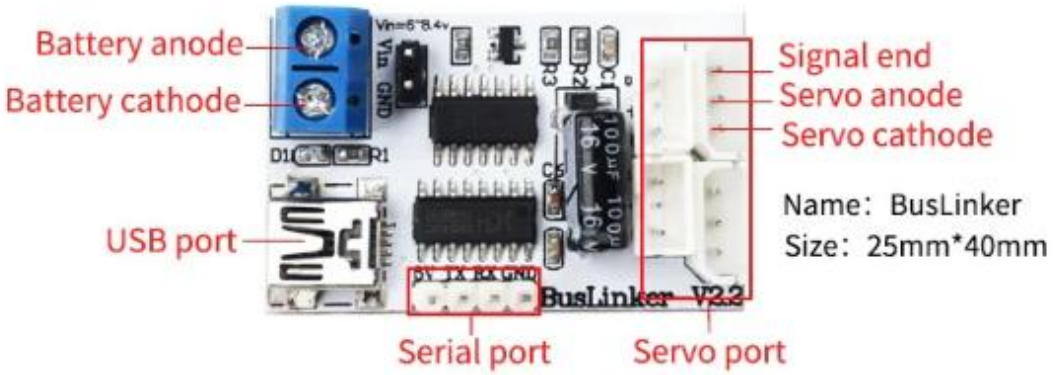
Hiwonder

Servo Debugging Board User Manual

V1.0

Prior to the use of servo, it is necessary to set servo ID in servo debugging software. TTL/USB debug board is a tool for debugging servos. With the provided Bus Servo Terminal software, it can test servos and set servo parameters. Additionally, the debug board can communicate via the serial port with a microcontroller to control the servos.

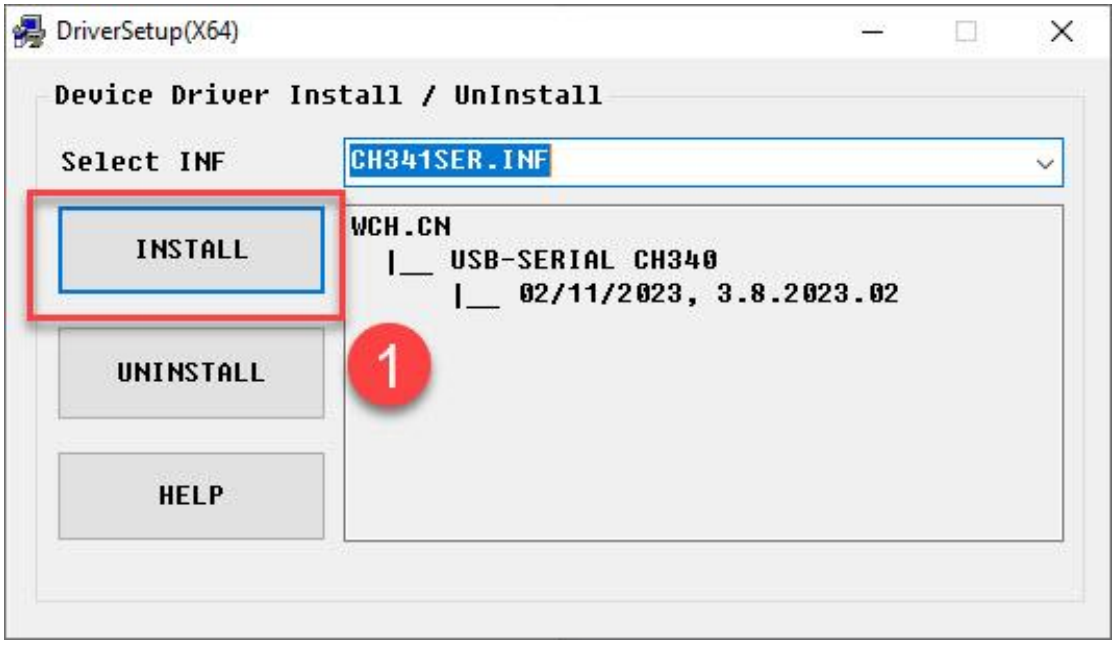


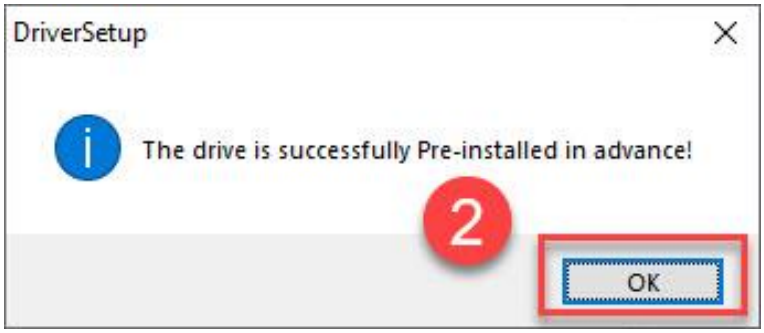
In this section, a servo will be connected to TTL/USB debugging board, and the connect to Bus Servo Terminal software for servo debugging.

1. Install Debug Board Driving Software

(1) Locate the "**ch341ser.exe**" driving package in "**Servo Parameter Seting Software/ BusLinker Debug Board Driver**"

(2) Install the software according to the installation prompts.

