

COL788: Advanced Topics in Embedded Computing

Lecture 5 – System Architecture (Cont.)



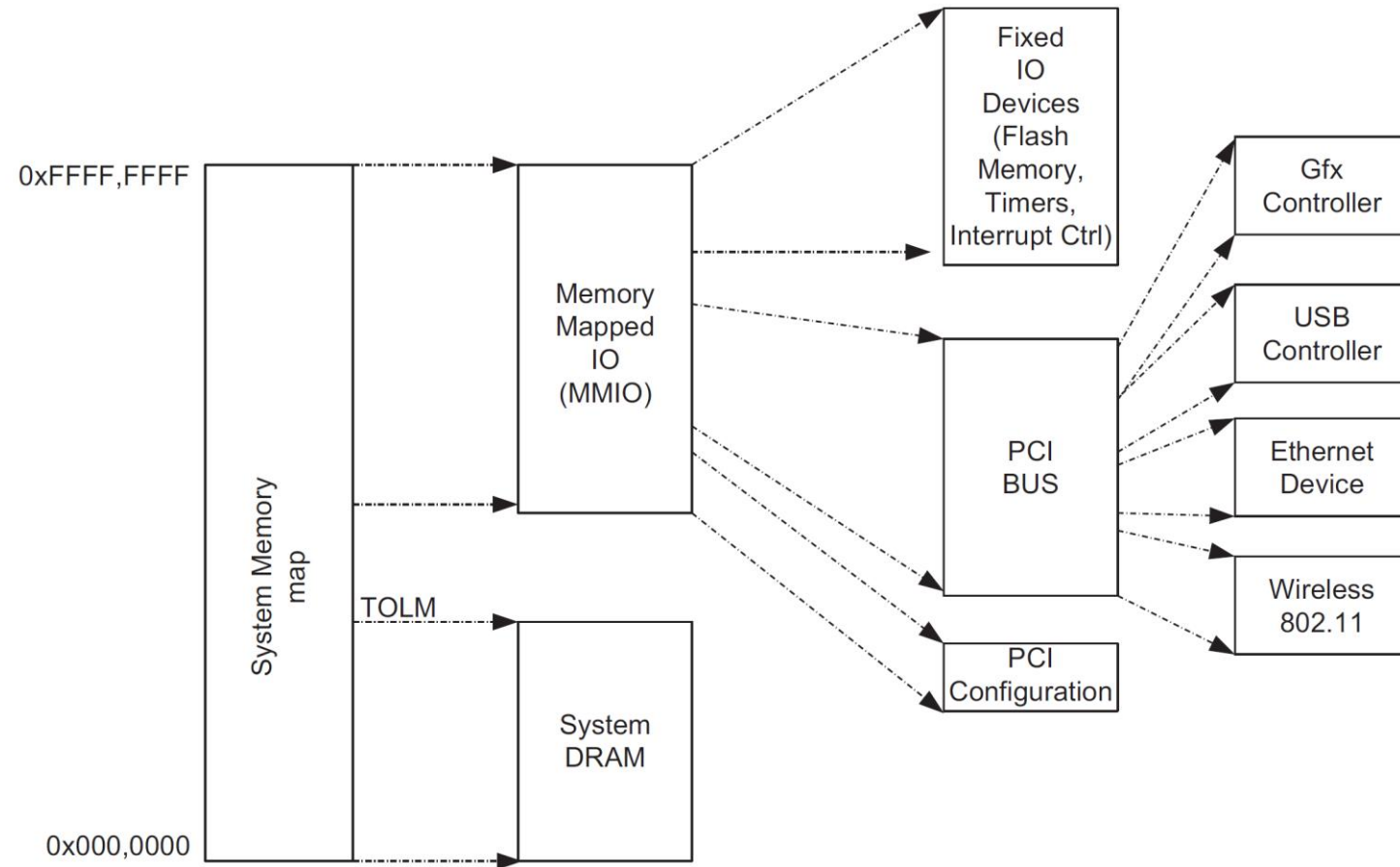
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Semester I
2022-2023

