Bluetooth LED Controller

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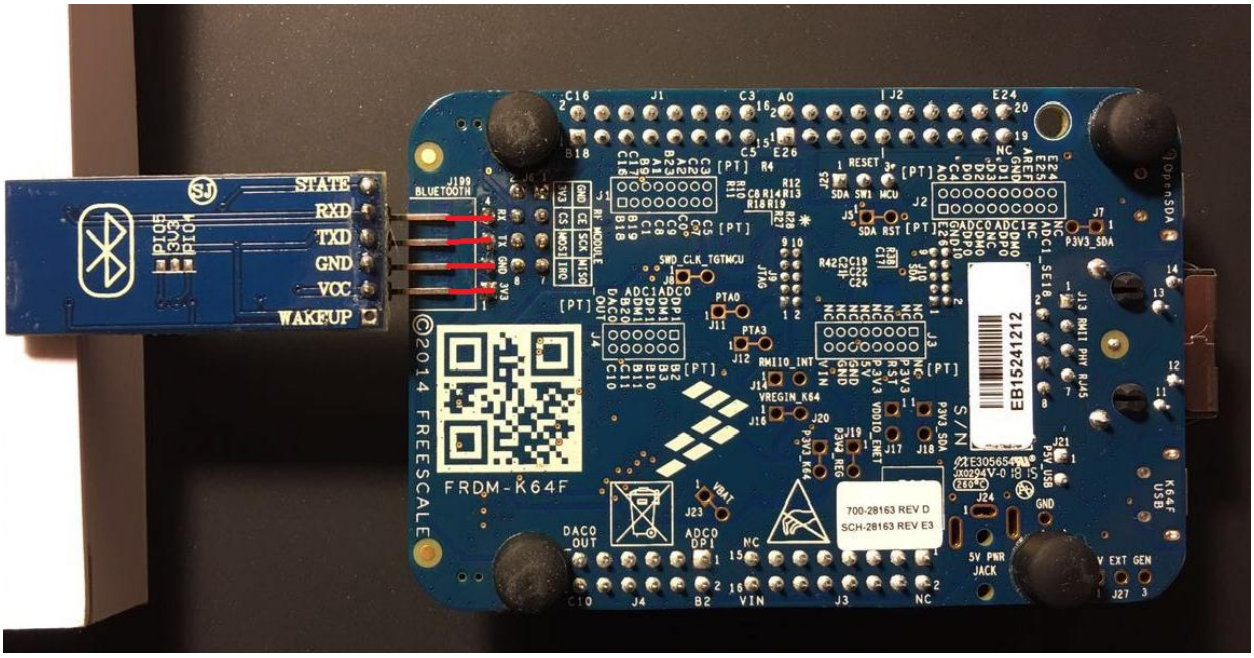
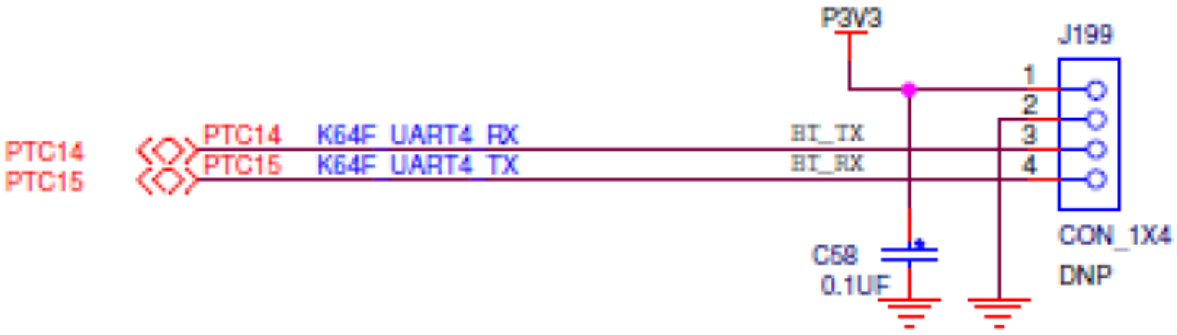
1. Introduction:
   This project use Freescale FRDM-K64F development board, HC-06 Bluetooth module and PC with Bluetooth to build a Bluetooth LED controller.

   The HC-06 Bluetooth module is connected with K64F dev board, and after paring with PC Bluetooth, there'll be a virtual UART connection created between PC and K64F dev board. Thus PC can control the K64F on-board LEDs through self-defined UART command interface.

2. Board connections:



   And the schematic of the connection is shown as follows:



Basically the "RXD" port of the HC-06 Bluetooth board is connected to "PTC14" port of the K64F dev board; and the "TXD" port of the HC-06 Bluetooth board is connected to "PTC15" port of the K64F dev board.

3. K64F side code.
   For detailed code, please refer to:
   https://github.com/yangsliu/Embedded/tree/master/e4357_bluetooth_led_controller/K64F_code/K64F_led

   The K64F side code basically do the following things:
   1) Initialize UART communication with HC-06 Bluetooth module;
   2) Kept receiving command strings through UART;
   3) Translate command strings and perform the corresponding control on LEDs.

   Command strings supported:

Command string (in regular expression)	Operation
R10	Turn off red LED
R00	Turn on red LED (always on)
R0[1-9][0-9]*	Turn on red LED (blink, time interval in seconds specified with the numbers from the 3rd bit of the command)
G10	Turn off green LED
G00	Turn on green LED (always on)
G0[1-9][0-9]*	Turn on green LED (blink, time interval in seconds specified with the numbers from the 3rd bit of the command)
B10	Turn off blue LED
B00	Turn on blue LED (always on)
B0[1-9][0-9]*	Turn on blue LED (blink, time interval in seconds specified with the numbers from the 3rd bit of the command)

4. PC side code in Python.
   For detailed code, please refer to:
   https://github.com/yangsliu/Embedded/tree/master/e4357_bluetooth_led_controller/PC_Python_code

   PC side code is written in Python, and only support Python 3.X.

   This Python program use the pyserial package:
   https://pythonhosted.org/pyserial/pyserial.html#installation

   The PC side Python code basically do the following things:
   1) Initialize virtual UART connection with the COM port created through Bluetooth connection;
   2) Build LED control GUI;
   3) Translate GUI operations to command strings, and send to the K64F dev board through virtual UART connection.

   GUI of the PC side LED controller: