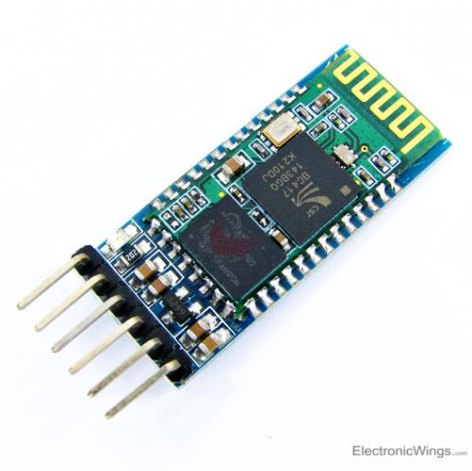
HC-05 Bluetooth Module Interfacing with PIC18F4550

Overview of Bluetooth

- HC-05 is a Bluetooth device used for wireless communication. It works on serial communication (USART).
- It is a 6-pin module.
- The device can be used in 2 modes; data mode and command mode.
- The data mode is used for data transfer between devices whereas command mode is used for changing the settings of the Bluetooth module.
- AT commands are required in command mode.
- The module works on 5V or 3.3V. It has an onboard 5V to 3.3V regulator.
- As the HC-05 Bluetooth module has a 3.3V level for RX/TX and the microcontroller can detect 3.3V level, so, no need to shift the transmit level of the HC-05 module. But we need to shift the transmit voltage level from the microcontroller to RX of the HC-05 module.

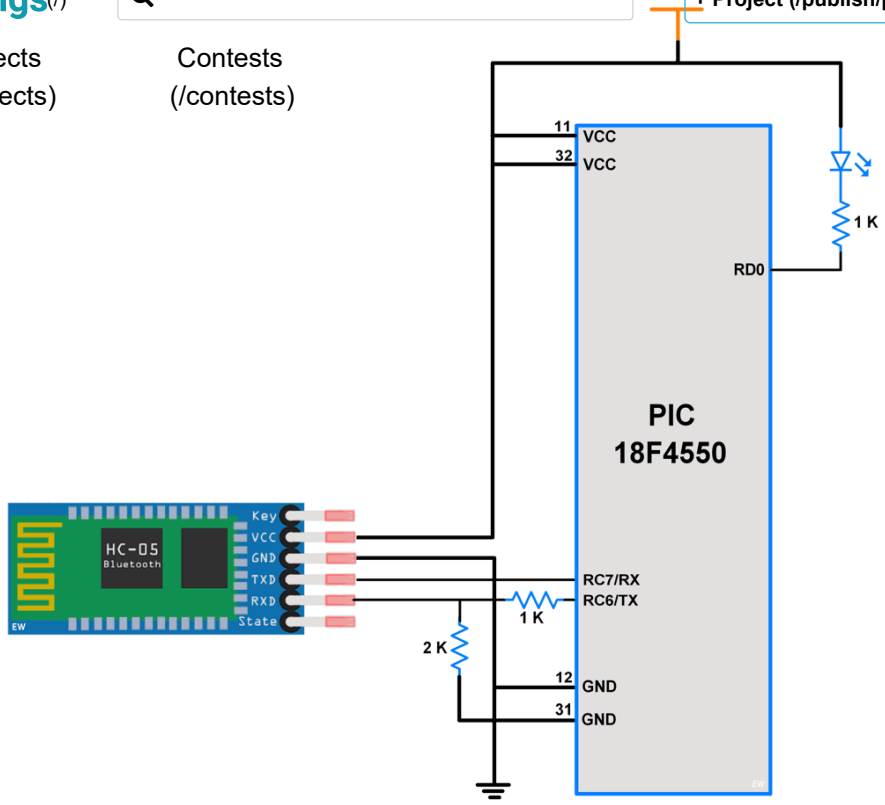
For more information about the HC-05 Bluetooth module and how to use it, refer to the topic Bluetooth module HC-05 (http://electronicwings.com/sensors-modules/bluetooth-module-hc-05-) in the sensors and modules section.

For information on USART in PIC18F4550 and how to use it, refer to the topic on USART in PIC18F4550 (http://electronicwings.com/pic/pic18f4550-usart) in the PIC inside section.



HC-05 Bluetooth Module

Connection Diagram of Bluetooth Module HC-05 to PIC18F4550



HC-05 Bluetooth Module Interfacing with PIC18F4550

Control the LED using HC-05 Bluetooth Module and PIC18F4550

Here let's develop a small application in which we can control LED ON-OFF through a smartphone.

This is done by interfacing PIC18F4550 with the HC-05 Bluetooth module. Data from HC-05 is received/ transmitted serially by PIC18F.

In this application, when 1 is sent from the smartphone, LED will turn ON and if 2 is sent LED will get Turned OFF. If received data is other than 1 or 2, it will return a message to mobile that select the proper option.

Programming HC-05

1. Initialize PIC18F4550 USART communication.
2. Receive data from the HC-05 Bluetooth module.
3. Check whether it is '1' or '2' and take respective controlling action on the LED.

