

## Develop Routine of TF03 in Arduino

In this routine, Arduino Uno and DUE board is taken as example, which is mainly for the user to quickly familiarize himself with our LiDAR and thus save the time of product development.

For detailed introduction and tutorial of Aruidno, please refer to following website:  
Arduino Official website: [www.arduino.cc](http://www.arduino.cc)

### Step 1: Hardware Connection

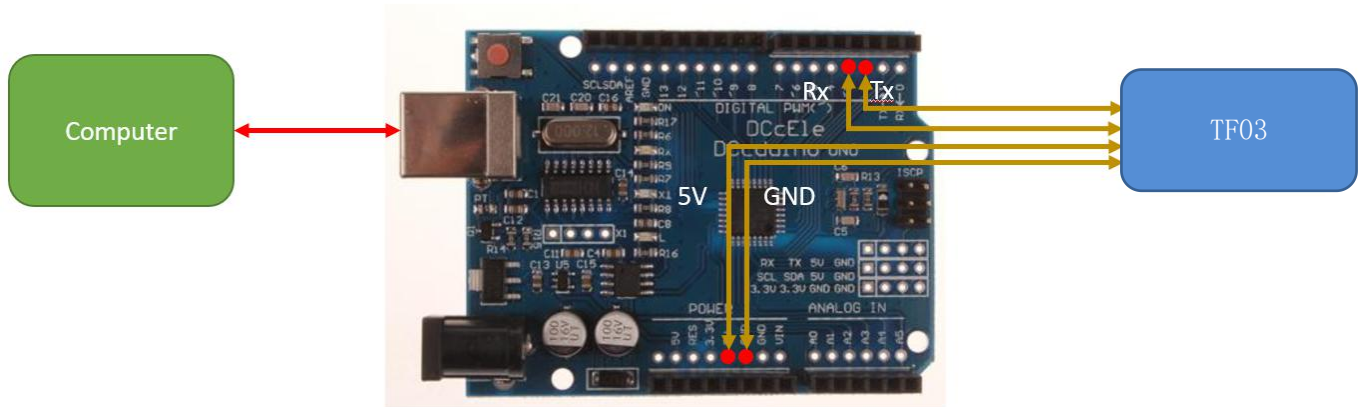


Figure 1 Schematic Diagram of Connection between TF03 and UNO Board

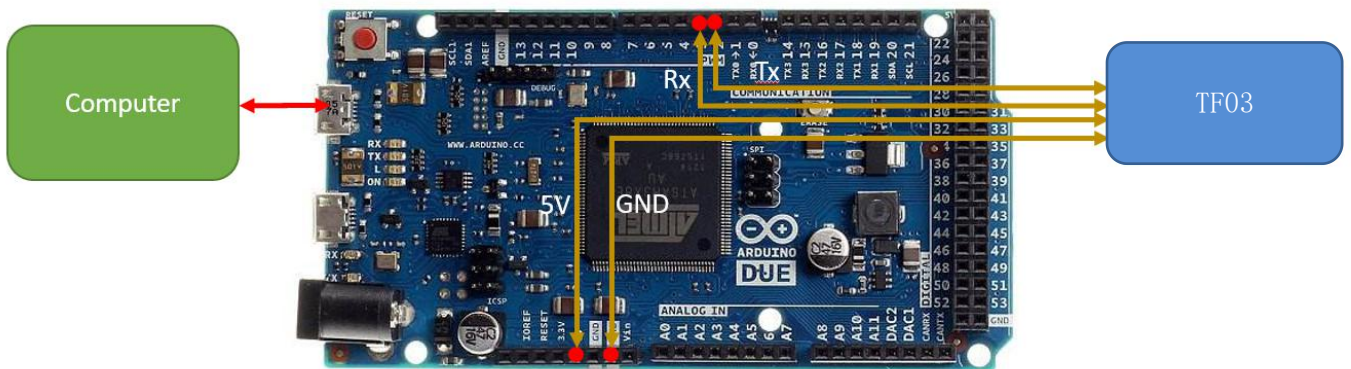


Figure 2 Schematic Diagram of Connection between TF03 and DUE Board



## Step 2: Program Compilation

At least two serial ports of Arduino are required for the achievement of this routine function with one for receiving data of LiDAR and another for outputting data to PC for display. The user may either copy following code and paste it in Arduino IDE program editing window or directly open relevant enclosed file.

```
/*
```

This program is the interpretation routine of standard output protocol of TF03 product on Arduino.

