

How to connect TFmini on Arduino Pro Mini

Version:v1.0

Updated date:2018.8.13

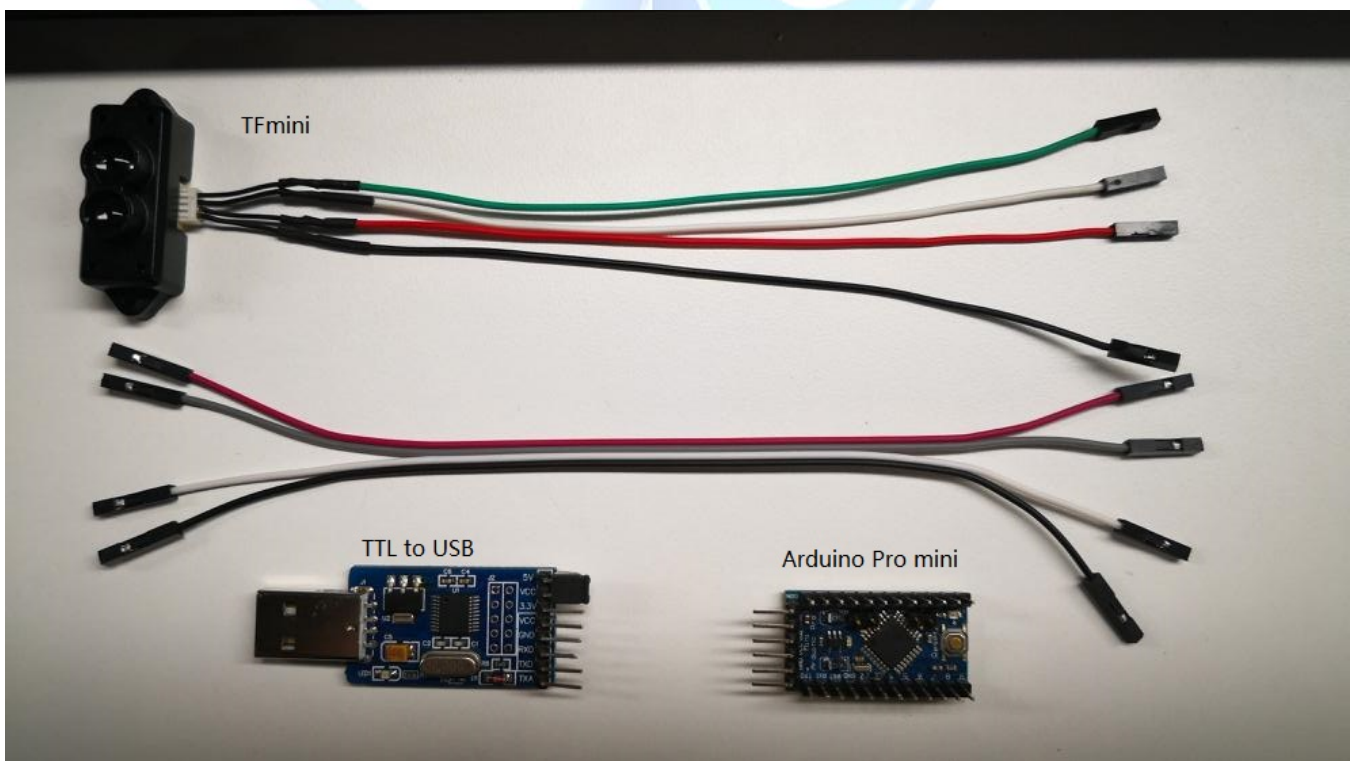
Mincy Zhao

1. Introduction

