

# iSMA-B-FCU

User Manual

## **FCU Updater**





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FCU Updater User Manual

## **1** Introduction

This user manual outlines features of the FCU Updater software.

## **1.1 Revision History**

Rev.	Date	Description
2.5	10 Nov 2023	Updated to FCU Updater V2.6.1 Improved BACnet MS/TP and BACnet IP gateway addressing features
2.4	16 May 2022	Rebranded
		Updated to FCU Updater V.2.5.1
		Added:
		<ul><li>Touch Point references;</li><li>NV actions.</li></ul>
2.3	9 Mar 2021	<ul> <li>Added features:</li> <li>iSMA Modus Tunnel;</li> <li>Modbus TCP gateway;</li> <li>Modbus BACnet IP gateway;</li> <li>Timeout request in project settings;</li> <li>Automatic backup disable option in project settings;</li> <li>Allowed to run multiple instances of FCU Updater on a single PC.</li> </ul>
2.2	24 Jun 2020	<ul> <li>Company data update</li> <li>Added information about BACnet File Transfer Speed</li> </ul>
2.1	30 Apr 2018	Updated to FCU Updater V.2.1.1
1.2	19 Jul 2017	Updated to FCU Updater V.2.0
1.0	6 Dec 2016	First edition

Table 1. Revision history



## **2** General Purpose of FCU Updater

📆 FCI	U Updater v2.5	.1							- 0	×
Proje Prote	New Project ect Name: Pro cocol: Modbus	Open F oject 1 RTU	roject	[	SOX	Cor	nsole Dow	nload Latest Firmwares About		
Path:	: C:\ Select Outdated	Devices	Select All Devic	ës	Clear Selec	tion	Backup_20220517_	134456_Manual V	Upload/Download Wizard	
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup		
		1	iSMA-B-FCU	826001		2.3	OFFLINE	N/A ~	Start Transmission	
•	$\checkmark$	2	iSMA-B-FCU - USB	826927	ОК	2.1	OUTDATED	Backup_20220517_134456_Manu $ \smallsetminus $	Stop Transmission	
		7	iSMA-B-FCU	826007		2.1	OFFLINE	Backup_20220517_132104_Ma ~	Transmission Settings	
									Discover Devices Add Device Remove Device	
									Heset Devices	
									Default Settings	

Figure 1. The FCU Updater

The FCU Updater software is designed to perform a start-up and maintenance operations for both a single device or for many devices connected to a communication network on the site. The FCU Updater is ready to communicate with the iSMA-B-FCU controller and iSMA-B-LP/Touch Point panel. The software is free and can be obtained from iSMA distribution partner or downloaded from the support server at ismacontrolli.com

Note: The FCU Updater has been developed in a way to guarantee the highest level of security against the loss of an existing application loaded on the devices before any changes are made. The software allows automatic backups of the application by downloading it to a local PC, where the FCU Updater is running. Moreover, the system always checks compatibility between the firmware and the uploaded application before transferring them to the controller to make sure they can work together on the device, without problems.

For simplicity and time-saving, the FCU Updater allows, e.g., to upload firmware, upload an application, reset a device, or set it to default settings on more than a single device at a time. This function can be beneficial as far as updating the firmware on all devices at once is concerned. Similarly, a backup of the existing applications from all devices can be automatically transferred to a local PC from many controllers at once without operator interactions.

FCU Updater is a project-oriented application, which means that the whole network configuration parameters, iSMA-B-FCU controllers with their application backups and firmware versions, are stored locally inside the project folder for later reuse.

FCU Updater offers the following actions:

- managing projects;
- loading the latest firmware versions from the iSMA CONTROLLI server;
- uploading new firmware on devices;
- uploading default or custom application on devices;

- performing backups of the existing devices application on a local PC;
- restoring earlier saved application to one or more devices;
- managing NV components values with NV actions;
- resetting devices;
- · resetting to default settings on many devices;
- starting/stopping SOX protocol to support programming in WorkPlace or iSMA Tool;
- viewing internal logs on Console.

All functions are available and work in the same way for all three communication types:

- Modbus RTU, using the RS485 port or the Modbus TCP gateway;
- BACnet MS/TP, using the RS485 port or the BACnet IP gateway;
- USB, using the direct USB cable connection except for SOX and Console option.



## **3** Naming and Definitions

The FCU Updater communicates to one or more devices and transfers data in both directions. It is crucial to distinguish the direction of data flow as described below.

- **uploading:** means transferring data from PC to a controller, for example, when a new firmware or custom application flows to the iSMA-B-FCU device;
- downloading: means transferring data back from the iSMA-B-FCU controller, for example, when data flows back from the iSMA-B-FCU device to a local PC.



Figure 2. Uploading and downloading to and from the FCU controller



## **4** Software Requirements

Windows compatibility: the FCU Updater is an application intended for Windows only, which can be run on Windows 7, 8, and 10 series.

#### Warning!

To use all features of the FCU Updater, the latest Oracle Java 32-bit is required. Please download the latest Java software from the Oracle Download website first.

Note: Multiple instances of the FCU Updater may run on a single PC.

## 4.1 Checking Software Requirements on Application Start

## 4.1.1 Java Version

The FCU Updater software requires Oracle Java 32-bit to be installed on the users PC. Each time the FCU Updater starts, the system notifies whether the core version of Java is available.



Figure 3. A dialog window if Java is not installed

The user can run the FCU Updater without having correct Java version installed with limited functionality, such as opening the SOX protocol and viewing internal and live logs on the console. The SOX protocol and Console are described in detail in the following sections herein.

#### Warning!

In case if the required Java version is not installed, it is recommended to close the FCU Updater and download Java SE 32-bit (windows x86) software from the Oracles website.

## 4.1.2 Internet Access and Firmware Availability

#### Warning!

If the FCU Updater is run for the first time, it is mandatory to have the Internet access on the local PC. The Internet access allows the application to connect to the iSMA CONTROLLI server and download (in the background) all new firmware files to the local PC automatically. If the FCU Updater finishes downloading, the following information dialog appears.



SFCU Updater v2.5.1	- 🗆 ×
New Project Open Project SOX Console Download Latest Firmwares About	-
No project selected, open an existing project or create a new one.	
Select Outdated Devices Select All Devices Clear Selection N/A ~	
Selected Devices: 0/0	Upload/Download Wizard
Checked MAC Devi Done X Backup	Start Transmission
Firmwares have been downloaded successfully.	Stop Transmission
	Transmission Settings
ОК	
	Discover Devices
	Add Device
	Remove Device
	NV Actions
	Reset Devices
	Default Settings

Figure 4. First run of the FCU Updater

Later, after the first start up, each time the FCU Updater is switched on, the system automatically checks (without downloading it automatically) whether a newer firmware version is available on the iSMA CONTROLLI server. It is recommended to download the latest available firmware from the server each time when prompted by the system. The user can check if the newest firmware is available at any time by pressing Download Latest Firmware button.

New Project Open Project	SOX Console Download Latest Firmwares About	
o project selected, open an existing project or create Select Outdated Devices Select Al Devices	Clear Selection N/A ~	
	Selected Devices: 0/0	Upload/Download Wizard
Checked MAC Device BACnet Address Name ID	New Firmwares × There is new firmware available to download. You can download them by clicking Download Latest Firmwares button.	Start Transmission Stop Transmission Transmission Settings
	ОК	Discover Devices
		Add Device Remove Device
		NV Actions

Figure 5. Firmware is checked each time the FCU Updater is run

After the new firmware files are successfully downloaded, the following confirmation dialog window is displayed.



Figure 6. A dialog window for successfully downloaded firmware

In case if no new firmware files are available on the server, the below dialog window appears.



## 4.1.3 After First Run

Each time the FCU Updater is running (except for the first start up as described above), a below FCU Updater window displays.

FCU Updater v2.5.1								- 0	×
New Project Open	Project		SOX		Console	Download Latest Firmwares	About		
No project selected, open a	n existing projec	t or create	a new one.						
Select Outdated Devices	Select All E		Clear		N/A		~		
			Selected De	evices: 0/0					
Checked MAC Address	Device Name	BACnet /	Application Status	Firmware Version	Firmware Status	Available Backup			
									1
								Transmission Settings	
								Discover Devices	
								Add Device	
								Remove Device	
								Default Settings	

Figure 8. The FCU Updater after a first run

**Note:** The FCU Updater has almost all options disabled at this moment. The user has two choices depending on what is expected:

• If the user wants to work with external software, e.g., the iSMA Tool, before running the SOX protocol it is essential to configure the connection of the iSMA-B-FCU controller directly to the USB port on the local PC. For more details, please refer to a relevant section herein.

If the user wants to use any impaired functions of the FCU Updater software, it is required to open or create the project first. Please follow next section for more details.

## **5 Working with Projects**

The FCU Updater is designed to be more consistent and portable through the introduction of a project orientation. Working with projects allows the user to keep all information in regards to the huge number of devices from different sites scored and organised in folders and subfolders. Operating with projects also allows the system to automatically update project folders with any newly discovered devices or backup, and other features.

**Note:** At first, it is essential to create a new project or open an existing one by selecting the New Project or Open Project buttons.