For details, refer to Product Specifications.

For Arduino boards with only one serial port like UNO board, the function of software virtual serial port is to be used.

```
*/
```

```
#include <SoftwareSerial.h> //header file of software serial port
```

```
SoftwareSerial Serial1(2,3); //define software serial port name as Serial1 and define pin2 as RX and pin3  
as TX
```

```
/* For Arduino boards with multiple serial ports like DUE board, interpret above two pieces of code and  
directly use Serial1 serial port*/
```

```
int dist; //actual distance measurements of LiDAR
```

```
int check; //save check value
```

```
int i;
```

```
int uart[9]; //save data measured by LiDAR
```

```
const int HEADER=0x59; //frame header of data package
```

```
void setup() {
```

```
    Serial.begin(9600); //set bit rate of serial port connecting Arduino with computer
```



```
Serial1.begin(115200); //set bit rate of serial port connecting LiDAR with Arduino

}

void loop() {

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

    if(Serial1.read() == HEADER) { //assess data package frame header 0x59

      uart[0]=HEADER;

      if (Serial1.read() == HEADER) { //assess data package frame header 0x59

        uart[1] = HEADER;

        for (i = 2; i < 9; i++) { //save data in array

          uart[i] = Serial1.read();

        }

        check = uart[0] + uart[1] + uart[2] + uart[3] + uart[4] + uart[5] + uart[6] + uart[7];

        if (uart[8] == (check & 0xff)){ //verify the received data as per protocol

          dist = uart[2] + uart[3] * 256; //calculate distance value

          Serial.print("dist = ");

          Serial.print(dist); //output measure distance value of LiDAR

          Serial.print('\t');

        }

      }

    }

  }

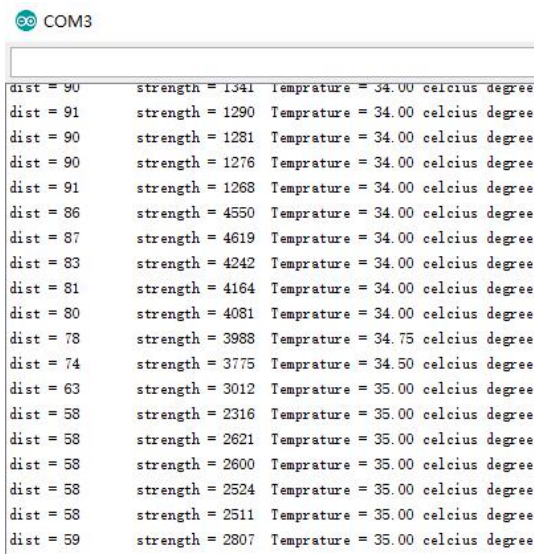
}
```



}

### Step 3: Viewing of Data

Download the code into Arduino board and open the serial monitor for the serial port. Then real-time distance values as well as the corresponding strength and chip temperature can be viewed, as shown in figure 3.



```
COM3
dist = 90 strength = 1341 Temperature = 34.00 celcius degree
dist = 91 strength = 1290 Temperature = 34.00 celcius degree
dist = 90 strength = 1281 Temperature = 34.00 celcius degree
dist = 90 strength = 1276 Temperature = 34.00 celcius degree
dist = 91 strength = 1268 Temperature = 34.00 celcius degree
dist = 86 strength = 4550 Temperature = 34.00 celcius degree
dist = 87 strength = 4619 Temperature = 34.00 celcius degree
dist = 83 strength = 4242 Temperature = 34.00 celcius degree
dist = 81 strength = 4164 Temperature = 34.00 celcius degree
dist = 80 strength = 4081 Temperature = 34.00 celcius degree
dist = 78 strength = 3988 Temperature = 34.75 celcius degree
dist = 74 strength = 3775 Temperature = 34.50 celcius degree
dist = 63 strength = 3012 Temperature = 35.00 celcius degree
dist = 58 strength = 2316 Temperature = 35.00 celcius degree
dist = 58 strength = 2621 Temperature = 35.00 celcius degree
dist = 58 strength = 2600 Temperature = 35.00 celcius degree
dist = 58 strength = 2524 Temperature = 35.00 celcius degree
dist = 58 strength = 2511 Temperature = 35.00 celcius degree
dist = 59 strength = 2807 Temperature = 35.00 celcius degree
```

