Rd-03_V2 Instructions for use of the upper computer

Version V2.0.0

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Document resume

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Content

1. Software description

This chapter introduces the usage of the Rd-03_V2 module host computer tool.

The RD-03_V2 version of the module has been burned to the factory with the relevant factory firmware. Ai-Thinker can provide visual host computer configuration tool software for Rd-03_V2 version module, it is convenient for developers to configure the parameters of the Rd-03_V2 version module according to the usage scenario and optimize the sensing effect.

1.1. Wiring instructions

This section describes how to use the serial port debugging tool to connect to the RD-03_V2 module.

- Table 1-1 shows the default pin connection mode of connecting the host computer to the Rd-03_V2 radar module through the USB to TTL serial port adapter board.

Table 1-1 Correspondence between the Rd-03_V2 version and the USB serial adapter board

Rd-03_V2	Serial port adapter board
1	3.3V
2	GND
3	RX
4	TX

- Open the Device Manager and check the serial slogan of the serial port where the radar module is located
- Open the serial port debugging tool, select the slogan above, set the baud rate of the serial port to 115200, then click the "Open Serial Port" button to view the detection results of the current radar at the output of the serial port debugging tool.

1.2. Use of the upper computer

This section describes the use of host computer tools for the Rd-03_V2 module, to help users understand the meaning of the relevant parameters, and how to obtain related parameters.

Note: The host computer tool and the serial port debugging tool cannot be used at the same time!

Before using the functions of the host computer, the user should first connect the Rd-03_V2 version module with the host computer, and the steps are as follows：

- Get the upper computer tool from the official website of Ai-Thinker
- Use the serial adapter board to connect the Rd-03_V2 module and the host computer according to Table 1-1
- Open the host computer tool, click on the "Refresh" button, in the Slogan drop-down list, select the slogan of the radar module, after confirming that the "baud rate" is 115200, click the "Connect Device" button to start connecting the host computer and the Rd-03_V2.

（a）Before the device is connected

（b）Once the device is connected

Figure 1-1 XenD101H_Tool

This is shown in Figure 1-1(a), the upper computer tool interface can be divided into 3 areas：the area where the device operates(Zone1), function button area(Zone2), functional page area(Zone3).

After the host computer tool is successfully connected to the Rd-03_V2 version module, the firmware version number of the Rd-03_V2 module is displayed in the Zone 1 area of the interface, the function page area of "Parameter View/Settings" displays the current parameter values of the module, this is shown in Figure 1-1(b).

1.2.1. Parameter viewing/setting

Figure 1-2 shows the Parameter View/Settings page of the host computer tool, it allows the user to view the current parameters of the radar, and modify the specified parameter configuration to meet the requirements of specific application scenarios.

The steps to read the radar parameters through the host computer tool are as follows：

- After connecting the module to the host computer tool, on the function page, click the "Read Sensor Settings" button, a message "Read Parameters Successful" pops up, and displays the current values of all parameters of the radar.

