Protocolo I2C

Inter-Integrated Circuit communication

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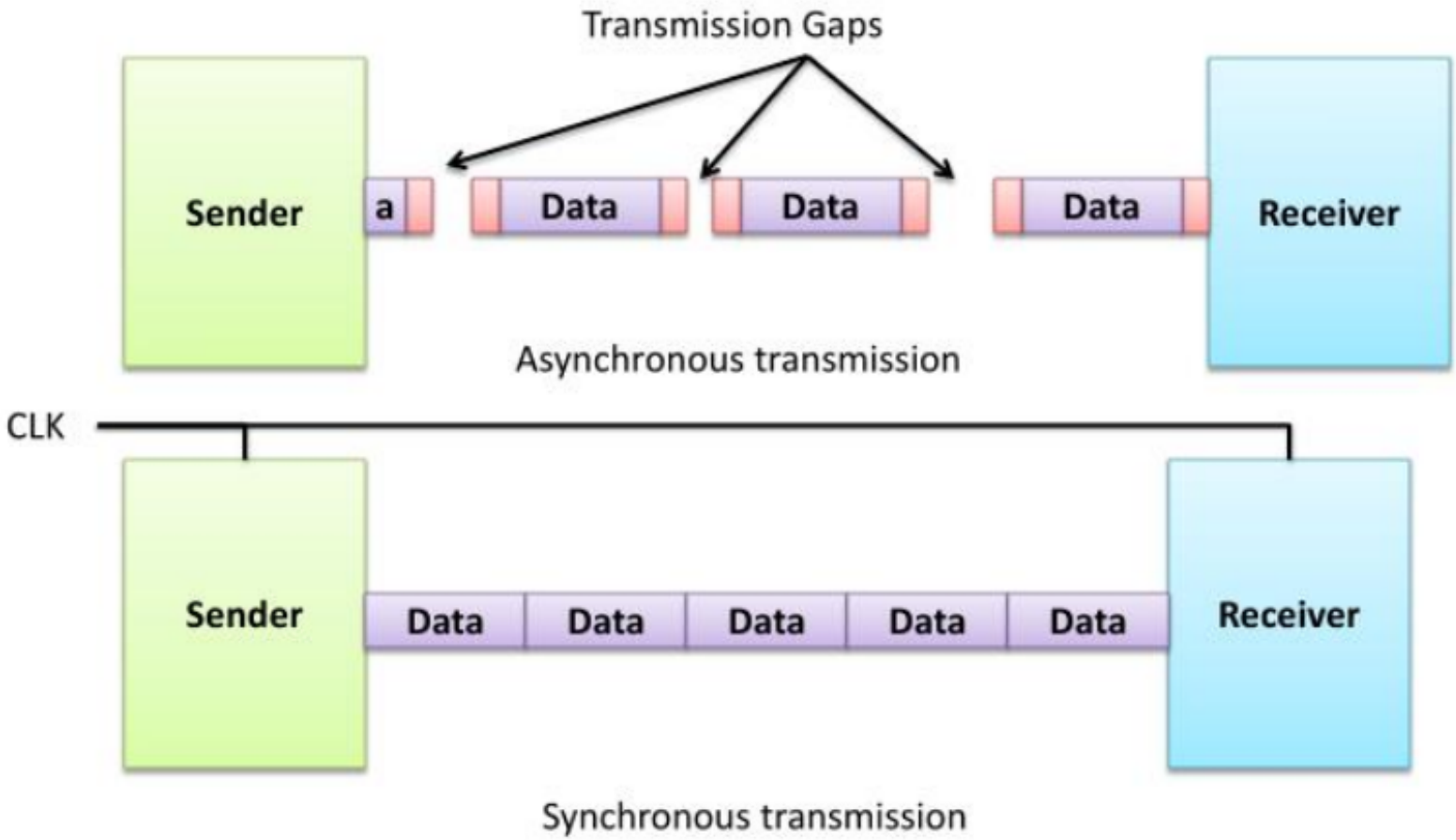
Breve explicación

I2C (Inter-Integrated Circuit) is an on-board communication protocol, which is ideal for short distances and low bandwidth. It has a master-slave architecture in which all slaves are connected to the master via two wires: the serial data wire (SDA) and the serial clock wire (SCL). I2C is typically used for attaching lower-speed peripherals such as sensors to processors and microcontrollers over short distances within an integrated circuit.
Tomado de: **I2C-vs-SPI**

