

YDLIDAR SDM15 USER MANUAL^{ALPHA}



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1 OPERATION UNDER WINDOWS

1.1 Development Kit

The SDM15 development kit has the following components:



SDM15 Lidar



USB Type-C Cable



USB Adapter Board

FIG 1 YDLIDAR SDM15 DEVELOPMENT KIT

CHART 1 YDLIDAR SDM15 LIDAR DEVELOPMENT KIT DESCRIPTION

Item	Qty.	Description
SDM15 Lidar	1	Standard version of the SDM15 lidar (provide connecting cable)
USB Type-C Cable	1	Use with USB adapter board to connect SDM15 and PC. USB cable is both a power supply cable and a data cable
USB Adapter Board	1	Realize USB to UART, convenient for the rapid interconnection of SDM15 lidar and PC.

Note: USB Adapter board has two interface: USB_DATA、USB_PWR.

USB_DATA: Data powered interface. In most cases, this interface can be used to meet power and communication requirements.

USB_PWR: Auxiliary power supply interface. The USB interface of some development platforms has weak current drive capability. At this time, auxiliary power supply can be used.

1.2 Device Connection

When SDM15 is evaluated and developed under windows, SDM15 and PC need to be interconnected. The specific process is as follows:

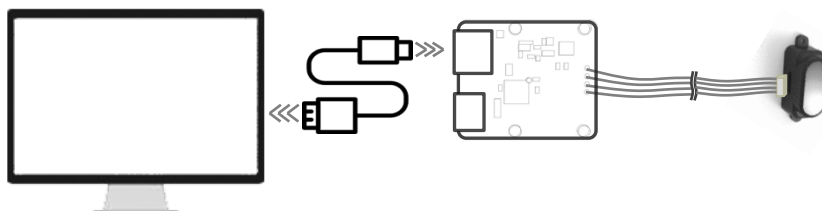


FIG 2 YDLIDAR SDM15 DEVICE CONNECTION

Connect the adapter board with SDM15 first, then connect the USB cable to the USB port of the adapter board and the PC. Note that the Type-C interface of the USB cable is connected to the USB_DATA of the USB interface board.

The drive current of USB interface of some development platforms or PC is not sufficient. SDM15 need to be connected to the auxiliary power supply of +5V, otherwise the lidar will be abnormal.

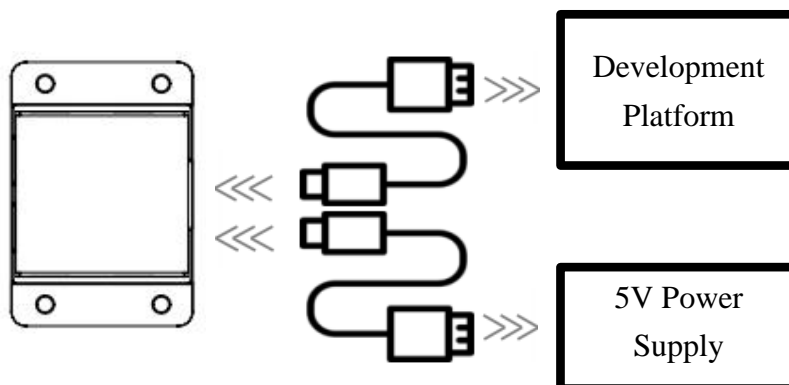


FIG 3 YDLIDAR SDM15 AUXILIARY POWER SUPPLY

1.3 How to Use LidarViewer

YDLIDAR provides LidarViewer, a point cloud data visualization software for SDM15 real-time scanning. Users can use this software to visually observe the SDM15 measurement data waveform.

Before using the YDLIDAR software, please make sure that the SDM15 USB adapter board serial port driver is installed successfully, and interconnect the SDM15 with the USB port of the PC. Run the evaluation software: LidarViewer.exe, select the corresponding serial port number.