## 5.1 Creating New Project

After clicking the New Project button, the new project is created and stored in a selected location, usually on a local PC drive.

PCU Updater v2.6.1	🤭 New Project		– o x	- 🗆 ×
New Project Open	O Modbus RTU	COM Port Baudrate Parity Bits	COM1 \v 115200 \v None \v	1
Select Outdated Devices	O BACnet MSTP	Router BACnet ID Gateway IP Adress	0 192.168.1.123	
Checked MAC	O ModbusTCP Gateway	Port Number IP Adapter	47808 Intel(R) Wi-Fi 6 AX201 160MHz (192.168.2.64)	pload/Download Wizard
Audress	BACnetIP Gateway	Timeout BACnet File Transfer Speed	8000 € Slow ✓	Start Transmission Stop Transmission
	Name Project Name	Automatic Backups		Discover Devices
	Location C:\Users\tjanicki\	Desktop	Browse	Add Device Remove Device
		ОК	Cancel	NV Actions Reset Devices Default Settings

Figure 9. Creating a new project

The window with transmission settings and specification of the location appears. Select the protocol type, Modbus RTU or BACnet MS/TP with all required communication settings for a chosen protocol. Alternatively, the project may also be created to communicate with FCU devices with Modbus TCP or BACnet IP gateways. For more details of transmission settings, please refer to relevant chapters describing how to set up Modbus RTU and BACnet MS/TP protocols, or Modbus TCP and BACnet IP gateways.

If at this point the exact protocol type is not known, the user can change protocol type and its setting later at any time.

**Note**: It is recommended to connect PC to the required Modbus or BACnet network first, which guarantees that the new COM port (other than the built-in COM1) appears in the COM Port field, for example, COM3. If it is required to make a direct connection (via USB on local PC port) to only one device: iSMA-B-FCU or iSMA-B-LP/Touch Point panel, please select the built-in COM1 in the COM Port field, and leave default values for other settings.



Using the Modbus TCP (either with the iSMA Modbus Tunnel or not) or BACnet IP gateways is possible only with the COM1 port.

New Project			- 🗆 X
O Mada a PTU	COM Port	COM1 V	
O Modbus RTU	Baudrate	115200 ~	
	Parity Bts	None $\vee$	
BACnet MSTP	Software BACnet ID	0	
	Gateway IP Adress	192.168.1.123	
	Port Number	502	
ModbusTCP Gateway	IP Adapter	Intel(R) Ethemet Connection (4)	l219-LM (192.168.1.51) $  \smallsetminus $
	Timeout	8000 🗘	
0.000.000.000	BACnet File Transfer Speed	Slow 🗸	
O BAChetiP Gateway	Automatic Backups	Enabled	
Name Project Name			
Location C:\Lisers\amosto	wik\Documents\ECIIIIndater		Prouze
Codelon C. Yosers Validato			browse
	ОК	Cancel	
			de la companya

Figure 10. The COM1 Port field setting for Modbus TCP or BACnet IP gateways

The Timeout field allows the user to set the maximum device response time for communication with the FCU Updater.

**Note:** In case the timeout value is too low, it may cause to fail FCU Updater operations with device timeout log. Increasing the timeout solves the issue.

While creating the new project, it is possible to enable or disable automatic backups before and after each of the FCU Updater's operation, for the whole project. This setting may positively impact the speed of operations, however, the Upload firmware and keep application operation still requires to perform backup before, therefore, it is performed regardless of the setting. By default, the options is set to enable automatic backups.

The second part of the dialog window asks for a project name and its location on the local PC.

Pressing the OK button verifies the typed data and creates a new folder in the indicated location. The folder name is the same as the one chosen for the Project Name. Thus the user can easily copy and move the folder to any other location or e-mail, or even rename it. Before performing any operations with the folder, close the FCU Updater first.

## 5.1.1 Creating New Project with Modbus TCP Gateway

The Modbus TCP gateway is a feature allowing to establish the communication between the FCU Updater software with FCU devices on the Modbus network with the gateway device (for example, the I/O module or the master controller with the iSMA Modbus Tunnel), which enables to pass the Modbus data packets between TCP and RTU Modbus networks.



New Project		- 0	>
	0011.0.1	0014	
O Modbus RTU	COM Port	COM1 V	
	Parity Bits	None	
	Software BACnet ID	0	
	Gateway IP Adress	192.168.1.123	
	Port Number	502	
ModbusTCP Gateway	IP Adapter	Intel(R) Ethemet Connection (4) I219-LM (192.168.1.51)	$\vee$
	Timeout	8000	
BACnetIP Gateway	BACnet File Transfer Speed	Slow 🗸	
	Automatic Backups	Enabled	
Name Project Name			
Location C:\Users\amost	owik\Documents\FCU Updater	Browse	
	ОК	Cancel	

Figure 11. Creating a new project with a Modbus TCP gateway

Creating the new project to communicate with FCU devices with the Modbus TCP gateway requires to set the following parameters:

- · Baud rate: corresponding to the gateway device setting;
- Gateway IP Address: gateway IPv4 address in standard format xxx.xxx.xxx;
- Port Number: port at which the gateway device supports the Modbus communication (Modbus default: 502);
- Timeout: the maximum device response time on the network.

### 5.1.2 Creating New Project with BACnet IP Gateway

The BACnet IP gateway is a feature allowing to establish the communication between the FCU Updater software with FCU devices on the BACnet network with the gateway device (for example, the iSMA-B-MAC36NL master controller), which enables to pass the BACnet data packets between IP and MS/TP BACnet networks.



New Project		- 0
O Modbus BTU	COM Port	сом1
	Baudrate	115200 ~
	Parity Bits	None 🗸
BACnet MSTP	Router BACnet ID	0
	Gateway IP Adress	192.168.1.123
	Port Number	47808
ModbusTCP Gateway	IP Adapter	Intel(R) Wi-Fi 6 AX201 160MHz (192.168.2.64)
	Timeout	8000
	BACnet File Transfer Speed	Slow ~
BACnetIP Gateway	Automatic Backups	
Name Project Name		
Name Project Name		
Location C:\Users\tjanick	ti\Desktop	Browse
	OK	Canaal
	UN	Callee

Figure 12. Creating a new project with a BACnet IP gateway

Creating the new project to communicate with FCU devices with the BACnet IP gateway requires to set the following parameters:

- Baudrate: corresponding to the gateway device setting;
- Router BACnet ID: the BACnet object ID assigned to the BACnet gateway device-the setting can be found in the Object IP field of the Local Device component set for the gateway device;

😁 BacnetNetwork 👔 ISMAModbusTunnel		×
Property Sheet		
▼  Local Device Local Bacnet Device	[device:1]	-
🗎 Status	(ok)	
Fault Cause		
Dbject Id	device 🔽 1	
🗎 System Status	Operational	
🕥 Vendor Name	Tridium	
🕥 Vendor Id	36	
Model Name	Niagara4 Station	
Firmware Revision	4.0.0.110	
Application Software Version	Tridium 4.8.0.110	
Location	unknown	
Description	Local BACnet Device object	
Protocol Version	1	
Protocol Revision	14	
Protocol Services Supported	111111111111111111111111111111111111111	
Protocol Object Types Supported	111111101110111000000000000000000000000	
Max A P D U Length Accepted	480	
Segmentation Supported	Segmented Both	
Max Segments Accepted	255	
🎬 Apdu Segment Timeout	2000 ms [0 - max]	
🗎 Apdu Timeout	3000 ms [0 - max]	
🗎 Number Of Apdu Retries	3	
Database Revision	3	
🗎 Last Restore Time		
🗎 Backup Failure Timeout	00000h 03m 00s)쉽 [0ms-+inf]	v

Figure 13. The Object ID field in the Local Device component set for the gateway device

- Port Number: port at which the gateway device supports the BACnet communication (BACnet default: 47808);
- IP Adapter: the IP adapter connected to the gateway device (list of available adapters is filled automatically);
- Timeout: the maximum device response time on the network;
- BACnet File Transfer Speed.

**Note:** In order for the BACnet IP gateway feature to function properly, it is required to set the routing parameters in the BACnet Network component configured for the gateway device.

😁 BacnetNetwork		×
Property Sheet		
Network Bacnet Network	Layer	
Router Table	Bacnet Router Table	
🔻 证 Ip Port	NetworkPort: id=3 net=1 enabled max=2:	
Network Number 1		
Link B/IP (19)	2.168.1.123:0xBAC0) Standard	
Adapter	eth0 v	
Ip Address	192.168.1.123	_
🗎 Udp Port	0xBAC0	
🗎 Ip Device Type	Standard -	
Bbmd Address	null	
Registration Lifetime	+00000h 15m 00s 3	
Broadcast Distribution T	able BDT: 0 entries	
Foreign Device Table	Foreign Device Table	- 1
🗎 Bbmd Debug	🔴 false 💌	
Status {ok}		
Fault Cause		- 1
Poll Service Bacnet	AultiPoll	
Max Devices max		
Enabled 🛑 true		
Port Id 3		
Port Info Annex	J IP	
Routing Enabled	🔵 true 🔍	
Maintain Routing Enabled	🔵 true 🔍	
🗎 Minimum Router Update Time	500 ms	
K75.	C Refresh	Ŧ

Figure 14. BACnet network settings required for the BACnet IP gateway to operate properly

Both Routing Enabled and Maintain Routing Enabled slots have to be set to true. Make also sure to:

- · correctly identify the network number;
- enable the IP port;
- enable the MS/TP port and set the network number for the MS/TP communication with FCU devices.

