SAFECONTROL

Niagara 4 Driver for ESSER
User Guide

SAFECONTROL

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Driver Overview

The SAFECONTROL Driver for Esser is written using Tridium's NDriver Framework, for use in Niagara 4 or later.

The driver provides support for communication with SEI (Serial Esser Interface) using Esser Data Protocol on RS232. The driver was written to conform to the protocol definition provided in the Honeywell document titled Esser Daten Protokoll version 1.7. The driver main purpose is to serve as gateway to essernet® for Tridium Supervisor 4 or JACE8000 stations (and OEM variations i.e. Centra Line, Trend, …).
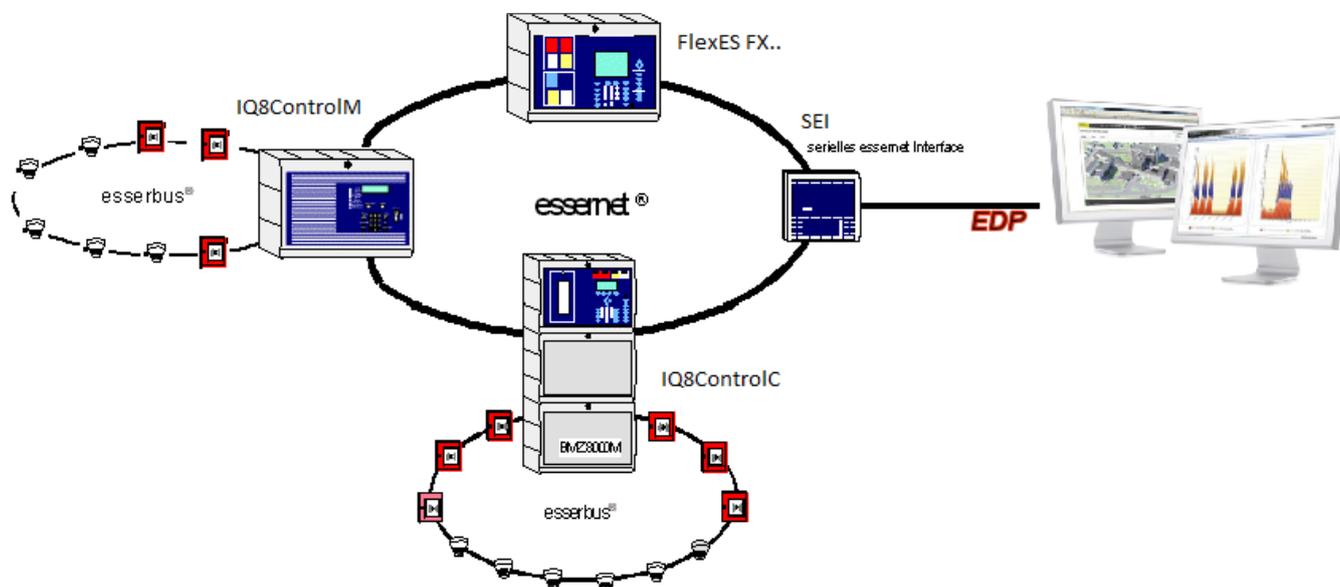
Figure 1: Connection diagram for the ESSER integration

Devices supported by the driver are as follows:

- Fire Panel: FlexES FX series, firmware version 4.3.003 and later
- Fire Panel: IQ8Control series, firmware version 3.10.005 and later
- Serial Essernet Interface (SEI) version 2.03R011 and later

The protocol used by the driver allows you to read various data about Panel, Primary Loop, Detectors, Zones and Output Zones from Fire Panels connected in essernet® as well as send commands to these devices. Each device in essernet can have its corresponding device in Essernet Driver Network, which shows its status and can be controlled via standard actions in the right mouse menu. You do not need to understand deeply the protocol used by this driver to successfully use it. You will need to understand what each point is used for however.

This help is also connected to the objects in Workbench / Coach NX and you can use the "Guide on target" function in the help or right menu to get more information.

Prerequisites for integration

1. Correctly installed modules with the driver, see chapter "***Installation***" for more details.
2. Active license and certificate for the driver on the target platform, see chapter "***Licensing***" for more details.
3. Physical connection between systems. ESSER SEI module must be correctly wired to JACE8000 or RS232/IP converter for Supervisor. See chapter "***Serial connection wiring***" for more details.
4. ***Export file from ESSER*** fire system (software tools8000, export of customer data). Ask ESSER installer company for this file.

Installation

Source files are available for download from SAFECONTROL license web (https://license.safecontrol.cz). Extract the **essernet.zip** archive and copy all included *.jar files to your Niagara modules directory, which is typically **C:\Niagara\Niagara-4.4.xx.xx\modules**.

For correct behaviour it is necessary to install *.jar files on the client platform (Workbench PC) as well as on the target platform (JACE8000 or Supervisor).

Note: Close the Niagara Workbench after inserting all the modules in the folder. Next time you start the Niagara Workbench the driver will be loaded in Niagara Workbench and will be immediately available for use.

Licensing

Driver is license limited by number of connected "Esser Elements". That means by the final number of used Panels, Primary Loops, Detectors, Zones and Output Zones. Demo license is limited up to 90 days and purchased licenses are not time limited.

You can ask for license via SAFECONTROL license web (https://license.safecontrol.cz) or by sending e-mail to sales@safecontrol.cz. Purchased license will be generated via Niagara-Central license web where it will be available for download together with safecontrol.certificate file. You can also download license online in Niagara Workbench from license manager view, see picture bellow:
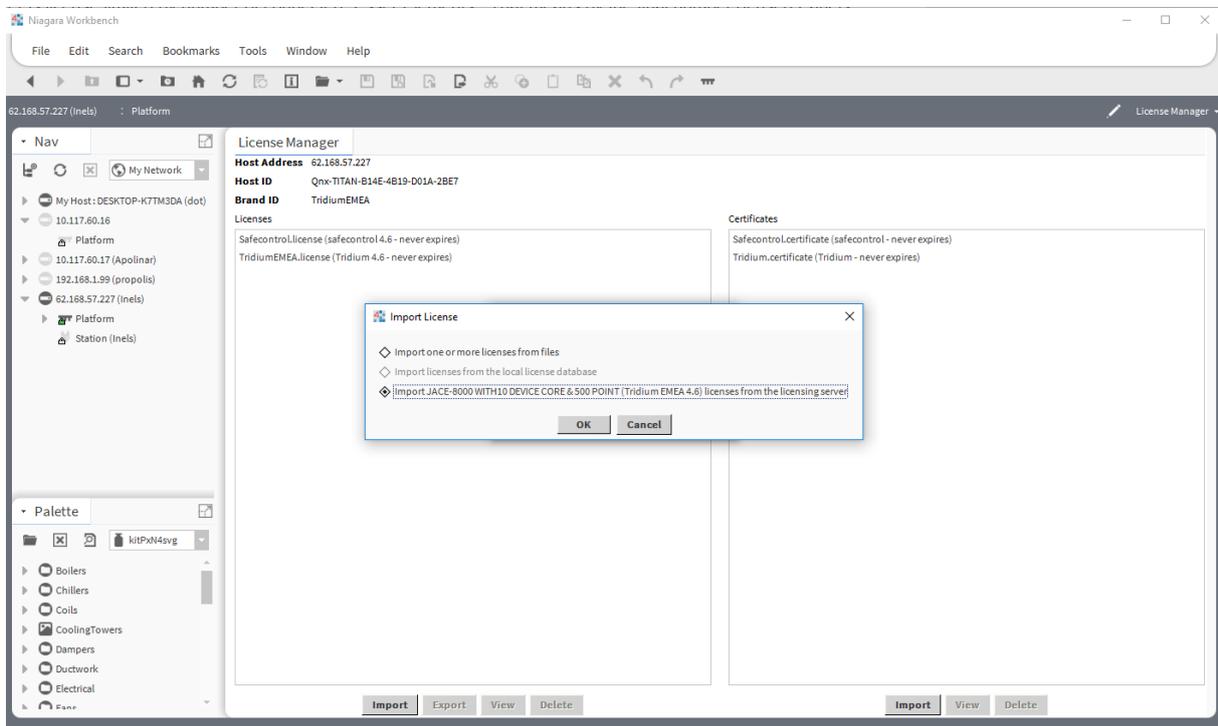
Figure 2: License import via License manager

Serial connection wiring
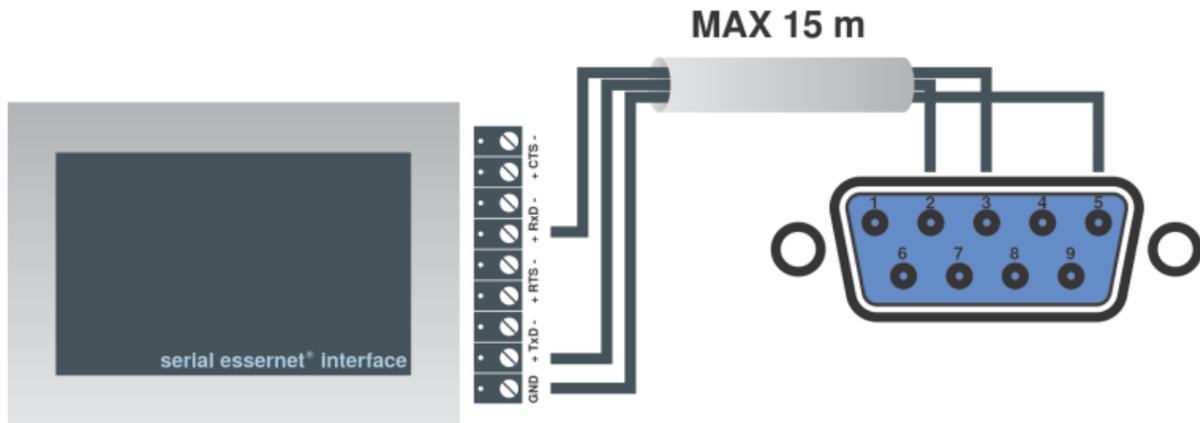
Figure 3: SEI RS232 wiring

DB-9 female connector	SEI PCB terminal	Description
05	GND	Ground
02	TxD+	Transmit data (on SEI PCB)
03	RxD+	Receive data (on SEI PCB)

The line length between the Serial Esser Interface (SEI) and the JACE8000 or RS232/IP converter must not exceed 15 m.