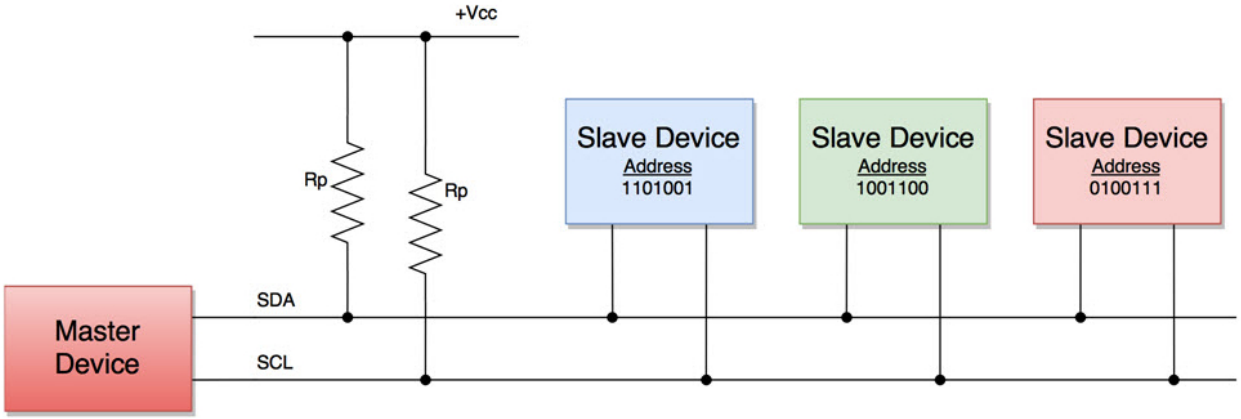
Caracterísitcas básicas

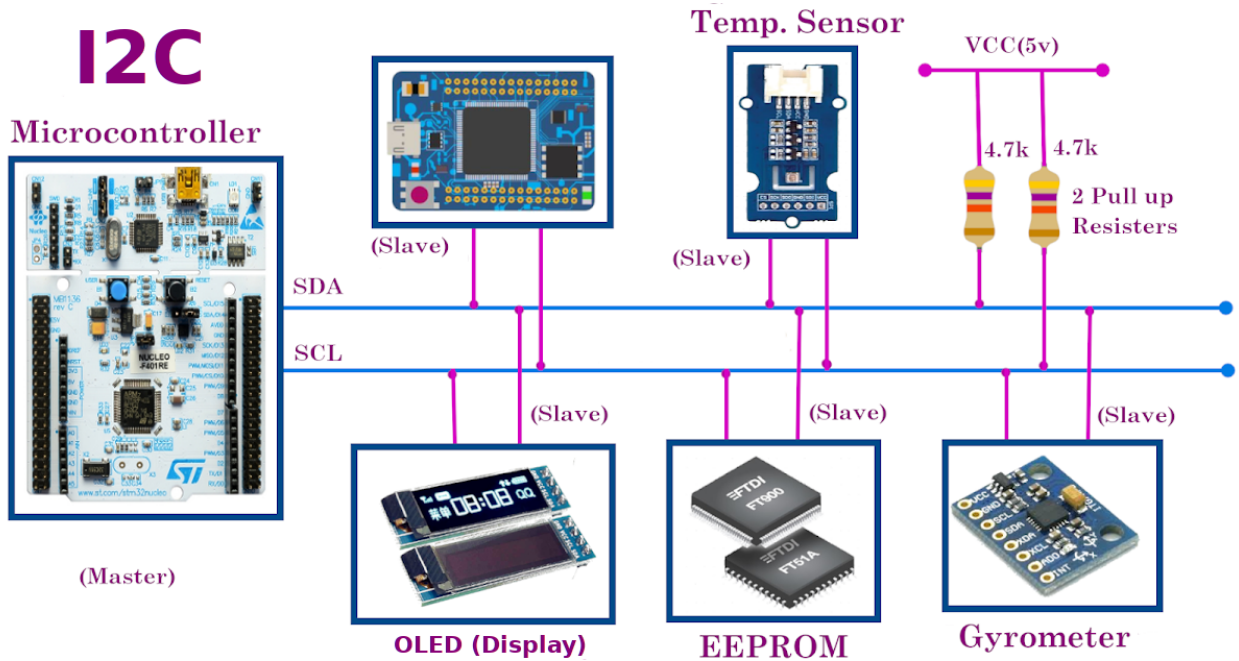
	I2C
Pin drive	Open drain
Signal lines	2
Max speed	400 kbps in fast mode (3.4 Mbps is possible with high-speed mode)
No. of peripherals	112 with 7-bit addressing
Multi-master	Yes
Flow control	Yes

