

# Hypersen Technologies Co., Ltd.

## LiDAR PC software

### User Manual

CONFIDENTIAL

## Content

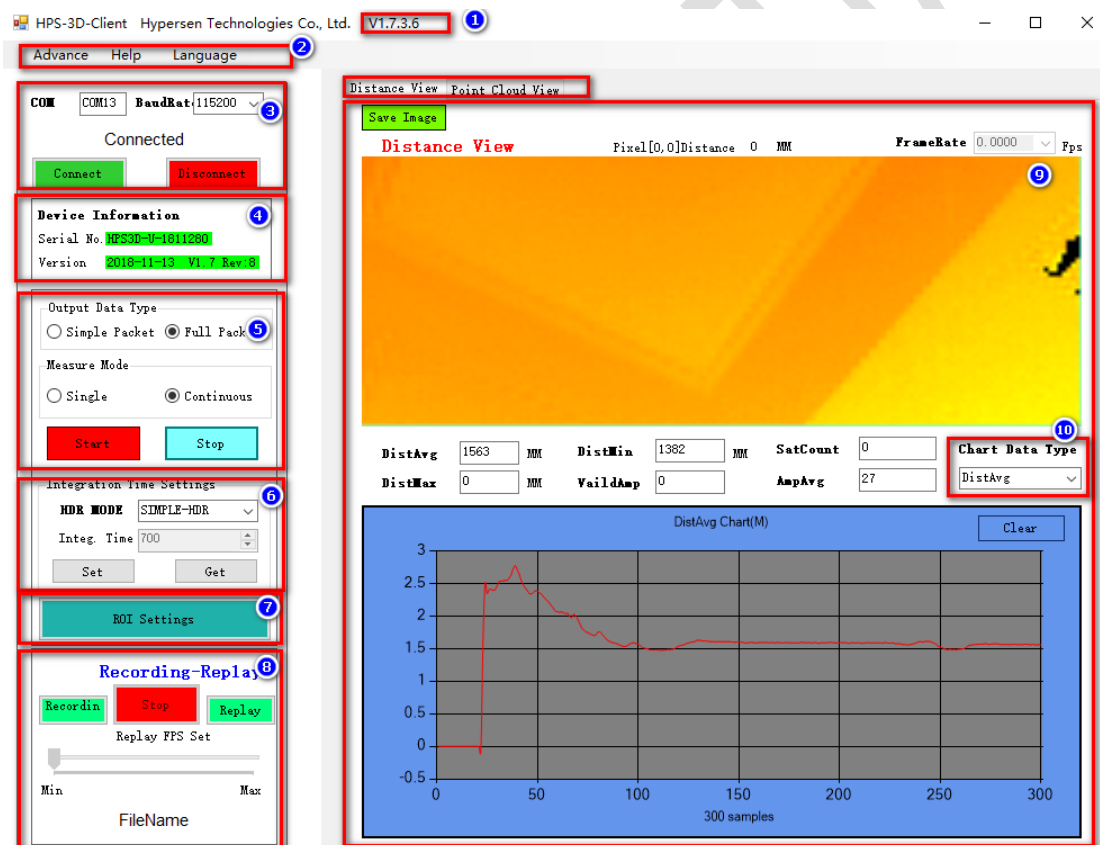
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# 1. Software introduction

## 1.1 General

The PC software can easily test the LiDAR produced by Hypersen Technology (Shenzhen) Co., Ltd. and the setting of sensor parameters.

## 1.2 Main interface



1) PC software version number

2) Menu

Advanced Features Settings tab: Includes the following features: user profile saving, factory reset, client profile saving, loading client software configuration files, baud rate reset and advanced feature settings, etc.

The Help tab contains hardware update, company information, client software version

number, and device information.

3) Device connection

Indicate connection status, port No., and baud rate.

4) Device information

Include device serial number and hardware version number

5) Measurement mode control

Include sampling mode (Single step and continuously measurement), output data packet and etc.

