Trend IQ Driver for Tridium Niagara

User Guide

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niagara4

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Contents

1 Introduction **2**

2 Requirements **2**

3 Quick Start **2**

4 Network **3**

5 Firewall **4**

6 Devices **4**

7 Points **6**

8 Point Addressing **7**

9 Point Discovery **7**

10 FAQ **8**

10.1 I cannot discover any devices 8

10.2 Points are not reading 8

10.3 How do I write to a point? 9

10.4 What is the difference between Modules and ModulesAndParameters discovery modes? 9

1 Introduction

The Trend[1] IQ2, IQ3, IQ4, and IQ5 systems include a wide range of programmable controllers for HVAC control and building automation. The controllers communicate with a proprietary protocol called Trend IQ Network using Ethernet (IQ3/IQ4/IQ5 series) or Trend current loop (IQ2 series).

Niagara Trend IQ driver is designed to enable communication between Trend IQ controllers and Tridium Niagara powered devices. It provides an efficient solution for retrofit of building management systems, facilitates seamless integration of multiple protocols and allows convenient makeover of front-end software.

A single Niagara powered device with the Trend IQ driver can serve as an integration platform for various Trend controllers: IQ3xcide, IQ3xact, IQ4, IQ5, IQ2xx, EINC, XTEND as well as 3rd party systems like Modbus, KNX, M-Bus, SNMP.

2 Requirements

- Niagara-powered device with software v4.8 or later, such as JACE, Supervisor, or their OEM versions
- Communication options
  - IQ3 Network: Ethernet
  - IQ2 Network: Ethernet via EINC or XTEND
- Trend driver license

3 Quick Start

1. Copy trend-rt.jar module to Niagara /modules folder and restart the software.
   a. If the driver is hosted on PC: restart Supervisor station.
   b. If the driver is hosted on JACE: import the module with all its dependencies into JACE and restart it.
2. Add **Trend Network** to the station.
3. Enter license code in **License** property under **Trend Network**.
4. **Discover** devices in the **Trend Device Manager**.
5. Add discovered devices to the station.

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6. For each device, open **Trend Point Manager** and **Discover** points.
7. Add discovered points to the station.

4 Network

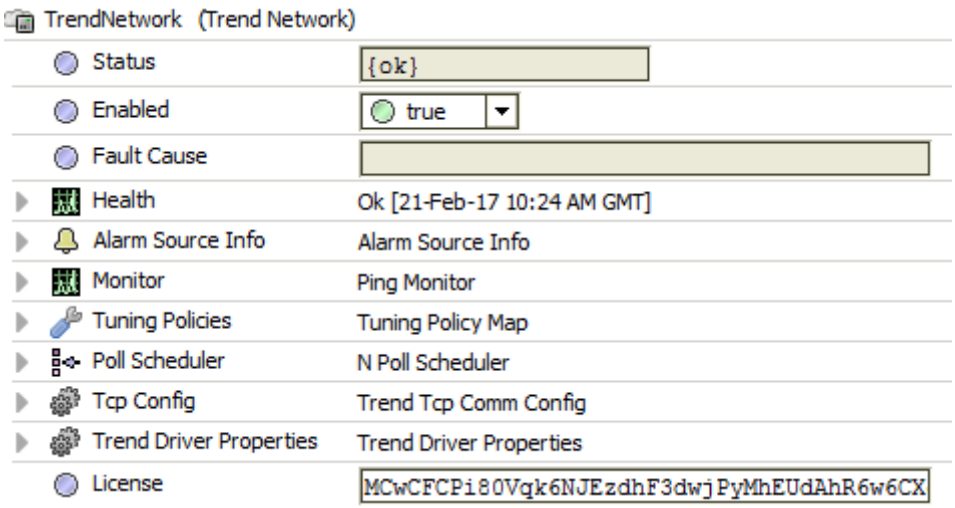
Network properties:

- **License** – the code that allows the driver to run on your host.

In most cases only the **License** property needs to be configured at the network level.

In order to start communication between JACE and Trend devices, make sure the JACE is connected to the same network as the IQ3 or IQ2 device and everything is powered.

