

# History

- Before 1980's in Tv Sets- Microcontroller connected to each peripheral by wire
- Complex and Bulky Structure
- Philips Developed Two wired Protocol-I2C
- Reduced Complexity

# Basic Characteristics

- Two wired bus
- Speed

Normal mode-100kbps

Fast mode-400kbps

High Speed mode-3.4mbps

- Data Transfer: Serial, 8 bit oriented , bidirectional
- Master slave approach with multimaster option
- Addressing-7 bit or 10 bit unique addressing

# Overview :

- SCL : Serial Clock Line
- SDA : Serial Data Line
- Data transfer between devices connected to the bus
- Master Slave Approach

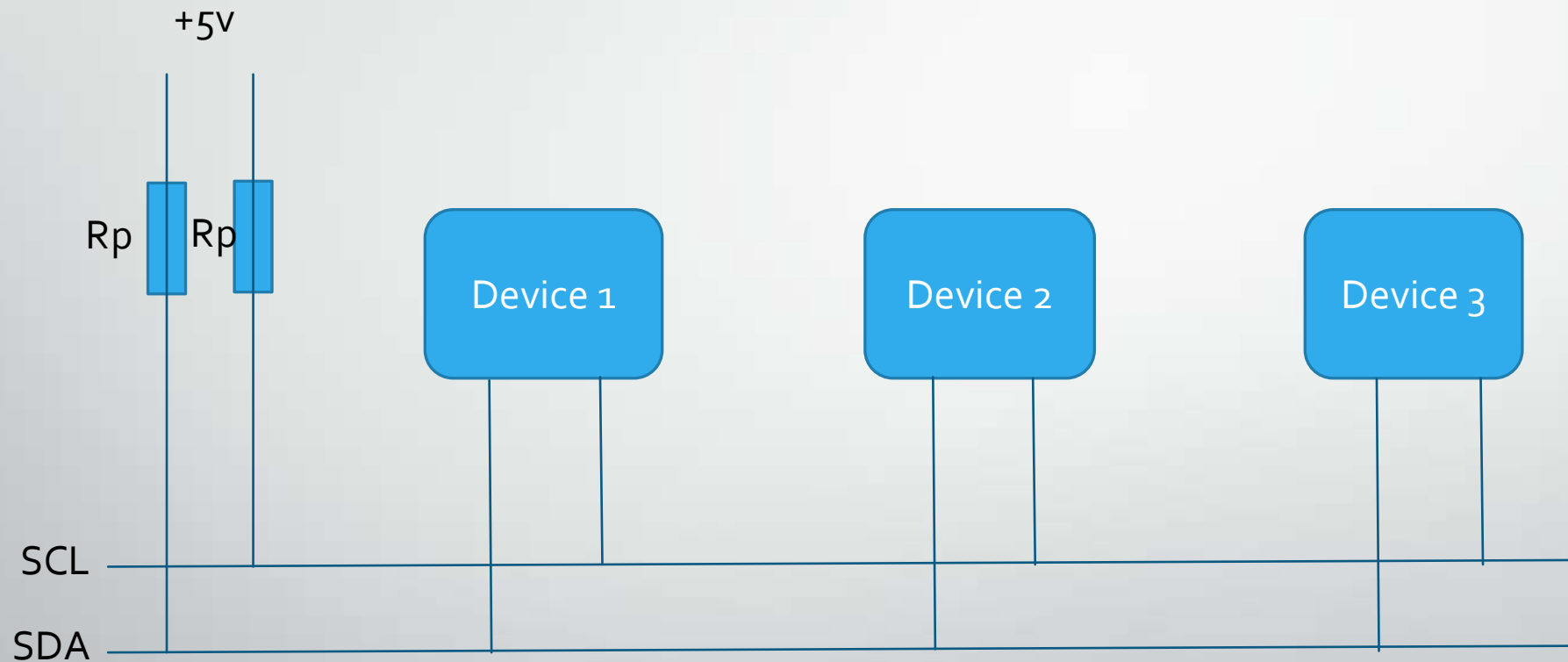
# Overview :Terms

- Transmitter – The device sending data to the bus
- Receiver – Device receiving data from the bus
- Master – device initiating a transfer, generates to clock and terminates a transfer
- Slave – Device addressed by the master
- Multi-master – more than one master can attempt to control the bus
- Arbitration – procedure to insure that only one master has control of ther bus at any instant
- Synchronization – procedure to sync then clocks of two or more devices