Once all settings in the New Project dialog window are properly established, creating new project have to be confirmed with the OK button.



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🚟 FCU Updater v2.5.1			×
New Project Open Project	SOX Console	Download Latest Firmwares About	
Project Name: Project Name Protocol: Modbus RTU Path: C:\			
Select Outdated Devices Select All Devices	Clear Selection	~	
	Selected Devices: 0\0	Upload/Download Wizard	
Checked MAC Device BACnet Address Name ID	Application Firmware Firmware Status Version Status	Available Backup	
		Stop Transmission Transmission	
		Discover Devices	
		Add Device	
		Remove Device	
		NV Actions	
		Reset Devices	
		Default Settings	

Figure 15. New project created

Now, the project is created and opened. The FCU Updater displays the current context by showing the information line about the opened project: its name, location, and setup transmission protocol. All that information appears on labels located under the New Project and Open Project buttons. Some of the previously disabled functions are now enabled, including Start Transmission and Transmission Settings.

The next step is to start transmission on the selected protocol.

## 5.2 Opening Existing Project

Pressing the Open Project button opens an existing project stored on given location, usually locally on a PC.



😁 FCU Up	pdater v2.5.1								×
New	/ Project Open 1	Project	SOX	Console	Download Latest Firmware	es Ab	out		
No proje	ect selected, open an	n existing project or crea	te a new one.						
	Open Project					- 🗆	×		
	Recent Project	Project Name					~		
		C:\						Start Transmission	
	One Project					Desures	- 1	Stop Transmission	
	) Open Project					Browse	1	Transmission Settings	
		E	ОК	Cancel					
								Add Device	
							1.7		
								NV Actions	
								Reset Devices	
								Default Settings	

Figure 16. Opening an existing project

To open the existing project, the user has two options available:

- selecting the project name directly from the drop-down list in the Recent Project field;
- browsing and finding a folder of the existing project, then pointing out a projects configuration file config.iSMA in the project folder.

After pressing the OK button, the existing project opens depending whether the system can localize the configuration file.

Now, the project is opened. The FCU Updater displays the current context by showing a confirmation of the opened project: its name, location, and setup transmission protocol. All that information appears on labels located under New Project and Open Project buttons. Also, all the information about devices name, type, versions, backups previously saved in the project folder appears in the main table on the application screen.



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FCU	Updater v2.5.1									- D >	<
Ne Projec Protoc	ew Project st Name: Proj sol: Modbus F	Open Pr ect Name1 RTU	roject		SOX	Con	sole Do	ownload Latest Firmware	s About		
Path: C	::\ lect Outdated E	Devices	Select All Devi	ces	Clear Select	lion			~		
					Selected Devices	0\2				Upload/Download Wizard	
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup		0.17	
+		2	iSMA-B-FCU - USE	826927	ОК	2.1	OUTDATED	N/A	~	Start Transmission	
		7	iSMA-B-FCU	826007		2.1	OFFLINE	N/A	~	Stop Transmission	
										Transmission Settings	
										Discover Devices	
										Add Device	
										Remove Device	
										ND / A. P	
										NV Actions	
										Reset Devices	
										Default Settings	

#### Figure 17. Existing project opened

Some of the previously disabled functions are now enabled, including the Start Transmission and Transmission Settings. The next step is to start transmission with the selected protocol, which is described in the following part of this manual.

The next step is to start communication with the controllers listed in the project. After pressing the Start Transmission button, the system rechecks the current status of devices and begins working with them online.



## 6 Start and Stop Transmission

After opening the new project or the existing one and connecting to the network (Modbus or BACnet), it is recommended to switch to online mode, starting data transmission. Press the Start Transmission button and wait until the Start Transmission button becomes disabled to indicate that the communication port COM was opened successfully.

Start Transmission
Stop Transmission
Transmission Settings

Figure 18. Transmission started successfully

If the system cannot open the COM port (set in transmission settings), a warning dialog window appears. In this case, please reopen protocol settings by pressing Transmission Settings and adjust them accordingly.

Failed to open port.							
	Could not open chosen COM port!						
	ОК						

Figure 19. The COM port could not be opened

Note: Remember to start transmission again after changing the communication settings.

If the FCU Updater opens the COM port successfully, statuses for all devices in the table update automatically on a periodic basis. Depending on how many devices are shown in the table, the speed of rechecking the status of each device varies. The rate drops, even more, if some of the devices are not physically connected to the network, but they are present in the table. In this case, the user can always manually check the status of the selected device by right-clicking it and choosing the Ping device option. In the below image, the selected controller is still offline even though the transmission is running. In this situation, it is recommended to ping the device manually, and if this operation does not help, it may indicate a communication issue, or that the device is offline, transmission settings are wrong, or protocol type is not adequate.



Figure 20. Ping device manually

**Note**: Remember that after changing some of the transmission settings the COM port is automatically closed. To open the COM port again and to start transmission data, please press the Start Transmission button again.



The user can stop transmission at any point by pressing the Stop Transmission button although it is not necessary because the FCU Updater performs it automatically as needed, for example, if the user opens other project or closes the software.

**Note**: The transmission must operate properly if the user wants to work with devices connected to the Modbus or BACnet network.

Only with the successful connection setup the user can:

- discover new devices on the network
- upload/download firmware and application
- perform backup/restore of application
- ping devices
- reset devices
- set devices to default settings

All these functions are described in the following parts of this manual.



## 7 Discover Devices

If the connection to Modbus or BACnet network is set up properly, it is possible to discover all the devices physically connected on the bus. The discovering process means recognition of device type together with its address in the network. Each found device is automatically added to the table of the current project, so the user does not need to know the type, address, and number of devices connected on the bus. The discovering process is fast, and it is recommended to run it at the beginning to have an overview of the whole network. It is also advisable to run it whenever a new physical device is added on the site.

**Note**: Before starting the discovering process, makes sure that the right project is opened by checking the project name and its path is shown under New Project, Open Project buttons.

To start the discovering process press the Discover Devices button to open a supporting dialog with some settings. The discovering process requires some individual settings depending on a protocol type.

## 7.1 Discovering Devices for Modbus

For the Modbus protocol, regardless whether devices are connected directly to the Modbus RTU network or discovered with the Modbus TCP gateway, it is required to set up the Modbus addresses range. The FCU Updater starts searching for the first device with the given address in the Start Address field until reaching the last device with the address specified in the Stop Address field. The time spent for discovering varies based on the devices range and networks baud rate. To reduce the discovering time, it is recommended to adjust the range accordingly.

Press the Find button to run identification process. During the process, all already detected devices are listed at the bottom of the dialog box. It is possible to abort this process without adding any devices to the table in the project by pressing the Cancel button. If the number of already identified devices is satisfactory, the user can stop the further process and add just the found devices to the table by pressing the Finish button.



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FCU Updater v2.5.1					>
New Project Quen Proj Project Name: Project 2 Protocol: Modbus RTU Path: C:\	lect	50X	Console Downlo	ad Latest Himwares	About
Select Outdated Devices	Select All Devices	Find Modules S Start Address	Stop Address	×	VUpload/Download Wizard
Checked MAC Address	Device BACnet Name ID	Applic Status	255	up	Start Transmission Stop Transmission
		Find	Cancel		Transmission Settings Discover Devices
					Add Device Remove Device
					NV Actions Reset Devices
					Default Settings

