TSD10 Single-Point LiDAR Based on DTOF Principle

50Hz Measuring Frequency / 10meters Range / Ambient Light Immunity 70Klux / Cost-effective

一、Product Overview

The TSD10 LiDAR is our newly launched laser ranging product and is specially designed for applications such as drones, sweeping robots, and industrial robots. Based on the DTOF principle, it features a compact size, low cost, superior performance, and high resistance to ambient light interference. This product is easy to use, flexible to install, convenient for expansion, and extremely cost-effective.

二、Features

- Based on DTOF principle (Direct Time of Flight)
- Maximum Measuring Range：10 m
- Measuring Blind Zone：5 cm
- Measuring Frequency：50Hz
- Accuracy：±5cm(<5m), 1%(≥5m)
- Resolution：1mm
- Operating Temperature：-20℃~+60℃
- Supply Voltage：4.5～5.5VDC
- Compact Size：12 x 7.5 x 9.1 mm
- Weight：1g
- Ambient Light Immunity：70Klux



三、 Applications

- Drone Altitude Holding and Obstacle Avoidance
- Robots Obstacle Avoidance
- Industrial Grade Light Curtain
- AGV Obstacle Avoidance

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四、 Specifications

#	Model	TSD10
1	Range	0.05m ~ 10m (90%reflectivity), 0.05m ~ 5m (10%reflectivity)
2	Frequency	50Hz
3	Accuracy	±5cm(<5m), 1%(≥5m)
4	Repeatability	±10mm
5	Ambient Light Immunity	2m@100KLux
6	Central Wavelength	940nm
7	Photobiological Safety	Class 1
8	FOV	3°
9	Wavelength for Indication	N/A
10	Photobiological Safety for Indication	N/A
11	Supply Voltage	4.5~5.5VDC
12	Peak Current	4.5mA
13	Average Current	4mA
14	Average Power Consumption	<0.1W
15	Communication Interface	UART
16	Protection Level	N/A
17	Dimension	12 x 7.5 x 9.1 mm
18	Weight	1g
19	Operating Temperature	-20℃ ~ +60℃
20	Wire Specification	4pin 1.25mm terminal, 10cm tinned stranded wires
21	Customization	available in appearance / structure / output protocol

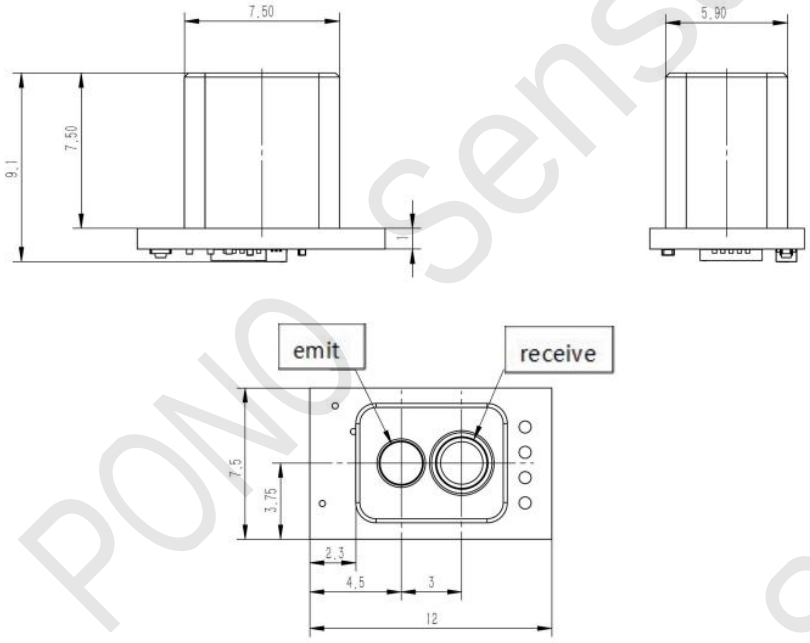
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五、Definitions of Pins



No.	Definition / Wire Color	User Interface
1	TX	RX
2	RX	TX
3	GND	Power -
4	5V	Power +

六、Dimensions



七、Communication Protocol: UART

1. Communication Interface

UART	
Baud Rate	460800 (adjustable)
Data Bit	8
Stop Bit	1
Parity Bit	None

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2. Output Format

The ranging module of this series would actively output data (4 bytes each frame) after completing the connection. When out of its measuring range, it would output 65535.