Basic config guide

1. Connect SEI to your JACE 8000 or Tridium Supervisor 4.
2. Add new Esser Network to your Drivers node.
3. Add corresponding CommConfig object from essernet palette to Esser Network:
    - EsserTcpCommConfig if you are using RS232/IP converter.
    - EsserSerialCommConfig if you are connected directly to SEI.
4. Correctly configure CommConfig object added to Esser Network in previous step.
5. Restart your station.
6. Upload the Esser Panel export files (customer data from tools8000) on your station files directory.
7. Open Esser Device Manager and use Discovery button to import devices from your tools8000 export.
8. Add discovered devices to your database.
9. If you want to add more panels, repeat step 7. And 8. with corresponding ID Panel.

For more in-depth help read following chapters.

![SAFECONTROL logo]

Connection

Connecting to Tridium Supervisor 4

Newer computer stations don't usually have serial connection and we solve this via "Serial to ethernet" converter for instance. You may use any kind of this device, but all the development and tests were conducted on Lantronix UDS1100. Other devices may have another communication system implemented and we don't provide support for them.

1. Check the correct wiring of SEI module and RS232/IP converter.
2. Connect the RS232/IP converter to LAN and check the power supply.
3. Continue with settings described in following chapters.
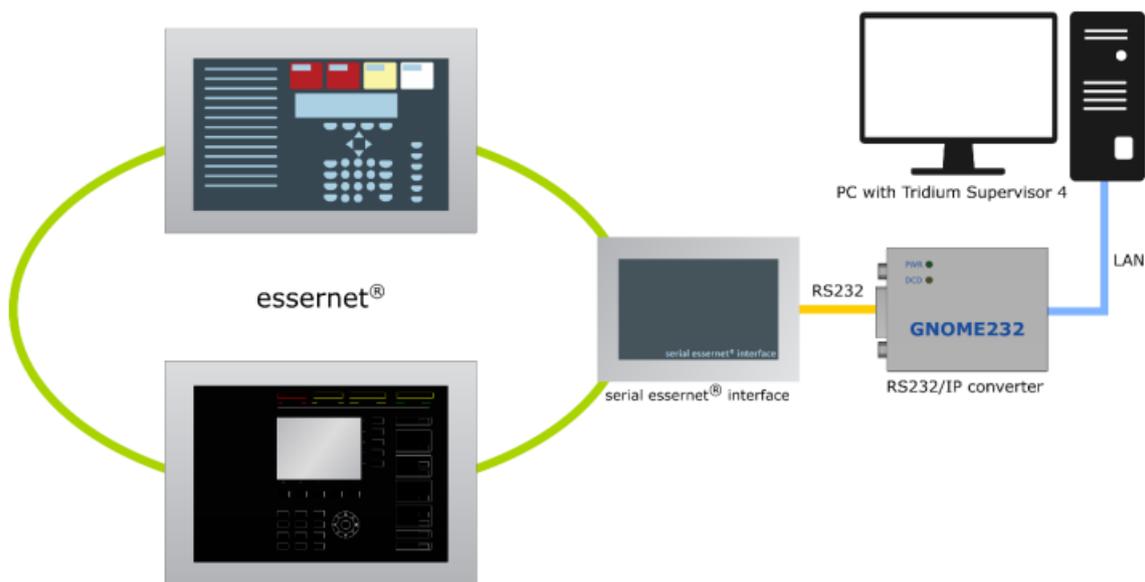
Figure 4: onnecting to Tridium Supervisor 4 via RS232/IP converter

Connection to JACE8000

There are two options how you can connect your JACE8000 to SEI:

- Use "Serial to ethernet" converter same way like for connection with Supervisor PC.
- Use NPB-8000-232 extension module for JACE8000 and connect SEI directly.
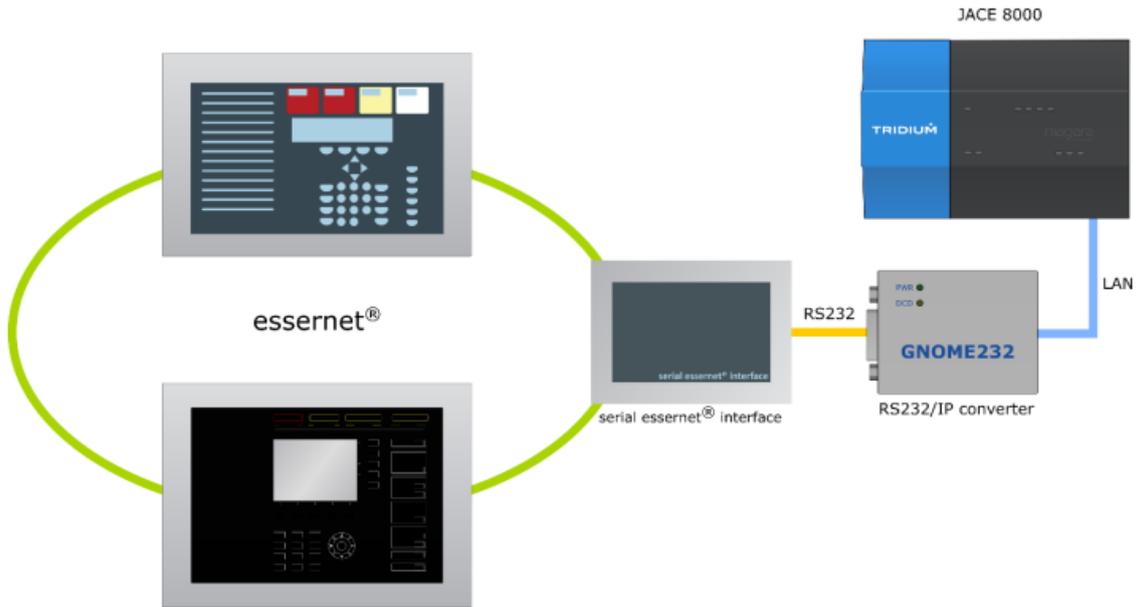
Figure 5: Connecting to JACE 8000 via RS232/IP converter
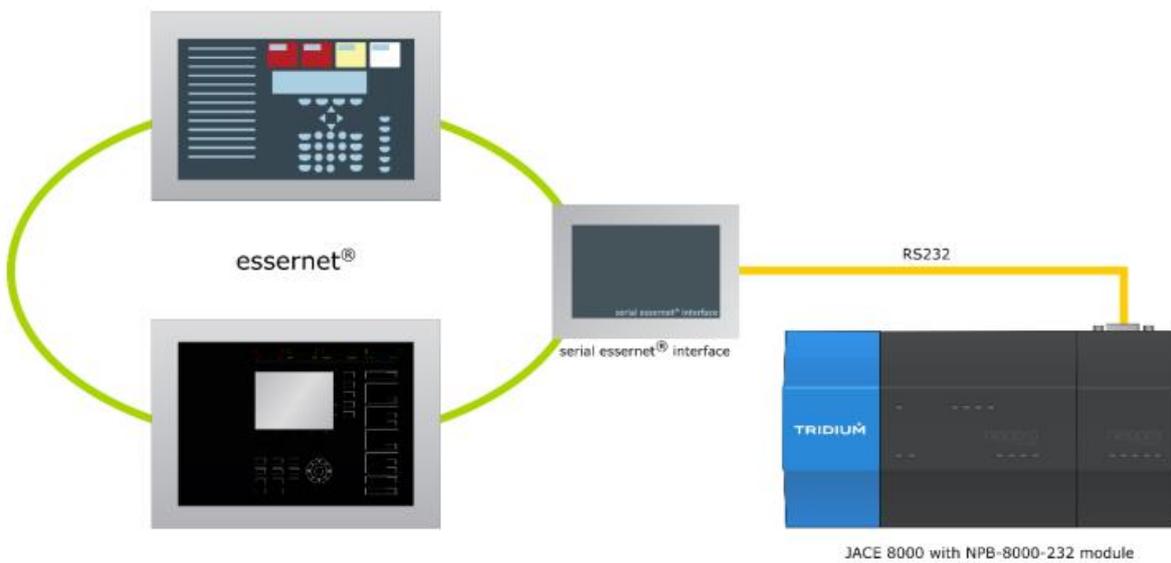
Figure 6: Connecting to JACE 8000 directly via NPB-8000-232 module

Esser Network

Overview

An Esser Network represents interface on Tridium Supervisor 4 or JACE8000 used for communication with SEI through Esser Data Protocol. You can add as many Esser Networks to a station as required.