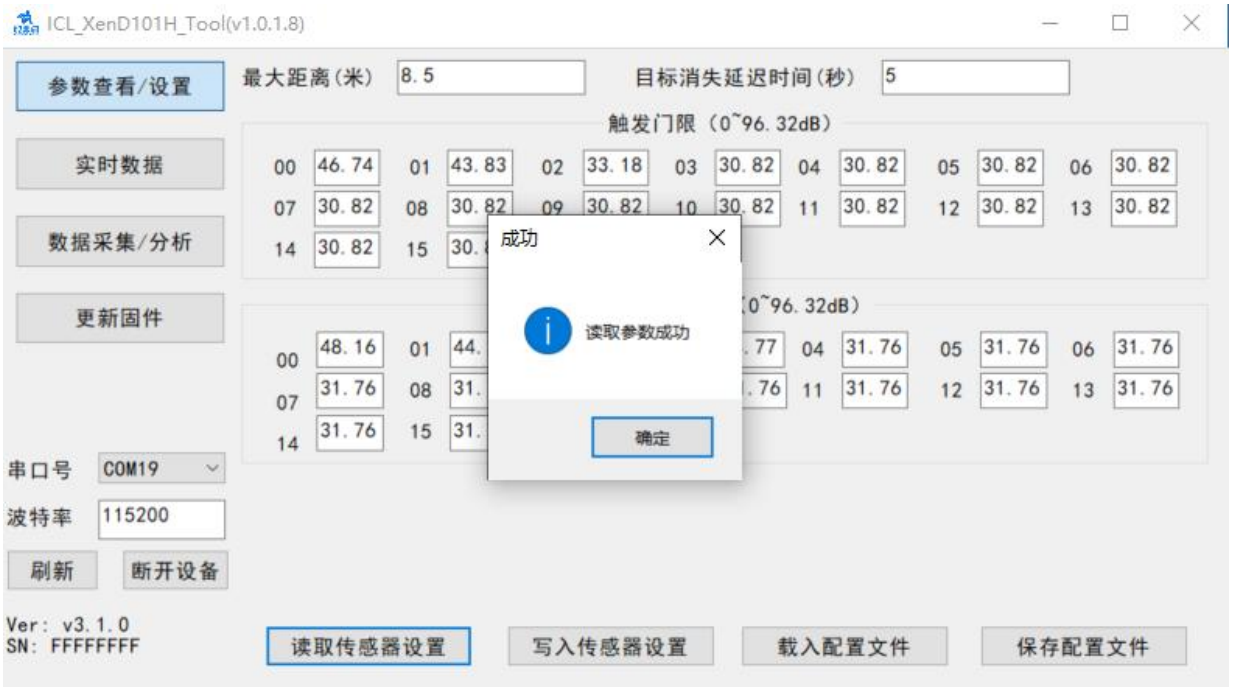

Figure 1-2 The upper computer reads the radar parameter interface

The steps to change the radar parameters through the host computer tool are as follows：

- After connecting the Rd-03_V2 module to the host computer tool, on the function page, enter new parameter values for all parameters that need to be changed.
- On the function page, click the "Write Sensor Settings" button, the host computer will write the parameter values in the current interface to the radar module, a message message indicating that the parameter was written successfully is displayed, click "OK" to complete the parameter setting.

Table 1-2 describes the parameters on the Parameter Settings page of the host computer.

Table 1-2 Parameters of the upper computer tool interface

The name of the parameter	Interpretation	Parameter range
Max distance(m)	Used to set the maximum effective detection range of the radar. The length of one is 70cm from the door.	0~10，precision 0.1m

The target disappears by delay(second)	Switching from manned to unmanned requires a delay of a certain period of time： during this period, if someone is detected, restart the timer for this time. The radar will switch to the unmanned state only after it detects that the unmanned state has lasted a full T time, no one was escalated.	0~65535
Trigger threshold(dB)	It is used to set the energy value threshold for the unmanned to manned state, it can be calculated using the "Generate Threshold" function.	0~100，precision 0.01
Micro-motion threshold(dB)	The threshold of the energy value used to detect the micro-motion state of the human body, it can be calculated using the "Generate Threshold" function.	0~100，precision 0.01

The host computer tool supports saving and loading radar parameter configurations：

- Click on the "Save Profile" button, select the path you want to save, the current parameter configuration is saved in the host computer in the form of a .xml file. The default save address is the folder where the host computer tool is located.
- Click the "Load Profile" button, the host computer tool will open the radar parameter configuration file under the user-specified path, and read in the radar parameters, click the "Write Sensor Settings" button to write the parameters in the configuration file to the radar module.

