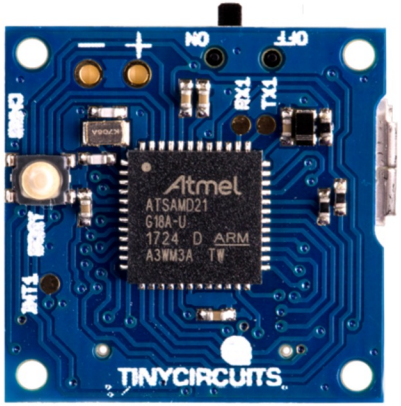
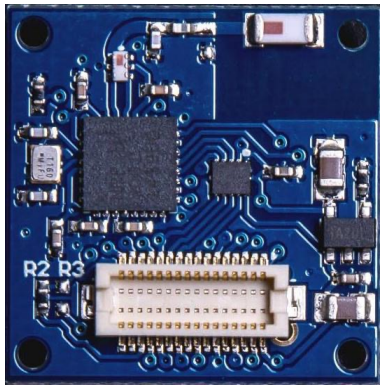
CSE190 Fall 2022



Lecture 10

Serial Busses

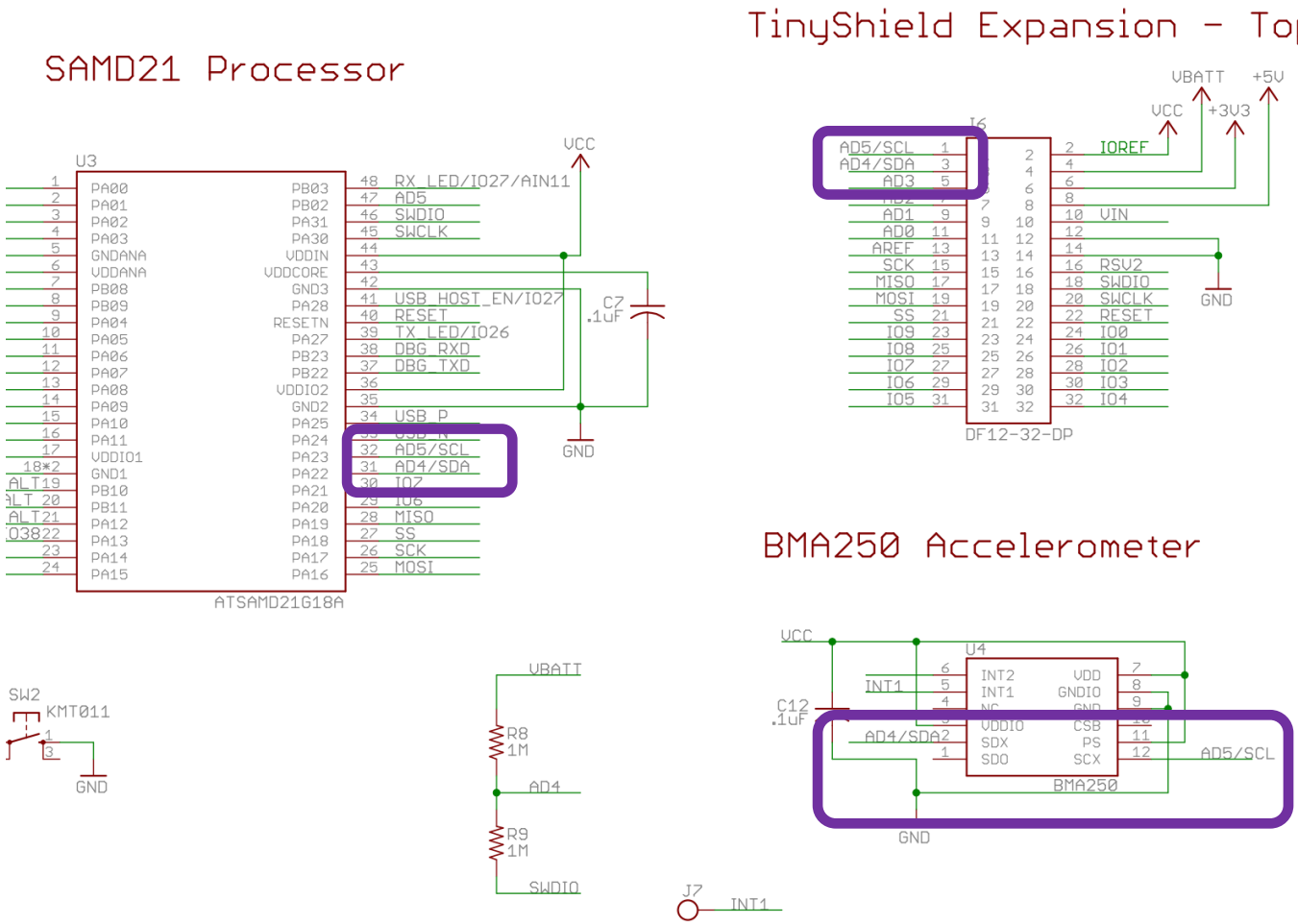


