# Using the Bluetooth HC-06 Module

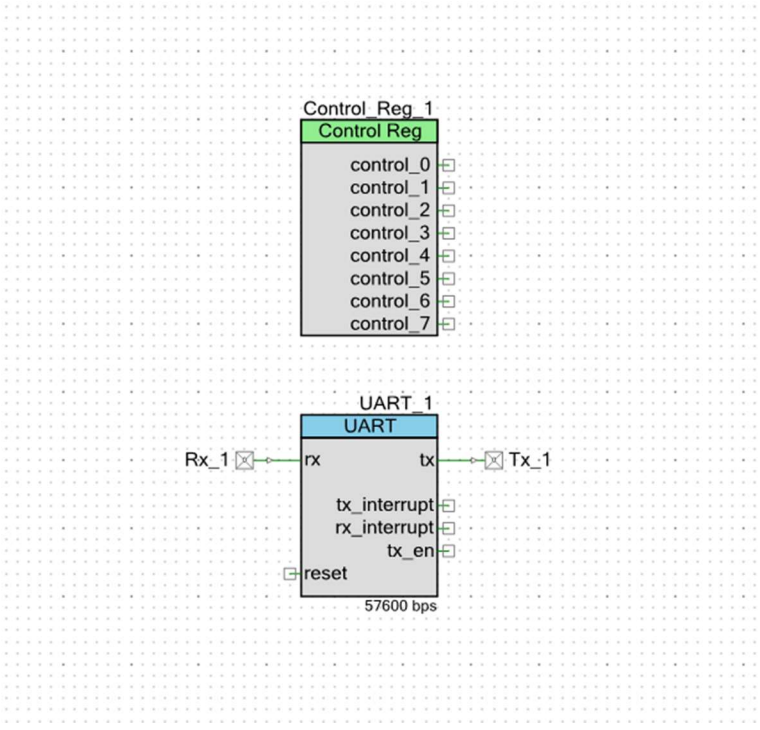
# Spring 2018

## Introduction

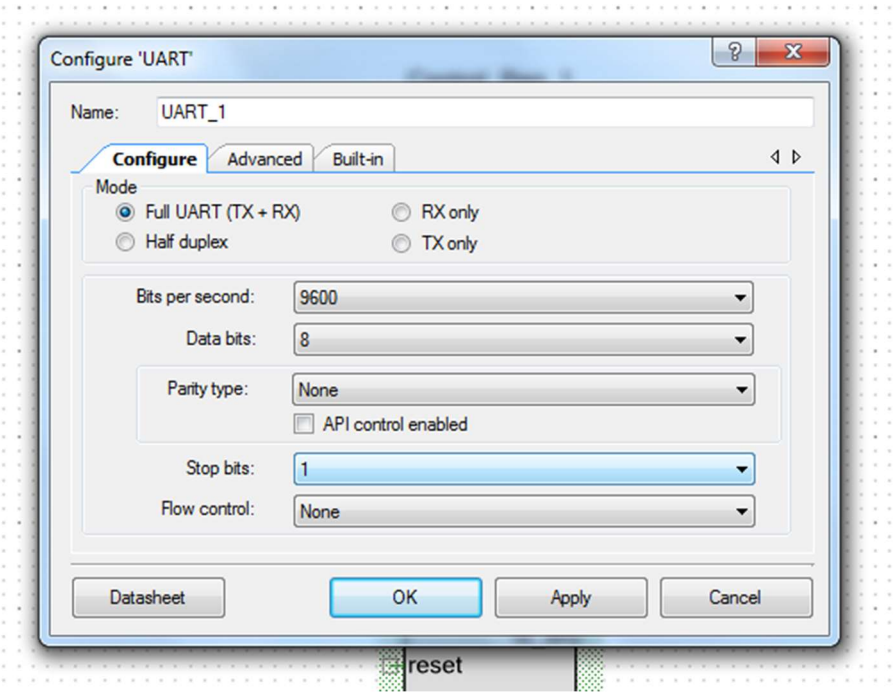
The HC-06 Module allows one to use simple UART protocols over Bluetooth. This example runs through communicating through a HC-06 module to a computer serial terminal with the PSoC. Due to variances in suppliers, the default baud rate and discoverable name may vary from module to module. This examples assumes a default name of 'HC-06' and a default baud rate of 9600.

