

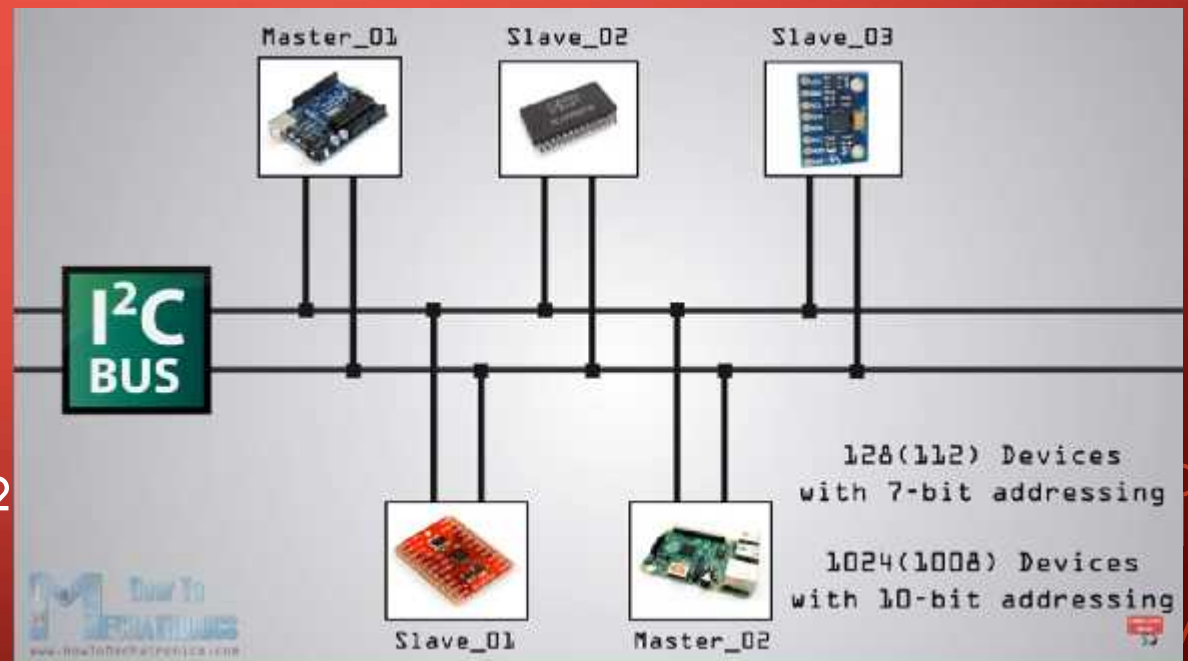
A decorative graphic on the left side of the slide, consisting of a network of orange lines and circles that resemble a circuit board or a neural network. The lines are of varying thickness and the circles are of varying sizes, creating a complex, branching pattern that extends from the top to the bottom of the slide.

I²C (INTER INTEGRATED CIRCUITS) COMMUNICATION

BY AKSHAY P KUMAR

I²C

- A protocol intended to allow multiple "slave" digital integrated circuits ("chips") to communicate with one or more "master" chips.
- It is a short distance serial interface that requires only 2 bus lines for data transfer

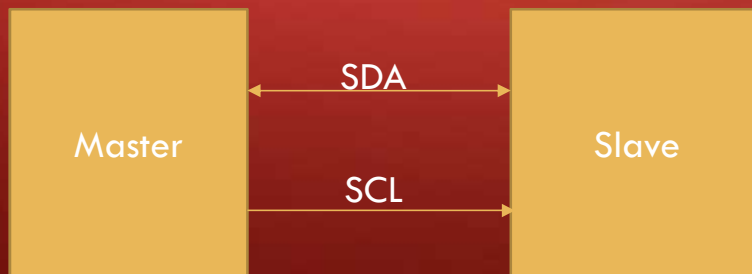


I²C

- It was invented by Philips in 1980's, originally to provide easy on-board communications between a CPU and various peripheral chips.
- it is working with 3 different speed of operations:
 - Slow(less than 100Kbps).
 - Fast (400Kbps)
 - High speed (3.4 Mbps)

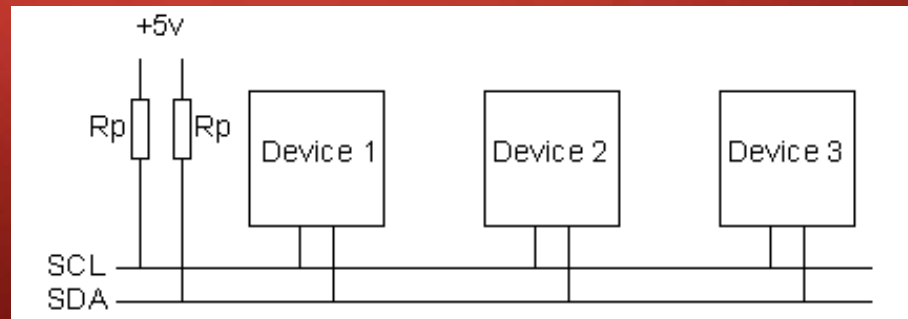
I²C

- I2C bus has two lines: a **serial data** line (SDA) and a **serial clock** line (SCL).
- Any data sent from one device to another goes through the SDA line,
- SCL line provides the necessary synchronization clock for the data transfer.
- Only a Master can initiate a data transfer and Slaves respond to the Master.
- The SCL clock line is always driven by the master.



