

Chipkin™ CAS BACnet Explorer USER MANUAL

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DOCUMENT REVISION HISTORY

REVISION	DATE	AUTHOR	NOTE
1	2019-May-13	ACF	- Updated document

Table 1 - Document Revision History

1. PREFACE

1.1 Welcome

As a new owner of Chipkin Automation Systems'™ (CAS) Software you have joined thousands of satisfied customers who use Chipkin's protocol gateways, data clients and integration services to meet their building and industrial automation requirements. Our configuration expertise in this field combined with free BACnet and other tools ensure your success; and our customer support via phone, email and remote desktop tools means that we're there when you need us. Thank you for choosing Chipkin's products.

1.2 Chipkin

Chipkin offers expert solutions for your building and industrial automation requirements. We develop, configure, install and support gateways (protocol converters), data loggers, and remote monitor and controlling applications. Founded in October 2000, Chipkin provides expert solutions for converting BACnet®, Modbus®, and Lonworks®—to name just a few—and enabling interfaces for HVAC, fire, siren, intercom, lighting, transportation and fuel systems. The high-quality products we offer (including those from other vendors) interface with Simplex™, Notifier™, McQuay™, GE™ and many others—so you can rest assured that Chipkin will select the most appropriate solution for your application.

1.3 Safety Warnings

The CAS Software User Manual provides information on how to install and setup the software and is intended for engineers, project management consultants and building management services. Before you install the device, please observe the safety warnings described in in this manual.

1.4 Customer Support

Chipkin is a small responsive company, and we live or die by the quality of our service—and with offices in two time-zones—we can provide support when you need it. For information on sales, service, obtaining documentation or submitting a service request, please call us toll free at 1-866-383-1657. Thanks for choosing Chipkin's protocol gateways, data clients and integration services to meet your building and industrial automation requirements.



SALES AND CUSTOMER SUPPORT

TOLL FREE: 1-866-383-1657

FAX: 1-416-915-4024

EMAIL: salesgroup1@chipkin.com

GENERAL

TOLL FREE: 1-866-383-1657

FAX: 1-416-915-4024

EMAIL: support@chipkin.com

SHIPPING ADDRESS

3381 Cambie St., #211

Vancouver, BC, Canada V5Z 4R3

2. OVERVIEW

2.1 Product Summary

CAS BACnet Explorer is the perfect utility for testing, debugging and discovering BACnet® networks and devices. It performs the following functions:

- **Exploring** – Automatically discovers all the BACnet devices, objects, and their properties on your network. The objects and devices are arranged in an easy to use tree format with branches for each network, object, and device.
- **Debugging** – With the report function you can document the current state of your BACnet® network and use the information in your documentation. Never again ask yourself if a BACnet® device is on your network, and what value does it have.
- **Monitoring** – A monitoring table can be set up to check the present value or any other property of a BACnet® object, easily with a single glance.
- **Testing** – The CAS BACnet Explorer allows you to write to the BACnet® points, turn lights on or off, generate alarms, ACK alarms, etc.

2.2 Product Features

- BACnet IP, BACnet Ethernet 802.3 and BACnet MS/TP up to 76k.
- Creates easy to read reports in HTML/XML suitable for documentation.
- Ability to read/write any property of a BACnet Object.
- Browses on BACnet IP, BACnet Ethernet 802.3 and BACnet MSTP simultaneously.
- Tested with 100s of 3rd party BACnet devices.
- Simple enough to be used by a someone without any BACnet protocol knowledge.
- Supports selection of BACnet network device on PC with more than one network card.

2.3 System Requirements

2.3.1 Operating System

The following operations systems are supported:

- Windows 2000
- Windows XP
- Windows 7 (32bit and 64bit)
- Windows 8 (32bit and 64bit)
- Windows 10 (32bit and 64bit)



Note: This application does **not** run in Windows Server 2012 edition.

2.3.2 Required Disk Space

The CAS BACnet Explorer requires 10mb of free space.

2.3.3 Serial Ports

Using BACnet MSTP requires an RS485 port. You will need to purchase a USB to RS485 converter. We recommend using an [Abacus USB to RS232/RS485 Converter](#).

3. GETTING STARTED

This section describes the steps to start using this software application. The section includes how to install the application, what happens the first time the application is run, and how to setup the application.



Note: This section has brief descriptions pertaining only to the initial start-up of the application. Please see other sections for more detailed information.

3.1 Installation

To install the CAS BACnet Explorer, click on the following link to download the installer.

http://www.chipkin.com/files/resources/Installer_CAS%20BACnet%20Explorer.exe

Launch the installer after downloading and follow the prompts to install the application.

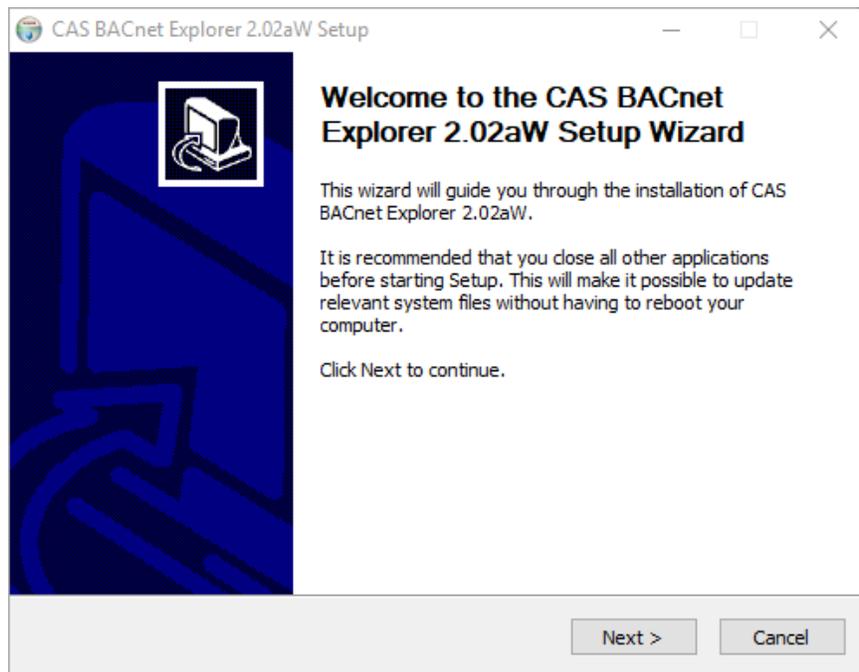


Figure 3.1-1 - Installer Welcome Page

Press Next > to continue to the License Agreement. On the License Agreement page, review the license and click Accept License and then the Next > to continue.

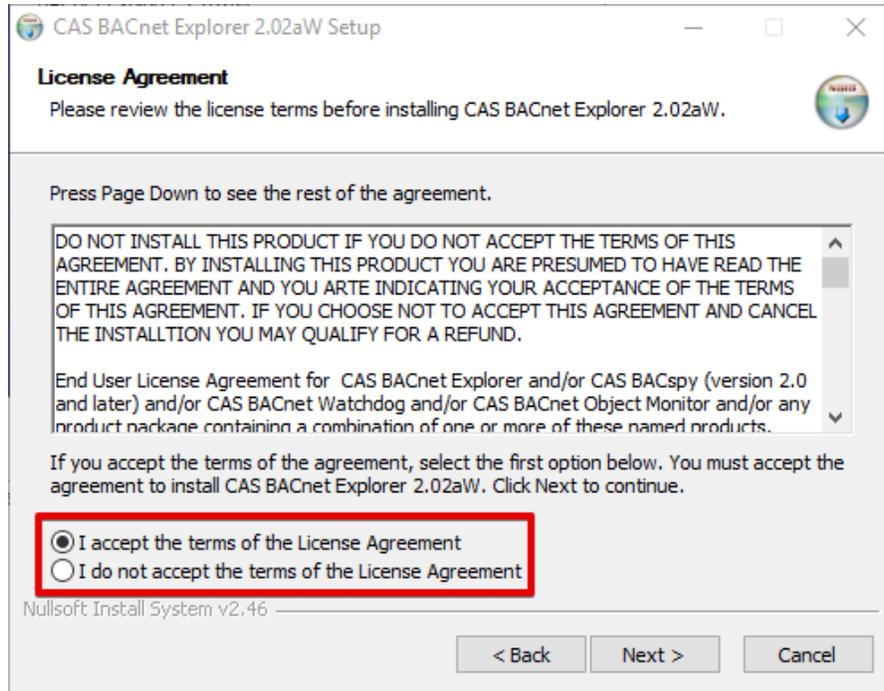


Figure 3.1-2 - License Agreement Page

Choose the components for the install. If unsure, keep all the defaults and click the Next > to continue.

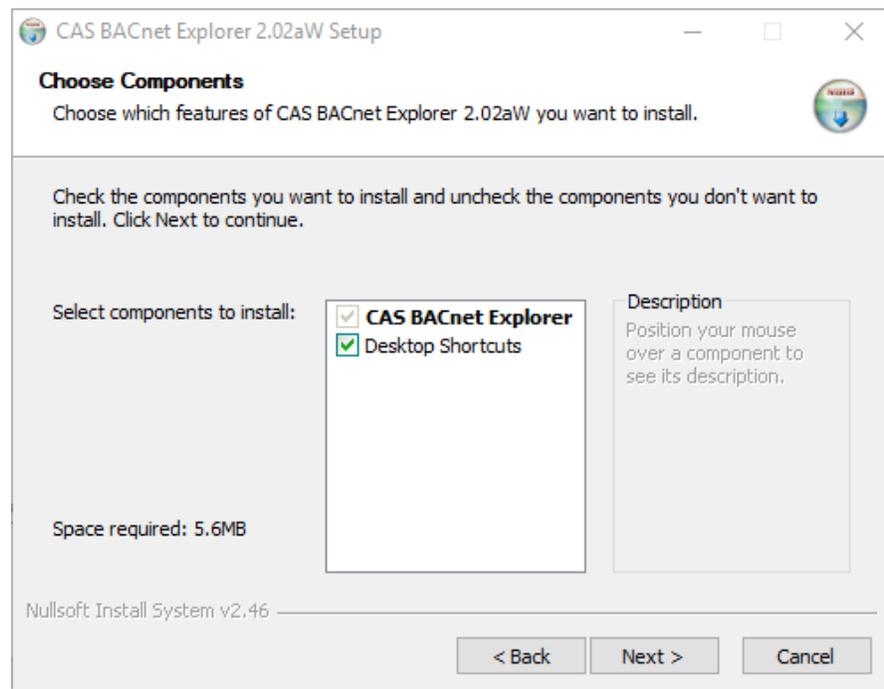


Figure 3.1-3 - Choose Components Page

Next, choose the install location and press the Next > to continue.

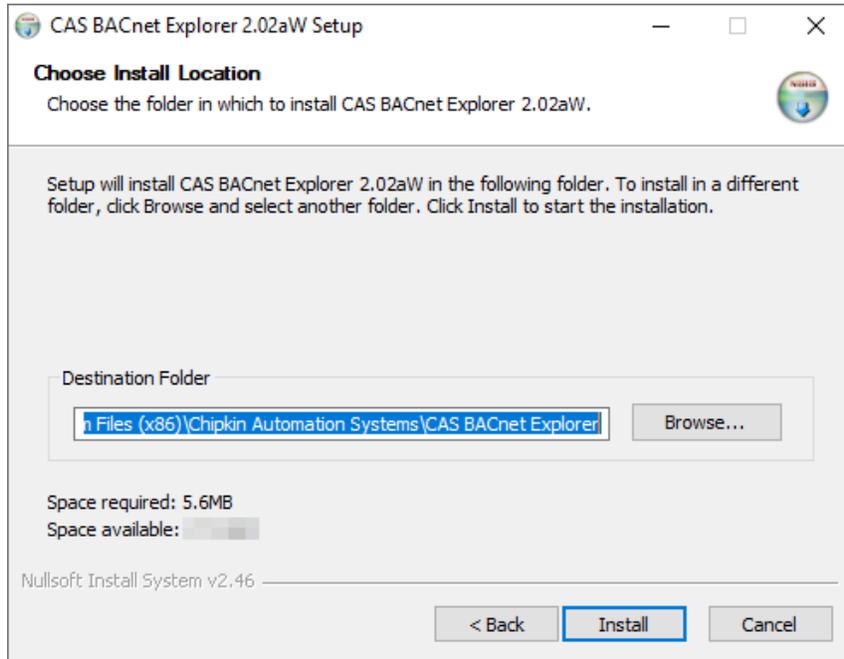


Figure 3.1-4 - Choose Install Location Page

If the installation is successful you will see the following page. Check the box to run the application after the installation process is complete.

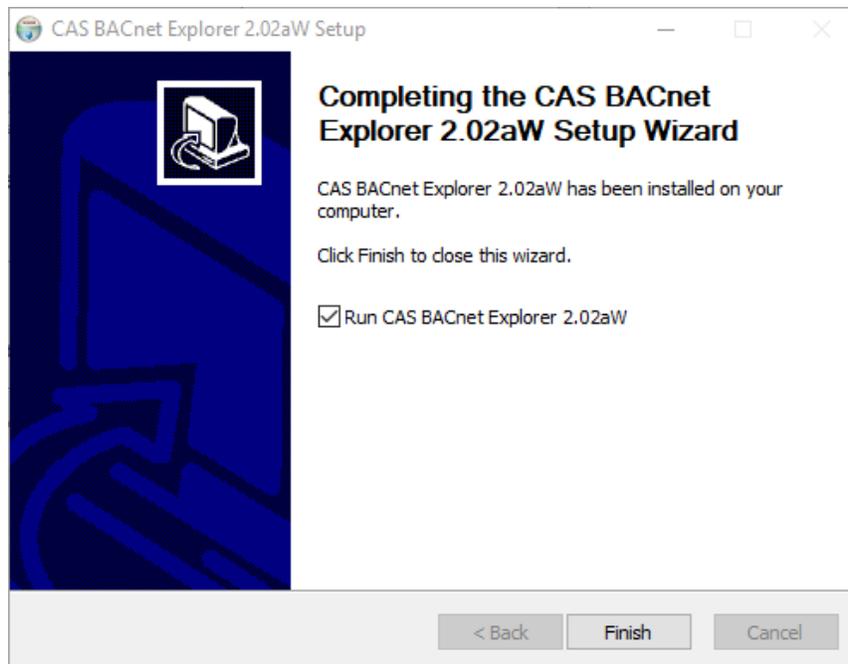


Figure 3.1-5 - Installation Complete Page

3.2 Software Licenses

There are a few different licenses that are provided for the CAS BACnet Explorer. Here is a brief description of them.