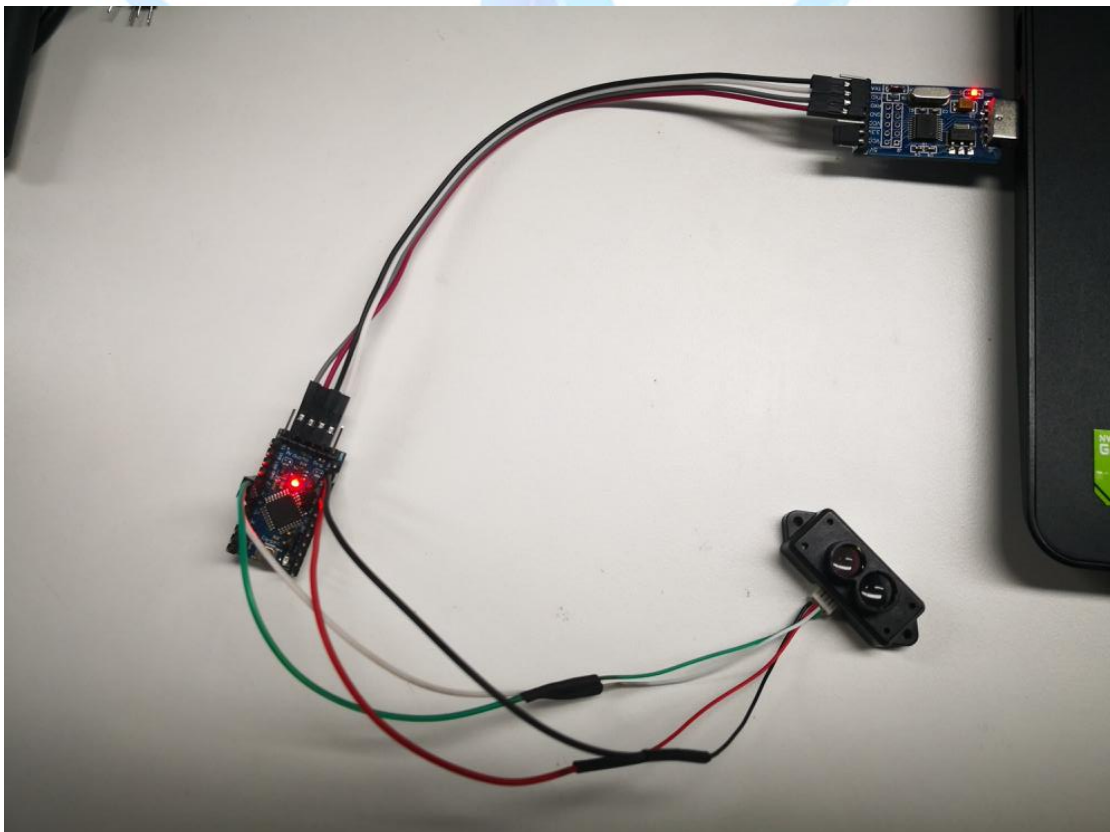
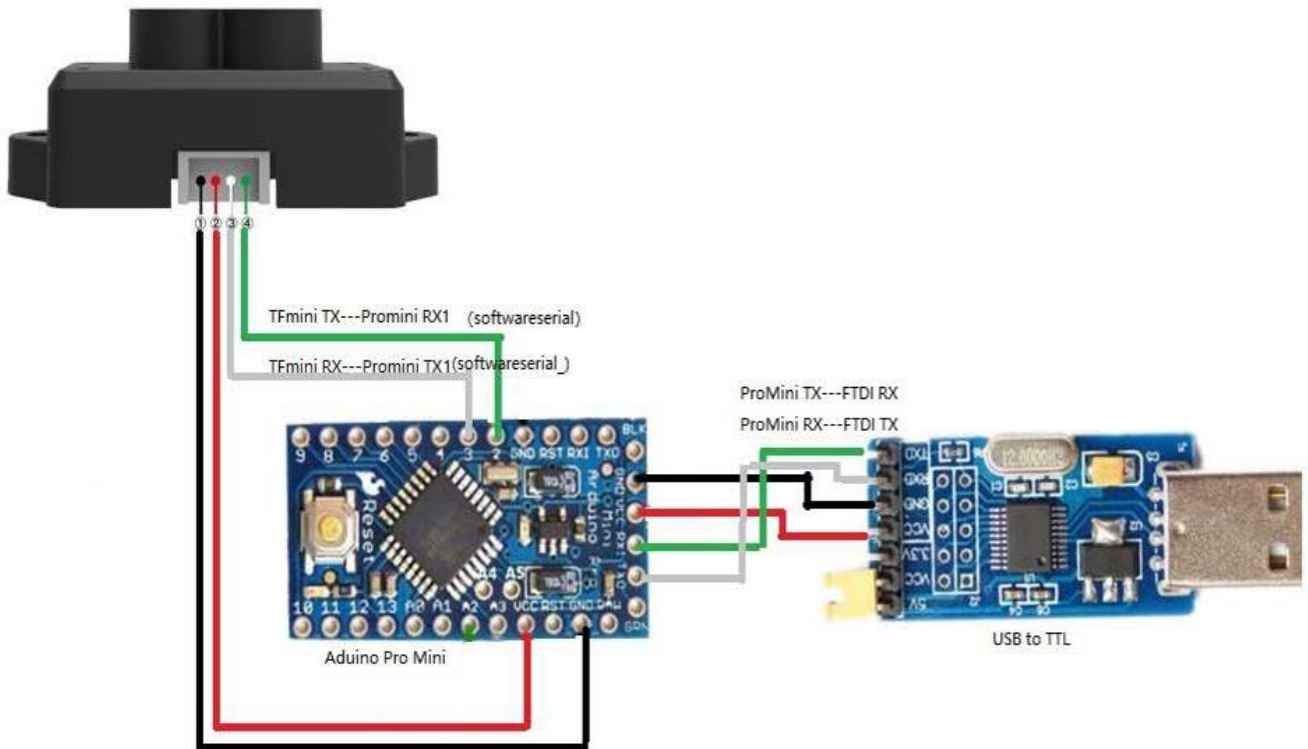
This is about how to connect Arduino Pro Mini board to a TFmini via TTL UART.

