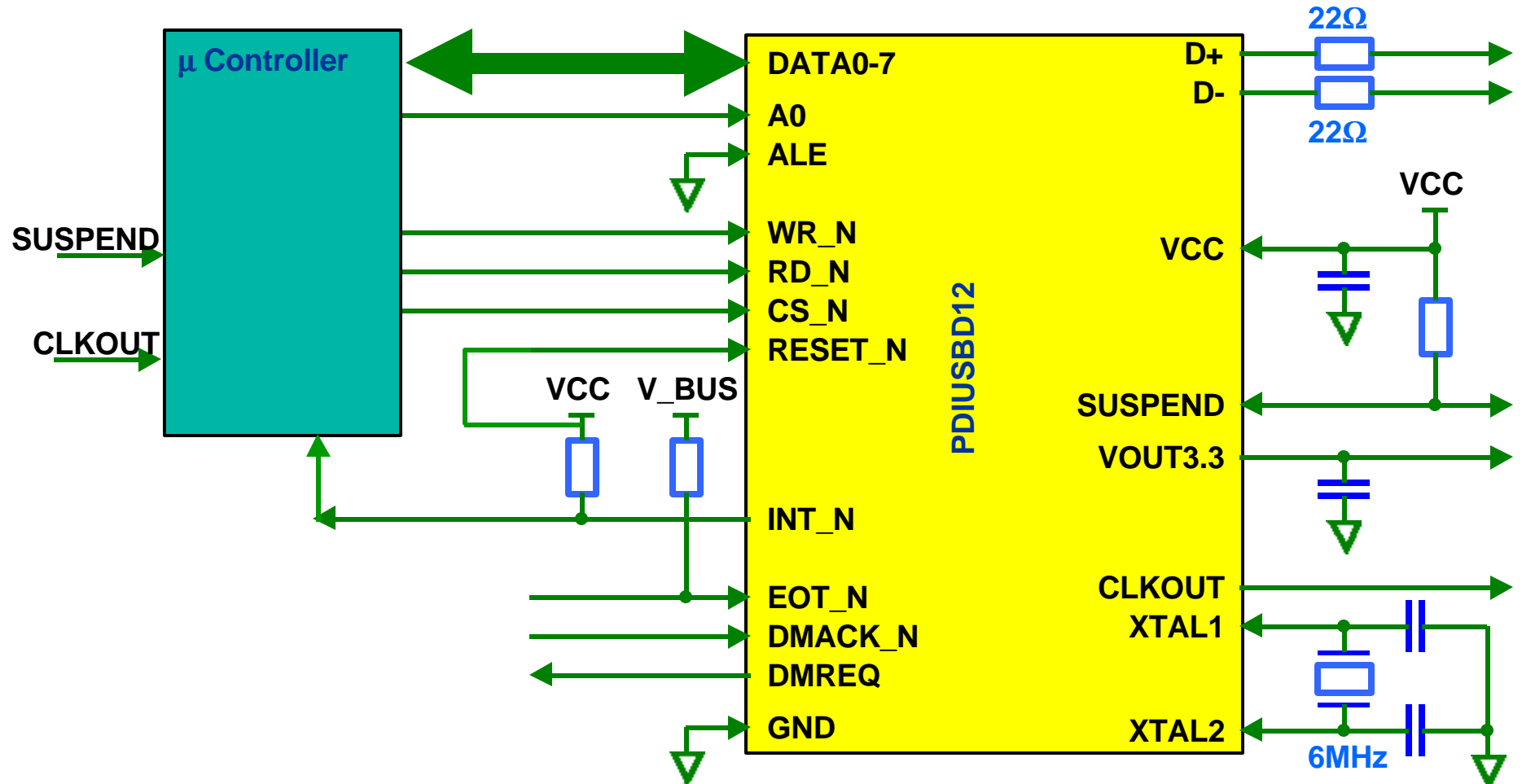
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Internal Block Diagram