Adding an Esser Network to your station

To add an Esser Network perform these following steps:

1. Open the station and expand the Nav Device tree in Nav Side Bar.
2. Double click on the Drivers node under your Station.
3. In the Driver Manager window click on the New button.
4. Select Esser Network from the drop-down list and click Ok.
5. Enter a name for the network and click Ok.
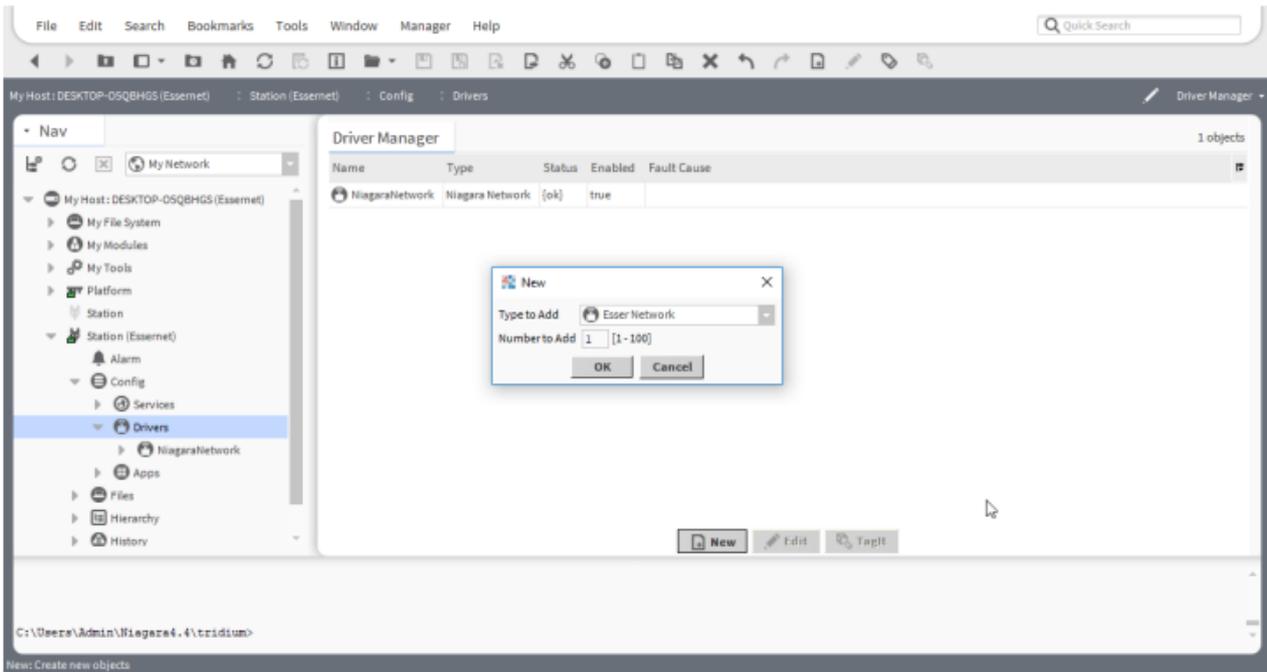
Figure 7: Creating a new Esser network
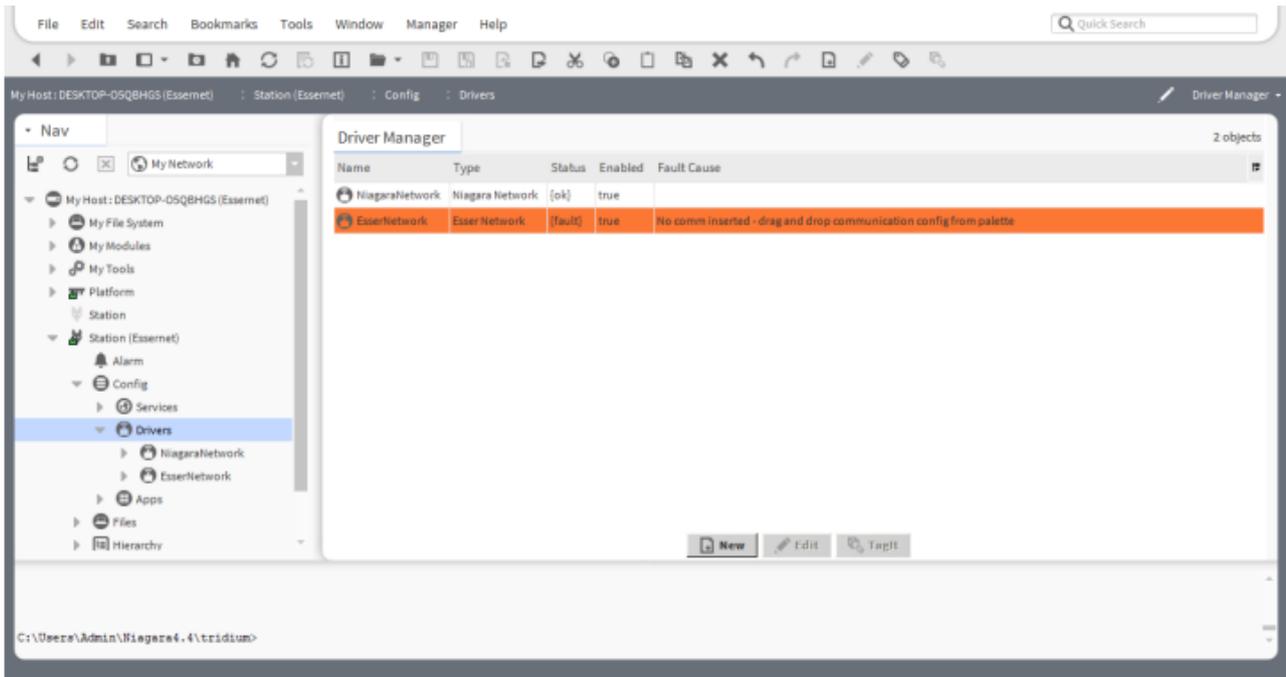
Figure 8: Newly created network does not have CommConfig object assigned yet
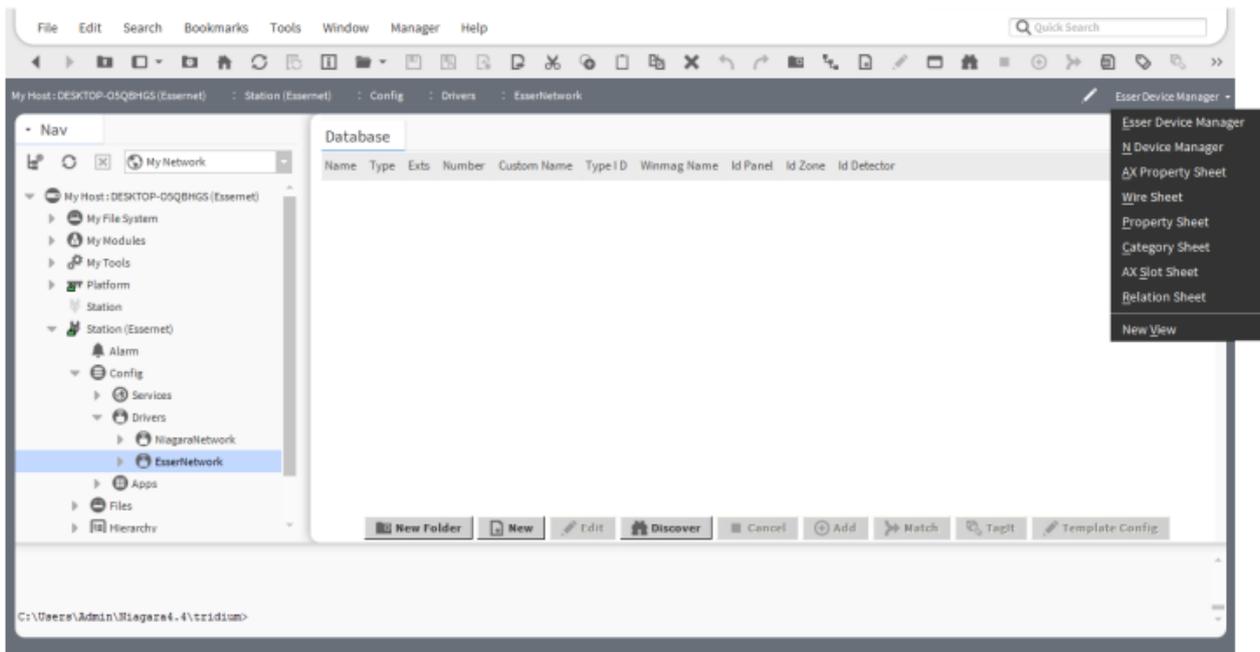
Figure 9: By double clicking Esser network in Driver Manager you will see Esser Device

Proceed by selecting Property Sheet from the top-right menu. This opens up Network settings typical for Niagara 4 framework.

Another approach:

1. Locate the Esser Network in the device manager.
2. Right click on the Esser Network and select Views -> Property Sheet from the context menu.

Configuring connection

If your SEI is connected to your router via RS232/IP converter, follow EsserTcpCommConfig setup section. If you are using direct connection to JACE8000 via RS232 cable, follow EsserSerialCommConfig setup section.