2. Materials

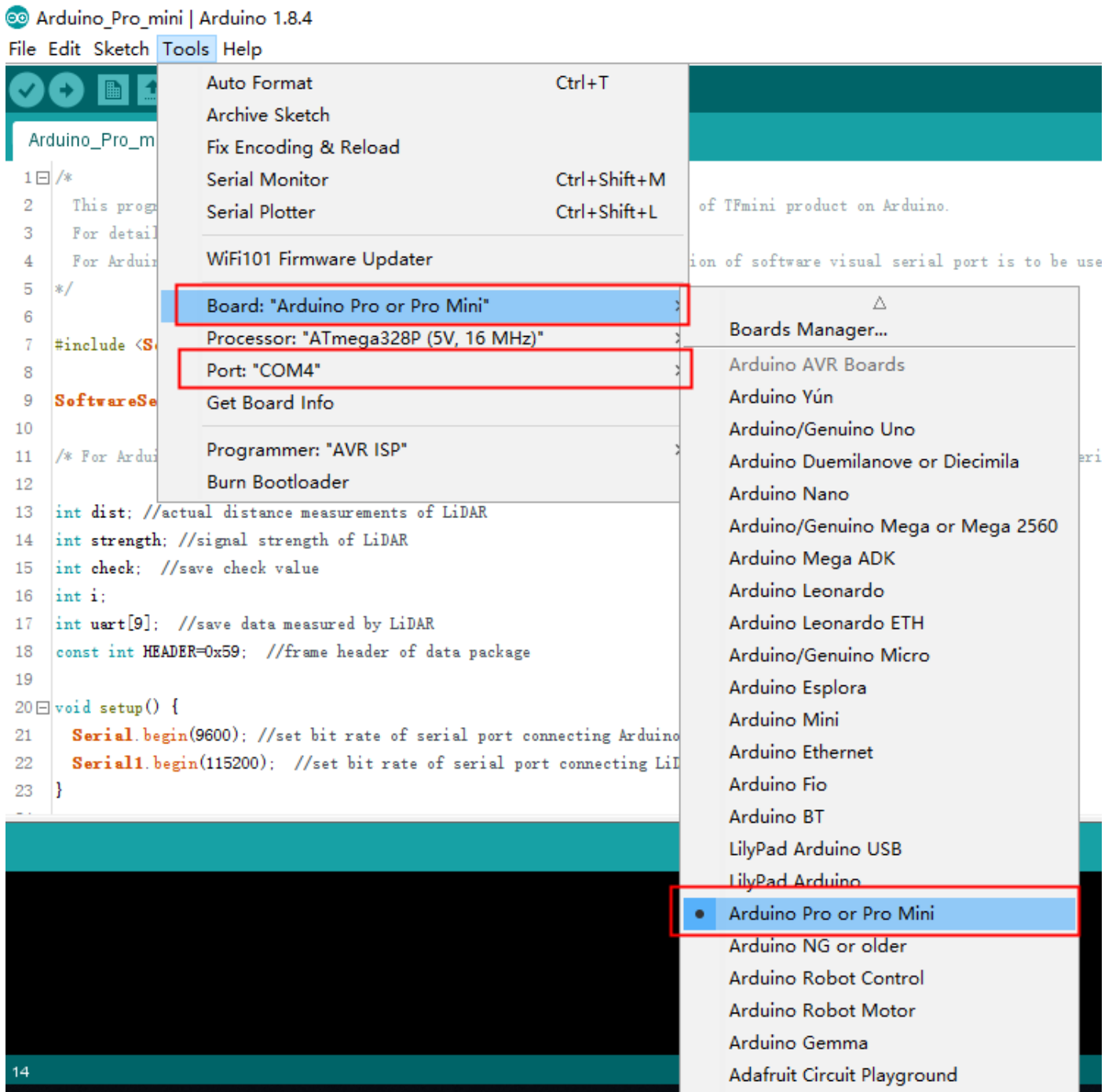
- TFmini × 1;
- Arduino Pro Mini × 1;
- USB to TTL converter × 1;
- DuPont wire;
- PC (Windows);
- Arduino IDE;