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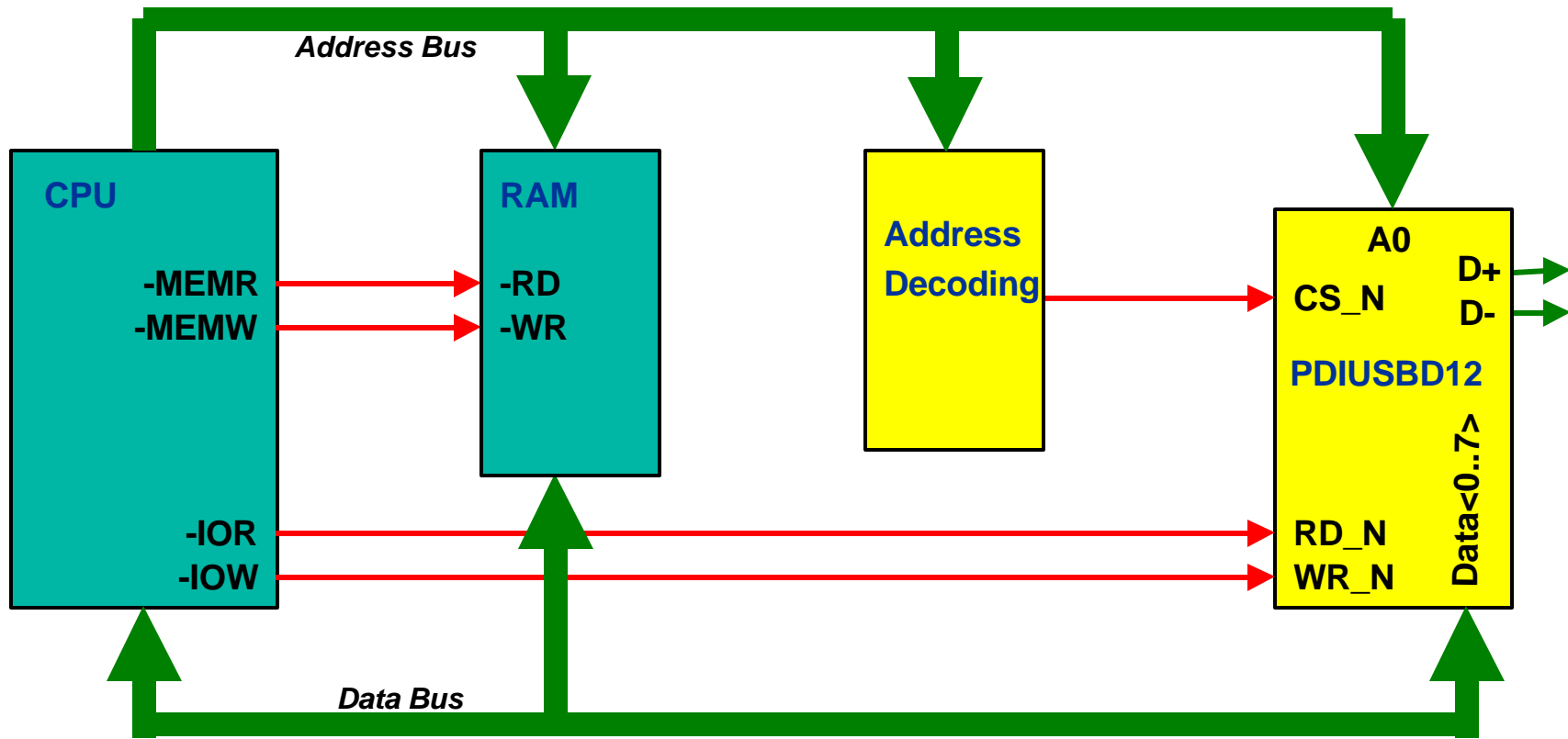
Interface (Minimum System)



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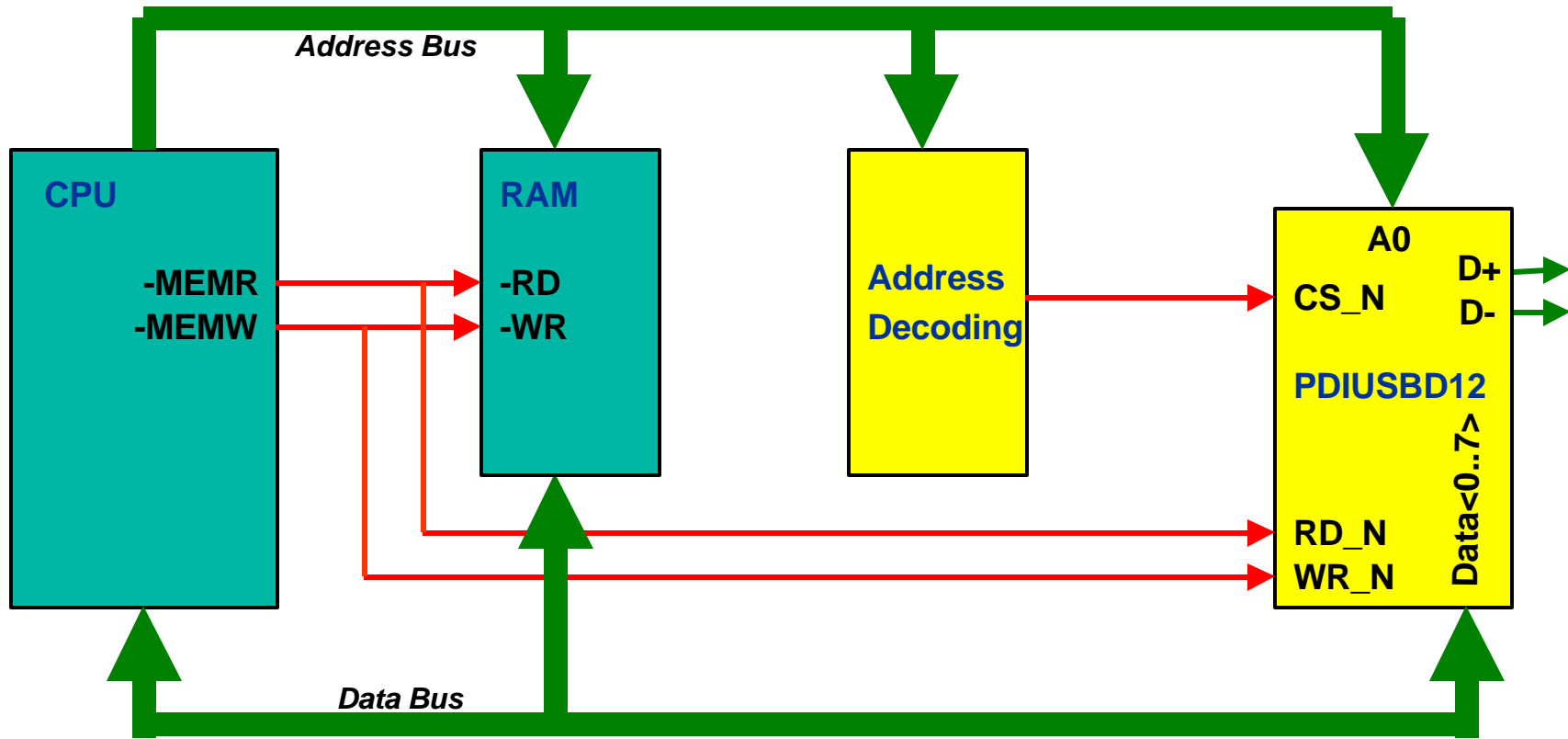
Using D12 - Non-DMA, Separate Address/Data Bus, IO Mapped