FIG 4 YDLIDAR SDM15 EVALUATION SOFTWARE

1.3.1 Start Scanning

Click "开启扫描" in the stopped state. The lidar will automatically start scanning and display the real-time data waveform. The distance is displayed on the right. Dis is the real-time distance (unit: mm). Click "停止扫描" again and the lidar will stop scanning, as shown below:

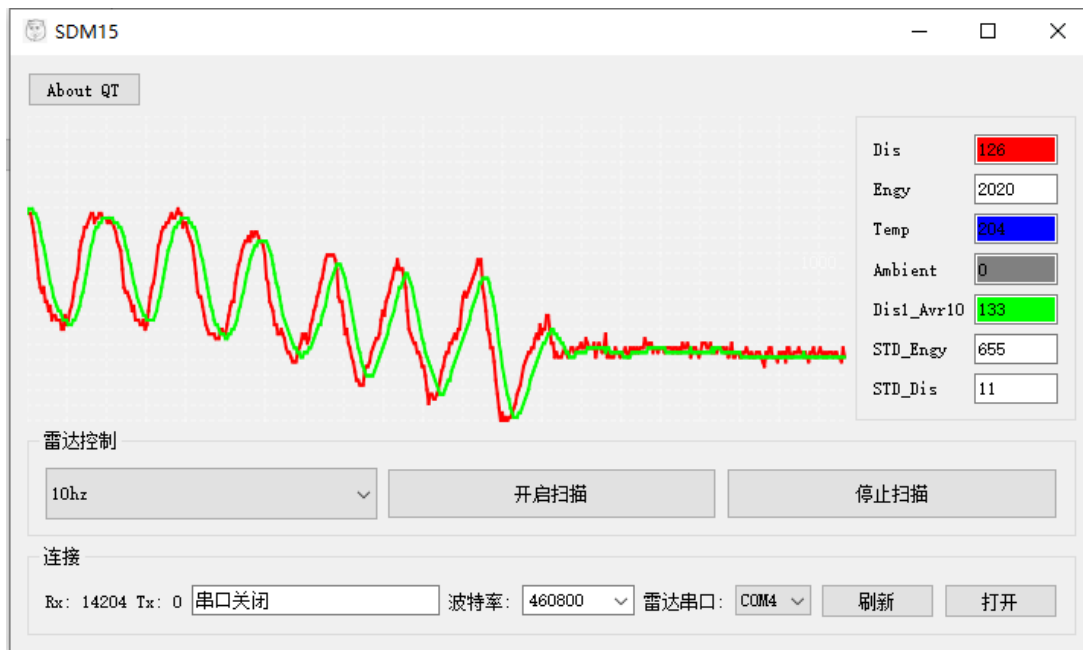


FIG 5 LIDAR SCANNING POINT CLOUD DISPLAY

2 LINUX SDK&ROS OPERATION

There are many Linux distributions. This manual only takes Ubuntu 18.04 and Melodic version ROS as examples.

2.1 Device Connection

Under Linux, the SDM15 and PC interconnect processes are consistent with those under Windows. See Device Connection under Window.

2.2 Using the SDK under Ubuntu

ydlidar_ros_driver depends on the YDLidar SDK library. If users have never installed the YDLidar SDK library, or if it has expired, must first install the YDLidar SDK library. If users have installed the latest version of YDLidar SDK, please skip this step and proceed to the next step.

```
$ git clone https://github.com/YDLIDAR/YDLidar-SDK.git
$ cd YDLidar-SDK/build
$ cmake ..
$ make
$ sudo make install
```

2.3 Using the SDK under ROS

- 1) Cloning GitHub's ydlidar_ros_driver Package:

```
$ git clone https://github.com/YDLIDAR/ydlidar_ros_driver.git  
ydlidar_ws/src/ydlidar_ros_driver
```

- 2) Build the ydlidar_ros_driver software package:

```
$ cd ydlidar_ws  
  
$ catkin_make
```

- 3) Package environment Settings:

```
$ source ./devel/setup.sh
```

Note: Add a permanent workspace environment variable. It will be very convenient if ROS environment variables are automatically added to your bash session every time you start a new shell:

```
$ echo "source ~/ydlidar_ws/devel/setup.bash" >> ~/.bashrc  
$ source ~/.bashrc
```

- 4) Verify that your package path is set, echo the ROS_PACKAGE_PATH variable.

```
$ echo $ROS_PACKAGE_PATH
```

Users should see something like this: /home/tony/ydlidar_ws/src:/opt/ros/melodic/share.