3. Connection



4. Arduino IDE



- If all are connected, there is no serial port number displayed in the computer. Please check if the driver of FTDI is installed successfully.



5. Coding

- Free test code can be found in the TFmini product manual or github(https://github.com/TFmini/TFmini-Arduino/tree/master/TFmini_Arduino_SoftwareSerial).

```
/*  
  
    This program is the interpretation routine of standard output protocol of TFmini 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 Arduinobords 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  
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

        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('\n');

    }

}

}

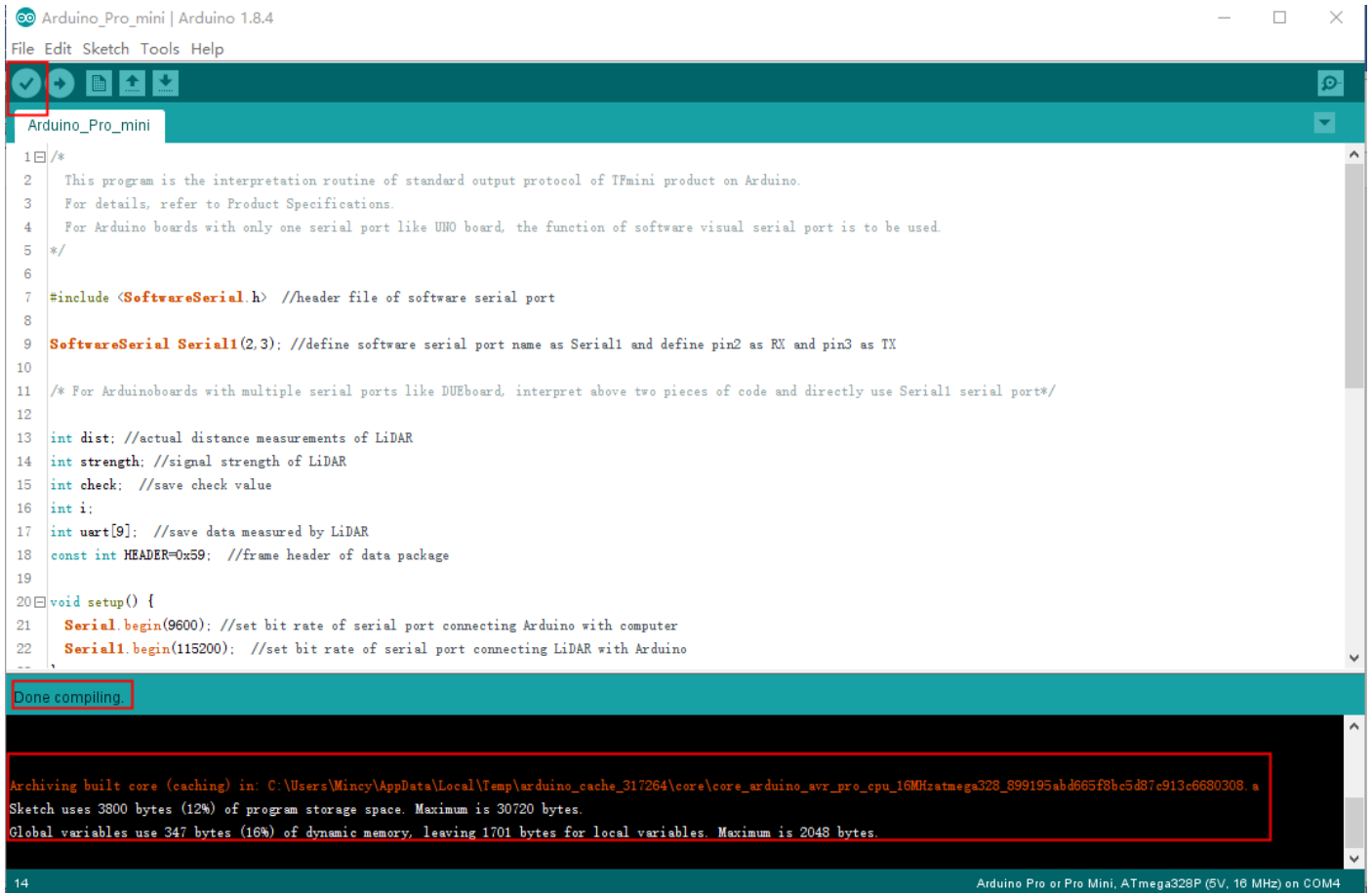
}
```

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6. Verify

- Click the verify button and wait. If the compilation is correct, it will show “Done compiling”.



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Arduino_Pro_mini | Arduino 1.8.4
File Edit Sketch Tools Help
Arduino_Pro_mini
1 /*
2  This program is the interpretation routine of standard output protocol of TFmini product on Arduino.
3  For details, refer to Product Specifications.
4  For Arduino boards with only one serial port like UNO board, the function of software visual serial port is to be used.