EsserSerialTcpCommConfig setup

1. Check that your serial settings on your RS232/IP converter is correct:
   - Protocol: RS232
   - Flow Control: None
   - Baud Rate: 19200
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
2. Locate EsserTcpCommConfig in Communication folder in essernet palette.
3. Click and drag EsserTcpCommConfig to EsserNetwork in the Drivers node.
4. Right click on EsserNetwork and select Property Sheet view.
5. To properly load EsserTcpCommConfig you will have to disable the EsserNetwork and enable it again.
6. Expand the EsserTcpCommConfig item by clicking small arrow on the left.
7. Expand Target item by clicking small arrow on the left.
8. Enter the IP Address and Port of your converter.
9. Click on the Save button.
10. It may be necessary to restart station for driver to properly connect to SEI.
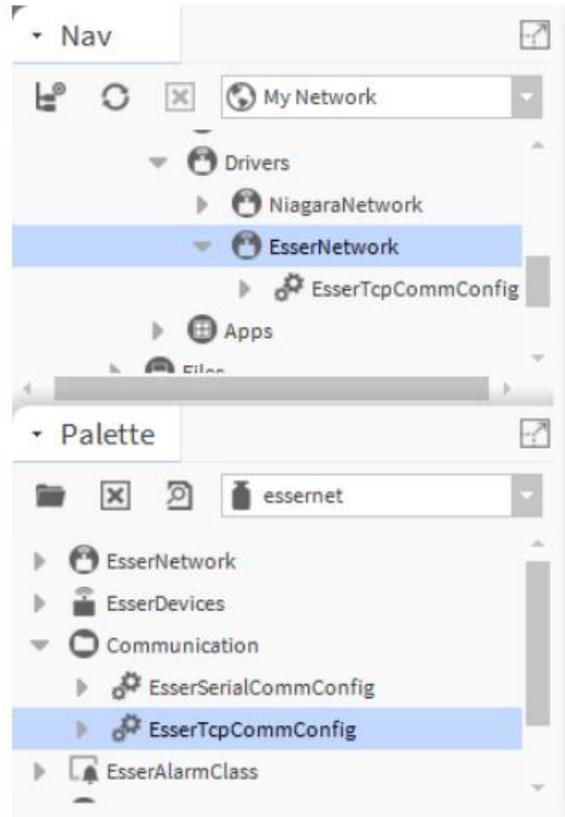
Figure 10: : EsserNetwork after draging EsserTcpCommConfig to it
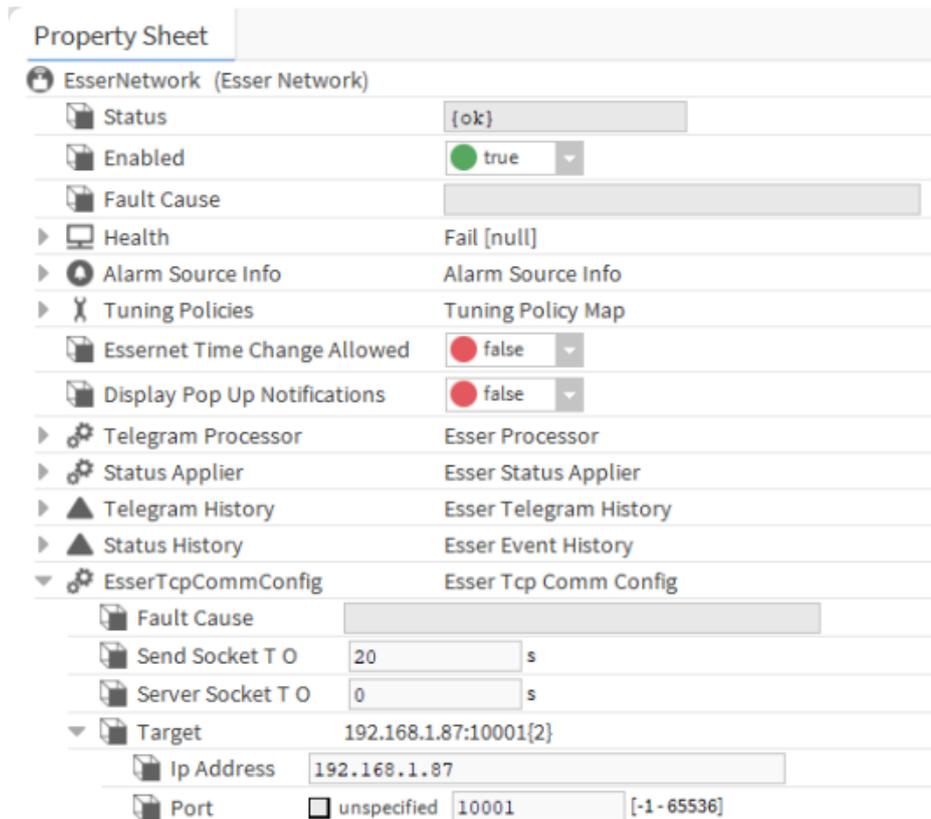
Figure 11: Status field in the picture should state "{ok}"

EsserSerialCommConfig setup

1. Locate EsserSerialCommConfig in Communication folder in essernet palette.
2. Drag and drop EsserSerialCommConfig to EsserNetwork in the Drivers node.
3. Right click on EsserNetwork and select Property Sheet view.
4. To properly load EsserSerialCommConfig you will have to disable the EsserNetwork and enable it again.
5. Expand the EsserSerialCommConfig item by clicking small arrow on the left.
6. Correctly config parameters:
   - Port Name: Usually COM1
   - Flow Control: Leave set to default
   - Baud Rate: Baud19200
   - Data Bits: Data Bits8
   - Parity: None
   - Stop Bits: Stop Bit1
7. Click on the Save button.
8. It may be necessary to restart station for driver to properly connect to SEI.
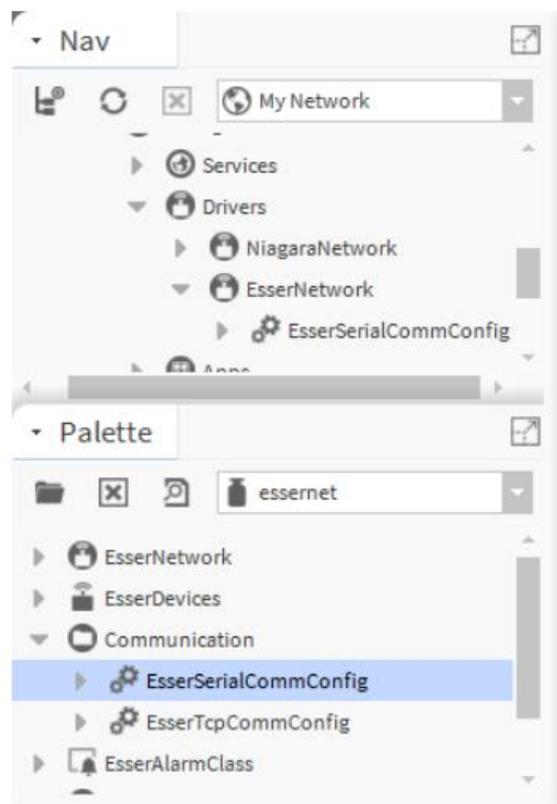
Figure 12: EsserNetwork after draging EsserSerialCommConfig to it
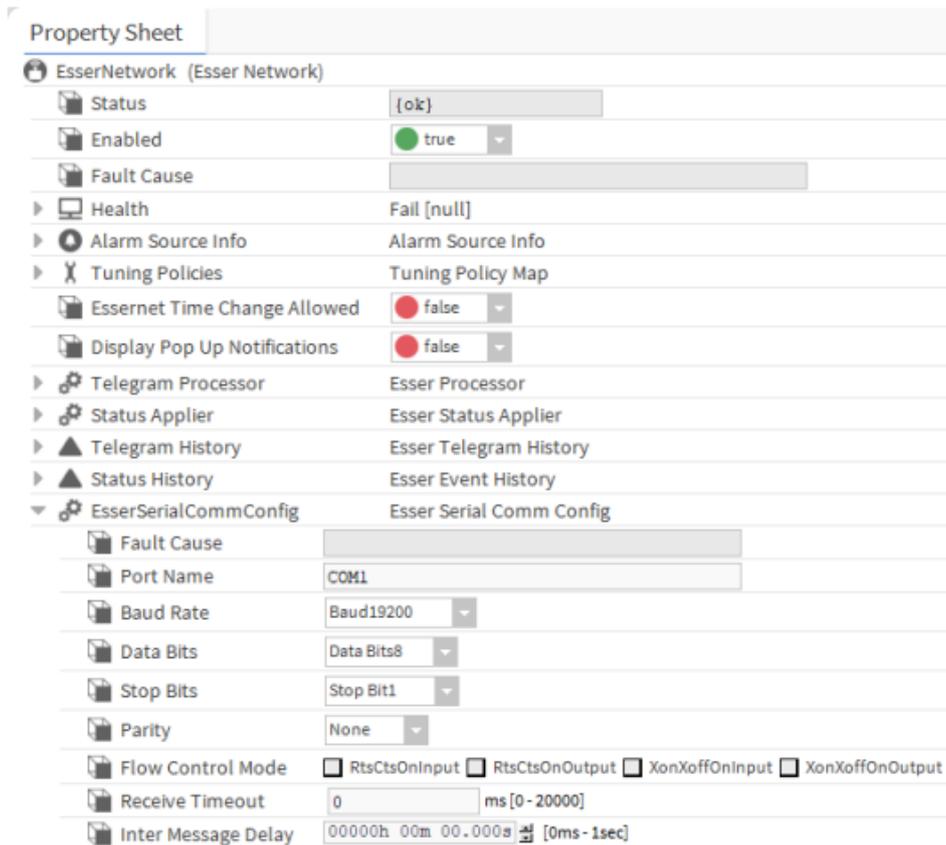
Figure 13: Status field presented in picture should state "{ok}"

The settings of the serial link above is by the default values. It could be changed on the SEI of course, but it would be confusing and is not recommended to do it.

Led indicator

SEI has red LED indicator for connection status display. If red light is on it means that our driver is not connected or configured properly. The red light will go off only after everything is connected in a proper way and our driver starts to respond to SEI. If red light is still on after the initial setup, check your wiring and computer setup and try to restart your station.

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Setting up additional Network properties

While the steps already taken should provide connection to Essernet, our driver provides many other settings that you should know about.

Figure 14: Expanded Esser Network Property Sheet

Time change allowance

The "Essernet Time Change Allowed" toggle button states if received time telegrams from essernet should be used for setting local system time.

- If "false" is selected, received time telegrams will have no effect.
- If "true" is selected, then after receiving time telegram, local system time will change to the time presented in the telegram.

Displaying pop up notifications

The "Display Pop Up Notifications" toggle button states if pop up notifications will be displayed.

Applying statuses

Information about Status Applier and its setup can be found in Status Applier section.

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Telegram History

History of sent/received telegrams is turned off by default. Information about Telegram history and its setup can be found in Telegram history section.

Status History

History of sent/received device statuses is turned off by default. Information about Status history and its setup can be found in Status history section.

Network Actions

Network right mouse button menu provides some extra functions described here.

- Clear ZIDX Cache – Driver stores status indices (ZIDX) which are cyclically transmitted by SEI, based on this, driver asks for missing statuses. Erasing this ZIDX cache will force driver to ask SEI for all missing statuses.

- Request State – You can ask on a custom ZIDX state (for example "fire on detector") by providing its integer representation. Driver will add your request to the outgoing telegram stack.

- Network Status Request – Special request directly to SEI asking on state of the entire essernet. In a while dialog window will appear with the status and also with statuses of each registered fire panels in network. For dialog window to appear you need to have Display Pop Up Notifications property in EsserNetwork set to true.

- Request Time – This will send a request for time telegram. SEI will answer with time he uses but if "Time change allowance" is set to False, nothing will happen.

- Set time – This displays dialog window with actual system time (You can change it here) and if essernet is configured properly, Time will be accepted and set on every Panel in essernet.

Time change to essernet is only processed when SEI has the network address set to 1.

Esser Device Manager

Esser Device Manager is the primary View on the Esser Network component. It provides table view on the devices in Essernet network.

Manager provides set of control buttons in the bottom of the View.