Comunicación Sincrona

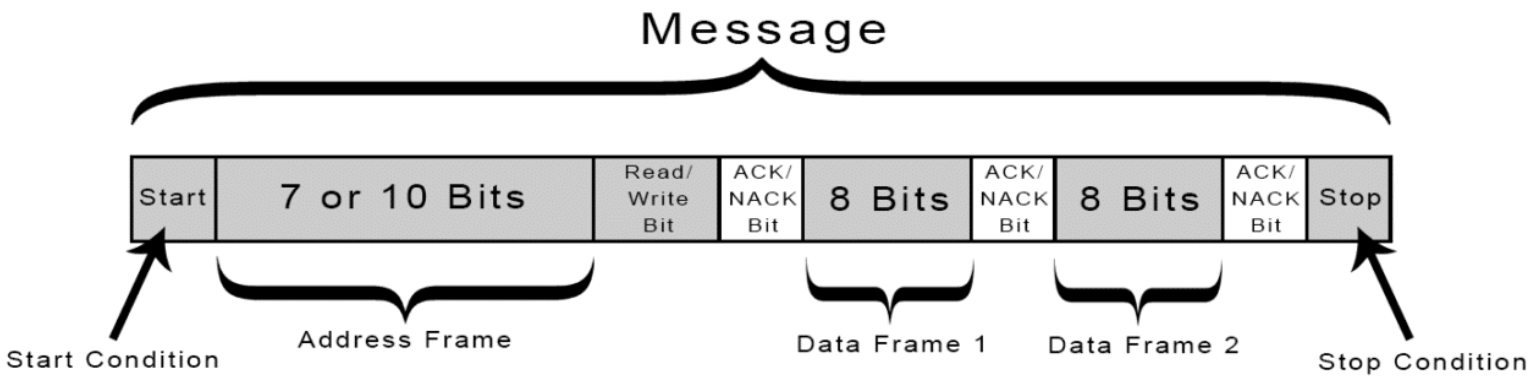


Conexión Hardware

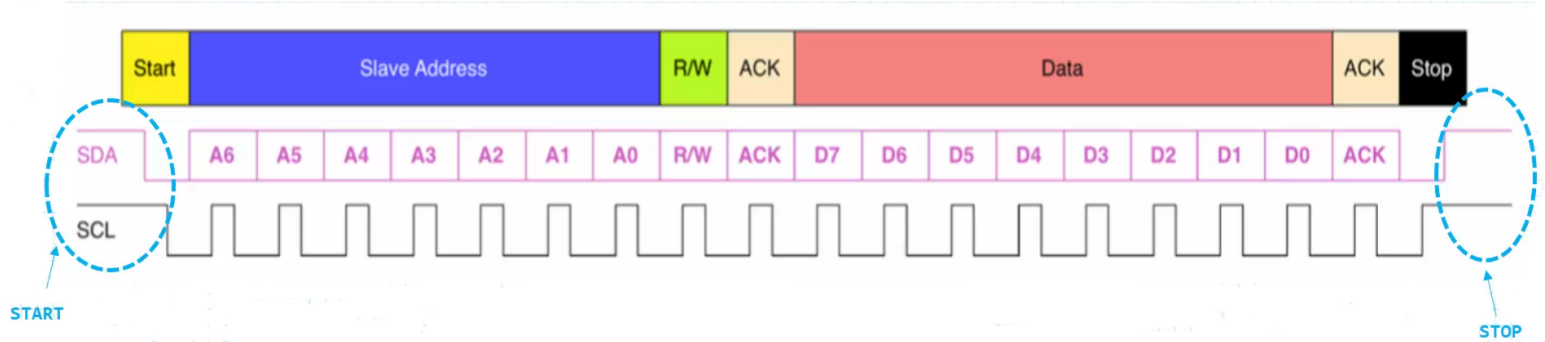


