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SLAMTEC C1 Low Cost 360 Degree Laser Range Scanner User Manual

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Contents

Overview

RPLIDAR C1 development kit includes the matched tools used for evaluating RPLIDAR's performance and initial development. After connecting the RPLIDAR C1 with PC via USB cable, users can observe the cloud map of the environment scanning point collected by the RPLIDAR in RoboStudio and start development based on the SDK.

Items in the Development Kit
RPLIDAR C1 Development Kit contains:

- RPLIDAR C1

- USB cable

- Micro-USB cable

RPLIDAR C1

The RPLIDAR C1 development kit contains standard RPLIDAR C1. The drivable motor controller can be used to configure the scan frequency by tuning motor speed. Developers can also choose to turn off the motor for power saving purpose.

RPLIDAR usage and interface definition will be introduced in the coming sections.

USB cable

Connection and Usage

Connection

RPLIDAR C1 can be easily connected to PC according to the following steps.

1. Connect RPLIDAR C1 with the USB cable

2. Connect the USB cable to your PC via the Micro-USB cable. If the PC is on, after connecting the USB cable to your PC, the indicator light of the USB will light up but the RPLIDAR will not start scanning.


Install Driver for the USB cable
The USB cable converts UART to USB by using CP2102 chip. You need to install the device driver for the chip. The driver can be found in the provided SDK package or downloaded from Silicon Labs' official website:
http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

Here's the installation steps in Windows: after connecting the RPLIDAR with PC, please find the driver file "CP210x VCP Windows" and choose correct operating system version accordingly: x86 for 32-bit OS and x64 for 64-bit OS.

