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RPLiDAR A2M8 360 Degree Laser Scanner Kit - 12M Range

SKU 110991066

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Description

The RPLIDAR A2 is the next generation low cost 360 degree 2D laser scanner (LIDAR) solution developed by SLAMTEC. It can take up to 8000 samples of laser ranging per second with high rotation speed. And equipped with SLAMTEC patented OPTMAG technology, it breakouts the life limitation of traditional LIDAR system so as to work stably for a long time.

RPLIDAR A2M5/A2M6 is the enhanced version of 2D laser range scanner(LIDAR). The system can perform 2D 360-degree scan within a 18-meter range. The generated 2D point cloud data can be used in mapping, localization and object/environment modeling.

The typical scanning frequency of the RPLIDAR A2 is 10hz (600rpm). Under this condition, the angular resolution will be 0.9°. And the actual scanning frequency can be freely adjusted within the 5-15hz range according to the requirements of users.

The RPLIDAR A2 adopts the low cost laser triangulation measurement system developed by SLAMTEC, which makes the RPLIDAR A2 has excellent performance in all kinds of indoor environment and outdoor environment without direct sunlight exposure. Meanwhile, before leaving the factory, every RPLIDAR A2 has passed the strict testing to ensure the laser output power meet the standards of FDA Class I.

Application Scenarios
- General robot navigation and localization
- Environment scanning and 3D re-modeling
- Service robot or industrial robot working for long hours
- Home service /cleaning robot navigation and localization
- General simultaneous localization and mapping (SLAM)
- Smart toy's localization and obstacle avoidance

Features
The core of RPLIDAR A2 runs clockwise to perform a 360 degree omnidirectional laser range scanning for its surrounding environment and then generate an outline map for the environment.
- 4cm Ultra-thin
- Ideal for all kinds of service robot.
- 8000 times sample rate the highest in the current economical LIDAR industry

- 360 degree laser range scanning
- Low Noise, Brushless Motor New Non-contact Drive
- 12m Range Radius
- OPTMAG Original Design,prolong the life-span
- Class 1 Laser Safety Standard
- High-speed RPVision Range Engine: RPVision 2.0
- Five years ultra-long life

Technical Details

Dimensions	76mm x 76mm x 41mm
Weight	G.W 190g
Battery	Exclude
Measurement Performance	
Distance Range	0.15 - 12m,Based om white objects with 70% reflectivity
Angular Range	0-360 Degree
Distance Resolution	<0.5mm
Angular Resolution	0.45~1.35 degree,Typical 0.9 degree
Sample Duration	0.25ms
Sample Frequency	2000~8000Hz,Typical 4000Hz,
Scan Rate	5~15Hz,Typical 10Hz,

Part List

RPLIDAR(PWM motor driver embedded)	1
USB Adapter	1

Laser Power Specification

- For Model A2M7/A2M8 Only

Item	Unit	Min	Typical	Max	Comments
Laser wavelength	Nanometer(nm)	775	785	795	Infrared Light Band
Laser power	Milliwatt (mW)	-	3	5	Peak power
Pulse length	Microsecond(us)	60	87	90	-
Laser Safety Class	-	-	FDA Class I	-	-

Figure 2-2 RPLIDAR Optical Specification

Note: the laser power listed above is the peak power and the actual average power is much lower than the value.

Optical Window

To make the RPLIDAR A2 working normally, please ensure proper space to be left for its emitting and receiving laser lights when designing the host system. The obscuring of the host system for the ranging window will impact the performance and resolution of RPLIDAR A2. If you need cover the RPLIDAR A2 with translucent materials or have other special needs, please contact SLAMTEC about the feasibility.
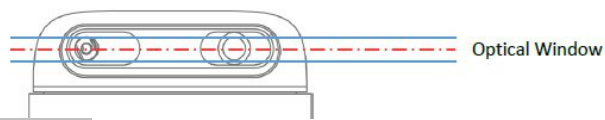

Optical Window

Figure 2-3 RPLIDAR Optical Window

You can check the Mechanical Dimensions chapter for detailed window dimensions.

Coordinate System Definition of Scanning Data

The RPLIDAR A2 adopts coordinate system of the left hand. The dead ahead of the sensors is the x axis of the coordinate system; the origin is the rotating center of the range scanner core. The rotation angle increases as rotating clockwise. The detailed definition is shown in the following figure:
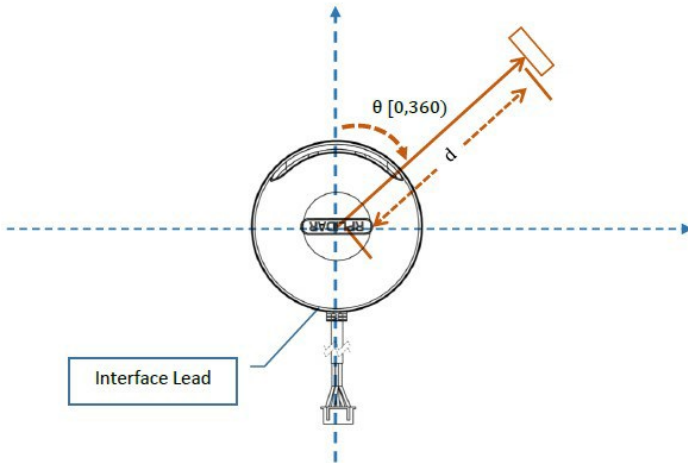