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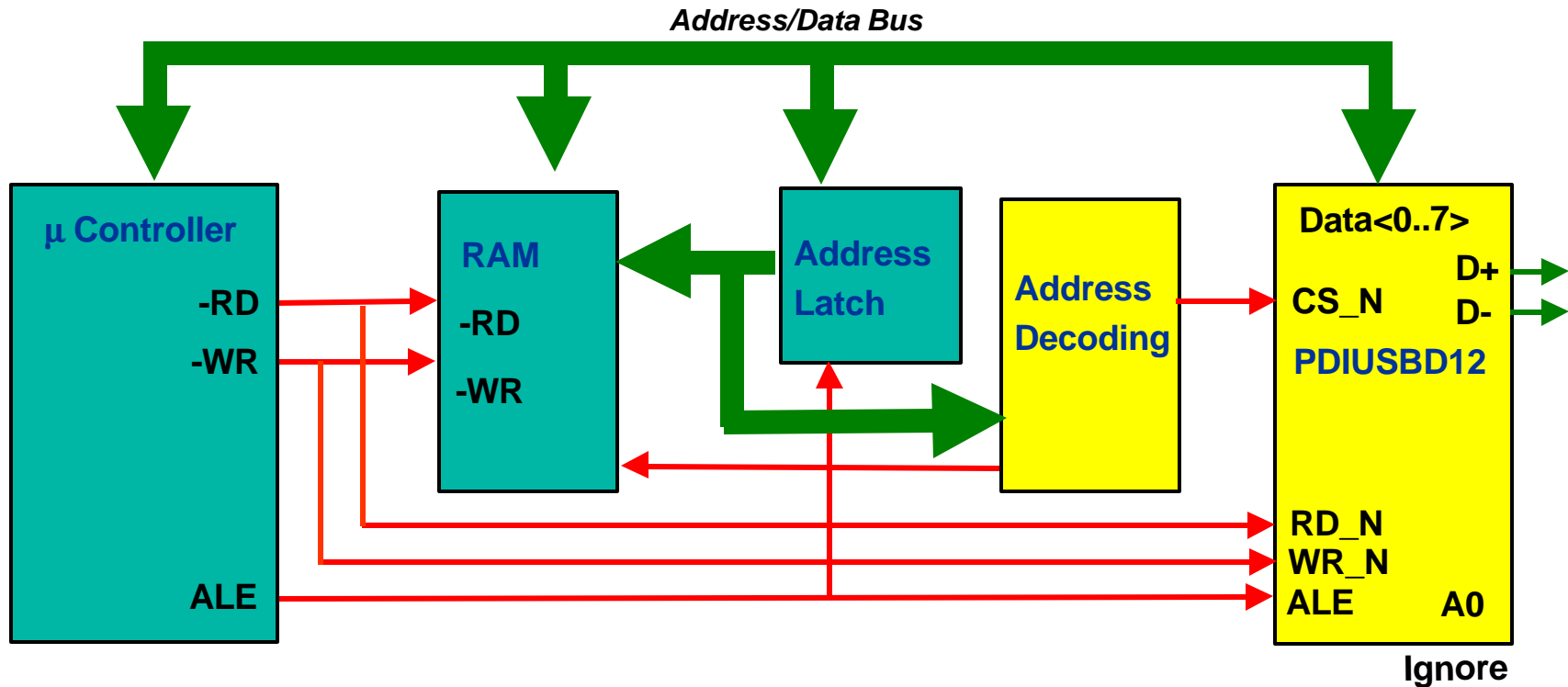
Using D12 - Non-DMA, Separate Address/Data Bus, Memory Mapped