Last Lectures on System Architecture

- Processor
 - CISC vs RISC
- Memory Usage
 - Main Memory
 - MMIO
- Interrupt
- Timer

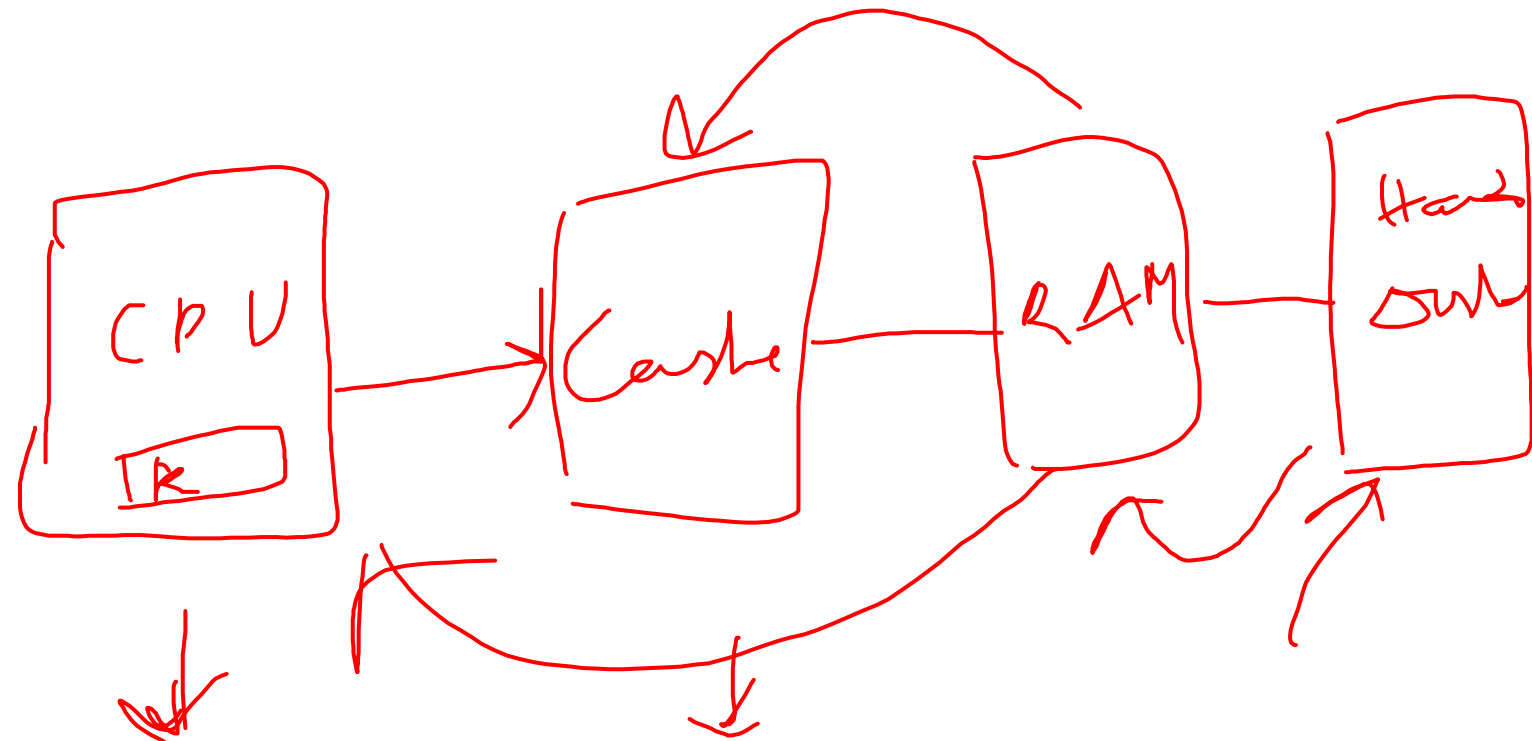


Agenda

- Memory types
- I/O types

Memory Types

- Register
- Cache
- Random Access Memory
- Disk Memory



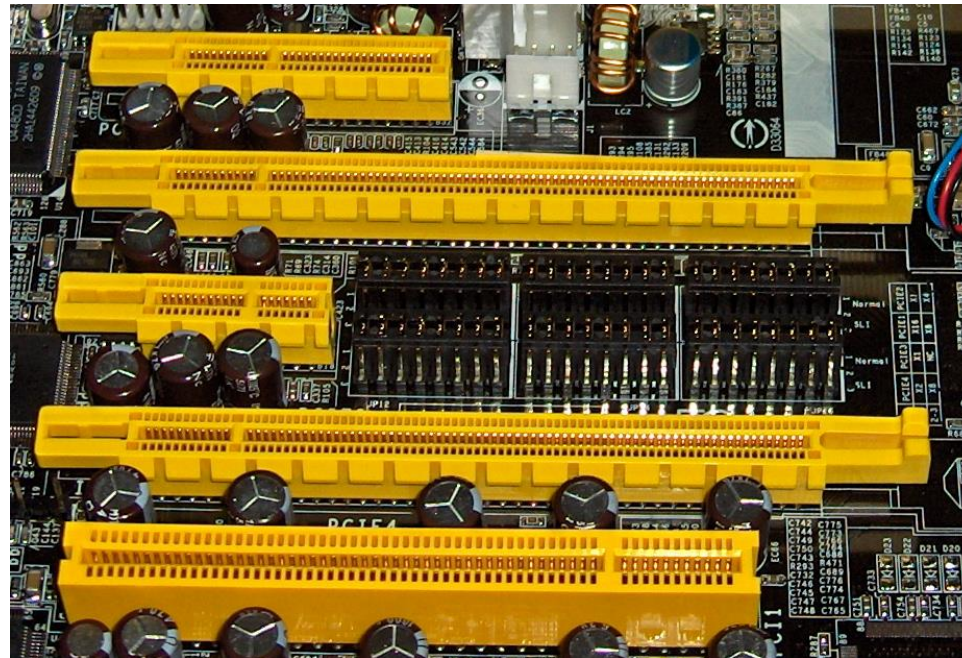
	Register	Cache	Random Access Memory	Disk Memory
Size	32 Bytes	64 KBs	128 MBs	32 GBs
Speed	3 ns	6 ns	60 ns	8 ms
Cost (Rupees)	Included with CPU	10,000/MB	100/MB	1/MB

Input/Output Types

- High Speed
 - Peripheral Component Interconnect (PCI)
 - Universal Serial Bus (USB)
- Low Speed
 - Inter-Integrated Circuit (I2C) bus
 - Serial Peripheral Interface (SPI) bus
 - Universal Asynchronous Receiver/Transmitter (UART)

