

PSI3441 – Arquitetura de Sistemas Embarcados

Bus (Barramento)

Escola Politécnica da Universidade de São Paulo

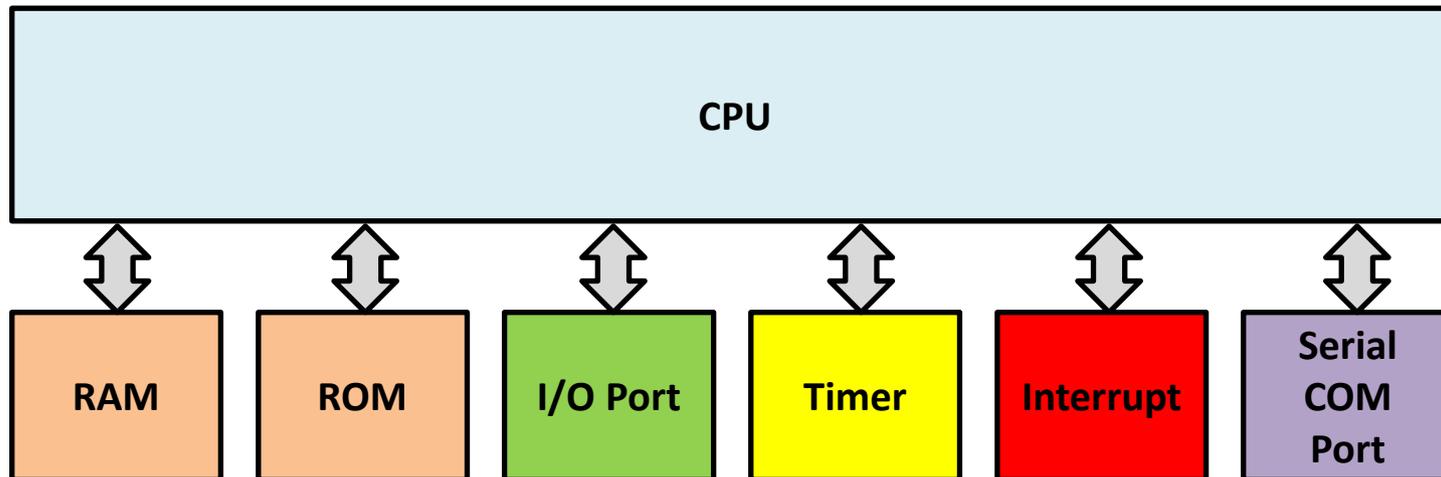
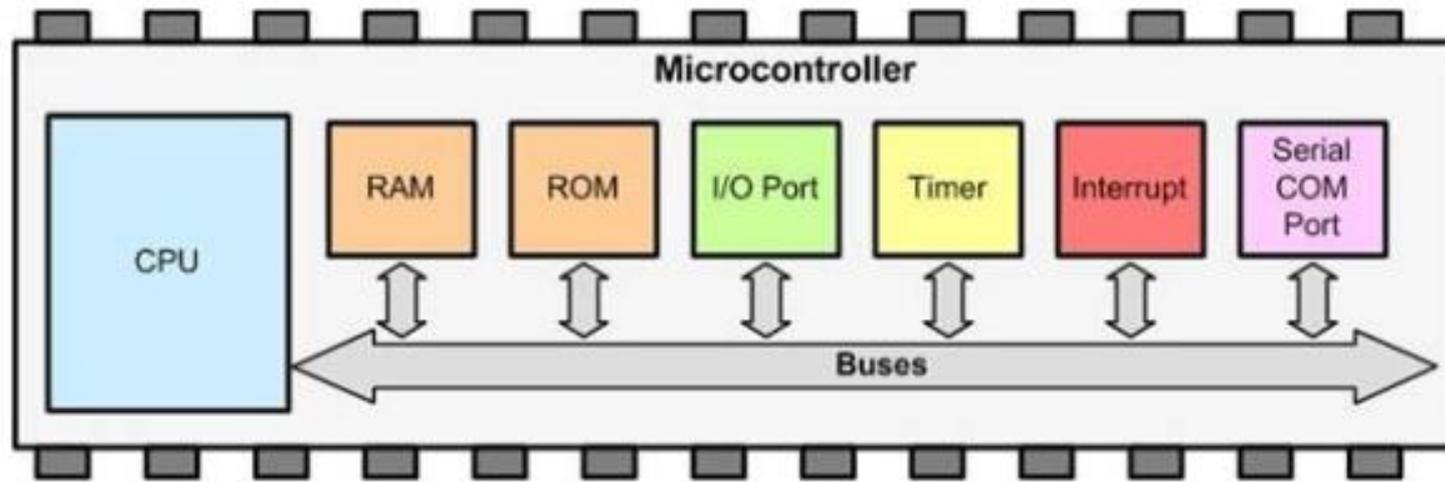
Prof. Gustavo Rehder – gprehder@usp.br



