BACnet OPC Client User's Manual

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Contents

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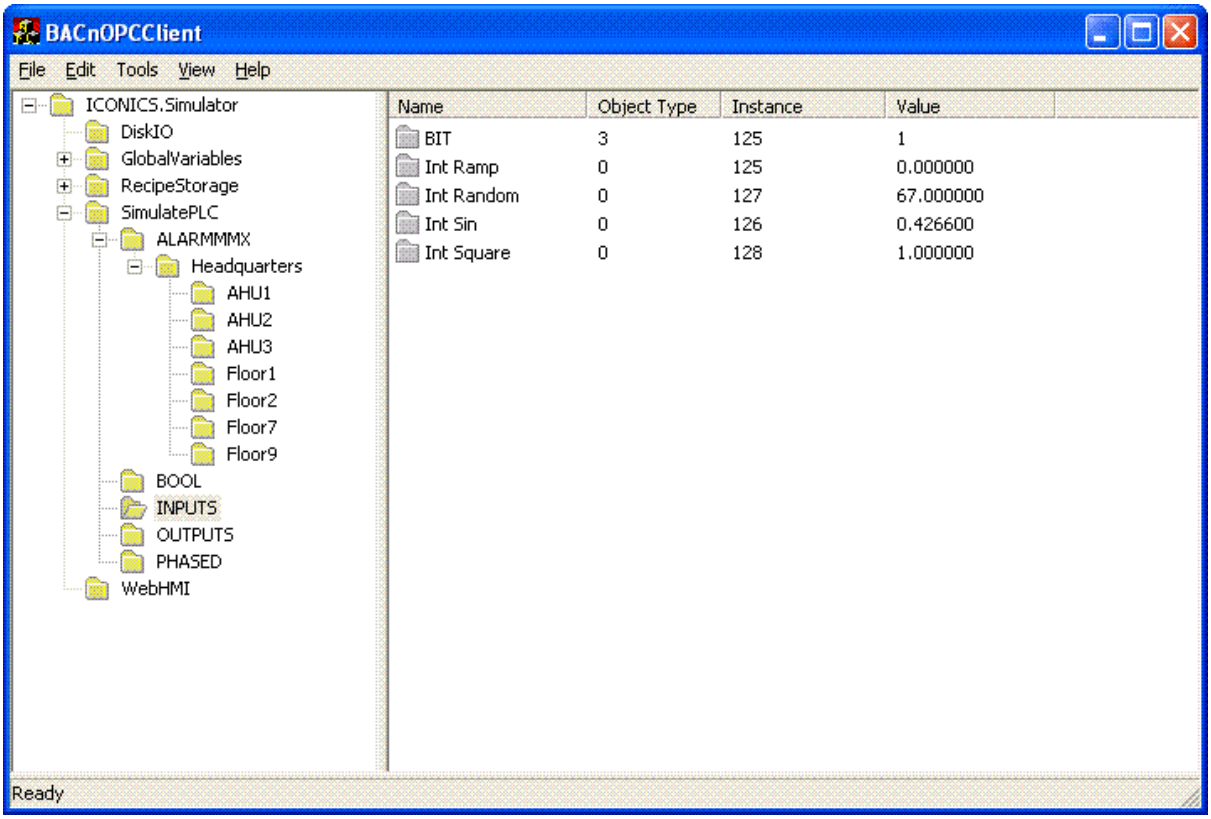
Overview

The BACnet OPC Client can operate as an NT Service by selecting Tools - Options from the menu. This will bring up a dialog box which has a checkbox for selecting NT Service operation. After this option has been selected, then application must be closed, and can only be restarted from the Control Panel - Services Applet. By default, the application will be set to "Interact With Desktop" and will be visible in the taskbar. To make the Service run in the background, uncheck this option from the control panel.

Overview

BACnet OPC Client:

- OPC Data Access Servers into BACnet.
- Explorer-style interface.
- BACnet auto discovery of OPC Tags.
- Acts as a BACnet Server.
- OPC datapoints mapped to local BACnet Objects within the BACnet Server.
- Savable CSV configuration files compatible with Microsoft Excel.



Overview

This software will read from an OPC compliant Server and store the information into BACnet Objects stored locally inside the BACnet Server. The BACnet Objects can be read from any BACnet complient device on the network.

An Explorer style interface allows BACnet properties to be easily configured as OPC tags.

BACnet local objects can be configured, modified, and saved online or offline from the OPC application.

Configuration files can be modified in Microsoft Excel.

OPC Server

There are many OPC Servers available, including.

- Modbus
- Lon
- Any type of PLC.