PCI Express

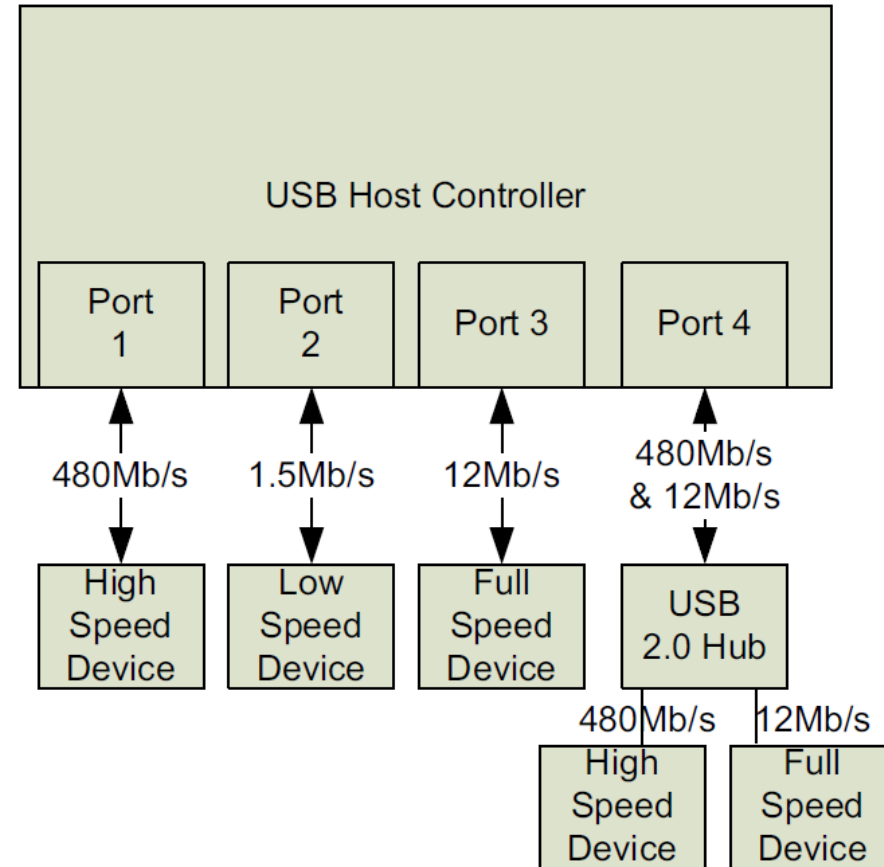
- Memory
- Graphics adapter
- Network interface