Figure 21. Discovering devices in the Modbus protocol

		Disco	over						_		×
											1
						Discover	red Devices: 0	)			
					Fi	ìnish		Cancel			
					Fig	gure 22. Dis	scovering p	process			
FCU Up	dater v2.5.1						0.				- 🗆 X
New	Project	Open Pr	roject		SOX	(	Console	Download Latest Firmwares	Ał	oout	]
Project N Protocol:	Name: Proj : Modbus F	ect 2 RTU									
Project M Protocol: Path: C:\ Select	Name: Proj : Modbus f t Outdated E	ect 2 RTU	Select All	Devices	Clear	r Selection				/	
Project M Protocol: Path: C:\ Select	Name: Proj : Modbus F t Outdated [	ect 2 RTU	Select All	Devices	Clear Selected D	r Selection evices: 0\2				<	Jpload/Download Wizard
Project N Protocol: Path: C:\ Select	Name: Proj : Modbus F t Outdated E Checked	ect 2 RTU Devices	Select All Device Name	Devices BACnet ID	Clear Selected D Application Status	r Selection levices: 0\2 Firmware Version	Firmware Status	Available Backup			Jpload/Download Wizard
Project N Protocol: Path: C:\ Select	Name: Proj : Modbus F t Outdated E Checked	ect 2 RTU Devices MAC Address 1	Select All Device Name iSMA-B-FCU	Devices BACnet ID 826001	Clear Selected Di Application Status OK	r Selection levices: 0\2 Firmware Version 2.3	Firmware Status OFFLINE	Available Backup N/A			Jpload/Download Wizard Start Transmission
Project N Protocol: Path: C:\ Select	Vame : Proj : Modbus F t Outdated D Checked	ect 2 RTU Devices	Select All Device Name iSMA-B-FCU iSMA-B-FCU	Devices BACnet ID 826001 826007	Clear Selected Do Application Status OK OK	r Selection levices: 0\2 Firmware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A			Jpload/Download Wizard Start Transmission Stop Transmission
Project N Protocol: Path: C:\ Select	Name: Proj : Modbus F t Outdated D Checked	ect 2 RTU Devices MAC Address 1 7	Select All Device Name iSMA-B-FCU iSMA-B-FCU	Devices BACnet ID 826001 826007	Clear Selected Dr Application Status OK OK	r Selection levices: 0\2 Fimware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A			Jpload/Download Wizard Start Transmission Stop Transmission Transmission Settings
Project N Protocol: Path: C:\ Select	Name: Proj Modbus F t Outdated D Checked	ect 2 RTU Devices MAC Address 1 7	Select All Device Name iSMA-B-FCU iSMA-B-FCU	Devices BACnet ID 826001 826007	Clear Selected D Application Status OK OK	r Selection levices: 0\2 Firmware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A		~	Jpload/Download Wizard Start Transmission Stop Transmission Transmission Settings Discover Devices
Project N Protocol: Path: C:\ Select	Name: Proj Modbus F t Outdated D Checked	ect 2 RTU Devices	Select All Device Name iSMA-B-FCU iSMA-B-FCU	Devices BACnet ID 826001 826007	Clear Selected D Application Status OK OK	r Selection evices: 0\2 Firmware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A			Upload/Download Wizard Start Transmission Stop Transmission Transmission Settings Discover Devices Add Device
Project N Protocol: 2 <sup>a</sup> th: C:\ Select	Vame: Proj : Modbus F t Outdated D Checked	ect 2 RTU Devices MAC Address 1 7	Select All Device Name iSMA-B-FCU iSMA-B-FCU	BACnet ID 826001 826007	Clear Selected D Application Status OK OK	r Selection levices: 0\2 Firmware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A			Upload/Download Wizard Start Transmission Stop Transmission Transmission Settings Discover Devices Add Device Remove Device
Project N Protocol 2rath: C:\ Select	Vame: Proj : Modbus F t Outdated D Checked	ect 2 RTU Devices MAC Address 1 7	Select All Device Name iSMA-B-FCU iSMA-B-FCU	BACnet ID 826001 826007	Clear Selected D Application Status OK OK	r Selection levices: 0\2 Fimware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A			Jpload/Download Wizard Start Transmission Stop Transmission Transmission Settings Discover Devices Add Device Remove Device NV Actions
Project N Protocol: ath: C:\ Select	Name: Proj Modbus F t Outdated D Checked	ect 2 RTU Devices	Select All Device Name iSMA-B-FCU iSMA-B-FCU	Devices BACnet ID 826001 826007	Clear Selected Do Application Status OK OK	r Selection levices: 0\2 Fimware Version 2.3 2.1	Firmware Status OFFLINE OUTDATED	Available Backup N/A N/A			Jpload/Download Wizard Start Transmission Stop Transmission Transmission Settings Discover Devices Add Device Remove Device NV Actions Reset Devices

Figure 23. Discovered devices in the Modbus protocol

## 7.2 Discovering Devices for BACnet

In the discovering process for the BACnet protocol, regardless whether devices are connected directly to the MS/TP network or discovered with the BACnet IP gateway, it is required to define the timeout value. The user is asked to set the timeout in the Timeout field in seconds to guarantee enough time to find all devices on the BACnet bus. Choosing the correct value depends on the networks baud rate (inversely proportionally) and the number of devices (proportionally) connected to the BACnet bus.

Press the OK button to run the identification process. During this process, the number of already detected devices is shown at the bottom of the dialog box. It is possible to abort this process without adding any devices to the table in the project by pressing the Cancel button. If the number of already identified devices is satisfactory, the user can stop the further process and add the found devices only to the table by pressing the Finish button.

New Project Open P	roject	S	ox (	onsole Download L	atest Firmwares	About	
	.,,						
iject Name: Project 5 itocol: BACnet MSTP							
h: C:\							
Select Outdated Devices		Ci	ear Selection		_	$\sim$	
		😁 MS	TP Timeout	—	<		
Checked MAC Address	Device BACnet Name ID	App Star	Timeour	in seconds	,		
			50				Start Transmission
			014				Transmission
			UK	Cancel			Transmission Settings
							Add Device
							Remove Device
							Reset Devices
							Default Settings

Figure 24. Discovering devices in the BACnet protocol

Discover		_	$\times$
	Discovered Devices: 0		
	Finish Cancel		

Figure 25. Discovering process

**Note:** If all devices are not found after the first scanning process is complete, increase the timeout value. If some missing controllers are still found, add the missing devices manually by pressing the Add Device button. The procedure of adding the devices manually is described in section Adding and removing devices manually.

## 7.3 Adding and Removing Devices Manually

Adding the device to the table or removing it allows a manual manipulation. Both functions (adding and removing) can be used either online or offline even without starting the transmission. This approach allows the user to edit the list of devices on any project before arriving on the site.

The discovering devices function together with adding and removing option helps the user to build a virtual list of all physical devices installed on the Modbus or BACnet network.

Pro FC	U Updater v2.5.1									- 0	×
Proj Prol Path	New Project ject Name: Proj tocol: Modbus I i: C:\	Open I ect Name RTU	Project 1		SOX		Console	Download Latest Firmwares	About		
	Select Outdated [	Devices	Select All	Devices	Clea	r Selection	N/A		~		
					Selected D	evices: 0\3					
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup			
•		2	iSMA-B-FCU	826927		0.0	OFFLINE	N/A	~		
		3	iSMA-B-FCU	826003		0.0	OFFLINE	N/A	$\sim$	Stop Transmission	
		7	iSMA-B-FCU	826007		0.0	OFFLINE	N/A	$\sim$	Transmission Settings	
										Discover Devices	
										Remove Device	
										Reset Devices	
										Default Settings	

Figure 26. Adding a device manually

Adding new device varies depending on the type of connection chosen for the project. Both protocol types ask for unique device identification on the bus. In the case of Modbus, the Modbus address (MAC address filed) is required but in BACnet, the BACnet ID is needed. To simplify the process, the system automatically calculates and gives proposition of the BACnet ID based on the typed MAC Address assuming that BACnet net is built with the default 82600 subnet (provided by the BACnet organisation to all iSMA CONTROLLI. devices).

Add Device		—		×
MAC Address	1			
BACnet ID	826001			
ОК		Cance	I	
				.:

Figure 27. Adding a Modbus device manually



Add Device		_	$\times$
MAC Address	1		
BACnet ID	826001		
ОК	C	Cancel	

Figure 28. Adding a BACnet device manually

Removing devices from the project allows to select one or more devices and remove them by pressing the Remove Device button. The FCU Updater requires confirmation before removing anything.

Ne <sup>r</sup> oject	w Project Name: Proj	Open F	Project		SOX Console Download Latest Firmwares About	
otoc th: C:	ol: Modbus	RTU				
Sel	ect Outdated [	Devices	Select All	Devices	Clear Selection N/A 🗸	
					Selected Devices: 3\3 Upload/Download Wiz	ard
	Checked	MAC Address	Device Name	BACnet ID	Remove	
		2	iSMA-B-FCU	826927	Start Transmission	
		3	iSMA-B-FCU	826003	Are you sure to remove 3 selected devices from list?	
		7	iSMA-B-FCU	826007	Transmission Setting	s
					Yes No Discover Devices	
					Add Device	
					Remove Device	
					NV Actions	
					Reset Devices	

Figure 29. Removing a device manually

It is possible to add the device to the list automatically (extend the list of devices) as soon as the physical unit is connected to the FCU Updater directly by the cable. This feature is convenient if there is the controller that is not yet attached to the bus, but the user can easily connect USB cable to it. The next chapter describes this process in more detail.



## 8 iSMA Modbus Tunnel

The iSMA Modbus Tunnel module, designed for Niagara driven controllers, enables establishing communication between the FCU Updater and iSMA-B-FCU devices on the Modbus network through a master controller, e.g., the iSMA-B-MAC36NL controller. The master controller acts as a gateway, and enables to establish all FCU Updater operations on iSMA-B-FCU devices, which are not directly connected to the PC. The communication with the gateway device is established with TCP connection, and the iSMA Modbus Tunnel enables to transfer data to iSMA-B-FCU devices with RS485 connection.

ModbusAsyncNetwork	iSMAModbusTunnel		×
Property Sheet			
iSMAModbusTunnel (Isma	Modbus Tunnel)		
Status	{ok}		
Fault Cause			
Enabled	🔵 true 🗾		
🔻 َ Port	502 tcp		
Public Server Port	502	[1-65535]	
Ip Protocol	Тср		
Port C O M	COM1		
Baud Rate	Baud _115200		
Data Bits	Data Bits8 🗢		
Stop Bits	Stop Bits1 🔍		
Parity Bits	None -		
Retry Count	3	1-10]	
Rs Timeout	5000 n	ns [50 - max]	
Send Modbus Errors	🔵 true 🔽		
		C Refresh	

Figure 30. The iSMA Modbus Tunnel module

## 8.1 iSMA Modbus Tunnel Configuration

Firstly, the iSMA Modbus Tunnel module has to be added to the Services in the station configured for the master controller.