3.2.1 Physical USB License Key

When purchasing the CAS BACnet Explorer, you will receive a green USB key. This USB key is the physical license key and must be plugged into the computer running the CAS BACnet Explorer application.



Figure 3.2-1 - Physical USB License Key

3.2.2 Soft Keys

If you have not yet received the green USB key, or are trying out the CAS BACnet Explorer as a demo, you can request a license from within the application. Copy and paste the key into the specific location in the application to apply the license. For more information about this, please refer to [Section 3.3.1 Requesting a License](#).

3.3 Application Start-up

When running the application for the first time, you will see the main application window:

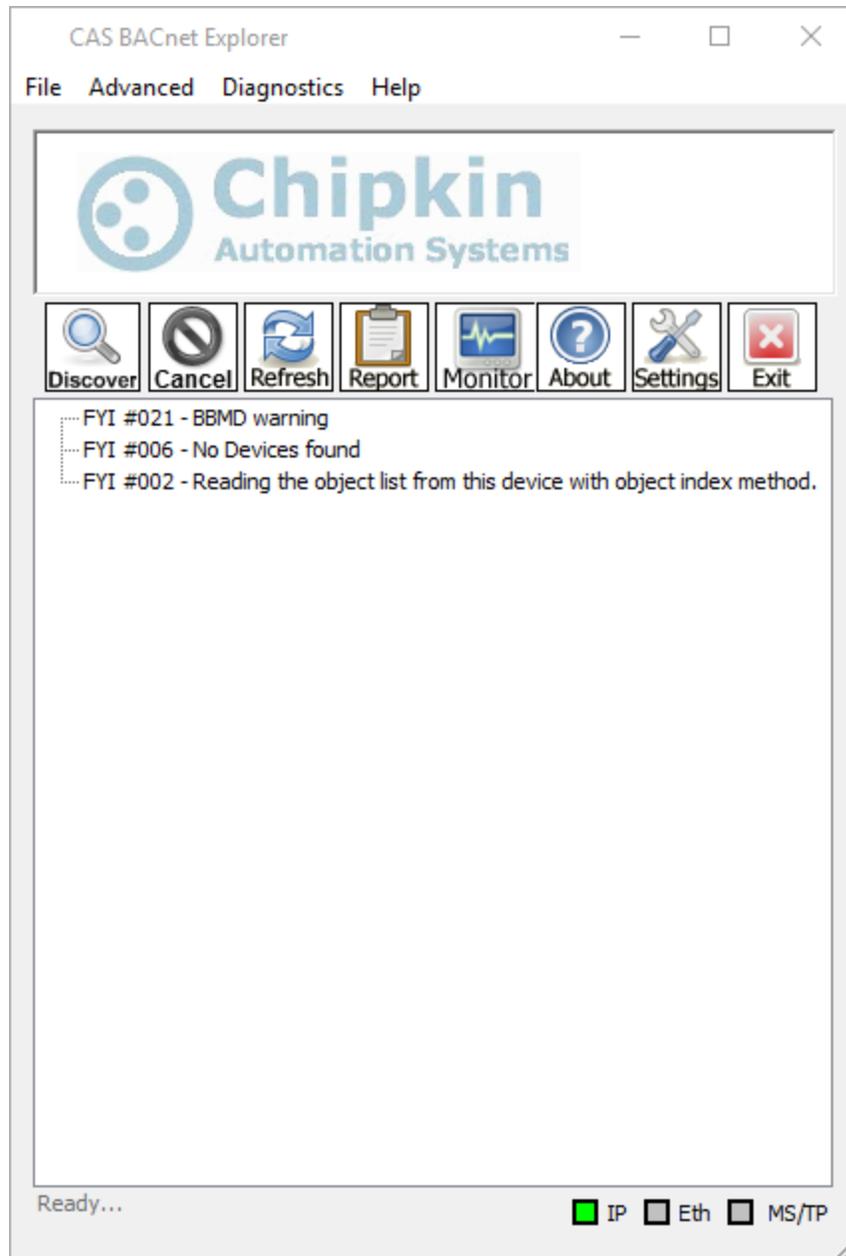


Figure 3.3-1 - CAS BACnet Explorer - Main Page

If you do not have a green USB key, then you will see the license page and must request a license before continuing:

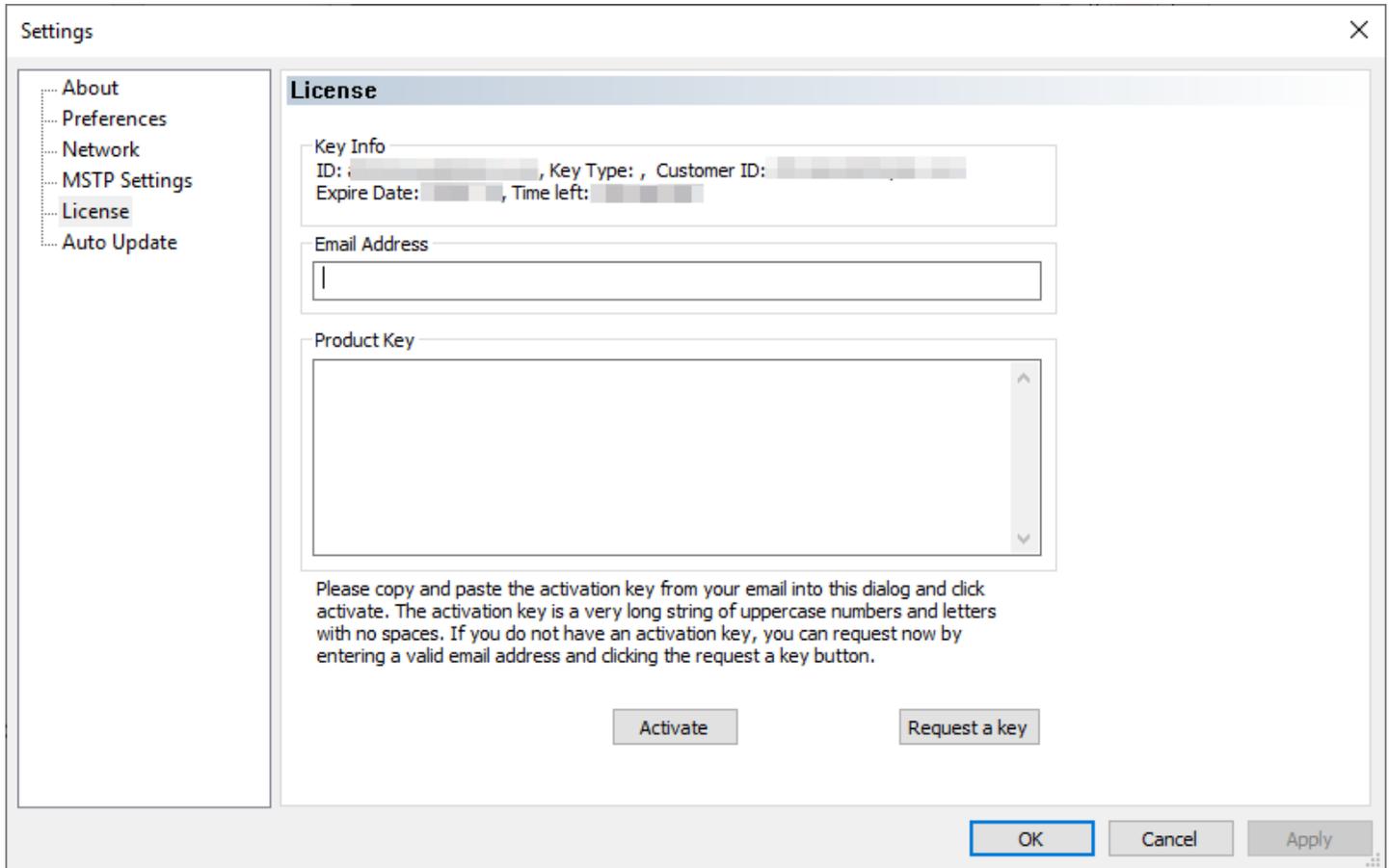


Figure 3.3-2 - Blank License Page

3.3.1 Requesting a License



Note: To request a license, the computer must have internet access.

First, enter in an email address. If you have purchased the CAS BACnet Explorer, please provide the email address that is associated with the purchase order, or contact Chipkin so we can update our records.

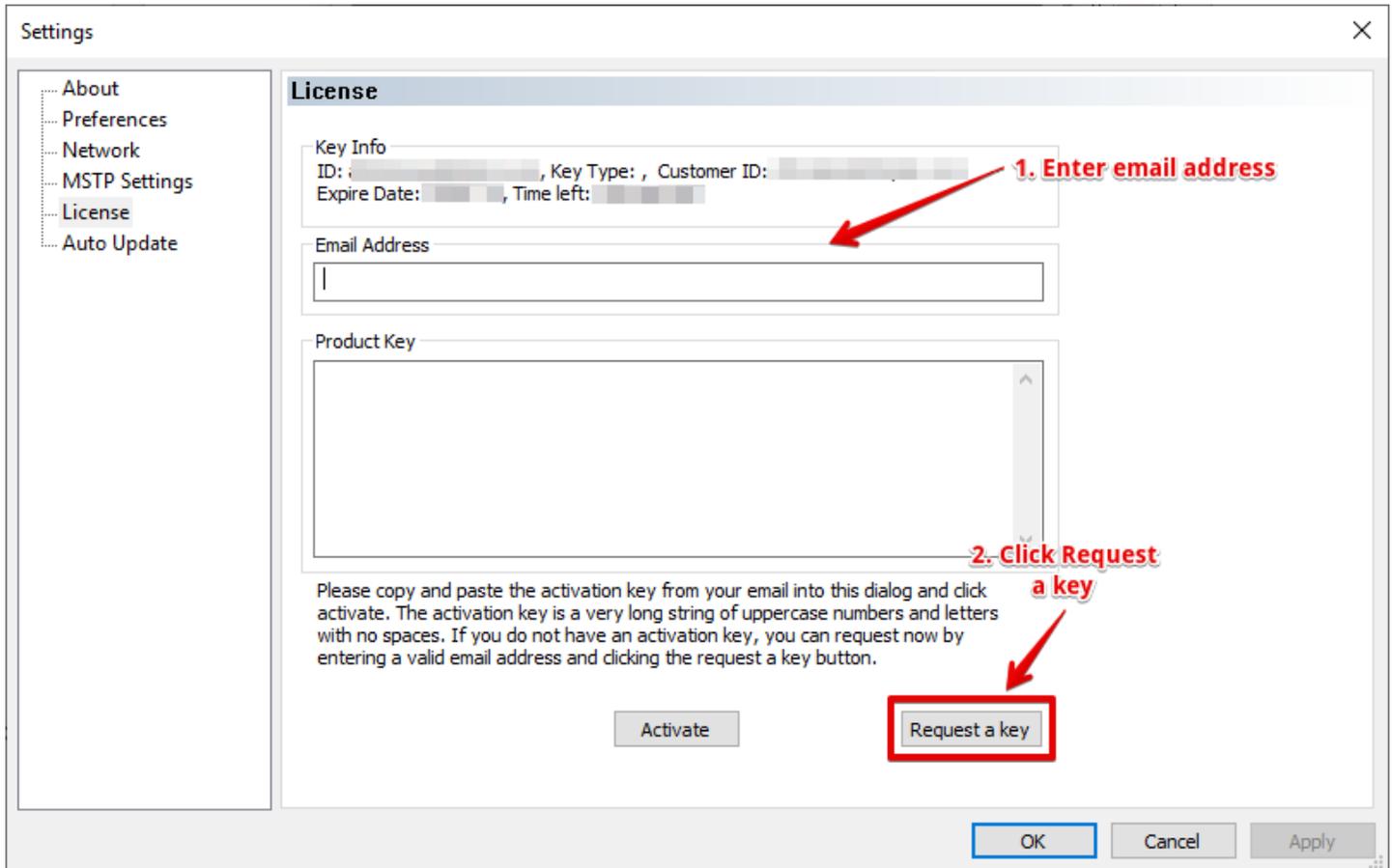


Figure 3.3-3 - Requesting a Key

Next, click the “Request a key” button. A web page will open with a form. Fill out the form if there are any blanks.



Request a product key

You have two choices

1. Obtain / Renew your trial license.

This can be done by you. The process is automated and can be completed 24/7.

Simply continue and complete this form and the new activation key will be emailed to you a

Name:	<input type="text"/>
Email Address:	<input type="text"/>
Product:	CAS BACnet Explorer 2.02aW
	<input type="button" value="Request a key"/>

What happens if you want to evaluate our software for more than 1 hour?

Email us directly or call and ask. In almost all cases we have accepted bone fide requests for

This can only be done during normal business hours.

Figure 3.3-4 - Request a license key form

Fill out the Name and Email Address fields. The Email Address field may already be pre-filled.

Finally click the “Request a key” button. You will see a product key to copy and paste into the application.