6) Integration time mode

Include HDR-DISABLE (Fixed integration time mode), AUTO-HDR (Adaptive integration time mode), SUPER-HDR (Super adaptive integration mode), SIMPLE-HDR (Simple adaptive integration mode), four modes;

7) ROI settings

8) Data recording and playback (default is saved in .CSV format)

Recording or playback of output packet data;

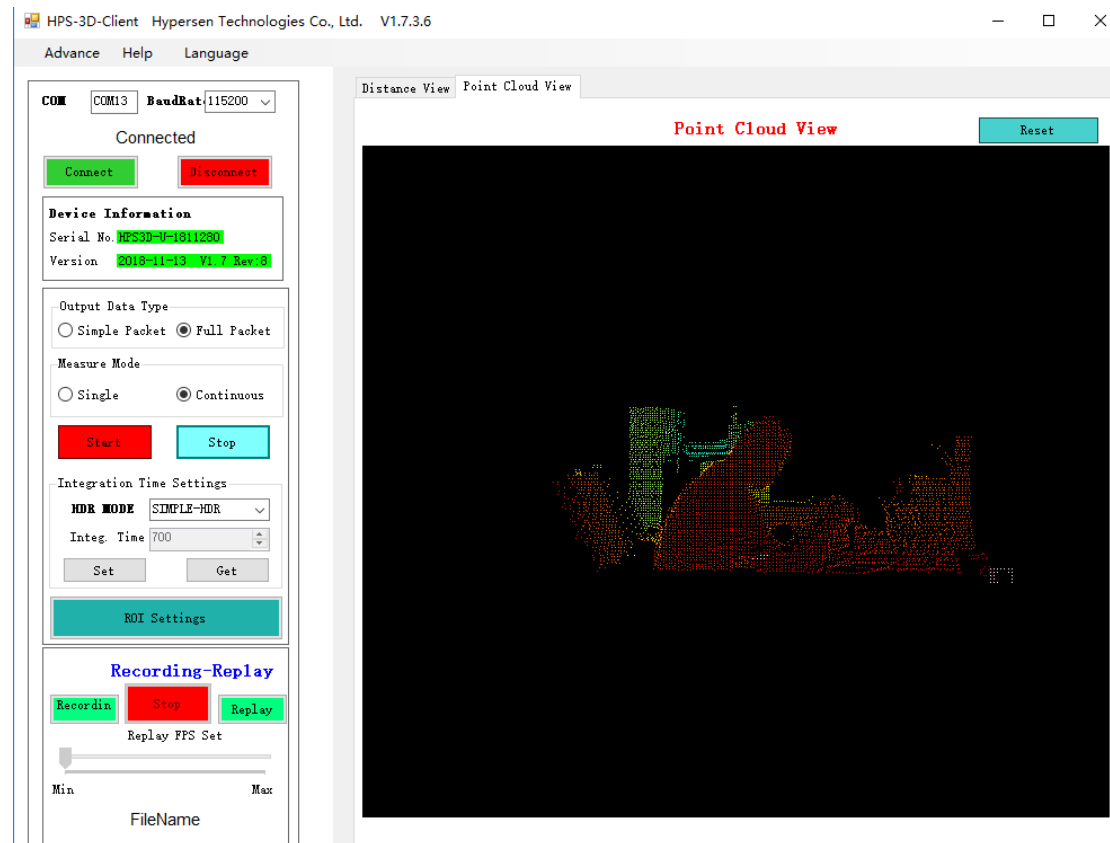
9) Image display shift

Include distance image and point cloud image. Click on any position on the image to observe the data of the pixel, and the purple area represents the minimum distance point, which supports the image saving function;

10) Curve data type selection

Choice of average distance, maximum / minimum distance, and a single pixel point distance data and other graph display

Point cloud view:



## 2. Software installation

Unzip "Release.rar" to any directory, first install the two necessary driver files, one is the virtual serial port driver and the other is .NET Framework 4.6.1 and above. After the installation is complete, you can run the client software (HPS-3D160 directory under HPS-3D160.exe)

