How to connect 3 TFminis on Arduino DUE via UART

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Mincy Zhao

1. Introduction

This is about how to connect 3 TFminis on Arduino DUE via TTL UART. The Arduino DUE comes with four hardware UART

interfaces. We use three of them to connect one TFmini separately. Another connects to the computer for viewing data.
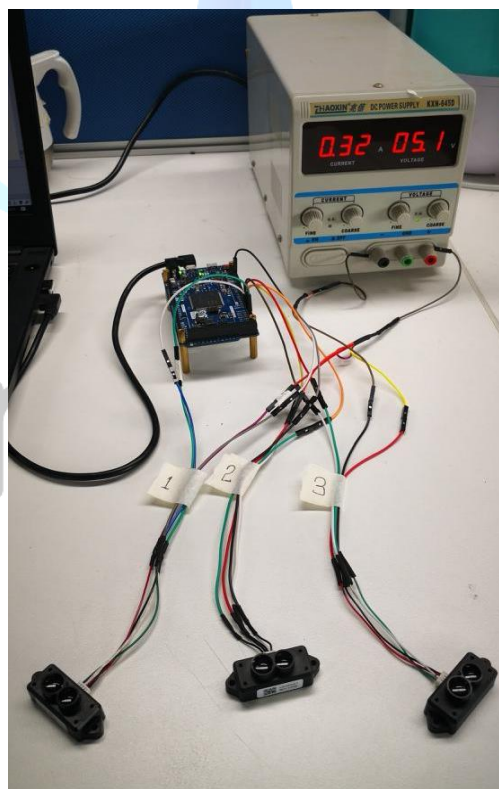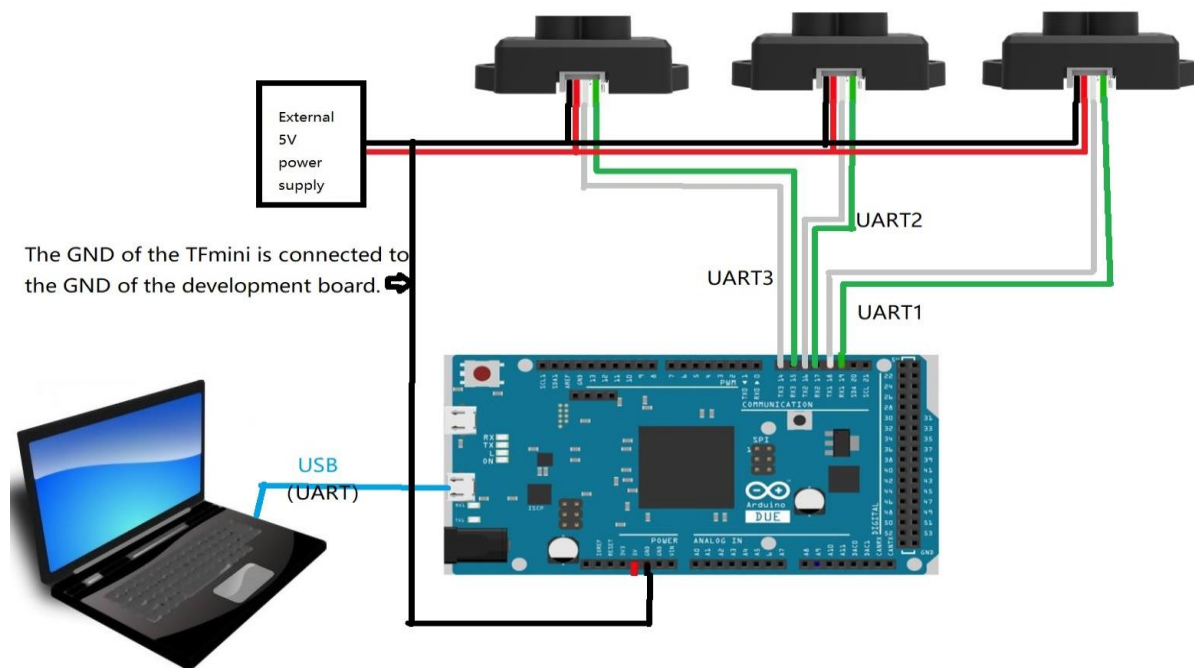
2. Materials

- TFmini $\times$ 3；
- Arduino DUE $\times$ 1；
- DuPont wire；
- PC（Windows）；
- Arduino IDE；

3. Connection

External
5V
power
supply

The GND of the TFmini is connected to
the GND of the development board.