## Software

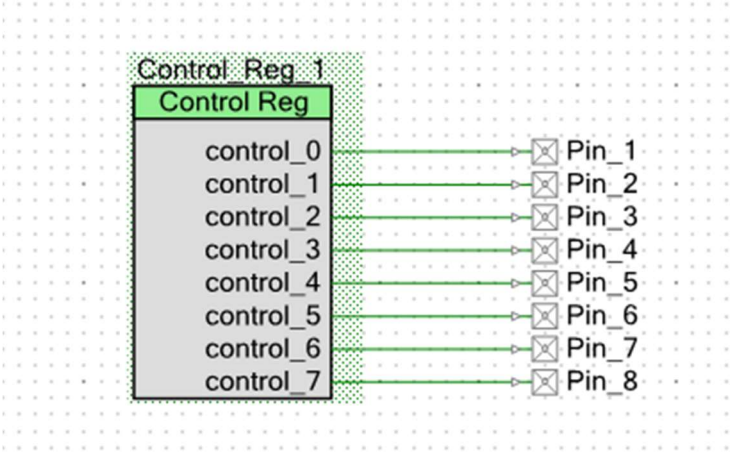
Firstly, open up a new PSoC Creator project, setup for your desired PSoC variant (this example is using a CY8CKIT-059). Drag a UART block and a Control Register block into the 'TopDesign.cysch' file. The UART block can be found under 'Communications' in the 'Components Catalog'. The Control Register block can be found under 'Digital'->'Registers'.



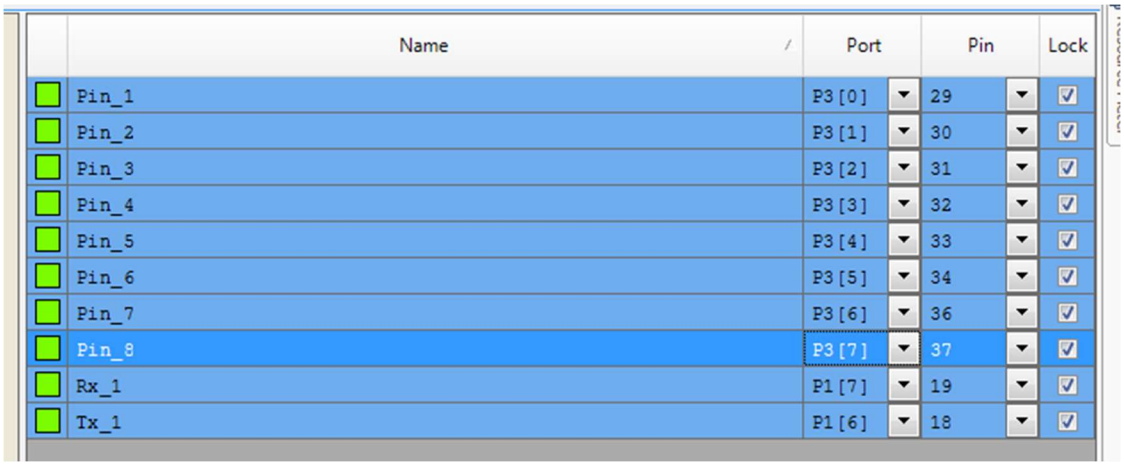

Now, modify the UART block settings to have a baud rate of 9600 and leave all other settings as default (shown below).




Add digital output pins for the control register. Wire them up to the control register outputs




Now, in the design wide resources file, add pin definitions for every created pin as shown below.