Figure 31. The iSMA Modbus Tunnel added to a station

In order to start the FCU Updater communication with the FCU device(s), using the iSMA Modbus Tunnel, follow the below configuration steps:

**Step 1:** The iSMA Modbus Tunnel establishes communication with FCU devices connection to the Modbus network with the COM1 port. In order to set up an uninterrupted communication, any Modbus network enabled on the master controller's station has to be switched off. The COM1 port cannot combine two communication channels at once.



😁 ModbusAsyncNetwork	dbusTunnel	×						
Property Sheet								
ModbusAsyncNetwork (Modbus Async Network)								
Status	(disabled)							
Enabled	🔵 false 🔍							
Fault Cause								
Health	Ok [2 mrz 2021 10:34 CET]							
Alarm Source Info	Alarm Source Info							
Monitor	Ping Monitor							
X Tuning Policies	Tuning Policy Map							
Poll Scheduler	Basic Poll Scheduler							
油 Retry Count	1							
Response Timeout	+00000h 00m 01.000s							
🗎 Float Byte Order	Order3210 -							
🗎 Long Byte Order	Order3210 💌							
🕥 Use Preset Multiple Register	🛑 false 🔍							
Use Force Multiple Coil	🛑 false 🔍							
Max Fails Until Device Down	2 [0-max]							
🗎 Inter Message Delay	00000h 00m 00.0008 궠 [0ms-1second]							
🕨 🌞 Serial Port Config	COM1, 115200, 8, 1, None							
Modbus Data Mode	Rtu 🔹							
Sniffer Mode	🛑 false 🔍							
🗎 Rtu Sniffer Mode Buffer Size	8 [1-max]							
Modbus Async Device1	Modbus\$20Async\$20Device1[1]							
	C Refresh							

Figure 32. The ModbusAsyncNetwork disabled on the iSMA-B-MAC39NL controller

**Step 2:** Go to the iSMA Modbus Tunnel property sheet, and enable the module. In case the Modbus network (or any other network operating on the COM1 port) has not been switched off, as indicated in the step 1, the iSMA Modbus Tunnel shows the Fault status and the Fault Cause indicates the COM1 port is busy.

Step 3: Set the communication parameters for the iSMA Modbus Tunnel:

- Port: check the TCP port number;
- · Baud Rate: check the baud rate value;
- Data Bits, Stop Bits, Parity Bits: check the settings for Modbus frame.



Figure 33. Communication parameters for the iSMA Modbus Tunnel

## 8.2 Using FCU Updater with iSMA Modbus Tunnel

Once the iSMA Modbus Tunnel is properly configured, it is ready to handle communication between the FCU Updater software and the FCU devices on the Modbus network. In order to establish the communication, follow the below steps:

Step 1: Open the FCU Updater software.

**Step 2:** Create a new project (or open the existing one if the iSMA Modbus Tunnel has been already used).

New Project		- 0
	COM Port	COM1 ~
O Modbus RTU	Baudrate	115200 ~
	Parity Bits	None $\sim$
BACnet MSTP	Software BACnet ID	0
0	Gateway IP Adress	192.168.1.123
	Port Number	502
ModbusTCP Gateway	IP Adapter	Intel(R) Ethemet Connection (4) I219-LM (192.168.1.51)
	Timeout	8000
	BACnet File Transfer Speed	Slow
<ul> <li>BACnetIP Gateway</li> </ul>	Automatic Backups	Enabled
Name Project Name		
Hane		
Location C:\Users\amost	owik\Documents\FCU Updater	Browse
	OK	Cancel
	UK	Calife

Figure 34. Creating a new project for the iSMA Modbus Tunnel

- Select the Modbus TCP Gateway option;
- Make sure that the communication parameters correspond to the parameters set in the iSMA Modbus Tunnel module:
  - Baud rate;
  - Gateway IP Address: insert the IP address of the master controller;
  - Port number.
- Insert the project name and file location as appropriate.

These settings may also be altered later in the Transmission Settings dialog window.

🚭 Change Transmission Settings – 🗆 🗙							
	COM Port	COM1 ~					
Modbus RTU	Baudrate	115200 ~					
	Parity Bits	None ~					
BACnet MSTP	Software BACnet ID	0					
0.000	Gateway IP Adress	192.168.1.123					
	Port Number	502					
ModbusTCP Gateway	IP Adapter	Intel(R) Ethemet Connection (4) I219-LM $~(192.168.1.51)~{}^{<}$					
	Timeout	8000					
	BACnet File Transfer Speed	Slow 🗸					
<ul> <li>BACnetiP Gateway</li> </ul>	Automatic Backups	Disabled					
	OK	Cancel					

Figure 35. The Transmission Setting dialog window

Step 3: Click the Start Transmission option.

**Step 4:** Select the Add Device or Discover Devices option. In the Add Device option, set the exact MAC address of the FCU device on the Modbus network (this option allows to add devices one by one). In the Discover Devices option, set the Modbus addresses range of the FCU devices on the Modbus network (this option allows to discover all devices on the network at once).

New	Project	Open P	Project		SOX	Console	Download Late	st Firmwares	About	
ject toco	Name:iSM I: Modbus	AModbus 1 RTU	<b>Funnel</b>							
1: C:\										
Sele	ct Outdated [	Devices	Select All	Devices	Add Device		<u> </u>	<	$\sim$	
										Upload/Download Wizard
_	Checked	MAC	Device	BACnet	MAC Address	1				
		Address 2	iSMA-B-FCU	826927	-				~	Start Transmission
		-			BACnet ID	826001				Stop Transmission
										Transmission Settings
					ОК	(	Cancel			
										Add Device
										Remove Device
										NV Actions
										Reset Devices

#### Figure 36. The Add Device dialog window

**Step 5:** Once the devices on the Modbus network are added in the FCU Updater and in the online status, the communication with iSMA Modbus Tunnel is set properly, and all FCU Updater's operations are available to be established on checked devices.

Update Options	×						
International states and loss and							
<ul> <li>Upload timware and keep application.</li> </ul>							
<ul> <li>Upload firmware and default application.</li> </ul>							
<ul> <li>Upload custom application (and firmware if outdated).</li> </ul>							
O Restore backup to devices.							
O Backup applications from devices.							
OK Cancel							

Figure 37. Option available in the Upload/Download Wizard

**Step 6:** In order to finish the communication with the iSMA Modbus Tunnel, stop the transmission in the FCU Updater, disable the iSMA Modbus Tunnel module in the master controllers station, and enable any network previously switched off on the COM1 port.



## 9 List of Devices with List of Errors

The main window of the FCU Updater shows the table with lists of devices. The list represents the physical devices collected either by using the discovery function or manually by adding device option in an opened project. Each row in the table represents one physical device.

The table shows the following information for each instrument:

- · MAC address: address set inside the device;
- Device Name: type of device;
- BACnet ID: BACnet ID address for BACnet network;
- Application Status: current status of running application on the controller (the following are available: ANY ERROR (see explanation bellow), N/A, OK);
- Firmware Version: firmware version running on the device;
- Firmware Status: firmware status (the following are available: offline, online, outdated, not compatible, bootloader, USB);
- Available Backup: backup files already stored in the project.

ANY ERROR: The FCU Updater from version 2.1.1 can read the Application Status from ithe SMA-B-FCU controller starting from firmware version 1.4.

From now, it is possible to see if the application (app) in the controller is running without any issue even though the controller is online. The Application State shows the current state of SVM (Sedona Virtual Machine) including details information related to bootstrap, image, system, application, component and runtime errors.

Below, there is a full list of possible errors (ANY ERROR) getting from Modbus register 99 or BACnet device property 5002:

Group	Туре	Code
iC	INIT	65535
Ok	ОК	0
Non-recoverable: Bootstrap	MALLOC IMAGE	1
	MALLOC STACK	2
	MALLOC STATIC DATA	3
	INPUT FILE NOT FOUND	4
	CANNOT READ INPUT FILE	5
Non-recoverable: Bad Image	BAD IMAGE MAGIC	6
	BAD IMAGE VERSION	7
	BAD IMAGE BLOCK SIZE	8
	BAD IMAGE REF SIZE	9
	BAD IMAGE CODE SIZE	10

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Non-recoverable: Runtime Errors	UNKNOWN OPCODE	11
	MISSING NATIVE	12
Non-recoverable: Sys	INVALID ARGS	40
	CANNOT INIT APP	41
Non-recoverable: App	CANNOT OPEN FILE	42
	INVALID MAGIC	43
	INVALID VERSION	44
	INVALID SCHEMA	45
	UNEXPECTED EOF	46
	INVALID KIT ID	47
	INVALID TYPE ID	48
	CANNOT MALLOC	49
	CANNOT INSERT	50
	CANNOT LOAD LINK	51
	INVALID APP END MARKER	52
	NO PLATFORM SERVICE	53
	BAD PLATFORM SERVICE	54
Non-recoverable: Component	INVALID COMP END MARKER	60
	NAME TOO LONG	61
Recoverable: Runtime Errors	NULL_POINTER	100
	STACK_OVERFLOW	101
	INVALID_METHOD_PARAMS	102
Special Codes	YIELD	253
	RESTART	254
	HIBERNATE	255
	Max. input frequency	100 Hz

Table 2. List of errors

For better visualization, each row in the table changes its background color following the controllers application status, firmware status and connection type. The colors meanings are:

• gray-offline,

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- white-online,
- orange–outdated,
- yellow–not compatible,
- red-bootloader or any error,
- green–USB direct connection.