5  */
6
7 #include <SoftwareSerial.h> //header file of software serial port
8
9 SoftwareSerial Serial1(2,3); //define software serial port name as Serial1 and define pin2 as RX and pin3 as TX
10
11 /* For Arduinoboards with multiple serial ports like DUEboard, interpret above two pieces of code and directly use Serial1 serial port*/
12
13 int dist; //actual distance measurements of LiDAR
14 int strength; //signal strength of LiDAR
15 int check; //save check value
16 int i;
17 int uart[9]; //save data measured by LiDAR
18 const int HEADER=0x59; //frame header of data package
19
20 void setup() {
21   Serial.begin(9600); //set bit rate of serial port connecting Arduino with computer
22   Serial1.begin(115200); //set bit rate of serial port connecting LiDAR with Arduino
23 }
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```

Done compiling.

```
Archiving built core (caching) in: C:\Users\Mincy\AppData\Local\Temp\arduino_cache_317264\core\core_arduino_avr_pro_cpu_16MHzatmega328_899195abd665f8bc5d87c913c6680308.a
Sketch uses 3800 bytes (12%) of program storage space. Maximum is 30720 bytes.
Global variables use 347 bytes (16%) of dynamic memory, leaving 1701 bytes for local variables. Maximum is 2048 bytes.
```

