

# Connecting IOMod 16DI to the WCC Lite

## Description

This article describes how to connect and configure IOMod 16DI to the WCC Lite using IEC101, IEC103, and Modbus RTU.



Typical connection schematic for IOMod 16DI

WCC Lite can be connected to IOMod 16DI via PORT1 or PORT2.

## Preparing the configuration

At first you need to make a configuration for the WCC Lite. This can be done using any spreadsheet editing program. Templates for configuration can be found on the WCC Lite web. Protocol Hub --> Configuration. On the bottom of the page there will be a *Download* button for template configurations.

PROTOCOL HUB	STATUS	SYSTEM	SERVICES	NETWORK	USERS	LOGOUT (ROOT)
CONFIGURATION	IMPORTED SIGNALS	EVENT LOG	PROTOCOL CONNECTIONS	PROTOCOL LOGGER	SCRIPT-RUNNER	

### Protocol configuration

#### IMPORT PROTOCOL CONFIGURATION

Here you can import Excel configuration file. Up to 1000 signals are allowed. All previous signals will be replaced.

Configuration file:  No file chosen

PLC (IEC-61499) Boot file:  No file chosen

IEC61850 Client model file:  No file chosen

IEC61850 Server model file:  No file chosen

#### DOWNLOAD CONFIGURATION

Template configurations:



You can download the example configuration for each firmware versions at the bottom of the article or create your own

using these links:

- For IEC103
- For IEC101
- For Modbus

You need to configure Devices and Signals sheets before continuing. After downloading template configurations, open phub templates folder. You will see that there's different template folders for each IOMod:

4CS4VS	2025-03-13 11:06	File folder
4RTD	2025-03-14 10:14	File folder
8AI	2025-03-13 11:06	File folder
8DI4RO	2025-03-13 16:01	File folder
8DI8DO	2025-03-13 16:26	File folder
16DI	2025-03-13 16:27	File folder

To select correct configuration, check the sticker on the back of IOMod. There you will find which protocol to use according to Factory FW type. For example, if you have IOMod 16DI with IEC103 FW, select configuration `iomod_16DI_IEC103_to_IEC104_DNP3_Modbus_SCADA`.

Before connecting IOMods to WCC Lite you need to configure it via mini USB. This can be done following [IOMod 16DI user manual](#).

You need to configure it, like it is done in the excel configuration. To do that, first you need to open IOMod utility app and change these parameters: *baudrate*, *parity*, *link address*. It is important, that *link addresses* for both IOMods are different and *parity* and *baudrate* should be even. Other parameters such as *data bits* and *stop bits* should be set to default. Signals sheet should be mapped according to functionality needed.

## Uploading configuration

Template configurations can work with default settings without any further changes. These template configurations can also be used to configure protocols like Modbus-master and DNP3. Configuration can be modified according to functionality needed. For that you can rely on the examples given in the links above (Preparing the configuration). If you need to specify different IEC104 slave settings, you can do that by changing excel configuration. By changing settings such as *info\_address* or *data\_type* you can adapt IEC104 slave to work as needed. To test this example you have to specify your computer's IP address in excel configuration for IEC104 slave.

After configuration is ready, upload it to WCC Lite (Configuration --> Choose file --> Import configuration):

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CONFIGURATION	IMPORTED SIGNALS	EVENT LOG	PROTOCOL CONNECTIONS	SCRIPT-RUNNER	

### Protocol configuration

#### IMPORT PROTOCOL CONFIGURATION

Here you can import Excel configuration file. Up to 1000 signals are allowed. All previous signals will be replaced.

Configuration file:	1	<input type="button" value="Choose File"/> No file chosen	<input type="button" value="Import configuration"/> 2
PLC (IEC-61499) Boot file:		<input type="button" value="Choose File"/> No file chosen	<input type="button" value="Import FBOOT file"/>
IEC61850 Client model file:		<input type="button" value="Choose File"/> No file chosen	<input type="button" value="Import client model file"/>
IEC61850 Server model file:		<input type="button" value="Choose File"/> No file chosen	<input type="button" value="Import server model file"/>

After upload is done and no errors were detected, you should see all imported signals (Protocol Hub --> Imported

signals):