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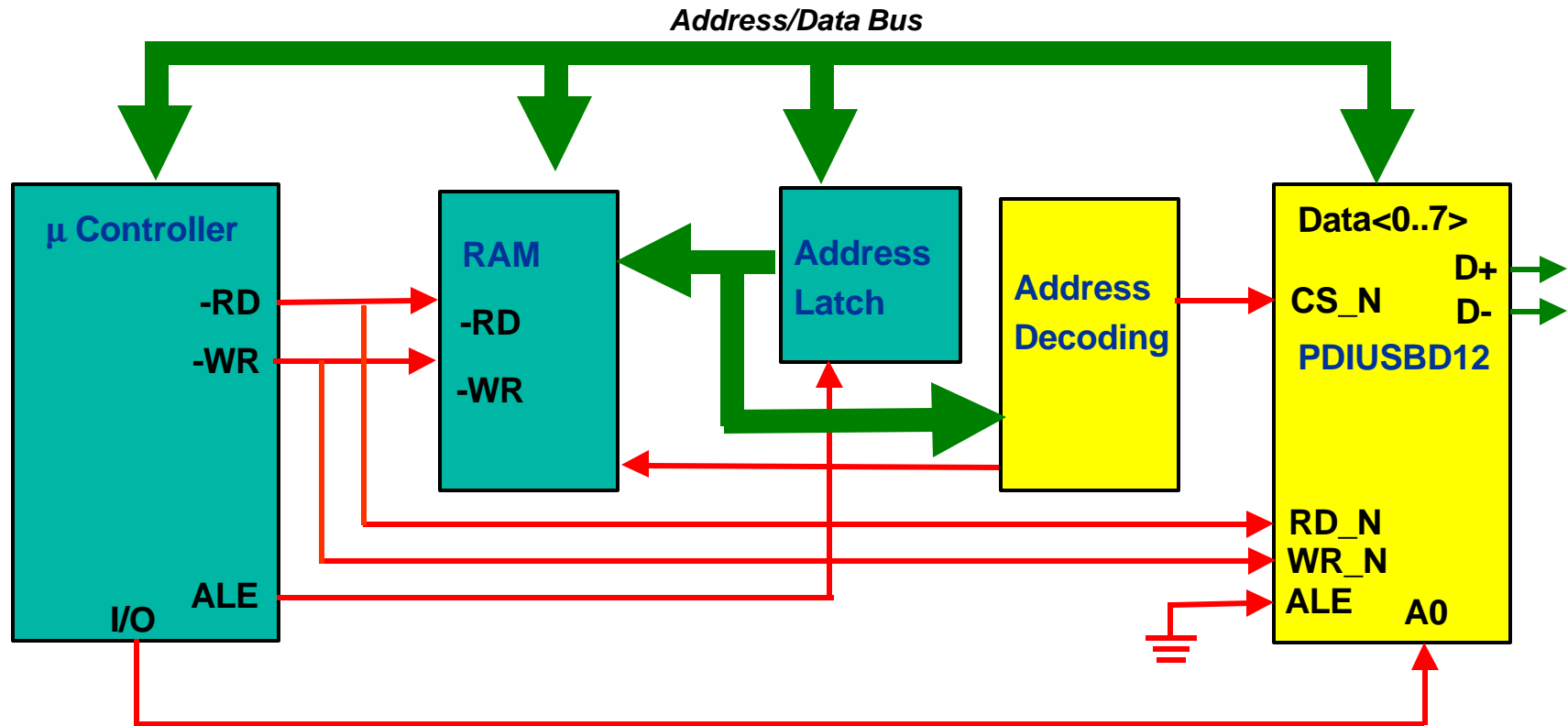
Using D12 - Non-DMA, Multiplexed Address/Data Bus, Memory Mapped



