Develop Routine of TF-Luna 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

Step 1: Hardware Connection

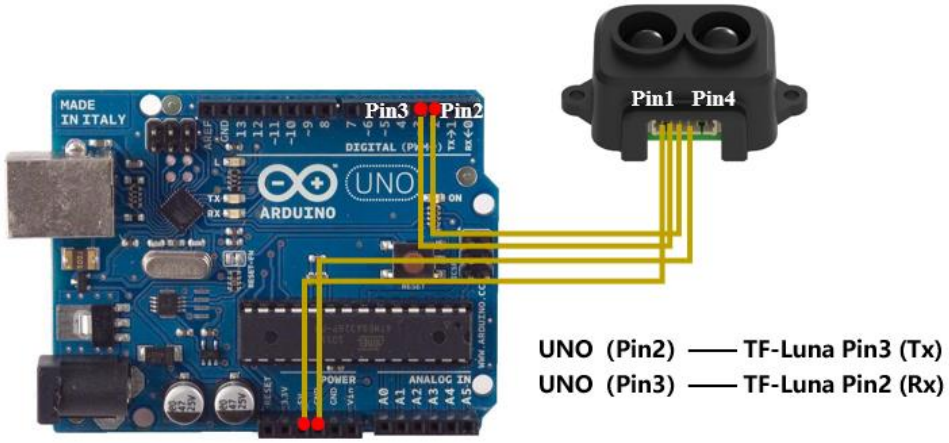

Figure 1 Schematic Diagram of Connection between TF-Luna and UNO Board

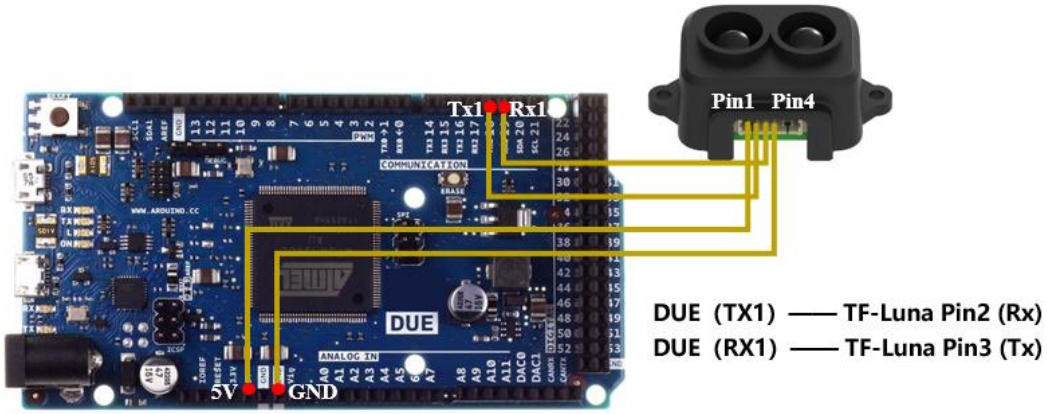

Figure 2 Schematic Diagram of Connection between TF-Luna and DUE Board

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 TFmini-Plus product on Arduino.
  For details, refer to Product Specifications.
  For Arduino boards with only one serial port like UNO board, the function of software visual 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 Arduinoboards with multiple serial ports like DUEboard, interpret above two pieces of code and directly use Serial1 serial port*/
int dist; //actual distance measurements of LiDAR
int strength; //signal strength of LiDAR
float temprature;
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
                    strength = uart[4] + uart[5] * 256; //calculate signal strength value
                    temprature = uart[6] + uart[7] *256;//calculate chip temprature
                    temprature = temprature/8 - 256;
                    Serial.print("dist = ");
                    Serial.print(dist); //output measure distance value of LiDAR
                    Serial.print('\t');
```