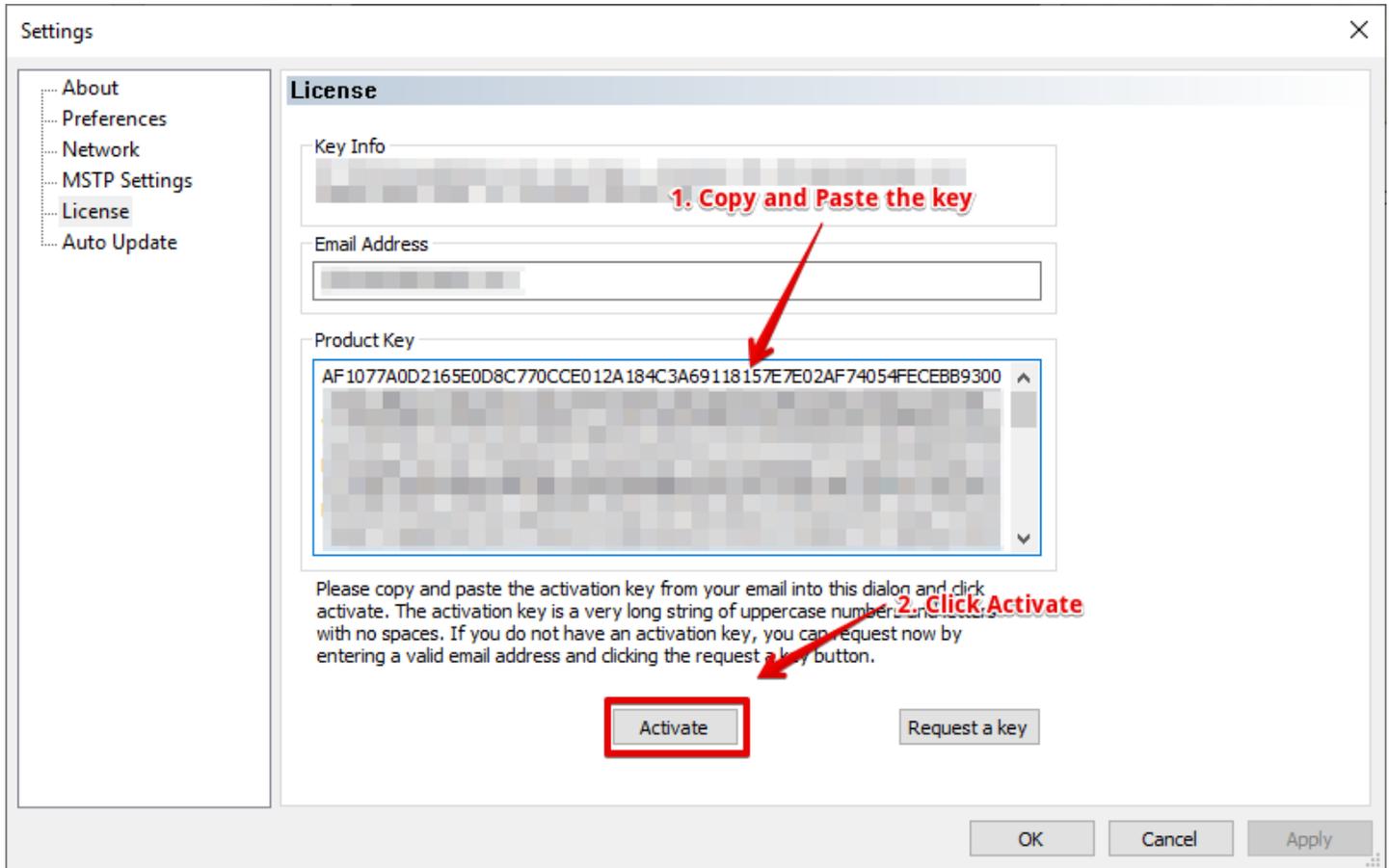


Figure 3.3-6 - Activating the License Key

If successful you will see the following message:

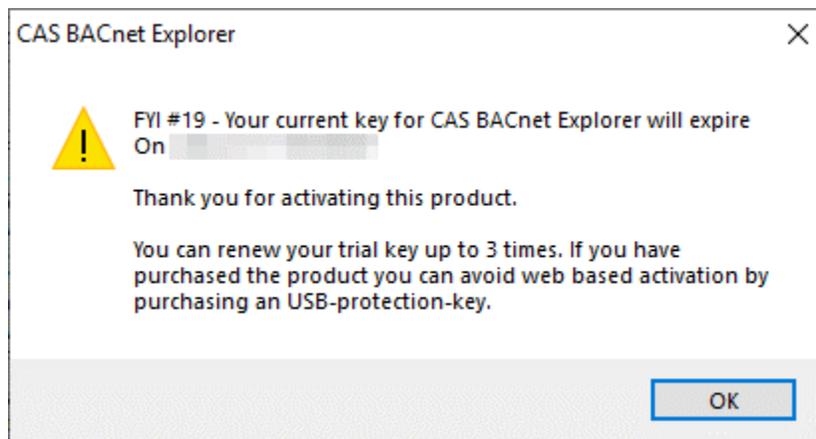


Figure 3.3-7 - License activation successful

Click the “OK” button to close the success message and click the “OK” button on the License Page to close the License Page.

3.4 Settings

Before starting, we need to setup the application to specify which BACnet networks to use.

Click the “Settings” toolbar icon as seen below:

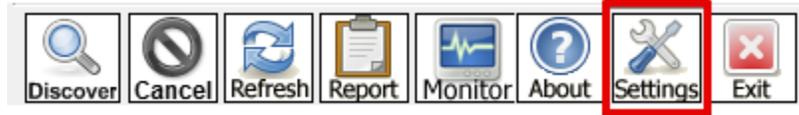
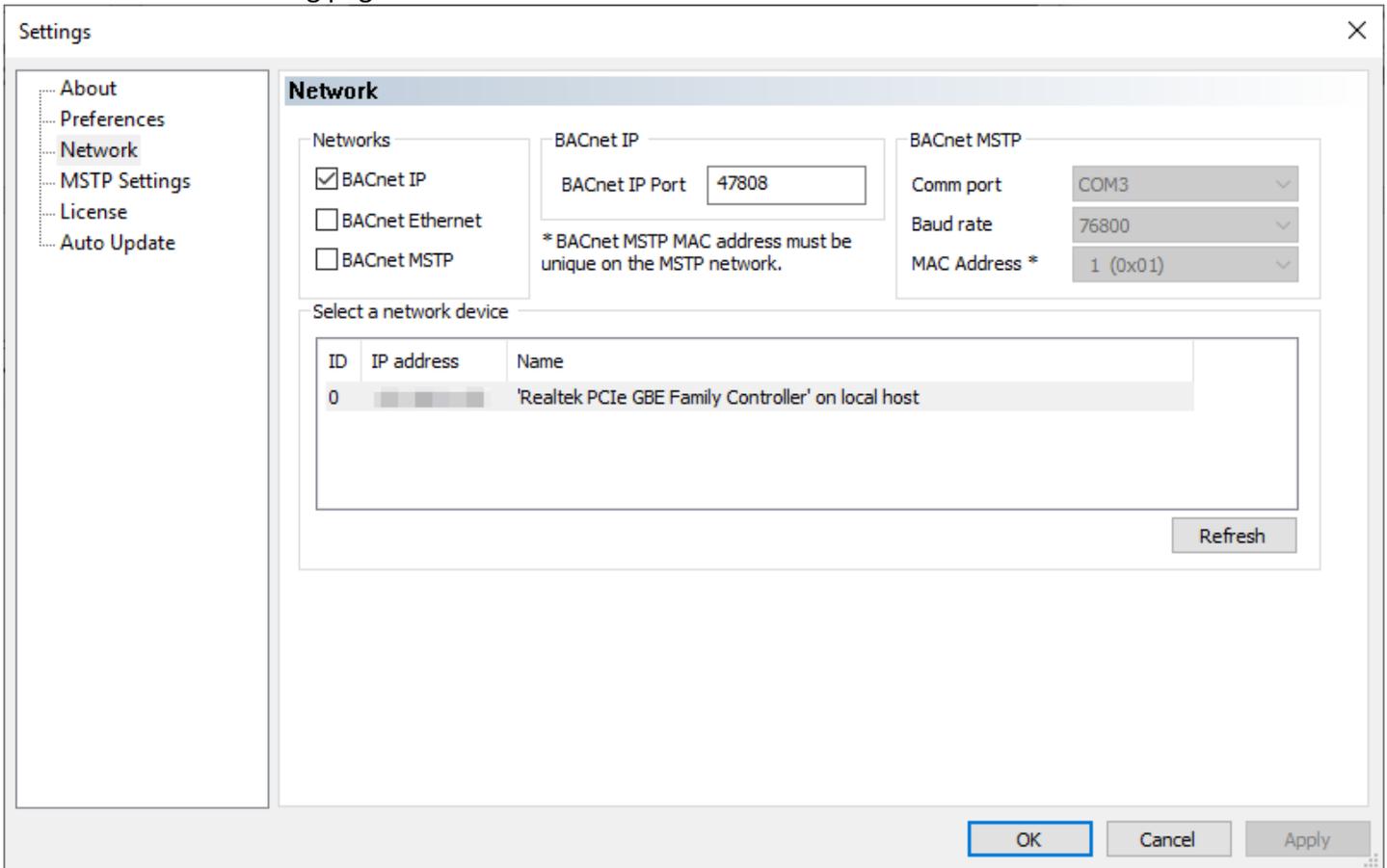


Figure 3.4-1 - Toolbar - Settings Icon

You will see the following page:



On this page, first select the BACnet networks to use. If unsure, select “BACnet IP”.

Next, select the BACnet IP Port to use. The default is 47808.

If using BACnet MSTP, then in the BACnet MSTP section, select the Comm port that is the RS485 serial port, select a baud rate, and finally select the MAC Address that is to be assigned to the application.

Finally, select the NIC (Network Interface Card) to use for BACnet IP traffic.

When finished, click the “OK” button to save the settings and close the settings window.

If the network has successfully been setup, the BACnet Network Status icons will appear green.



Figure 3.4-2 - BACnet Network Status

For more information, or if the icons are red, please refer to [Section 8.1 BACnet Network Status](#).

3.5 Discovery

Now, click on the “Discover” toolbar icon to begin the discovery process.



Figure 3.5-1 - Discover toolbar icon

The following dialog will appear:

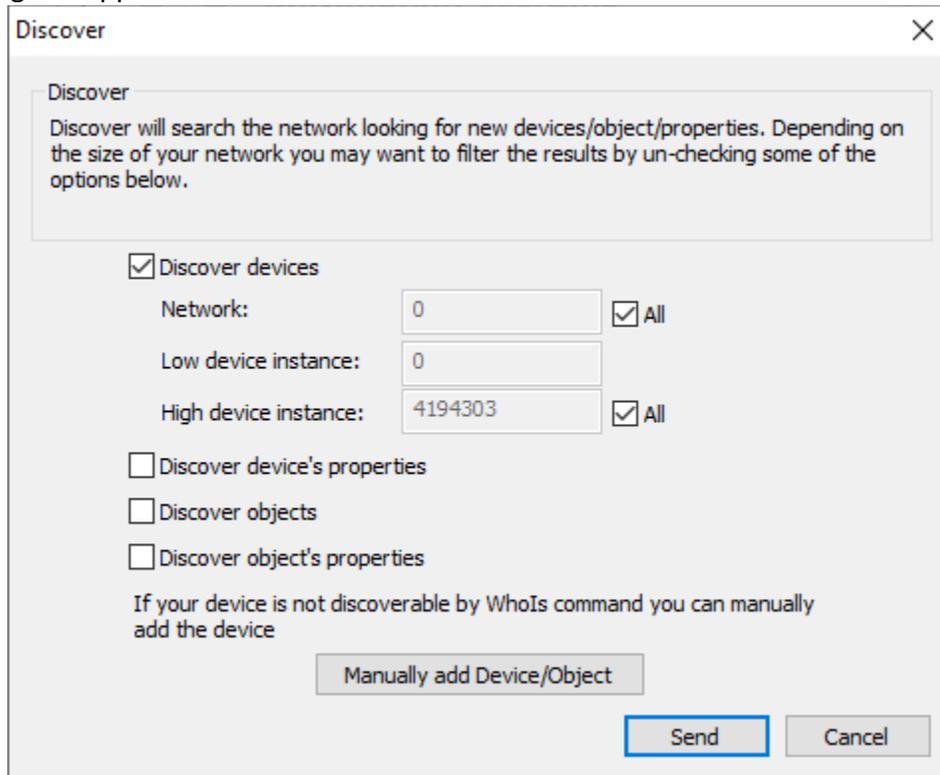


Figure 3.5-2 - Discover dialog

Click the “Send” button to discover any BACnet devices on the network.