- **New Folder** – This will create new folder of type Esser Device Folder meant for custom ordering of Devices.
- **New** – With this button you can create new custom device. Be aware that statuses to this device will only be applied if its real counterpart on essernet exists identified by the same Panel/Zone/Detector IDs.
- **Edit** – (Same as double-click on device) you can edit names of selected device and also its identifiers. Be aware that if you type incorrect identifiers (Panel/Zone/Detector), status won't be applied from essernet to this particular device.
- **Discover** – This button starts standard Discover process. After setting up Preferences in dialog window, new Discovery job is created which will in a little while create all the possible Devices from provided export file.
- **Add/Cancel** – Buttons used during the process of adding discovered devices to the station.
- **Match** – Useful button for matching automatically discovered devices already in station and devices discovered from export file.

For Discovery process you will need User Data Export from the tools8000 setup tool (Used for configuring Esser Fire Panels).
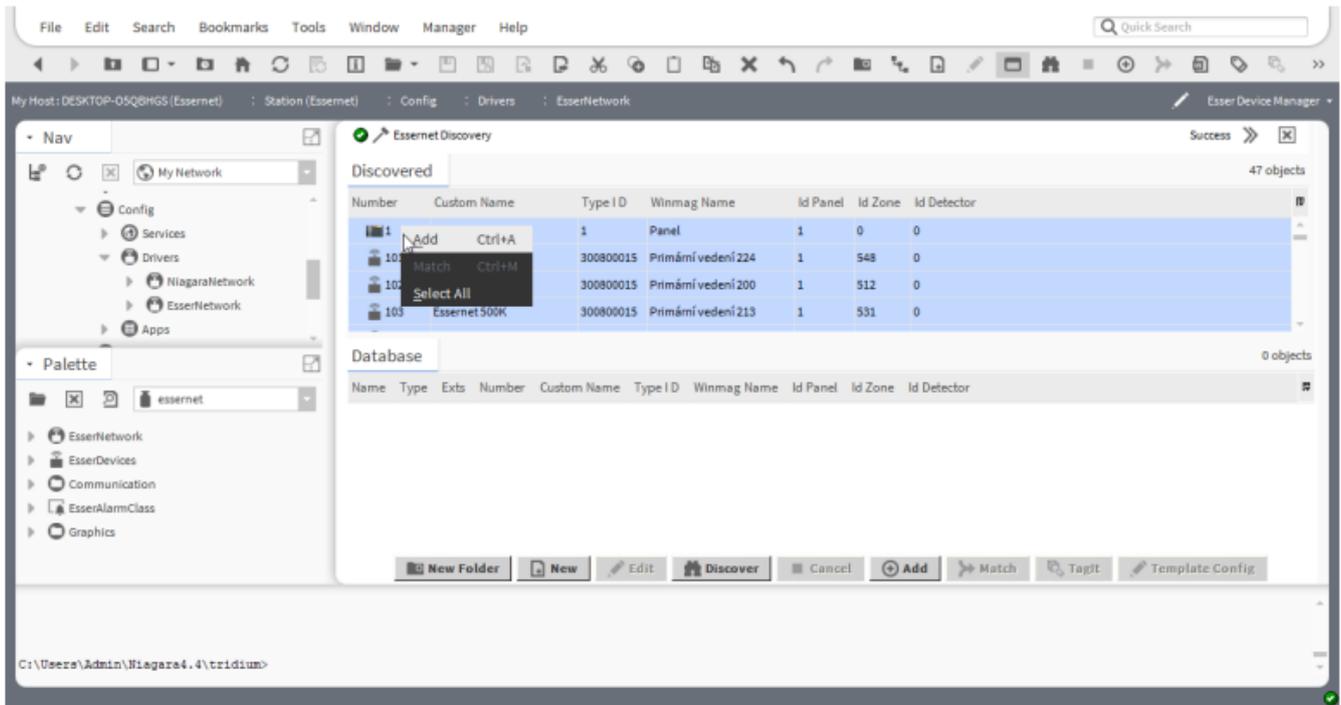
Figure 15: Add action on discovered devices

Figure 16: Adding discovered devices to the Station

Esser Learn Devices Job

This Job is created after clicking Discover button in the Network Device Manager View and providing correct info for Discovery preferences. It takes provided file on the station, and line by line creates devices exported from toools8000 software. Progress of this process is displayed in the top bar of Device Manager View and you can also observe output of this process after clicking the little double arrow next to the progress bar.

Status	Timestamp	Message	Details	
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30009 - led2		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30010 - led3		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30011 - led4		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30012 - Výstupní řídící skupina 54		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30013 - Výstupní řídící skupina 55		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30014 - Výstupní řídící skupina 56		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30015 - Výstupní řídící skupina 57		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30016 - Výstupní řídící skupina 58		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30017 - Výstupní řídící skupina 59		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30018 - Výstupní řídící skupina 60		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30019 - Výstupní řídící skupina 61		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30020 - vystup 1 41		
☐ Message	07-Sep-18 9:23 AM CEST	Discovered device: 30021 - vystup 2 42		
✓ Success	07-Sep-18 9:23 AM CEST	Job Success		

OK

Figure 17: ob Log from discovering devices

Esser Discovery Preferences

Preferences are displayed as dialog window upon clicking the Discover button in Esser Device Manager. Discovery is made for each Panel (Fire Station) and the following preferences are bind to the one single discovery. It consists of three information:

- ID Panel – Meaning the essernet network address of Panel being currently discovered. This should be number from 1 to 32.
- Import File Name – This targets the "User export file" from tools8000 software. This file should be copied on the station first, so that station can access it locally. On Windows the path is usually **c:\ProgramData\Niagara4.4\tridium\stations\NameOfYourStation\shared**. To copy your file to JACE you will have to use File Transfer Client in your platform.
- Encoding – this is by default set to Windows CP1250 but you can use for example the UTF8 file format for export and in that case specify this in this field.
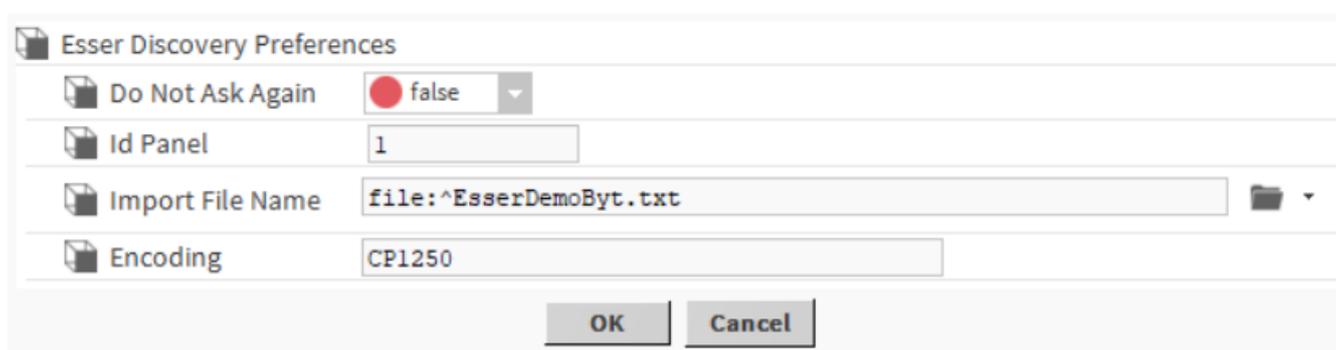
Figure 18: Discovery preferences window

Esser Device

Device is the main super class for each device in the network.
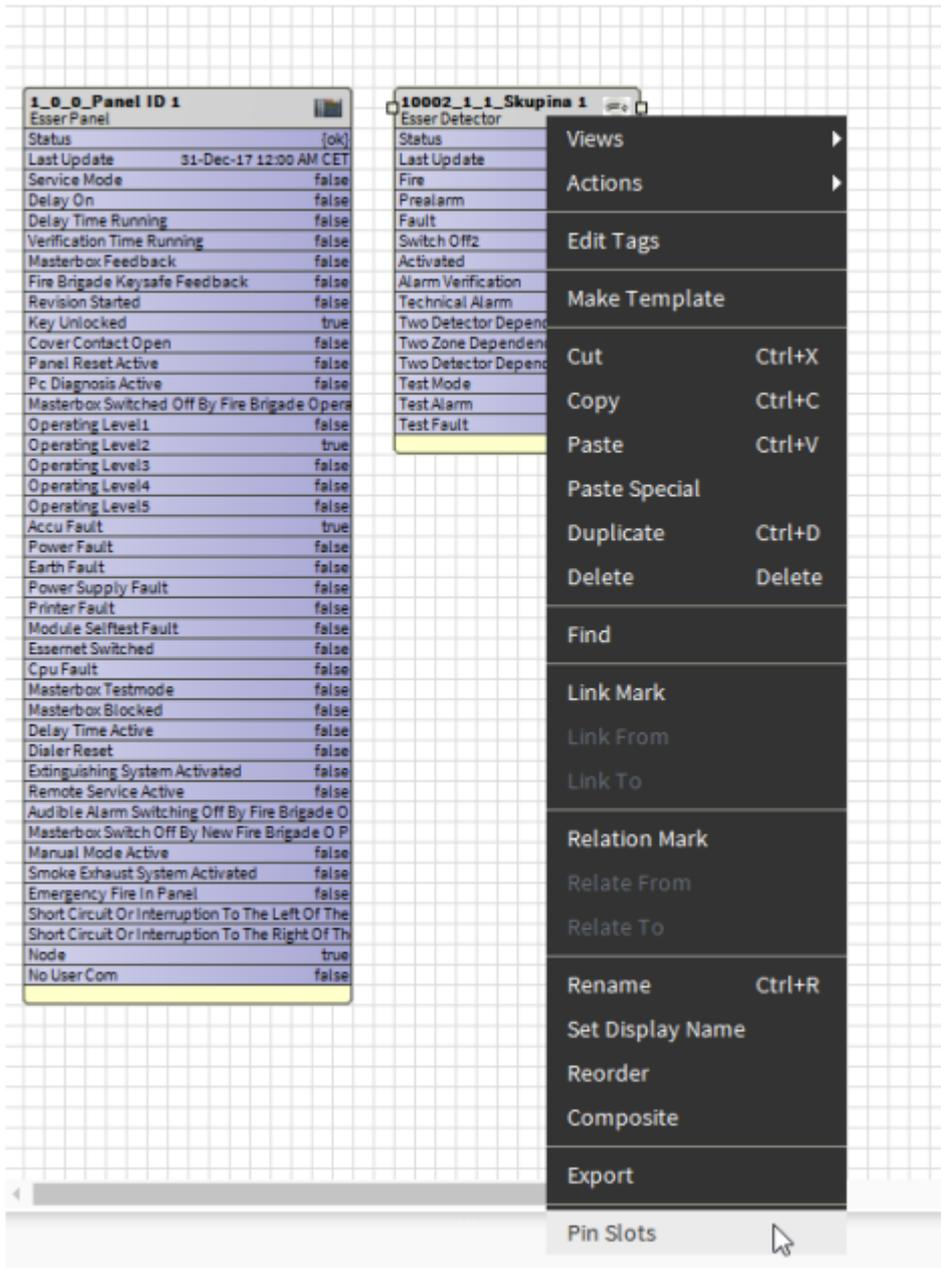
Figure 19: Customizing output slots

Esser Device Folder

Device folder is used for organizing devices in custom tree structure.