UART2

UART3

UART1

USB
(UART)
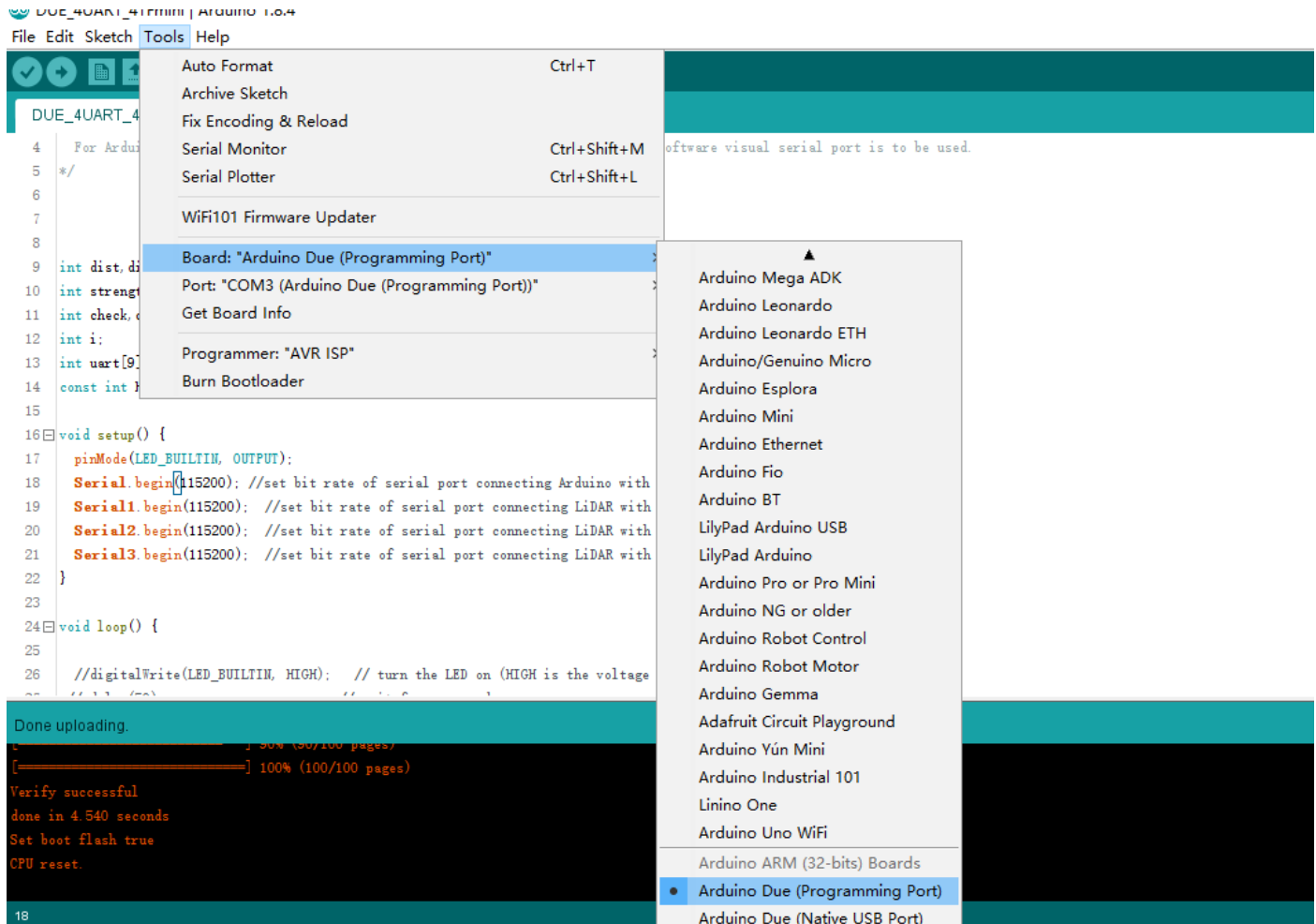

- Because the 5V output capability on the DUE board is not enough to power three TFminis. So all TFminis use an external 5V power supply.