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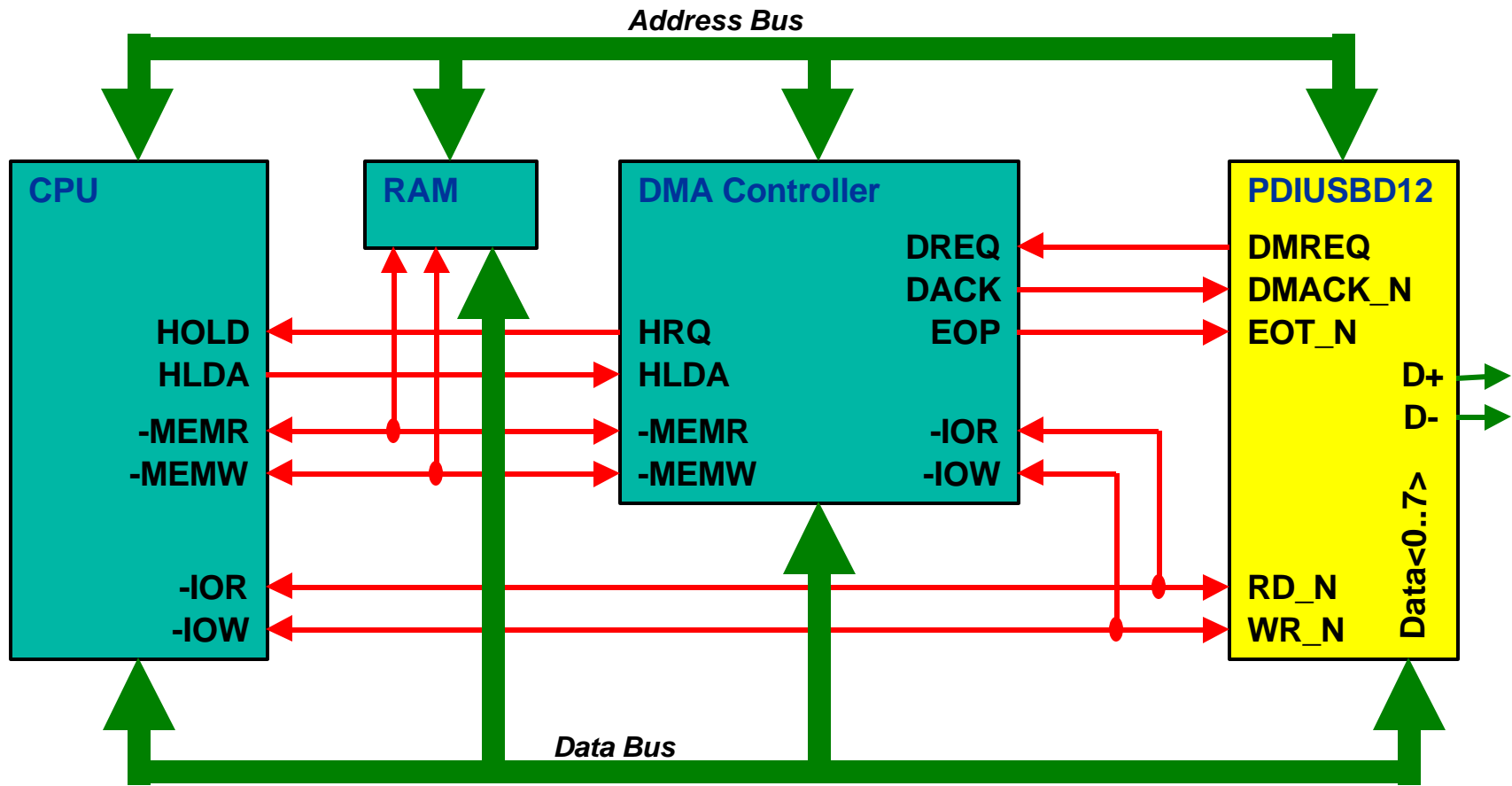
Using D12 - Non-DMA, Multiplexed Address/Data Bus, Memory Mapped



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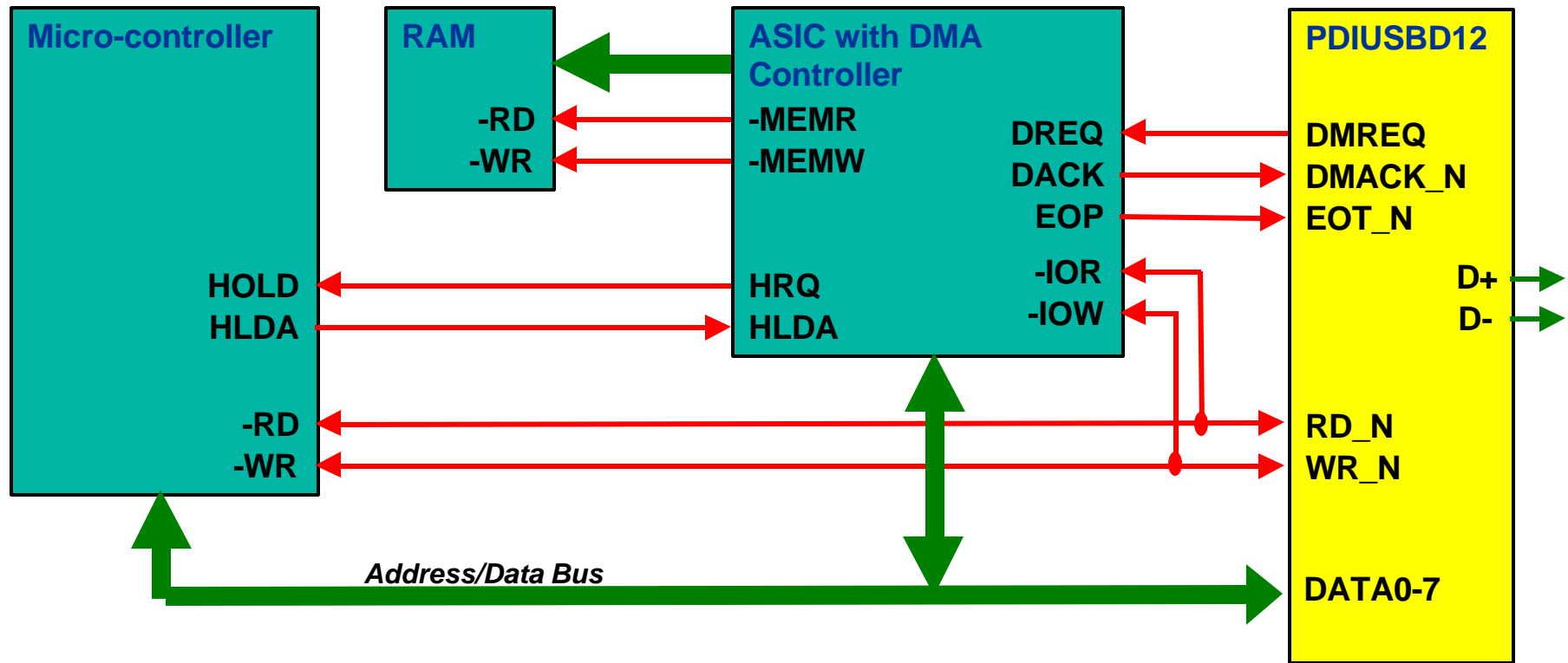
Using D12 - CPU and ASIC DMA with