## 3. Device connection and software startup

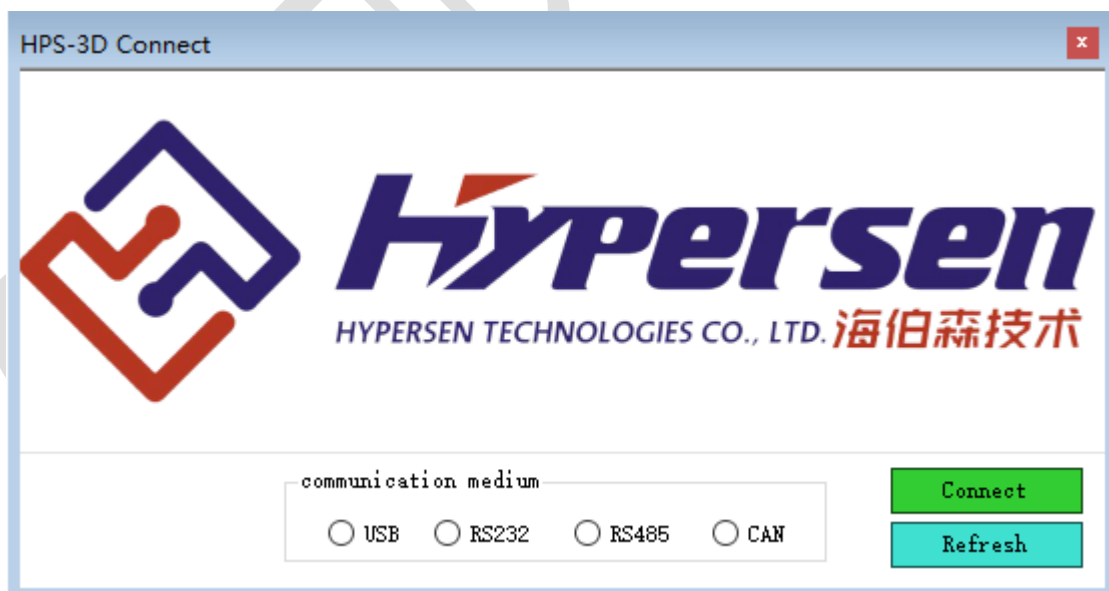
Communication ports wiring diagram is shown as below:

Connector No.	PIN	Definition	Cable color	Description
1		CAN H	Orange	CAN Data+
2		CAN L	Orange+White	CAN Data-
3		USB+	Orange	USB Data+
4		USB-	Orange+White	USB Data-
5		USB voltage		Suspended
6		OUT	Blue	Output out

7	PH-VCC		Optocoupler voltage, no voltage output
8	PH-GND	Purple+white	Optocoupler ground , output COM
9	IN	Blue+white	Input IN, require current drive
10	RS232-RX	Orange+white	232 input
11	RS232-TX	Orange	232 output
12	485-A	Orange	485 A cable / Data+
13	485-B	Orange+ white	485 B cable / Data-
14	GND	Purple	
Power positive		Red	
Voltage negative		Black	

After connecting according to different communication interfaces, the software can be run after the connection with the PC is successful;

The software currently supports USB, RS232, RS485, CAN interfaces. After running the software, you need to set the communication interface and parameters, and then click the connection.



## 4. Functions

### 4.1 Main interface function description

After the device is successfully connected, the main interface will have a connected status indication, and display the currently connected port number and the set baud rate;

