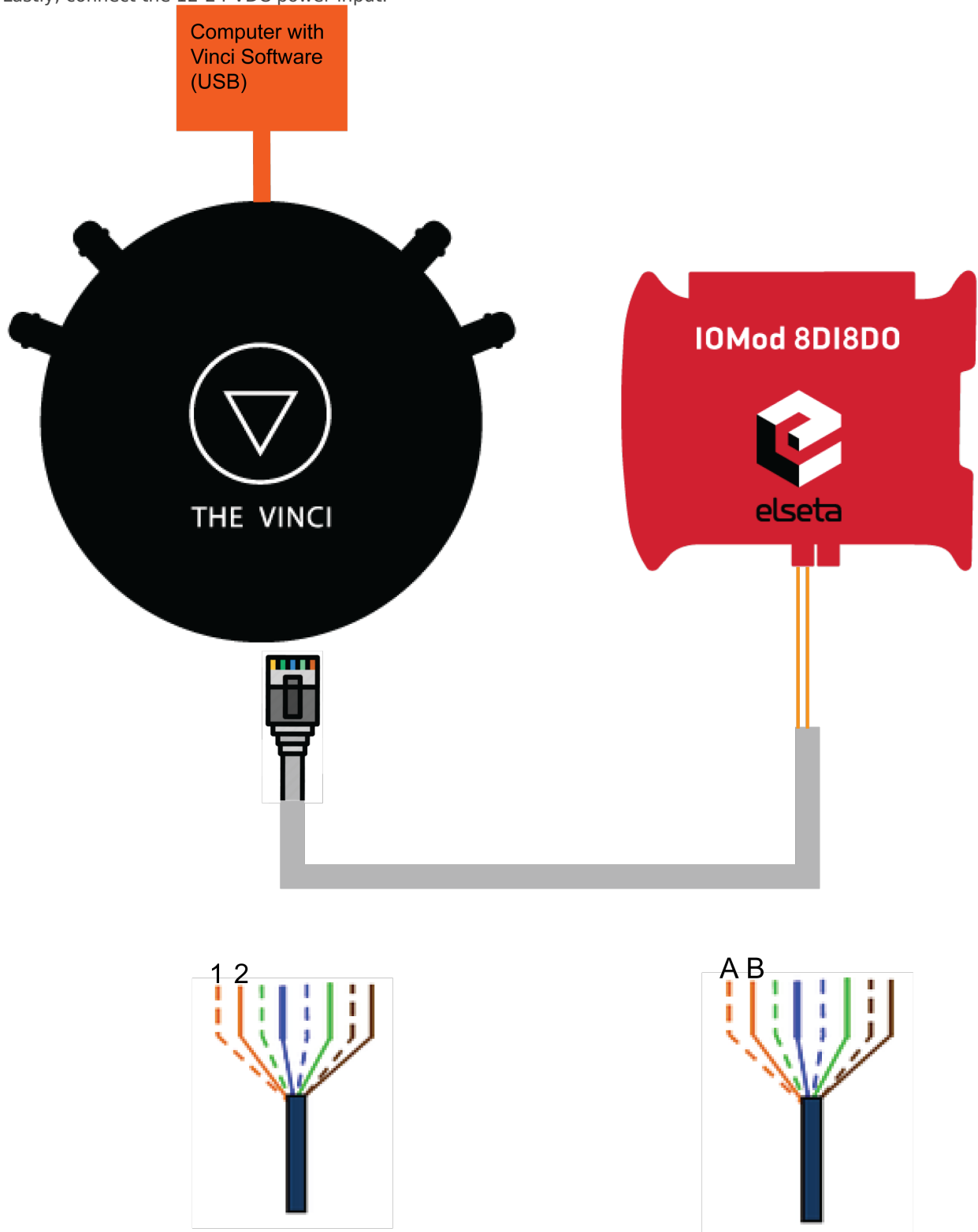


Testing IOMod 8DI8DO IEC-103

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 connect one end to the Vinci, and the other two wires to IOMod 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.
- Lastly, connect the 12-24 VDC power input.



To test IOMod with default settings, the user connects the device through RS485 to IEC 60870-5-103 master. For example, using “The Vinci Expert” as a serial interface converter and adapter to PC with “The Vinci” software. When opening “The Vinci” software, choose IEC 60870-5-103 – Master mode. Initial settings – 9600 baud rate; 8 data, no parity, 1 stop bit. Press Start, send Time synchronization, General interrogation, and go to the “Statistic” tab:

The screenshot displays the 'THE VINCI PROTOCOL ANALYZER' software. The 'Statistic' tab is active, showing a table of protocol events. The 'System' tab on the right contains controls for APDU, General Interrogation, Clock synchronization, and General Command.