📁 x64	2014/2/8 21:01	文件夹	
📁 x86	2014/2/8 21:01	文件夹	
☑ 🖳 CP210xVCPInstaller_x64.exe	2013/10/25 11:39	应用程序	1,026 KB
🖳 CP210xVCPInstaller_x86.exe	2013/10/25 11:39	应用程序	901 KB
📄 dpinst.xml	2013/10/25 11:39	XML 文档	12 KB
📄 ReleaseNotes.txt	2013/10/25 11:39	文本文档	10 KB
📄 SLAB_License_Agreement_VCP_Win...	2013/10/25 11:39	文本文档	9 KB
📄 slabvcp.cat	2013/10/25 11:39	安全目录	12 KB
📄 slabvcp.inf	2013/10/25 11:39	安装信息	5 KB
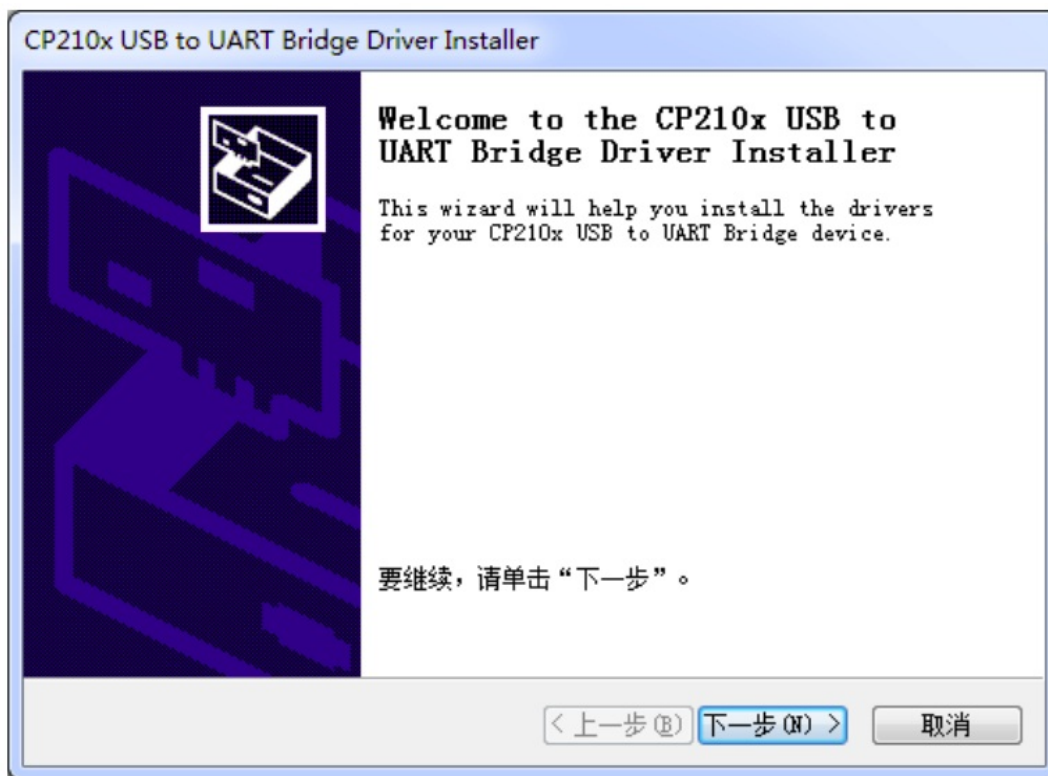
After Installing the driver according to the above installation steps, you will see corresponding serial port name in the [Control Panel] -> [Device and Printers]. Please refer to the below figure.
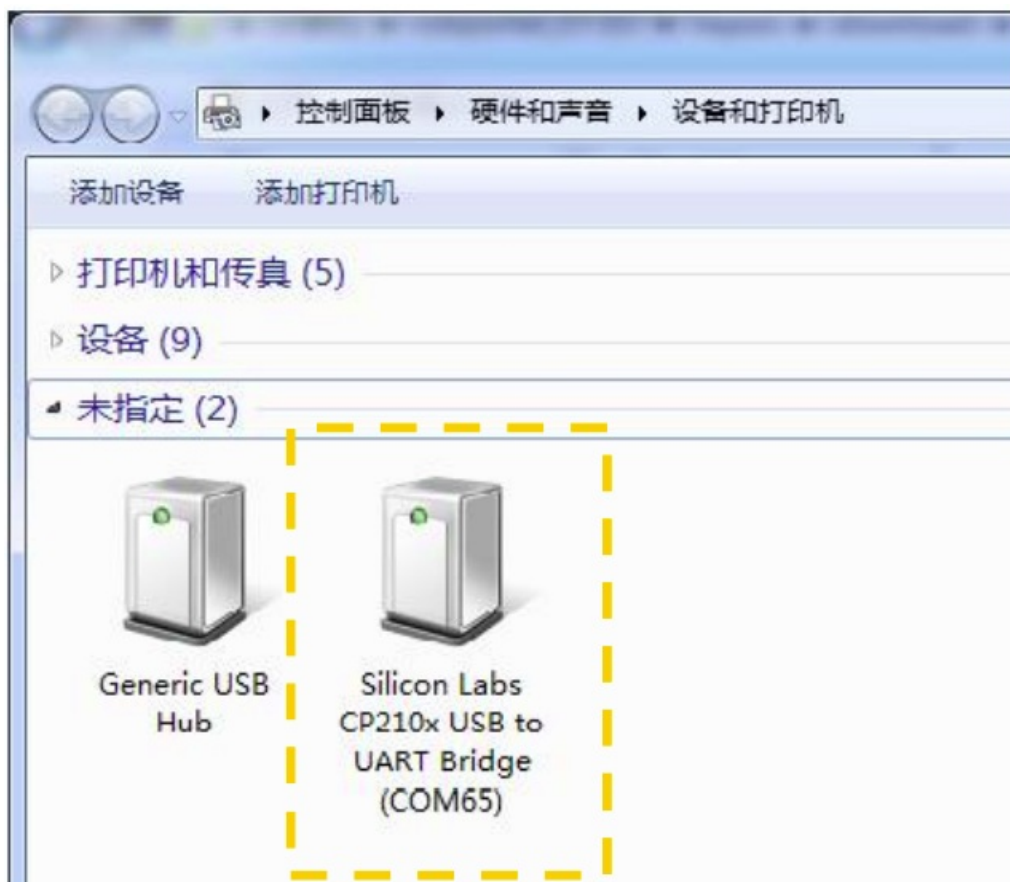

Run Demo Application

SLAMTEC provides a Lidars plugin in RoboStudio for users in test and evaluation. You can view the scan result directly in the UI and save the scan result to files for further processing.