Primeiro Semestre de 2020



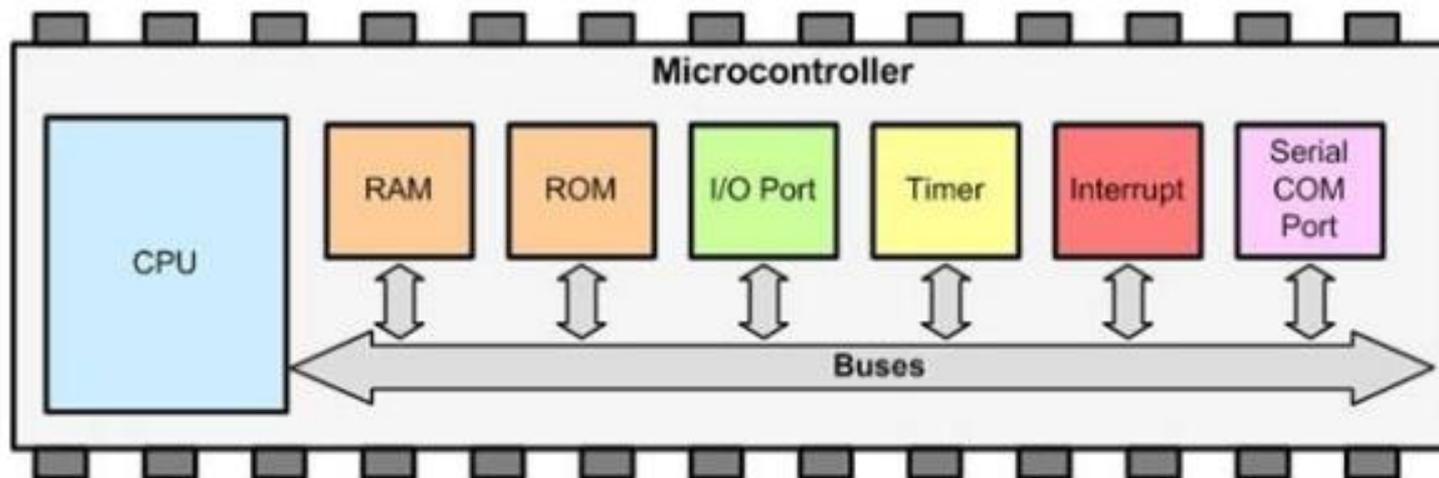
Por que os Microcontroladores usam Bus?





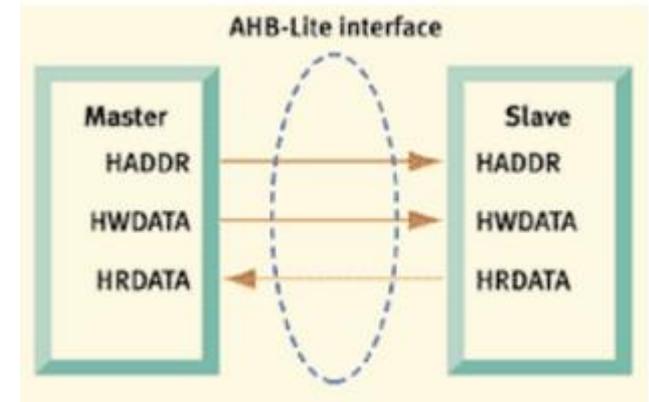
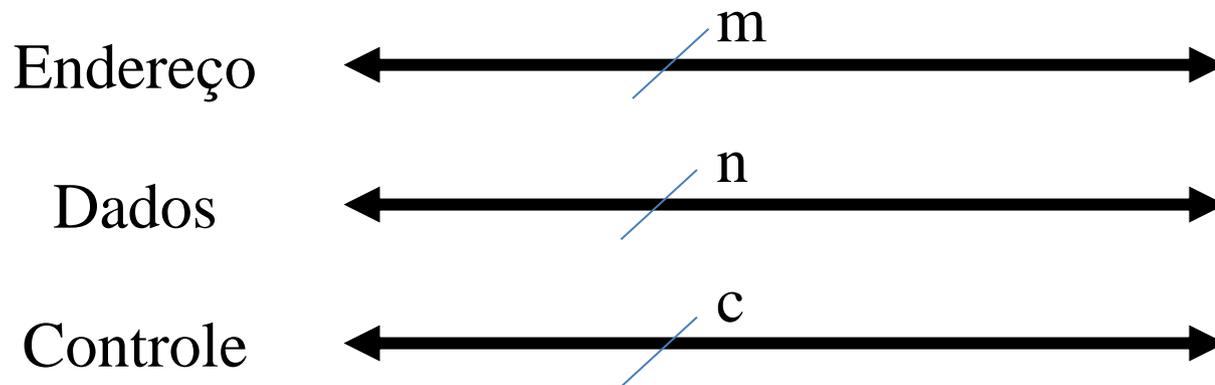
Bus (Barramento)