I²C

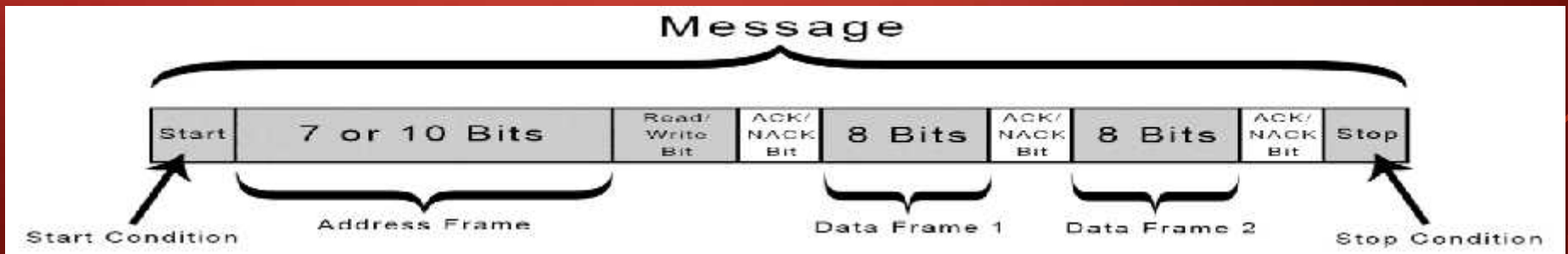
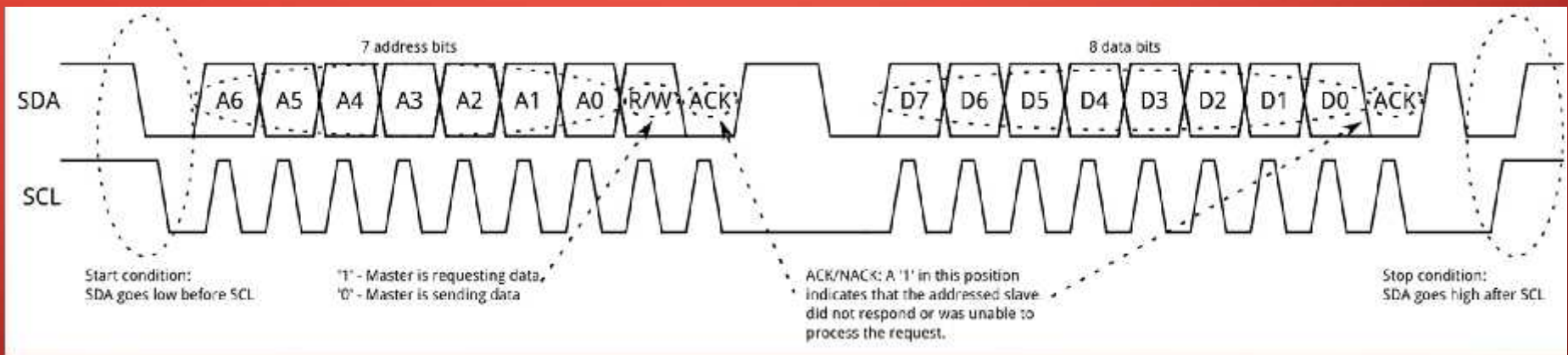
- Both SCL and SDA lines are "open drain" drivers.
- What this means is that the chip can drive its output low, but it cannot drive it high.
- For the line to be able to go high you must provide pull-up resistors to the 5v supply.
- There should be a resistor from the SCL line to the 5v line and another from the SDA line to the 5v line. You only need one set of pull-up resistors for the whole I2C bus, not for each device,