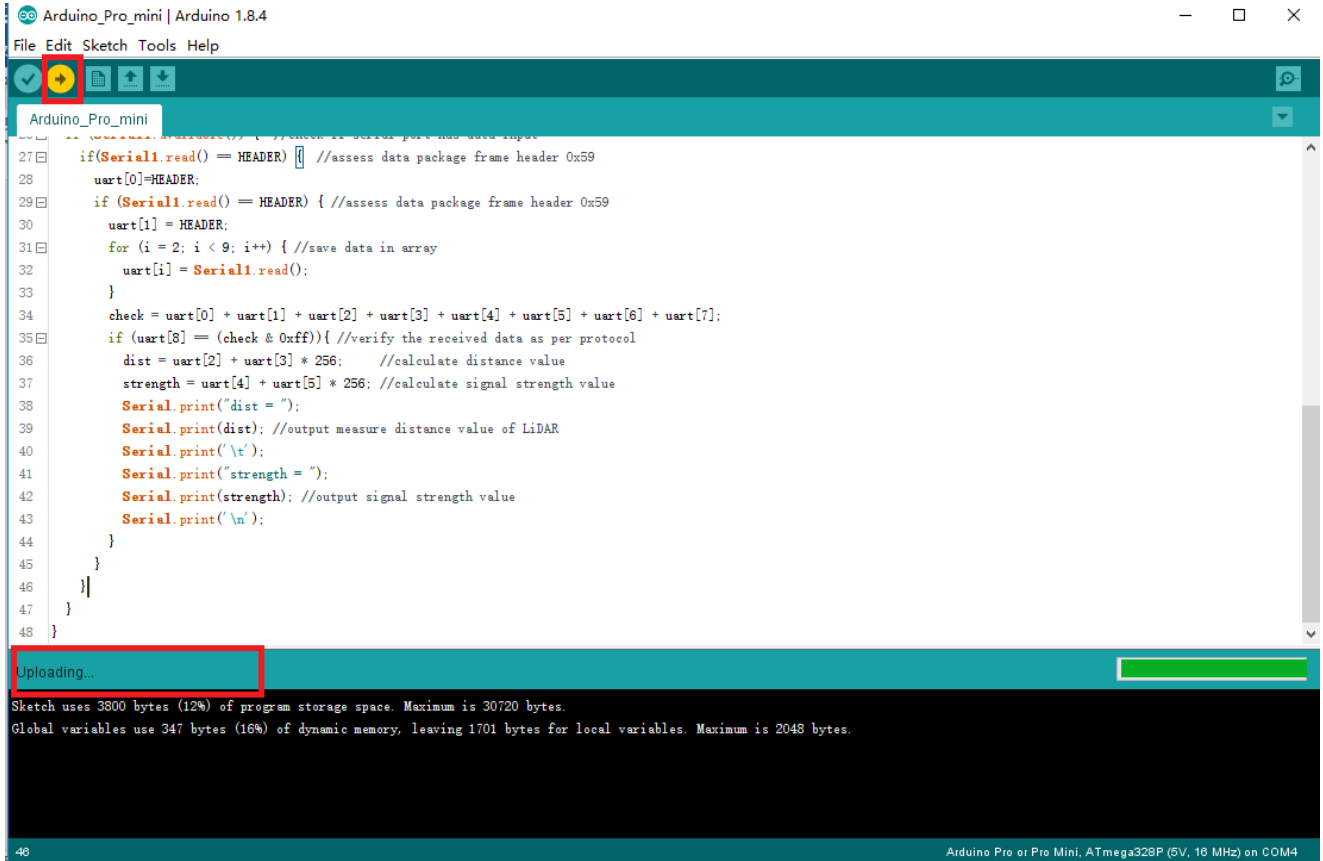
14 Arduino Pro or Pro Mini, ATmega328P (5V, 16 MHz) on COM4

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7. Upload

- Click the upload button and wait. Press the “Reset” button once on the Arduino Pro mini board immediately when the word "Uploading..." appears.