Wireless Embedded Systems

Aaron Schulman

Serial Busses

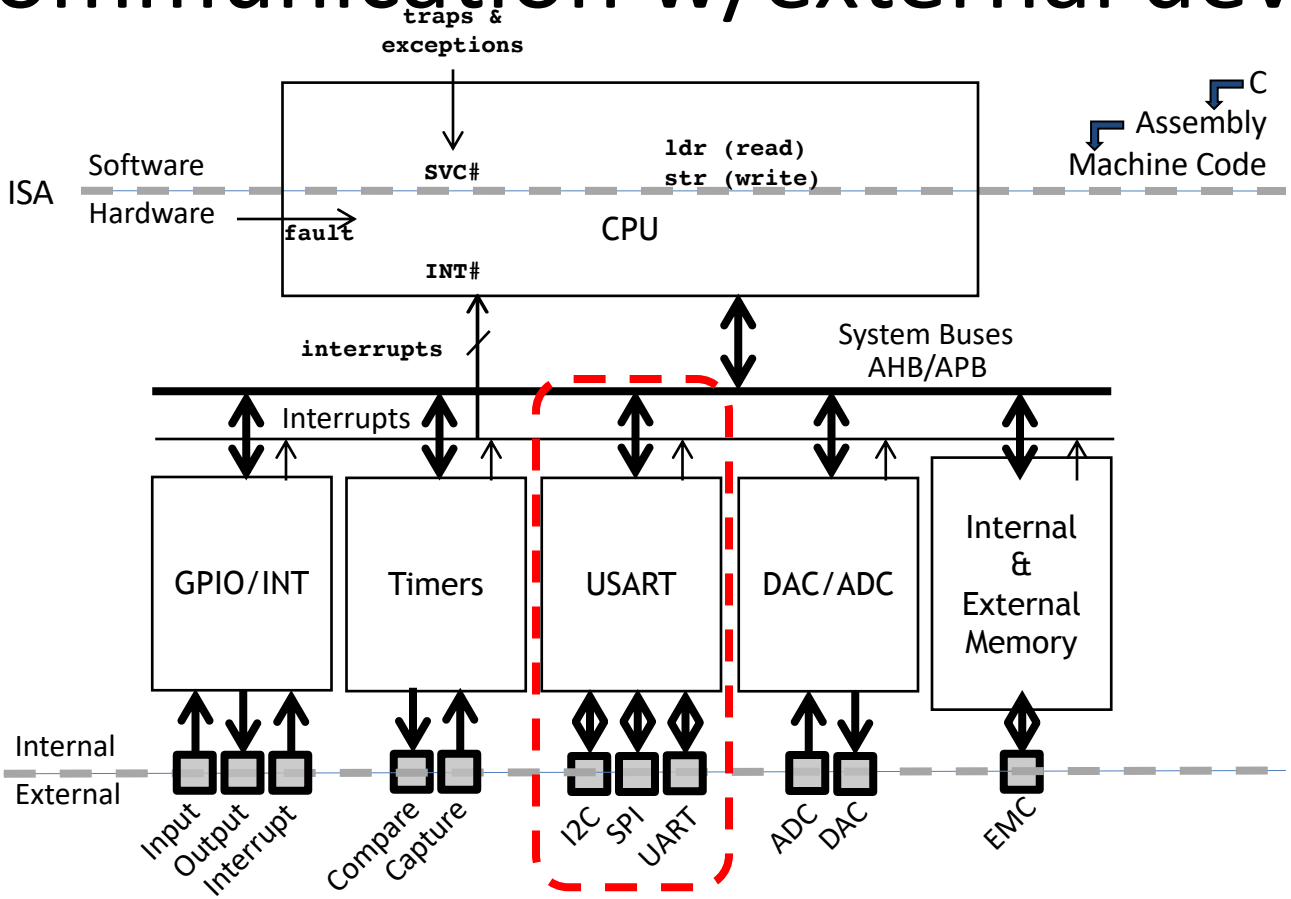
Digital data highways that *external peripherals* use to communicate with microcontrollers