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IMPORTED SIGNALS

☐ Column filter

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
Elseta IOMod16DI	DI1	IOMod16	DI1	0			cot=20	2025-03-14 14:37:52.65
Elseta IOMod16DI	DI2	IOMod16	DI2	0			cot=20	2025-03-14 14:37:52.95
Elseta IOMod16DI	DI3	IOMod16	DI3	0			cot=20	2025-03-14 14:37:53.25
Elseta IOMod16DI	DI4	IOMod16	DI4	0			cot=20	2025-03-14 14:37:53.55
Elseta IOMod16DI	DI5	IOMod16	DI5	0			cot=20	2025-03-14 14:37:53.85
Elseta IOMod16DI	DI6	IOMod16	DI6	0			cot=20	2025-03-14 14:37:54.15
Elseta IOMod16DI	DI7	IOMod16	DI7	0			cot=20	2025-03-14 14:37:54.45
Elseta IOMod16DI	DI8	IOMod16	DI8	0			cot=20	2025-03-14 14:37:54.75
Elseta IOMod16DI	DI9	IOMod16	DI9	0			cot=20	2025-03-14 14:37:55.04
Elseta IOMod16DI	DI10	IOMod16	DI10	0			cot=20	2025-03-14 14:37:55.36
Elseta IOMod16DI	DI11	IOMod16	DI11	0			cot=20	2025-03-14 14:37:55.66
Elseta IOMod16DI	DI12	IOMod16	DI12	0			cot=20	2025-03-14 14:37:55.96

Before doing anything further you should also check for protocol connections if IOMod 16DI is connected to WCC Lite via PORT1. Go to Protocol connections where you can see all the connected slave and master protocol devices:

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PROTOCOL CONNECTIONS

Device name	Device alias	Protocol	Host	Status	Timestamp
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Elseta IOMod16DI	IOMod16	IEC 60870-5-103 master	PORT1	Connected	2025-03-14 14:37:50
Modbus SCADA system	Modbus_SCADA	Modbus TCP slave	192.168.1.2	Disconnected	2025-03-14 13:41:34
DNP3 SCADA system	DNP3_SCADA	DNP3 slave	192.168.1.2	Disconnected	2025-03-14 13:41:04
IEC104 SCADA system	IEC104_SCADA	IEC 60870-5-104 slave	192.168.1.2	Disconnected	2025-03-14 13:40:59
IEC101 SCADA system	IEC101_SCADA	IEC 60870-5-101 slave	PORT2	Disconnected	2025-03-14 13:40:57

You can also change signal names according to your needs:

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	math_expression	multiply	add	operation	units	min_value	max_value	absolute_threshold	threshold_units	suppression_time_ms	suppression_values	gi	log	function	common_address	info_address	info_number	data_type	tag_job_todo
DOOR OPEN	IOMod16	DI1			1			-1					0,1	real			1	1	160	1	1	0	1	

PROTOCOL HUB

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IMPORTED SIGNALS

☐ Column filter

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Elseta IOMod16DI	DOOR OPEN	IOMod16	DI1	0			cot=20	2025-03-14 15:12:20.17

In every signals sheet you can see a signal named COMMUNICATION STATUS. It is an indicator that shows whether the service is running and whether there is a connection with the device.

signal_name	device_alias	signal_alias	source_device_alias	source_signal_alias	enable	math_expression	multiply	add	operation	units	min_value	max_value	absolute_threshold	threshold_units	suppression_time_ms	suppression_values	gi	log	common_address	info_address	data_type	tag_job_todo
IEC104 SCADA DI1	IEC104_SCADA	IEC104_SCADA_DI1	IOMod16	DI1	1												1	0	1	1	30	
IEC104 SCADA DI2	IEC104_SCADA	IEC104_SCADA_DI2	IOMod16	DI2	1												1	0	1	2	30	
IEC104 SCADA DI3	IEC104_SCADA	IEC104_SCADA_DI3	IOMod16	DI3	1												1	0	1	3	30	
IEC104 SCADA DI4	IEC104_SCADA	IEC104_SCADA_DI4	IOMod16	DI4	1												1	0	1	4	30	
IEC104 SCADA DI5	IEC104_SCADA	IEC104_SCADA_DI5	IOMod16	DI5	1												1	0	1	5	30	
IEC104 SCADA DI6	IEC104_SCADA	IEC104_SCADA_DI6	IOMod16	DI6	1												1	0	1	6	30	
IEC104 SCADA DI7	IEC104_SCADA	IEC104_SCADA_DI7	IOMod16	DI7	1												1	0	1	7	30	
IEC104 SCADA DI8	IEC104_SCADA	IEC104_SCADA_DI8	IOMod16	DI8	1												1	0	1	8	30	
IEC104 SCADA DI9	IEC104_SCADA	IEC104_SCADA_DI9	IOMod16	DI9	1												1	0	1	9	30	
IEC104 SCADA DI10	IEC104_SCADA	IEC104_SCADA_DI10	IOMod16	DI10	1												1	0	1	10	30	
IEC104 SCADA DI11	IEC104_SCADA	IEC104_SCADA_DI11	IOMod16	DI11	1												1	0	1	11	30	
IEC104 SCADA DI12	IEC104_SCADA	IEC104_SCADA_DI12	IOMod16	DI12	1												1	0	1	12	30	
IEC104 SCADA DI13	IEC104_SCADA	IEC104_SCADA_DI13	IOMod16	DI13	1												1	0	1	13	30	
IEC104 SCADA DI14	IEC104_SCADA	IEC104_SCADA_DI14	IOMod16	DI14	1												1	0	1	14	30	
IEC104 SCADA DI15	IEC104_SCADA	IEC104_SCADA_DI15	IOMod16	DI15	1												1	0	1	15	30	
IEC104 SCADA DI16	IEC104_SCADA	IEC104_SCADA_DI16	IOMod16	DI16	1												1	0	1	16	30	
COMMUNICATION STATUS	IEC104_SCADA	comm_stat																1				communication_status

If everything is connected and service is running, COMMUNICATION STATUS should display 1. Otherwise, if not it should display 2.