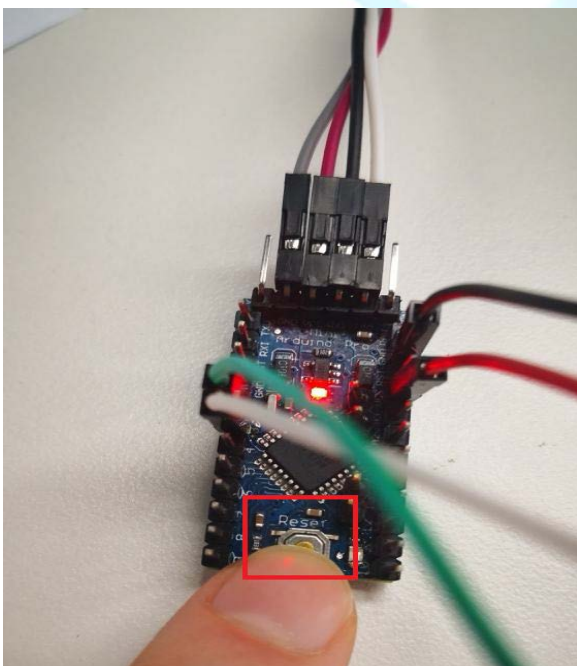


```
Arduino_Pro_mini | Arduino 1.8.4
File Edit Sketch Tools Help
Arduino_Pro_mini
27 if (Serial1.read() == HEADER) { //assess data package frame header 0x59
28   uart[0]=HEADER;
29   if (Serial1.read() == HEADER) { //assess data package frame header 0x59
30     uart[1] = HEADER;
31     for (i = 2; i < 9; i++) { //save data in array
32       uart[i] = Serial1.read();
33     }
34     check = uart[0] + uart[1] + uart[2] + uart[3] + uart[4] + uart[5] + uart[6] + uart[7];
35     if (uart[8] == (check & 0xff)) { //verify the received data as per protocol
36       dist = uart[2] + uart[3] * 256; //calculate distance value
37       strength = uart[4] + uart[5] * 256; //calculate signal strength value
38       Serial.print("dist = ");
39       Serial.print(dist); //output measure distance value of LiDAR
40       Serial.print("\t");
41       Serial.print("strength = ");
42       Serial.print(strength); //output signal strength value
43       Serial.print("\n");
44     }
45   }
46 }
47 }
48 }
```

Uploading...