# Master and Slave

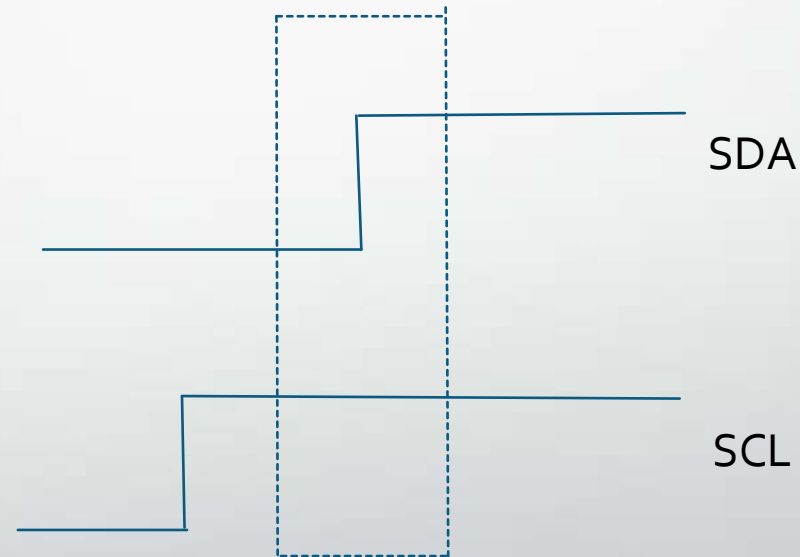
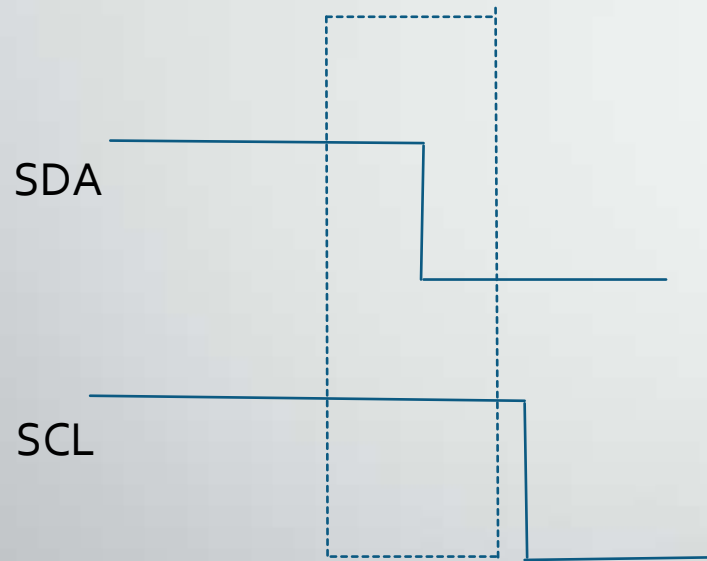
- Master :
  - Controls the SCL
  - Starts and stops data transfer
  - Controls addressing of other devices
- Slave :
  - Device address by master

# Physical Structure:



# Special Start and Stop Conditions:

- Only in Start and Stop conditions SDA is allowed to change while SCL is high
- Data transfer mode : SDA is stable when SCL is High



# Data Transfer

- Every Byte put on SDA must be 8 bit long
- Each Byte followed by Acknowledge bit
- Transfer- MSB to LSB
- When SCL is low- Data can be transfer



# Advantages

- Only two signal lines requires
- Flexible data transmission rates
- Each device on the bus is independently addressable
- Devices have a simple Master/Slave relationship
- Capable of handling multiple master communications by providing arbitration and communication collision detection

# Disadvantages

- Open Collector driver at master needs pull up resistance 2.2k on each line
- High Power Requirement
- Low Speed
- Low Throughput

# Comparison : I2C Vs SPI

I2C	SPI
Requires only two lines	Requires minimum four lines
Low Speed	Higher Speed
Half Duplex	Full Duplex
Additional Signal select lines not required if devices increases	Additional Signal select lines are required as devices increases
More Power required	Less Power Required
Multimaster can be used easily	Multimaster is difficult to implement