Serial Buses in our project

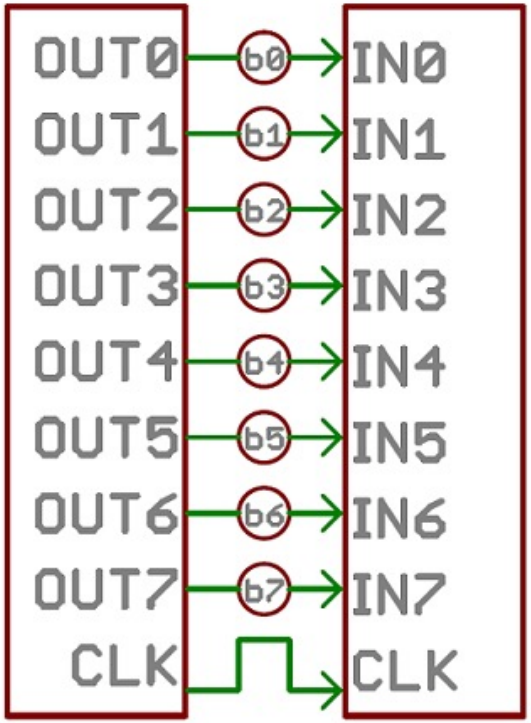
- UART serial bus for sending debug messages to your development host
- I2C serial bus for communicating with sensors (e.g., the accelerometer)
- SPI serial bus for communicating with the Bluetooth Low Energy radio