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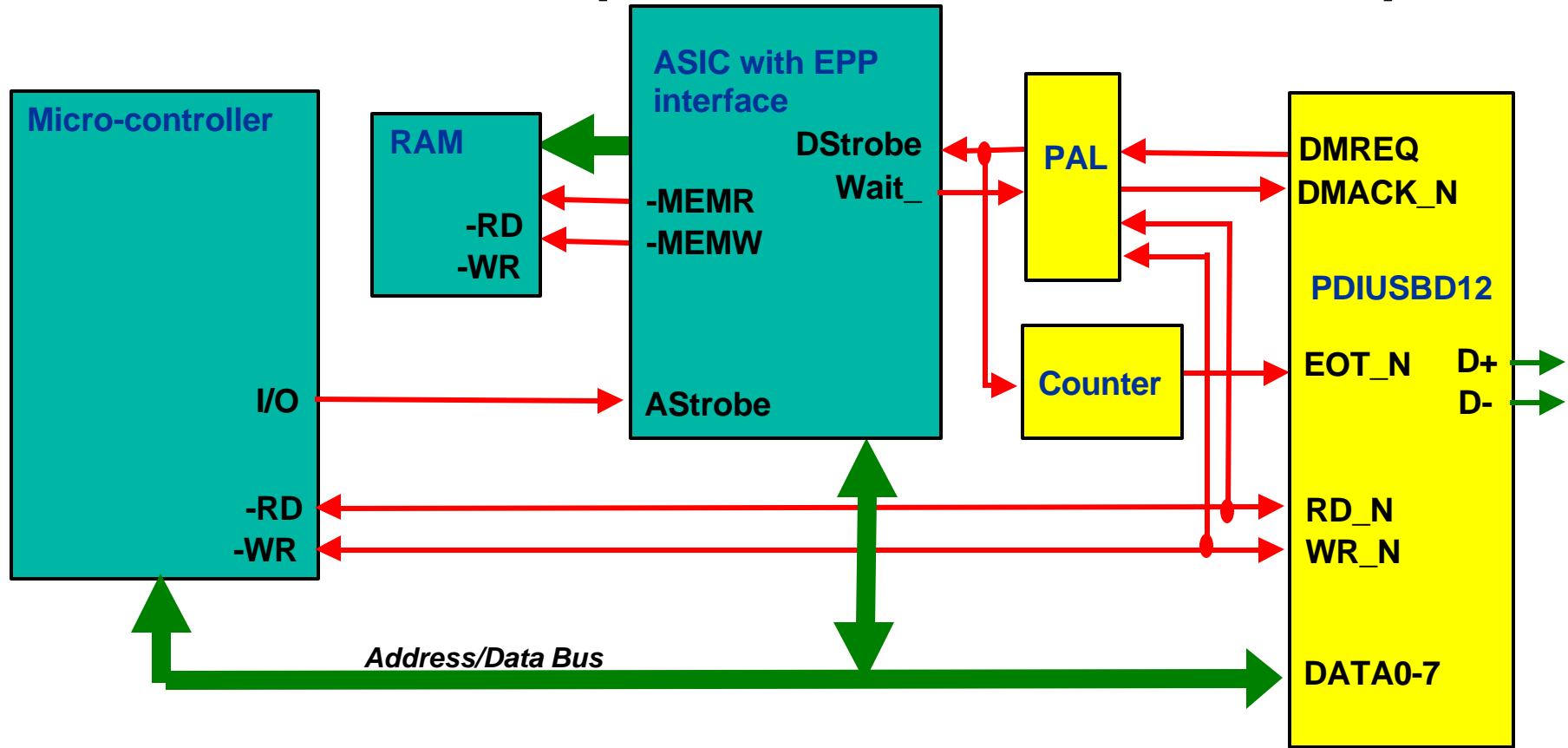
Using D12 - μ Controller and ASIC with DMA interface