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Esser Processor

Esser Processor is the main communication core which handles telegram processing. It sorts received telegrams by type, handles ping and token exchange with SEI and prepares outgoing telegrams. If status telegram is received, it is postponed to the Status Applier and processed there for instance. If status sum counters are received, it checks internal memory and asks for any missing statuses.

In Property Sheet of this component you can see both telegram queues and number of unprocessed telegrams in real time. If you have enabled Telegram History you can list through sent and received telegrams which are processed by Esser Processor.

Esser Status Applier

Status Applier is a special component running in separate thread which handles application of statuses from telegrams to the devices under Essernet Network drivers. Upon receiving status telegram, it starts searching target device under Essernet Network and if device is found, status is applied in form of a Boolean output change and enumerated state.

Status clarification

Besides normal state represented by Enumerable value, during state/status application also Niagara Framework states are set on special occasions. Niagara 4 Statuses are usually represented as a String between curly brackets and in their own separated column, or as an addition to output state. By setting these statuses, each line in Device View can have special colour background if such occasion occurs and user can easily recognize them. In this driver Niagara Statuses are used to accompany enumerated states primarily because of the easy recognition in Device View. Next list of statuses shows the desired meaning and conditions for each.

- Alarm – Red colour – Set for Detector / Detector Zone when Fire state is active.
- Fault (Single device) - Orange colour – Set for Detector / Detector Zone when Fault state is active.
- Disabled – Grey colour – Set for Detector / Detector Zone when Switch Off state is active.
- Down – Yellow colour – Set usually for all devices and Network itself to alert of no communication.
- Fault (All devices) - Orange colour – When set for all devices and/or network it alerts of wrong configuration, usually wrong serial port settings.

State distribution

Essernet status telegram sends telegrams updating only status of the original status creator. For instance, if status "Fire" appears on Detector. Essernet will inform about this but only about this. Usually the Panel displays also the corresponding Detector Zone. And because of these events, there are switches for distributing statuses from Detector up to the Zone and also from Zone down to the detectors. By default, both switches are set to true (enabled).

"Distribute Detector to Zone" set to true is handy if you have many detectors in a large room because fire (or other state) detected on one Detector will be also set on the Detector Zone which this Detector is part of.

"Distribute Zone to Detectors" set to true is handy if for instance the whole Zone is switched off or in a fault state, then every detector from this Zone is also switched off or in fault state.

Esser Enum Switcher

Essernet devices do not have classical enumerated states - meaning one state at a time. Every device can be in multiple states, for instance Detector can be in up to 13 states at once. But for convenient use one enumerated output is available under every device. The problem is solved by providing a stack of statuses for every device and by cyclically switching from one to another. This is done by separate thread "Enum Switcher" which searches through all devices and if any device has more than one state, it takes state from the last position and puts it on the top and continues this way.

Because process of switching statuses is dependent on number of devices in the network you can set the switching speed. It's basically number of milliseconds which the thread is allowed to sleep before starting another run through all the devices. The initial value of 1000 milliseconds is based on around 30 devices in network. If switching speed is too fast or too slow, you can adjust it here. Higher the number, slower the speed of switching and vice versa.

History

Esser Telegram History

Esser Telegram History can store telegrams received and sent by this driver. Its records are accessible in standard way under Stations history tree leaf. By setting its "enabled" state to True, driver will automatically start collecting telegrams.

One of the options in Telegram History Property Sheet is called "Log SP Probe Telegrams" and it's turned off by default. During communication with SEI, small packets (just 4 bytes) are exchanged which serves similar purpose as usual ping packet and are called SP Probe telegrams. So, by leaving this option switched off, History extension will not log these small ping packets and only large communication telegrams or token exchange telegrams.

Data Display switch lets you choose how the telegrams data parts are stored.

- Hex Code – This will write the data part in the history in form of hexadecimal string.
- Decoded String – This will transform the original hexadecimal string in human-readable form based on the protocol documentation for supported telegram types.
- Both – This will write both versions of telegram in the history table so that for every telegram there will be two records.

History Config provides usual set of options for history collecting, for instance how many records should be stored. Full policy and so on.

Esser Event History

Esser Event History can store received information about statuses of devices. Its records are accessible in standard way under Stations history tree leaf. By setting its "enabled" state to True, driver will start automatically collecting events from essernet. For example, fire state on detector.

In the Property Sheet of Status History, you can see last stored record containing all the information available from telegram.

Status telegrams contains Date-Time field in the history called "Time in telegram" but without the year information. Year information is therefore taken from actual system year.

History Config provides usual set of options for history collecting, for instance how many records should be stored. Full policy and so on.

Alarming

Esser Alarm Class is specially altered Alarm class for receiving alarm notifications/alerts from devices from Essernet. In its property sheet it shows every possible state of Essernet devices and there you can set custom priority of each status. Default values are set for example for fire to 0 – which means the highest priority and in alarm console it will be displayed in a line with full red background. Opposite are statuses with low priority (lowest being 255) which goes through green background colour to simple white as default. If you set number higher then 255, the default low priority (255) will be used.

For proper functionality and intended use, follow these steps:

1. Open essernet palette and locate Esser Alarm Class.
2. Drag and drop Esser Alarm Class from palette to the station Alarm Service.
3. (Optional) Add alarm console from alarm palette and link previously added class.
4. Open Property Sheet of Esser Alarm Class under Alarm Service and edit priorities of statuses as needed. (Highest priority = 0 / Lowest priority = 255).
5. Use Program Service in station services to find all Alarm Source Info Extensions (Custom Type –> essernet –> EsserAlarmDeviceExt).
6. Select (multiple) points you are interested in receiving alarm from in this manner and click on Edit Slot button.
7. You can set two slots: Enabled and Alarm Class. Enabled is true by default and alarm class is Default Alarm Class by Default. Set alarm class to Esser Alarm Class and make sure the points are not in disabled state (Enabled = true).
8. From now on alarms will be routed with custom priorities set in Essernet Alarm Class.

Note: In the property sheet of Esser Alarm Class in the top row is located usual setup of priorities but in this Class, it has no effect whatsoever.

If you leave Default Alarm Class in the Device Alarm Extension setting and You have Default Alarm Class routed to some recipient in Alarm Service, you will still receive alarms from device set like this but all in default lowest priority. If you do not want to receive any alarms from Essernet just use Program Service to set all extensions to Enabled=false state.

Graphics

This guide should provide you with enough information about using graphic parts of module in PX files.

Adding device to the Px presentation file

The most convenient way to add devices to the presentation file is by drag and drop from the navigation tree.
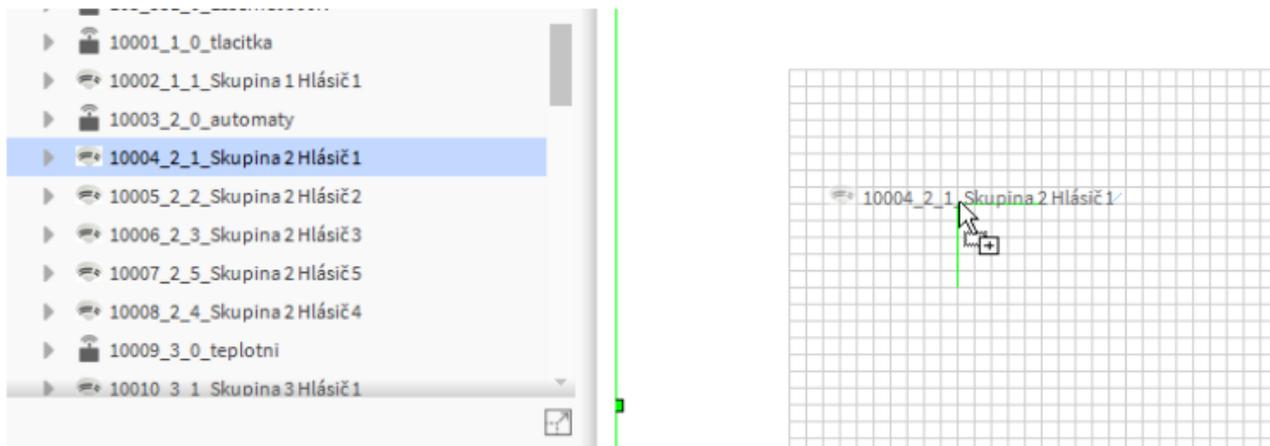
Figure 20: Drag and Drop Detector to the Px pane
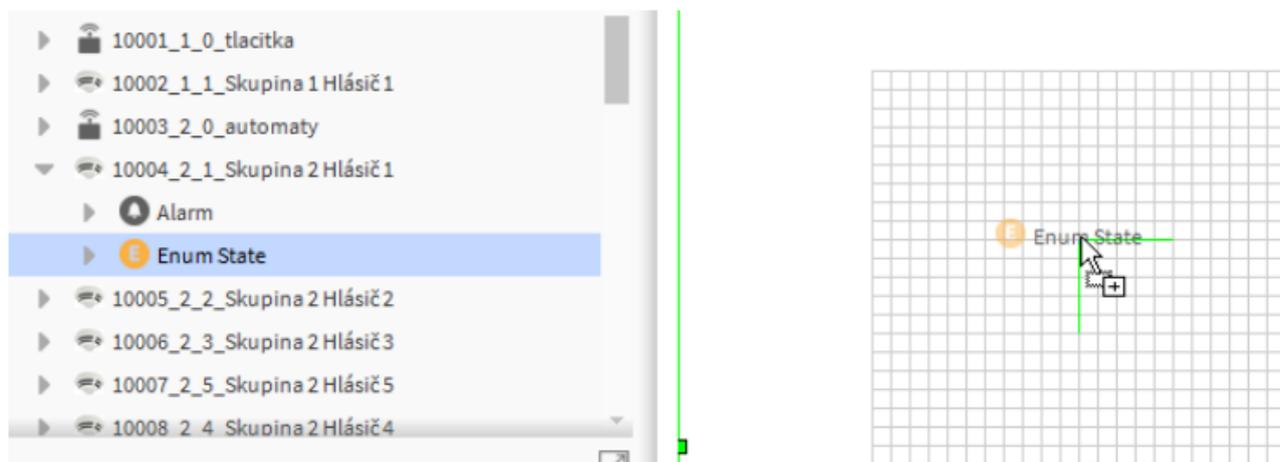
Figure 21: Drag and Drop underlying EnumPoint to the Px pane