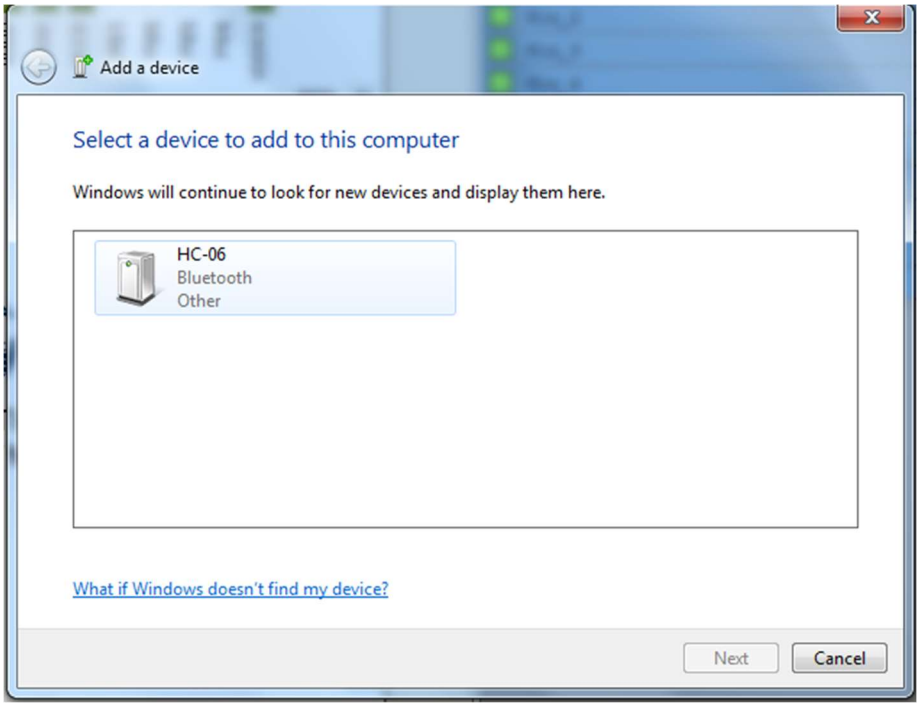
| Name | Port | Pin | Lock |
|---|---|---|---|
| Pin_1 | P3[0] | 29 | ☑ |
| Pin_2 | P3[1] | 30 | ☑ |
| Pin_3 | P3[2] | 31 | ☑ |
| Pin_4 | P3[3] | 32 | ☑ |
| Pin_5 | P3[4] | 33 | ☑ |
| Pin_6 | P3[5] | 34 | ☑ |
| Pin_7 | P3[6] | 36 | ☑ |
| Pin_8 | P3[7] | 37 | ☑ |
| Rx_1 | P1[7] | 19 | ☑ |
| Tx_1 | P1[6] | 18 | ☑ |

Build the program so that PSoC creator includes the necessary API's (which allows for auto-completion when writing the following code). In the 'main.c' file, we need to initialize the UART module and then on every loop iteration check if a message is available. If a message is available, we echo it back to the sender and output the received byte to the control register.

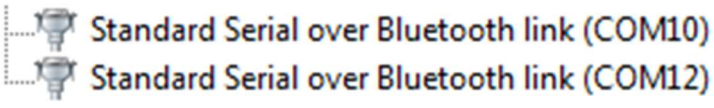
```
11 */
12 #include <project.h>
13
14 int main()
15 {
16     CyGlobalIntEnable; /* Enable global interrupts. */
17
18     /* Place your initialization/startup code here (e.g. MyInst_Start()) */
19     UART_1_Init();
20     UART_1_Start();
21
22     for(;;)
23     {
24         /* Place your application code here. */
25         if (UART_1_GetRxBufferSize() > 0) {
26             uint8 c = UART_1_GetChar();
27             UART_1_PutChar(c);
28             Control_Reg_1_Write(c);
29         }
30     }
31 }
32
33 /* [] END OF FILE */
34
```