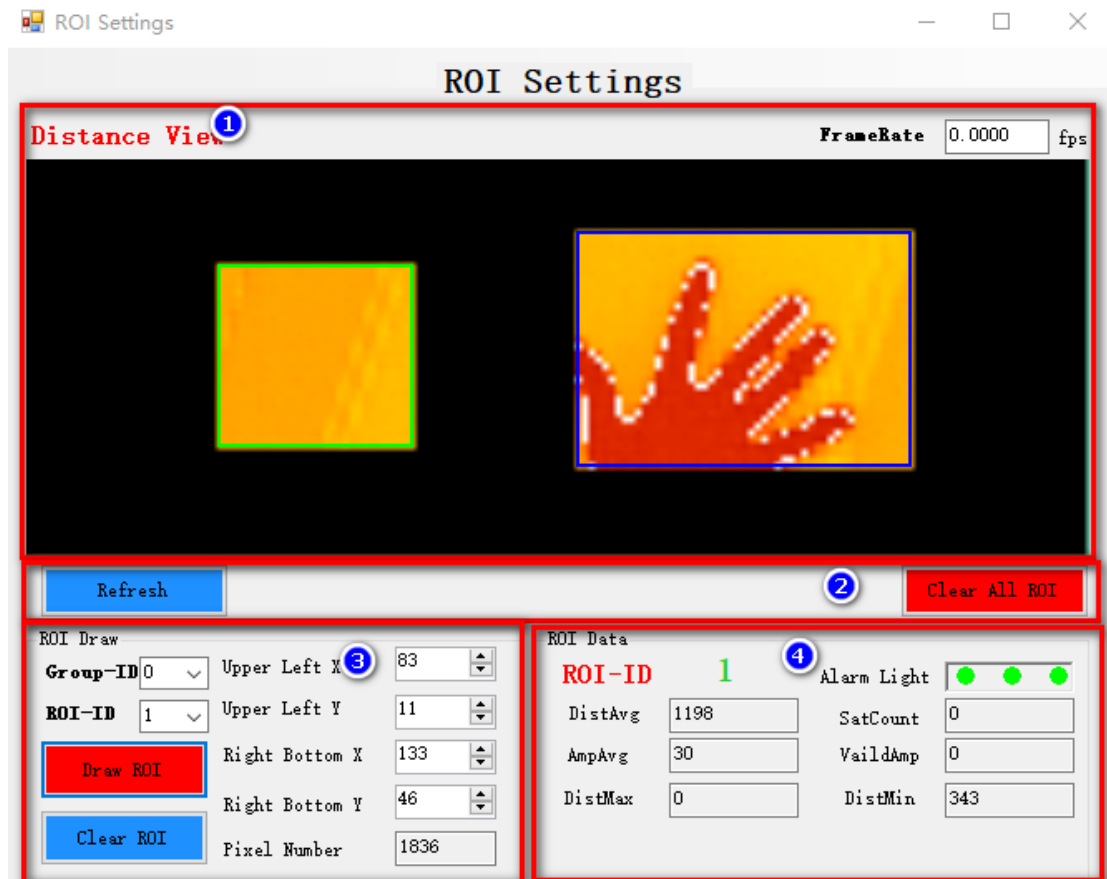
Main interface function introduction:

- (1) Sampling mode selection: Single step measurement and continuous measurement.
- (2) Output data selection: Simple data packet and complete data packet
- (3) Integration mode setting:  
HDR-DISABLE, AUTO-HDR, SUPER-HDR and SIMPLE-HDR (Detailed description please refer to Section 4.3 Advanced parameters setting)
- (4) ROI setting: Support 16 groups of ROI settings, each group support multi ROI settings, (For details and settings, please refer to Section 4.2)
- (5) Data recording and playback function: real-time data recording for data analysis, and the playback frame rate can be adjustable.
- (6) Measurement view: color distance image and point cloud image depth image display, save images is also supported
- (7) Measurement data curve graph: curve data type is selectable to draw curve analysis separately for an output data type.
- (8) Advanced function settings: Advanced function settings include advanced parameter settings, save user profiles, restore factory settings, save/restore client profiles, and advanced parameter settings;

### 4.2 Region of interest (ROI) function setting and introduction

Currently, the client software supports 16 groups of user-defined ROI, each group supports multiple custom ROI. It can be combined by setting multiple different ROIs to meet the needs of our actual application scenarios.