- 5) Create Serial Port Alias [Optional]

```
$ chmod 0777 src/ydlidar_ros_driver/startup/*  
  
$ sudo sh src/ydlidar_ros_driver/startup/initenv.sh
```

Note: After completing the previous operation, re-insert the LiDAR again.

2.4 Run the ydlidar_ros_driver

Run ydlidar_ros_driver with startup file, as shown below:

```
$ roslaunch ydlidar_ros_driver Tmini.launch
```

2.5 RVIZ Scan Result Checking

Run launch file, open rivz to view the SDM15 scan result:

```
$ roslaunch ydlidar_ros_driver lidar_view.launch
```

Note: Take G4 as an example by default. If you use other lidars, change the lidar.launch file in lidar_view.launch file to the corresponding *. (If using SDM15 lidar, change to SDM15.launch)



2.6 Use of SCM Platform

The serial port data analysis function of the SCM platform as follow:

```
/* *****  
* Function Name   : SDM15_Decode  
* Description     : Hex 命令解析接口, 输入 RxData  
* ***** */  
uint8_t Rx_buffer_temp[18];  
uint8_t Rx_buffer_ok[18];  
void SDM15_Decode(uint8_t RxData){  
    static uint8_t RecCmd_Step=0,Checksum=0,RecCmd_Data_len=0,Data_cnt=0;  
    switch(RecCmd_Step){  
        case 0:  
            if(RxData == 0xAA){  
                Rx_buffer_temp[0]=RxData;  
                RecCmd_Step++;  
            }  
            Checksum = 0xAA;  
            break;  
        case 1:  
            if(RxData == 0x55){  
                Rx_buffer_temp[1]=RxData;  
                RecCmd_Step++;  
                Data_cnt = 0;  
                Checksum+=RxData;  
                RecCmd_Data_len = 0;  
            }  
            else{  
                RecCmd_Step = 0;  
            }  
            break;  
        case 2:  
            Rx_buffer_temp[2]=RxData;  
            Checksum+=RxData;  
            RecCmd_Step++;  
            break;  
        case 3:  
            Rx_buffer_temp[3]=RxData;  
            Checksum+=RxData;  
            RecCmd_Data_len = Rx_buffer_temp[3];  
            RecCmd_Step = RecCmd_Data_len==0 ? 5 : RecCmd_Step+1;  
            break;  
        case 4:  
            if(Data_cnt<RecCmd_Data_len){
```

```
        Rx_buffer_temp[4+Data_cnt++]=RxData;
        Checksum+=RxData;
        if(Data_cnt>=RecCmd_Data_len){
            RecCmd_Step++;
        }
    }
    break;
case 5:
    if(Checksum==RxData){
        memcpy(Sensor_Data.Buffer,&Rx_buffer_temp[0],18);
        RecCmd_Step=0;
        Data_cnt = 0;
        Checksum = 0;
    }
    else{
        RecCmd_Step = 0;
        Data_cnt = 0;
        Checksum = 0;
    }
    break;
default: break;
}
}
```

3 ATTENTION

3.1 Ambient Temperature

When the working temperature of SDM15 is too high or too low, it will affect the accuracy of the ranging system, and may damage the structure of the scanning system, reducing the service life of lidar. Please avoid using in high temperature (>50 °C) and low temperature (- 10 °C).

3.2 Ambient Lighting

If users need to use it outdoors, please avoid the SDM15's vision system directly facing the sun.

3.3 Power Supply

During the development process, since the drive current of the USB interface of each platform or the USB interface of the computer may be too low to drive the SDM15, the external power supply of the +5V to the SDM15 needs to be provided through the USB_PWR interface of the USB interface board. It is not recommended for use mobile phone power bank because the voltage ripple of power bank is too large.

4 Revise

Date	Version	Content
2022-08-29	0.1.0	The 1st release
2023-01-16	0.1.1	Optimize use tutorial under Windows
2023-05-11	0.1.2	Increase SDK & ROS content