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4. Arduino IDE

5. Coding

```
/*
    Multiple TFminis ----    Arduino DUE -----    UART
    This is a sample code for connecting 3TFminis to Arduino DUE board via UART, each TFmini use one UART.
    For details, refer to Product Specifications.
    The Arduino DUE comes with four hardware UART interfaces. We use three of them to connect one TFmini separately.
    Another connects to the computer for viewing data.
    This is just to provide testing, not my company's official product. Do not use for commercial purposes
    In principle, we do not provide technical support for this code.
    Author:Mincy Zhao
    Update date:2018.08.14
*/
```

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```
int dist,dist2,dist3; //actual distance measurements of LiDAR
int strength,strength2,strength3; //signal strength of LiDAR
unsigned char check,check2,check3;    //save check value
int i;
unsigned char uart[9],uart2[9],uart3[9];    //save data measured by LiDAR
const int HEADER=0x59;    //frame header of data package
int rec_debug_state = 0x01,rec_debug_state2 = 0x01,rec_debug_state3 = 0x01;//receive state for frame
//unsigned char rec_flag = 0,rec_flag2 = 0,rec_flag3 = 0;

void setup() {
   Serial.begin(115200); //set bit rate of serial port connecting Arduino with computer
   Serial1.begin(115200);    //set bit rate of serial port connecting LiDAR1 with Arduino
   Serial2.begin(115200);    //set bit rate of serial port connecting LiDAR2 with Arduino
   Serial3.begin(115200);    //set bit rate of serial port connecting LiDAR3 with Arduino
}

void loop() {
   Get_Lidar1_data();//if this channel is not be used, comment out this line
   Get_Lidar2_data();//if this channel is not be used, comment out this line
   Get_Lidar3_data();//if this channel is not be used, comment out this line
}

void Get_Lidar1_data(){
   if (Serial1.available()) {    //check if serial port has data input

        if(rec_debug_state == 0x01){//the first byte
            uart[0]=Serial1.read();
            if(uart[0] == 0x59){
                check = uart[0];
                rec_debug_state = 0x02;
            }
        }

        else if(rec_debug_state == 0x02){//the second byte
            uart[1]=Serial1.read();
            if(uart[1] == 0x59){
                check += uart[1];
                rec_debug_state = 0x03;
            }
            else{
                rec_debug_state = 0x01;
            }
        }
```

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```
else if(rec_debug_state == 0x03){
    uart[2]=Serial1.read();
    check += uart[2];
    rec_debug_state = 0x04;
}

else if(rec_debug_state == 0x04){
    uart[3]=Serial1.read();
    check += uart[3];
    rec_debug_state = 0x05;
}

else if(rec_debug_state == 0x05){
    uart[4]=Serial1.read();
    check += uart[4];
    rec_debug_state = 0x06;
}

else if(rec_debug_state == 0x06){
    uart[5]=Serial1.read();
    check += uart[5];
    rec_debug_state = 0x07;
}

else if(rec_debug_state == 0x07){
    uart[6]=Serial1.read();
    check += uart[6];
    rec_debug_state = 0x08;
}

else if(rec_debug_state == 0x08){
    uart[7]=Serial1.read();
    check += uart[7];
    rec_debug_state = 0x09;
}

else if(rec_debug_state == 0x09){
    uart[8]=Serial1.read();
    if(uart[8] == check){
        dist = uart[2] + uart[3]*256;//the distance
        strength = uart[4] + uart[5]*256;//the strength
    Serial.print("dist = ");
    Serial.print(dist); //output measure distance value of LiDAR
    Serial.print('\t');
    Serial.print("strength = ");
```

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```
            Serial.print(strength); //output signal strength value
            Serial.print('\n');
            }
            rec_debug_state = 0x01;
        }
    }
}


void Get_Lidar2_data(){
    if (Serial2.available()) {    //check if serial port has data input

        if(rec_debug_state2 == 0x01){//
            uart2[0]=Serial2.read();
            if(uart2[0] == 0x59){
                check2 = uart2[0];
                rec_debug_state2 = 0x02;
            }
        }

        else if(rec_debug_state2 == 0x02){//
            uart2[1]=Serial2.read();
            if(uart2[1] == 0x59){
                check2 += uart2[1];
                rec_debug_state2 = 0x03;
            }
            else{
                rec_debug_state2 = 0x01;
            }
        }

        else if(rec_debug_state2 == 0x03){
            uart2[2]=Serial2.read();
            check2 += uart2[2];
            rec_debug_state2 = 0x04;
        }

        else if(rec_debug_state2 == 0x04){
            uart2[3]=Serial2.read();
            check2 += uart2[3];
            rec_debug_state2 = 0x05;
        }