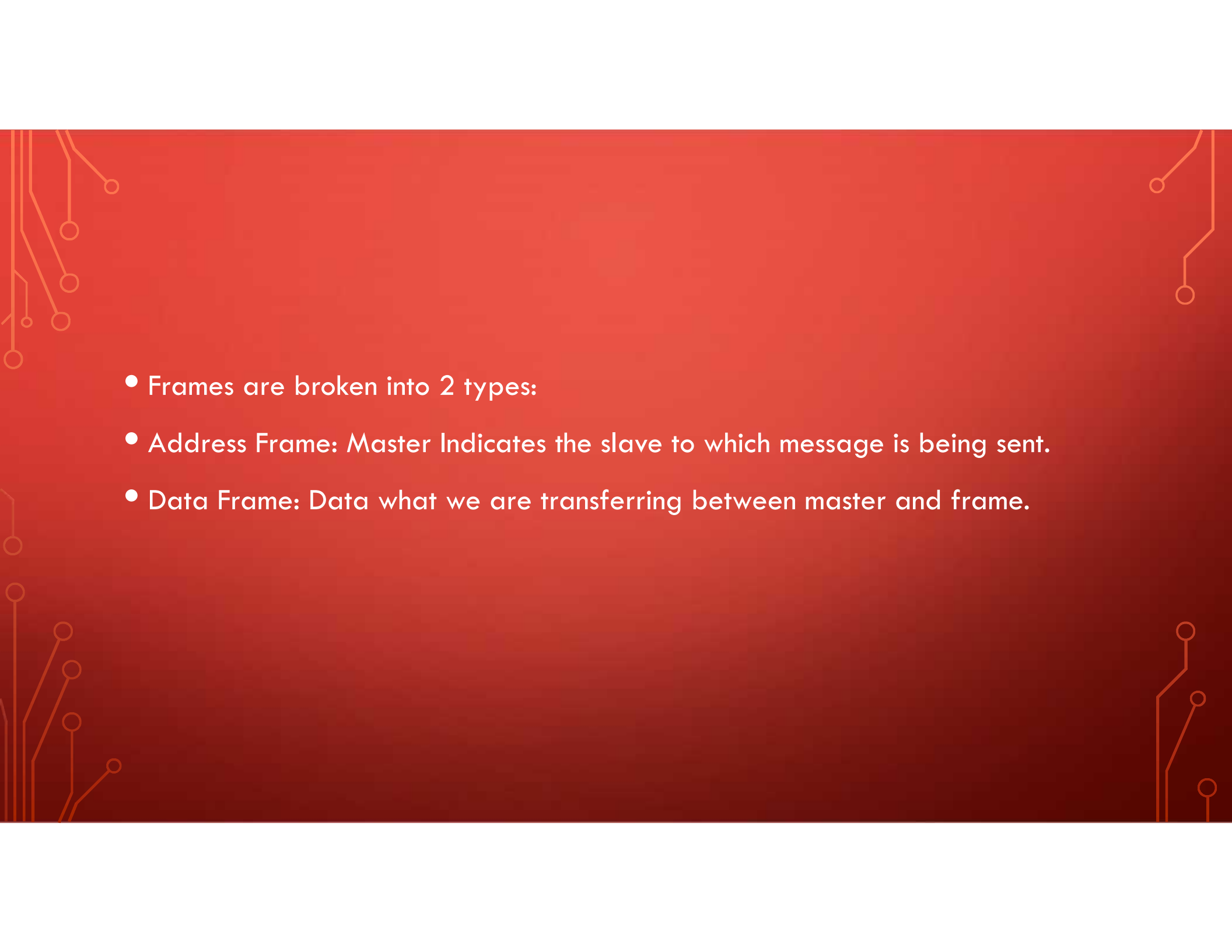


MASTER AND SLAVE

- The master is always the device that drives the SCL clock line.
- The slaves are the devices that respond to the master.
- A slave cannot initiate a transfer over the I2C bus, only a master can do that.
- There can be, and usually are, multiple slaves on the I2C bus, however there is normally only one master. It is possible to have multiple masters

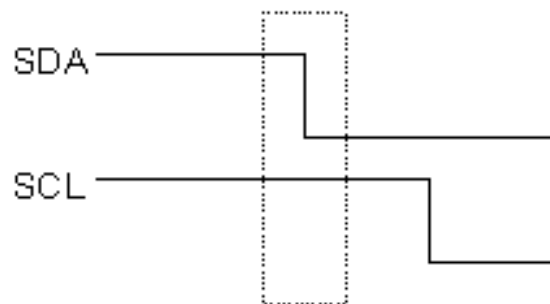
I²C FRAME FORMAT



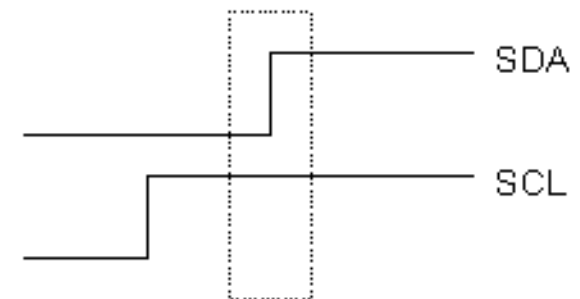
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- The slide features a dark red background with a subtle gradient. In the corners, there are decorative elements resembling circuit board traces or fiber optic paths, consisting of thin orange lines and small circles.
- Frames are broken into 2 types:
 - Address Frame: Master Indicates the slave to which message is being sent.
 - Data Frame: Data what we are transferring between master and frame.

START AND STOP CONDITION

Start sequence



Stop sequence



I2C DEVICE ADDRESSING

SDA

A6	A5	A4	A3	A2	A1	A0	R/W	ACK
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SCL

1	2	3	4	5	6	7	8	9
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DATA

SDA

D7	D6	D5	D4	D3	D2	D1	D0	ACK
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SCL

1	2	3	4	5	6	7	8	9
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