Click the ROI setting button on the main interface to enter the ROI setting main interface, as shown below:



#### 4. 2. 1 ROI setting main interface function and introduction

- (1) Distance image display interface: color image display and rectangular ROI drawing and setting sections;
- (2) Refresh current display interface and delete all custom ROI under current ROI group (Group ID)
- (3) ROI drawing: At present, the client software supports drawing up to 8 non-repetitive ROI. For detailed drawing steps, please refer to Section 4.2.2.
- (4) ROI data display box: This area is used to display simple data in the current ROI. By moving the mouse to the ROI drawn, the current ID and its simple data package contents are displayed in the area; The alarm indicator represents three segments threshold of alarming output status bit (bit0 bit1 bit2): Maximum/minimum distance coordinate is this pixel point position correspond to original pixel point (0,0) position

#### 4. 2. 2 ROI setting steps

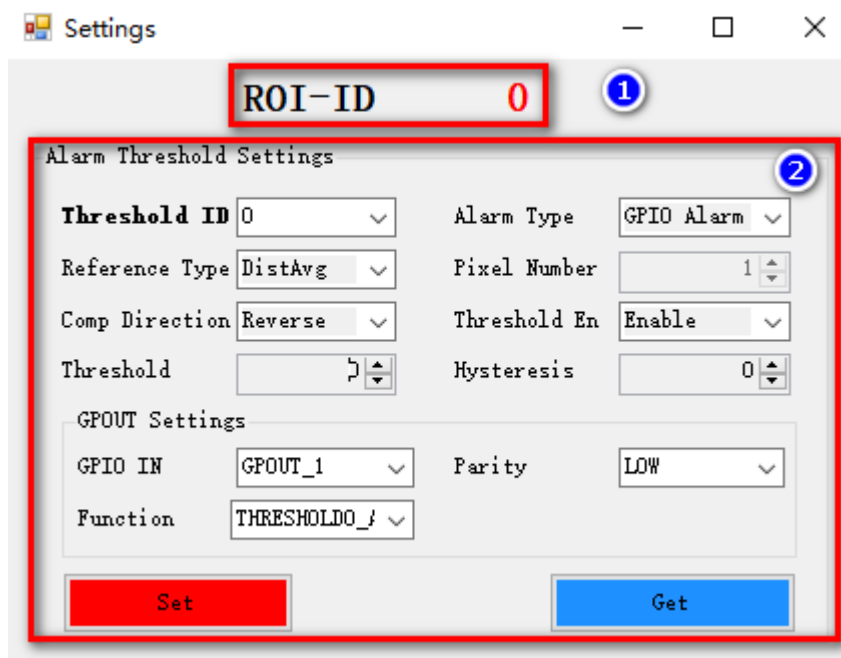
In the first step. Choose group ID (Group-ID) (0~15) in ROI main interface 3 area.

In the second step, select area- ID number;

In the third step, click the button to draw the ROI in interface 1, and then use the mouse to drag the mouse from the upper left to the lower right in the area to draw the rectangle of ROI. If you need to draw again after each drawing, you need to click the button to draw ROI.



In the fourth step, click the mouse in the ROI to be displayed, and set the alarm parameters for the area. The setting interface is as follows:



- 1) Display the currently set ROI ID number
- 2) Alarm threshold setting: At present, the client software supports three segments of threshold setting threshold ID range is 0~2;

The setting steps are as follows:

Step 1: Select a threshold ID, and set three threshold parameters by ID switching.

Step 2: Select a threshold reference type, the reference type represents a data type of the threshold, and the set threshold is compared with the reference type to output; Notice: This type is only for uses of reference data, no matter largest or smallest values or other parameter types, it is only considered that type is the sensor's output, this value only compares with threshold value. When reference type selects pixel number, pixel point number parameter setting is valid.

Step 3: Select the comparison direction, you can select two types: forward comparison and reverse comparison. The forward direction indicates that the reference value is larger than the threshold value to output alarm signal, and the reverse direction indicates that the reference value is smaller than the threshold value to output the alarm signal.

Step 4: Set a threshold, which is set according to the selected reference type;

Step 5: Set the alarm type, select GPIO to output an alarm or turn off the alarm;

Step 6: Set the threshold enable to individually switch a certain threshold;

Step 7: Set the hysteresis range, which is to solve the problem that the frequent alarm output occurs when the reference type value jumps back and forth around the threshold. Therefore, the setting of the value should not be too large, otherwise the alarm trigger delay will be caused;

Step 8: GPIO output configuration, select the alarm function, and set a certain threshold alarm separately; This parameter is used with threshold ID. Please notice that GPIO output is optocoupler no voltage output.