- Mecanismo com o qual o CPU comunica com a memória e dispositivos de I/O;
- Trilha (fios) em paralelo;
- Protocolo de comunicação entre dispositivos.





Estrutura de um Bus Genérico



- **Trilhas de Controle:**
 - Estabelece o protocolo de transição de dados
 - Requerimento e Reconhecimento de Sinais
 - Indica que tipo de informação esta nas trilhas de dados
- **Trilhas de Dados:**
 - Transporta Dados e Endereços da fonte para o destino (endereço são uma forma de dados)
 - Transporta comandos complexos



Estrutura simples de um Barramento – Port Mapped I/O

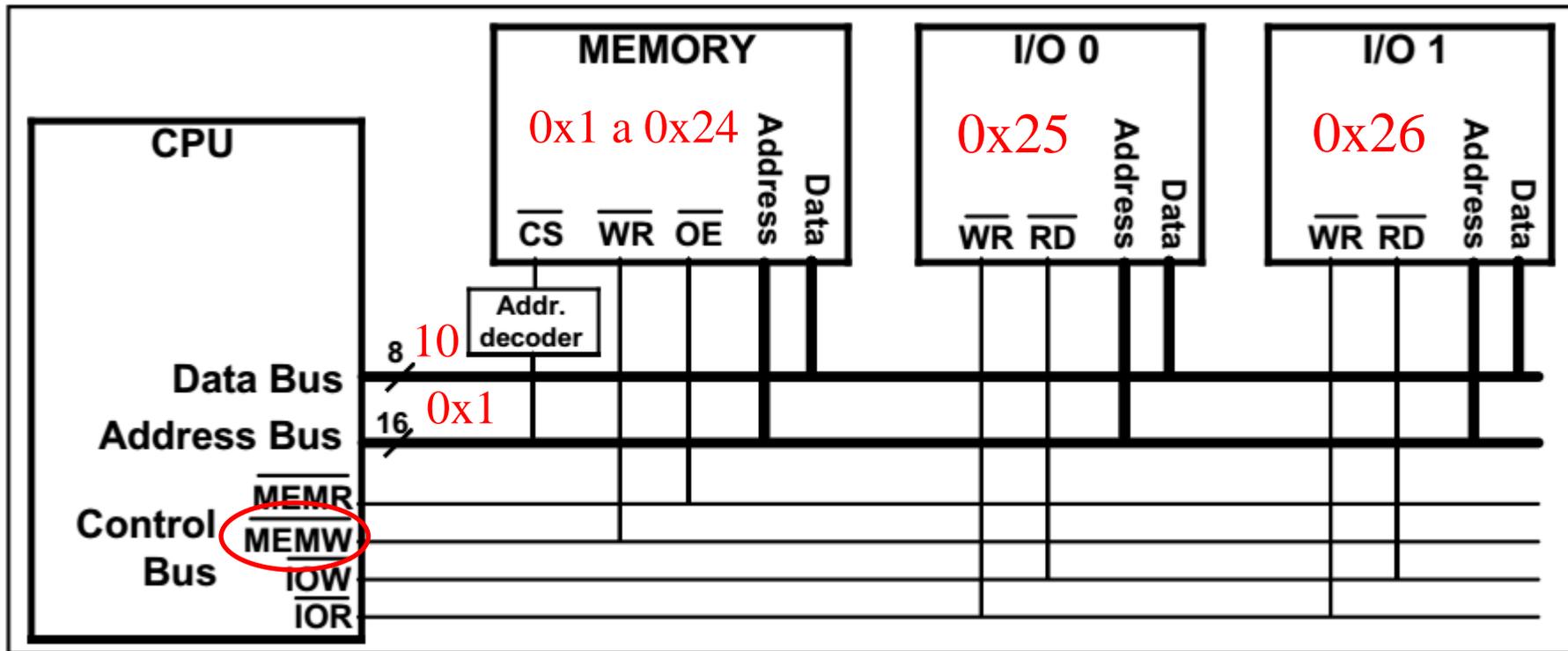
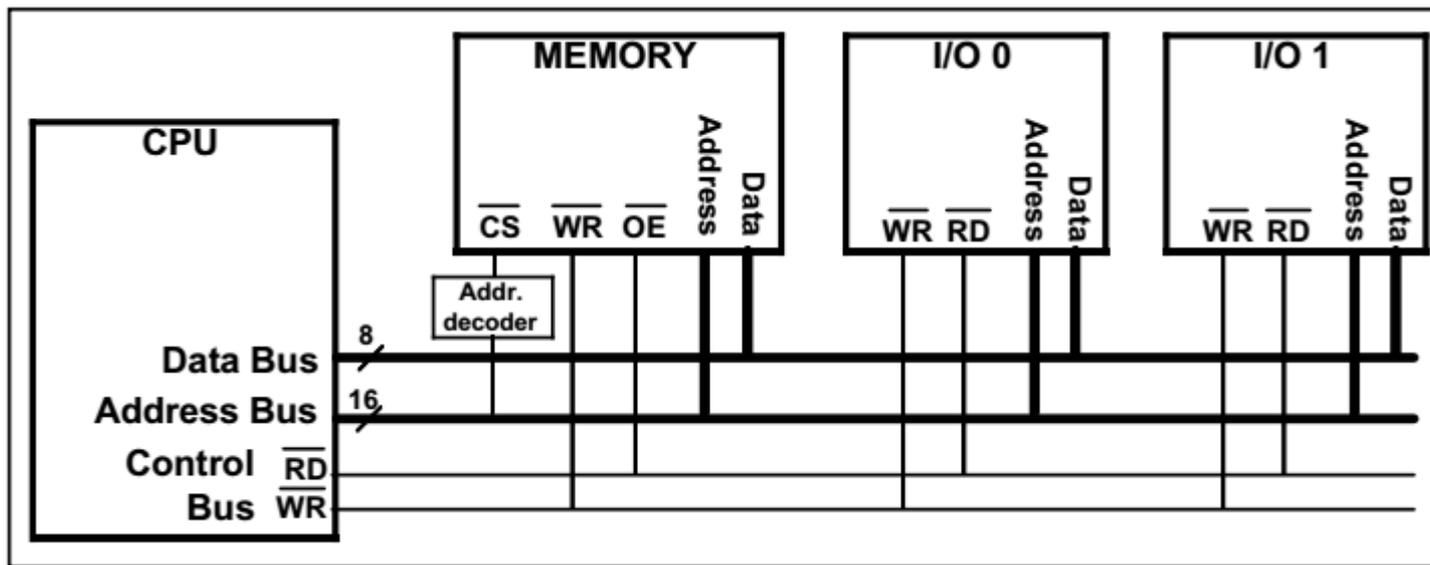


