Document number	

Product Specification Manual

Product name: Optical Flow Laser Module

Product class:

Product code: UP-T1-001-Plus(T101-Plus)

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upixels 优象®

Revision Records

Number	Revise contents	Reviser	Revision data	Version	Changed number
01	Preliminary draft	WuDongzhi	20240812	V1.0	

Table of Contents

1.Product specification

	Specification	Parameters
Module	Working voltage	3.7～5.0V
	Working current	≤100mA
	Power dissipation	≤0.5W
	Peak current	100mA
	Electrical level	LVTTL（3.3V）
	Baud rate	115200
	Supported aggrement	Upixels+TOF 、 MSP V2 MAVLINK V1 PX4、 MAVLINK V1 APM
	Initialization time	Within 3S
	Working temperature	-20～60℃
	Storage temperature	-40～70℃
	Communication interface	UART
	Measure	20*14*9.55mm（Length * width * height）
	Weight	1.1g
TOF	Field angle	Horizontal/vertica：5°/4°
	Measuring distance	Indoor:88% Reflectivity white card /4m range/ @0KLux Indoor:5% Reflectivity black card /4m range/ @0KLux Outdoor:88% Reflectivity black card /3.8m range/ @100KLux Outdoor:5% Reflectivity black card/3.5m range/ @100KLux
	Measuring span	0.025～4m
	Measurement accuracy	2.5~25cm accuracy ±1cm, 25cm~4m accuracy within 2%
	Unmeasurable area	2.5cm
	Wave length	940nm
	Operating environment	Indoor and outdoor
Optical Flow	Field angle	Horizontal/vertical:30°
	Frame rate	50Hz
	Illumination intensity	>20Lux
	Maximum measured speed	One meter height:7m/S
	Operating environment	Indoor and outdoor

2.Outline dimensional drawing

The model of this product is UP-T1-001-Plus, The hardware part is mainly the motherboard. The motherboard size structure diagram is shown in Figure 1.The product is 20mm in length,14mm in width,9.55mm in height.

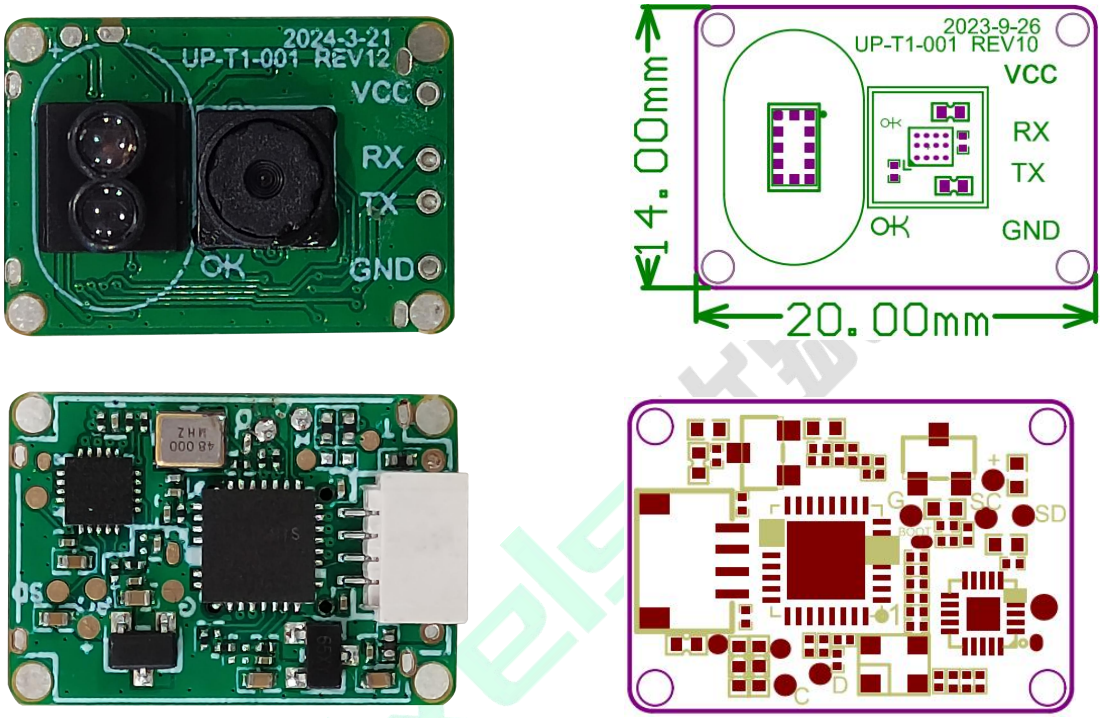

Figure1 Structure chart (Length unit: mm)

3.Pin configuration

The UP-T1-001-Plus can use UART port to connect flight control,As shown in Figure 2,The connection seat spacing is 1.0mm.