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☐ Column filter

Device name	Signal name	Device alias	Signal alias	Value	Units	State	Attributes	Time
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
IEC104 SCADA system	COMMUNICATION STATUS	IEC104_SCADA	comm_stat	1				2025-03-14 17:43:51.48

## Simulating SCADA via Vinci software

After uploading Excel configuration, you can simulate SCADA using Vinci software. In order to simulate IEC104 slave you need to choose IEC 60870-5-104 protocol and Master(Client) mode and press start. In *Settings* tab, check Structure, Timeouts and Windows values to match Excel configuration.

File Tags Options Hardware Help

 Protocol: IEC 60870-5-104 Mode: Master (Client) **START**

Settings Console Statistic

Structure

COT size in bytes: 2

ASDU size in bytes: 2

IOA size in bytes: 3

Parameters

☒ Send Start DT on start up

☒ Auto ack. Test Frame

Security

☐ Enable TLS

Timeouts

t0 in seconds: 30

t1 in seconds: 15

t2 in seconds: 10

t3 in seconds: 20


Windows

RWT (w) size: 8

SWT (k) size: 12


Then set correct IP address and Port at the top of the program page. **Port** for IEC104 should be 2404 and **IP address** should match your WCC Lite IP address (default address is 192.168.1.1 if it's connected to your computer via ethernet cable).

File Tags Options Hardware Help

 Protocol: IEC 60870-5-104 Mode: Master (Client) **START** IP: 192.168.1.1 Port: 2404

Settings Console Statistic

After clicking start, you should check protocol connections tab again to see if IEC104 slave is connected.

PROTOCOL HUB	STATUS	SYSTEM	SERVICES	NETWORK	USERS	LOGOUT (ROOT)	 WCC LITE
CONFIGURATION	IMPORTED SIGNALS	EVENT LOG	PROTOCOL CONNECTIONS	PROTOCOL LOGGER	SCRIPT-RUNNER		
PROTOCOL CONNECTIONS							
Device name	Device alias	Protocol	Host	Status	Timestamp		
Elsela IOMod16DI	IOMod16	IEC 60870-5-103 master	PORT1	Connected	2025-03-14 17:43:41		
Modbus SCADA system	Modbus_SCADA	Modbus TCP slave	192.168.1.2	Disconnected	2025-03-14 15:12:16		
DNP3 SCADA system	DNP3_SCADA	DNP3 slave	192.168.1.2	Disconnected	2025-03-14 15:11:44		
IEC104 SCADA system	IEC104_SCADA	IEC 60870-5-104 slave	192.168.1.2	Connected	2025-03-14 17:43:51		
IEC101 SCADA system	IEC101_SCADA	IEC 60870-5-101 slave	PORT2	Disconnected	2025-03-14 15:11:41		

Once IEC104 slave is connected, console tab in Vinci software should look something like this:

FileTagsOptionsHardwareHelp

Protocol:IEC 60870-5-104

Mode:Master (Client)

STOP

IP:192.168.1.1

Port:2404

Extra

Interface infoPingSockets

SettingsConsoleStatistic

Time	Source	Message	TI	Cause	ASDU	IOA	Value	Status	TimeTag	Name	RawData
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	8	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	9	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	10	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	11	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	12	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	13	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	14	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	15	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	16	OH[0]	Not Topical	2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	1	OH[0]		2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	2	OH[0]		2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	3	OH[0]		2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	4	OH[0]		2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	5	OH[0]		2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:0	M_SP_TB_1 (30)	Spontan (3)	1	6	OH[0]		2025-3-14 15:43:...		68 F1 00 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	7	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	8	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	9	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	10	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	11	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	12	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	13	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	14	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	15	OH[0]		2025-3-14 15:43:...		68 83 02 00 00
13:43:52:070	192.168.1.1:2404	RSN:0 SSN:1	M_SP_TB_1 (30)	Spontan (3)	1	16	OH[0]		2025-3-14 15:43:...		68 83 02 00 00

☒ Auto Scroll

Total: 36, Filtered: 0

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If you want to configure IOMod 16DI, you should refer to ->IOMod 16DI User Manual.

Revision #18

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