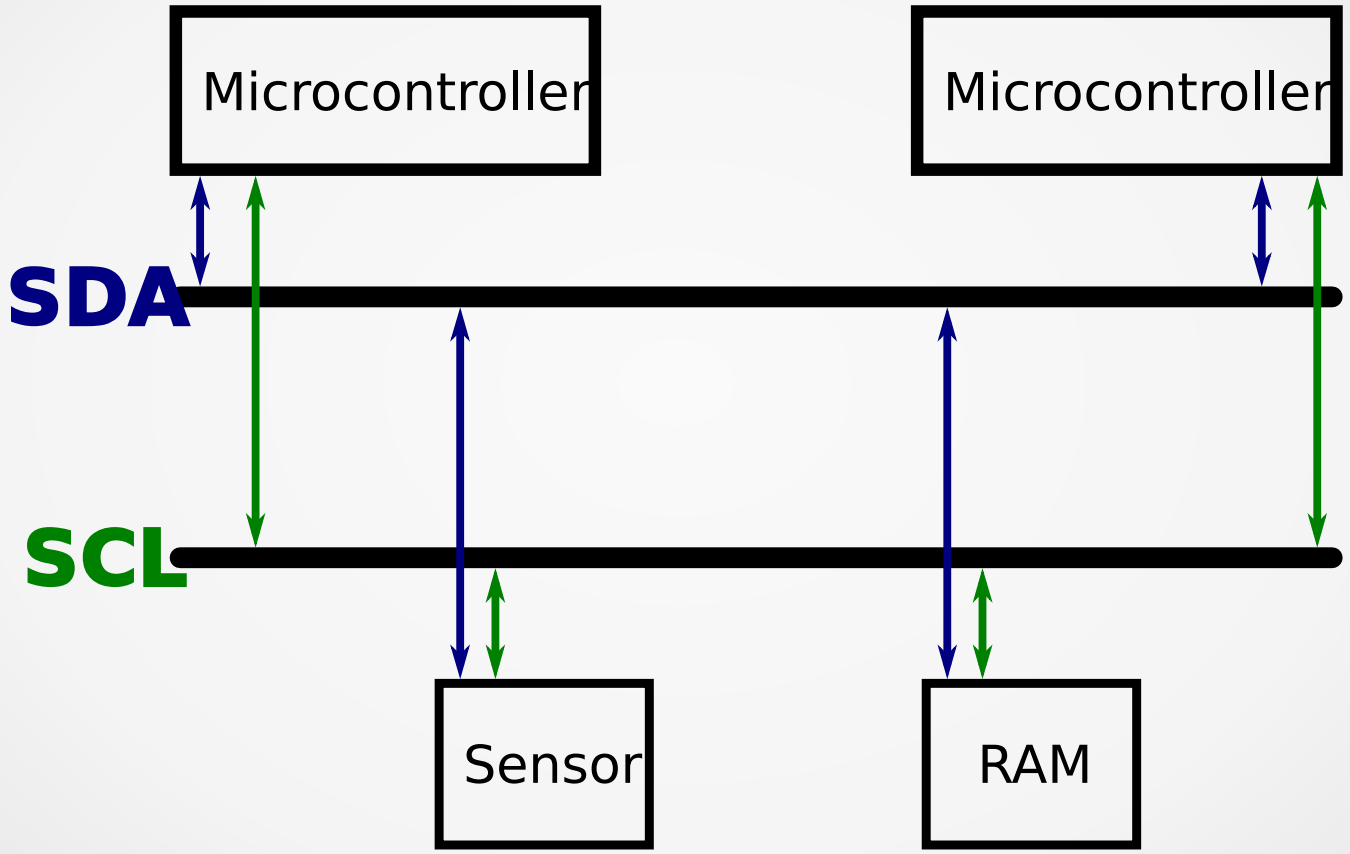
ECE 381 – Microcontrollers

Inter-Integrated Circuit (IIC/I2C)