1.2.2. Real-time data

Figure 1-3 shows the Real-time Data page of the host computer, the function page is described below：

- The colored light icon in the upper left corner indicates the presence or absence in the detection area：when the radar detects the presence of a human body, the colored lights are red; when no human presence is detected, the colored lights are green.
- The text display box behind the colored lights shows the targets detected by the radar and the radial distance to the radar.
- The "Start/Pause" toggle button is used to turn the radar's detection on and off.
- The Generate Threshold button is used to scan ambient noise and calculate the Trigger Threshold and Hold Threshold for each distance gate.
- "Motion Information/Micro Motion & Static Information" displays the motion energy value (green line) and threshold value (red line) of each distance gate in real time; a black

background indicates that the distance gate is a valid detection range, a gray background indicates that the distance gate is an invalid detection range.

- "Distance VS Time" displays the change in the distance of the target human body detected by the radar in the past 60 seconds in real time; the gray background area indicates that the radar detected the target human body during that time period, a black background area indicates that the radar did not detect the target human body during that time period.

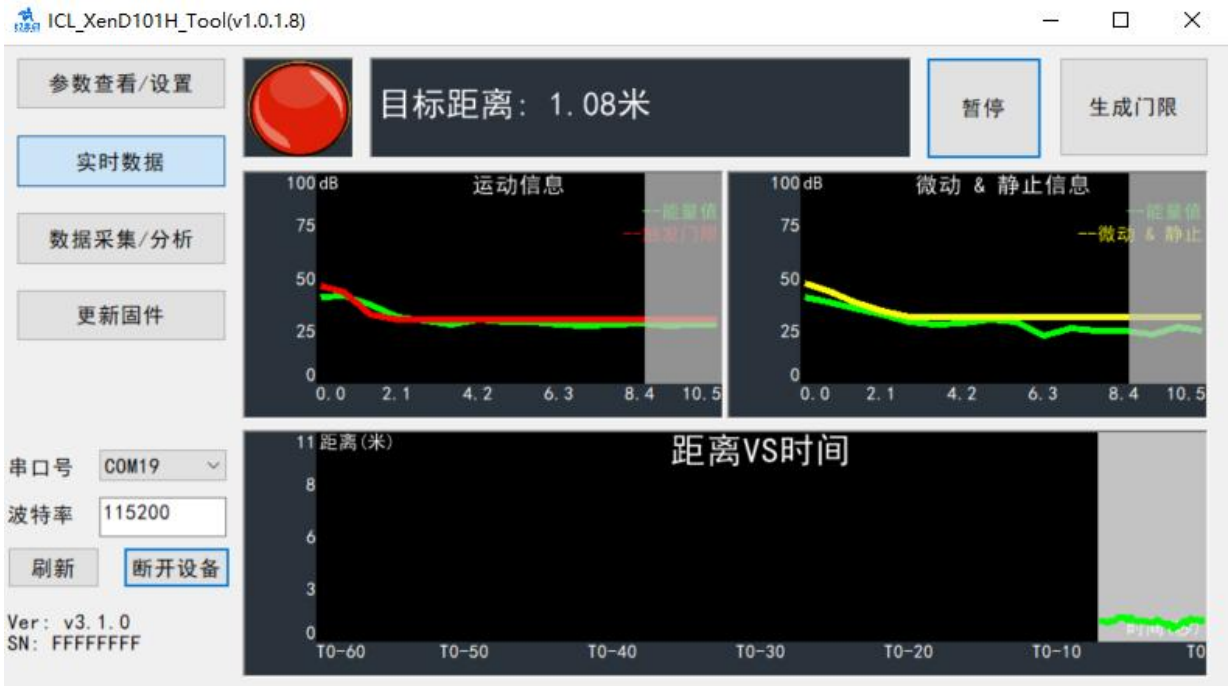

Figure 1-3 Real-time Data page of the host computer

The steps to view real-time data through the host computer are as follows:

- After connecting the module and the host computer, click the "Real-time Data" button to switch to the function screen, at this time, the upper computer tool automatically turns on the detection function of the radar, the "Start/Pause" toggle button shows "Pause", the two line charts on the function page of the host computer start to display the corresponding real-time data information.
- Click the "Start/Pause" toggle button to pause the radar's detection function, the illuminations on the function screen are green, the target distance is displayed as "0.00 meters", the two line charts below stop updating.