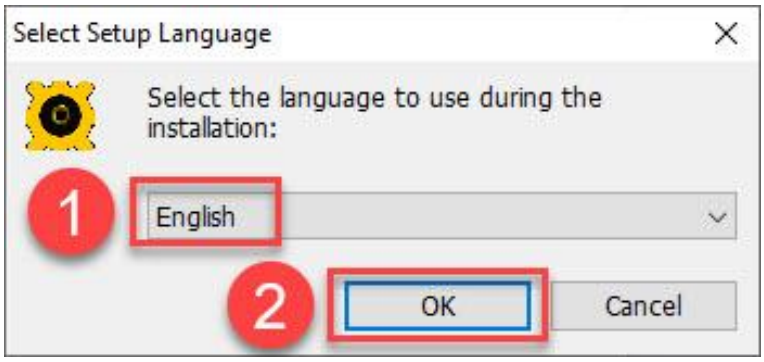


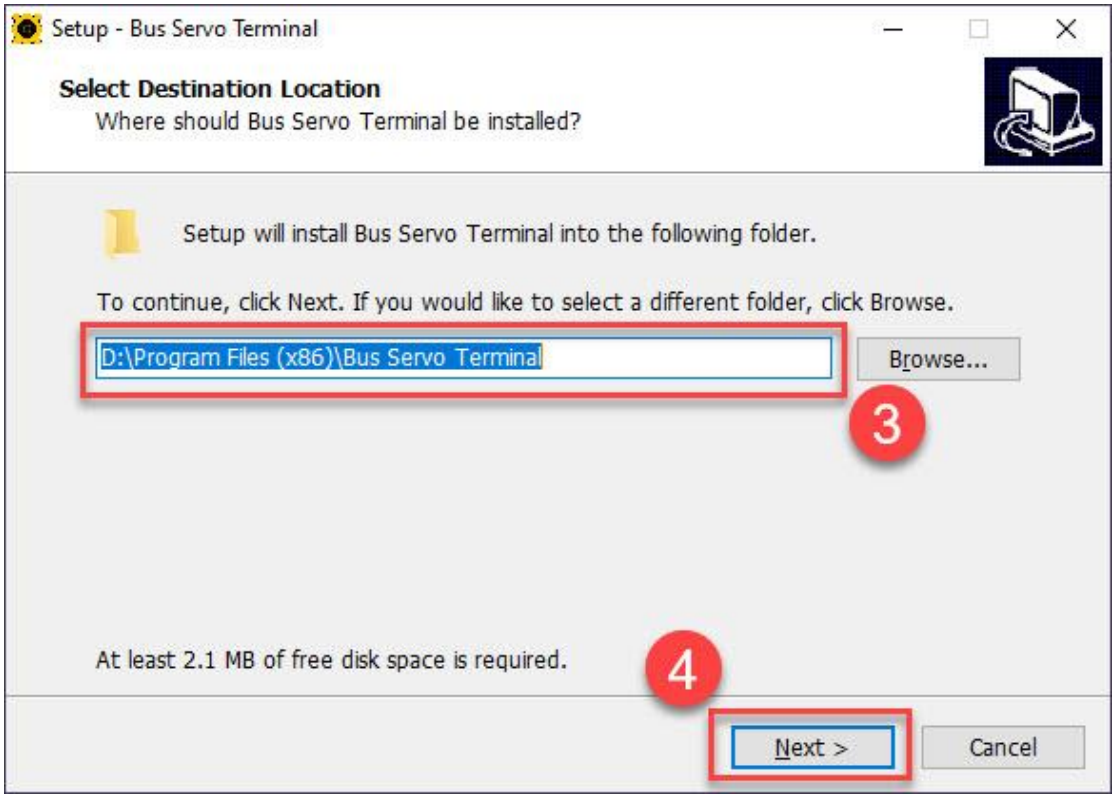


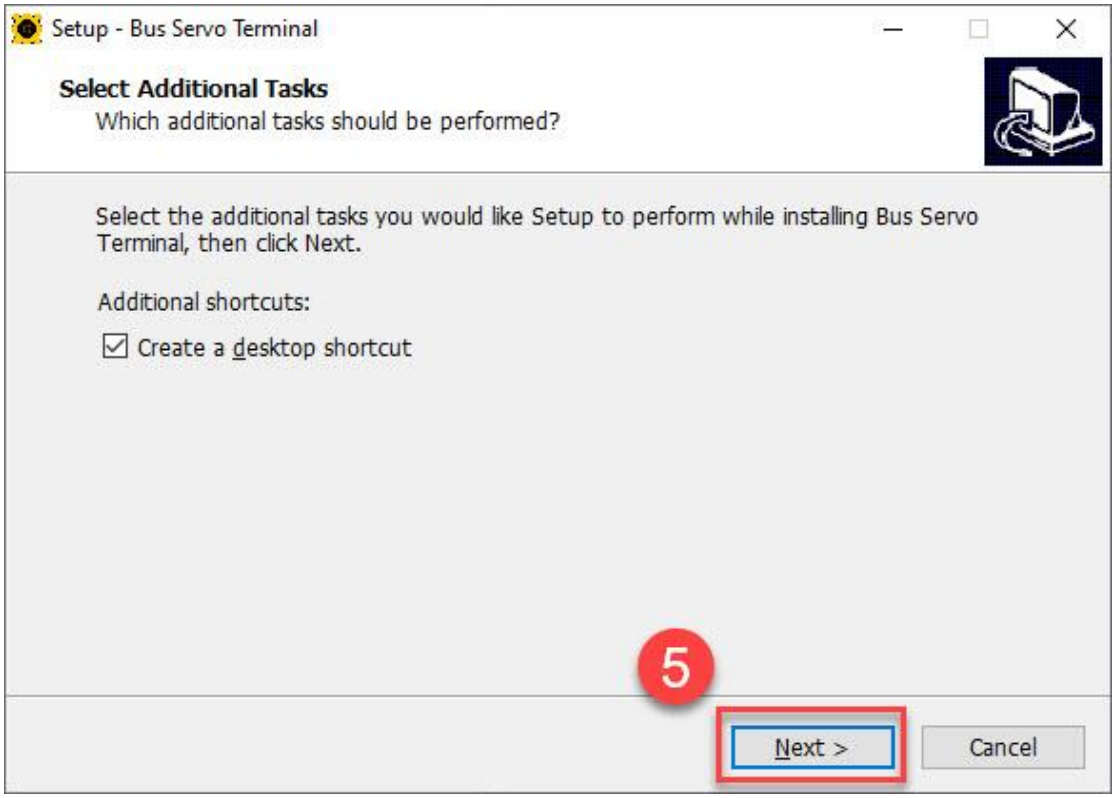
2. Install Debugging Board Tool

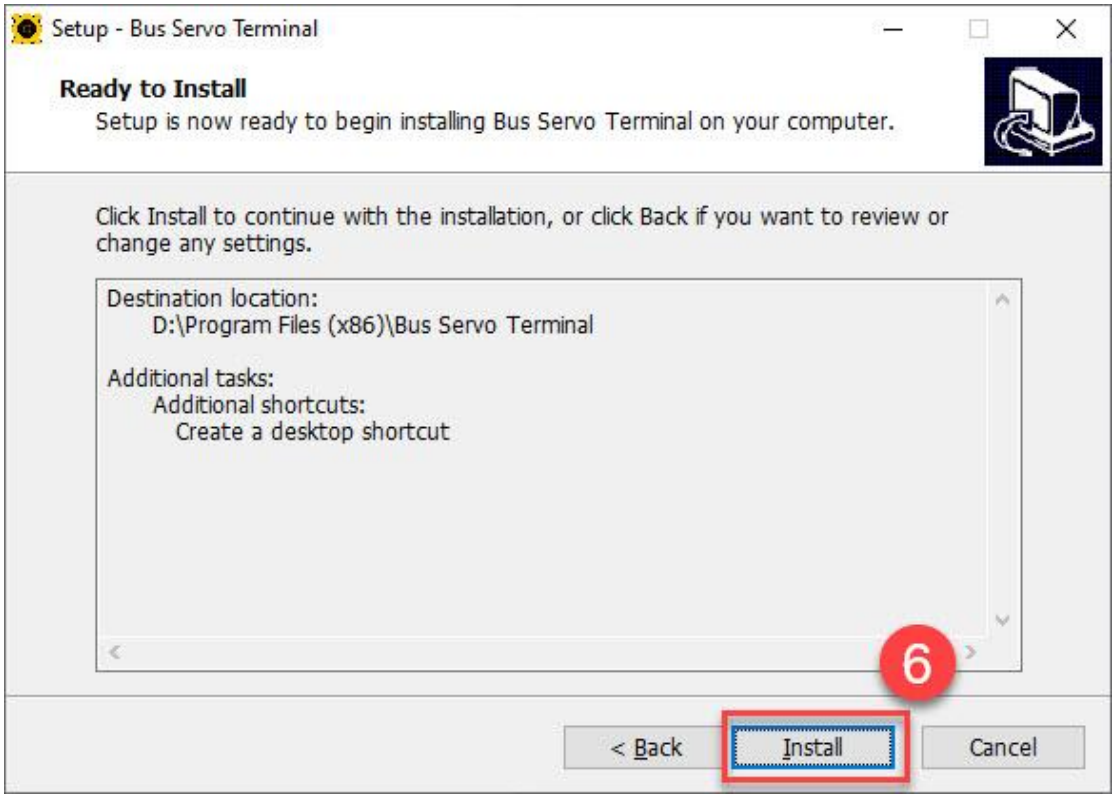
After the driving software is install, locate