BACnet BIBBs Supported

DS-RP-A, DS-RPM-A, DS-WP-A, DS-WPM-A, DS-COV-A, DS-COVU-A, AE-N-A, AE-ACK-A, AE-ASUM-A, AE-ESUM-A, DM-DDB-A, SCHED-A

OPC Support

Data Access Specification 1.0 and 2.0 and Event/Alarm Specification 1.0

OPERATING SYSTEMS

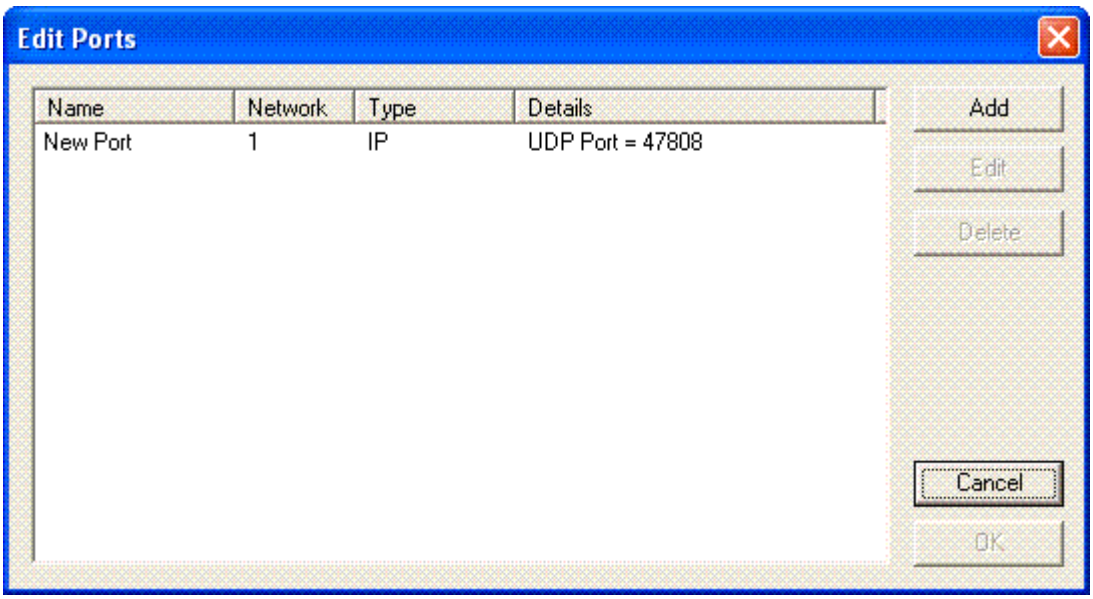
Windows NT 4.0, Windows 2000, Windows XP

Tutorial

SCADA Engine BACnet OPC Client - Tutorial

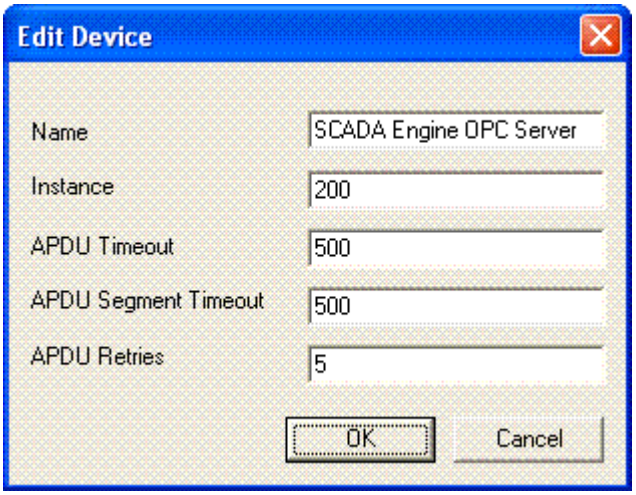
Step 1 - Configure Port

From the tools menu select Configure Port. The application will default to BACnet/IP configured on network 1. You may need to change the network number to suit your site.



