I2C lesson

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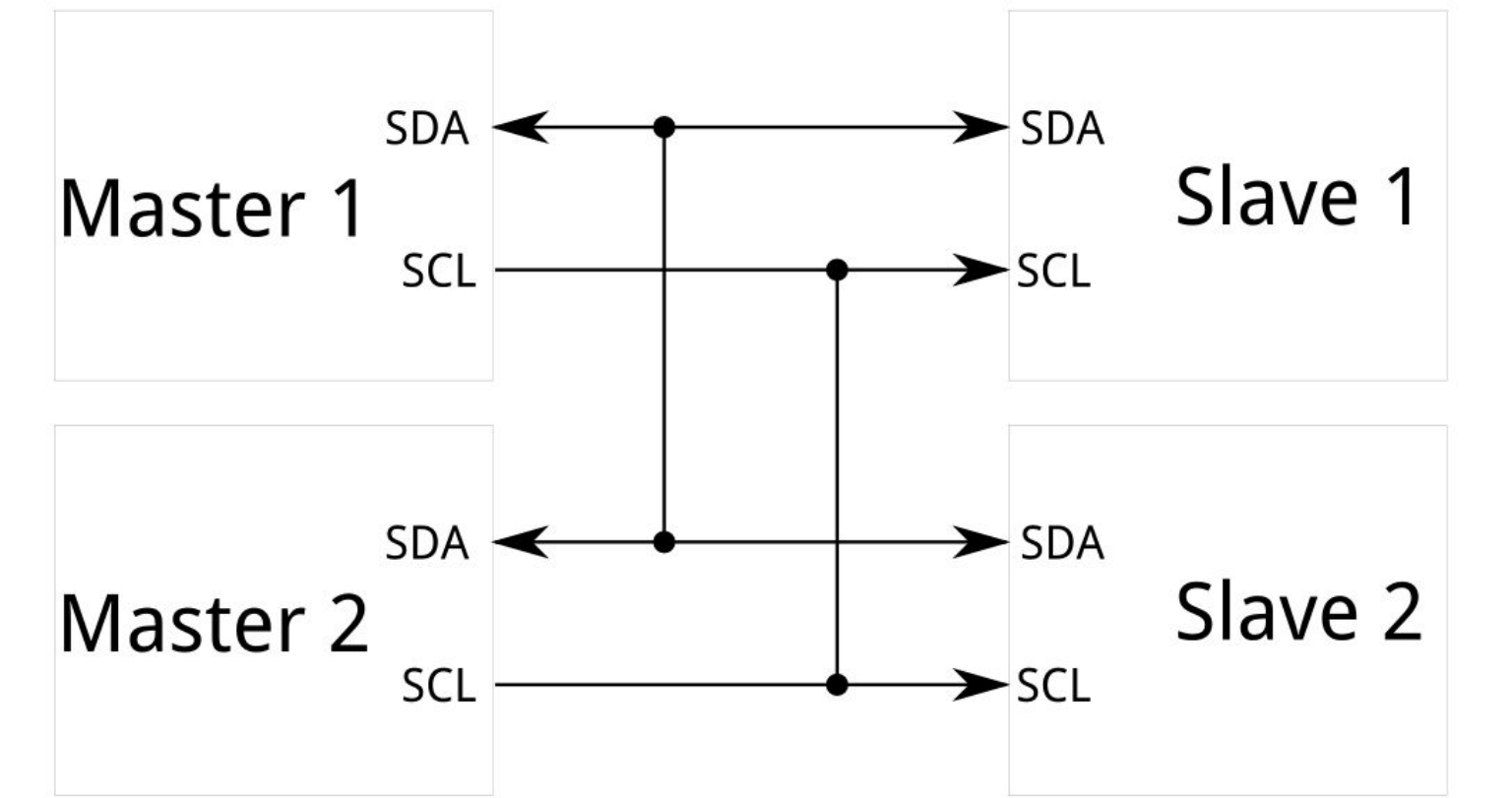
What is I2C?

- Serial protocol used to support many-to-many communication
- Each device is a Master or a Slave
- Each device has an address (7 bits is typical)
- Communication is synchronous (difference between UART)
- Data line is default high, hardware pulls it low and releases as necessary



I2C diagram (courtesy of SparkFun) - SDA = serial data, SCL = serial clock

General Protocol

1. **Start condition**: Master pulls SDA low while SCL is still high
    a. Slaves notice and are on the lookout
2. Master controls clock and data is sent on **rising edge**
3. Master sends 7 bit slave address followed by R/W bit (**MSB** first)
    a. This is called the Address Frame
4. Master sends (or receives) 8 bits of data, MSB first
    a. This is called the Data Frame, any number can be sent in a row w/o address change
5. Both Address and Data frames are followed by a 9th bit called the **NACK/ACK** bit. If this is not pulled low, there was an error
6. **End condition**: Master lets SCL go high before SDA

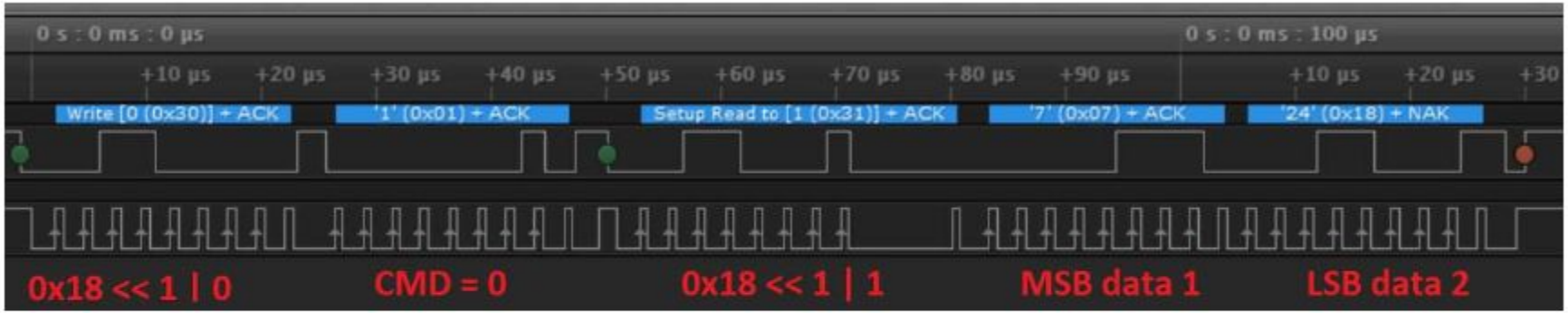


Figure 2a: Typical I2C READ Command Communication (e.g. “Battery Voltage”, Command 1)

EPS - I2C example (courtesy of Endurosat)