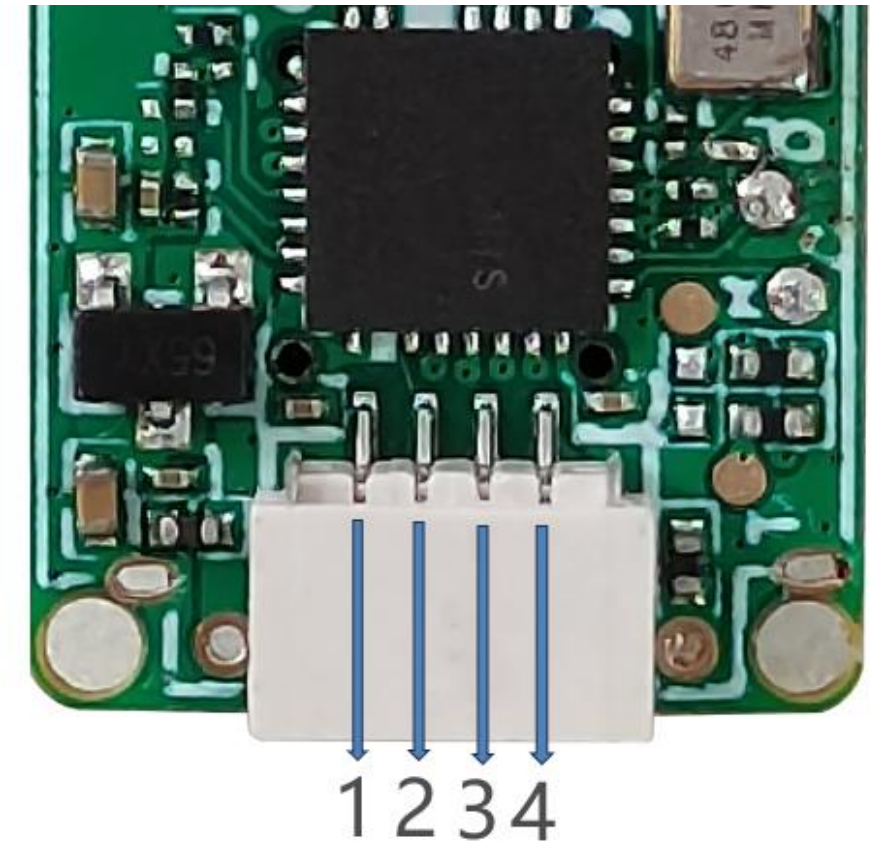

Figure2 Connection diagram

Serial number	UART
1	5V
2	RXD
3	TXD
4	GND

4.Module interface protocol

The UART data format is 1 start bit, 8 data bits, 1 stop bit, and no parity bit. The baud rate is 115200. The VCC provides 5.0V power input. The maximum power consumption is 0.5W for a 5.0V power supply.

serial number		Packet data	contents note
1	Packet header	0xFE	The start identifier of the packet
2		0x0A	Packet bytes（fixed value 0x0A）
3	Optical flow laser data structure	Low byte of flow_x_integral	X:The cumulative displacement of pixels over the cumulative time,(radians*10000) [Divided by 10,000 times the height is the actual displacement]
4		High byte of flow_x_integral	
5		Low byte of flow_y_integral	Y:The cumulative displacement of pixels over the cumulative time,(radians*10000) [Divided by 10,000 times the height is the actual displacement]
6		High byte of flow_y_integral	
7		Low byte of integration_timespan	The total time between the last optical flow data transmission and the current optical flow data transmission（us）
8		High byte of integration_timespan	
9		Laser ranging in low bytes	Laser ranging distance(mm),For example, the low byte is 0x12,High byte is 0x08,The laser ranging distance is 0x0812=2066mm
10		Laser ranging in high bytes	
11		valid	status value： 0(0x00) indicates that optical flow data is unavailable, and 245(0xF5) indicates that optical flow data is available
12		Confidence of laser ranging	Laser ranging confidence,for example, 0x64 indicates that the laser ranging confidence is 100%
13	Proof test value	XOR	3-12 bytes XOR
14	Data packet end	0x55	The end identifier of the packet(fixed value 0x55)

5.Optical flow coordinate

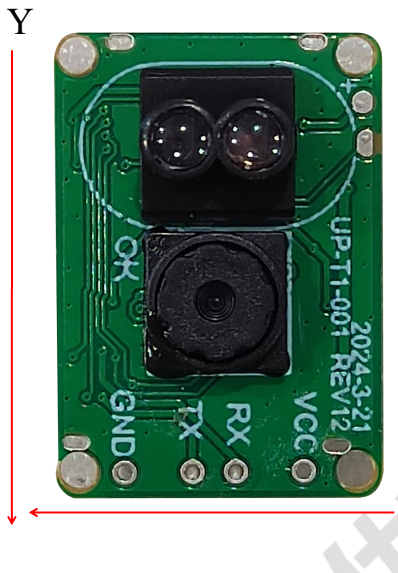

Figure3 Optical flow coordinate system