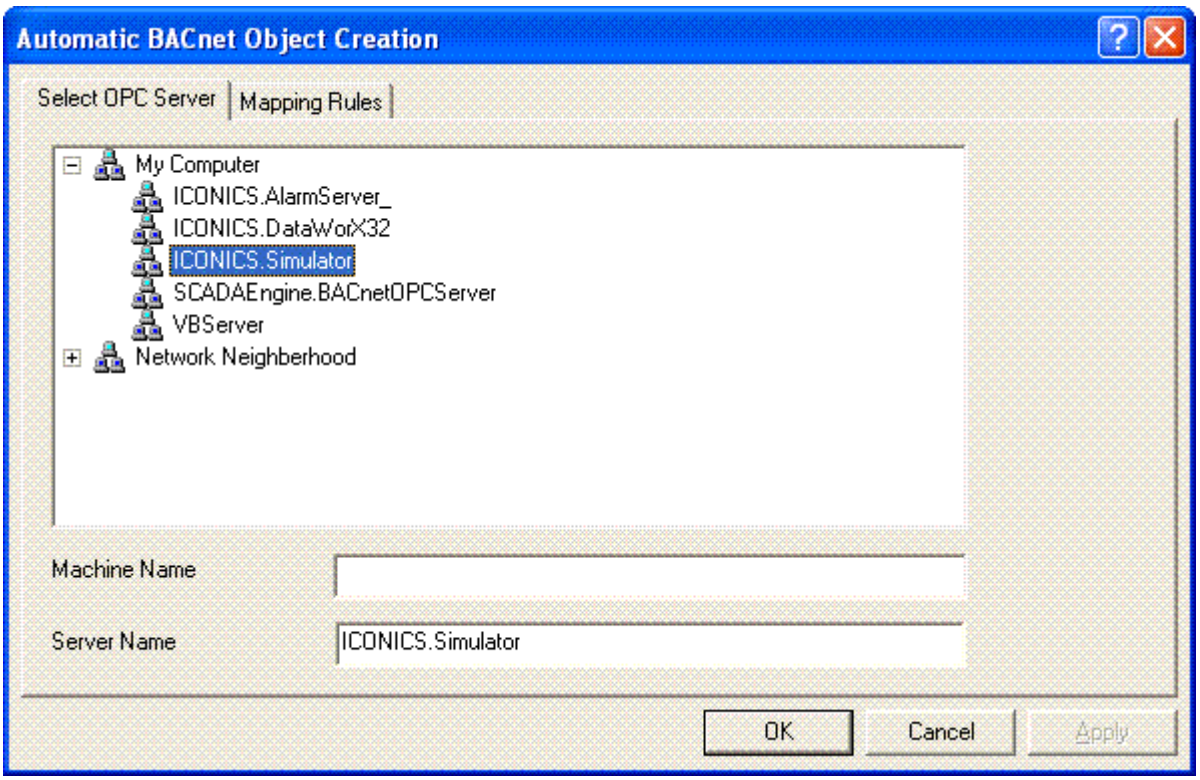
Step 2 - Configure Device

From the tools menu section select Configure Device. The application will default to device instance 0 and is the ID of the BACnet OPC Client. This should be changed to a new device instance when used on site. Each device on the BACnet network number needs a unique device instance. The BACnet installer will give you a device instance to use, in this example we will use instance 200. You can leave the other options as their default values.



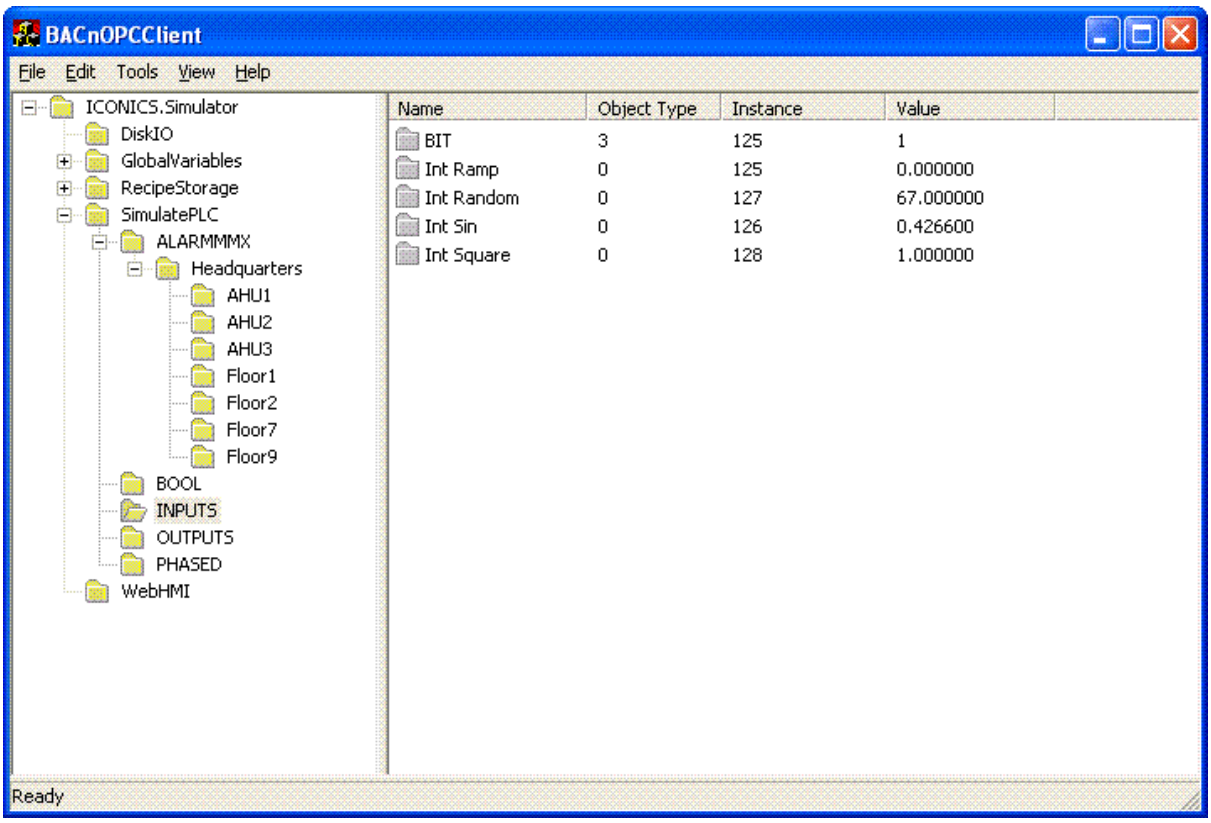
Step 3 - Automatic Object Creation

You are now ready to create internal BACnet Objects which will be updated with real time data from an OPC Server, from the Tools menu select "Automatic Object Creation" to bring up a list of available OPC Servers on the network. Select an OPC Server from the list and then select OK. The application will attempt to read all of the OPC Tags within the OPC server and map the Tags to BACnet internal objects. The Datatype of the OPC Tag is used to determine the type of BACnet Object to use.



Step 4 - View the Real Time Data

After the BACnet Internal Objects have been built, the explorer will be populated with the OPC Tag list. The BACnet Internal Objects are grouped in the same format as the OPC Server. When you navigate to the list of names, the BACnet OPC Client will display real time data as shown below.



Step 5 - Save the OPC Tags

After the Tag list has been build, the OPC Tag list should be saved into the database. The BACnet OPC Client uses a CSV file for storing the OPC Tag database; you can save the configuration under a new name name using the File - SaveAs option. The BACnet OPC server is now ready for use and will load in the Saved OPC Tag list the next time it starts.

Installation

Installation

The BACnet OPC Client requires an application called Winpcap which must be installed as a separate program and is available from the SCADA Engine Web site. The BACnet OPC Client is installed using the installation program. It has been created using InstallShield and uses the Microsoft Installer that comes with the operating system. Follow the prompts to install the BACnet OPC Client, you do not need to change any of the options.

Uninstall

To remove the BACnet OPC Client, go to the Control Panel and select Add/Remove programs. Locate the entry for the BACnet OPC Client and remove it. You may also need to Remove Winpcap which is listed separately under Add/Remove programs.

Configuration

The configuration of the BACnet OPC Client is broken up into 4 sections as follows.

- Ports The port is the connection to the BACnet network which may not be the same in each installation.
- Device The BACnet OPC Client acts as a device on the BACnet Network and requires a unique Device ID.
- BACnet Internal Objects The BACnet Internal Objects are mapped to a corresponding OPC tags inside an OPC Server.
- NT Service Allows the BACnet OPC Client to operate as an NT Service.

Ports

Edit Ports

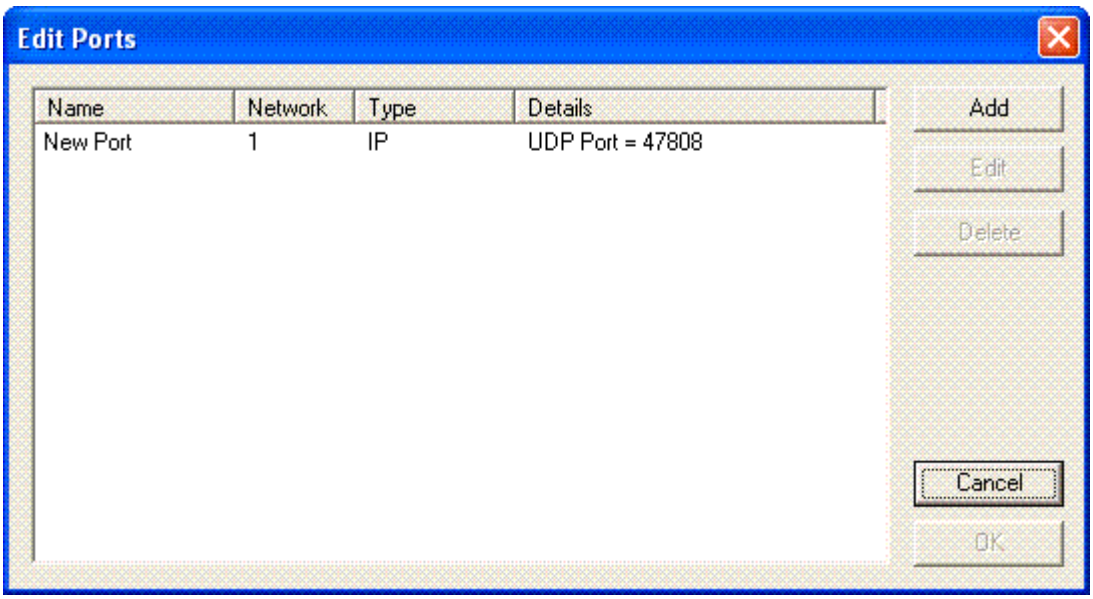
Overview

A port is a connection to the BACnet network and can be one of several different types including BACnet Ethernet, BACnet/IP, BACnet MSTP and BACnet PTP. Each of these port types can be considerred as a different driver; two BACnet devices that are physically connected to each other need to be using the same communication type such as BACnet/IP.

BACnet has the ability to combine all of the different communication types on the same network through the use of routers. Most BACnet sites will have a combination of BACnet/IP devices and BACnet MSTP devices. The most common configuration for the BACnet OPC Client will be using 1 single BACnet/IP port; any BACnet MSTP devices will be accessible through the BACnet routers.

Configuration

The ports can be configured by selecting the Tools - Configure Port from the menu which will bring up the following Dialog Box.



Here you will see a list of ports, which normally will contain only 1 entry for BACnet/IP. Each port needs to be assigned to a unique Network Number that corresponds to the network number used on site. A network number can be considered to be a physical connection between 1 or more devices, devices on different networks are accessible only via a router that connects the two networks together.

Editing a port

To edit a port, double click on the port in the list box, or highlight the port and select Edit. This will bring up an Edit port Dialog with one of the following types:

- BACnet Ethernet
- BACnet/IP
- BACnet MSTP
- BACnet PTP

Adding a port

New ports can be added by select the Add Button.

Deleting a port

A Port can be added by highlighting the port and selecting the Delete Button.

Column Definitions

The List box contains the following columns.

Name

The network name is for descriptive purposes only; you can use the name to give the port a description.

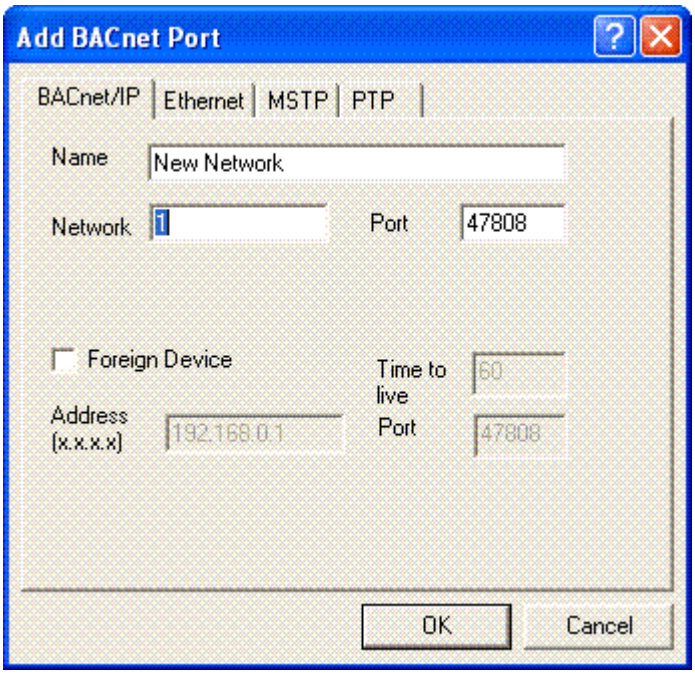
Network
The network field contains a Number between 1 and 65534 that Uniquely Identifies the network.

Type
The type field is one of four types: IP, Ethernet, MSTP or PTP

Details
The details field contains a summary of the port parameters.

BACnet/IP
Overview

BACnet/IP is the most common connection to the BACnet Network, and in order to connect to the network you should consult the BACnet Installer to determine which UDP Port is being used and the Network Number. Be aware that BACnet Ethernet is different to BACnet/IP. Many installers do not realize that most BACnet devices can be configured to use either BACnet Ethernet or BACnet/IP and often do not identify which one is being used. BACnet/IP was introduced after BACnet Ethernet and is often referred to as Annex J. Both protocols operate over an Ethernet connection, however all devices must be configured to use the same protocol.



This dialog has the following parameters available for configuration.

Name

The network name is for descriptive purposes only; you can use the name to give the port a description.

Network

The network field contains a Number between 1 and 65534 that Uniquely Identifies the network.

Port

This identifies the UDP Port used by BACnet, the default value is 47808 (BAC0).

Foreign Device

When this box is ticked, the BACnet OPC Client will act as a foreign device and can be connected to a BBMD. This option is available if the BACnet OPC Client is not located on the same IP subnet as the other BACnet devices.

Time To Live

This option is available only when the Foreign Device Tickbox has been selected. It is used by the BACnet OPC Client when registering as a foreign device.

Address

This option is available only when the Foreign Device Tickbox has been selected. This is the Address of the BBMD.

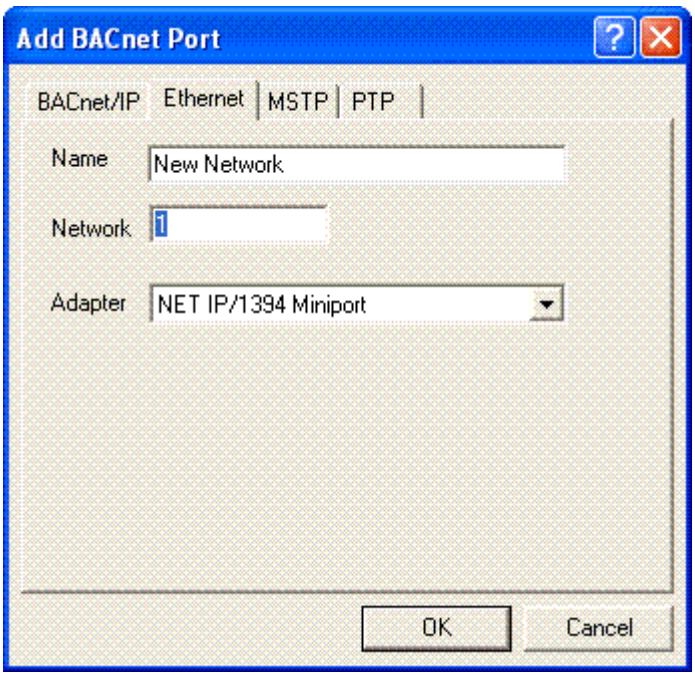
Port

This option is available only when the Foreign Device Tickbox has been selected. This is the port number of the BBMD.

BACnet Ethernet

Overview

BACnet Ethernet connects directly to the ethernet network and does not use TCP/UDP; you will need to ask the BACnet installer for the network number that is being used. Be aware that BACnet Ethernet is different to BACnet/IP. Many installers do not realize that most BACnet devices can be configured to use either BACnet Ethernet or BACnet/IP and often do not identify which one is being used. BACnet/IP was introduced after BACnet Ethernet and is often reffered to as Anex J. Both protocols operate over an ethernet connection, however all devices must be configured to use the same protocol.



This dialog has the following parameters available for configuration.

Name

The network name is for descriptive purposes only; you can use the name to give the port a description.

Network

The network field contains a Number between 1 and 65534 that Uniquely Identifies the network.

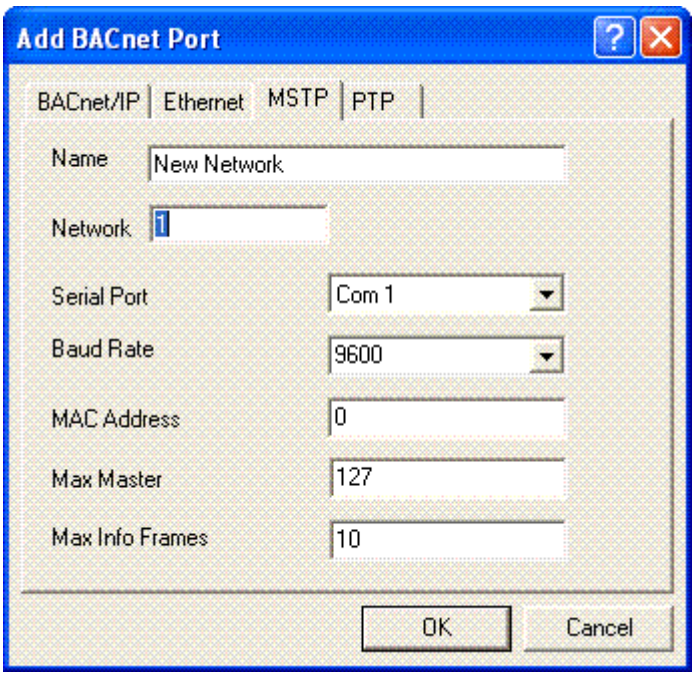
Adapter

A list of Ethernet Adapters identifies which Ethernet adapter will be used to connect to the network.

BACnet MSTP

Overview

BACnet MSTP is used by most field devices. The field devices are in turn connected to a global controller which acts as a router from BACnet/IP to MSTP. In most cases it is not necessary to connect directly to the MSTP network. MSTP operates over RS485 which means an RS485 card would need to be purchased in order to use this driver. The RS232 port on a PC does not support the maximum Baud Rate of 76800; an RS485 card normally does support the higher baud rates.



This dialog has the following parameters available for configuration.

Name

The network name is for descriptive purposes only, you can use the name to give the port a description.

Network

The network field contains a Number between 1 and 65534 that Uniquely Identifies the network.

Serial

This is the Com Port Number

Baud

This is the Baud Rate

MAC Address

The MAC Address of the port in the range of 0 to 127.

Max Master

The Maximum MAC Address on the Network in the range of 0 to 127, reducing this figure may result in increased performance.

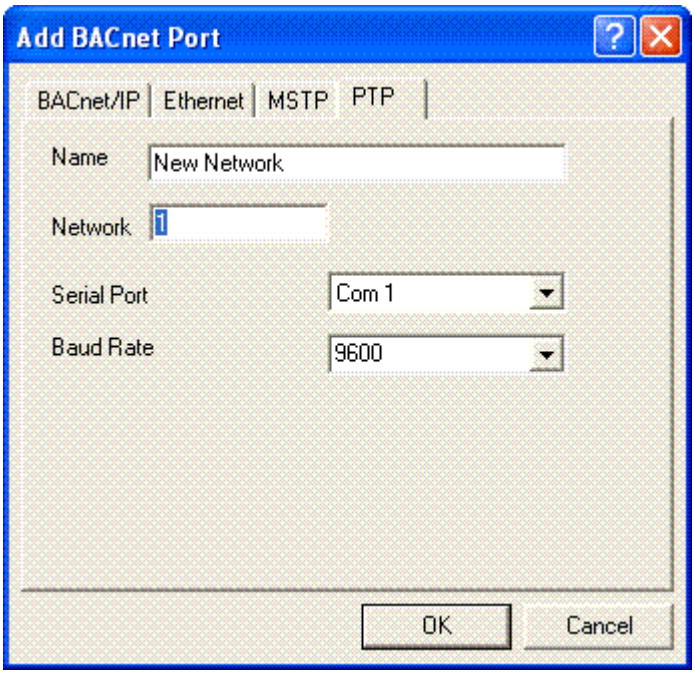
Max Info Frames

The number of frames to send before passing the token enables a device to use more bandwidth.

BACnet PTP

Overview

BACnet PTP is typically used by remote workstations to dial up into a site via modems. It is the least reliable of connections and does not give the same performance as other types of connections.



This dialog has the following parameters available for configuration.

Name

The network name is for descriptive purposes only; you can use the name to give the port a description.

Network

The network field contains a Number between 1 and 65534 that Uniquely Identifies the network.

Serial

This is the Com Port Number

Baud

This is the Baud Rate

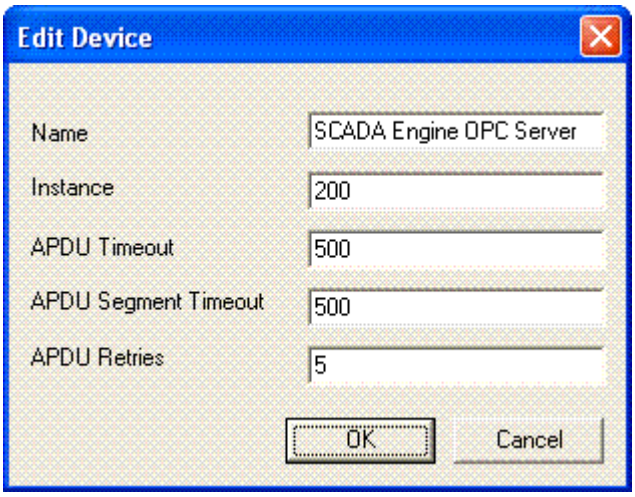
Device

Device Settings

Overview

The BACnet OPC Client acts as a BACnet device and requires a unique Device ID. You should consult the BACnet Installer for a Device ID.

To change the Device Settings, select Tools - Configure Device from the menu and the following Dialog Box will appear.



Name

The Name Field can be used to change the Object Name in the Device Object of the BACnet OPC Client.

Instance

This is the Device ID of the BACnet OPC Client; each Device requires a unique device ID on the BACnet network. The default stting is 0. The accepted range is 0 to 4194303.

APDU Timeout

This is the time the driver will wait for an expected response from the device before retrying or going on to the next request. The default setting is 500 milliseconds. The accepted range is 300 to 30000 milliseconds.

APDU Segment Timeout

This is the time the driver will wait for an expected response from the device before retrying or going on to the next request. The default setting is 500 milliseconds. The accepted range is 300 to 30000 milliseconds.

APDU Retries

The retry setting determines the number of times the driver will retry a confirmed request before giving up. The default setting is 3 retries. The accepted range is 0 to 5.

BACnet Internal Objects

Overview

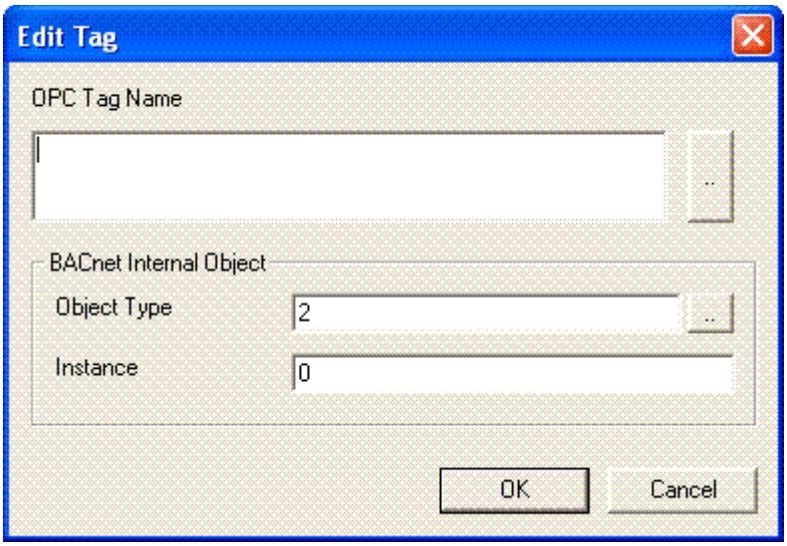
The application reads real time data from an OPC Server and stores it in an internal BACnet Object. Each internal BACnet Object is mapped to a corresponding OPC tag inside an OPC Server. The application uses a CSV file to store the mapping information for each internal BACnet Object, each line in the file contains an entry for the OPC tag and it's representation in the BACnet Server.

- Manual Object Creation BACnet Internal Objects can be created manually using this feature.
- Automatic Discovery The BACnet OPC Client supports the Automatic Creation of Internal Objects from an OPC Server.
- Tag Database The OPC Tag Database is stored as a CSV file which can be edited in Excel.

Manual

Overview

Internal BACnet Objects can be created manually from the Edit Menu; objects can be created one at a time or edited manually. To Add a BACnet Object, select Edit - Add Tag from the menu to bring up the following Dialog Box.



OPC Tag Name

The OPC Tag Name is a string that identifies the OPC Tag in the OPC Server. The button to the right of the edit box allows for tag names to be browsed.

Object Type

The Object Type is the type of Object which is being read from the device, it forms part of the mapping from BACnet to OPC. The accepted range is 0 to 5.