Figure 0-17. A Simple System Using Peripheral I/O



Estrutura simples de um Barramento – Memory Mapped I/O





Decodificação do Endereço - Memória

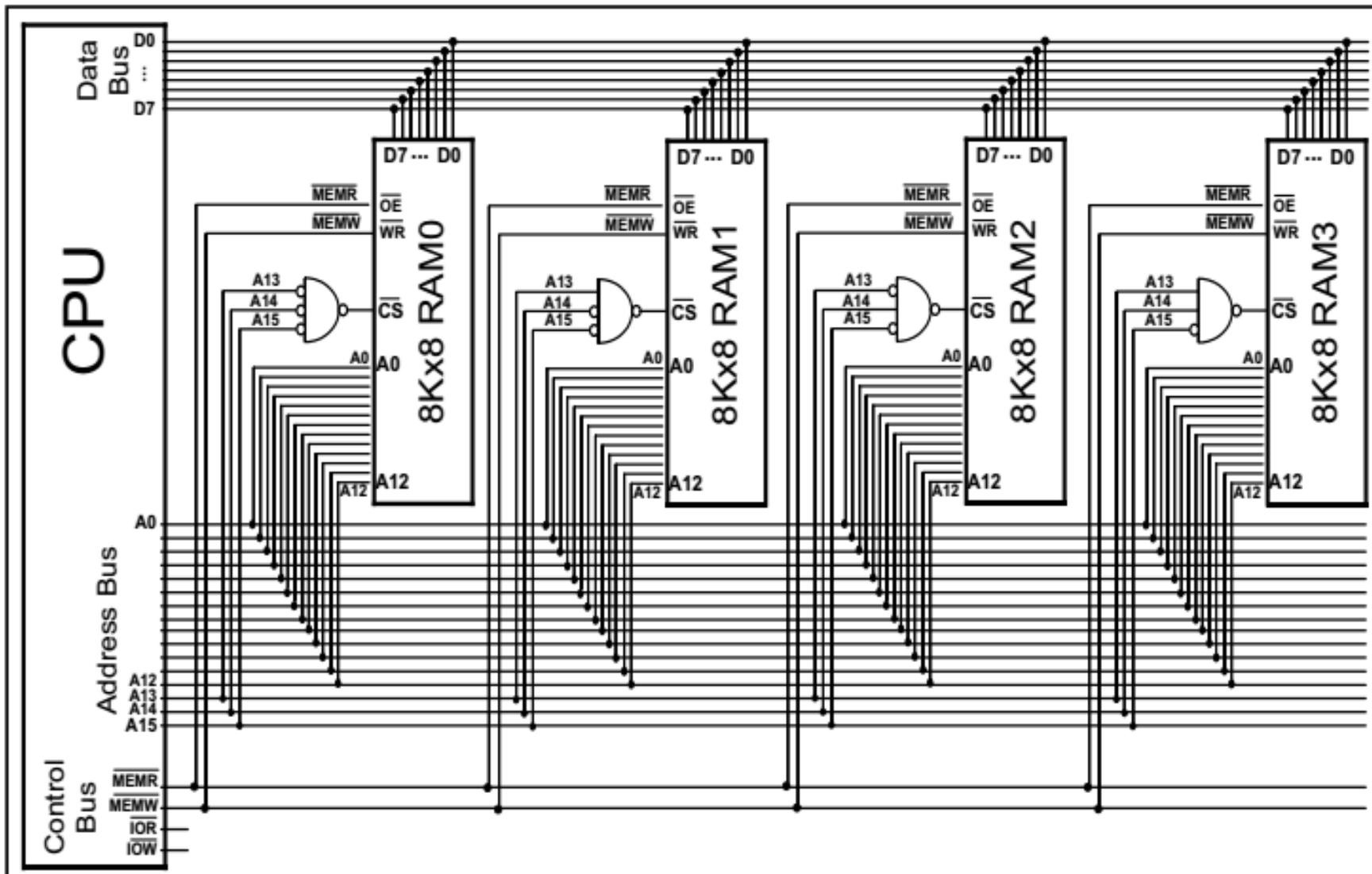


Figure 0-20. Connecting Four Memory Chips to the CPU

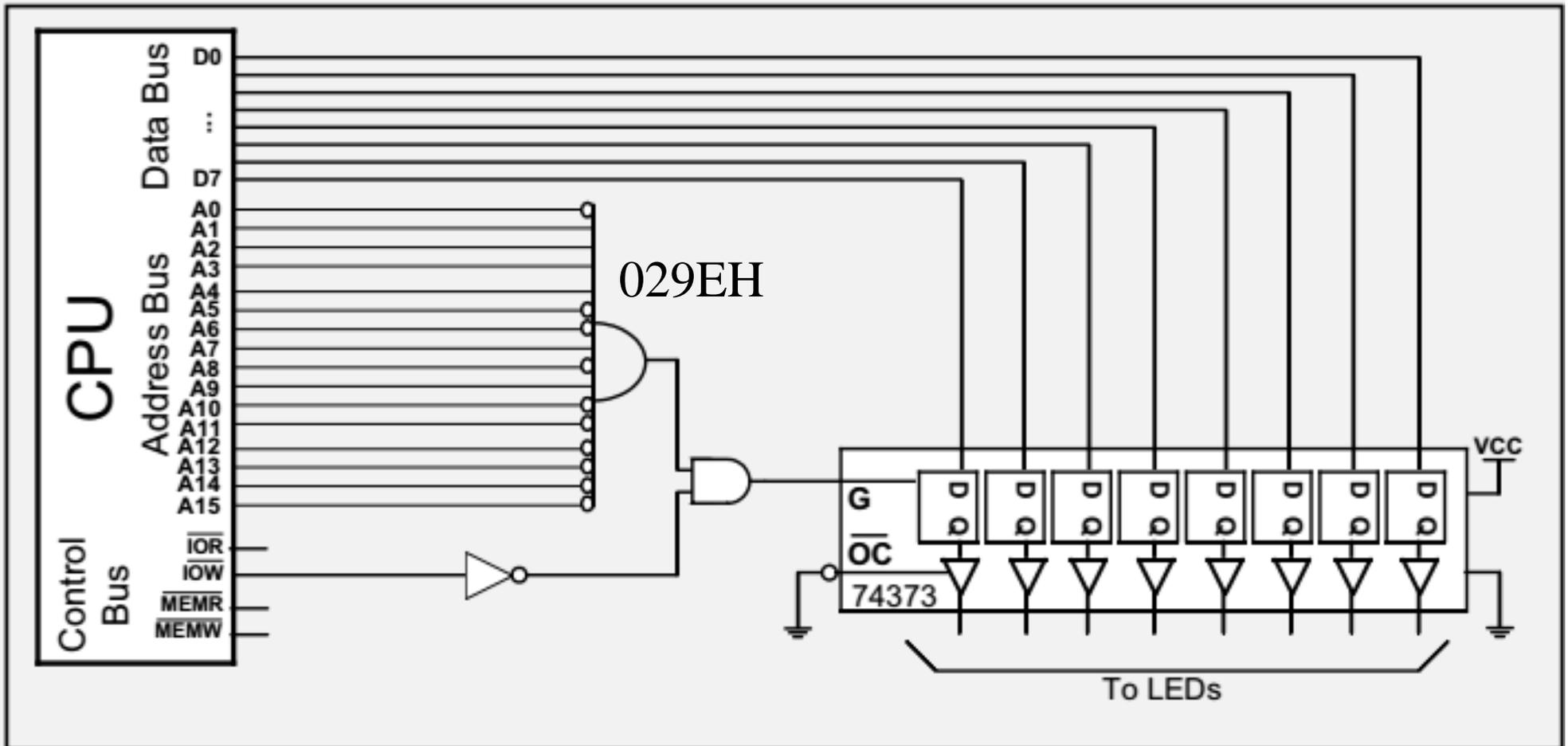
CS – Chip Select