The following describes how to generate a threshold from the host computer:

1. When the Start/Pause button on the Live Data page displays "Pause", click the "Generate Threshold" button, the host computer tool will pop up the "Threshold Generation" information window, as shown in Figure 1-4.

2. Click the "Start" button on the host computer to start automatically generating the threshold; when the threshold is generated, a message "Threshold generation successful" is displayed, click "Close" to automatically save and apply the generated threshold value to start the detection.

Figure 1-4 Threshold acquisition

During threshold generation, it is necessary to keep the environment in the detection area open, if there is significant movement of the human body during generation, after the generation is complete, the host computer will give you a hint. If there is a lot of interference in the environment, the radar will not be able to work even the basic motion detection, The threshold is regenerated, as shown in Figure 1-5. If there is a small interference in the environment, the detection performance will be degraded, indicates the distance at which there is interference, users can choose whether or not to regenerate the threshold, as shown in Figure 1-6.

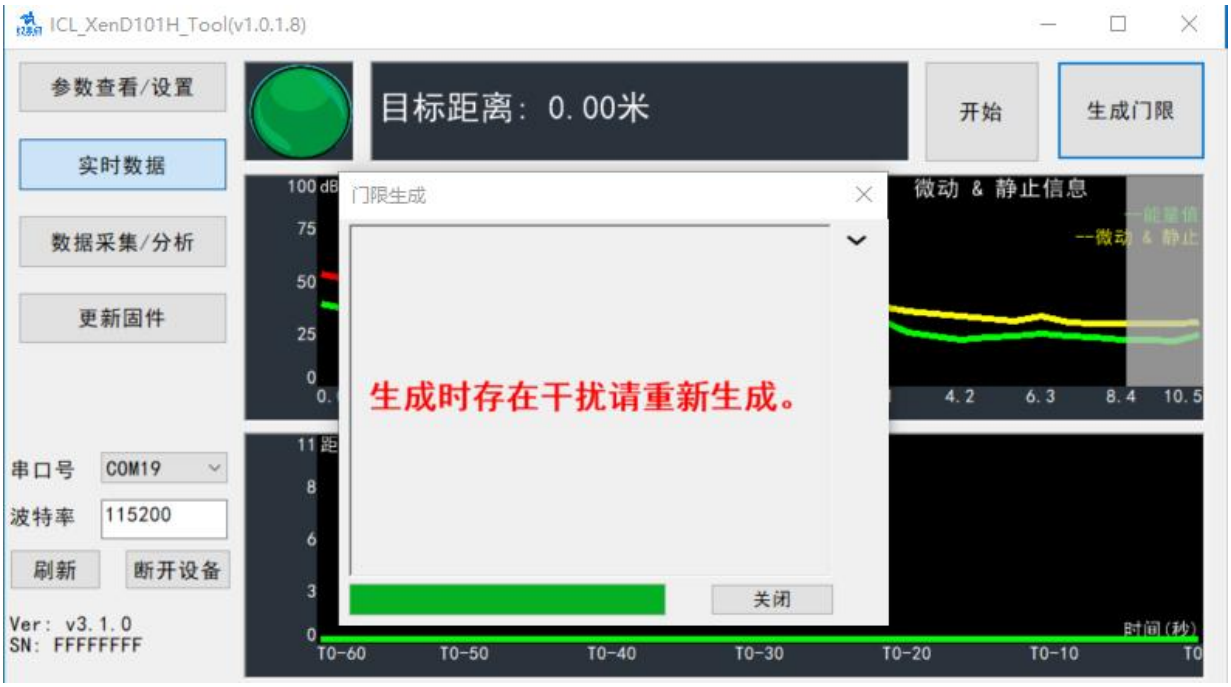

Figure 1-5 Failed to generate a threshold

Figure 1-6 Minor interference

1.2.3. Power interference alert

After the module is powered on, the module will perform a self-test on the power supply, if there is significant interference in the power supply, a prompt will be given in the target distance information in the real-time data interface of the host computer(If the host computer does not give a prompt, it does not mean that there is no interference in the power supply), as shown in Figure 1-7. Power supply disturbance detects power supply spurs.