the "**Bus Servo Terminal setup V2.3.exe**" in "**Servo Parameter Seting Software (Debug Board)/ BusLinker Debug Board Software**"

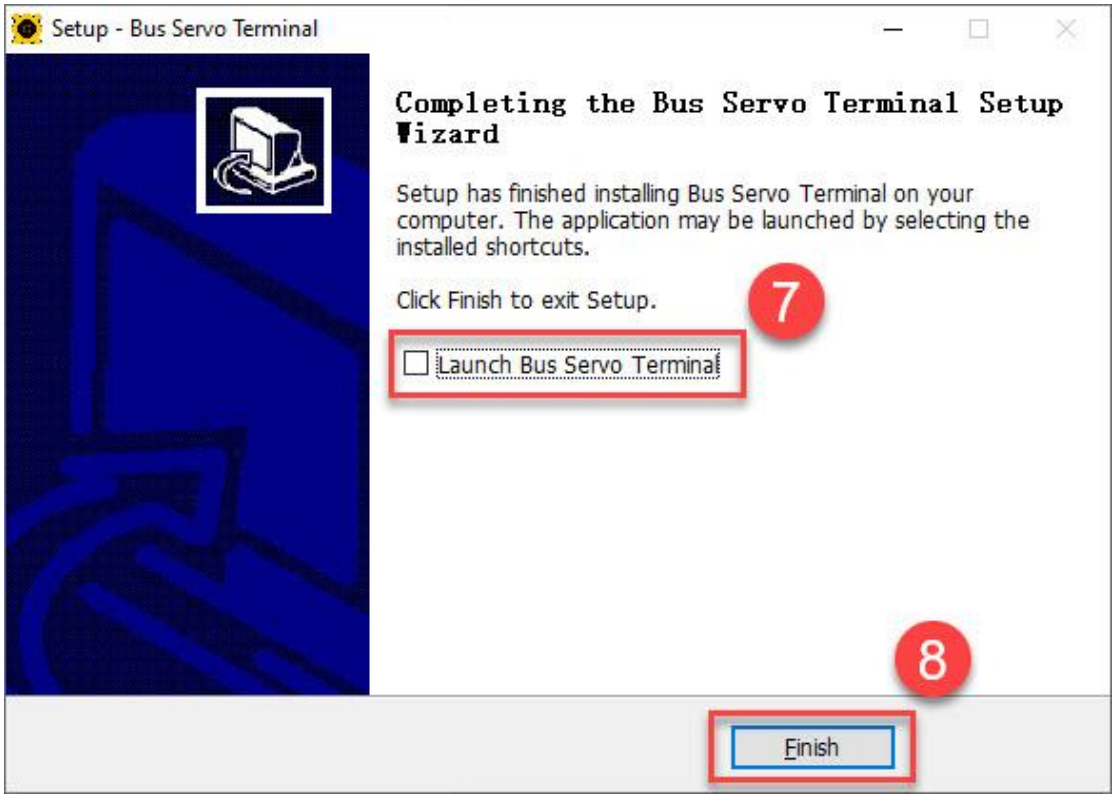
Install the software according to the installation prompts.