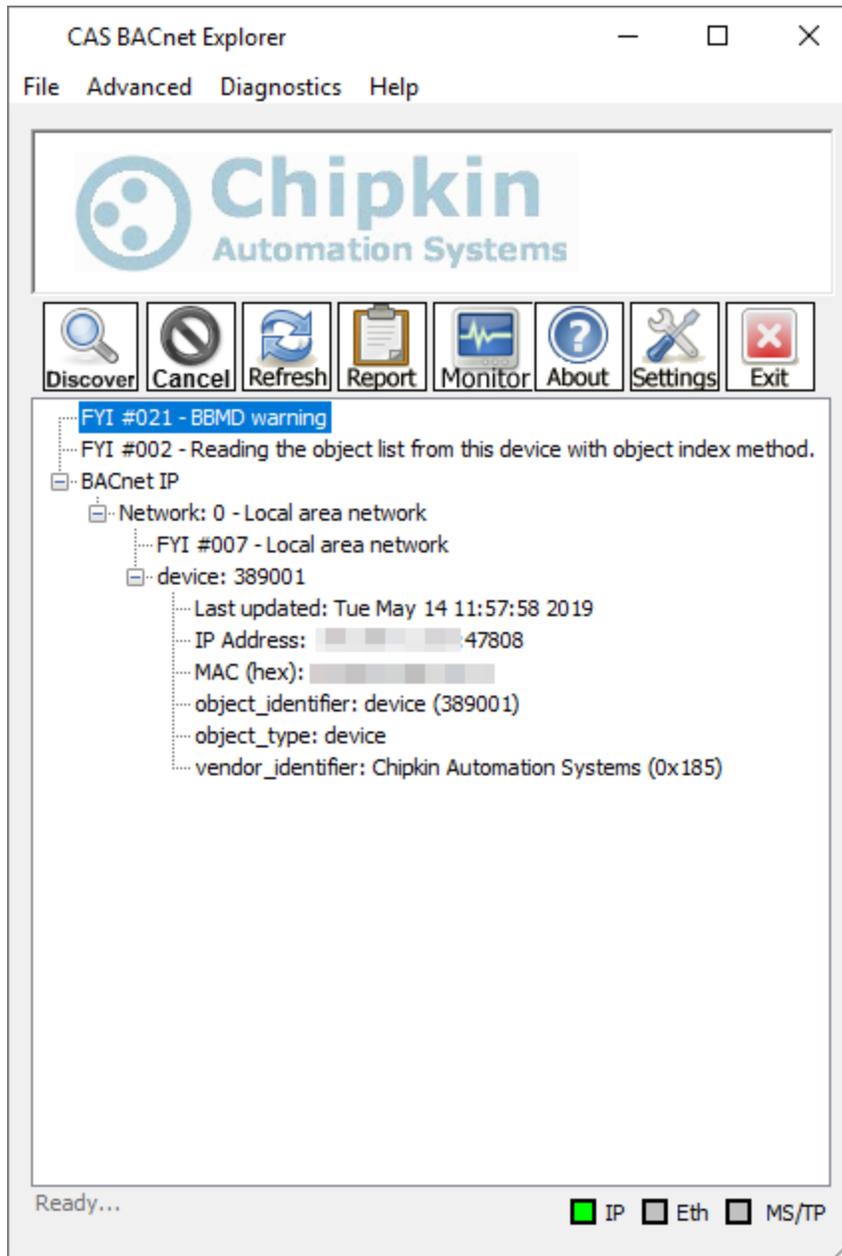


Figure 3.5-3 - Discovered device

If there are devices on the network, they will appear in a collapsible tree in the main window of the application. For more information about the discovery process, please refer to [Section 4.1 Discover](#).

4. TOOLBAR ACTIONS

This section contains instructions and descriptions of the various toolbar icons.



4.1 Discover

The Discover action opens a dialog to send a combination of Who-Is and Read Property BACnet messages to find BACnet devices and their objects and properties.



Figure 4.1-1 - Toolbar Action – Discover

Click on the “Discover” icon to open the Discover dialog.

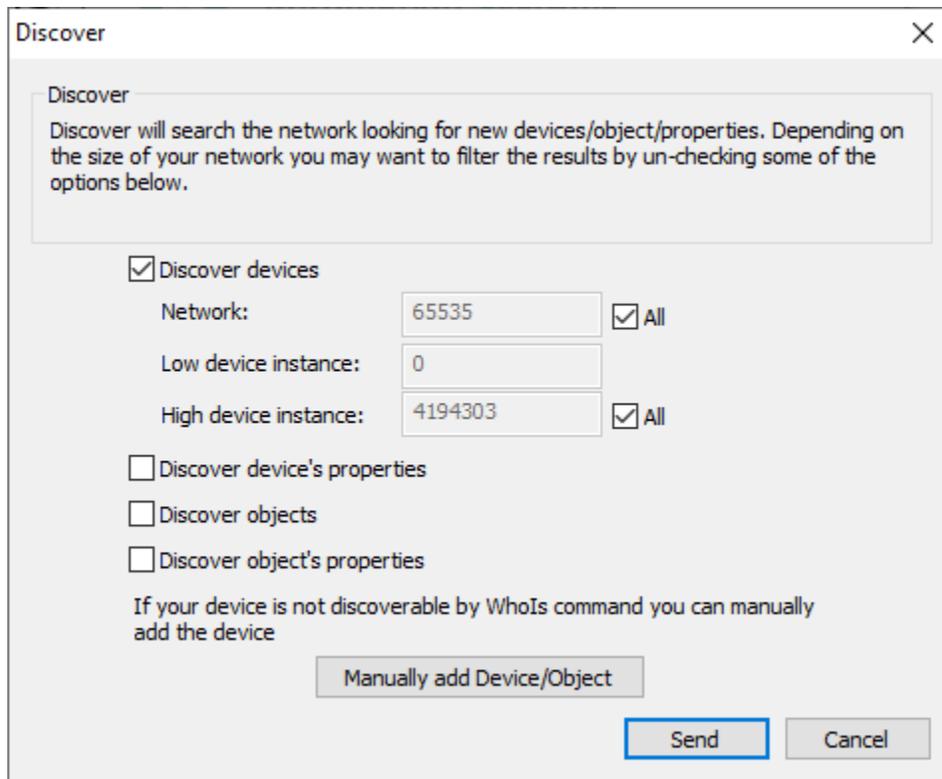


Figure 4.1-2 - Discover Dialog

Depending on the options selected, various BACnet messages will be sent out.

4.1.1 Discover Devices

If checked, the CAS BACnet Explorer will send a broadcasted Who-Is message based on the following parameters:

- **Network:** If all is checked, broadcasts across all BACnet networks using the value 65535. Otherwise, broadcasts on only the specified BACnet network.
- **Low device instance / High device instance:** If all is checked, the Who-Is requests for all devices with instance from 0 to 4194303. Otherwise, requests for only devices within the low device instance to high device instance range, inclusively.

4.1.2 Discover Device's Properties

If checked, the CAS BACnet Explorer will attempt to send a Read Property Multiple all to the BACnet devices to get all the device properties. If there are too many properties to fit in one single packet, the device may respond with a BACnet Abort: Segmentation Not Supported. If this occurs, then the CAS BACnet Explorer will send Read Property messages for all the common device properties.

4.1.3 Discover Objects

If checked, the CAS BACnet Explorer will send Read Property Multiple all to read the device's object list. If there are too many objects to fit in one single packet, the device may respond with a BACnet Abort: Segmentation Not Supported. If this occurs, then the CAS BACnet Explorer will send a Read Property message for each index of the Object List property array.

4.1.4 Discover Object's Properties

If checked, the CAS BACnet Explorer will send Read Property Multiple all messages to read the device's object's properties.



Note: All of these options can be selected at the same time, but this may slow down the discover process as it polls for every object and property on each device that was discovered.

4.2 Cancel

The Cancel action is only active when another action is currently running and is used to cancel that action.

When the Cancel action is disabled / not available, it is greyed out.



Figure 4.2-1 - Toolbar Action - Cancel

4.3 Refresh

The Refresh action is used to refresh the value of an individual property or all the properties of an object or device.



Figure 4.3-1 - Toolbar Action - Refresh

To refresh a value, click on a Device, Object, or Property to highlight it, then click the Refresh action.

4.4 Report

The Report action is used to create a report of the BACnet network. The resulting report is created in the following formats:

- HTML
- XML
- Text

These reports can be used to document your current BACnet network configuration



Figure 4.4-1 - Toolbar Action – Report

When clicking the “Report” action, you will see the following dialog:

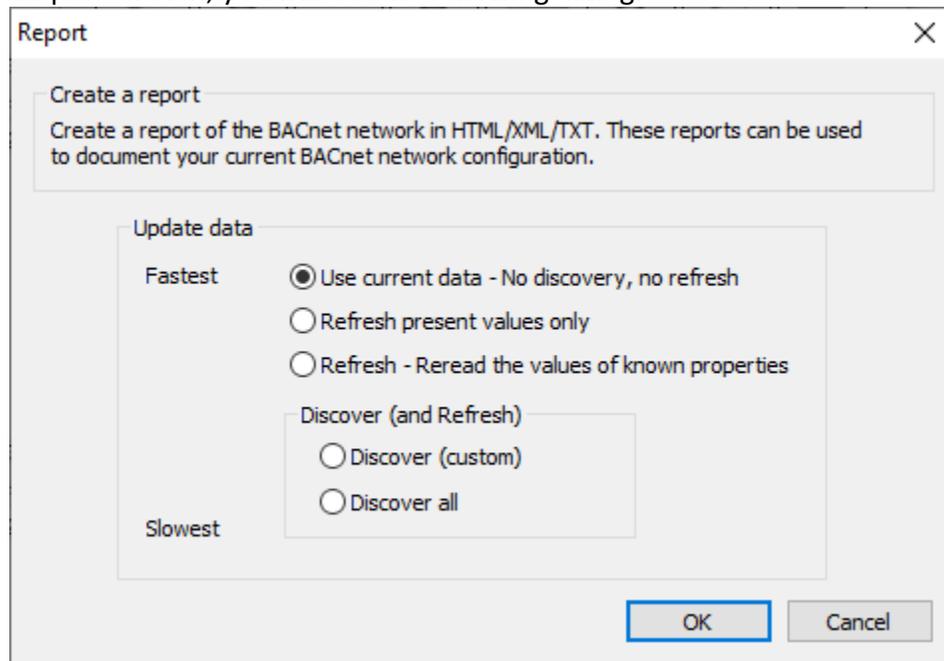


Figure 4.4-2 - Report Dialog

Select one of the following options:

- Use current data – Generates the report with all the existing data. This is the default option.
- Refresh present values only – Before generating the report, refreshes all the values of the present value properties.
- Refresh – Before generating the report, refreshes all the values of all the known properties.
- Discover (and Refresh)
 - Discover (custom) – Before generating the report, completes a custom discover action.
 - Discover all – Before generating the report, completes a full discover action.

After the report has been generated, the HTML version of the report will automatically load in a web browser.

An example of the output follows:

CAS BACnet Explorer

This report was created with [CAS BACnet Explorer 2.02aW](#)

Created with: CAS BACnet Explorer 2.02aW

Last Updated: 5/14/2019 13:56

FYI #021 - BBMD warning

FYI #002 - Reading the object list from this device with object index method.

- [Flat report](#) - The flat report shows a list of all the nodes and points on a single page
- [Hierarchical report](#) - The Hierarchical report is a list of nodes, that leads to a single page of details per node.
- [Static Device List](#) - A striped down version of the device list
- [Static Points List](#) - A striped down version of the Points list
- [BACnet XML](#) - XML version of data
- [BACnet Data](#) - Text version of data

Figure 4.4-3 - Example HTML Report output

To access all the report files, click on the Diagnostics menu and click the “View debug files” option. A file explorer will open at the CAS BACnet Explorer install directory. All the reports will be stored in the “reports” folder. See image below:

exports	7/21/2016 2:01 PM	File folder	
logs	5/31/2016 9:53 AM	File folder	
reports	5/14/2019 1:56 PM	File folder	
database.db	5/31/2016 10:01 AM	Data Base File	19 KB
Debuglog.txt	5/14/2019 1:57 PM	Text Document	8 KB
dump.txt	5/14/2019 1:56 PM	Text Document	1 KB
license.txt	5/31/2016 10:02 AM	Text Document	1 KB
monitorListSettings.txt	9/6/2017 10:37 AM	Text Document	1 KB
mstp_log.pkt	1/4/2019 1:33 PM	Wireshark capture...	5,993 KB
packets.pkt	5/14/2019 1:25 PM	Wireshark capture...	1 KB
Settings.json	5/14/2019 11:37 AM	JSON Source File	3 KB
style.css	5/14/2019 1:56 PM	CSS Source File	1 KB

Figure 4.4-4 - Reports Directory

4.5 Monitor

The Monitor action opens a Monitor List. Object and Device properties can be added to this list. Any values in this list are polled automatically over time and allows users to quickly take a glimpse of specified values over time.