```
                Serial.print("strength = ");
                Serial.print(strength); //output signal strength value
                Serial.print("\t Chip Temprature = ");
                Serial.print(temprature);
                Serial.println(" celcius degree"); //output chip temperature of Lidar
            }
        }
    }
  }
}
```

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.

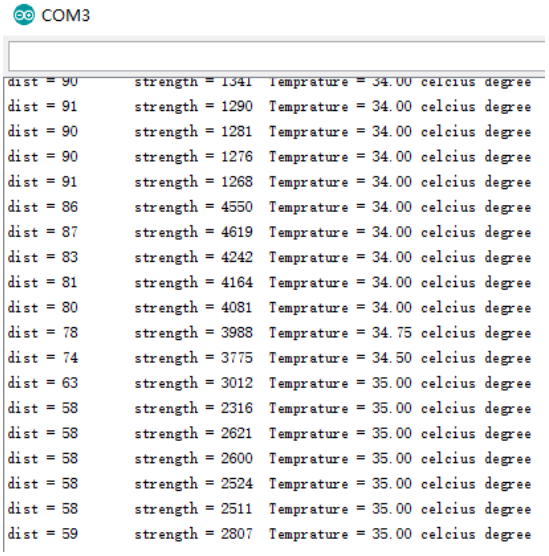

Figure 3 Lidar data displayed on the monitor software by serial port

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(" ");
//Serial.print("strength = ");
Serial.print(strength); //output signal strength value
//Serial.print("\t Chip Temprature = ");
Serial.print(" ");
Serial.print(temprature);
Serial.println();
//Serial.println(" celcius degree");
```

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.

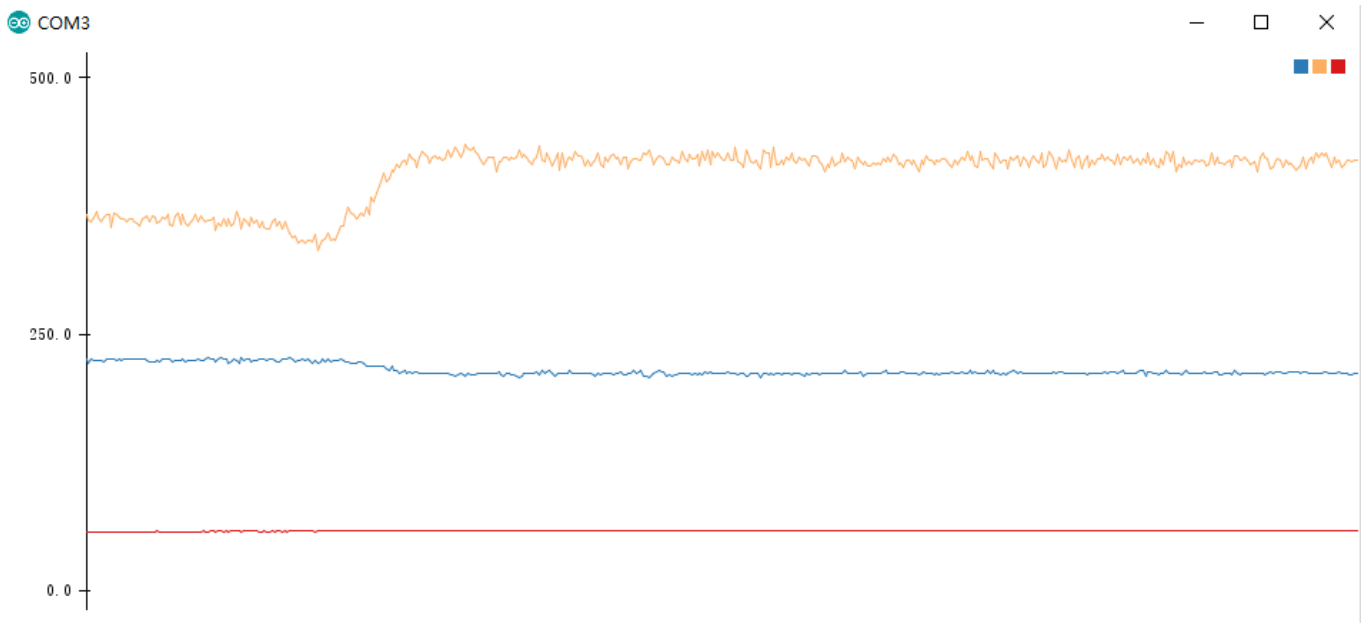

Figure 4 Plots of TF-Luna data on Curve plotter for Serial Port