CPE403 – Advanced Embedded Systems

Design Assignment #05

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Github Repository link (root): https://github.com/kirkster96/DqF514-not-embedded

Youtube Playlist link (root):

https://www.youtube.com/playlist?list=PLiqmqQ7XKuf7ArV7lO6b20D1ES5SUp0Yk

Follow the submission guideline to be awarded points for this Assignment.

Submit the following:

- Demo (Video link text file), Document, and Code.
- Documentation: Submit the midterm report with 1) Goal, 2) Detailed Implementation, 3) Schematics, 4) Video links, 5) Screenshots, and 6) Conclusions (tasks completed).

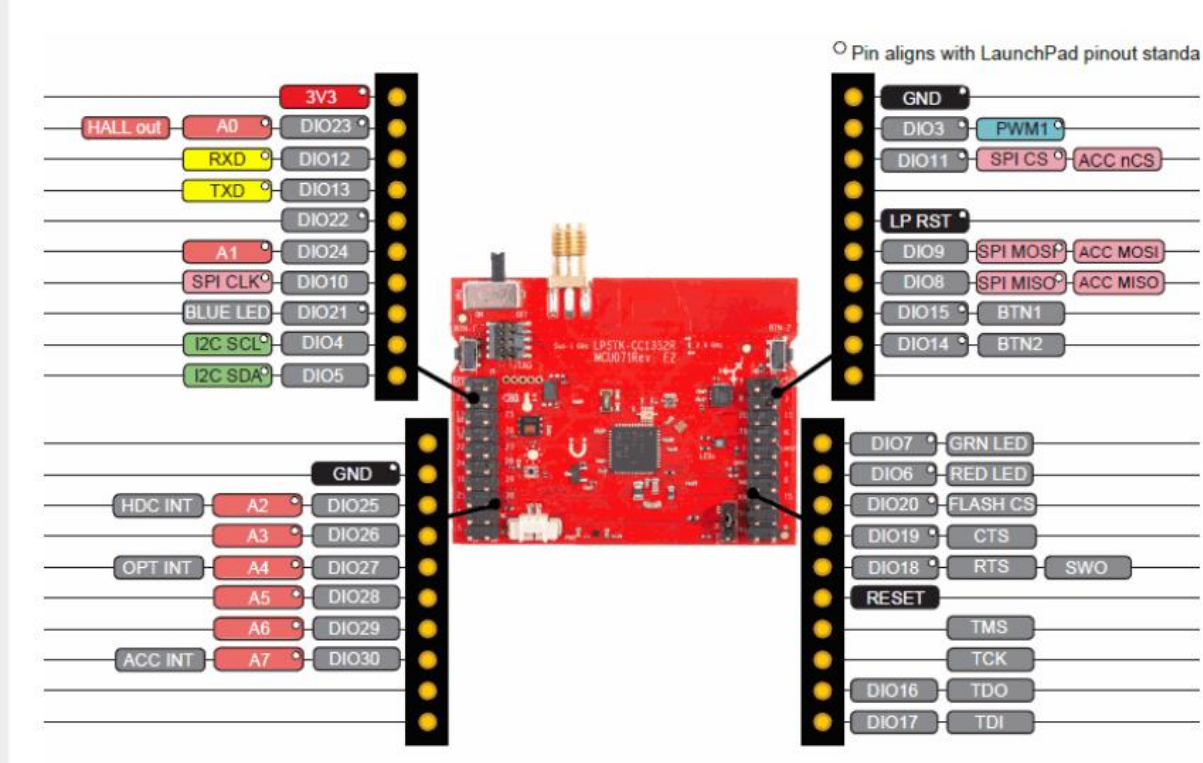
1. Goal

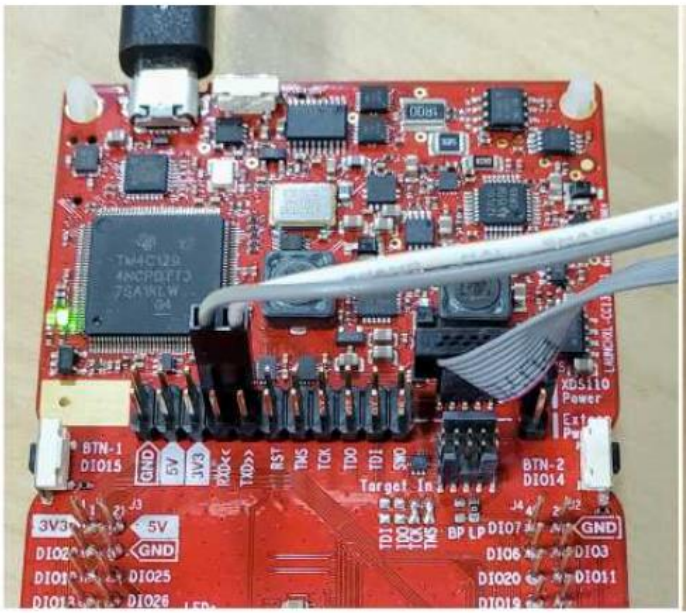
The goal of this assignment was to use the LPSTK as a sensor and transmit to the collector node CC1351R. A star topology network is created using the Sub-1GHz application. The sensor data from the CC1352 LPSTK is transmitting