

I2C

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1. Introduction

Structure

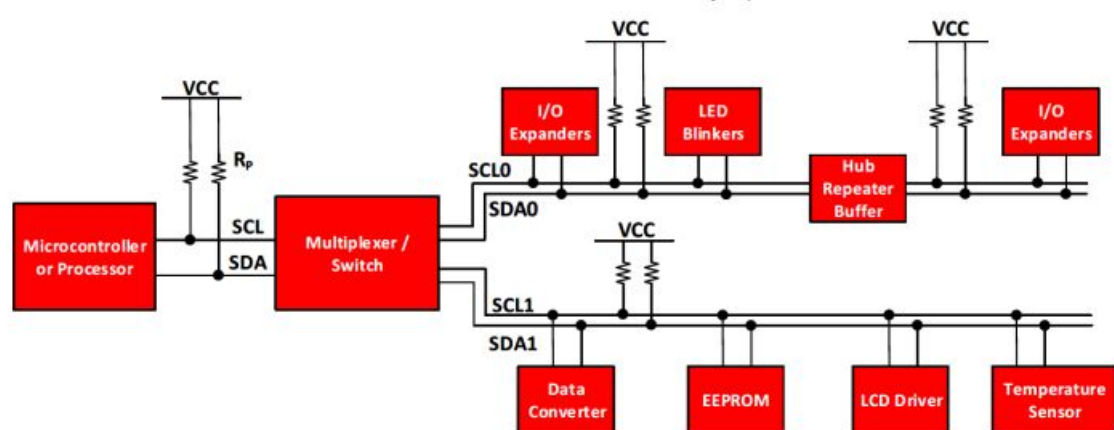


Figure 1. Example I²C Bus

- 最左边的微控制器是I2C的主器件
- 包含了很多从器件

Property

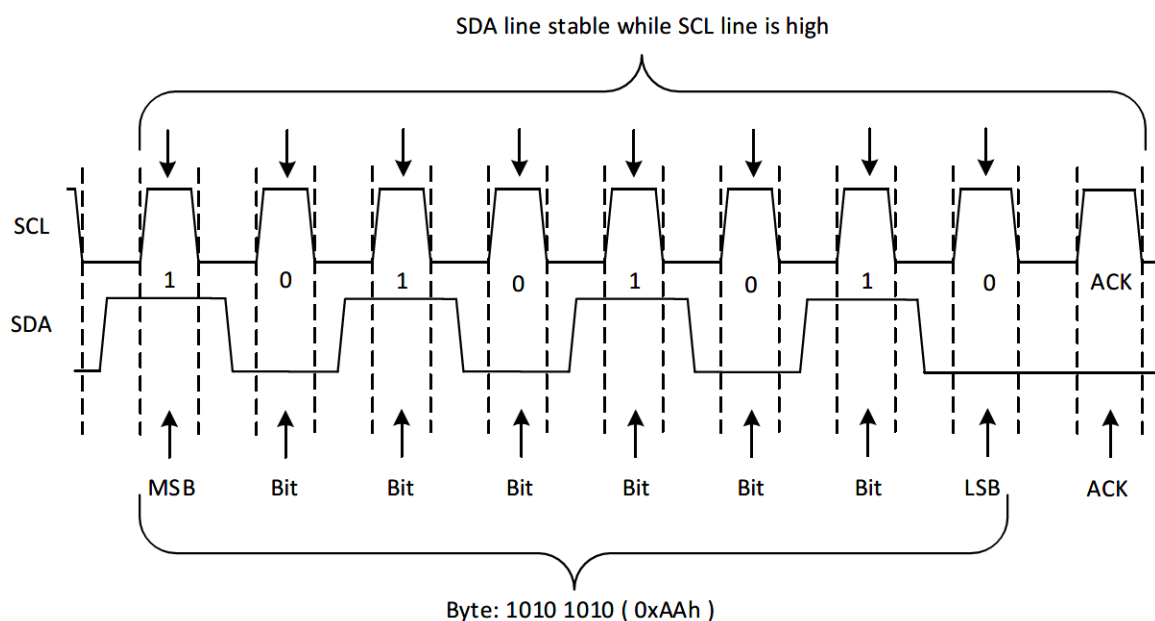
两线式串行总线，如今已经成为芯片间低速串行通信的事实标准

2. Timing Analysis

- 传输时钟SCL high期间，数据线SDA必须保持稳定;
- SDA变化相对于SCL的go high 沿有setup时间的要求;
- SDA 变化相对于SCL go low 沿有hold 时间的要求;

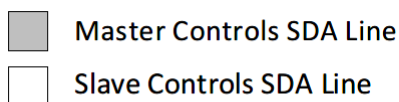
- 在SCL low 期间，数据SDA才能改变。

Signal Timing