This GUI demo can only run under Windows. For Linux and MacOS users, please refer to the other simple demo

provided in the SDK.

Please make sure you have connected RPLIDAR to PC by using USB cable and installed the device driver correctly before running the demo application in RoboStudio. Launch RoboStudio and log in.
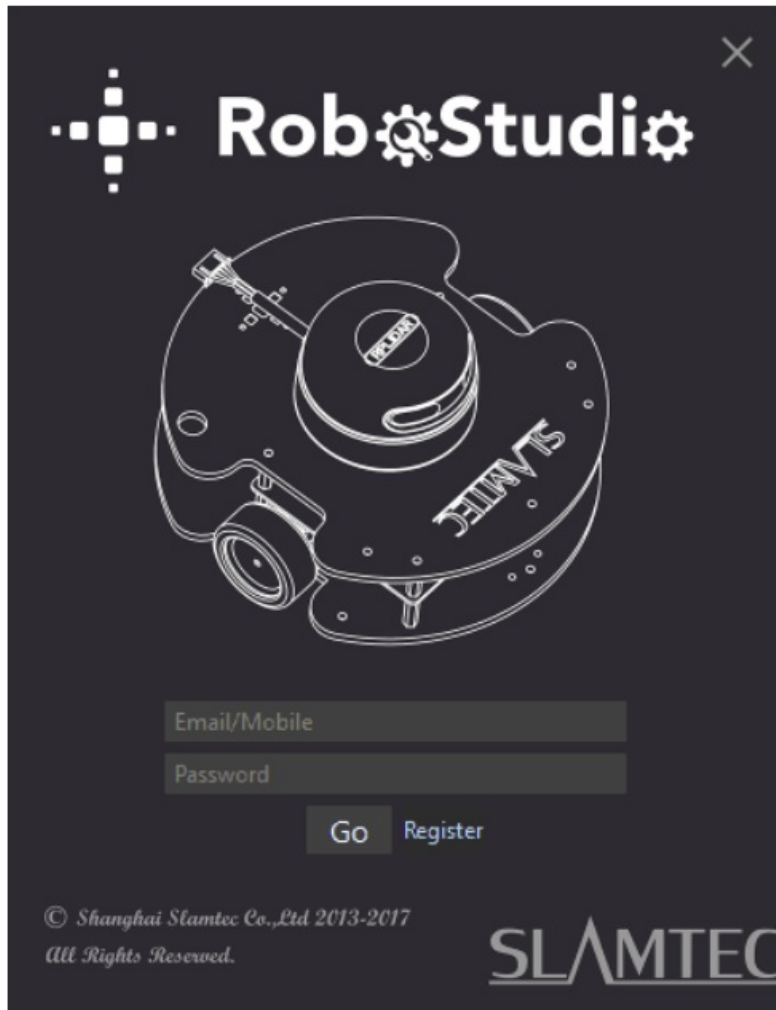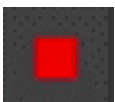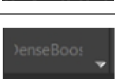

If the connection is ok, you shall see the user interface is shown as below.

