ECE/CSE 474:
Intro to Embedded Systems

Configuring Bluetooth for UART Communication

The instructions in this document are slightly biased toward the Windows OS. Moreover, this document assumes that you are using the TM4C1294XL Tiva Board. If you haven't gone through the PuTTY tutorial document provided, you will need to do so before completing this document.

Bluetooth

Bluetooth is a very handy way to communicate information wirelessly, removing the need of pesky wires. Much like a serial port, Bluetooth can be recognized as a COM port, and you can use the same UART protocol. The difference between a serial configuration and the Bluetooth configuration is simply how you connect the Bluetooth device to your computer. Here's a rundown of what you need to do:

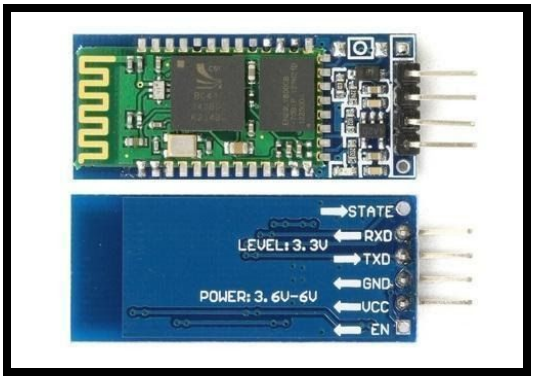

Figure 1. Front and back view of the Bluetooth module

The Bluetooth module provided to you makes interfacing with the microcontroller's UART easy. To connect the module to the TM4C, you need to connect four pins in particular: VCC and GND for power, and TXD and RXD for UART communication. Specifically, VCC needs to be connected to the 5V output of the board, while TX and RX need to be connected to GPIO pins configured to use the board's UART hardware. Check out Table 2 for UART modules and their respective pins that are recommended for Bluetooth configuration.

- Connect TXD pin of the Bluetooth to the board's GPIO pin configured as UART RX line.
- Connect RXD pin of the Bluetooth to the board's GPIO pin configured as UART TX line.

The two steps above may seem counterintuitive at first, but the trick is understanding what TXD and RXD are actually doing. RXD takes in serial data to be transmitted to the module's wireless counterpart. TXD outputs data serially that it receives from its wireless counterpart. Simply, TXD transmits data to the MCU, and RXD receives data from the MCU.

The default settings of the Bluetooth are:

- Baud rate 9,600 (b/s)
- 8 bits
- No parity
- 1 stop bit
- Hardware flow control enabled

Table 1: Recommended UART Modules (TM4C1294XL)

UART	TX Pin	RX Pin
UART2	PA7	PA6
UART3	PA5	PA4
UART4	PK1	PK0
UART5	PC7	PC6

Pairing the Bluetooth module with your computer (Windows-OS Steps):

1. Make sure the Bluetooth module is powered, and thus discoverable. The red LED should be blinking. If not, check the wiring above. (The red LED will keep blinking until you connect your module with PuTTY)
2. Open the Bluetooth device manager on your computer (make sure that your computer is Bluetooth compatible) and add a new device. The module should appear as HC-06.
3. Click the new device and enter the pairing code. This should be the factory default 1234.
4. Once the device is paired, you don't need to repeat this step to pair it again.
5. Open your Device Manager and find the Bluetooth COM port: Standard Serial over Bluetooth Link. You may find two COM ports with this name, you'll need to try connecting both to the PuTTY to see which is the correct port to use. The Bluetooth module will stop blinking if the connection from PuTTY is successful.
6. Right-click on the Bluetooth COM port and select properties, then select Port Settings. Configure the port setting to match the default setting of Bluetooth shown on the top of this page.
7. You should now be able to transmit/receive data over the Bluetooth Module.