Setup - Bus Servo Terminal
Select Destination Location
Where should Bus Servo Terminal be installed?
Setup will install Bus Servo Terminal into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
D:\Program Files (x86)\Bus Servo Terminal
Browse...
3
At least 2.1 MB of free disk space is required.
4
Next >
Cancel


Setup - Bus Servo Terminal
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing Bus Servo Terminal, then click Next.
Additional shortcuts:
Create a desktop shortcut
5
Next >
Cancel

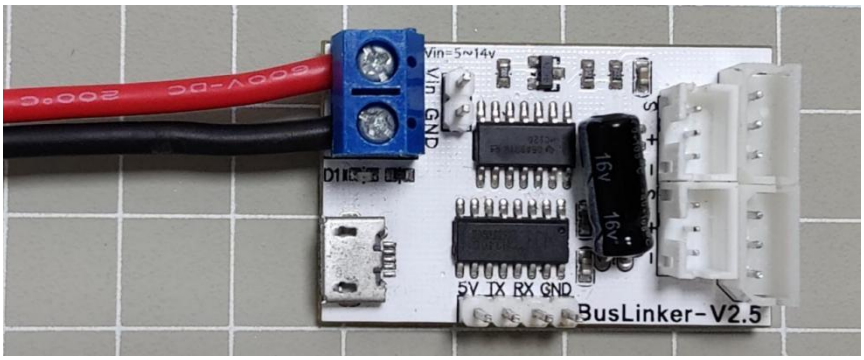

Setup - Bus Servo Terminal
Ready to Install
Setup is now ready to begin installing Bus Servo Terminal on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
D:\Program Files (x86)\Bus Servo Terminal
Additional tasks:
Additional shortcuts:
Create a desktop shortcut
6
< Back
Install
Cancel


Setup - Bus Servo Terminal
Completing the Bus Servo Terminal Setup Wizard
Setup has finished installing Bus Servo Terminal on your computer. The application may be launched by selecting the installed shortcuts.
Click Finish to exit Setup.
7
Launch Bus Servo Terminal
8
Finish

3. Connect Debugging Board to Debugging Software

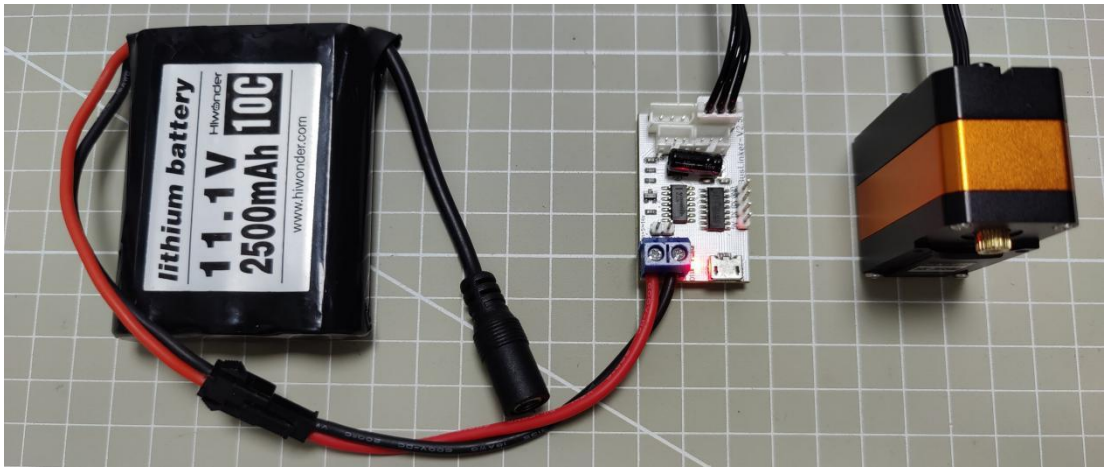
(1) Take out the power cord that comes with the battery. Connect the red wire to the positive terminal (Vin) of the servo debugging board, and the black wire to the negative terminal (GND).

Note: Do not directly connect the battery terminals to the debugging board before the power cord are connected to the board to avoid short-circuiting the positive and negative terminals.