temperature, humidity and light sensor data to the collector node. In addition, the number of right BTN-2 presses should be counted and transmitted to the collector node.

2. Detailed Implementation

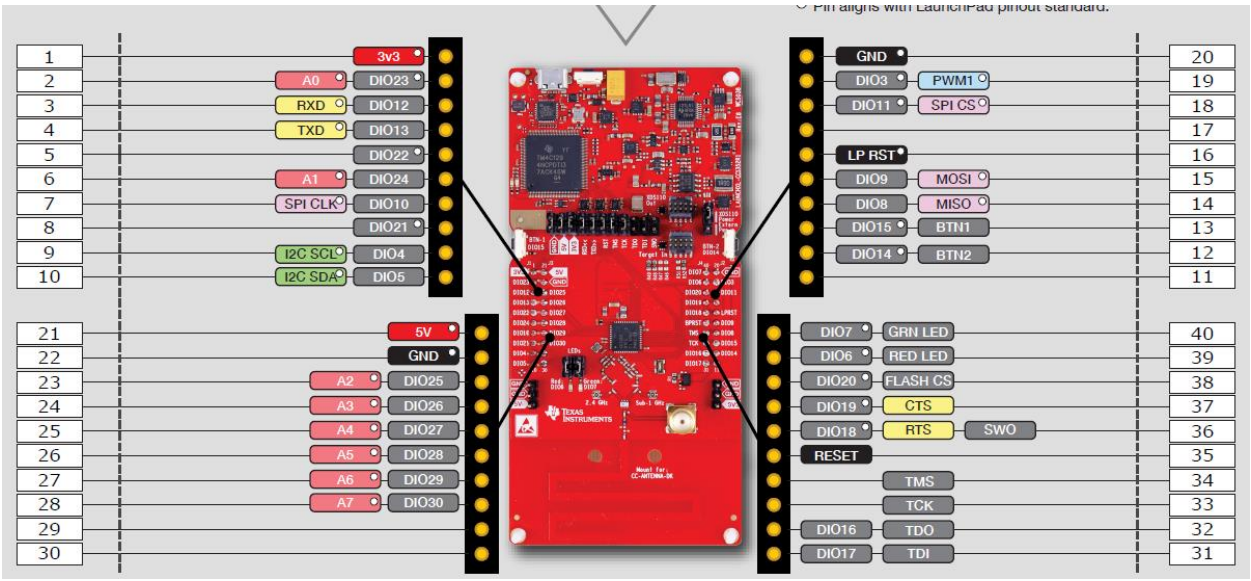
My implementation was achieved by using the SysConfig to configure and use the LPSTK hardware in my sensor. Specifically, I had to define the LPSTK as a definition for my project which will enable to use of all lines of code that only execute in the sensor project if the LPSTK definition is set. I also copied in the header files and function definitions for the LPSTCK and it's dependencies. The result is that the sensor is able to use and transmit the sensor messages to the collector. The collector is modified simply to only show the messages from the sensor that include the light temp and humidity data. In addition, there is a message included to display the number of button presses.