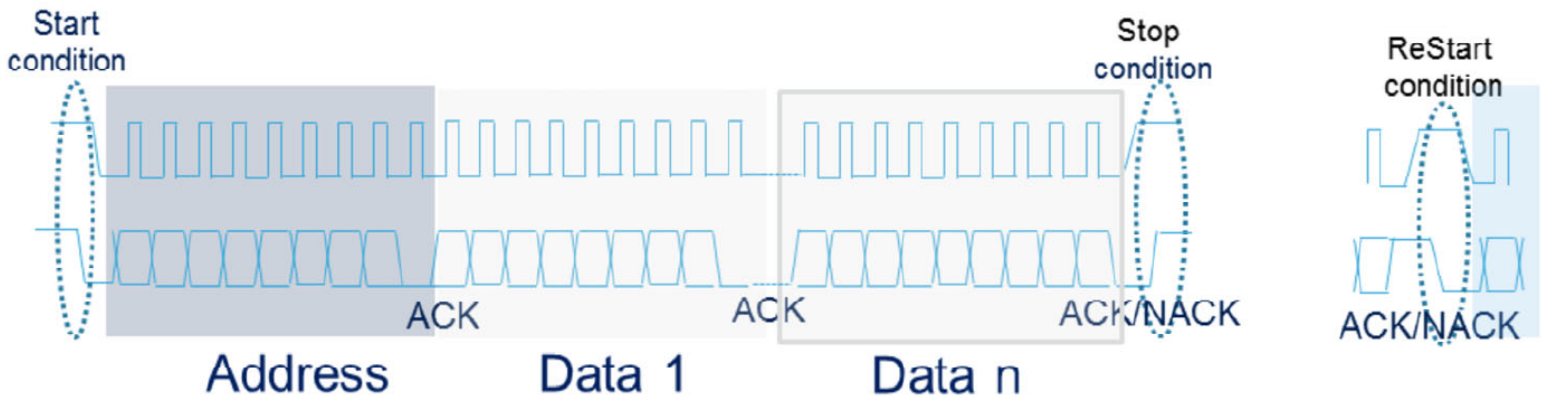


Trama de datos del I2C (1)



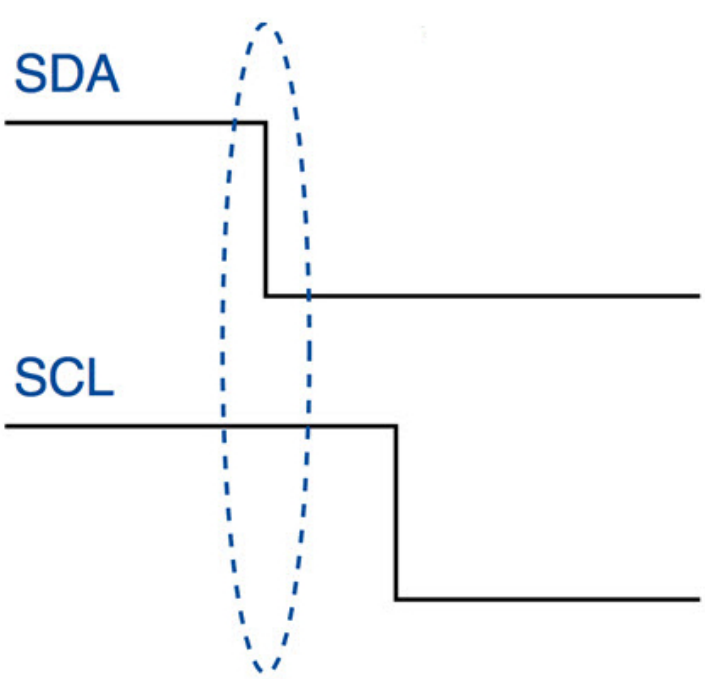
Trama de datos del I2C (2)



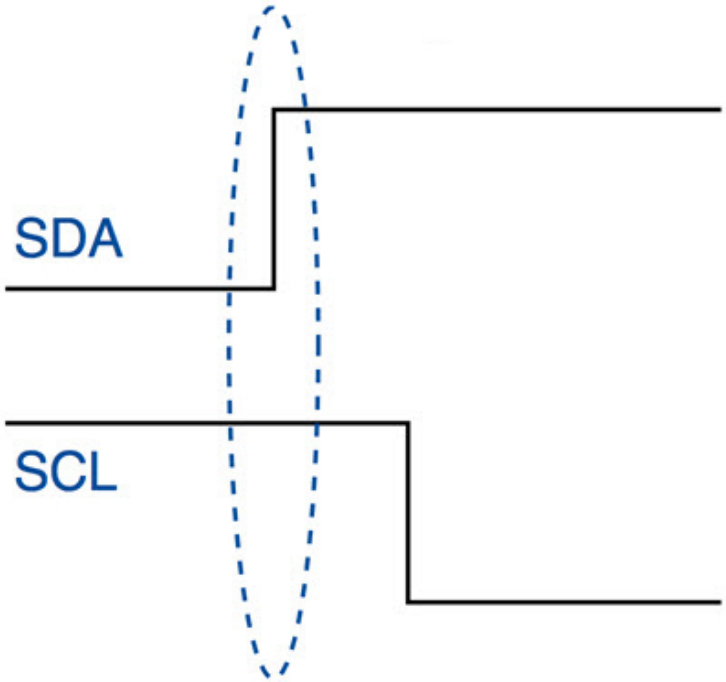


I²C protocol

Condición Start y Stop



Start Condition



Stop Condition

I2C Mode

Es la velocidad a la que la interface de I2C va a funcionar. Existen 4 modos definidos en la especificación de I2C:

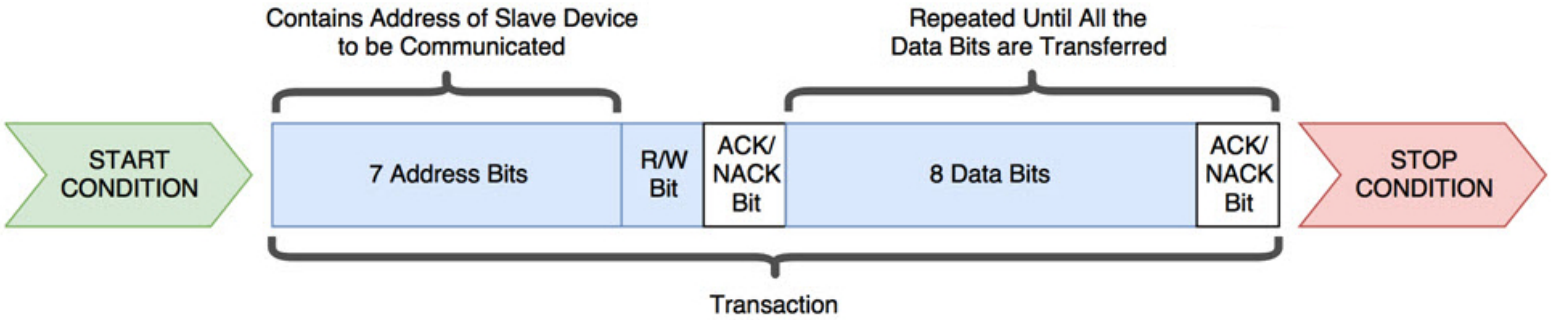
- Standart mode (Sm): 100KHz (Clock)
- Fast mode (Fm): 400KHz (Clock)
- Fast mode plus (Fm +): 1MHz (Clock)
- High-Speed mode : 3.4MHz (Clock)