Figure 4.5-1 - Toolbar Action – Monitor

Clicking on the “Monitor” action will open the following dialog:

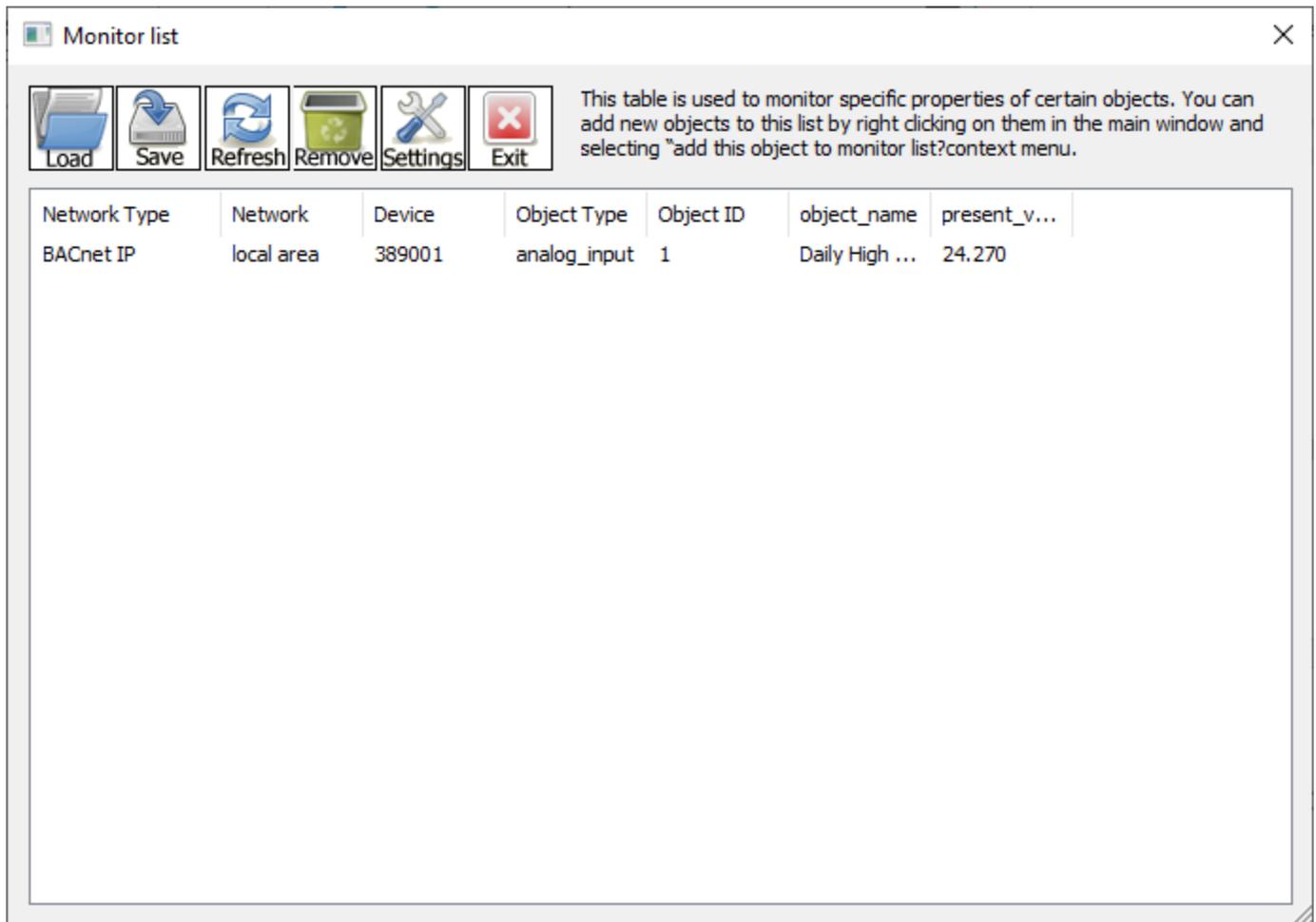


Figure 4.5-2 - Monitor List

To add a property to the monitor list, find the property in the BACnet tree, right-click and click the “Add this object to the monitor list”.

The Monitor List dialog has the following toolbar actions:



Figure 4.5-3 - Monitor List Actions

4.5.1 Load

Opens a file browser to search for a saved monitor list profile to load. The profile is an XML file that contains a list of all the objects and properties that are being monitored.

Selected the file to use. Default is monitor_list.xml. Then press the “Open” button to load the file.

4.5.2 Save

Saves a monitor list profile as an XML file. Click the “Save” action and provide a name for the profile file.

If successful, the following notification will appear:

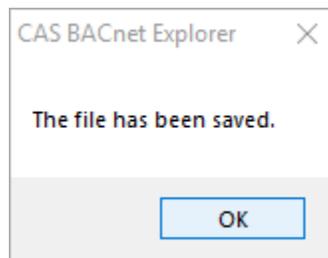


Figure 4.5-4 - Monitor list save success

4.5.3 Refresh

Click the “Refresh” to immediately refresh all of the values in the Monitor List.

4.5.4 Remove

Select a row in the Monitor List, then click the “Remove” action to delete that entry from the Monitor List.

4.5.5 Settings

Click on the “Settings” action to open the Monitor List Settings dialog:

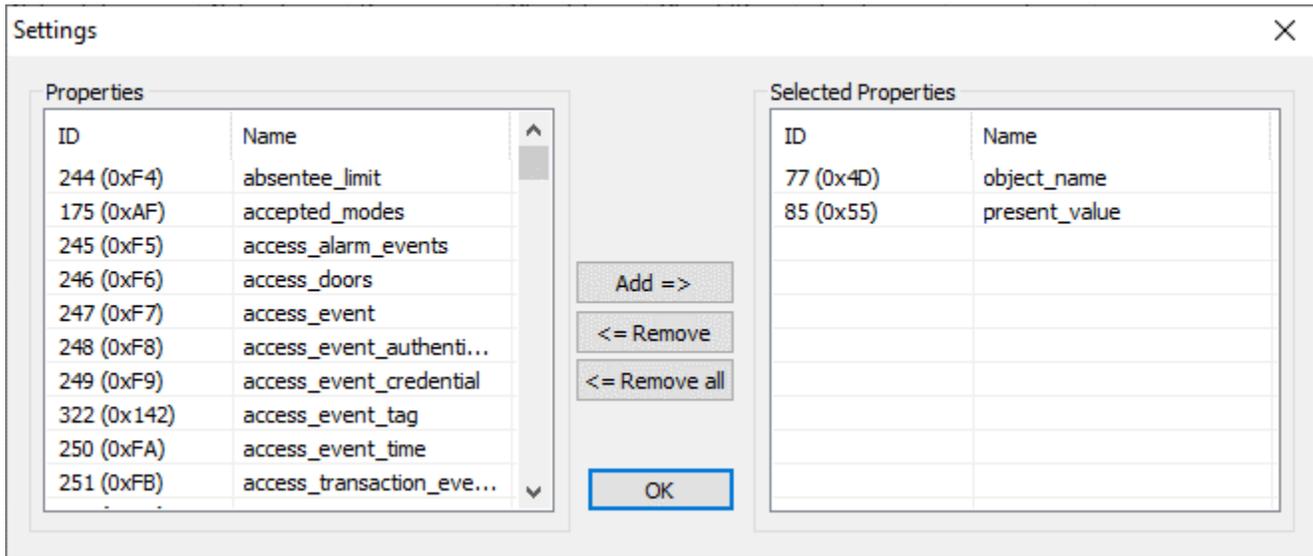


Figure 4.5-5 - Monitor list settings dialog

On the settings page, select different properties to either add to be monitored, or remove. You can also remove all the currently monitored properties to start from a clean slate. Click “OK” to close the dialog.

4.5.6 Exit

Click the “Exit” action to close the Monitor List dialog.

4.6 About

The “About” action opens the About Page that contains information about the application.



Figure 4.6-1 - Toolbar Action – About

Clicking the “About” action opens the following dialog:

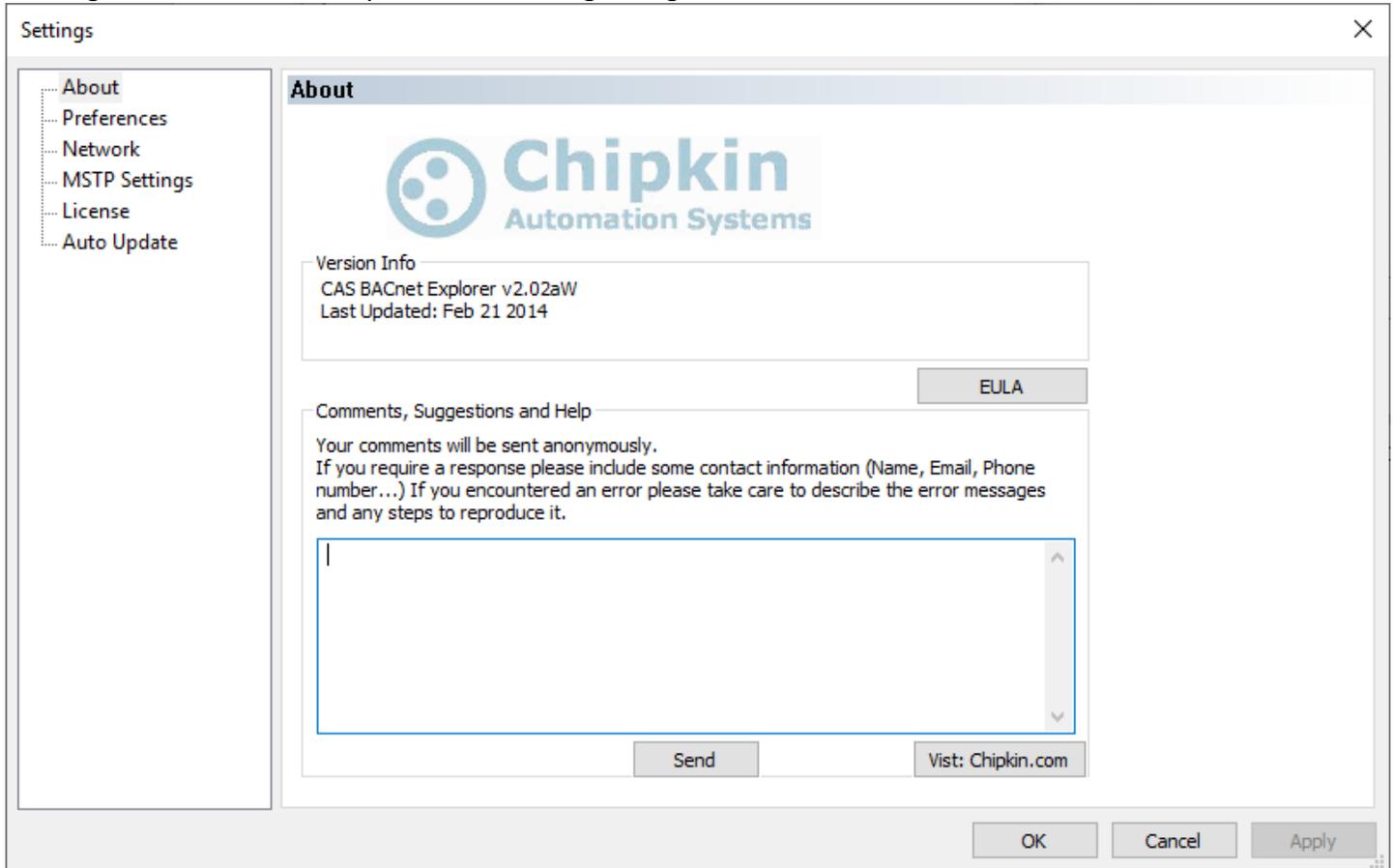


Figure 4.6-2 - About dialog

The About Page contains the application version info, the EULA (End User License Agreement) as well as a Comments, Suggestions, and Help section. You can also open a web browser to visit Chipkin.com by clicking on the “Visit: Chipkin.com” button.

4.7 Settings

The “Settings” action opens the Settings Page which contains multiple subpages for different settings of the application.



Figure 4.7-1 - Toolbar Action – Setting

Clicking the “Settings” action opens the following dialog:

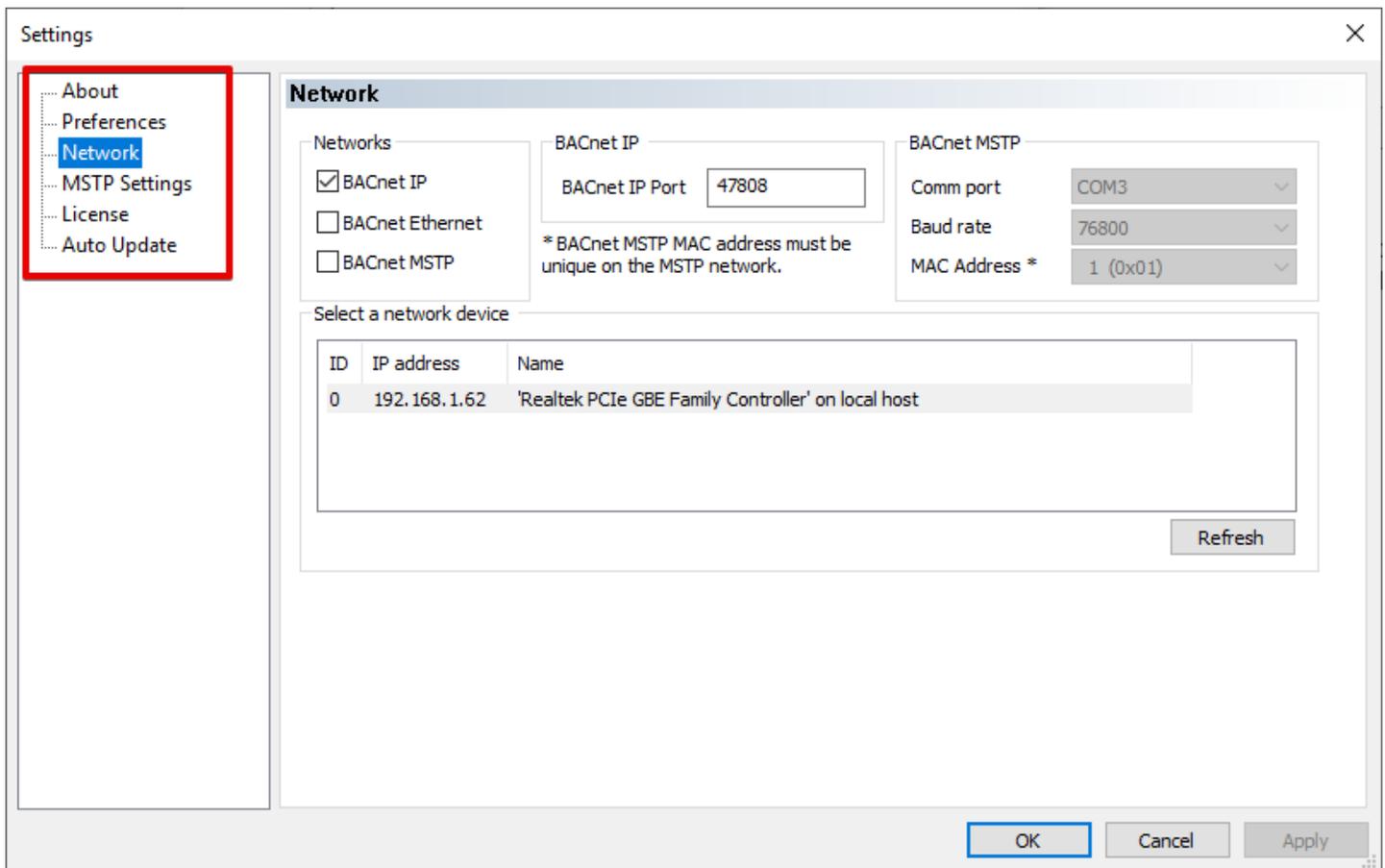


Figure 4.7-2 - Settings Page

The Settings page contains multiple subpages.