## Hardware

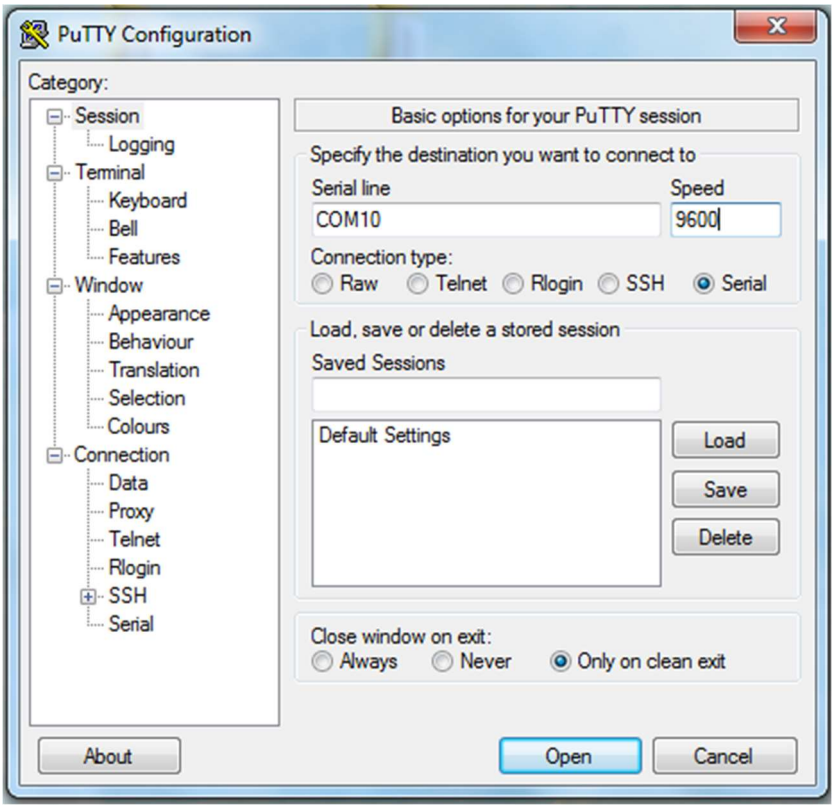
To wire up the HC-06 Module you need to wire VCC to 5V, TXD to whichever pin was assigned to Rx_1, RXD to the pin assigned to Tx_1, and connect grounds. **Ensure that your PSoC is operating at 3.3V or that you are using a level shifter in between the PSoC and HC-06**. In this example we'll be using Windows 7 and PuTTY to communicate, but any OS with Bluetooth support and any terminal emulator should be usable. Power up your circuit and navigate to your Bluetooth settings. Click 'Add a device' and you should see a screen similar to the one below appear. Add the HC-06 device and use a device pin of '1234' (your module may have a different default pin, also try '0000').




If the device is successfully added, you now have to wait for Windows to fetch the drivers. Once it finishes, you should be able to go to 'Device Manager' (Go->Search 'Device Manager') and under 'PORTS (COM & LPT)' you should see one or two new devices related to Bluetooth. Only one of them will work, so you'll need to go through some trail and error. In this case, COM10 is the correct port.




Now, open up PuTTY, or your terminal emulator of choice, and connect to your port (COM10) with a baud rate of 9600. As you type in the terminal you should see the characters echoed back and the pins connected to the control register should match the ASCII code of the sent character. If this occurs, congratulations, you are successfully using the HC-06 Module! When connected, the red LED should stop blinking and become solid.




# Troubleshooting

- No characters echoed back and pins not changing
  - First, try using the second COM port if it is available
  - Make sure your baud rates match and you are using 8 data bits, no parity, and 1 stop bit
  - Ensure your code matches the provided code exactly
  - Ensure Rx_1 is connected to TXD and vice-versa
- Nonsense output on serial terminal emulator
  - Ensure correct baud rates are being used
- Cannot find HC-06 Module on ‘Add a device’ screen
  - Try restarting both the computer and the device
  - Begin searching for devices shortly after HC-06 has turned on