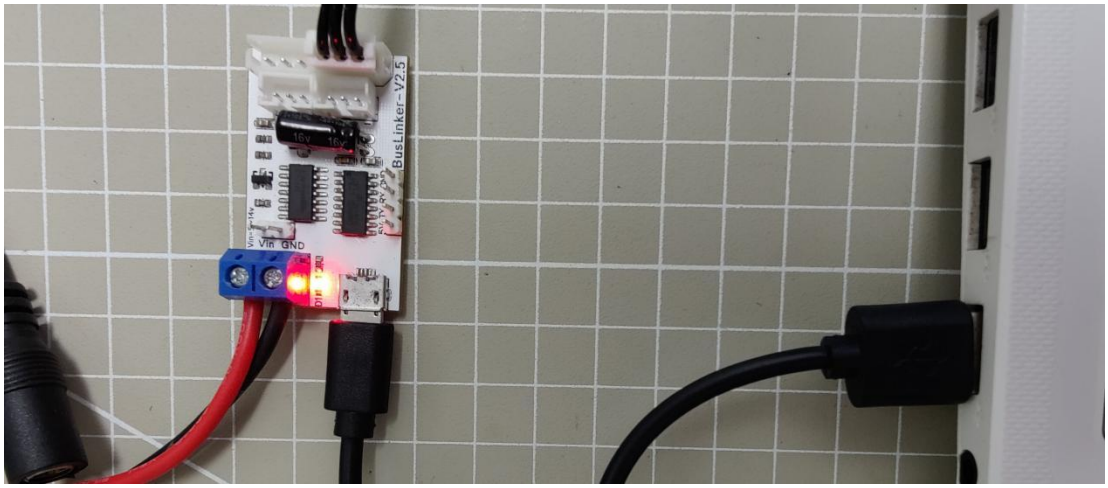


(2) Connect the servo to the debugging board using a 3-pin cable (The servo interface is designed to prevent reverse insertion. Do not force the cable). See the figure below:

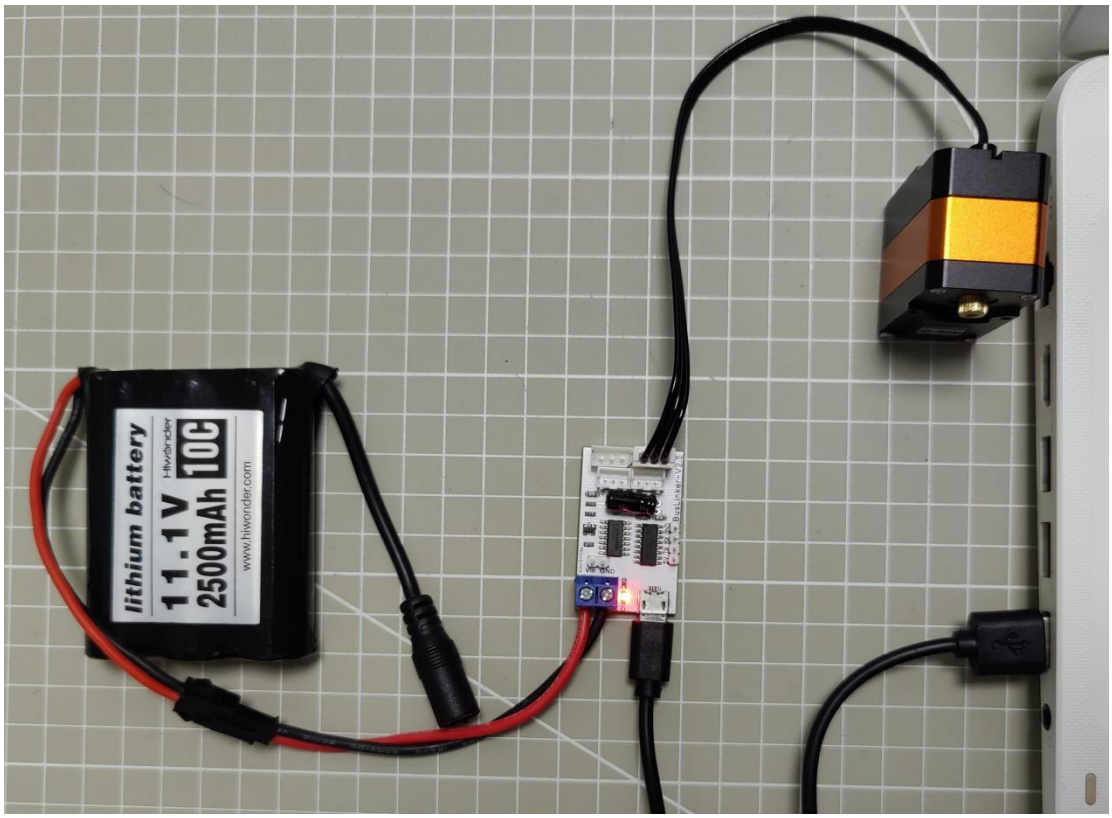
(3) After completing the connection, connect the battery terminals with red to red and black to black. **The design prevents reverse insertion, so if it doesn't connect easily, do not force it and change another side.**



(4) Connect the debugging board to the PC using a USB cable.