Selected Devices: 1\3									
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Fimware Status	Available Backup	
۶.		1	iSMA-B-FCU	826001		BOOT 1.3	BOOTLOADER	Backup_20180427_133349_Before	~
		2	iSMA-B-FCU	826002	N/A	1.3	OUTDATED	Backup_20170907_105541_After	~
		3	ISMA-B-FCU	826003		1.3	OFFLINE	Backup_20170907_105541_After	~

Figure 38. List of devices



## **10 Direct USB Connection to Device**

Each iSMA-B-FCU controller and iSMA-B-LP/Touch Point panel has one mini USB type B available on its board, which allows direct connection to a PC with the FCU Updater running. This USB connection automatically configures the communication COM port on the PC and enables adequate functions on the FCU Updater.

**Note:** With USB cable connected to mini USB slot on the device it is not possible to operate on any other device from the list except for the one automatically recognized as connected to the PC and marked with green color (see the image below).

After selecting a marked device, available functions are as follows:

- upload/download,
- reset,
- set to default,
- open console,
- run SOX driver.

Nev	w Project	Open P	roject	[	SOX	Cons	ole Dov	vnload Latest Firmwares	About	
oject otoco th: C:'	Name: Proj ol: Modbus F	ect 1 RTU								
Sele	ect Outdated E	Devices	Select All Devic	es	Clear Sele	ction			$\sim$	
					Selected Devices	s: 0\3				Upload/Download Wizard
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup		
		1	iSMA-B-FCU	826001		2.3	OFFLINE	N/A	~	Start Transmission
		2	iSMA-B-FCU	826927		0.0	OFFLINE	N/A	~	Stop Transmission
		7	iSMA-B-FCU - USB	826007	ОК	2.1	OUTDATED	N/A	~	Transmission Settings
										Discover Devices
										Add Device
										Remove Device
										NV Actions
										Reset Devices

Figure 39. List with direct connections to devices with a USB cable

All mentioned functions are described in detail in the following parts of this manual.

**Note:** Direct connection of the device by USB cable adds this controller automatically to the projects list for the future use, see the picture above with added iSMA-B-FCU controller. Please note that, after disconnecting the USB cable, it is necessary to restart the connection with the bus by pressing the Start Transmission button.

**Note:** Only the device with the unique address can be added to the list. Before connecting any devices by USB, please check that there is no object on the list with the same address as the unit to be connected.

## **11 Non-volatile Actions**

#### Warning!

Available from the 2.3 FCU firmware version and 2.5.1 FCU Updater version.

The FCU Updater allows to perform actions to manage the NV (non-volatile) values of components. The NV components are components, which value can be recorded in the device's EEPROM non-volatile memory. Whenever the device is restarted or the power is down, the values of NV components remain saved.

Since the values of components are not stored in a Sedona application itself, but in the non-volatile memory of the device, when the application is copied between two devices, output values are not saved and will assume the values stored in the local EEPROM memory. To copy NV components to another device along with their values (e.g., setpoint), use non-volatile actions, which allow for:

- copying values of NV components as default values in the FCU default application;
- copying values from default values in the FCU default application to NV components;
- · copying values from NV components to User slot values;
- copying values from the User slot to NV components;
- setting NV components in the auto mode.

Select Non Volatile Action								
<b>.</b>								
<ul> <li>Copy values from NV to default</li> </ul>								
Copy values from default to NV								
○ Copy values from NV to User								
○ Copy values from User to NV								
◯ Set NV in Auto								
Ok	Cancel							

In particular, the NV actions in the FCU Updater perform the following operations:

- Copy values from NV to default: copies values from the Out slot to the Default slot in all NV components;
- Copy values from default to NV: copies values from the Default slot to the Out slot in all NV components;
- Copy values from NV to User: copies values from the Out slot to the User slot in all NV components;
- Copy values from User to NV: copies values from the User slot to the Out slot in all NV components;
- Set NV in Auto: sets all NV components in the auto mode.

New Project Open Project	SOX Console Download Latest Firmwares	About	
o <mark>ject Name: Project Name</mark> tocol: Modbus RTU h: C:∖Users\tjanicki\Documents	Select Non Volatile Action		
Select Outdated Devices Select All Devi	Copy values from NV to default	~	Upload/Download Wizard
Checked MAC Address Device Name	Copy values from default to NV     Copy values from NV to User	~	Start Transmission
	Copy values from User to NV     Set NV in Auto		Stop Transmission Transmission Settings
	Ok		Discover Devices
	d		Add Device Remove Device
			NV Actions
			Reset Devices

Figure 40. Using the NV action in the FCU Updater



## 12 Upload and Download

The Upload and Download functions are available under Upload/Download Wizard. Before pressing this button, it is necessary to start transmission and to select device or devices. The selection can be done by checking the box at the beginning of each tables row or by using filter buttons (Select Outdated, Select All Devices, Clear Selection) at the top of the table.

Upload/Download Wizard offers the following options:

- · Upload firmware and keep application,
- · Upload firmware and default application,
- Upload custom application and firmware (if outdated),
- Restore backup to devices,
- Backup application from devices.

reg FCU U	Jpdater v2.5.1						- 🗆 X
Net	w Project	Open F	Project		SOX Console Download Latest Firmwares	About	
Project Protoc Path: C:	t Name: Proj ol: Modbus I \	ect 1 RTU			Update Options ×		
Sel	ect Outdated [	Devices	Select All Devic	ces	Upload firmware and keep application.     Upload firmware and default application.	~	Upload/Download Wizard
•	Checked	MAC Address 1 2 7	Device Name iSMA-B-FCU iSMA-B-FCU ISMA-B-FCU - USB	BA0 ID 8260 8260 8260	Upload custom application (and firmware if outdated).  Restore backup to devices.  Backup applications from devices.	× × ×	Start Transmission Stop Transmission Transmission Settings
					OK Cancel		Discover Devices Add Device Remove Device
							NV Actions Reset Devices
							Default Settings

Figure 41. Upload and download options

All upload options are sensitive because they transfer data from a local PC to the external device, and some of them override firmware and application on the controller. Therefore, the FCU updater always does a safety backup of the existing application in the controller before and after the uploading process. Moreover, it recompiles the application with dedicated firmware locally on the PC before uploading to the controller. This approach guarantees that in the case of a failure the user can restore the old program with its firmware and run the previous version of the application on the controller smoothly.

#### The upload option has three variations:

 Upload firmware and keep application: only the firmware and kits are uploaded, the application remains the same and is not overridden. This option updates the firmware to the latest firmware version downloaded from the iSMA CONTROLLI server only after a successful recompilation. It takes the existing application from the controller and recompiles it with the newest manifests before replacing the old firmware on the controller. This approach guarantees smooth operation of the current application with the newest firmware.  Upload firmware and default application: firmware, kits and default application are uploaded. The present application on the device is overridden. This option uploads the newest version of the default application together with the newest firmware (\*) available on the iSMA CONTROLLI It is recommended to use this option if the user does not have the custom application. System recompiles the downloaded application with the newest firmware, and if successful, it uploads the firmware and the default application to the device.

#### Warning!

This option clears the existing application.

 Upload custom application, and firmware (if outdated): firmware, kits and custom application are uploaded. The system asks for the custom application to upload to the device. The current application on the controller <u>is overridden</u>. If the firmware on the device is outdated, this option downloads (\*) the latest firmware version from the iSMA CONTROLLI server. If the firmware on the controller is not outdated, this option keeps the current firmware version. In both cases, after verification of the firmware, the system recompiles the firmware with the custom application. If the recompilation finishes successfully, the FCU Updater uploads the custom application to the device followed by the firmware.

#### Warning!

This option clears the existing application.

(\*) - During any upload, the system will not check what is available on the server. The FCU Updater transfers the latest and compatible firmware that is stored locally on the PC. The user must manually download the latest firmware version from the iSMA CONTROLLI server by pressing the Download Latest Firmware button after the FCU Updater is run.

Last two options are related to backup operations:

• Restore backup to devices: restores the older backup (application with its firmware) to the controller. The stored data for restoring process is chosen from the available backups for each device individually by selecting the backup from the drop-down list in the table. If the system makes the backup, either automatically or by the user, the FCU Updater creates a new folder in the project folder and names it as Backup\_xxxxxxxxx, where xx xxxxxxxx represents the timestamp. This folder contains the backups taken at the same time for all the selected devices. The FCU Updater explores all backup folders within the project to find out all backups available for each controller. Results are sorted and presented in the drop-down list for each device individually. Before proceeding to the restore option, the user has to select not only the devices but also choose the backup from the drop-down list for each device individually. There is a general choice (in the table column named: Available Backup) to simplify the selection of backup for all devices. If the controller has no backup made at the time selected by general form, the user should choose any other backup from the devices drop-down list to specify which backup should be used for the restoring process.