OE – Output Enable

WR – Write Enable



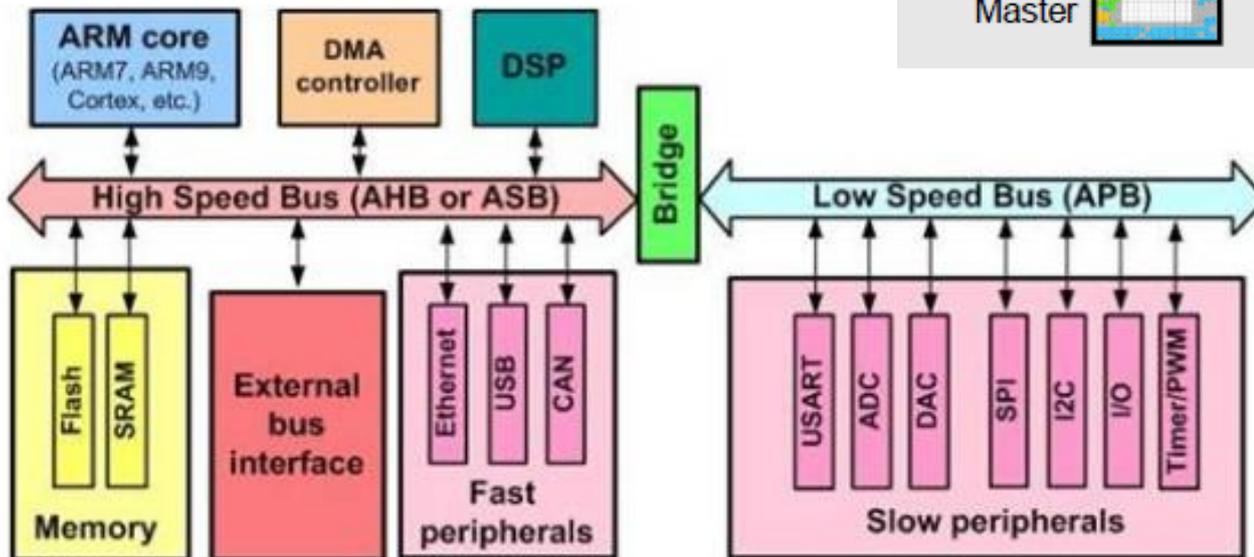
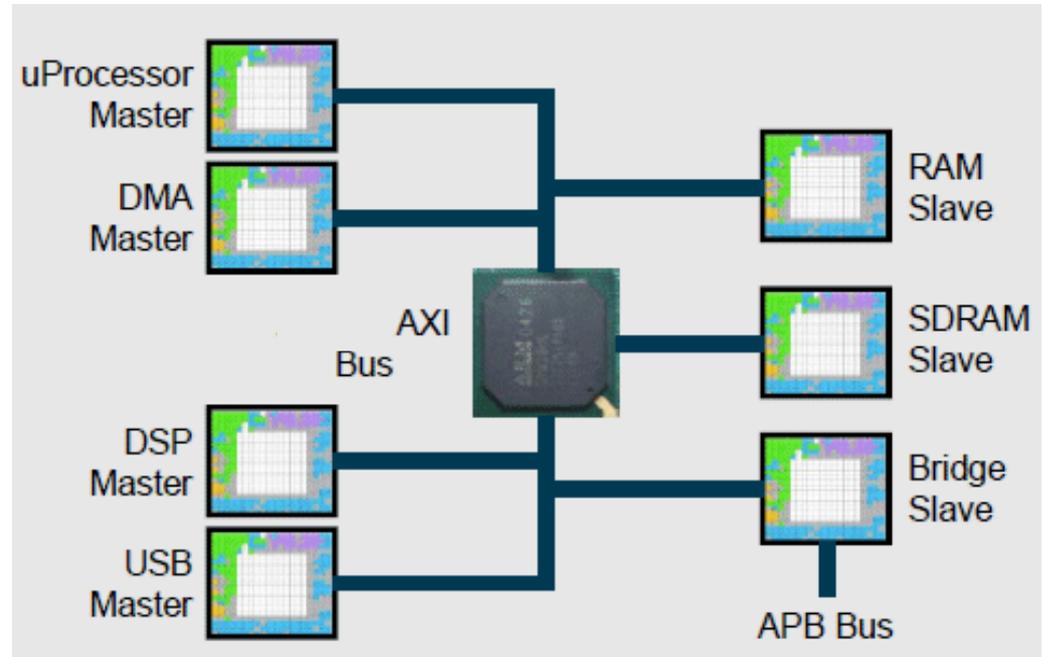
Decodificação do Endereço – I/O