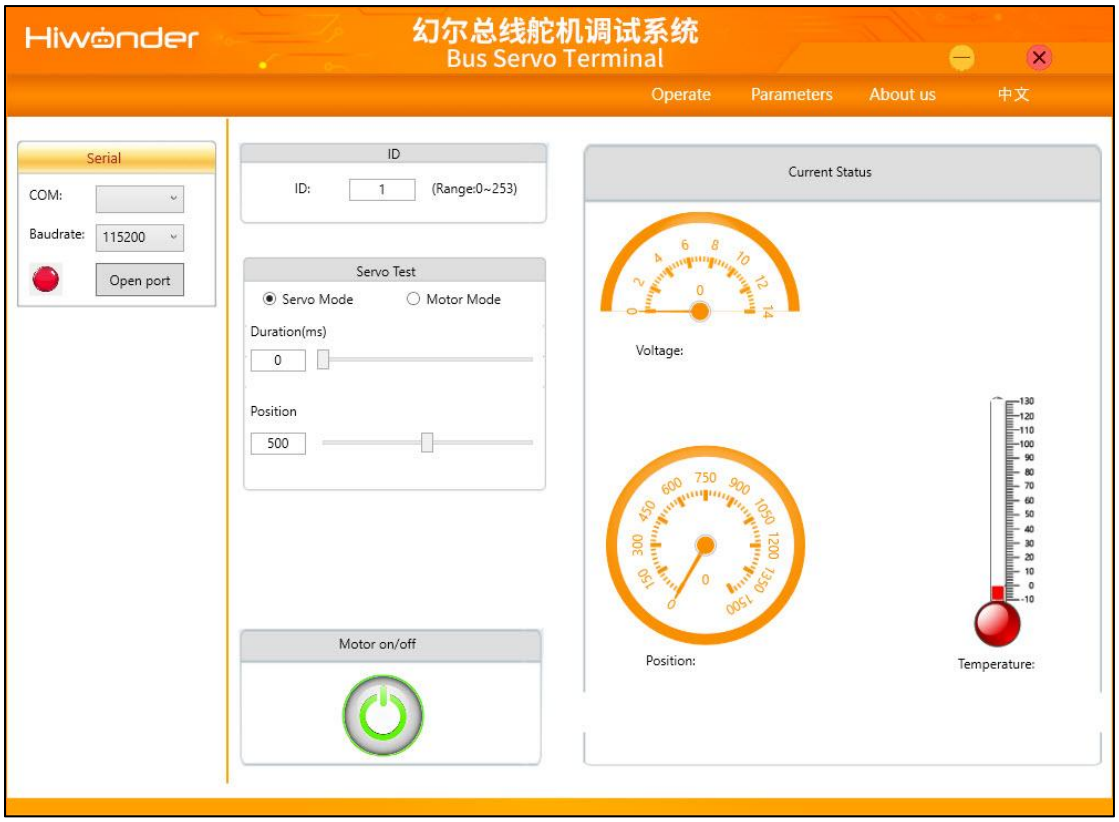


(5) The complete wiring diagram is as follow:



(6) Double click 

to open the servo debugging tool.

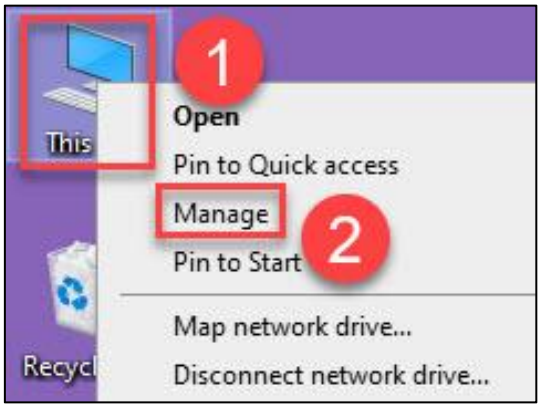


(7) Click on the drop-down button of the COM port in the serial communication toolbar and select the port number to connect to (the port number appears randomly; in this example, it is COM3. Do not connect if COM1 appears, as it is the system's communication interface). Here, we use the "COM3" port as an example.

(8) At this point, the servo debugging board has successfully established a connection with the servo debugging tool.

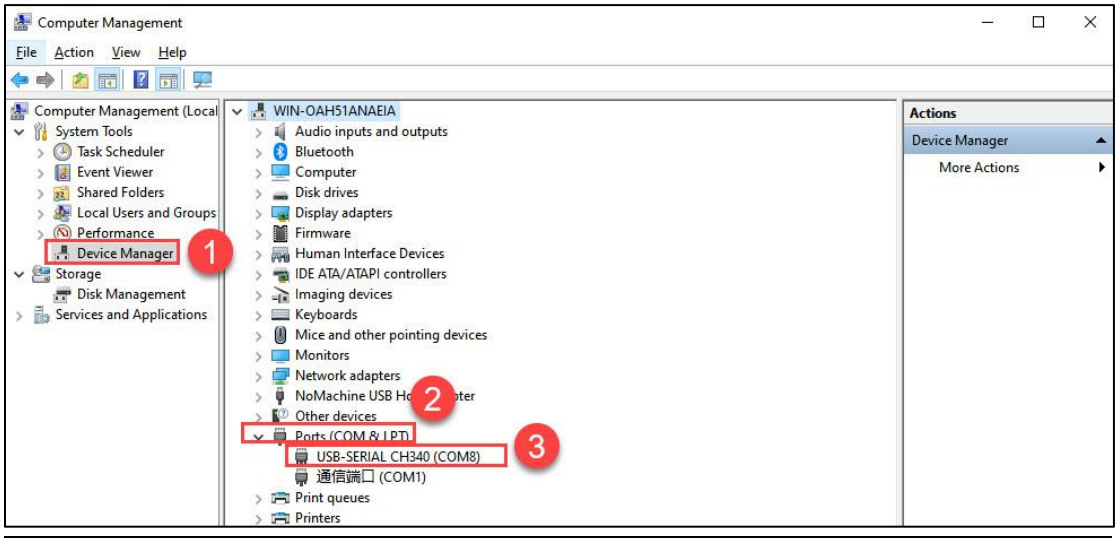
Note: If multiple devices are connected to the computer, you can check the port number of the servo debugging board in the Device Manager. Look for the entry labeled "USB-SERIAL CH340" which indicates our device. The specific steps are as follows:

Right-click on "**This PC**" and click "**Manage**".



