

## **Smart house**

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# **Components of project**

- 1-Uart
- 2- Bluetooth module
- 3- Spi
- 4- Lcd driver
- 5- Led

# Uart

## **- Steps for Setting UART:**

- The first step is to set the baud rate in both, the master and the slave. The baud rate has to be the same for both –master and slave.
- Set the number of data bits, which needs to be sent.
- Then enable the transmitter/receiver according to the desired usage.
- Get the buffer ready! In case of transmission (from AVR to some other device), load it up with the data to be sent, whereas in case of reception, save the previous data so that the new received data can be overwritten onto it.
- UART Can be used in Polling or Interrupt

## **- UART Settings :**

- Open Datasheet on USART Section and Start Designing UART Driver
- According to UART Operation needing to Initialize UART, Recv via UART and Send data using UART

# **Bluetooth module**

## **Bluetooth Module:**

### **HC-05 Technical Specifications**

- Serial Bluetooth module formicrocontrollers
- Operating Voltage: 4V to 6V (Typically +5V)
- Operating Current: 30mA
- Range: <100m
- Works with Serial communication (USART) and TTL compatible
- Follows IEEE 802.15.1 standardized protocol
- Uses Frequency-Hopping Spread spectrum (FHSS)
- Can operate in Master, Slave or Master/Slave mode
- Can be easily interfaced with Laptop or Mobile phones with Bluetooth
- Supported baud rate: 9600,19200,38400,57600,115200,230400,460800.

## **Bluetooth pin configuration:**

### **HC-05 Default Settings**

DefaultBluetoothName:“HC-05”

DefaultPassword:1234or0000

DefaultCommunication:Slave

DefaultMode:DataMode

DataModeBaudRate:9600,8,N,1

CommandModeBaudRate:38400,8,N,1

Defaultfirmware:LINVOR

## **Settings to Start Bluetooth with Mobile:**

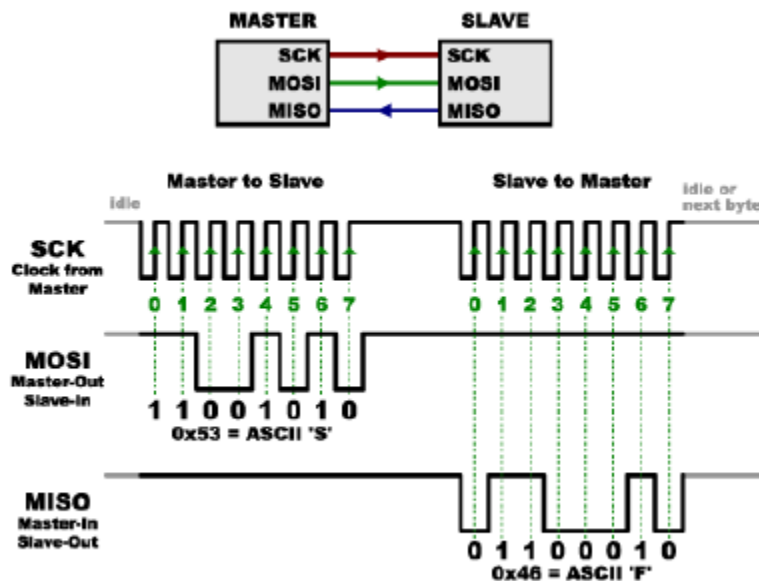
- First you need to pair HC05 with your Mobile
- Second you need to install BlueTermApp or similar app on your Mobile
- Third you need to connect your app to the HC05

- Then Data will be displayed if the HC05 is sending or you can send characters to the HC05

## Spi

### How Communication is done?

- Clock has phase and polarity transfer is done at specific edge condition
- SPI has 4 lines one for clock
- And two for data , Master Out Slave in
- Master In Slave Out



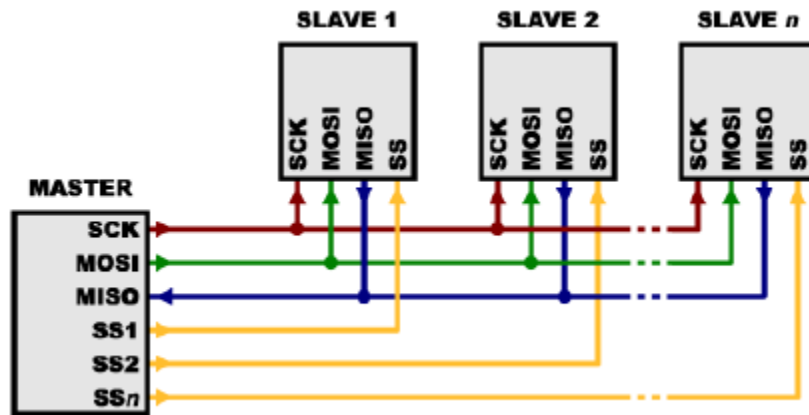
### Slave select:

- SS pin is slave select is to make the master to select which device to communicate with
- It's an active low signal comes out from
- The master to slave
- In master the user has the control of the SS pin

- In slave the SPI has the control on SS pin

## Single Master Multi-Slave:

- Multiple slaves option is guaranteed in SPI by using multiple SS pins each for every device.



## Lcd driver

### Build up LCD Module :

- Module for LCD will be divided into LCD.c and LCD.h
- Which should contain the LCD driver, the basic driver should contain the following functions:
  - LCD\_Init();
  - LCD\_Command(cmd);
  - LCD\_char(data);
  - LCD\_String(\*str);

# Led

## Active High vs Active Low:

Draw the circuit diagram on proteus where Button is connected to PD2 and LED is connected to PD3

Write a program for Atmega32 to :

Make the LED glow when the button is pressed.

Note This LED is Active High