We use an internal peripheral for serial communication w/external devices

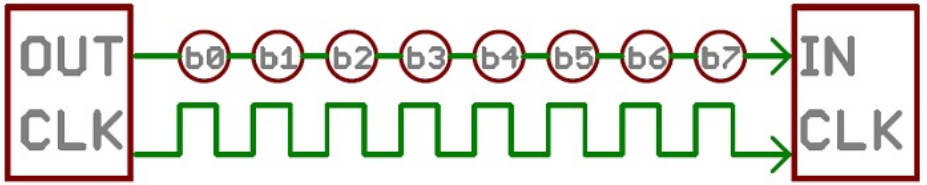


Parallel Bus vs Serial Bus

Parallel

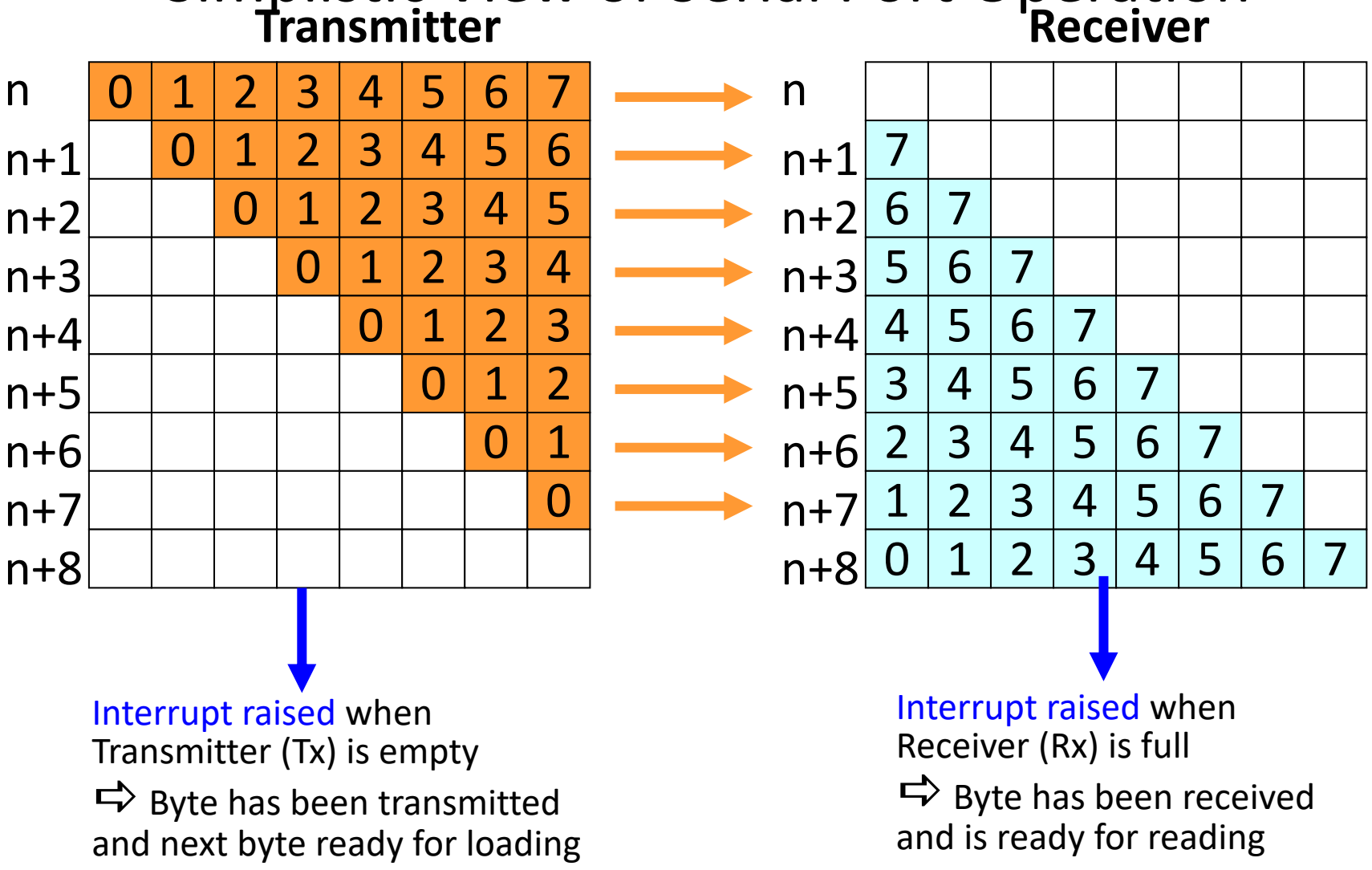


Serial



What is the benefit of a serial bus over a parallel bus (and vice versa)?

Simplistic View of Serial Port Operation



Serial Bus Interface Motivations

- Motivation
  - Without using a lot of I/O lines
    - I/O lines require I/O pads which cost $$$ and size
    - I/O lines require PCB area which costs $$$ and size
  - Connect different systems together
    - Two embedded systems
    - A desktop and an embedded system
  - Connect different chips together in the same embedded system
    - MCU to peripheral
    - MCU to MCU
  - Often at relatively low data rates
  - But sometimes at higher data rates
- So, what are our options?
  - Universal Synchronous/Asynchronous Receiver Transmitter
  - Also known as USART (pronounced: “you-sart”)