

Introduction Inter-Integrated Circuit **I²C**

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Prerequisite

- Knowledge of Computer Organization
- Knowledge of Microprocessor

Abbreviations

1. I2C Inter-Integrated Circuit
2. SDA Serial Data
3. SCL Serial Clock

What is I²C

- It is an popular method to implement connection of many device together for communication purpose
- It has very simple structure, physically just 3 wires (and resistors).
- Because of it's simplicity (just wires, no other extra circuit component are required) , it can save lots of space and reduce the cost. (The old methods require lost of copper in routing)
- It support multi-mastering (but each time only one master)
- It is bi-directional
- It is a 1-bit serial bus : data is transferred bit by bit

The structure

It consist of 3 wire

	Symbol	Full name	Function
Active Wire	SDA	Serial Data	
	SCL	Serial Clock	
Passive Wire	GND	Ground	Ground

Master and Slave

- When the devices are connected onto the bus, all device are assigned with unique address
- All device can be acted as transmitter or receiver
- The device that send the information is defined as the master, other devices are all slave.
- The master can control the SDA and SCL line (change it's from high to low / low to high)

Signal Type

It has 3 type of signal

- START signal : It occur when $\begin{cases} \text{SCL remains high} \\ \text{SDA change from high to low } \neg \downarrow \end{cases}$
- STOP signal : It occur when $\begin{cases} \text{SCL remains high} \\ \text{SDA change from low to high } \neg \uparrow \end{cases}$
- ACK (Acknowledge) signal : It occur when receiver did receive the signal from sender

State of the bus line

- Stable State / Idling State : When $SCL = 1$, content of SDA is said to be *stable* , that is , content of SDA cannot be changed
- When $SCL = 0$, the SDA is changeable. (from high to low / low to high)
- Thus by control the SCL and SDA, different bit patterns (represented by bit sequences in SDA) can be sent from one device to another device.

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