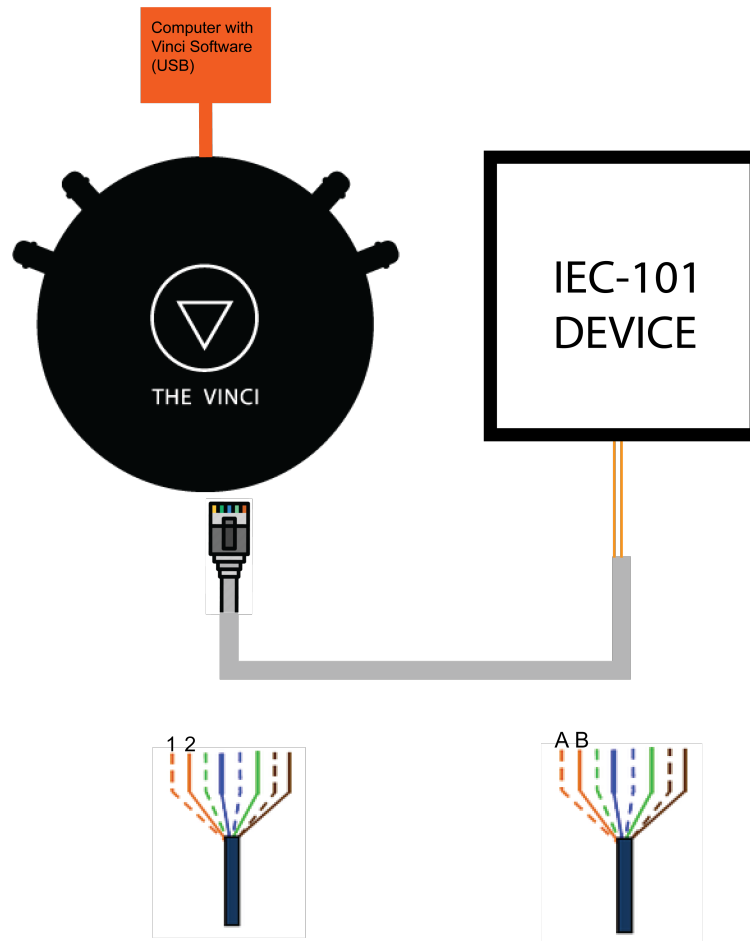# IEC 101 Slave Simulator Tutorial

Initial Setup

The first thing to do when setting up is to connect the IOMod to the computer using The Vinci Expert to convert from RS485 to USB. You need to connect it like in the diagram depicted below.

- Connect The Vinci Device to the computer using a micro USB cable.
- Using an ethernet cable or connect one end to the Vinci, and the other two wires to IEC101 Device A and B pins.
  - If the wire is connected using RJ-45 the A wire will be the orange striped wire and the B wire will be the single color orange wire.

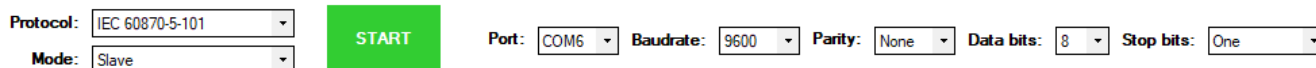> ℹ Standard settings in the Vinci software are for an RJ-45 cable, but it is configurable using the Hardware tab.

Selecting protocol and mode

Fig. 1. Selecting protocol and mode

After the ethernet cable has been connected it's time to open The Vinci Software and start configuring the simulated device parameters. Since The Vinci Expert will simulate the Slave (Server) when the software is started just select the IEC 60870-5-101 protocol and select Slave mode.
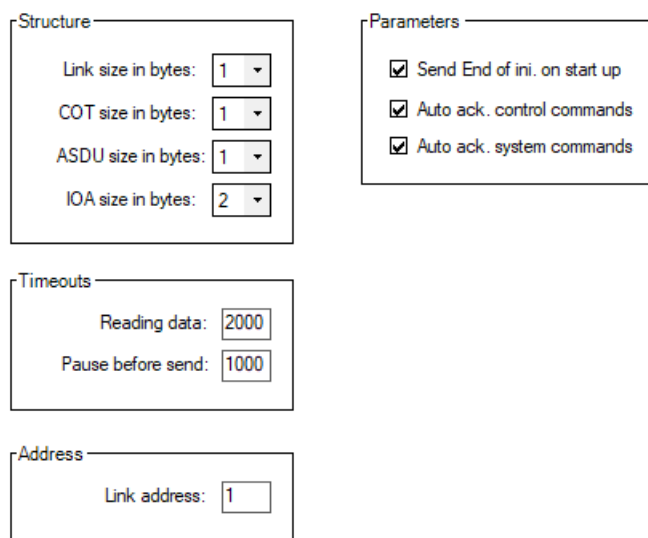
Selecting the Serial parameters

Fig. 2. Selecting the Serial parameters

The next step is to choose the correct serial port for your device and then set up serial communication parameters like baudrate, parity, databits, and stopbits in accordance with your device.