4.7.1 About

See [Section 4.6 About](#) for more information.

4.7.2 Preferences

The Preferences page contains general settings for the application.

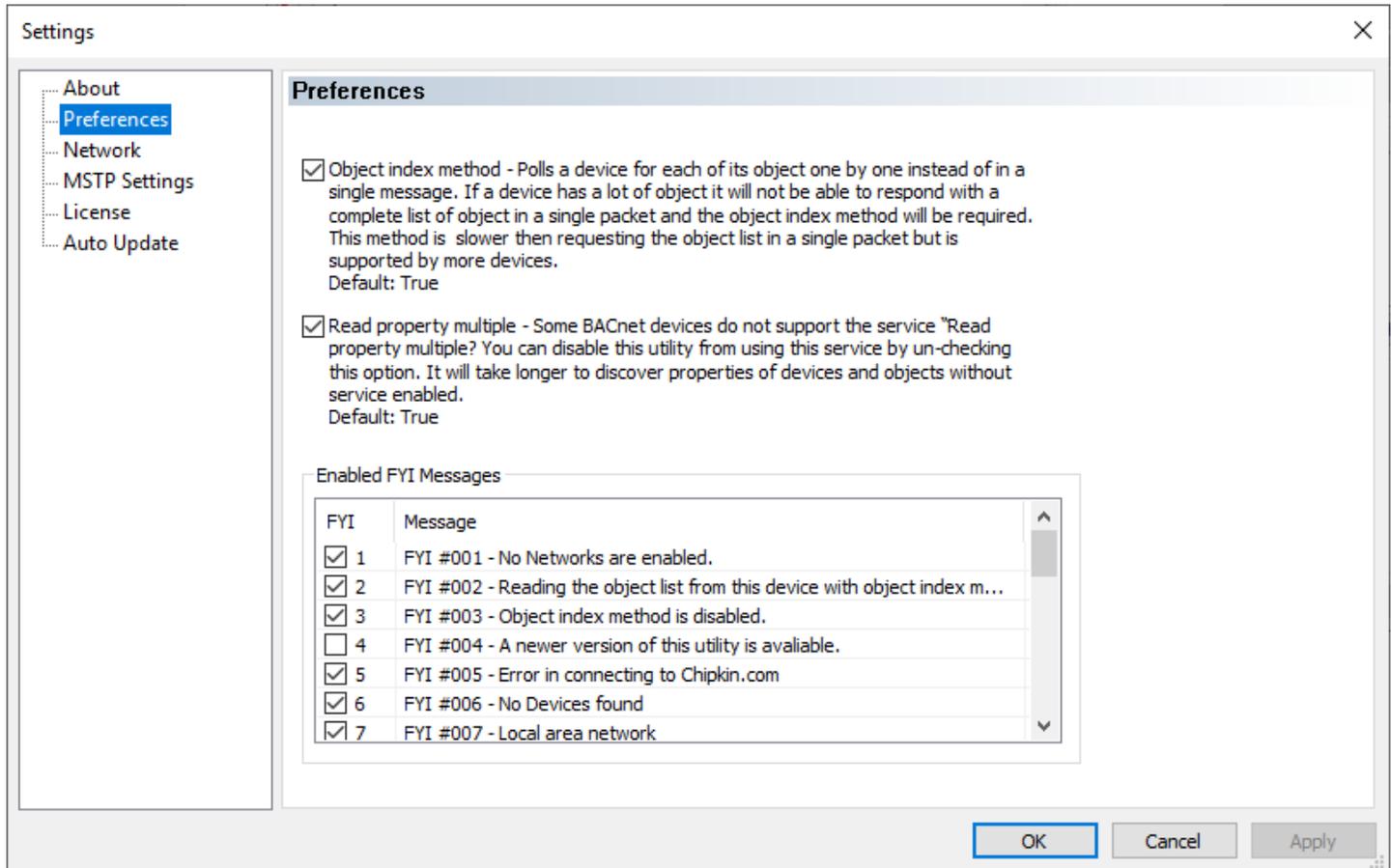


Figure 4.7-3 - Settings – Preferences

The following options are available:

- Object index method – Polls a device for each of its object one by one instead of in a single message. If a device has a lot of objects will not be able to respond with a complete list of objects in a single packet and the object index method will be required. **NOTE:** This method is slower then requesting the object list in a single packet but is supported by more devices. Default – True (enabled).
- Read property multiple – Some BACnet devices do not support the service Read Property Multiple. You can disable this application from using Read Property Multiple by un-checking this option. **NOTE:** It will take longer to discover properties of devices and objects without the service enabled. Default – True (enabled).
- Enabled FYI Messages – you can turn off various FYI messages from being displayed in the BACnet tree.

4.7.3 Network

The Network page contains settings for enabling and setting up the various BACnet networks.

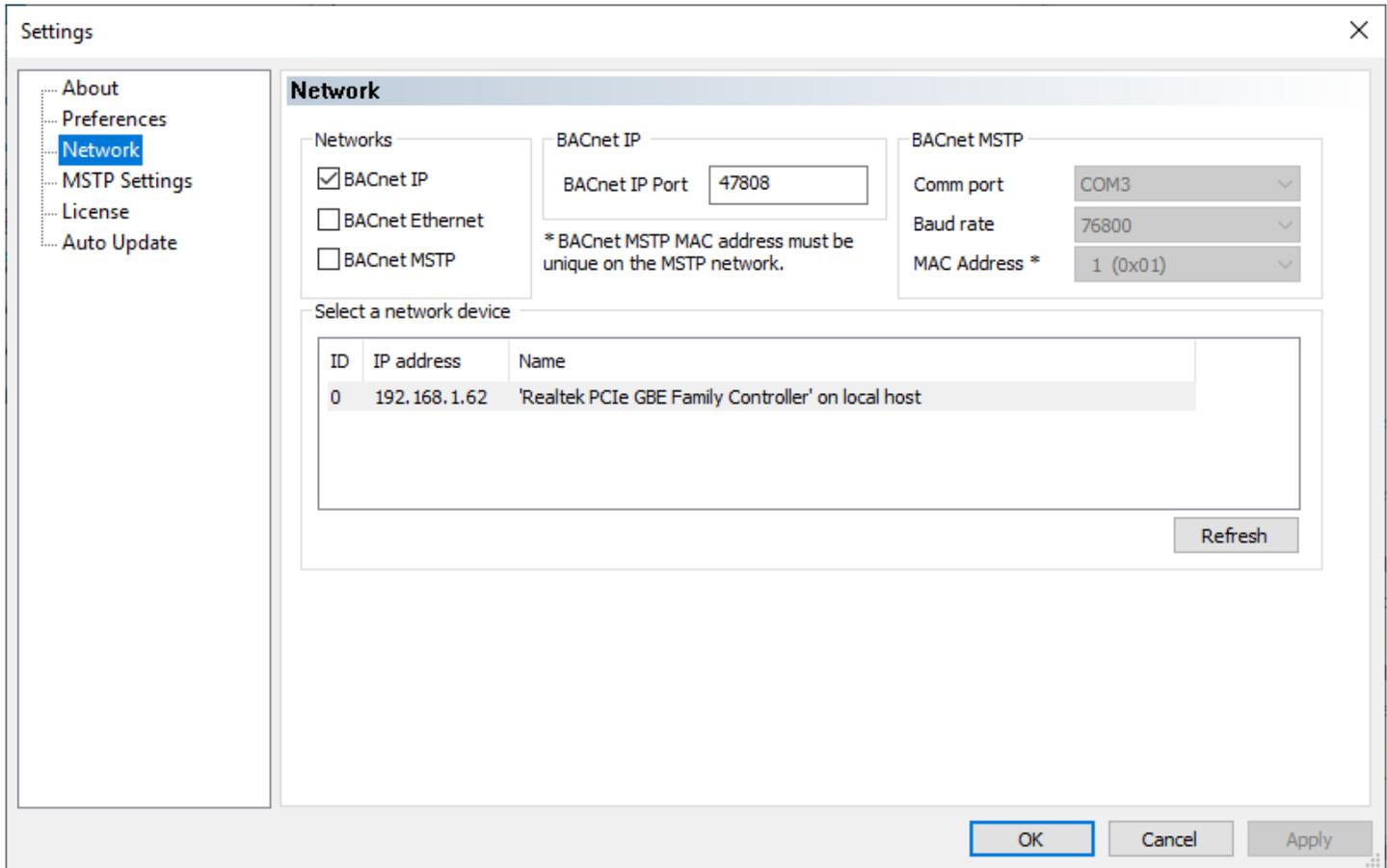


Figure 4.7-4 - Settings – Network

Networks

Select the BACnet networks to use. Available networks:

- BACnet IP
- BACnet Ethernet
- BACnet MSTP

BACnet IP

Select the port that the CAS BACnet Explorer will use for BACnet IP communication. The default is 47808.

BACnet MSTP

If using BACnet MSTP, select the settings for the RS485 serial port.

- Comm port – The comm port on the computer that is the RS485 serial port.
- Baud rate – The baud rate for the serial communication
- MAC Address – The BACnet MSTP MAC address to assign to the CAS BACnet Explorer. **Note:** The BACnet MSTP MAC address must be unique to the MSTP network.

Select a network device

This is a list of all the NIC (Network Interface Cards) installed on the computer. This can include Wi-Fi cards and virtual networks. Select the network interface that is connected to the BACnet network.

Click the “OK” button to save the Network settings.

4.7.4 MSTP Settings

The MSTP Settings page contains specific settings for the MSTP network.

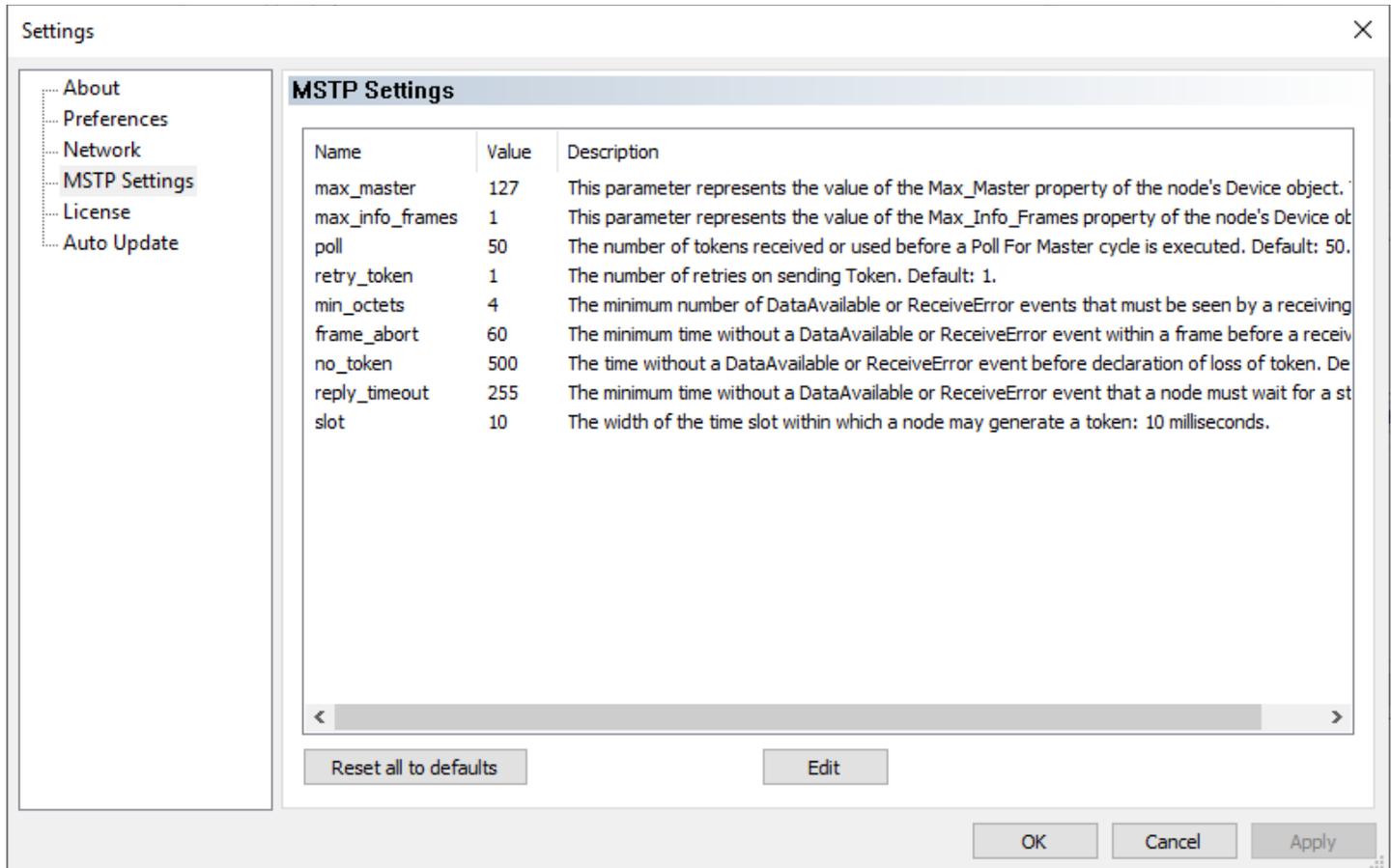


Figure 4.7-5 - Settings - MSTP Settings

Click the “Edit” button to change the MSTP Settings. **Note:** If you are unsure about what these settings mean in BACnet MSTP, please do not change them. Contact Chipkin for support.