#### Warning!

Before restoring a backup, it is necessary to perform the Copy values from NV to default or Copy values from NV to User action. See Non-volatile Actions.

 Backup applications from devices: transfers the application from selected devices to the local PC. First, the FCU Updater creates a backup folder and names it, e.g., as Backup\_xxxxxxxx\_manual, where xxxxxxxx is the current timestamp and postfix manual describes that the user requests it manually. If the system performs the backup automatically, the postfixes are before or after depending on whether the backups have been made before or after the whole process. When the backup process starts out, the system creates a new backup folder to which the applications from each selected devices are transferred. Finally, the FCU Updater updates the drop down lists in the table according to the latest backup.

#### Warning!

Before creating a backup, it is necessary to perform the Copy values from default to NV or Copy values from User to NV action. See Non-volatile Actions.

After running one of the above-mentioned functions, the progress bar window appears on the screen. Additionally, it shows the status of the phase the FCU Updater is performing (backup, upload or restore) and the device number, on which it is being executed. The information varies depending on the protocol and function being performed as shown in the pictures below.

ocol: : C:\	Modbus F	RTU								
C:\										
ielect										
,01000	t Outdated D	evices	Select All Devic	es	Clear Select	tion	Backup_20220517	_132104_Manual	$\sim$	
					Selected Devices:	1\3	Backup_20220517	_132104_Manual		Upload/Download Wizard
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup		
		1	iSMA-B-FCU	826001		2.3	OFFLINE	N/A	~	Start Transmission
		2	iSMA-B-FCU	826927		0.0	OFFLINE	N/A	$\sim$	
		7	iSMA-B-FCU - USB	826007	ОК	2.1	OUTDATED	Backup_20220517_132104_Ma	$\sim$	Transmission Settings
										Add Device
										Remove Device
										NV Actions
										Devel Devices

*Figure 42. Defining backups for restore process* 



Contract Con	—		$\times$
Performing backup from devices.			
Downloading application from device with MAC Address 1 and BACnet ID 826001.		Device	1/4
Cancel			.:
Figure 43. Performing backup on upload			
C Upload	_		×
Uploading firmware with default application to devices.		Phase 2	2/3
Waiting for device with MAC Address 3 and BACnet ID 826003 to enter bootloader.		Device	1/1
Cancel			

Figure 44. Uploading firmware

When the process finishes, the confirmation box pops up showing all phases and devices. The user can view the log to verify if the required job has been executed on all selected devices successfully.

Done		×
?	Process completed. Log saved to project's location. Do you want to view log?	
	Tak Nie	
	Figure 45. Confirmation dialog window upon upload/download	



## **13 Restarting Devices**

Restarting the device should be the first action that user does in case of problems with the controller or application functionality in general. The restarting procedure forces the application to start execution of the program from the beginning and initiates reading raw values for inputs.

Note: It is recommended to restart the application before contacting technical support.

Restarting the selected device or multiple devices by pressing the Reset Devices button sends a special request by the Modbus or BACnet network or by USB (if the controller is connected directly). If the device receives the request, it processes the restart, and the FCU Updater shows the driver status as offline for a moment.

	oponti	ojoci		50X		Insole Dow	Miloau Latest Filmwares ADOUT	
ct Name: Project	1 J							
C:\								
elect Outdated Devi	ces	Select All Device	es	Clear Selec	tion	Backup_20220517	_134456_Manual ~	
				Selected Devices	: 1\1			Upload/Download Wizard
Checked A	AC	Device Name	BACnet	Application	Firmware	Firmware	Available Backup	
	uless	iSMA-B-FCU - USB	826927	OK	2.1	OUTDATED	Backup_20220517_134456_Ma ~	Start Transmission
								Stop Transmission
								Transmission Settings
								Discover Devices
								Add Device
								Remove Device
								NV Actions
								Reset Devices
								THOSE DEVICES

Figure 46. Restarting devices



## **14 Default Settings**

The Default Settings button sets all selected controllers parameters to their initial (default) values. In application, all NV parameters are set to their default values. All communication settings that are not configured by DIP switches are set to their default values as well. For example, RS485 communication parameters are set to the following parameters:

- for the iSMA-B-FCU controller, the COM1 is set to data bits 8, parity bits 0, stop bits -1;
- for the iSMA-B-FCU controller, the COM2 is set to data bits 8, parity bits 0, stop bits 1, baud rate 115200, Modbus protocol type 0.

Note: It is recommended to restore the default settings in following cases:

- the controlled physical object has been replaced,
- the role of controller in the network has been changed in regards to the master-slave configuration,
- the application does not work as presumed and restarting the application with its default parameters could help.

To perform the set to default action, select one device or multiple devices and press the Default Settings button. The FCU Updater sends a special request by the Modbus or BACnet network or by USB (if the controller is connected directly). When the device receives the request, it processes it, and the FCU Updater shows the device status as offline for a moment.

ect Name: Project 1 tocol: Modbus RTU	roject	SUX	Console	Download Latest Himwares	About	
: C:\ Select Outdated Devices	Select All Devices	Clear Selection	Backup_202	20517_134456_Manual	~	Upload/Download Wizar
Checked MAC Address 2	Device Name B SMA-B-FCU - USB 8	This action will set fol Communication parar Inputs and outputs EEPROM Are you sure you wan	lowing settings neters t to continue?	of 1 devices to default:	4456_Ma 🗸	Start Transmission Stop Transmission Transmission Settings
		_		Yes No		Discover Devices Add Device Remove Device
						NV Actions

Figure 47. Default settings



## **15 Connecting FCU Updater to Physical Device or Bus**

The FCU Updater is a software that runs under Windows operating system and transmits data to iSMA-B-FCU controllers or iSMA-B-LP/Touch Point panel. In both cases, the FCU Updater uses a COM port for communication. There are two ways of connecting to the device/s: the direct way by USB cable to only one device or the whole RS485 bus network to multiple devices.

**Note:** The FCU Updater allows for only one type of connection at a time. The user can setup the direct connection by USB cable or make the RS485 connection to the whole network. Parallel connections through the direct USB cable and by the RS485 bus are not allowed.

**Note:** It is not allowed to interrupt any process performed by the FCU Updater, like transferring data to/from device/s by connecting or disconnecting communication cable.

## **15.1 Direct Connection with USB Cable**

Both iSMA-B-FCU controller and the iSMA-B-LP/Touch Point panel have a mini USB slot on the housing. The mini USB slot can be connected to the PC with the FCU Updater software running by the mini USB-USB cable.

After directly connecting the controller or the panel to the PC, the system automatically recognizes the attached device and shows it in the main table assuming a project is already opened. No particular communication settings are required for setting transmission parameters or starting the transmission. The system marked the device in the list with the green background in its line.





Figure 50. Touch Point panel USB connection

**Note**: All available operations included in this manual such as upload, backup, restore, reset and set to default, are only to be executed by the connected device. The user cannot select another controller from the table as long as a direct connection setup is being performed.

**Note**: The direct connection by USB cable can only be setup to one device at the time. To end the direct link simply disconnect the cable. The device being disconnected is automatically added to the list of devices.

Ne	w Project	Open	Project		SOX	0	Console	Download Latest Firmwares About	
ec ec	t Name: Fic tol: Modbur NFCU Updat	oor1 aRTU er∖Projects							
Se	lect Outdated	Devices	Select Al De	rvices	Clear S	election	Backup_20180	427_133349_Before V	
					Selected Devi	ices: 0\1			Upload/Download Wizard
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup	
		1	ISMA-B-FCU - USE	8 826001	ОК	1.4	ONLINE	Backup_20180427_133349_Before ~	Start Transmission
		2	ISMA-B-FCU	826002		1.3	OFFLINE	Backup_20170907_105541_After ~	Stop Transmission
		3	ISMA-B-FCU	826003		1.3	OFFLINE	Backup_20170907_105541_After V	Transmission Settings
									Discover Devices
									Add Device
									Remove Device
									Reset Devices
									Dafa & Satissa

Figure 51. Directly USB connected device (green background)

#### 15.2 Connection to RS485 Bus

Connecting the FCU Updater to the RS485 bus is recommended on a site where all devices are linked together. The RS485 network needs to be connected to the PC with the FCU Updater software running. If the PC is not equipped with the RS485 communication port, a converter is required. iSMA CONTROLLI recommends using iSMA-B-CVT-RS485, sold separately.



Figure 52. An RS485 converter

**Note:** Before connecting the PC to the FCU Updater running on the RS485 network, it is recommended to disconnect a master controller. The next step is to connect the PC via the RS485 converter (if required) and run the FCU Updater. After this, the new project needs to be opened or created. When done, set up all required transmission settings, and the transmission will start. The transmission settings for the Modbus and BACnet protocols are described below.

**Note:** Once operation with the FCU Updater is finished, please remember to disconnect the PC from the RS485 network and reconnect the master unit.