        else if(rec_debug_state2 == 0x05){
            uart2[4]=Serial2.read();
            check2 += uart2[4];
```

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```
        rec_debug_state2 = 0x06;
    }

    else if(rec_debug_state2 == 0x06){
        uart2[5]=Serial2.read();
        check2 += uart2[5];
        rec_debug_state2 = 0x07;
    }

    else if(rec_debug_state2 == 0x07){
        uart2[6]=Serial2.read();
        check2 += uart2[6];
        rec_debug_state2 = 0x08;
    }

    else if(rec_debug_state2 == 0x08){
        uart2[7]=Serial2.read();
        check2 += uart2[7];
        rec_debug_state2 = 0x09;
    }

    else if(rec_debug_state2 == 0x09){
        uart2[8]=Serial2.read();
        if(uart2[8] == check2){
            dist2 = uart2[2] + uart2[3]*256;//the distance
            strength2 = uart2[4] + uart2[5]*256;//the strength
            Serial.print("                                    dist2 = ");
            Serial.print(dist2); //output measure distance value of LiDAR
            Serial.print('\t');
            Serial.print("strength2 = ");
            Serial.print(strength2); //output signal strength value
            Serial.print('\n');
        }
        rec_debug_state2 = 0x01;
    }
  }
}

void Get_Lidar3_data(){
    if (Serial3.available()) {    //check if serial port has data input

        if(rec_debug_state3 == 0x01){//
            uart3[0]=Serial3.read();
            if(uart3[0] == 0x59){
                check3 = uart3[0];
```

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```
                rec_debug_state3 = 0x02;
            }
        }

        else if(rec_debug_state3 == 0x02){//
            uart3[1]=Serial3.read();
            if(uart3[1] == 0x59){
                    check3 += uart3[1];
                    rec_debug_state3 = 0x03;
            }
            else{
                    rec_debug_state3 = 0x01;
            }
        }

        else if(rec_debug_state3 == 0x03){
            uart3[2]=Serial3.read();
            check3 += uart3[2];
            rec_debug_state3 = 0x04;
        }

        else if(rec_debug_state3 == 0x04){
            uart[3]=Serial3.read();
            check3 += uart3[3];
            rec_debug_state3 = 0x05;
        }

        else if(rec_debug_state3 == 0x05){
            uart3[4]=Serial3.read();
            check3 += uart3[4];
            rec_debug_state3 = 0x06;
        }

        else if(rec_debug_state3 == 0x06){
            uart3[5]=Serial3.read();
            check3 += uart3[5];
            rec_debug_state3 = 0x07;
        }