Figure 3 Lidar data displayed on the monitor software by serial port

In addition, data curve can be viewed in the curve plotter for serial port, however, the above coding regarding the print of serial port should be modified:

```
//Serial.print("dist = ");
Serial.print(dist); //output measure distance value of LiDAR
Serial.print(" ");
```

Re-compile and download to Arduino board and open the curve plotter. Then two curves including the dist and strength can be viewed, as shown in Figure 4.



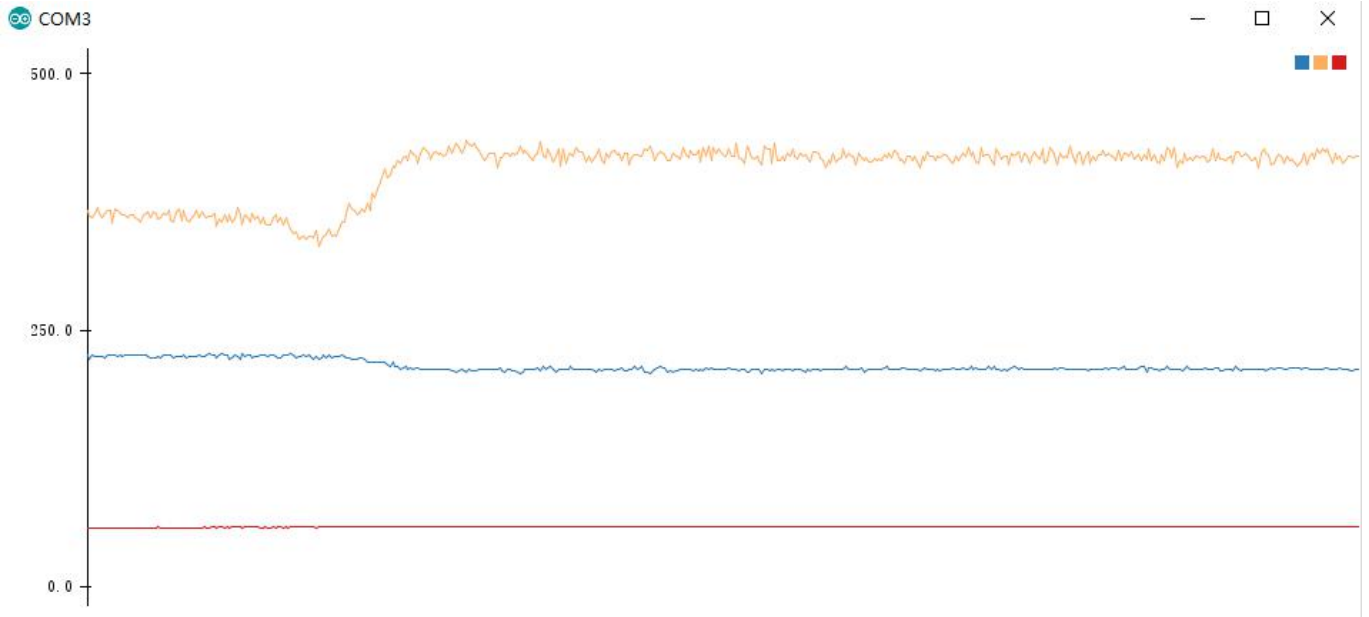


Figure 4 Plots of TF03 data on Curve plotter for Serial Port