Click on the “Reset all to defaults” to reset any changed settings.

Click “OK” to close the MSTP Settings page.

4.7.5 License

The License Page contains all the information about the current license, whether that be the green USB key or the software key.

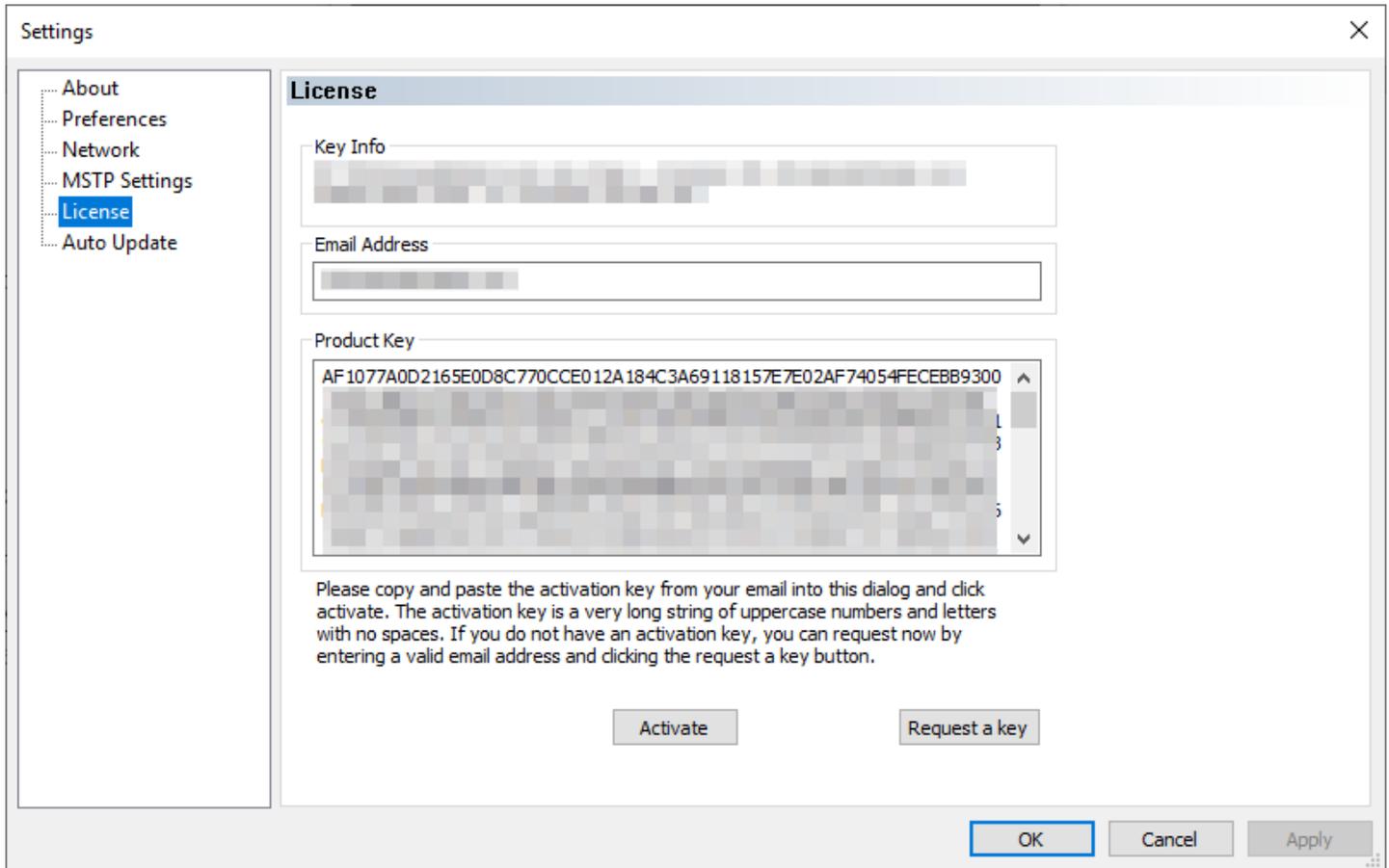


Figure 4.7-6 - Settings - License

For more information on requesting a software key, please refer to [Section 3.3.1 Requesting a License](#).

4.7.6 Auto Update

The Auto Update page contains a button “Check for updates” that when pressed will check to see if there is a newer version of the CAS BACnet Explorer.

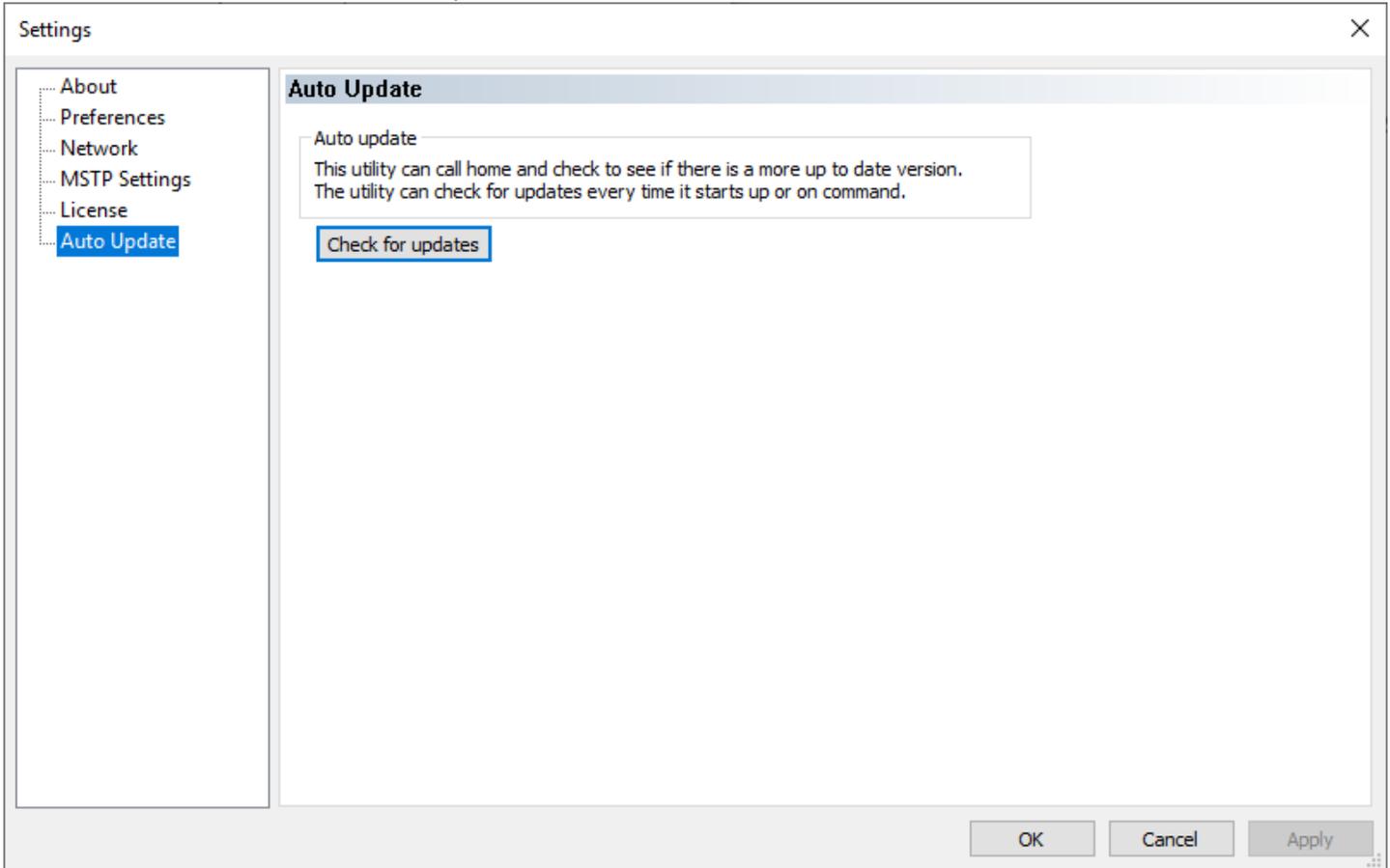


Figure 4.7-7 - Settings - Auto Update

4.8 Exit

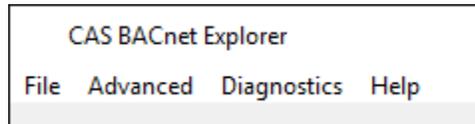
The Exit action will cancel any currently running actions and close the CAS BACnet Explorer application.



Figure 4.8-1 - Toolbar Action - Exit

5. MENU ITEMS

The following descriptions are of the menu items found at the top of the CAS BACnet Explorer.



5.1 File

The file menu contains various admin functions.

5.1.1 Settings

The Settings menu item opens the Settings Page.

See [Section 4.7 Settings](#) for more information.

5.1.2 Export to EDE

The Export to EDE menu item opens the Export to EDE dialog. This form is used to generate EDE formatted csv files based on the selected device. **Note:** You must first select a BACnet device in the BACnet tree before clicking the Export to EDE option.

Figure 5.1-1 - Export to EDE Dialog

Provide the following:

- **Project Name:** A name for the project, used in the output EDE file.
- **Version of Reference File:** The version for this file, used in the output EDE file.
- **Author of Last Change:** The author who generated the file.
- **File Save Location:** Where to store the generated files. If kept blank, the files are generated in the CAS BACnet Explorer My Documents folder.

Select the files to Export:

- EDE.csv File – the EDE file
- Units.csv File – contains a list of BACnet units
- ObjectTypes.csv File – contains a list of BACnet object types.

Click the “Export” button to close the dialog and generate the EDE files. Otherwise, click the “Cancel” button to simply close the dialog.

5.1.3 Save Profile

The Save Profile menu item opens a Save File dialog where a user can save the profile of the BACnet tree as a text file.

The default saved file name is profile.txt

This file can later be used with Load Profile to pre-populate the BACnet tree instead of having to re-discover all the BACnet devices. This can save time on sites that you are re-visiting that have many devices with lots of BACnet objects.

5.1.4 Load Profile

The Load Profile menu item opens a Load File dialog where a user can load a profile.txt file.

When the file is loaded, the BACnet tree is populated based on the contents of the file.

The user can then refresh the data points or rediscover to see if any new devices and objects have been added.

5.1.5 Clear Tree

The Clear Tree menu item deletes all entries in the BACnet tree allowing the user to proceed with a fresh clean slate.

5.1.6 Quit

The Quit menu item closes the CAS BACnet Explorer.

5.2 Advanced

The Advanced menu contains ways for the user to send specific BACnet messages by filling out the specific forms.

5.2.1 Who Is

The Who Is menu item opens the Who-Is dialog that allows a user to send a specific BACnet Who-Is message.

Figure 5.2-1 - Who-Is Dialog

The Who Is form as the following fields:

IP

If the Broadcast is checked, the CAS BACnet Explorer will send a Who Is message to the global IP Address of 255.255.255.255. Otherwise, the CAS BACnet Explorer will send a Who Is message either to a local broadcast address if supplied, for example: 192.168.1.255, or directly to a specific IP address.

NPDU

If the Broadcast is checked, the CAS BACnet Explorer will broadcast the Who Is message to all BACnet networks using the value of 65535. Otherwise, the CAS BACnet Explorer will send the Who Is message to the specified BACnet network.

APDU

- **APDU Type:** describes the BACnet APDU type of this message. Not changeable.
- **Service Choice:** describes the BACnet Service choice of this message. Not changeable.
- **Low device instance / High device instance:** If All is checked, the Who Is message is asking for all device instances. Otherwise, the Who Is message looks for devices with instances within the range of low instance to high instance inclusively.

Click the “Send” button to send the Who Is message. Or click the “Cancel” button to close the form and do nothing.

5.2.2 Who Has

The Who Has menu item opens the Who-Has dialog that allows a user to send a specific BACnet Who-Has message.

Figure 5.2-2 - Who-Has Dialog

The Who-Has form has the following fields:

IP

If the Broadcast is checked, the CAS BACnet Explorer will send a Who-Has message to the global IP Address of 255.255.255.255. Otherwise, the CAS BACnet Explorer will send a Who-Has message either to a local broadcast address if supplied, for example: 192.168.1.255, or directly to a specific IP address.

NPDU

If the Broadcast is checked, the CAS BACnet Explorer will broadcast the Who-Has message to all BACnet networks using the value of 65535. Otherwise, the CAS BACnet Explorer will send the Who-Has message to the specified BACnet network.

APDU

- **APDU Type:** describes the BACnet APDU type of this message. Not changeable.
- **Service Choice:** describes the BACnet Service choice of this message. Not changeable.
- **Low device instance / High device instance:** If All is checked, the Who-Has message is asking for all device instances. Otherwise, the Who-Has message looks for devices with instances within the range of low instance to high instance inclusively.
- **Search by Object:** If checked, provide the Object Identifier to search for.
- **Search by Name:** If checked, provide the Name to search for.

Note: Either Search by Object or Search by Name must be checked, not both.

Click the “Send” button to send the Who-Has message. Or click the “Cancel” button to close the form and do nothing.

5.2.3 Read Property Index

The Read Property Index menu item opens the Read Property Index dialog that allows a user to send a Read Property message by specifying the properties to poll.



Note: A device or object must be selected in the BACnet tree.