Depending on the chosen protocol, the following transmission settings are required:

For BACnet communication protocol

- COM Port: select the COM port used for the BACnet MS/TP communication, which the RS485 bus is attached to;
- Baud rate: select baud rate for communication;
- Software Device ID: set the BACnet ID of the local PC–it must be different from ones for the other devices connected to BACnet bus;
- BACnet File Transfer Speed: select the file transfer speed; three modes are available: slow, normal, and fast. Depending on the number of the device on the bus and the quality of communication it is possible to select the most appropriate transfer speed to avoid errors during file transfer.

For Modbus communication protocol

- COM Port: select the COM port used for the Modbus RTU communication, which the RS485 bus is attached to;
- Baud rate: select the baud rate for communication;
- Parity Bits: define parity bits; available options: None, Even, Odd.

**Note:** In order to improve the Modbus RTU or BACnet MS/TP communication, which is especially important for the 9600 baud rate, the following settings should be changed in the converter driver (accessed: Device Manager -> USB Serial Port -> Settings - > Advanced):

- Serial enumerator: set to off;
- Delay time: set to 1 ms.



## 16 Manage Bootloader State on Controller

In some circumstances, the controller can get to the state of bootloader. This state can happen if the firmware has not been transferred successfully to the device due to any interruption, like disconnecting transmission cable or power failure. In the bootloader state, the controller can not operate properly, and its application is not executed either. To return the controller to normal operation, the FCU Updater needs to upload the latest firmware without touching the existing application. This process can be achieved by the Modbus or BACnet network or directly by the USB cable. In both cases, the newest firmware will be transferred to the controller in the bootloader state.

CU	Updater v2.1	f.								- 0
N	ew Project	Open	Project		S	50X	Console	Download Latest Firmwares	About	
rojek roto ath: (	col: Modbus	er\Projects								
S	ect Outdated	d Devices	Select /	NI Devices	c	Jear Selection	Backup_20	180427_133349_Before	~	
					Selecte	d Devices: 1\3				Upload/Download Wizard
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup		
•		1	ISMA-B-FCU	826001		800T 1.3	BOOTLOADER	Backup_20180427_133349_E	efore 🗸	Start Transmission
		2	ISMA-B-FCU	826002	N/A	1.3	OUTDATED	Backup_20170907_105541_/	Viter 🗸	Stop Transmission
		3	ISMA-B-FCU	826003		1.3	OFFLINE	Backup_20170907_105541_/	iter 🗸	Transmission Settings
										Discover Devices
										Add Device
										Remove Device
										Remove Device Reset Devices

Figure 53. One of controllers in a bootloader state

If the iSMA-B-FCU controller is connected directly by USB cable, and the FCU Updater recognizes its bootloader state, then the following dialog window appears.

Ne	w Project	Oper	n Project			юx	Console	Download Latest Firmwares	About		
ojec	t Name: Flo	por1									
otoc th: C	NFCU Updat	er\Projects									
Se	lect Outdated	Devices	Select	All Devices	0	lear Selection	Backup_20	180427_133349_Before	~		
					Selecte	d Devices: 1\3				Upload/Download Wizard	1
	Checked	MAC Address	Device Name	BACnet	Application Status	Firmware Version	Firmware Status	Available Backup			
		1	ISMA-B-FCU	826001		BOOT 1.3	BOOTLOADER	Backup_20180427_133349_Before	~	Start Transmission	
		2	ISMA-B-FCU	826002	N/A	1.3	OUTDATED	Backup_20170907_105541_After	~	Stop Transmission	
		3	ISMA-B-FCU	826003		1.3	OFFLINE	Backup_20170907_105541_After	~	Transmission Settings	
			FCU	in bootlo	əder			×			1
										Discover Devices	
					iust have the late	est firmware uplo	der state. aded to work pro	perly.		Add Device	
				app	lication on the	device. Iding the latest f	irmware now will	result		Remove Device	1
				wit	h unpredicted b	ehavior of FCU d	evice, therefore, F	cu			
				Do	you want to up	oad the latest fin	mware now?			Reset Devices	

Figure 54. The FCU Updater recognizes a bootloader state in one controller

Pressing the Yes button starts upload of the latest firmware to the controller to return the controller to normal operation.

Choosing the No button closes the FCU Updater because further work with the controller in the bootloader state will result in unpredicted behaviors, which cannot be properly controlled by the FCU Updater.

## **17 SOX Protocol**

The SOX function allows programming of the iSMA-B-FCU controller online (real-time). The controller must be connected directly via the USB cable as described above. The SOX button is always enabled each time the USB cable is connected directly to the iSMA-B-FCU controller, and, moreover, opening of any project is not required.

FCU U	pdater v2.5.1								- 0	
Nev	/ Project	Open F	roject	(	SOX	Cor	nsole Dow	vnload Latest Firmwares Abo	out	
Project Protoco	Name: Proj I: Modbus I	iect 1 RTU								
Sele	ct Outdated [	Devices	Select All Devic	8	Clear Seler	tion	Backup 20220517	13//56 Manual		
COL			Coloci / W Dovio		Selected Devices	s: 1\3			Upload/Download Wizard	d
	Checked	MAC Address	Device Name	BACnet ID	Application Status	Firmware Version	Firmware Status	Available Backup	]	
		1	iSMA-B-FCU	826001		2.3	OFFLINE	N/A ~	Start Transmission	
•		2	iSMA-B-FCU - USB	826927	ок	2.1	OUTDATED	Backup_20220517_134456_Manu ~	Stop Transmission	
		7	iSMA-B-FCU	826007		2.1	OFFLINE	Backup_20220517_132104_Ma ~	Transmission Settings	
									Discover Devices	
									Add Device	
									Remove Device	
									NV Actions	
									Reset Devices	

Figure 55. Opening the SOX protocol

The SOX button guides the user to the next window, where the SOX protocol can be started by pressing the Begin Communication button. After starting the communication to the connected controller, the user can edit or build the application inside the iSMA-B-FCU controller by using the iSMA Tool software.

The SOX window has the following communication parameters:

- Port: port number (usually 1876) used by SOX protocol;
- Begin Communication button: start SOX communication. It is recommended to open SOX communication with the iSMA-B\_FCU controller before running the WorkPlace software.

Stop Communication button: stop SOX communication.

SOX	_	×
Port		
1876 Basis Communication Star Communication		
		_

Figure 56. The SOX protocol console

**Note**: Only one instance of the SOX Protocol console can be opened at a time. If the SOX button in the main application window is disabled, the SOX Protocol console has been already opened, and probably it is hidden somewhere under other windows on the user's screen.



## **18 Console**

The console allows viewing internal system logs of the directly connected iSMA-B-FCU device. The console can only be used, if the device is connected to the PC directly by the USB cable even without opening any project.

To open the console, connect the iSMA-B-FCU device to the PC using the USB cable as shown above, and press the Console button. The new console window appears listing the iSMA-B-FCU controllers internal logs.

🧐 FCU U	lpdater v2.5.1								- 0	
Nev Project Protoce	w Project : Name: Proj ol: Modbus I	Open P ect 1 RTU	roject	[	SOX	Co	nsole Dow	nload Latest Firmwares About		
Path: C:\ Select Outdated Devices Select All Devices			Clear Selec Selected Devices	tion : 1\3	Backup_20220517_	_134456_Manual 🗸	Upload/Download Wizard			
	Checked	MAC	Device Name	BACnet	Application	Firmware	Firmware	Available Backup		
		1	iSMA-B-FCU	826001	Julua	2.3	OFFLINE	N/A 🗸	Start Transmission	
+		2	iSMA-B-FCU - USB	826927	ок	2.1	OUTDATED	Backup_20220517_134456_Manu ~	Stop Transmission	
		7	iSMA-B-FCU	826007		2.1	OFFLINE	Backup_20220517_132104_Ma 🗸	Transmission Settings	
									Discover Devices Add Device Remove Device NV Actions Reset Devices Devices	

*Figure 57. Opening the console logs* 

Console	_		×
MESSAGE [sox::SoxService] started port=1876 MESSAGE [sys::App] Application starting. file_closed() file_open(app.sab, r) Running SVM in Platform Mode			^
Console log from FCU device.    Time: 2017.07.20 12:33:20    Project: None    Device MAC Address: unknown Cannot run VM (45) ERROR: Cannot load app err=45 file_closed() - ERROR [sys::App] Schema mismatch (checksum): iSMA_AdvancedControl 0xbd256685 != iSMA_AdvancedControl 0xe424258 file_open(app.sab, r) Running SVM in Platform Mode			ĺ
Console log from FCU device.    Time: 2017.07.21 13:29:03    Project: Project Name    Device MAC Address: unknown EEPROM Write NV structure - MESSAGE [sys::App] Application running. - MESSAGE [sys::SoxService] DASP Discovery enabled - MESSAGE [sox::SoxService] started port=1876 - MESSAGE [sys::App] Application starting. (file_closed) file_open(app.sab, r) Running SVM in Platform Mode			
Console log from FCU device.    Time: 2017.08.08 09:36:54    Project: None    Device MAC Address: unknown LOG END.			
			*
		Se	end



**Note**: Only one instance of the console can be opened at a time. If the Console button on main application window is disabled, it is because the console has been already opened and probably it is hidden somewhere under other windows on the user's screen.