1. Click File->Lidars to open the lidar control panel in the left;
2. Click Serial Ports to extend the lidar lists and you'll find the RPLIDAR C1 previously connected to your PC;
3. Click the RPLIDAR C1 icon to extend the tool buttons below the icon: the left one is to adjust the motor speed while the right one is to open the tool bar in the major work area as shown in Figure 2-7.
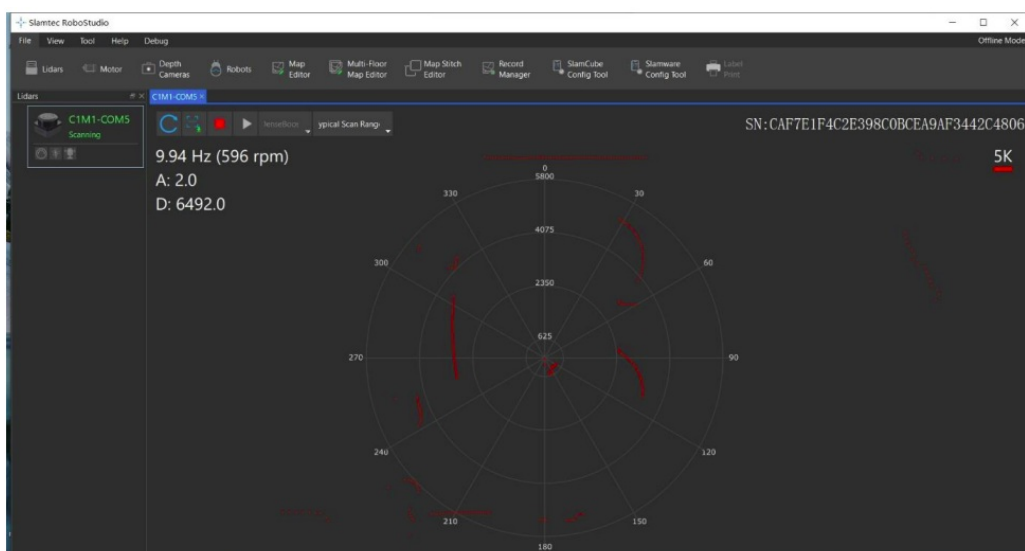
The serial number, version and model of the RPLIDAR C1 will show next with its icon in the lidar control panel. The supported commands of RPLIDAR are showed in the tool bar. The descriptions are listed in the bellow table

Button	Function	Description
	Restart RPLIDAR	Restart scan core to clear internal errors
	Save Scan Data	Save current scan data to the local file
	Stop Scan	Scan core enter power save mode
	Start Scan	Scan data will be displayed after scan core starting work
	Work Mode Switch	Switch among different work modes to fit in specific environments
	Adjust Motor Speed	Adjust the motor speed as required

Press the Start Scan button , the scan data will be displayed as below (b default, the motor rotating speed should be 10Hz.):
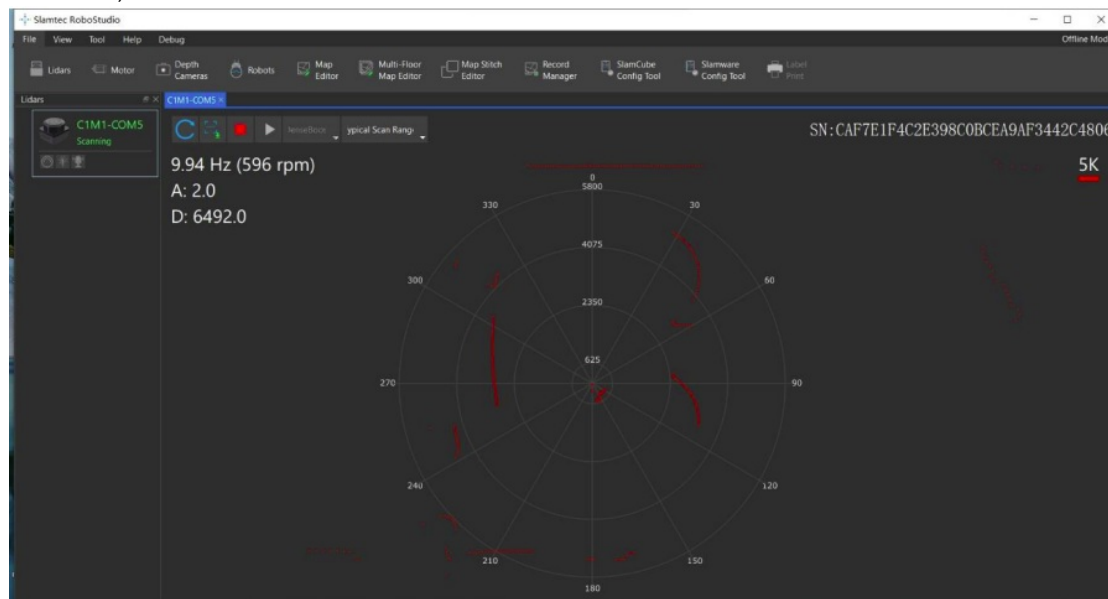
Right click in the major working area to choose a range so as to zoom in or out the view.

The scan frequency is also showed in the above interface.

Troubleshooting
When the scan core or the laser power works abnormally, the scan core will enter protection mode. This state can be retrieved via SDK API. If such scenario happened, please send restart command to reset the scan core.