Next dialog window will appear automatically after the detector is placed on the pane.
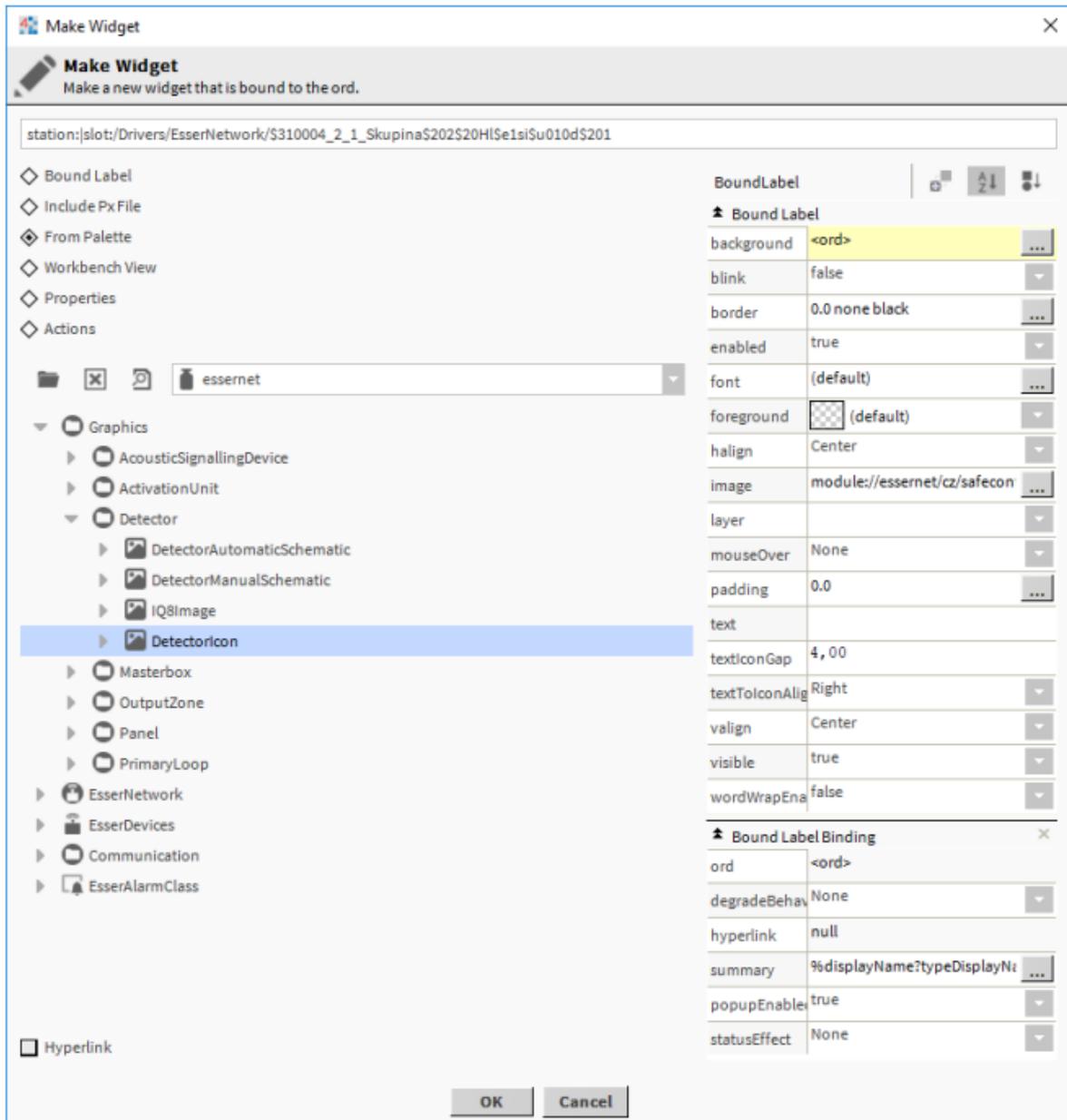
Figure 22: Making widget from detector

Now is the best time to change foreground picture labelled as "image" in the property table. And also, the colour scheme can be changed here by opening the row labelled as "background".

By checking the little "Hyperlink" box in the bottom of this window, the graphic component will become clickable and routes user to the Property Sheet of target device.
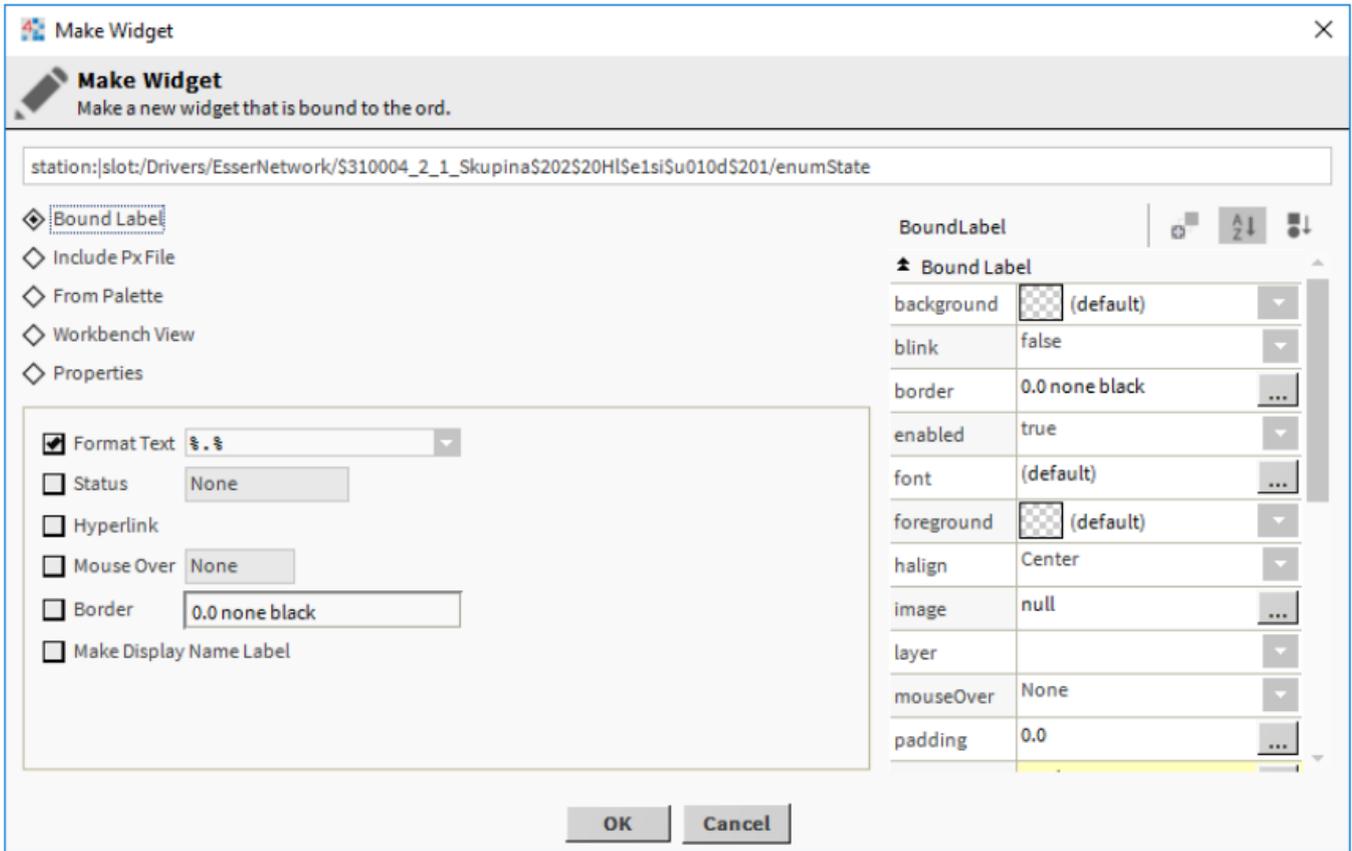
Figure 23: Making Bound Label from underlying Enum point