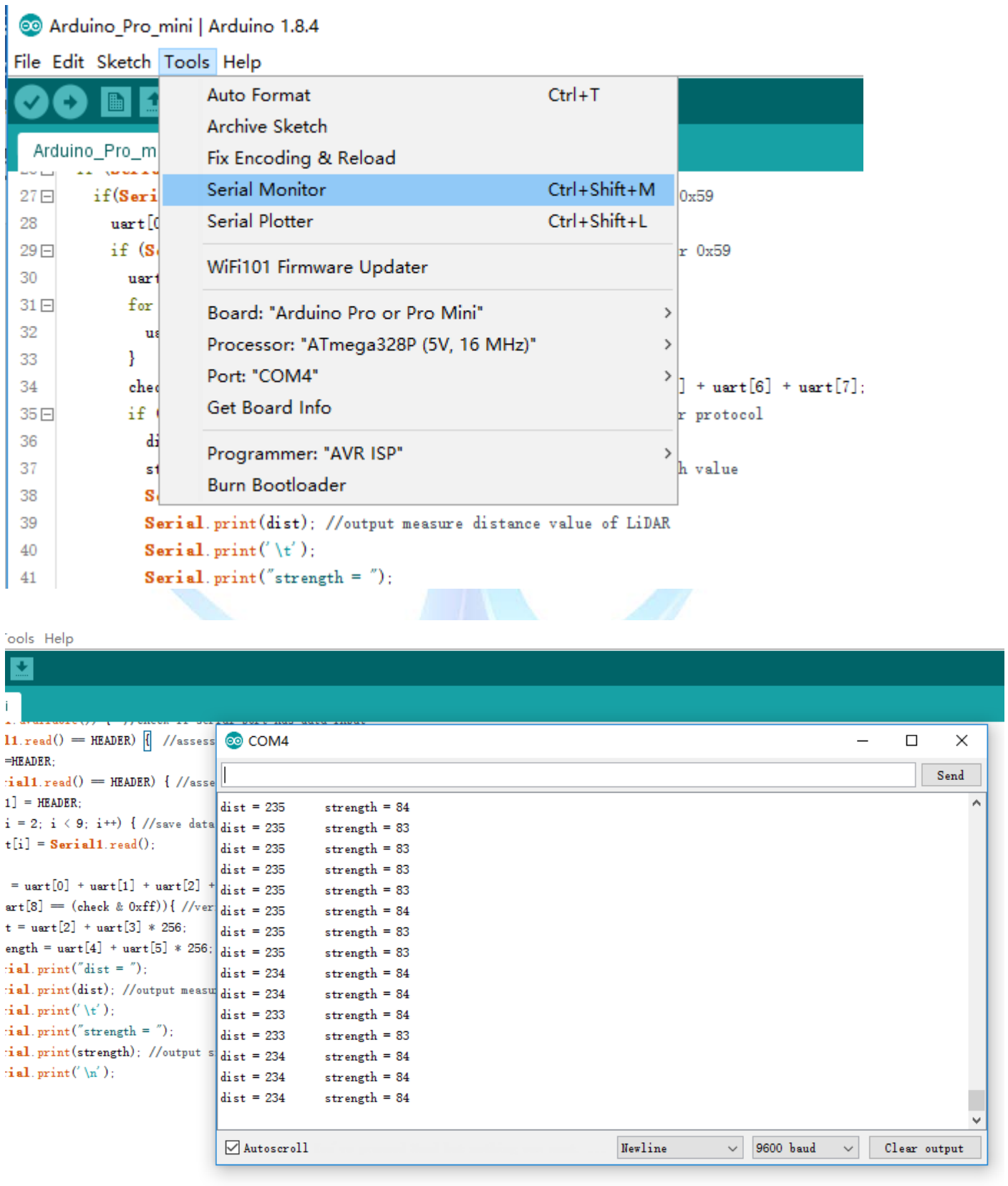
Sketch uses 3800 bytes (12%) of program storage space. Maximum is 30720 bytes.
Global variables use 347 bytes (16%) of dynamic memory, leaving 1701 bytes for local variables. Maximum is 2048 bytes.

48 Arduino Pro or Pro Mini, ATmega328P (5V, 16 MHz) on COM4



8. Viewing

- Use Serial Monitor to view the data.



The screenshot shows the Arduino IDE interface. The 'Tools' menu is open, and 'Serial Monitor' is selected. The Serial Monitor window is open, displaying the output of the sketch. The sketch code is visible in the background, showing the use of the Serial library and the Serial Monitor.

```
Arduino_Pro_mini | Arduino 1.8.4
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 Firmware Updater
Board: "Arduino Pro or Pro Mini" >
Processor: "ATmega328P (5V, 16 MHz)" >
Port: "COM4" >
Get Board Info
Programmer: "AVR ISP" >
Burn Bootloader

27 if(Serial.available())
28   uart[0] = Serial.read();
29   if (Serial.available())
30     uart[1] = Serial.read();
31   for (int i = 2; i < 9; i++)
32     uart[i] = Serial.read();
33   }
34   checkSum = (uart[0] + uart[1] + uart[2] +
35   if (Serial.available())
36     dist = Serial.read();
37     strength = Serial.read();
38   Serial.print(dist); //output measure distance value of LiDAR
39   Serial.print('\t');
40   Serial.print("strength = ");
41   Serial.print(strength); //output strength value
42   Serial.print('\n');
43 }
```

Serial Monitor (COM4) output:

dist	strength
235	84
235	83
235	83
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