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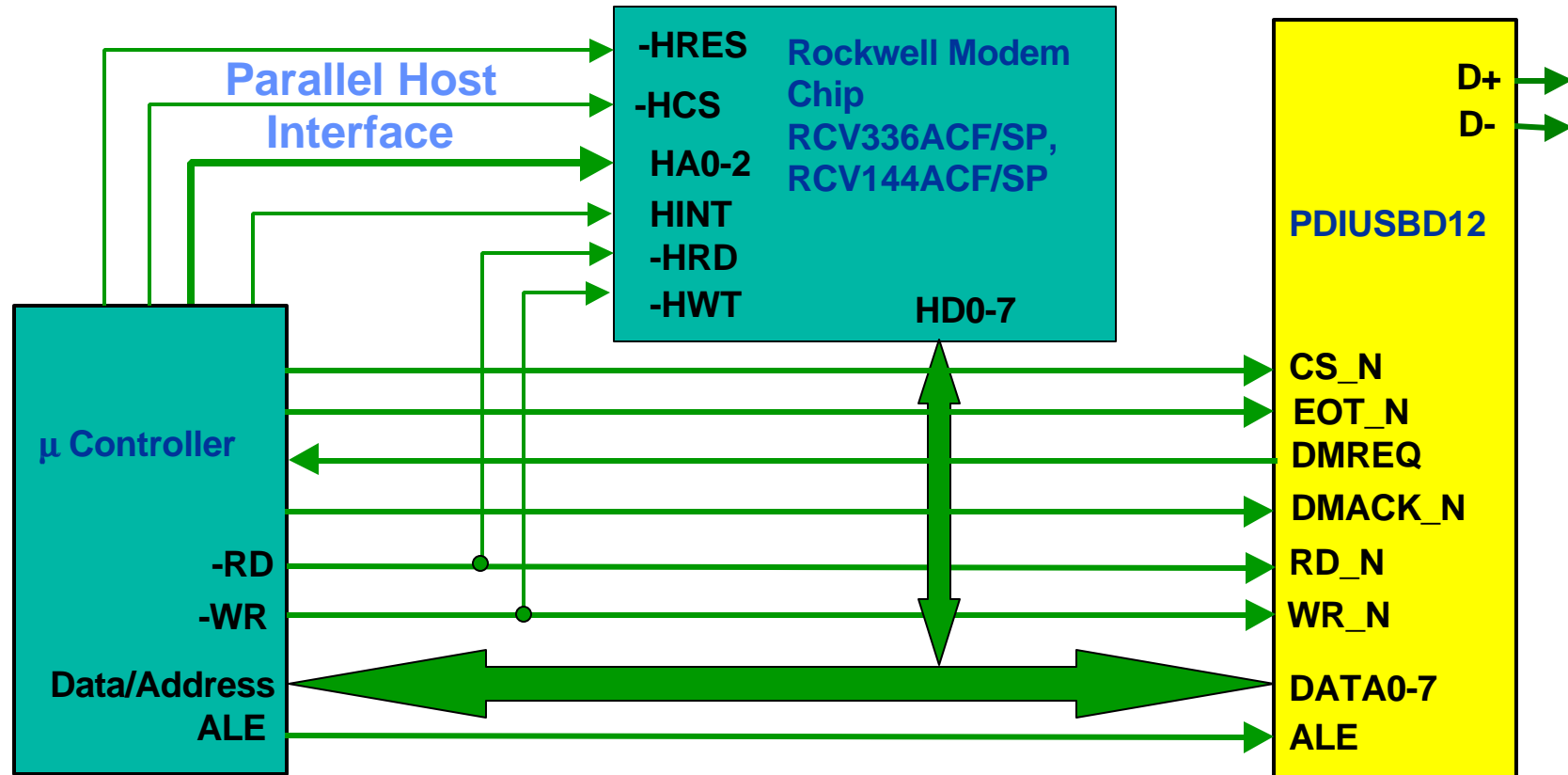
Using D12 - μ Controller and ASIC with EPP interface (Scanner Architecture)



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Using D12 - μ Controller and Parallel Host Bus interface (Modem Architecture)



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Endpoint Modes (On Configuration byte)

- **Non-ISO mode**
 - * **Mode 0**
- **ISO mode**
 - * **Mode 1: Isochronous output only**
 - * **Mode 2: Isochronous input only**
 - * **Mode 3: Isochronous input and output**

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Mode 0

| Endpoint Number | Endpoint Index | Direction | Transfer Type | Max Packet Size |
|-----------------|----------------|-----------|---------------|-----------------|
| 0 | 0 | OUT | Control Out | 16 |
| | 1 | IN | Control In | 16 |
| 1 | 2 | OUT | Generic Out | 16 |
| | 3 | IN | Generic In | 16 |
| 2 | 4 | OUT | Generic Out | 64 |
| | 5 | IN | Generic In | 64 |

Notes:

1. Double buffering on endpoint 2.
2. Generic can be either interrupt or bulk.
3. Maximum data rate is 1.2 Mbytes/s for Bulk Transfer.

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Mode 1

| Endpoint Number | Endpoint Index | Direction | Transfer Type | Max Packet Size |
|-----------------|----------------|-----------|-----------------|-----------------|
| 0 | 0 | OUT | Control Out | 16 |
| | 1 | IN | Control In | 16 |
| 1 | 2 | OUT | Generic Out | 16 |
| | 3 | IN | Generic In | 16 |
| 2 | 4 | OUT | Isochronous Out | 128 |

Notes:

1. Double buffering on endpoint 2.
2. Generic can be either interrupt or bulk.
3. Maximum transfer rate is 128 bytes/packet, 1.28 Mbytes/s

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Mode 2

| Endpoint Number | Endpoint Index | Direction | Transfer Type | Max Packet Size |
|-----------------|----------------|-----------|----------------|-----------------|
| 0 | 0 | OUT | Control Out | 16 |
| | 1 | IN | Control In | 16 |
| 1 | 2 | OUT | Generic Out | 16 |
| | 3 | IN | Generic In | 16 |
| 2 | 5 | IN | Isochronous In | 128 |

Notes:

1. Double buffering on endpoint 2.
2. Generic can be either interrupt or bulk.
3. Maximum transfer rate is 128 bytes/packet, 1.28 Mbytes/s