You can drag and drop like this even multiple detectors:
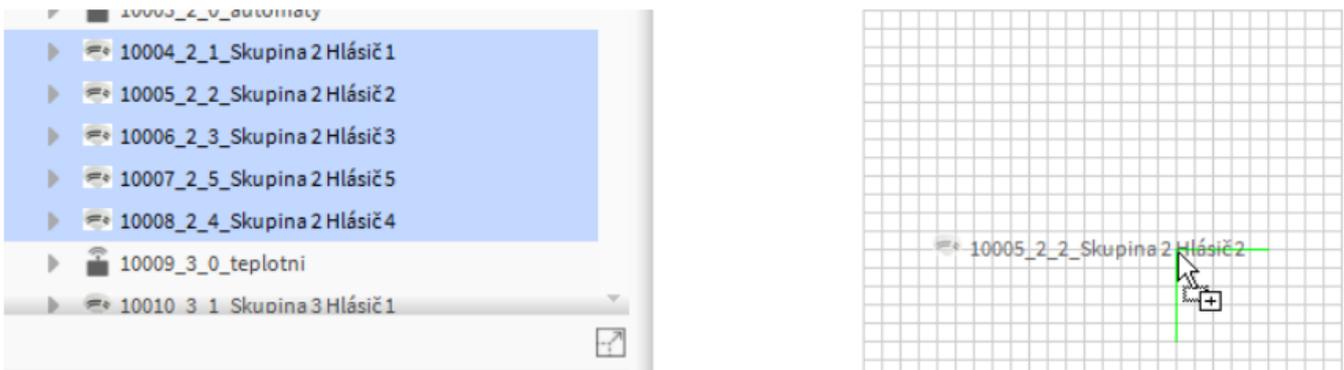
Figure 24: Drag and Drop Multiple Detectors to the Px pane
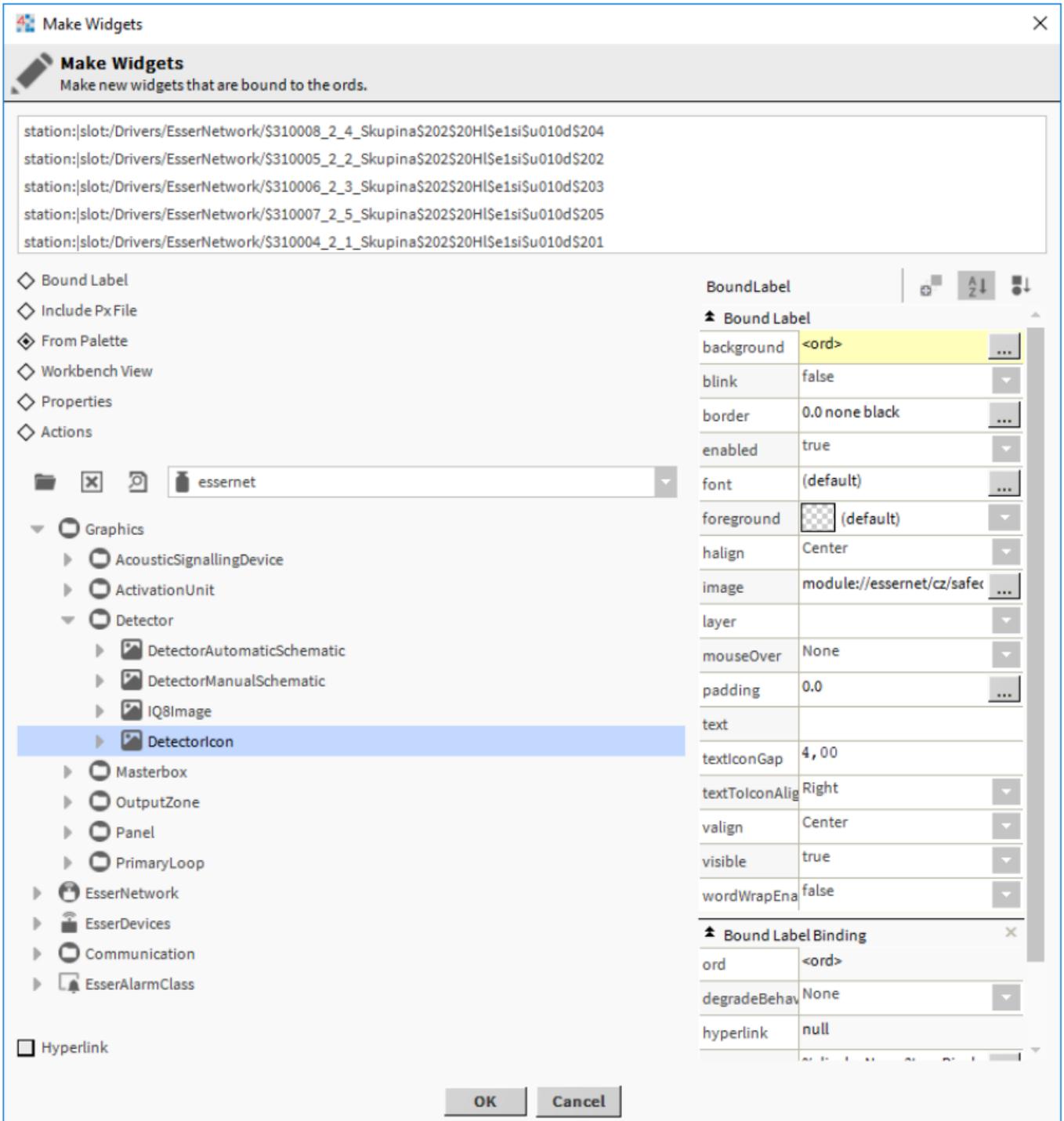
Figure 25: Making widget from detectors

Changing colour scheme of device presentation

If you display properties of graphical representation of detector for instance and then double-click the background row, you will see default colour scheme for enumerated states of device. Changing colour like this will only change scheme for one particular device. If colours should be changed, best way to accomplish this for large number of devices is during addition to the Px file when adding multiple devices.
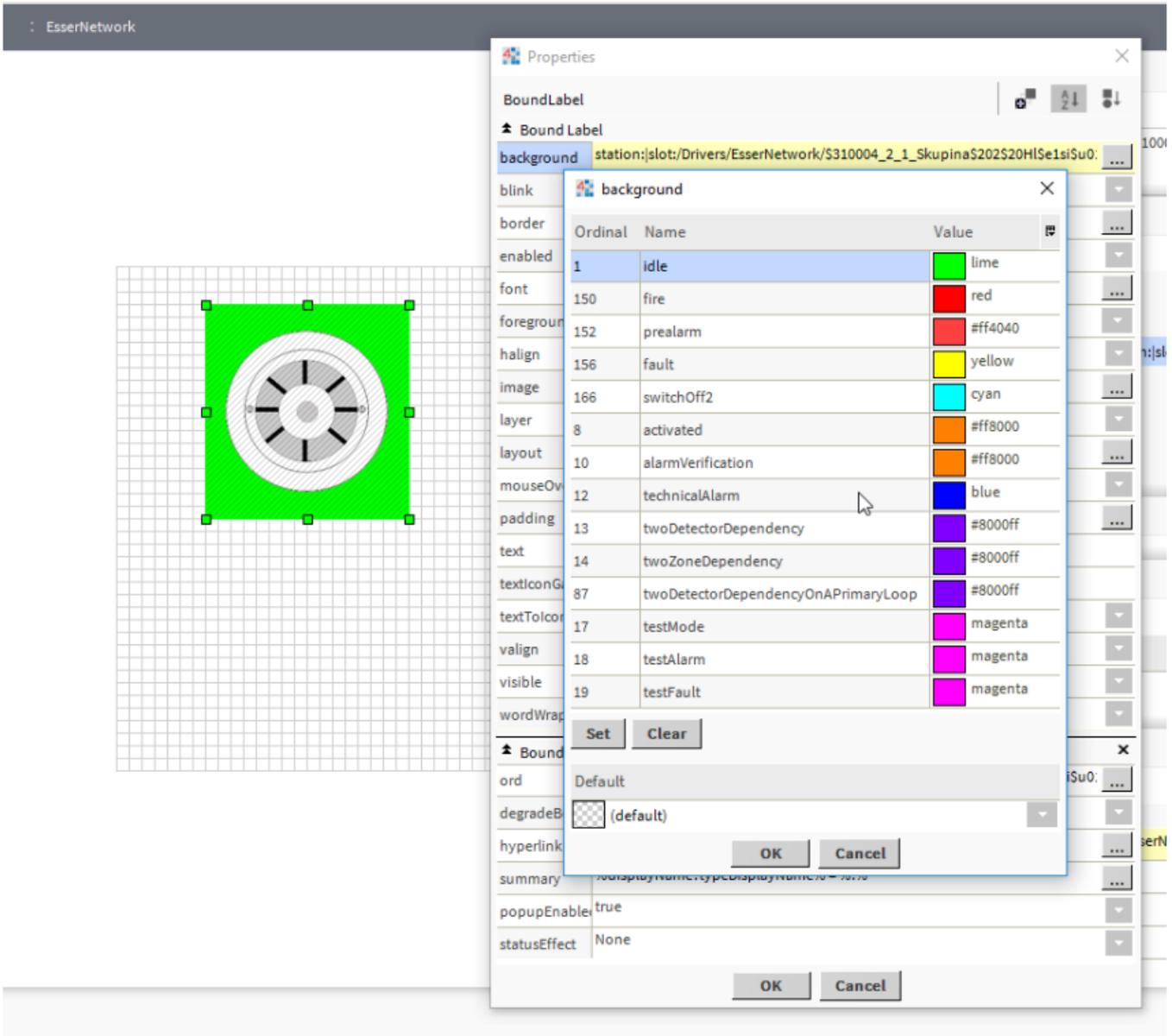
Figure 26: Detector Icon Colour Setup

FAQ

Q: How can I send a command to the panel or detector?

A: Discover an appropriate device or add it manually to the database. Right click on it and from context menu select actions –> choose the available command.

Q: I cannot send command to the Panel. It doesn't work!

A: Check whether you have set the correct Panel ID.

Q: Can I read the current time setting from Panel and change it?

A: Use the context menu on the Essernet Network. If the SEI has address 1, it will resend the time to all connected panels

Q: Palette has no components or showing white space or content of previously selected palette!

A: Make sure, you have Essernet module in your local modules directory.

Q: LED diode on SEI is still red and connection is not working!

A: Check the SEI wiring and communicator setup. Then restart your station.