Selecting the protocol parameters
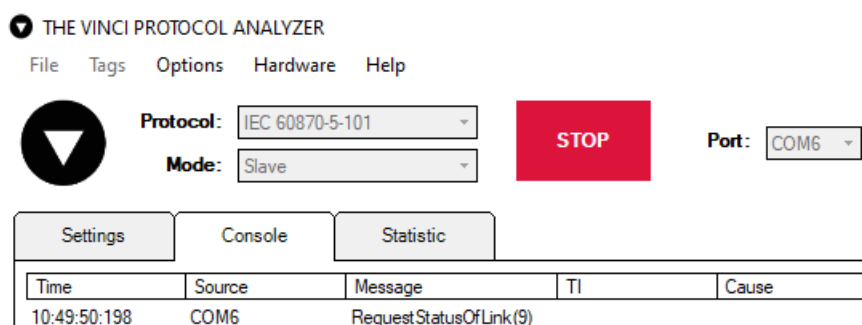

Fig. 3. Selecting the protocol parameters

Go to the settings tab when you have serial communication parameters configured. Now it's time to configure your device according to your Device settings. The defaults that are here are usually the defaults in most cases, but make sure to double-check.

Establishing a connection with the device

Fig. 4. Establishing a connection with the device.

Pressing the green "START" button should establish serial communication with the device. After the device responds with link status tags can be sent. Tags can be found on the right side of the Vinci software in the system tab.

Simulating an IOMod

This example will show how to simulate an IOMod using Vinci Protocol Analyzer. In the example below 4RTD IOMod is simulated.

Firstly, to simulate an IOMod tags should be created by clicking "Add" button. Tags are simulating signals that would be overwise sent by a real IOMod (4RTD in this case).

Fig. 5. Tags section.

In order to create a tag some values from Excel configuration will be required.

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	units	add	multiply	math_expression	min_value	max_value	absolute_threshold	threshold_units	suppression_time_ms	suppression_values	log	gi	common_address	info_address	data_type
RTD1	IOMod4	RTD1			1							0	real			0	1	1	1	36
RTD2	IOMod4	RTD2			1							0	real			0	1	1	2	36
RTD3	IOMod4	RTD3			1							0	real			0	1	1	3	36
RTD4	IOMod4	RTD4			1							0	real			0	1	1	4	36

Fig. 6. Signals sheet of 4RTD IOMod.

In the picture below a tag creation window is shown. It opens after clicking "Add" button. To create a tag the Name has to be specified. After that the Type has to be specified. The type can be found in "data_type" column of Excel configuration. After that "Ioa" has to be specified. Its value for each tag can be found in "info_address" column. Lastly, a random value can be specified in "Value" box. Finally the tag can be saved by clicking "Save" button.

Fig. 7. Tag creation window.

The created tags can be seen in WCC Lite Imported Signals section in browser.

Fig. 8. Imported Signals tab in browser.

They can also be seen in Statistics section of Vinci application.

Fig. 9. Previously created tags in Statistics section of Vinci.

The state of the signals can be changed in System section of Vinci application by ticking Test or/and P/N options.

Fig. 10. Selecting Test and P/N options.

The change of signal states will be seenin WCC Lite Imported Signals section in browser.

Device	Signal	Value	Units	State	Attributes	Time
IOMod 4RTD	RTD1	10		cotn,test	asdu=1,cot=20,ioa=1,org=0,type=float	2023-05-02 16:59:58.20
IOMod 4RTD	RTD2	17		cotn,test	asdu=1,cot=20,ioa=2,org=0,type=float	2023-05-02 17:07:21.72
IOMod 4RTD	RTD3	15		cotn,test	asdu=1,cot=20,ioa=3,org=0,type=float	2023-05-02 17:16:26.86
IOMod 4RTD	RTD4	12		cotn,test	asdu=1,cot=20,ioa=4,org=0,type=float	2023-05-02 17:16:49.42

Fig. 11. Changed State of signals after selecting Test and P/N options.