In the Computer Management window that pops up, click on "**Device Manager**," then click on the drop-down button for "Ports." The "**COM3**" port

next to "**USB-SERIAL CH340**" is the port number for our device (the port number appears randomly).



4. Servo Debugging Tool Interface Layout

In the servo debugging tool interface, there are three main operation interfaces: Basic Operations, Parameters, and About Us. Details about each interface are explained in the following sections.

4.1Basic Operations

The Basic Operations interface allows real-time operation of the servo and observation of its operational status. Functionally, it can be divided into four parts: the menu bar, debugging board connection area, servo control area, and servo status display area, as shown in the diagram below:

① Status Bar: close or minimize the software, switch the interface language, and switch between pages. Detailed functionality descriptions can be found in the table below.

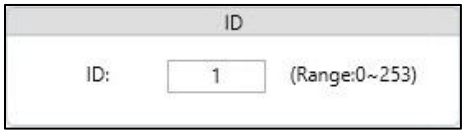
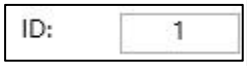
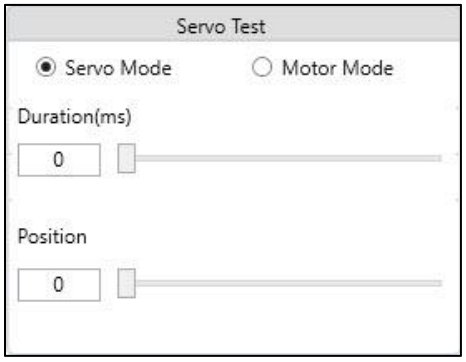
Icon	Function Instruction
	Minimize the interface
	Close the interface
	Switch to servo operation interface
	Switch to servo parameter settings interface
	Hiwonder official information interface

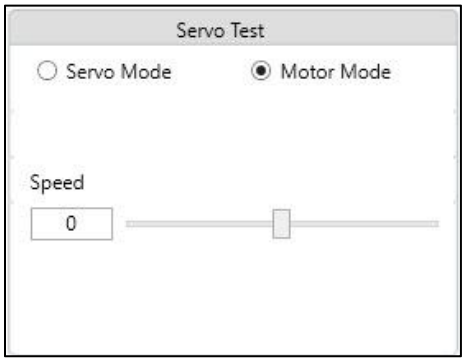
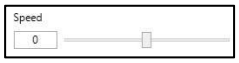
		Set interface language.
		Switch to the next interface from the right side.
		Switch to the next interface from the left side.
		Select and switch to the corresponding interface.

② Debugging Board Connection Area: In this area, you can establish a connection between the debugging board and the software. Detailed functionality descriptions can be found in the table below.

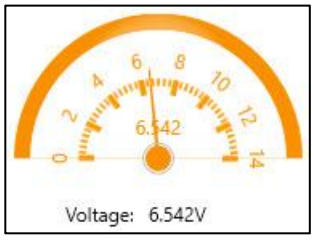
Icon	Function Instruction
	Click the drop-down button to select the device port number.
	Click the drop-down button to select the serial baud rate (The baud rate for debugging board is 115200)
	Click '**Open Port**', the button turns green. Clicking again will close it, and the button turns red.

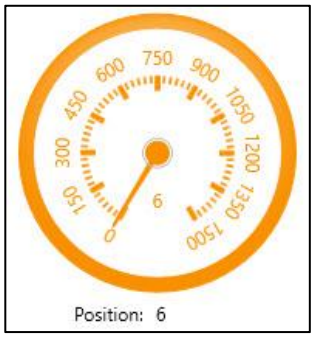
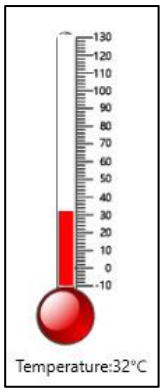
③ Servo Control Area: Controls the rotation of the servo. Detailed functionality descriptions can be found in the table below.

Icon		Function Instruction
		Input servo ID number to control the corresponding servo.
		Switch to servo mode.
		The time for the servo to move from the current angle to the specified angle (0~3000ms).
		Servo's rotational position (0~1000, corresponding to angles from 0° to 360°).
		Clicking it turns off the motor, and the button turns red; clicking it again turns on the motor, and the button turns green.

		Slide the slider to adjust the speed of the servo's rotation. The greater the absolute value of the speed, the faster the servo rotates. Range: -50 to 50. Unit: pulses/10ms. When a negative value is selected, the servo rotates counterclockwise; when a positive value is selected, it rotates clockwise. A value of 0 stops the servo rotation.

④ Status Display area: display the voltage, position and temperature information of the current servo. Detailed function description refers to the below table.

Icon	Function Instruction
	Display the current voltage of servo.

	Display the current position information of the servo.
	Display the current temperature information of the servo.