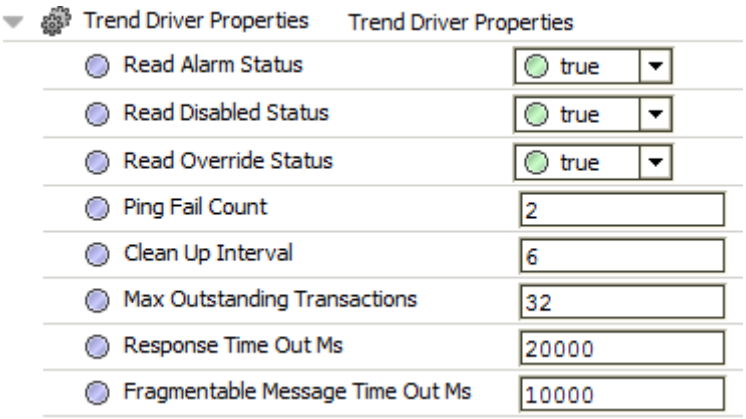
1. Install **trend.jar** and all dependent modules via Software Manager
2. Start the station and add new **Trend Network**
3. In network **Properties** enter the license number and restart the station



Optional driver properties are located under **Trend Driver Properties** section:

- **Read Alarm Status** – Niagara will read the Trend system alarm status and will change the status of the Niagara point accordingly.
- **Read Disabled Status** – Niagara will read the Trend system enabled/disabled status and will change the status of the Niagara point accordingly.
- **Read Override Status** – Niagara will read the Trend system override status and will change the status of the Niagara point accordingly.

- **Ping Fail Count** – number of times device ping has to fail before the driver will change the Niagara status from normal to fault.
- **Clean Up Interval** – driver will perform a clean up and outgoing message group optimization every X number of transactions.
- **Max Outstanding Transactions** – number of messages that can be sent simultaneously.
- **Response Time Out Ms** – timeout in milliseconds between the message request being sent and the last message fragment received.
- **Fragmentable Message Time Out Ms** – timeout in milliseconds between the fragmentable messages.