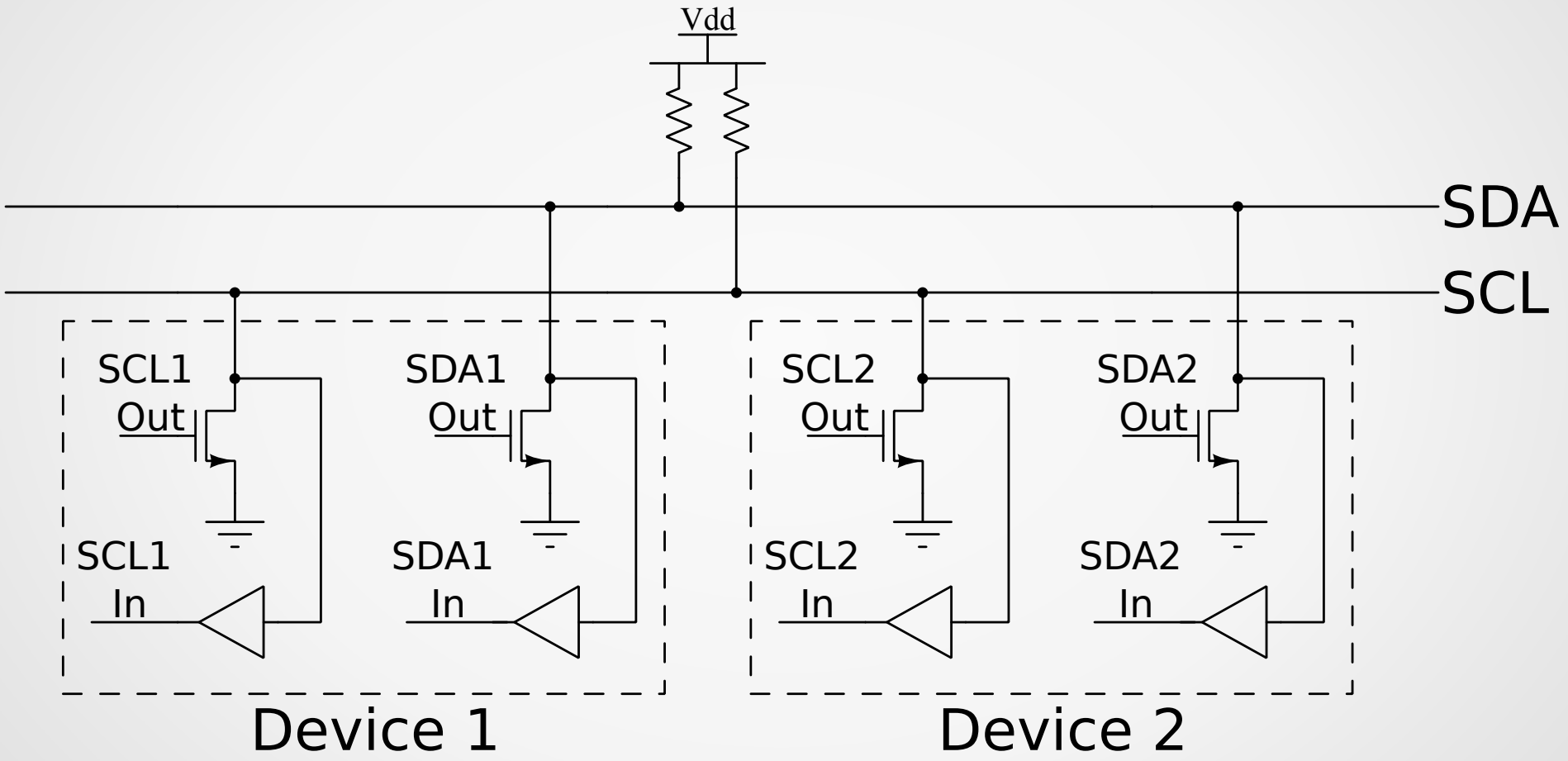
How To Talk To Chips?

- Parallel is usually too expensive
- Serial Communication
  - UART? Sometimes, but high voltage swing can be problematic
- I2C, Simple Two Wire Interface
  - Shared two-wire bus
    - SDA (Serial Data)
    - SCL (Serial Clock)
  - 100 kbit/s (Standard), 400 kbit/s (Fast), 3.4 Mbps (high-speed)
  - Each device has unique address (7-bit, standard, 10-bit extended)
    - Group 1: Hard-coded portion of address
    - Group 2: User defined, typ. by pin voltages