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Mode 3

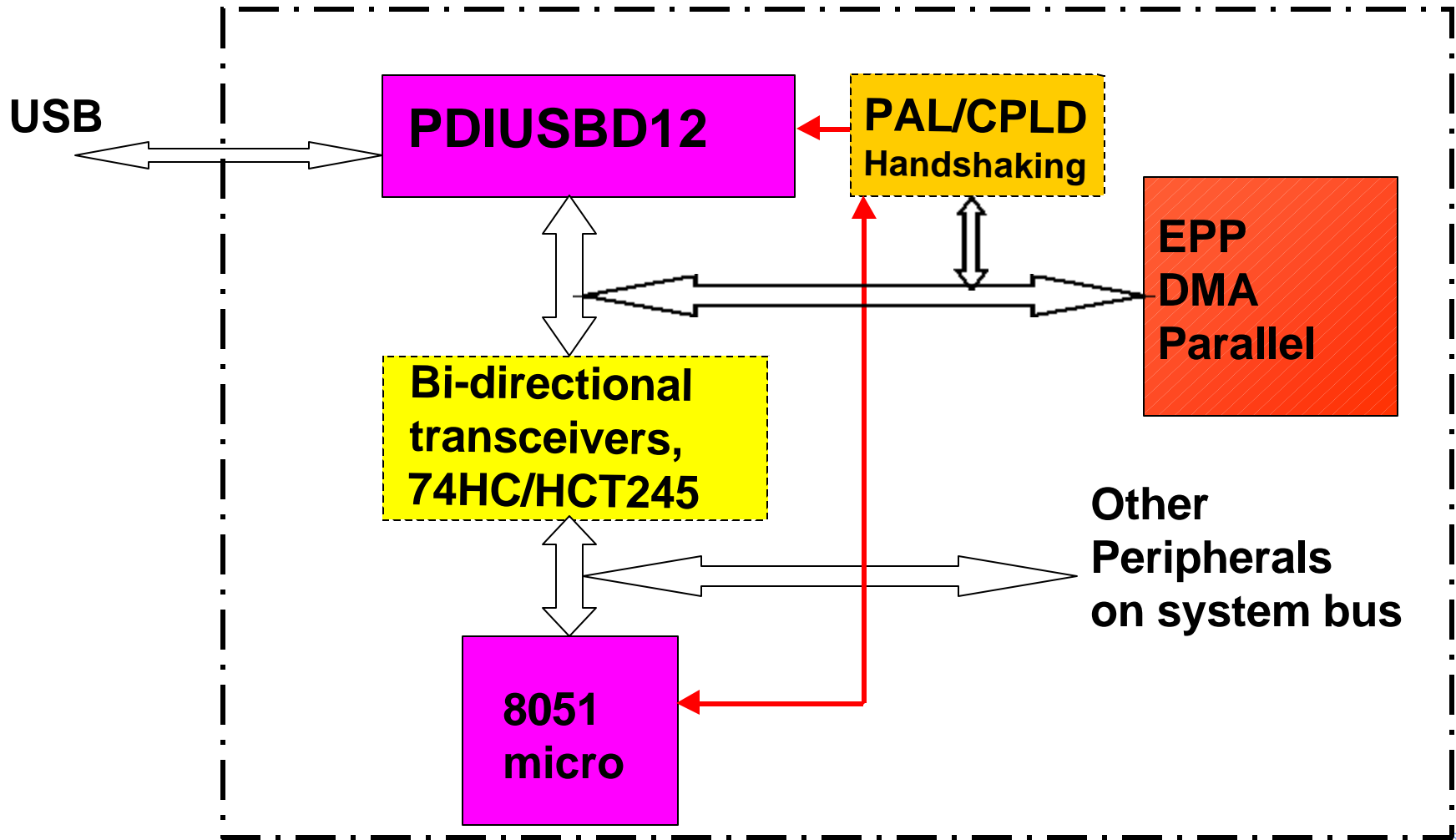
| Endpoint Number | Endpoint Index | Direction | Transfer Type | Max Packet Size |
|-----------------|----------------|-----------|-----------------|-----------------|
| 0 | 0 | OUT | Control Out | 16 |
| | 1 | IN | Control In | 16 |
| 1 | 2 | OUT | Generic Out | 16 |
| | 3 | IN | Generic In | 16 |
| 2 | 4 | OUT | Isochronous Out | 64 |
| | 5 | IN | Isochronous In | 64 |

Notes:

1. Double buffering on endpoint 2.
2. Generic can be either interrupt or bulk.
3. Maximum transfer rate is 64 bytes/packet per direction. Total 1.28Mbytes/s

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Commands Usage, Example 6 - DMA



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Speed Performance of D12

- **Parallel Port interface**

- **I/O read and write is 500 ns. 2 Mbyte/sec.**
Micro-controller read/writing speed is 2 us (8051).

Micro-

- **DMA Transfer interface is also 500 ns. 2 Mbyte/sec.**
No micro-controller intervention required.

- **USB interface**

- **Bulk (64bytes per packet max) - 1.2 Mbytes/sec.**

- **ISO (Bi-directional, 64 bytes/pac, 1023 bytes/pac max)**

- **ISO (Uni-directional, 128 bytes/pac, 1023 bytes/pac max)**
- 1.28Mbytes/sec.

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