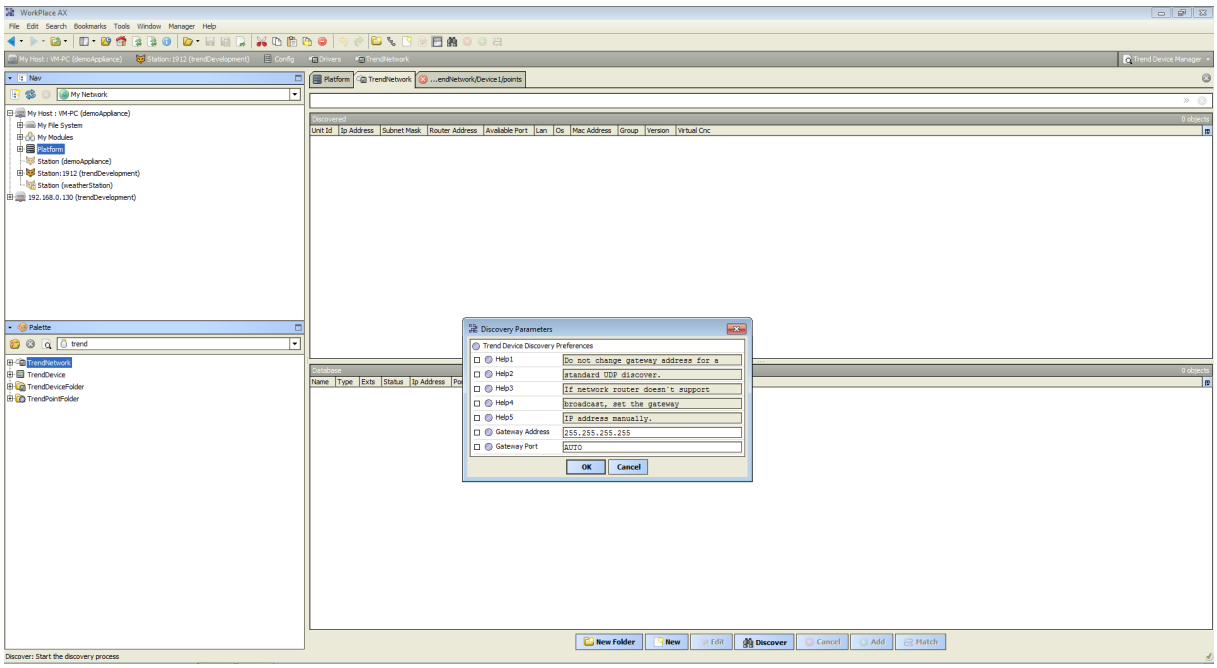
5 Firewall

A JACE 9000 running Niagara 4.15 or later enables a built-in host firewall that blocks all incoming traffic by default. Device discovery is performed over UDP, and the controllers' replies arrive as **incoming** UDP packets, so on this platform the firewall must be opened before devices can be discovered.

On this platform, add a **FirewallPortHelper** component from the **net** palette to the station and configure it to allow **incoming UDP port 65534** (used for Trend device discovery). Device polling itself uses an outbound TCP connection to the controller (default port 10101) and does not require a firewall rule. No firewall configuration is required on other platforms, such as older JACE models or a Supervisor / PC host.

6 Devices

Open the **Device Manager** and press **Discover** button.

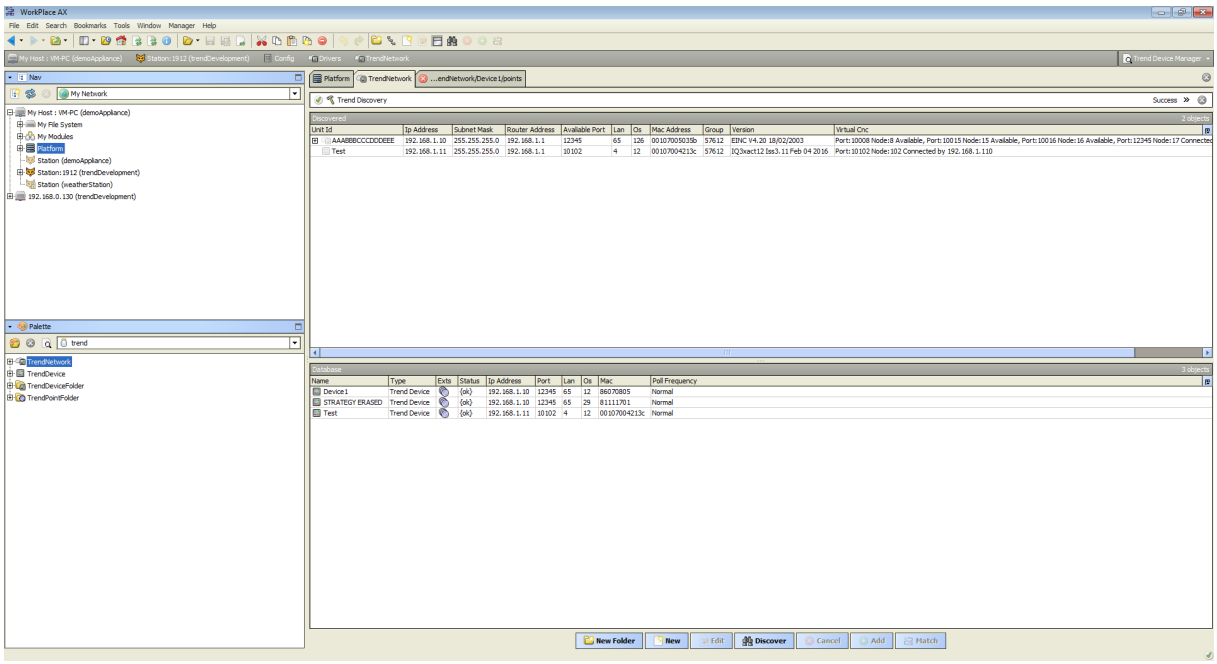


The devices will be discovered via UDP protocol. If the JACE is connected to the Trend system directly there is no need to change any discovery properties.

If there is a router between the JACE and the Trend system, in most cases the router will not support broadcast messages. It will be necessary to set the discovery device IP address and port. Port forwarding in the router has to be configured.

Press **OK** button.