Ti	Cause	ASDU	FUN	INFO	INDEX	Value	Status	Time Tag	Name	Count
StartOfGeneralInt...	GeneralInterrogati...	1	0	0	0	1				2
Time Tagged Mes...	GeneralInterrogati...	1	128	1	0	0x(1)	SIN:1	17:14:20:248		2
Time Tagged Mes...	GeneralInterrogati...	1	128	2	0	0x(1)	SIN:1	17:14:22:319		2
Time Tagged Mes...	GeneralInterrogati...	1	128	3	0	0x(1)	SIN:1	17:14:24:392		2
Time Tagged Mes...	GeneralInterrogati...	1	128	4	0	0x(1)	SIN:1	17:14:26:472		2
Time Tagged Mes...	GeneralInterrogati...	1	128	5	0	0x(1)	SIN:1	17:14:28:568		2
Time Tagged Mes...	Command (20)	1	128	6	0	0x(1)	SIN:16	17:29:45:98		6
Time Tagged Mes...	GeneralInterrogati...	1	128	7	0	0x(1)	SIN:1	17:14:32:734		2
Time Tagged Mes...	GeneralInterrogati...	1	128	8	0	0x(1)	SIN:1	17:14:34:811		2
Time Tagged Mes...	GeneralInterrogati...	1	160	1	0	0x(1)	SIN:1	17:14:36:906		4
Time Tagged Mes...	GeneralInterrogati...	1	160	2	0	0x(1)	SIN:1	17:14:38:982		2
Time Tagged Mes...	GeneralInterrogati...	1	160	3	0	0x(1)	SIN:1	17:14:41:55		2
Time Tagged Mes...	GeneralInterrogati...	1	160	4	0	0x(1)	SIN:1	17:14:43:125		2
Time Tagged Mes...	GeneralInterrogati...	1	160	5	0	0x(1)	SIN:1	17:14:45:205		2
Time Tagged Mes...	GeneralInterrogati...	1	160	6	0	0x(1)	SIN:1	17:14:47:277		2
Time Tagged Mes...	GeneralInterrogati...	1	160	7	0	0x(1)	SIN:1	17:14:49:363		2
Time Tagged Mes...	GeneralInterrogati...	1	160	8	0	0x(1)	SIN:1	17:14:51:441		2
GeneralInterrogati...	EndOfGeneralInt...	1	255	0	0	15				2
Identification (5)	StartRestart (5)	1	255	1	0	[2] [IOMOD-88] [1414745157]				1

The 'System' tab on the right includes the following controls:

- APDU:** ASDU: 1
- General interrogation:** Send button, Scan: 1
- Clock synchronization:** Send button, checkboxes for IV, SM, SB, PC time (2021-12-31 12:37:48)
- General Command:** FUN: 128, INF: 5, RI: 0, ON/OFF buttons

Fig. 1. Testing IOMOD device with “THE VINCI” software

As seen in Figure 1, Outputs and inputs are shown with info numbers 1-8, and function types are 128 and 160 respectively.

General Interrogation, Time Synchronization, and General Command options can be found on the right side of the program, in the “System” tab.

Output commands are controlled by the “General command” window on the right side of the program, in the “System” tab, with Output address (Function type) 128, and output number (Info number).

Figure 2 shows the 6th output command sent and the “CMD ACK” response received.

This screenshot is similar to Figure 1, but highlights the 6th output command in the 'Statistic' table. The 'General Command' window in the 'System' tab is also visible.

Ti	Cause	ASDU	FUN	INFO	INDEX	Value	Status	Time Tag	Name	Count
StartOfGeneralInt...	GeneralInterrogati...	1	0	0	0	1				2
Time Tagged Mes...	GeneralInterrogati...	1	128	1	0	0x(1)	SIN:1	17:14:20:248		2
Time Tagged Mes...	GeneralInterrogati...	1	128	2	0	0x(1)	SIN:1	17:14:22:319		2
Time Tagged Mes...	GeneralInterrogati...	1	128	3	0	0x(1)	SIN:1	17:14:24:392		2
Time Tagged Mes...	GeneralInterrogati...	1	128	4	0	0x(1)	SIN:1	17:14:26:472		2
Time Tagged Mes...	GeneralInterrogati...	1	128	5	0	0x(1)	SIN:1	17:14:28:568		2
Time Tagged Mes...	Command (20)	1	128	6	0	0x(2)	SIN:16	17:23:32:800		4
Time Tagged Mes...	GeneralInterrogati...	1	128	7	0	0x(1)	SIN:1	17:14:32:734		2
Time Tagged Mes...	GeneralInterrogati...	1	128	8	0	0x(1)	SIN:1	17:14:34:811		2
Time Tagged Mes...	GeneralInterrogati...	1	160	1	0	0x(1)	SIN:1	17:14:36:906		4
Time Tagged Mes...	GeneralInterrogati...	1	160	2	0	0x(1)	SIN:1	17:14:38:982		2
Time Tagged Mes...	GeneralInterrogati...	1	160	3	0	0x(1)	SIN:1	17:14:41:55		2
Time Tagged Mes...	GeneralInterrogati...	1	160	4	0	0x(1)	SIN:1	17:14:43:125		2
Time Tagged Mes...	GeneralInterrogati...	1	160	5	0	0x(1)	SIN:1	17:14:45:205		2
Time Tagged Mes...	GeneralInterrogati...	1	160	6	0	0x(1)	SIN:1	17:14:47:277		2
Time Tagged Mes...	GeneralInterrogati...	1	160	7	0	0x(1)	SIN:1	17:14:49:363		2
Time Tagged Mes...	GeneralInterrogati...	1	160	8	0	0x(1)	SIN:1	17:14:51:441		2
GeneralInterrogati...	EndOfGeneralInt...	1	255	0	0	15				2
Identification (5)	StartRestart (5)	1	255	1	0	[2] [IOMOD-88] [1414745157]				1

The 'System' tab on the right includes the following controls:

- APDU:** ASDU: 1
- General interrogation:** Send button, Scan: 1
- Clock synchronization:** Send button, checkboxes for IV, SM, SB, PC time (2021-12-31 12:37:48)
- General Command:** FUN: 128, INF: 5, RI: 0, ON/OFF buttons

Fig. 2 Replies from IOmod device after a command has been sent through “THE VINCI” software

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