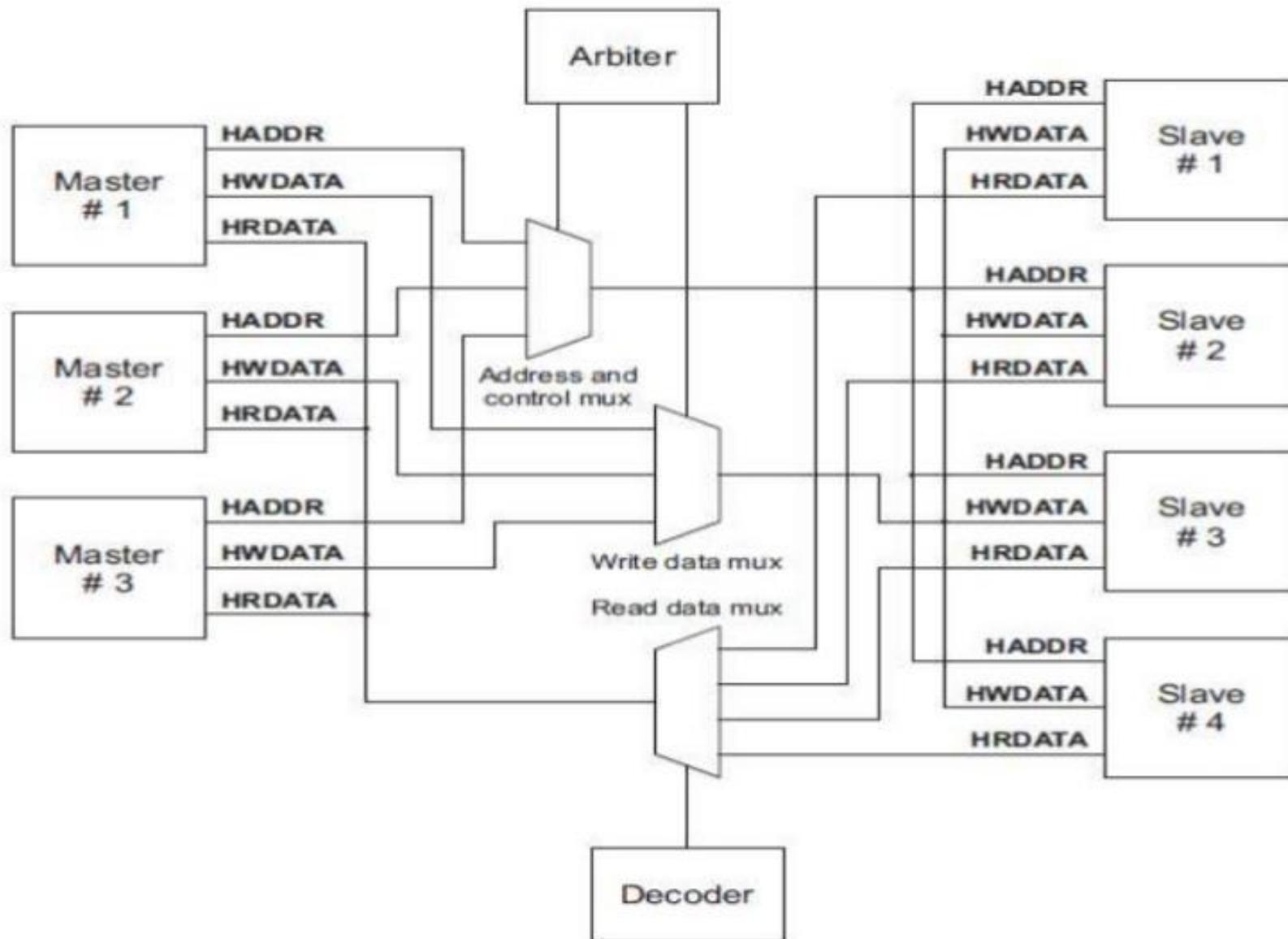
Barramento do Cortex M

- Advanced Microcontroller Bus Architecture (AMBA)
- 2 Buses AMBA 3
 - (AHB-Lite e APB) – 32 bits