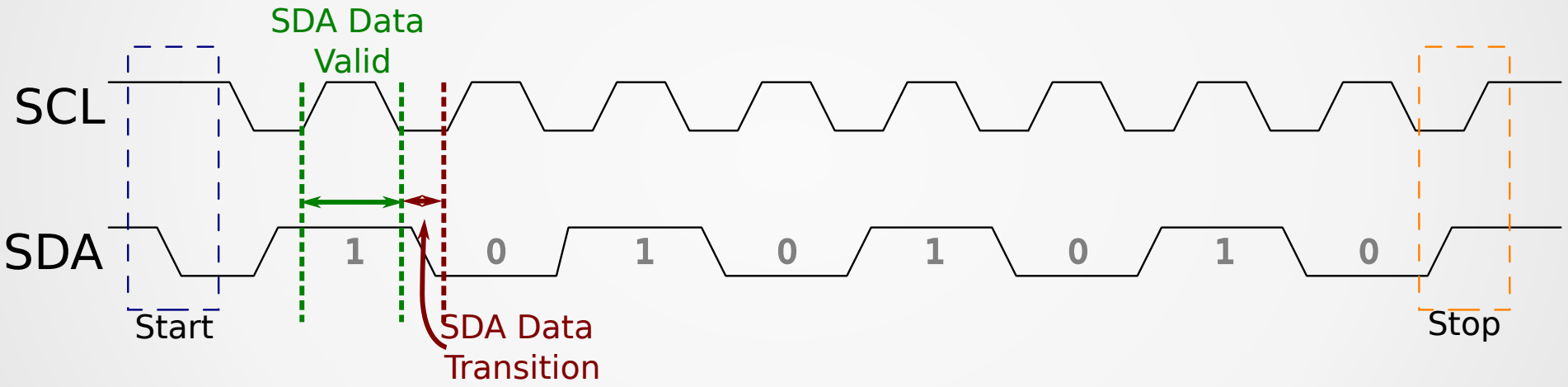
I2C Setup



I2C Schematic

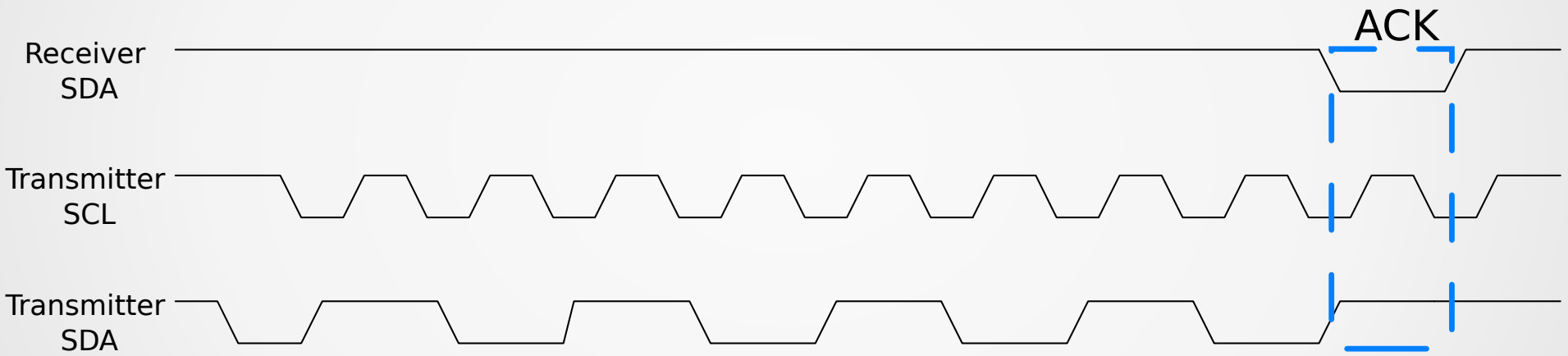


I2C Data Transfer

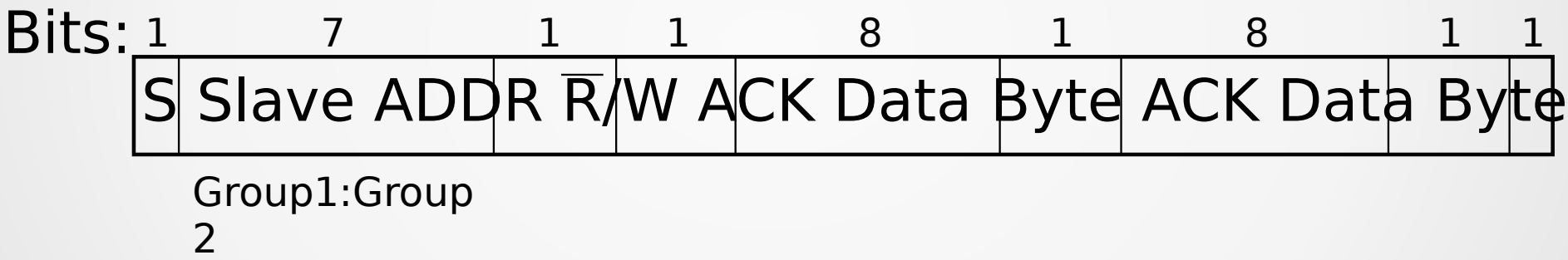


Data is in MSB order!

I2C Receiver Acknowledge



I2C Message Format



Pay attention to PSoC implementation! R/W bit implicit in function call! (You should really read the datasheet!)

Reading

- Textbook, Chapter 12.11
- PSoC5 I2C Datasheet