Step 9: Click the Settings button to save the settings. If the settings needed to be available on the next time power on, you need to save to the user configuration.

The fourth step is to view the data information in the current ROI and move the mouse to the ROI to be viewed.

## 4.3 Advanced parameters setting function introduction

Click the Advanced Features tab of the main interface and select Advanced Parameter Settings to display the advanced parameter settings window, as follows:

The screenshot shows the 'Advance Param Settings' window with the following sections and settings:

- Integrated time model (1):**
  - HDR Mode: AUTO-HDR
  - AUTO-HDR exposure AMP: 500.000
  - AUTO-HDR over exposure AMP: 800.000
  - AUTO-HDR weak AMP: 90.000
  - AUTO-HDR weak serious AMP: 50.000
  - SIMPLE\_HDR Max Integ Time: 2000
  - SIMPLE\_HDR Min Integ Time: 250
  - SUPER-HDR FrameCnt: 4
  - SUPER-HDR MaxIntegrated Time: 30000
  - HDR-DISABLE Integrated Time: 352
- Other Advance settings (2):**
  - User-ID: 0
  - Dist Offset: 0
  - Multi Camera: Enable
  - Optical Param: Disable
  - Filter Type: DISABLE
  - Filter Arg: 0
- GPIO IN Settings (3):**
  - GPIO IN: GPIN\_1
  - Parity: LOW
  - Function: DISABLE
- Distance Filter Settings (4):**
  - Mode: DISABLE
  - Threshold: 100
  - KalmanK: 0.1
  - CheckNum: 2

(1) Integration time mode setting: set the corresponding parameters according to the selected mode;

The HDR-DISABLE mode is to measure by manually setting the integration time;

The AUTO-HDR mode automatically adjusts the integration time based on the amplitude of the signal in the current measurement environment. This mode is more suitable for use in close proximity sensitively situation (background is neglectable);

The SUPER-HDR mode is measured by combining multiple frames into one frame. This mode is suitable for the situation where the background of the measured object is more concerned; for example, the number of frames is 4, and the maximum integration time is 40000us, then the

integration time of the four frames 4000, 40,000/4, 40,000/4/4, 40,000/4/4/4;

The SIMPLE-HDR mode combines data frames acquired under two different integration times to synthesize one frame of data for output; the two sets of integration time can be adjusted according to the actual application scenario;

(2) Other advanced parameter settings:

User-defined ID: used to set the frame ID, the default is 0;

Distance offset: this parameter is suitable for correcting the error between the measured value and the actual, this value can be positive or negative.

Multi-machine interference: Turn multi-machine collaboration function on or off, the default status is ON

Optical parameter enables settings; Turn on or the ratio between the optical compensation parameter and the emission angle;

Smoothing filter setting: Filtering edge noise and optimizing image display;

(3) Distance filter

Mode selection: Turn the distance filter function on or off;

Noise threshold: This threshold should be set higher than the expected distance noise, otherwise each noise peak will clear the counter or cause unnecessary filter reset;

Scale factor K: filter gain value for filtering sensitivity control;

Threshold check frame number: The effective threshold value that must be reached to check the number of frames for filter reset. The default value is 2, the larger the value, the slower the corresponding speed and the longer the delay;

(4) GPIO input setting: set input GPIO input function, realize command transmission by level triggering;

Caution: GPIO input connection: purple-white ground, blue and white to 24V power supply; default configuration GPIO polarity is low, when this pin is high, GPIO function is executed; if GPIO polarity is high, GPIO function is CAPTURE\_START default When the power is turned on, the client will not be able to configure the parameters again and cannot connect. You need to connect the GPIO to the 24V power supply to stop the sensor, and then connect to the client again to configure.

## 5. FAQ

### 5.1 The interface layout of the software is confusing

Method:

This problem is caused by the resolution mismatch, the software supports resolution adaptation, please maximize the software window;