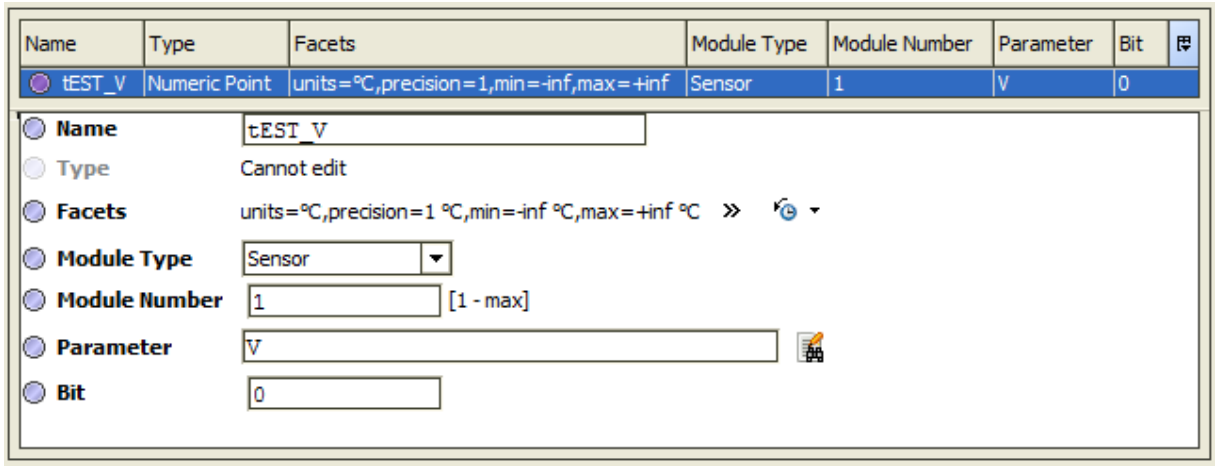
Niagara will find all connected devices and will display their models and Trend system properties. Please note that IQ3 devices will be shown as separate devices while IQ2 devices will be shown under the discovered gateway network. In order to see them press the **+** button. Press **Add** button to add them to Niagara station.



7 Points

Every Trend point extension contains the following properties:

- **Module Type** – type will match Trend system standard module types.
- **Module Number** – Trend system module number.
- **Parameter** – module parameter.
- **Bit** – relevant only for binary values. Allows reading a single bit value.



8 Point Addressing

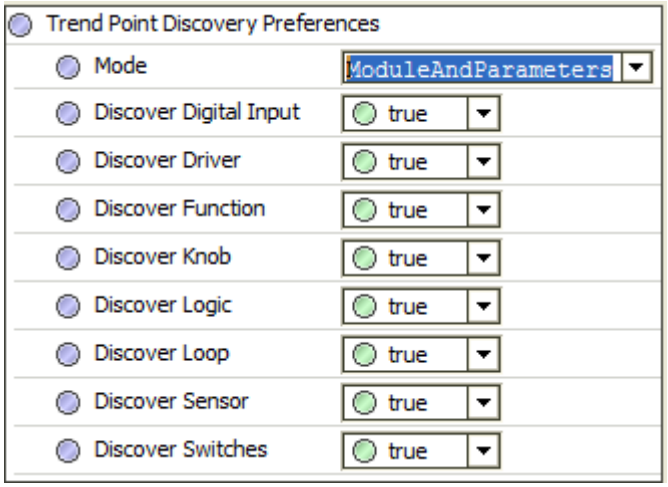
A Trend point is addressed by the fields that identify a single value inside the controller program, following the standard Trend IQ addressing convention:

- **Module Type** – the Trend module category. Each type corresponds to a single letter used in Trend engineering tools: **S** Sensor, **I** Digital Input, **D** Driver, **K** Knob, **L** Loop, **W** Switch, **A** Analogue Node, **B** Digital Byte, **F** Function, **G** Logic, **Z** Schedule.
- **Module Number** – the module instance within the controller, starting at 1 (for example Sensor 3).
- **Parameter** – the module attribute to read or write, entered as the Trend parameter letter (for example a sensor's current value). Each module type exposes its own set of parameters.
- **Bit** – used only for binary values; selects a single bit of the module value.

Together these read like the address used in the controller strategy, for example module type **S (Sensor)**, module number **3**, and the parameter for the value. When points are added through discovery these fields are set automatically; to add a point manually, set them to match the controller program.

9 Point Discovery

Open device **Trend Point Manager** and press **Discover** button.



- **Mode** – there are two discovery modes. **ModulesAndParameters** will discover the module value and the other parameters (e.g., labels, alarm states, disabled states, etc.), but it will take longer for the discovery process to finish. **Modules** will discover just the module value.

- **Individual module discovers** – by default all the modules are discovered. They can be disabled to speed up the discovery process.

Press **OK** button.

Niagara will find all available points, their types, units, and attributes. Text labels will be available if programmers have included them into the program.

Label	Module Type	Module Number	Parameter	Value	Units	Description
Fan Speed 1	Sensor	1	V	0.3 °C {ok}	DegC	The process value of this module
Fan Speed 1	Sensor	1	~	false {ok}		Disable Module
Fan Speed 1	Sensor	1	!	0.00 {ok}		In Alarm
Fan Speed 1	Sensor	1	I	1.00 {ok}		Type of sensor 0=Analogue input 1=Internal analogue 2=Digital input 3=Internal digital
Fan Speed 1	Sensor	1	%	DegC {ok}		The engineering units for the process value of this sensor
Fan Speed 1	Sensor	1	^	false {ok}		Override Output
Fan Speed 1	Sensor	1	v	1.00 {ok}		Override Value
Fan Speed 1	Sensor	1	H	200.00 {ok}		High Alarm Limit
Fan Speed 1	Sensor	1	L	1.00 {ok}		Low Alarm Limit
Fan Speed 1	Sensor	1	S	0.30 {ok}		Source(mV)
Fan Speed 1	Sensor	1	$	Fan Speed 1 {ok}		The label of a module used for identification
Sensor 1	Sensor	2	V	1.0 °C {ok}	DegC	The process value of this module
Sensor 1	Sensor	2	~	false {overridden}		Disable Module
Sensor 1	Sensor	2	!	0.00 {overridden}		In Alarm
Sensor 1	Sensor	2	I	0.00 {overridden}		Type of sensor 0=Analogue input 1=Internal analogue 2=Digital input 3=Internal digital
Sensor 1	Sensor	2	%	DegC {overridden}		The engineering units for the process value of this sensor
Sensor 1	Sensor	2	^	true {overridden}		Override Output
Sensor 1	Sensor	2	v	1.00 {overridden}		Override Value
Sensor 1	Sensor	2	H	2000.00 {overridden}		High Alarm Limit
Sensor 1	Sensor	2	L	0.00 {overridden}		Low Alarm Limit
Sensor 1	Sensor	2	S	0.00 {overridden}		Source(mV)

Add found points to Niagara station to start reading them. Note that all points are added as read-only by default. Change point types to writable before adding them to station if required.

If a discovered point has a dimension field, it will be automatically translated into Niagara units and assigned to the point.

10 FAQ

10.1 I cannot discover any devices

- Verify the JACE is on the same network as the IQ3 or IQ2 controllers.
- If there is a router between the JACE and the Trend system, configure the discovery IP address and port, and set up port forwarding on the router.
- Ensure controllers are powered and connected to the Ethernet network.
- Check that the license is valid.

10.2 Points are not reading

- Verify the device is online (device status should show **ok**).
- Check the **Module Type**, **Module Number**, and **Parameter** values match the Trend controller program.
- If the device shows yellow (offline), check network connectivity between the JACE and the controller.
- Try increasing **Response Time Out Ms** in the driver properties if the network has high latency.

10.3 How do I write to a point?

Points are added as read-only by default. To write to a point, change the point type to writable before adding it to the station. If the point is already added as read-only, delete it and re-add it with a writable type.

10.4 What is the difference between Modules and ModulesAndParameters discovery modes?

Modules discovers only module values and is faster. **ModulesAndParameters** also discovers labels, alarm states, and disabled states, but takes longer. Use **Modules** for a quick overview and **ModulesAndParameters** for complete information.