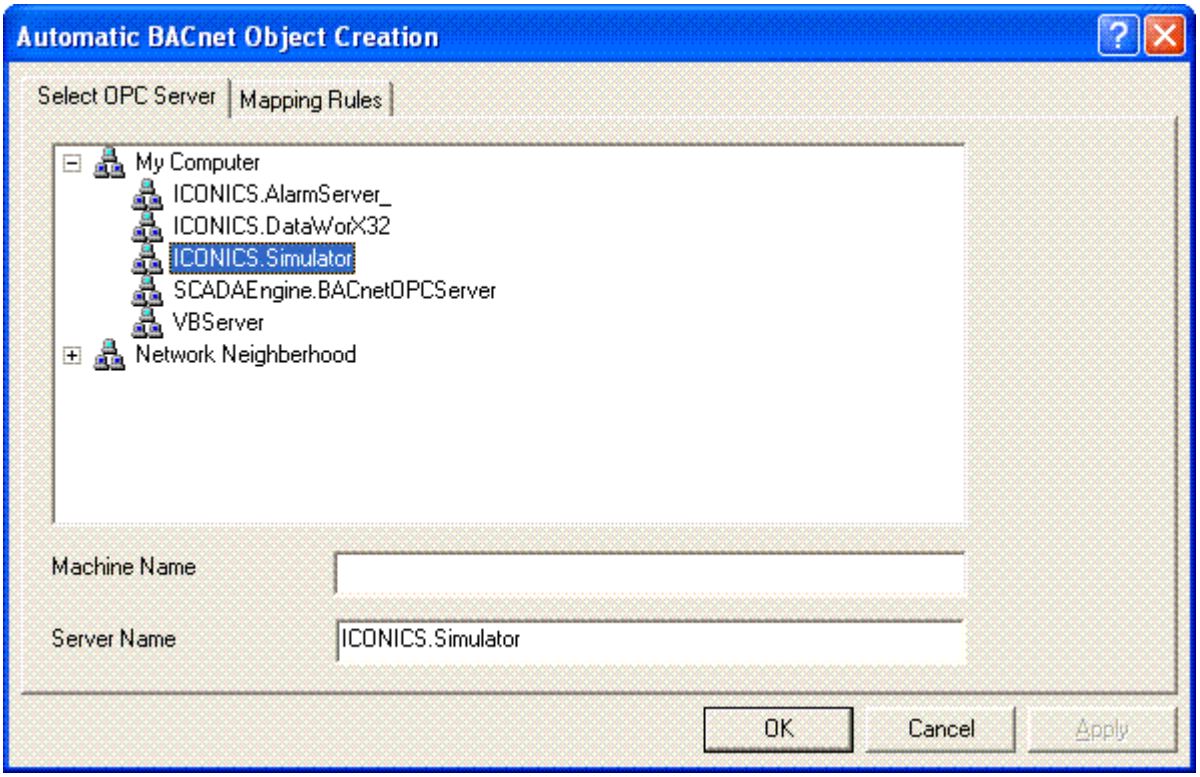
Instance

The Instance Number is the instance of the type of Object which is being read from the device, it forms part of the mapping from BACnet to OPC. The accepted range is 0 to 4194303.

Automatic Creation

Overview

The application can automatically create internal BACnet Objects from an OPC server. To create objects automatically select "Automatic Object Creation" from the tools menu to bring up a list of available OPC Servers on the network. Select an OPC Server from the list and then select OK. The application will attempt to read all of the OPC Tags within the OPC server and map the Tags to BACnet internal objects. The Datatype of the OPC Tag is used to determine the type of BACnet Object to use.



Database

The OPC Tags are stored in a CSV file saved on the hard disk. This file can be edited in Microsoft Excel if required. One possible reason for editing the file would be to rename the OPC Tags.

NT Service

Configuration

The BACnet OPC Client can operate as an NT Service by selecting Tools - Options from the menu. This will bring up a dialog box which has a checkbox for selecting NT Service operation. After this option has been selected, then application must be closed, and can only be restarted from the Control Panel - Services Applet. By default, the application will be set to "Interact With Desktop" and will be visible in the taskbar. To make the Service run in the background, uncheck this option from the control panel.

Protocol Implementation Conformance Statement

Products

Product	Model Number	Protocol Revision	Software Version	Firmware Version
SCADA Engine BACnet OPC Client	BACnOPCSvr	135-1995b (1)	1.0.0.1	1.0.0.1

Date Tested: Not Tested

Vendor Information

SCADA Engine

5A Hartnett Close
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Australia
www.scadaengine.com

Product Description

The SCADA Engine BACnet OPC enables BACnet properties to be read and written to from an OPC compliant workstation.

BACnet Standardized Device Profile

Product	Device Profile	Tested
BACnOPCSvr	BACnet Application Specific Controller (B-ASC)	

Supported BIBBs

Product	Supported BIBBs	BIBB Name	Tested
BACnOPCSvr	DS-RP-A	Data Sharing-ReadProperty-A	
	DS-RPM-A	Data Sharing-ReadPropertyMultiple-A	
	DS-WP-A	Data Sharing-WriteProperty-A	

	DS-WPM-A	Data Sharing-WritePropertyMultiple-A	
	DS-COV-A	Data Sharing-COV-A	
	DS-COVU-A	Data Sharing-COV-Unsolicited-A	
	AE-N-A	Alarm and Event-Notification-A	
	AE-ACK-A	Alarm and Event-ACK-A	
	AE-ASUM-A	Alarm and Event-Alarm Summary-A	
	AE-ESUM-A	Alarm and Event-Enrollment Summary-A	
	DM-DDB-A	Device Management-Dynamic Device Binding-A	
	SCHED-A	Scheduling-A	

Standard Object Types Supported

Product	Object Type	Creatable	Deletable	Tested
BACnOPCSvr	Analog Input	Yes	Yes	
	Analog Output	Yes	Yes	
	Analog Value	Yes	Yes	
	Binary Input	Yes	Yes	
	Binary Output	Yes	Yes	

	Binary Value	Yes	Yes	
	Calendar	Yes	Yes	
	Device	No	No	
	Event Enrollment	Yes	Yes	
	File	Yes	Yes	
	Loop	Yes	Yes	
	Multi-state Value	Yes	Yes	
	Notification Class	Yes	Yes	
	Program	Yes	Yes	
	Schedule	Yes	Yes	
	Trend Log	Yes	Yes	

Data Link Layer Options

Product	Data Link	Options	Tested
BACnOPCSvr	BACnet/IP (Annex J)	Can communicate as a Direct BACnet/IP device. Can register as a Foreign BACnet/IP device.	
	Ethernet (ISO 8802-3)		
	MS/TP Master	9600, 19200, 38400, 76800	
	PTP		

Segmentation Capability

Product	Segmentation Type	Supported	Window Size (MS/TP product limited to 1)	Tested

BACnOPCSvr	Able to transmit segmented messages	Yes	Configurable	
	Able to receive segmented messages	Yes	Configurable	

Device Address Binding

Product	Static Binding Supported	Tested
BACnOPCSvr	Yes	

Networking Options

Product	Router Option	Options	Tested
All Products	Router	Multiple BACnet/IP, Multiple Ethernet, Multiple MS/TP Multiple PTP	

Character Sets

Product	Character Sets supported	Tested
All Products	ANSI X3.4	