3. Schematics

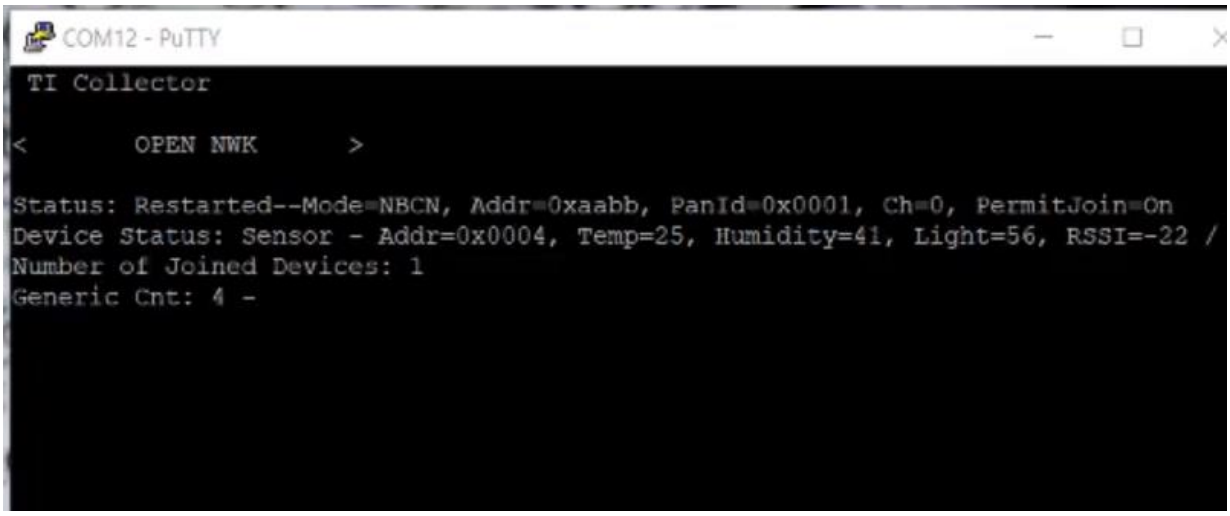


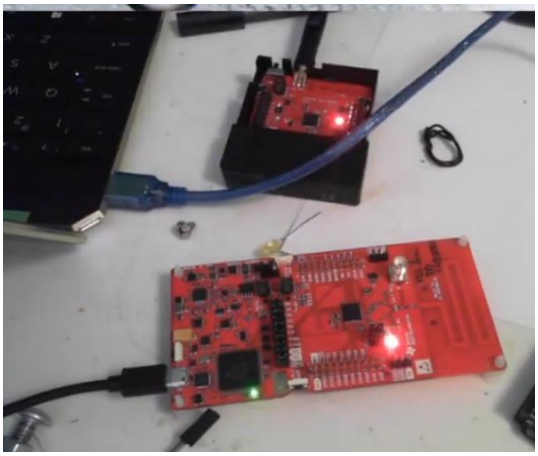

BTN-1
DIO15
BTN-2
DIO14
GND
5V
3V3
RXD
TXD
RST
TMS
TCK
TDO
TDI
SWO
XDS110
Power
Target In
BP
LP
DIO7
DIO6
DIO3
DIO20
DIO11
DIO25
DIO26


LP-EM-CC1352P7
MCU 7 Rev E2


Pin aligns with LaunchPad pinout standard.
1
2
3
4
5
6
7
8
9
10
3v3
A0
DIO23
RXD
DIO12
TXD
DIO13
DIO22
A1
DIO24
SPI CLK
DIO10
DIO21
I2C SCL
DIO4
I2C SDA
DIO5
21
22
23
24
25
26
27
28
29
30
5V
GND
A2
DIO25
A3
DIO26
A4
DIO27
A5
DIO28
A6
DIO29
A7
DIO30
20
19
18
17
16
15
14
13
12
11
GND
DIO3
PWM1
DIO11
SPI CS
LP RST
DIO9
MOSI
DIO8
MISO
DIO15
BTN1
DIO14
BTN2
40
39
38
37
36
35
34
33
32
31
DIO7
GRN LED
DIO6
RED LED
DIO20
FLASH CS
DIO19
CTS
DIO18
RTS
SWO
RESET
TMS
TCK
DIO16
TDO
DIO17
TDI

4. Screenshots





5. Video Links

https://youtu.be/AiZyo73WGnc

6. Conclusion

In conclusion, the TI 15.4 Stack is a very powerful tool for implementing RF applications. The sensor and collector project files that are provided for various wireless MCUs allow for fast modification and development of wireless sensor networks and systems. I was able to implement a customized sensor and collector network with minimal coding.

I understand the Student Academic Misconduct Policy -
http://studentconduct.unlv.edu/misconduct/policy.html

"This assignment submission is my own, original work".
Cameron Kirk