IoTSSC LAB #4

BLUETOOTH COMMUNICATION*

*Manual based on updated ARM University Program 2014 material and mbed-cli documentation.

OVERVIEW

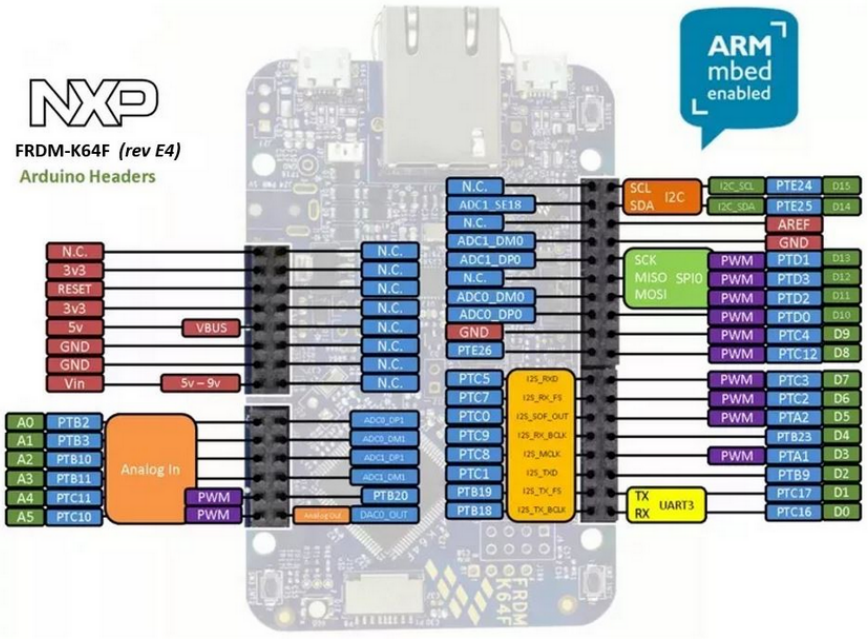
In this lab, you will practice communicating between a phone and the embedded device via bluetooth. This communication will involve a HC-06 bluetooth module and Mbed's serial communication API.

IMPLEMENTATION DETAILS

HARDWARE

FRDM-K64F

The FRDM-K64F board pin descriptions are shown below:

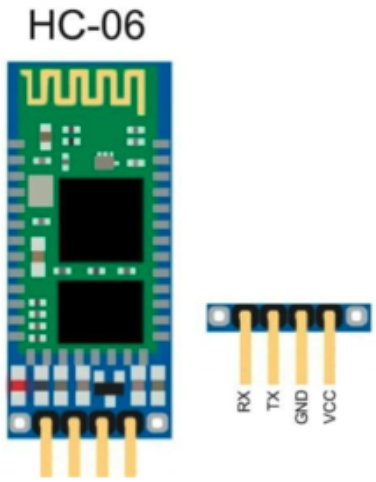


Note that the pin names used for the mbed API are those outlined in **dark green.**

HC-06 BLUETOOTH MODULE

The HC-06 bluetooth module is a slave bluetooth device that relays data sent to it by a master (often a phone) through a serial interface. This serial interface is enabled by the TX and RX pins of the module, which can be connected to the relevant pins on the board.

Pin Label	**Description**
GND	Connect to ground
VCC	Power supply: 3.3V – 5V
RX	Receiving pin of module
TX	Transmitting pin of module



In order to connect the bluetooth module to the board we must wire the RX and TX pins together. Note that the pins on the HC-06 denote **its** receiving and transmitting pins which are opposite to the serial pins on the board.

SOFTWARE

MAKING A NEW PROJECT

Though we will later integrate the bluetooth functionality with our sensors, it will be useful to start a new project to ensure the communication is working in isolation.

```
$ conda activate iotssc

(iotssc) $ mbed new bluetooth_communication
(iotssc) $ cd bluetooth_communication
```

If you do not have a functional `main.cpp` file from the last lab you can copy the one provided with these instructions, i.e. copy this file to the project folder.

CONNECTING BLUETOOTH MODULE AND PHONE

To ensure that we can communicate with the bluetooth module, before writing any code, download the “Serial Bluetooth Terminal” app (by Kai Morich). It can also be found here:

https://play.google.com/store/apps/details?id=de.kai_morich.serial_bluetooth_terminal&hl=en_GB

This app will allow you to communicate with the bluetooth module from your **phone**. In order to connect to the module with the app you must first have paired with the module. Navigate to the bluetooth settings, search for local devices and pair with the one named ‘HC-06’.

Next, open the serial bluetooth terminal app and ensure you can connect to HC-06.

YOUR APPLICATION CODE

In this lab, you need to perform the following tasks:

- Get familiar with Mbed’s RawSerial library. This will be used on the embedded device to communicate with the module.
- Write code to write to the bluetooth module. Ensure that when connected to the module from the phone you can see the messages written by the board.
- Write code to read from the bluetooth module and print the message to the terminal. You can test if this is working by connecting to the module via the phone app and typing a message. Is this message printed to your screen? **Note:** You may have to explore mbed callbacks to get this working.
- If you have completed the above tasks experiment with sending data from the gas sensors across the bluetooth link.