Motor Speed Adjustment

During the running process, different motor rotating speed can be achieved by pressing the button, which can fit in different working environments or meet specific requirements. There will be a speed adjustment dialog box and dash board popped up for users to enter required speed. After entering a value, the motor will work as the settled rotating speed automatically. User can also drag the sliding handle to the required rotating speed.

The current actual rotating speed will show in the upper left corner of the major work area. For instance, the actual rotating speed in the following screenshot is 10.02Hz.
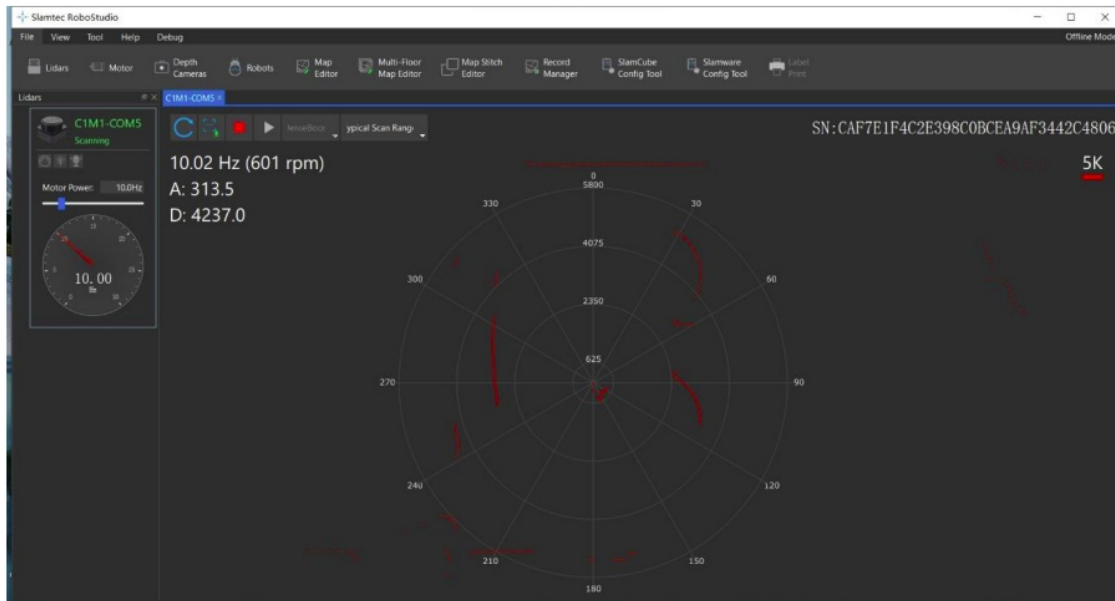
SDK Introduction and Usage

RPLIDAR C1 Pin Definition and Specification

The RPLIDAR C1 uses separate 5V DC power for powering the range scanner core and the motor system. And the standard RPLIDAR C1 uses XH2.54-5P male socket. Detailed interface definition is shown in the following figure:
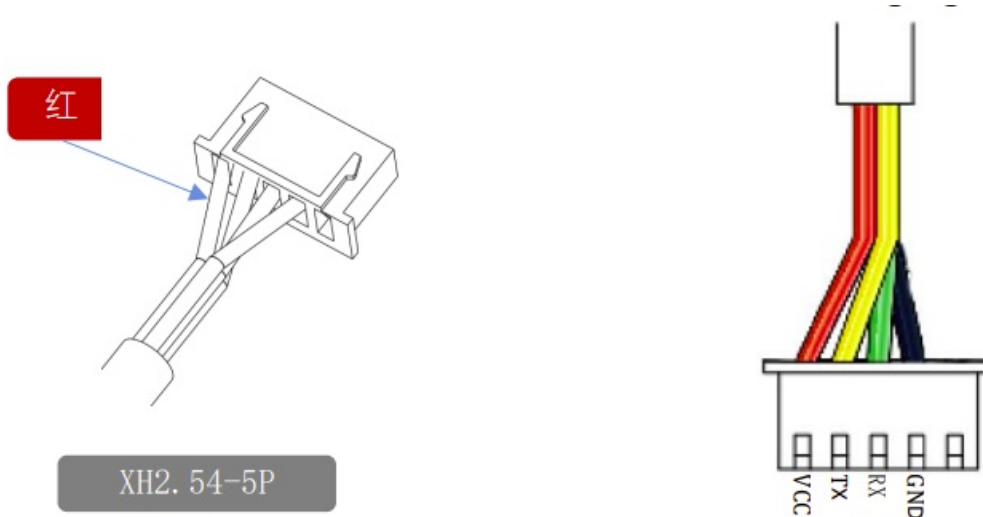
Color	Signal Name	Type	Description	Min	Typical	Max
Red	VCC	Power	Total Power	4.8V	5V	5.2V
Yellow	TX	Output	Serial port output of the scanner core	0V	/	3.5V
Green	RX	Input	Serial port input of the scanner core	0V	/	3.5V
Black	GND	Power	GND	0V	0V	0V