I2C Duty

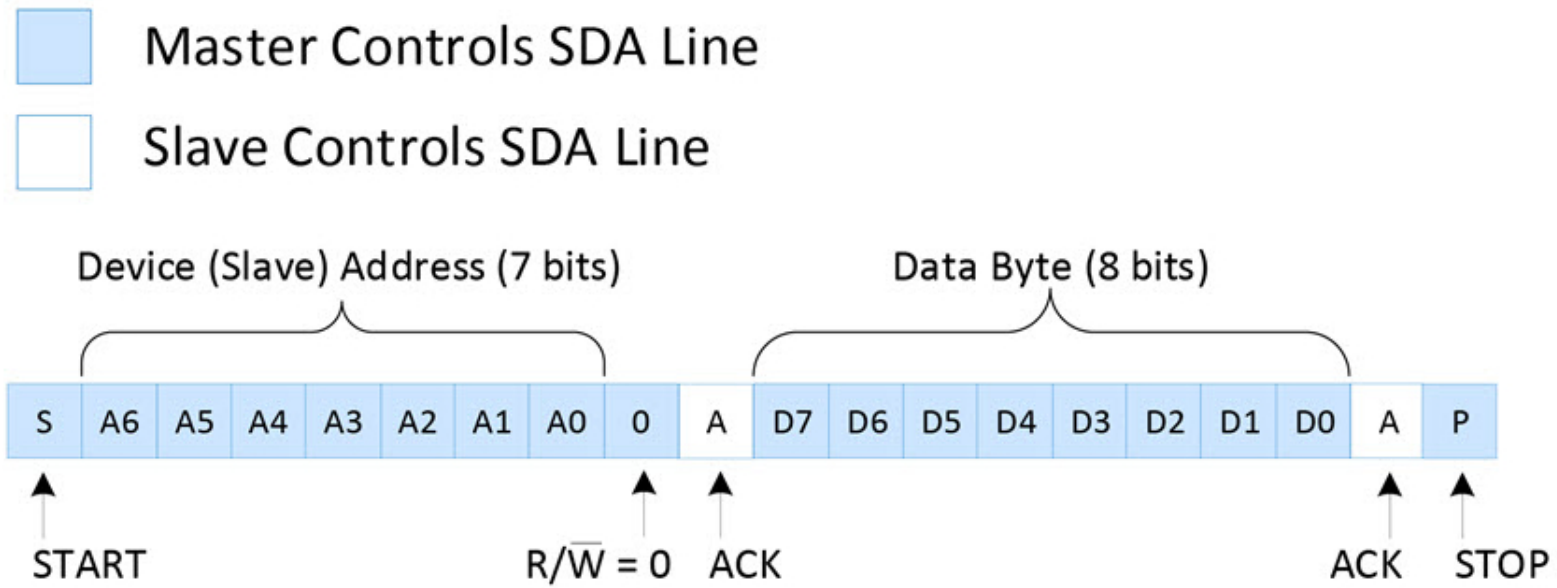
Especifica la relación del tiempo en bajo (T_{LOW}) y tiempo en alto (T_{HIGH}), de la señal de reloj (SCL)
Se tienen especificados dos posibles valores:

- I2C Duty cicle 2:1
- I2C Duty cicle 16:9

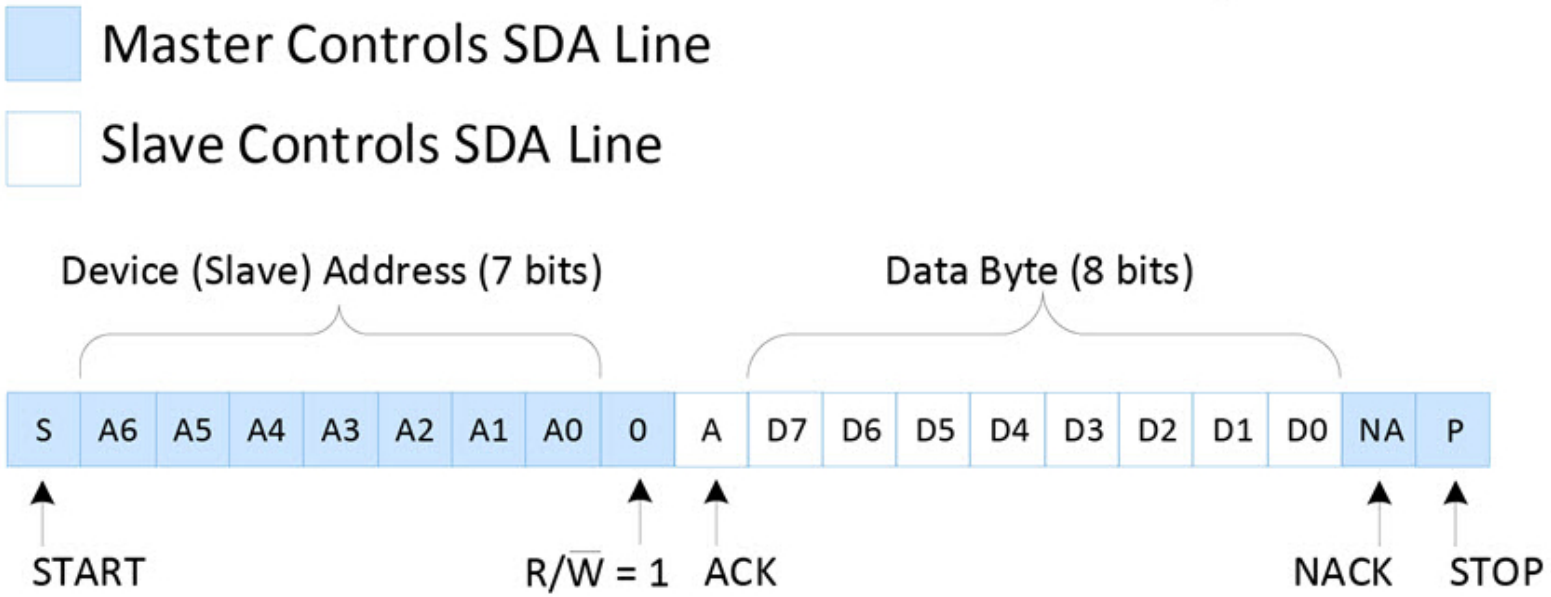
Transacción I2C



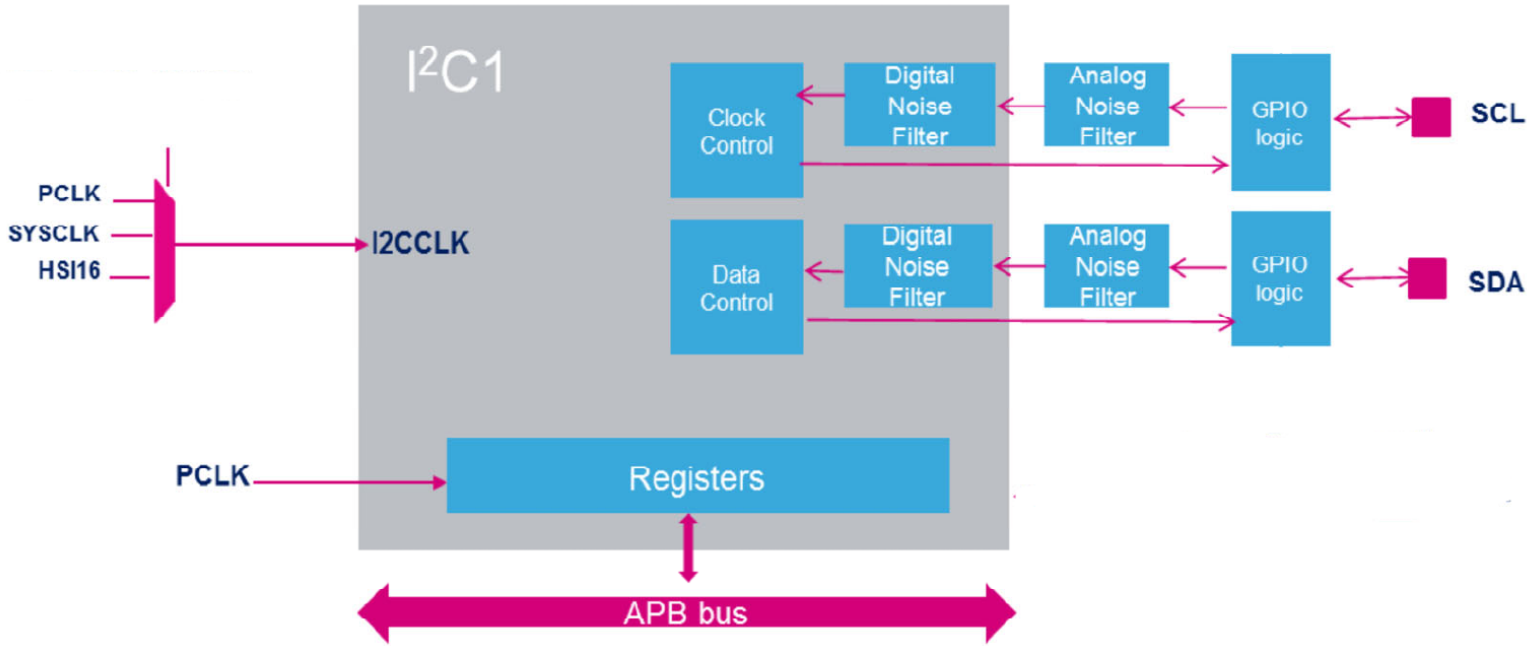
Transacción I2C - Maestro a Esclavo



Transacción I2C - Esclavo a Maestro



Implementación en STM



Configuración del Reloj

La siguiente página presenta una excelente explicación de las consideraciones necesarias para configurar adecuadamente los registros que generan la señal de reloj del protocolo I2C:

I2C clock settings with explanmations