Frame Header	Distance 2 Bytes		Check Byte
5C	02	11	EC
Frame header 1 byte	Distance value 2 bytes means the measuring distance is 4354mm, little-endian, range 0-65535. When out of range, it would output 65535		From 02 to 11, opposite of the Check byte, 1 byte

3. UART Commands

#	Description	Send	Return	Note
1	Baud rate setting	5A 06 02 80 04 checksum	5A 86 02 80 04 checksum	60 00 (9600) C0 00 (19200) 80 01 (38400) 80 04 (115200) 00 09 (230400) 00 0A (256000) 00 12 (460800) Any other baud rate is not available
2	Stop	5A 0A 02 00 00 F3	5A 8A 02 00 00 73	5A 8A 02 00 00 73 Stop measure
3	Start	5A 0A 02 02 00 F1	5A 8A 02 02 00 71	5A 8A 02 02 00 71 Start measure

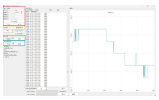
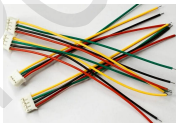
4. Check Function

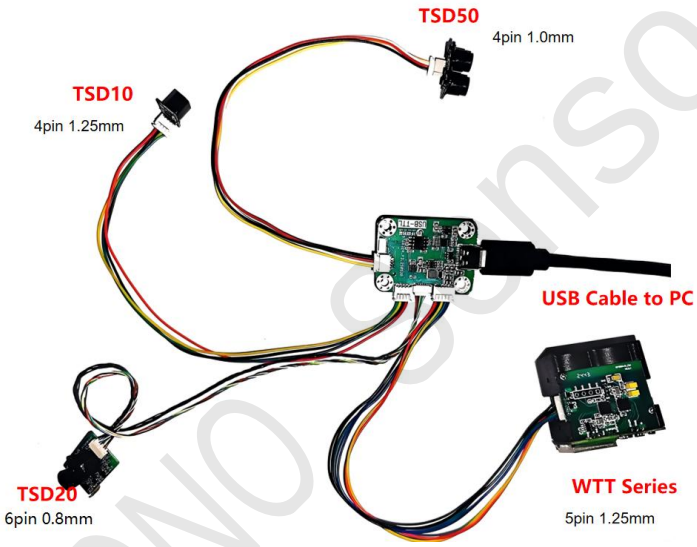
```
uint8_t Check_Sum(uint8_t *_pbuff, uint16_t _cmdLen)
{
uint8_t cmd_sum=0;
uint16_t i;
for(i=0;i<_cmdLen;i++)
{
cmd_sum += _pbuff[i];
}
cmd_sum = (~cmd_sum);
return  cmd_sum;
}
```

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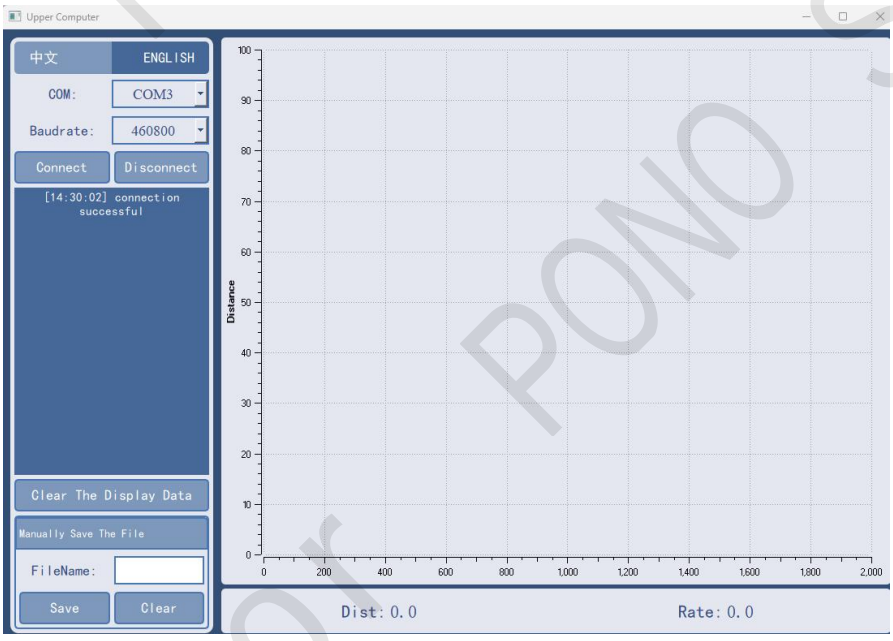
八、Quick Test

Test materials: TTL to USB adapter board, 5V DC power, Lidarviewer / serial port assistant. After the TSD10 successfully connected to your computer,

TSD/WTT sensor	Adapter	Type-C cable	PC(Windows)	Software	USBdriver	cable
						



select the baud rate and click “connect”, then the data can be monitored on the upper computer. Here is a sample figure of Lidarviewer::



九、Attentions

- There is NO protection for reverse polarity and overvoltage, please strictly follow the specification for correct power supply and wiring.

- The photobiological safety of this product is Class 1, so please DO NOT look straight at the lens after successfully connected.

- When operating this product in a dusty place, it is better to add a piece of red transparent glass or acrylic plate over the lens for dust prevention. (905nm wavelength needs a transmittance ≥ 85%.)

- When touching this product, please wear anti-static gloves to prevent the product from failing.

- There is a risk of failure when using this product to measure high-reflective objects (such as 3M tapes) and mirrors.

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