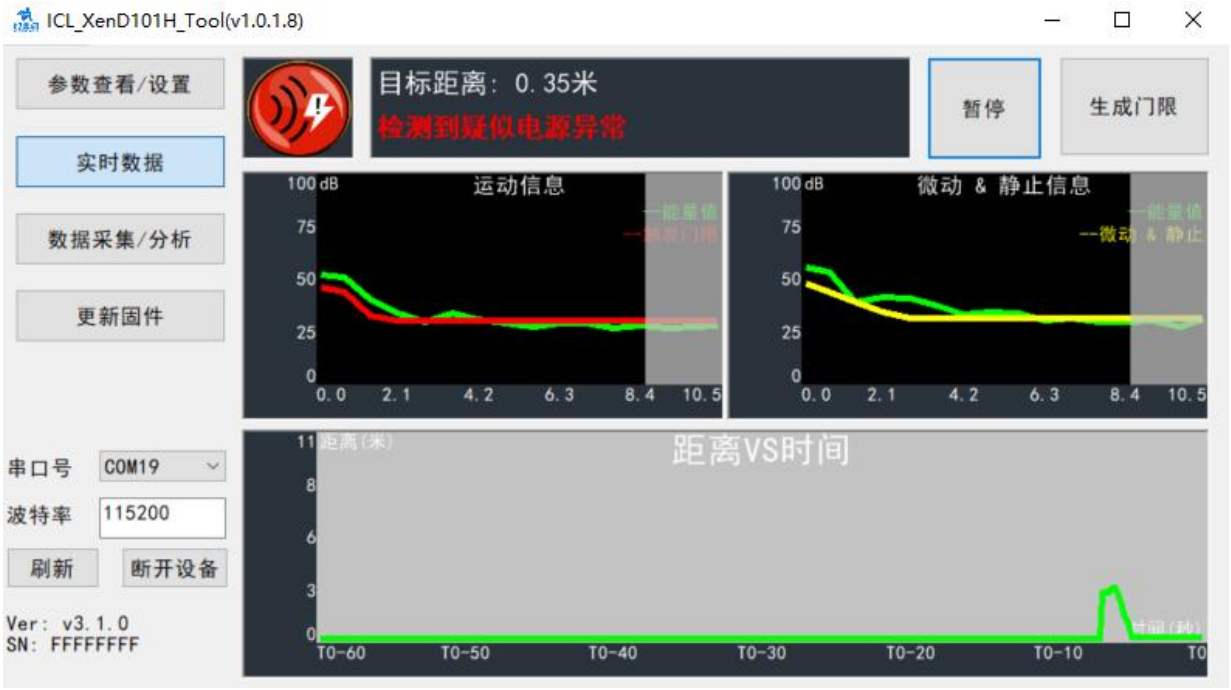

Figure 1-7 Power supply interference

1.2.4. Update firmware

The prerequisite for using this feature is that the factory firmware must be burned.

Figure 1-8 shows the update firmware page of the host computer. The steps to update the radar module firmware through the host computer are as follows:

1. After connecting the module to the host computer, click the "Update Firmware" function button to switch to the function page
2. Click the "Get Firmware Information" button on the function page, the ID of the current device is displayed in the message box on the right
3. Click on the "Select bin file path" button, select the desired .bin file，click the "Download" button to start upgrading the firmware, the download result will be displayed in real-time in the prompt box on the right, the bin file information and the current download progress are displayed below

Figure 1-8 Upgrade the firmware of the host computer

After the firmware upgrade is successful, the message box on the page will display "Download successful!", when the firmware upgrade fails, an error message appears in the message box.

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