Figure 2-4 RPLIDAR Scanning Data Coordinate System Definition

Communication interface

The RPLIDAR A2 uses separate 5V DC power for powering the range scanner core and the motor system. And the standard RPLIDAR A2 uses XH2.54-5P male socket. Detailed interface definition is shown in the following figure:
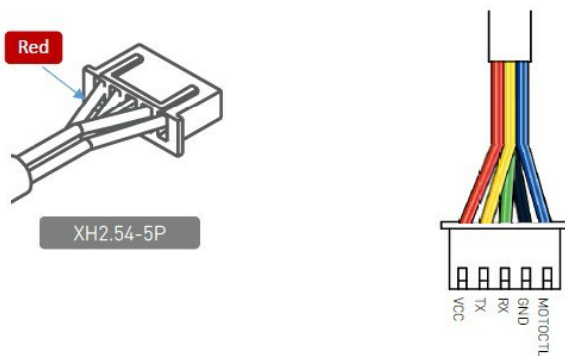

Figure 2-5 RPLIDAR Power Interface Definition

Color	Signal Name	Type	Description	Min	Typical	Max
Red	VCC	Power	Total Power	4.9V	5V	5.5V
Yellow	TX	Output	Serial port output of the scanner core	0V	3.3V	3.5V
Green	RX	Input	Serial port input of the scanner core	0V	3.3V	3.5V
Black	GND	Power	GND	0V	0V	0V
Blue	MOTOCTL	Input	Scan motor /PWM Control Signal (active high, internal pull down)	0V	3.3V	5V

Figure 2-6 RPLIDAR External Interface Signal Definition

Power Supply Interface

RPLIDAR A2 takes the only external power to power the range scanner core and the motor system which make the core rotate. To make the RPLIDAR A2 work normally, the host system needs to ensure the output of the power and meet its requirements of the power supply ripple.

- For Model A2M7/A2M8 Only

Item	Unit	Min	Typical	Max	Remark
Power Voltage	V	4.9	5	5.5	If the voltage exceeds the max value, it may damage the core
Power Voltage Ripple	mV	-	20	50	High ripple may cause the core working failure.
System Start Current	mA	-	1200	1500	The system startup requires relatively higher current.
Power Current	mA	TBD	200	220	5V Power, power off
		TBD	450	600	5V Power, power on

Figure 2-7 RPLIDAR Power Supply Specification

Data communication interface

The RPLIDAR A2 takes the 3.3V-TTL serial port (UART) as the communication interface. The table below shows the transmission speed and the protocol standard.

Item	Unit	Min	Typical	Max	Comments
Band rate	bps	-	115200	-	-
Working mode	-	-	8N1	-	8n1
Output high voltage	Volt (V)	2.9	-	3.5	Logic High
Output low voltage	Volt (V)	-	-	0.4	Logic Low
Input high voltage	Volt (V)	1.6*	-	3.5	Logic High
Input low voltage	Volt (V)	-0.3	-	0.4	Logic Low

Figure 2-8 RPLIDAR Serial Port Interface Specifications

Note: the RX input signal of A2M4 is current control type. In order to ensure the reliable signal identification inside the system, the actual control node voltage of this pin will not be lower than 1.6v.

Scanner Motor Control

The RPLIDAR A2 is embedded with a motor driver which has speed tuning feature. Users can control the start, the stop and the rotating speed for the motor via MOTOCTL in the interface. MOTOCTL can be supplied using PWM signal with special frequency and duty cycle, and in this mode, the rotating speed is decided by the duty cycle of the input MOTOCTL PWM Signal.

The following table describes the requirement for the input PWM signal of MOTOCTL:

Item	Unit	Min	Typical	Max	Comments
High level voltage	V	3.0V	3.3V	5V	-
PWM frequency	Hz	24,500	25,000	25,500	Square Signal
Duty cycle range	-	0%	60%*	100%	Typical value is the duty cycle of high pulse width when the scanner frequency is at 10hz

Figure 2-9 RPLIDA Specification for PWM Signal of MOTOCTL

Note: the typical value is tested when the scanner rotating frequency is 10Hz. With

the same rotating speed, the PWM duty cycle of every RILIDAR A2 may vary slightly. If a precise rotating speed is required, users can perform a closed-loop control.

If the host system only need to control the start and stop of the motor, please use the direct current signal in high level and low level to drive MOTOCTL. Under this condition, when the MOTOCTL is the low level signal, the RPLIDAR A2 will stop rotating and scanning; when the MOTOCTL is the high level signal, the RPLIDAR A2 will rotated at the highest speed.

MISC

- For Model A2M7/A2M8 Only

Item	Unit	Min	Typical	Max	Comments
Weight	Gram (g)	TBD	190	TBD	
Temperature range	Degree Celsius (ºC)	0	20	45	

Figure 2-10 RPLIDAR MISC Specification

Documents

- A2M8 Datasheet
- Dev Kit User Manual
- Protocol
- SDK User Manual
- SDK and Firmware/Application Note/3D Models

Questions and Answers

Have a question about this? Ask people who own it.

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