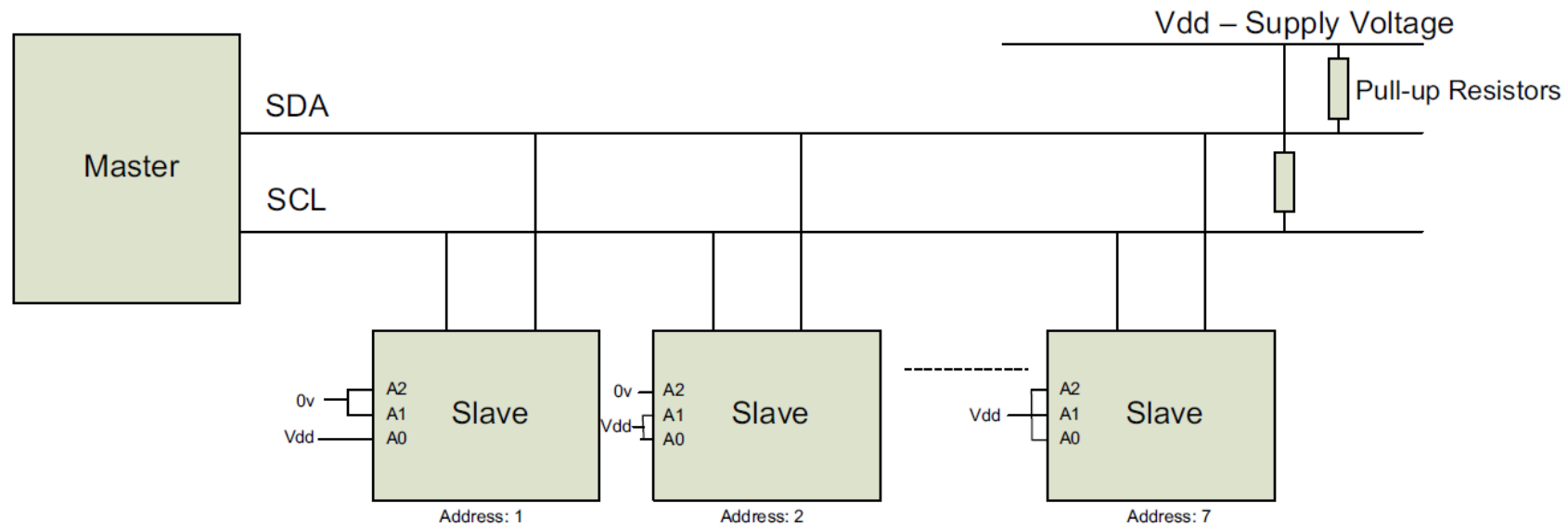
USB

- Printer
- Keyboard
- Mouse

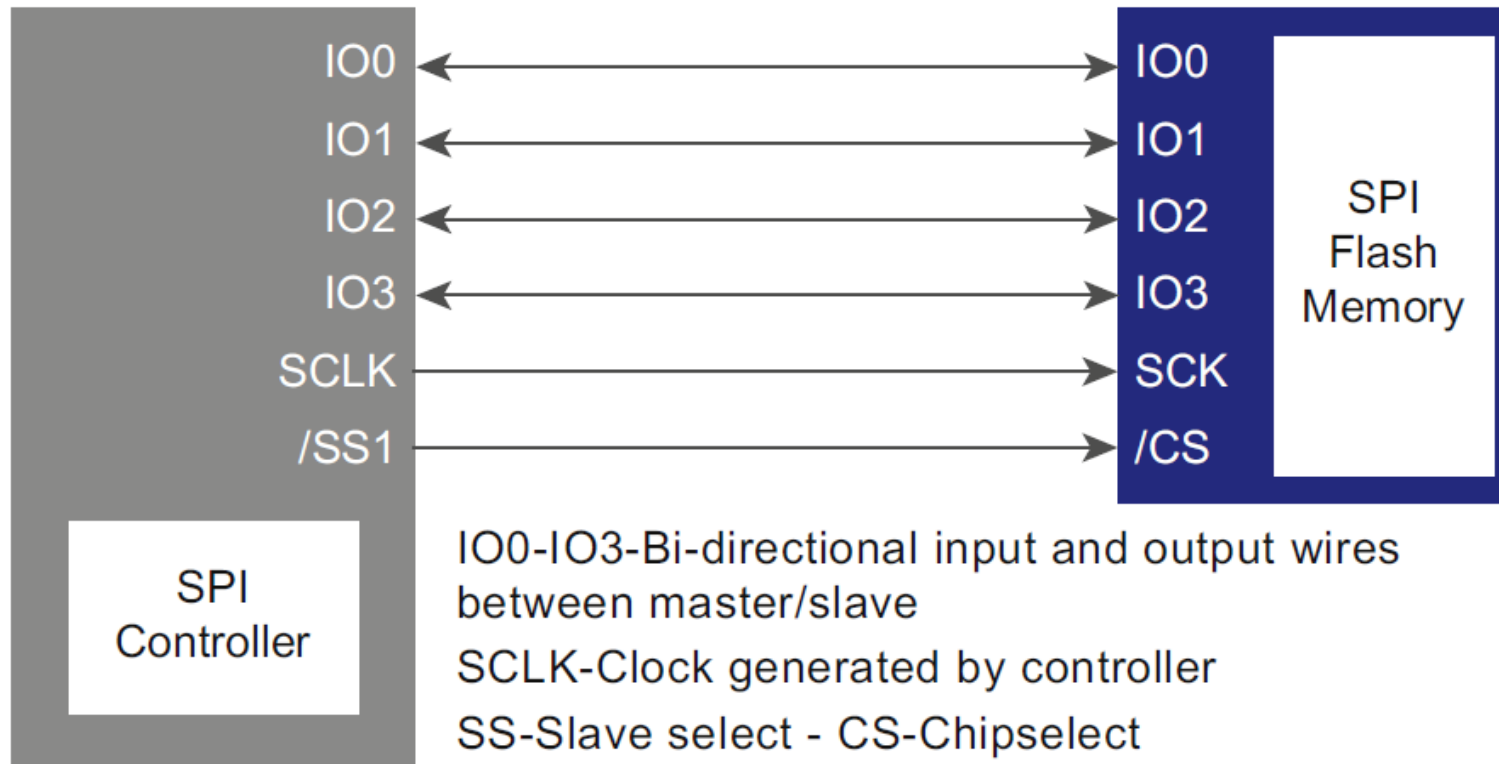
- Programming Interface



Inter-Integrated Circuit (I2C)



Serial Peripheral Interface (SPI)



What's Next?

- Next Lecture (August 22, Monday, 11 am – 12 pm)
 - Lecture 6