With build-in and speed-adjustable motor driver, RPLIDAR C1 can control th start, the stop and the rotating speed of the motor via the MOTOCTL signal

RPLIDAR.
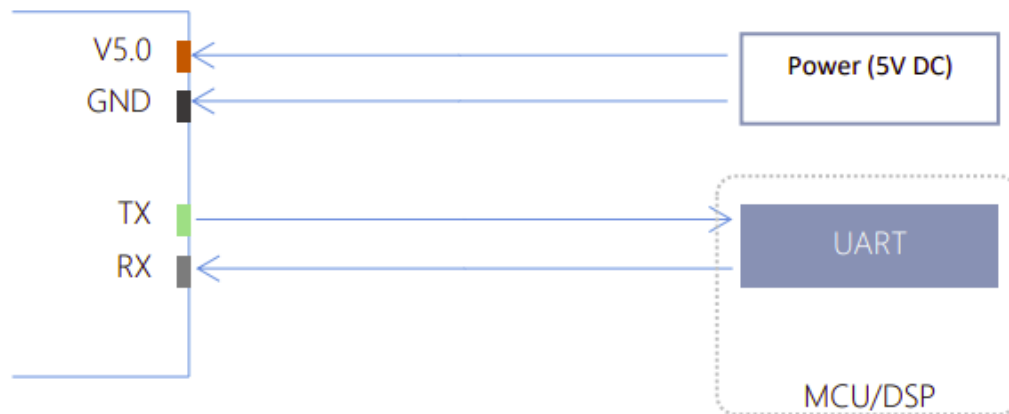
Pin Definition for the USB cable
The USB cable is also using XH2.54-5P specification socket, and it can be connected with RPLIDAR C1 directly. The pin definition is the same as the RPLIDAR C1.

Configure RPLIDAR C1 Scan Frequency
The RPLIDAR C1's scan frequency can be modified by invoking the related functions in the SDK to configure the motor speed.

Please refer to the RPLIDAR protocol and application note for more information and the SDK for the sample code on RPLIDAR scan frequency.

SDK Usage
SLAMTEC provides RPLIDAR SDK support on both Windows and Linux platform. And users can embed the SDK source code to other operational system or embedded system quickly. Please refer to the SDK document for more information.

Operation Recommendation

Pre-Heating for Best Performance
The scan core will be heating when start working. We recommend pre-heating RPLIDAR (Start the scan mode and the scan motor is rotating) for more than 2 minutes to get the best measurement accuracy.

Ambient Temperature
RPLIDAR's measurement resolution is sensitive to the ambient temperature. Improper use may even damage the sensor. Please avoid using RPLIDAR in extreme high temperature (>40℃) and too low temperature (<-10 ℃)
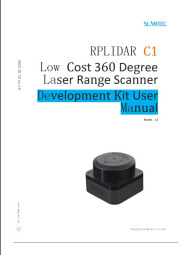
Revision History

Date	Version	Description
2023-10-13	1.0	RPLIDAR C1 initial version

SLAMTEC

Documents / Resources

	SLAMTEC C1 Low Cost 360 Degree Laser Range Scanner [pdf] User Manual C1 Low Cost 360 Degree Laser Range Scanner, C1, Low Cost 360 Degree Laser Range Scanner, Laser Range Scanner, Range Scanner, Scanner

References

- **Silicon Labs**
- **User Manual**