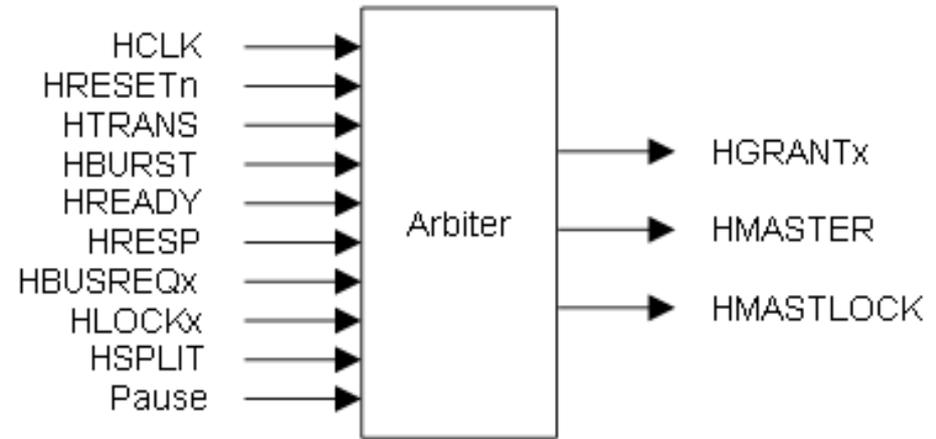
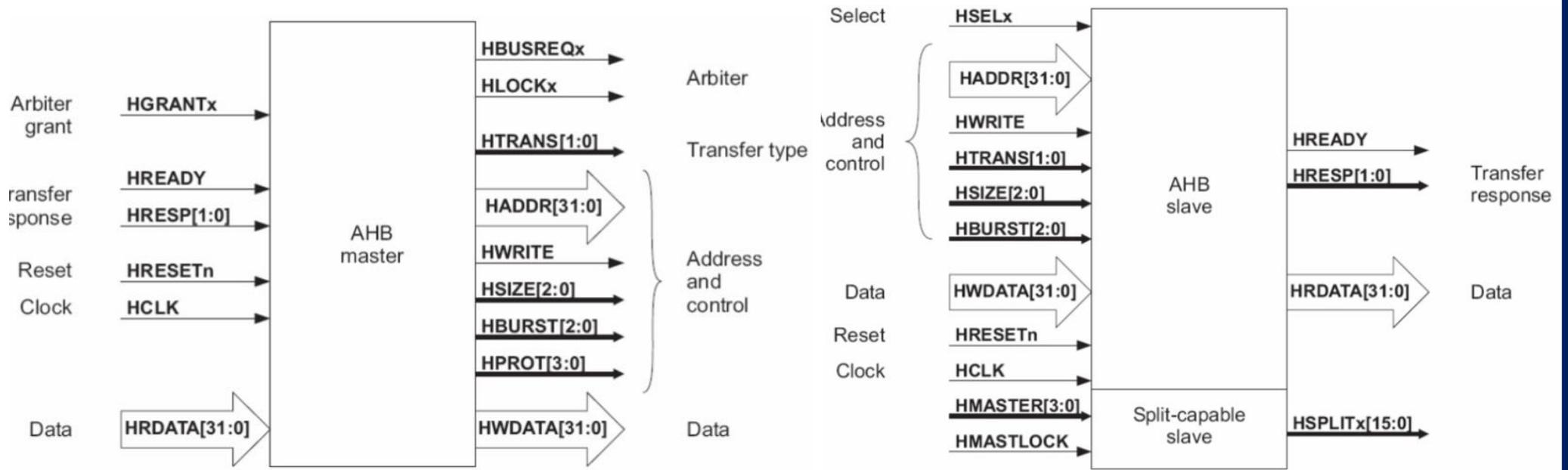


Estrutura do Barramento AMBA





Interfaces





Protocolo de Transferência

- **Basic transfer**