4.2 Parameters Interface

The parameter setting interface allows for the configuration of basic parameters for the servo. Functionally, it can be divided into three parts: the menu bar, the debugging board connection area, and the servo parameter setting area, as shown in the following figure:

① Status Bar:

- Close or minimize this software.
- Switch the language and page of the interface.
- For detailed functionality description, refer to section 3.4.1 for the contents of the status bar.

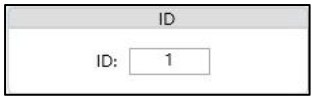
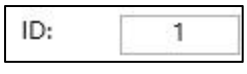
② Debug Board Connection Area:

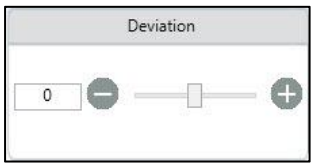
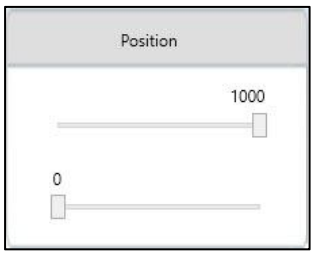
- In this area, you can establish a connection between the debug board and the software.
- For detailed functionality description, refer to section 3.4.1 for the contents of the debug board connection area.

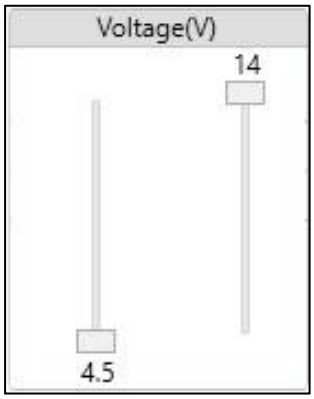
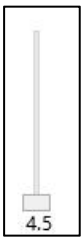
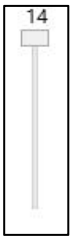
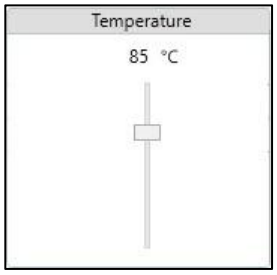
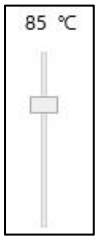
③ Servo Parameter Setting Area:

- Read servo parameter information.

- Set servo parameter information.
- Restore servo to default parameters.
- Specific functionality is described in the table below:

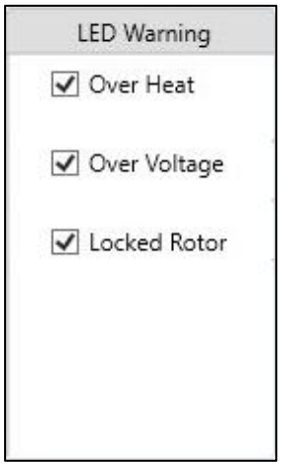
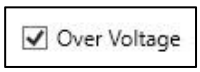
Icon	Function Instruction
	When performing parameter settings for the servo, first click the "**Read**" button to retrieve the current parameter values of the servo motor.
	After completing the modification of servo parameters, click the "**Set**" button to apply the changes and make them effective.
	Restore the servo parameters to their initial values. Then, click "**Set**" to apply these initial values to the servo settings.
 	The ID number of the servo is typically default set to 1. You can input a number in the text box to set the servo motor's ID, within the range of 0 to 253.

		Adjust the servo offset by dragging the slider, clicking the “+” or “-” icons, or entering a numerical value in the text box. The adjustment range is -125 to 125, corresponding to an angle deviation of ±30°.
		The adjustment range for 360° magnetic encoder bus servo positions is from 0 to 1500. For other bus servos, the angle range is from 0 to 1000. Adjustment is made using two sliders. Moving the upper slider adjusts the maximum rotation position of the servo. When the slider is set to 1500, the servo can rotate up to 360°. The angle conversion is calculated as: 360/1500 = 0.24°.
		Dragging the lower slider adjusts the servo's minimum rotation position. When the slider is at 0, the servo can rotate to a minimum angle of 0°.

<table>
<tr>
<td rowspan="2"> 
</td>
<td> 
</td>
<td>Moving the slider adjusts the minimum output voltage, which ranges from 4.5V to 13.9V. After adjusting, if the voltage drops below the minimum value during use, the servo will stop operating.</td>
</tr>
<tr>
<td> 
</td>
<td>Dragging the slider allows adjustment of the maximum output voltage, within the range of 6.5V to 14V. After adjustment, during operation, if the voltage exceeds the maximum value, the servo will trigger an over-voltage alarm.</td>
</tr>
<tr>
<td> 
</td>
<td> 
</td>
<td>Temperature Range Adjustment: Users can set the operating temperature range for the servo.

Drag the slider to adjust within the range of 50 to 100.

If the servo exceeds the set temperature during operation, it will trigger a high-temperature alarm. At this point, the servo stops rotating, and its temperature increases rapidly. Immediate power disconnection</td>
</tr>
</table>

		is necessary, allowing the servo to cool down before resuming operation.
	 	LED Light Control: control the on/off state of the LED light on the servo. Click the icon to toggle the LED light. When the icon is yellow, the LED is in the on state; when it is gray, the LED is in the off state.
		Over-temperature: When the servo temperature exceeds the set temperature range, the LED light will flash red as an alarm. At this point, immediately disconnect the power and wait for the servo to cool down before resuming use.
		Check Over-voltage: When the servo voltage exceeds the set voltage range, the LED light will flash red as an alarm. At this point, immediately

		disconnect the power and inspect the circuit for any issues.
		Check Stall: When the servo is stalled, the LED light will flash red as an alarm. At this point, immediately disconnect the power and adjust the servo's rotation position.