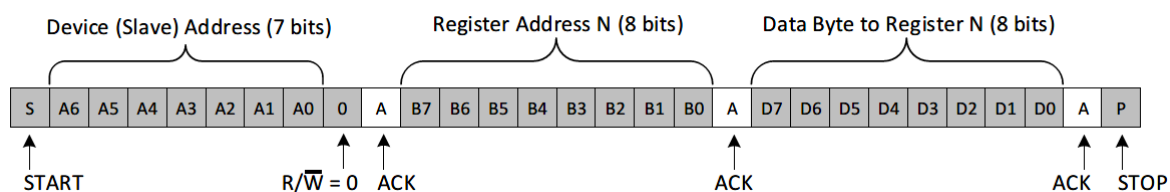


- 如果从器件可用，从器件会在ACK的slot将总线拉低

Address Searching

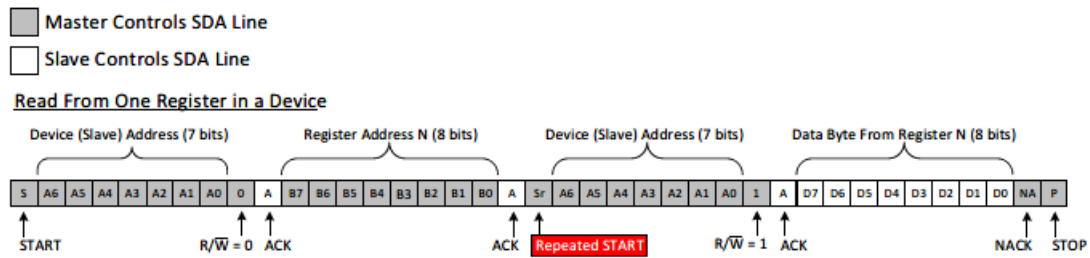


Write to One Register in a Device



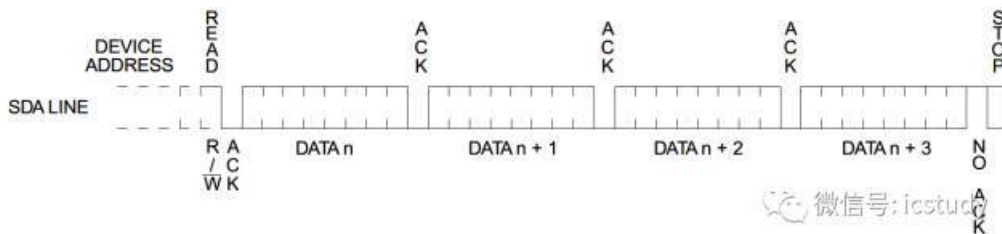
首先写入从器件地址，然后写入从器件内部寄存器地址。

Reading Process: Random Reading



- START+器件地址（R/W bit 置为0，执行写）+寄存器地址；
- 重复START+器件地址（R/W bit置为1，执行读）+从器件输出data（1个或多个byte）+STOP

Reading Process: Sequence Reading



After finish reading a inner register, the inner address will be added by 1.