HC-05 Bluetooth Module Code for PIC18F4550

```
//Interface HC-05 Bluetooth module with PIC18F4550
* http://www.electronicwings.com
*/
#include <pic18f4550.h>
#include "Configuration_Header_File.h"
#include "USART_Header_File.h"

#define LED LATD0
void main()
{
    OSCCON=0x72;    /* use internal oscillator frequency
                which is set to 8 MHz */
    char data_in;
    TRISD = 0;    /* set PORT as output port */
    USART_Init(9600);    /* initialize USART operation with 9600 baud rate */
    MSdelay(50);
    while(1)
    {
        data_in=USART_ReceiveChar();
        if(data_in=='1')
        {
```

Video of LED ON and OFF using HC-05 Bluetooth and PIC18F4550

Components Used

Bluetooth Module HC-05 Bluetooth is a wireless communication protocol ...	X 1	(https://www.mouser.in/ProductDetail/Seeed-Studio/113020008?qs=%2Fha2pyFadujxGtKPZQOIsfAELhtMLc13%2FotJz6J0MPjFYdv7Yo3kbw%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/bluetooth-module-hc-05/1/datasheet)
PIC18f4550 PIC18f4550	X 1	(https://www.mouser.in/ProductDetail/Microchip-Technology/PIC18F4550-I-P?qs=oKK8NaWdAJs8nLDXBGwMXw%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/pic18f4550/1/datasheet)

Components Used

PICKit 4 MPLAB PICKit 4 MPLAB	X 1	(https://www.mouser.in/ProductDetail/Microchip-Technology/PG164140?qs=r5DSvlrkXmLKDuYNJlmLWw%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/pickit-4-mplab/1/datasheet)
Breadboard Breadboard	X 1	(https://www.mouser.com/ProductDetail/Bus Board-Prototype-Systems/BB830?qs=VEfmQw3KOauhPeTwYxNCaA%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/breadboard/1/datasheet)

Components Used

LED 5mm LED 5mm	X 1	(https://www.mouser.in/ProductDetail/Lite-On/LTL-307EE?qs=Yz4wJs0d%252BpgyXm%2FpkMp2pg%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/led-5mm/1/datasheet)

Downloads

PIC18F4550 HC-05 Bluetooth Project File	Dow nloa d (/api/download/platform-attachment/110)
HC-05_AT_Commands	Dow nloa d (/api/download/platform-attachment/111)

Comments

Comment

cagoscra
(/users/cagoscra/profile)
2018-11-17 07:58:17

What if I'm getting weird characters?
What should I correct?
I also have another PIC18F46K80
Reply Like

lokeshc
(/users/lokeshc/profile)
2018-11-17 22:47:08

If you are getting weird characters then you should check for communication baud rate.
Reply Like 1

cocooscar
(/users/cocooscar/profile)
2018-12-10 01:19:47

I was using anothe clock speed so that changes also I suppose the baud rate, is there any way to use another port for the communication?
Reply Like

keerthanaece1008
(/users/keerthanaece1008/profile)
2019-11-07 15:05:45

Because the receiving character from bluetooth is to be nibble shifted.
Reply Like

kmachakanja
(/users/kmachakanja/profile)
2019-03-16 08:44:49

Hi, can I use PIC16F723A instead of PIC18F4550 ?
Also do you have any tutorial on pic to pic Bluetooth tutorial. I want to send data using a microcontroller instead of phons
Reply Like 1

lokeshc
(/users/lokeshc/profile)
2019-03-16 10:07:03

Not sure about pic16f723a. If their register are same then you can use.
N if that is the case then use xc. h instead of pic18f4550. h
For Pic to Pic Bluetooth communication, just make one Bluetooth master and other one should be slave. Connect them and then you can communicate serially as mentioned above.
Reply Like

eliza
(/users/eliza/profile)
2019-04-06 01:40:47

Hi, do you mind showing the breadboard and what's on it more clearly? Thanks
Reply Like

lokeshc
(/users/lokeshc/profile)
2019-04-06 12:29:47

It looks exactly same as given in interfacing diagram.
Reply Like

blarblublublar
(/users/blarblublublar/profile)
2019-05-14 15:54:35 • Edited

```
USART_Init(9600); /* initialize USART operation with 9600 baud rate */
MSdelay(50);
else
{
```

USART_SendString(" select 1 or 2"); /* send msg to select proper option */
}()
MSdelay(100);
why delay 50ms and 100ms?
Reply Like

lokeshc
(/users/lokeshc/profile)
2019-05-14 16:27:05

No need of both delay as such.
Reply Like 1

blarblublublar
(/users/blarblublublar/profile)
2019-05-14 22:06:56

USART_SendString() code?
and why 1k and 2k resistor use in RX pin?
Reply Like

Isteward
(/users/Isteward/profile)
2020-03-06 03:31:38

Entering 1 or 2 produces the correct message on the android , but each is followed by 'select 1 or 2' which is not logical based on the while loop. I am using Bluetooth SR Terminal. Any ideas on why this should happen?
Reply Like

Isteward
(/users/Isteward/profile)
2020-03-07 02:49:00

Issue resolved by checking for cr and lf
Reply Like

vb60419
(/users/vb60419/profile)
2020-04-27 00:34:57

How to add xc.h header file
Reply Like 1

DmitrijDmitrij
(/users/DmitrijDmitrij/profile)
2020-11-14 18:04:43

Germany: Danke, es funktioniert mit PIC16F1939 und HC-06 Bluetooth Module!

Hab den Code ein bisschen umgeändert:
Habe mein "config.h".
Einstellungen im "USART_Header_File.h" sind fast identisch, außer "TRISCbits.TRISC6 = 0;" und im "main" > "#define LED PORTDbits.RD1".
Reply Like

ESSAYEDABOEID
(/users/ESSAYEDABOEID/profile)
2022-04-27 01:22:20

dear sir
can i ask for hex file to be burned on pic 18f4550
thanks in advance
essayed9@hotmail.com
whats app
00201006273051
Reply Like

weitaiChee
(/users/weitaiChee/profile)
2022-07-24 18:13:00

May i know what plugins is required pls?Thx

Reply Like

JasuoSayan (/users/JasuoSayan/profile)
2023-06-29 22:51:48

el modelo del USART con el servo en el PIC18F4550?

Reply Like

DiogogPires (/users/DiogogPires/profile)
2023-09-23 00:52:22

You are the goat, you save me so hard! Thank you

Reply Like