

**2020F\_ESE\_3014\_1**

**SEMESTER: 3<sup>rd</sup> SEM**

**INSTRUCTOR: Prof. Linchen Wang**

**LAB 7**

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## **INTRODUCTION :**

In this lab, we will show the communication between beaglebone black and arduino uno board using an optocoupler(HCPL-2200).From the datasheet we found that the maximum input current should be 230mA for the safety measures.

Here we used a GPIO port which usually runs on 3.3v. For the safety measures we added a 1K ohm resistor in series so that the current could not exceed 3.3mA at the input of the optocoupler.

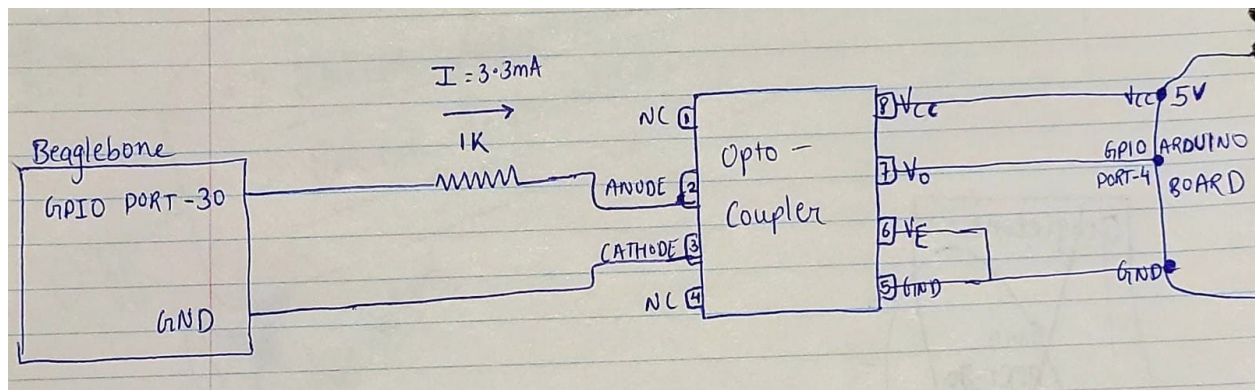
On the receiver side of the optocoupler we connected the arduino board to receive the data.

## **DESCRIPTION :**

To begin with, we connected GPIO Port 30 of the beaglebone black to the anode of the optocoupler with a resistor in series with that.

And we connected the GND of the beaglebone to the cathode of the optocoupler.

Circuit Diagram of the connections is shown below:



The receiver side of the optocoupler is connected to the arduino as shown in the above diagram.

Then we used the C++ code to set the GPIO 40 as an output port and also to send HIGH and LOW signals alternatively for some seconds.

The c++ code is shown below :

## Simple.cpp

```
#include<iostream>
#include<unistd.h> //for usleep
#include"GPIO.h"
using namespace exploringBB;
using namespace std;

int main(){
    GPIO outGPIO(30); // port 30

    outGPIO.setDirection(OUTPUT); //setting port 30 as output
    for (int i=0; i<30; i++){
        outGPIO.setValue(HIGH); // 1
        usleep(500000); //microsecond sleep 0.5 seconds
        outGPIO.setValue(LOW); // 0
        usleep(500000); //sleep for 0.5 second
    }

    return 0;
}
```

This program sends the series of 1 and 0 alternatively for a while and then it stops .

For the header file gpio.h, we took the reference from the link as follows :

<https://github.com/derekmolloy/exploringBB/tree/version2/chp06/GPIO>

Now in order to receive the signal from the beaglebone, at first we set the port 4 of the arduino as an input port .

Then using the serial.print command, we can see the received signal on that port using the serial monitor.

The code for the arduino is as follows:

### **gpio.ino**

```
void setup(void)
{
  // Start Serial (to display results on the Serial monitor)
  Serial.begin(115200); //baud rate

  // Set GPIO 4 as input
  pinMode(4, INPUT);}
void loop() {

  // Read GPIO 4 and print it on Serial port
  Serial.print("State of GPIO 4: ");
  Serial.println(digitalRead(4));

  // Wait 0.5 second
  delay(500);
}
```

**Output :**

**Youtube Link:**

[https://www.youtube.com/watch?v=zEOkCWaOM\\_0&t=18s](https://www.youtube.com/watch?v=zEOkCWaOM_0&t=18s)

## **CONCLUSION :**

To sum up, we learned how to send the data from beaglebone black to arduino uno board using optocoupler as an interface between them.