        else if(rec_debug_state3 == 0x07){
            uart3[6]=Serial3.read();
            check3 += uart3[6];
            rec_debug_state3 = 0x08;
        }
```

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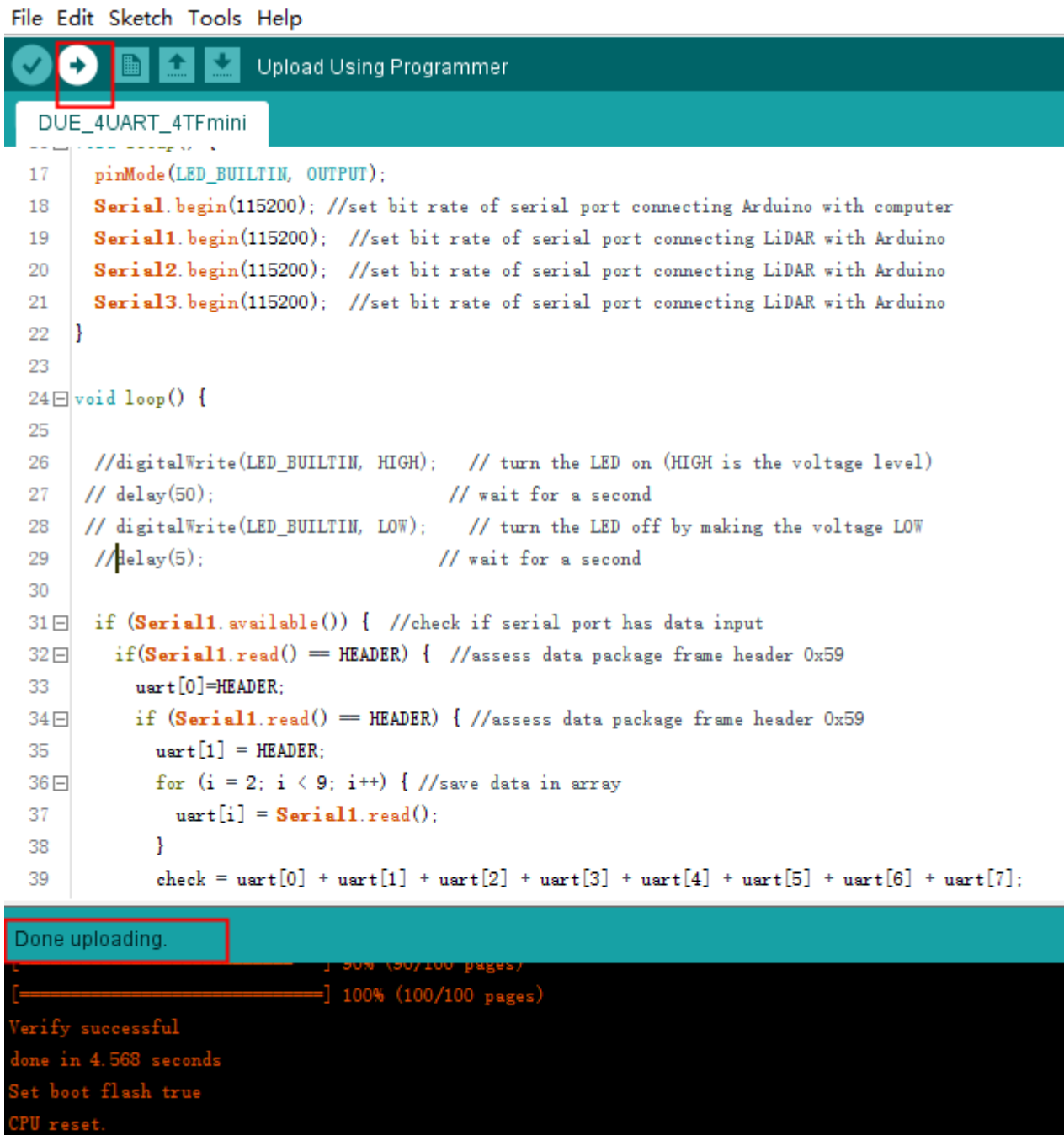
```
        else if(rec_debug_state3 == 0x08){
            uart3[7]=Serial3.read();
            check3 += uart3[7];
            rec_debug_state3 = 0x09;
        }

        else if(rec_debug_state3 == 0x09){
            uart3[8]=Serial3.read();
            if(uart3[8] == check3){
                dist3 = uart3[2] + uart3[3]*256;//the distance
                strength3 = uart3[4] + uart3[5]*256;//the strength
                Serial.print("                                              dist3 = ");
                Serial.print(dist3); //output measure distance value of LiDAR
                Serial.print('\t');
                Serial.print("strength3 = ");
                Serial.print(strength3); //output signal strength value
                Serial.print('\n');
            }
            rec_debug_state3 = 0x01;
        }
    }
}
```

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6. Verify & upload


```
File Edit Sketch Tools Help

                          Upload Using Programmer

 DUE_4UART_4TFmini

17    pinMode(LED_BUILTIN, OUTPUT);
18    Serial.begin(115200); //set bit rate of serial port connecting Arduino with computer
19    Serial1.begin(115200);  //set bit rate of serial port connecting LiDAR with Arduino
20    Serial2.begin(115200);  //set bit rate of serial port connecting LiDAR with Arduino
21    Serial3.begin(115200);  //set bit rate of serial port connecting LiDAR with Arduino
22  }
23
24  void loop() {
25
26    //digitalWrite(LED_BUILTIN, HIGH);   // turn the LED on (HIGH is the voltage level)
27    // delay(50);                        // wait for a second
28    // digitalWrite(LED_BUILTIN, LOW);    // turn the LED off by making the voltage LOW
29    //delay(5);                          // wait for a second
30
31    if (Serial1.available()) {  //check if serial port has data input
32      if(Serial1.read() == HEADER) {  //assess data package frame header 0x59
33        uart[0]=HEADER;
34        if (Serial1.read() == HEADER) { //assess data package frame header 0x59
35          uart[1] = HEADER;
36          for (i = 2; i < 9; i++) { //save data in array
37            uart[i] = Serial1.read();
38          }
39          check = uart[0] + uart[1] + uart[2] + uart[3] + uart[4] + uart[5] + uart[6] + uart[7];
```

```
Done uploading.

[==============================] 90% (90/100 pages)
[==============================] 100% (100/100 pages)
Verify successful
done in 4.568 seconds
Set boot flash true
CPU reset.
```

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7. Viewing

- Use Serial Monitor to view the data.

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