ID	Name
<input type="checkbox"/> 244 (0xF4)	absentee_limit
<input type="checkbox"/> 175 (0xAF)	accepted_modes
<input type="checkbox"/> 245 (0xF5)	access_alarm_events
<input type="checkbox"/> 246 (0xF6)	access_doors
<input type="checkbox"/> 247 (0xF7)	access_event
<input type="checkbox"/> 248 (0xF8)	access_event_authentication_factor
<input type="checkbox"/> 249 (0xF9)	access_event_credential
<input type="checkbox"/> 250 (0xFA)	access_event_tag

Figure 5.2-3 - Read Property Index Dialog

The Read Property Index form has the following fields:

Object Identifier

This is the object that will be polled using the Read Property message. This should be pre-filled based on the object or device that was selected.

Property Identifier

Select the BACnet Properties to poll for. All the properties are in alphabetical order.

To select all, press the “Select All” button

To select none, press the “Select None” button.

Click the “Send” button to send the Read Property message. Or click the “Cancel” button to close the form and do nothing.

5.2.4 Read Property

The Read Property menu item opens the Read Property dialog that allows users to send a Read Property message for a specific property.

Figure 5.2-4 - Read Property Dialog

The Read Property form as the following fields:

Network

Select the network connection information of the BACnet Device

- **Network Type:** Choose the BACnet network to use. If only one network type was enabled, then that network type is automatically selected.
- **IP Address:** If using BACnet IP or BACnet Ethernet, provide the IP Address of the BACnet device.
- **MAC Address:** If using BACnet MSTP, provide the BACnet MSTP MAC Address of the BACnet device.

NPDU

Select the NPDU settings for the BACnet Device

- **Network:** The BACnet network number the device is on. If on the local network, use 0.
- **Device Instance:** The BACnet Device Instance number of this device.

APDU

- **APDU Type:** describes the BACnet APDU type of this message. Not changeable.
- **Service Choice:** choose between Read Property or Read Property Multiple.
- **Object Identifier:** Select the Object Type and Object instance to poll for.
 - If you select the Proprietary Object Type, you can fill in a number in the Proprietary Object field.
- **Property Identifier:** Select the BACnet Property to poll for.
 - If you select the Proprietary Property you can fill in a number in the Proprietary Property field.

Click the “Send” button to send the Read Property or Read Property Multiple message. Or click the “Cancel” button to close the form and do nothing.

5.2.5 Write Property

The Write Property menu item opens the Write Property dialog that allows users to send a Write Property message to change the value of a specific property.



Note: A device or object property must be selected before clicking the Write Property menu item.

Write property

Some BACnet properties are not writable. If the property is not writable the device should return an error message. For example: The (Present value) property should be writable for most Analog outputs objects, but not Analog inputs. If you attempt to write to the (Present value) property of a Analog input you will probably get a Error:WRITE_ACCESS_DENIED error.

Even thou it may seem that the write was successful, depending on your device the value may be unexpected. For example: If your write a 0.01 (REAL) to a analog input and the device only supports unsigned int the device may round the write value to 0.0 instead of the original value of 0.01

Binary outputs use a 'enumerated' data type with a value of either '0'=inactive, or '1'=active.

Data type formats:
 Boolean: Format: 1 = true, 0 = false. Example: 1
 Date: Format: MM/DD/YYYY. Example: 04/15/1983
 Time: 24 hour clock, Format: HH:MM:SS. Example: 13:16:56

Object Identifier: analog_input: 0
 Property Identifier: present_value (85)

Data Value:

Priority:

Data Type:

Figure 5.2-5 - Write Property Dialog

The Write Property form has the following fields:

Data Value

The value to attempt to write to the property. The value should be formatted based on the selected Data Type:

- **Boolean:** 1 = true, 0 = false. Example: 1
- **Date:** MM/DD/YYYY. Example: 05/16/2019
- **Time:** 24-hour clock format: HH:MM::SS. Example: 13:16:56
- **BitString:** Array of 1's or 0's where 1 = true, 0 = false, max of 200. Example: 101011
- **OctetString:** Array of bytes. Example: 010203
- **CharacterString:** String of characters. Example: This is an example.

- **Object Identifier:** ObjectType with underscores instead of spaces and with the instance number in parentheses. Example: Analog_input (12345).
- **Double, Real, Signed Integer, Unsigned Integer, Enum:** Regular values. Examples:
 - **Double:** 123456789.987
 - **Real:** 1.2345
 - **Signed Integer:** -987
 - **Unsigned Integer:** 123456
 - **Enum:** 12. Note if writing to Binary Outputs or Values present value property, data type will be Enumerated and use a value of 0 for inactive or 1 for active.

Priority

If writing to an object that uses a priority array (Analog Output, Binary Output, Multi-state Output, or others), then you can specify a priority to write the value to that specific priority. If unsure, leave value as Undefined.

Data Type

Select the data type of the value to write. This should be pre-filled based on the property that you are attempting to write to, but if you are testing error states, then change the data type as needed.

Click the “Send” button to send the Write Property message. Or click the “Cancel” button to close the form and do nothing.

5.2.6 Export for Philips Teletrol

This function is not generally used.

5.3 Diagnostics

The Diagnostics menu items open dialogs that contain information helpful for troubleshooting.

5.3.1 MSTP Network Status

The MSTP Network Status menu items opens the MSTP Network stats window that contains various statistics and suggestions about the MSTP network.

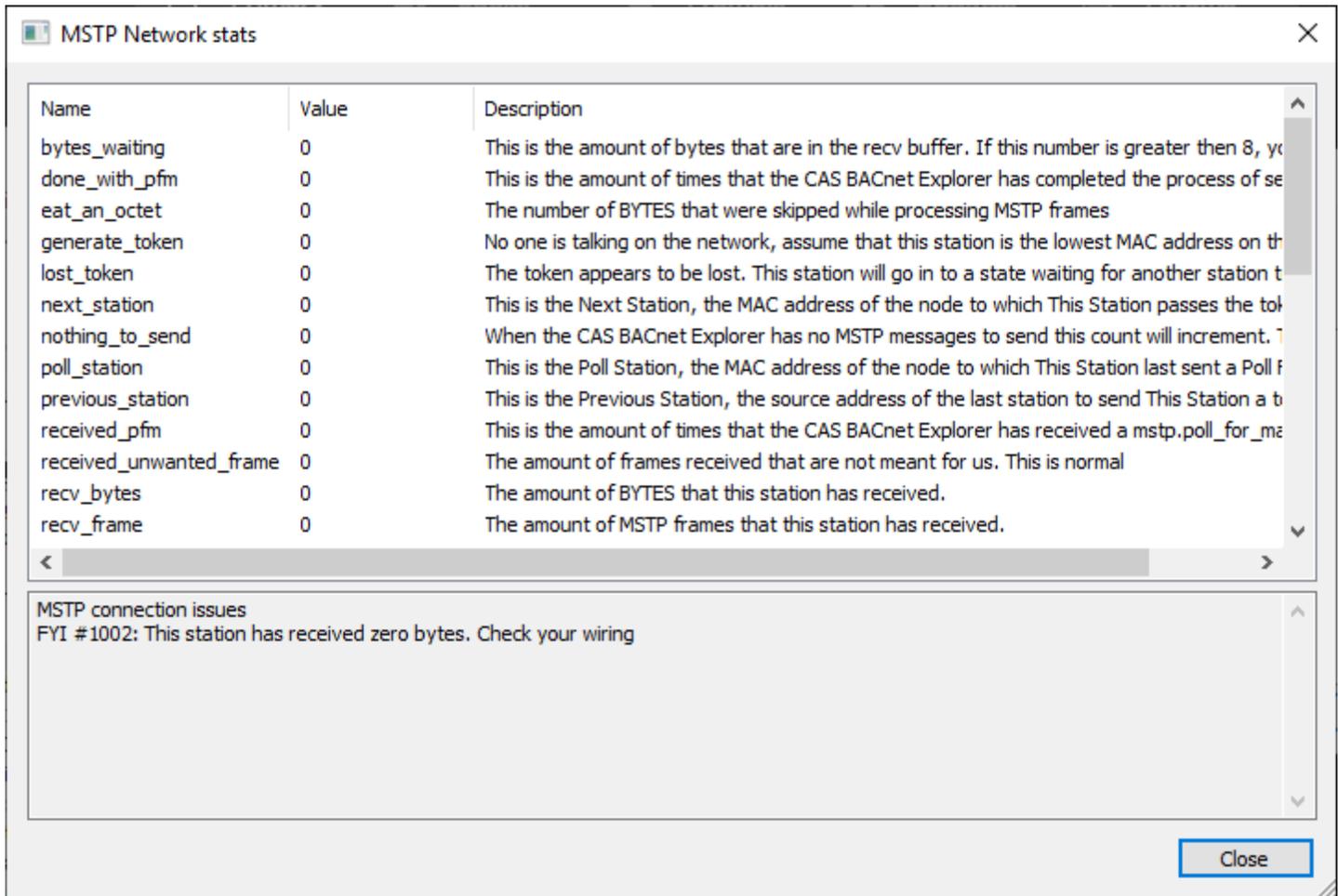


Figure 5.3-1 - MSTP Network Stats

Please contact Chipkin for help with determining what these statistics mean.

Click the “Close” button to close this window.

5.3.2 View Debug Files

The View Debug Files menu item opens a file explorer in the CAS BACnet Explorer My Document directory.

Name	Date modified	Type	Size
exports	7/21/2016 2:01 PM	File folder	
logs	5/31/2016 9:53 AM	File folder	
reports	5/14/2019 1:56 PM	File folder	
Debuglog.txt	5/16/2019 9:16 AM	Text Document	7 KB
dump.txt	5/14/2019 1:56 PM	Text Document	1 KB
license.txt	5/31/2016 10:02 AM	Text Document	1 KB
monitorListSettings.txt	9/6/2017 10:37 AM	Text Document	1 KB
mstp_log.pkt	1/4/2019 1:33 PM	Wireshark capture...	5,993 KB
packets.pkt	5/16/2019 9:11 AM	Wireshark capture...	3 KB
Settings.json	5/16/2019 8:56 AM	JSON Source File	3 KB
style.css	5/14/2019 1:56 PM	CSS Source File	1 KB

Figure 5.3-2 - CAS BACnet Explorer My Documents Directory

The debug files that are relevant are the following:

- Debuglog.txt – debug log of all the operations of the CAS BACnet Explorer.
- Dump.txt – contains a text file of the BACnet tree contents.
- Mstp_log.pkt – if using BACnet MSTP, this wireshark log contains the MSTP traffic.
- Packets.pkt – if using BACnet IP or BACnet Ethernet, this wireshark log contains the BACnet traffic.



Note: Packets.pkt file gets updated when the CAS BACnet Explorer is closed.

5.3.3 Network Stats

The Network Stats menu item opens the Network Stats window that contains statistics about the different BACnet messages sent and received by the CAS BACnet Explorer.

Setting	Value	Description
Confirmed_request messages	0	Requests for information from the server BACnet device. Example messages: Who-is
Unconfirmed_request messages	4	Example messages: Write property ack
SimpleACK messages	0	Example messages: Read property ack, Read property multiple ack
ComplexACK messages	2	Example messages: Read property multiple ack
SegmentAck messages	0	Errors responses to Confirmed Request type messages
Error messages	1	Rejects responses to Confirmed Request type messages
Reject messages	0	Abort responses to Confirmed Request type messages
Abort messages	0	Vendor proprietary PDU messages that could not be decoded
Unknown messages	0	

Figure 5.3-3 - Network Stats

Click the “Close” button to close the Network Stats window.

5.3.4 Show Errors

The Show Errors menu item opens the Error window. This window contains any BACnet errors that are received by the CAS BACnet Explorer.

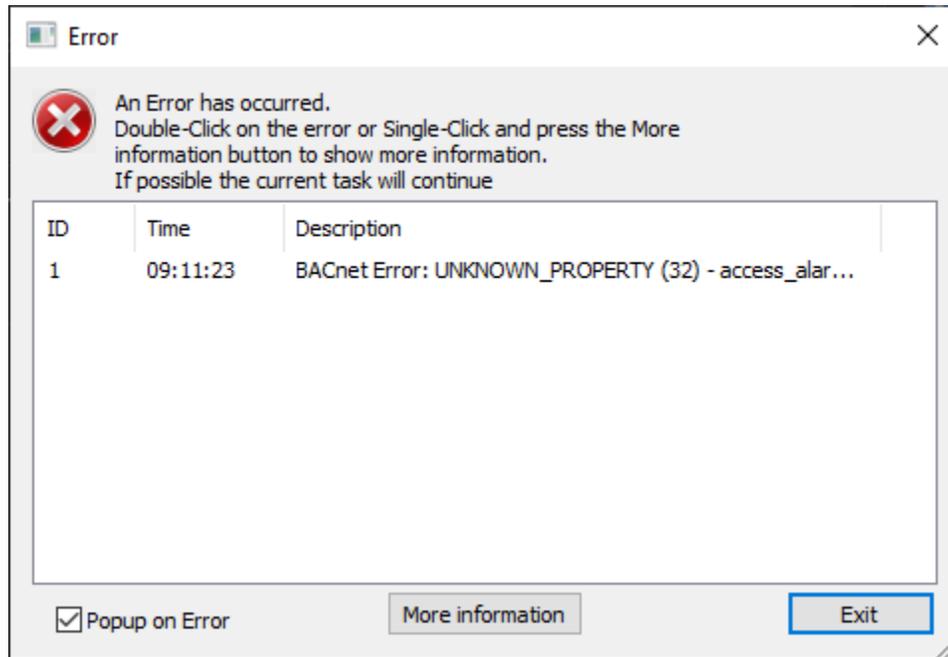


Figure 5.3-4 - Error Window

The Errors are listed with the most recent as listed first.

You can double-click on an error or select an error and press the "More Information" button to open the error details. An example:

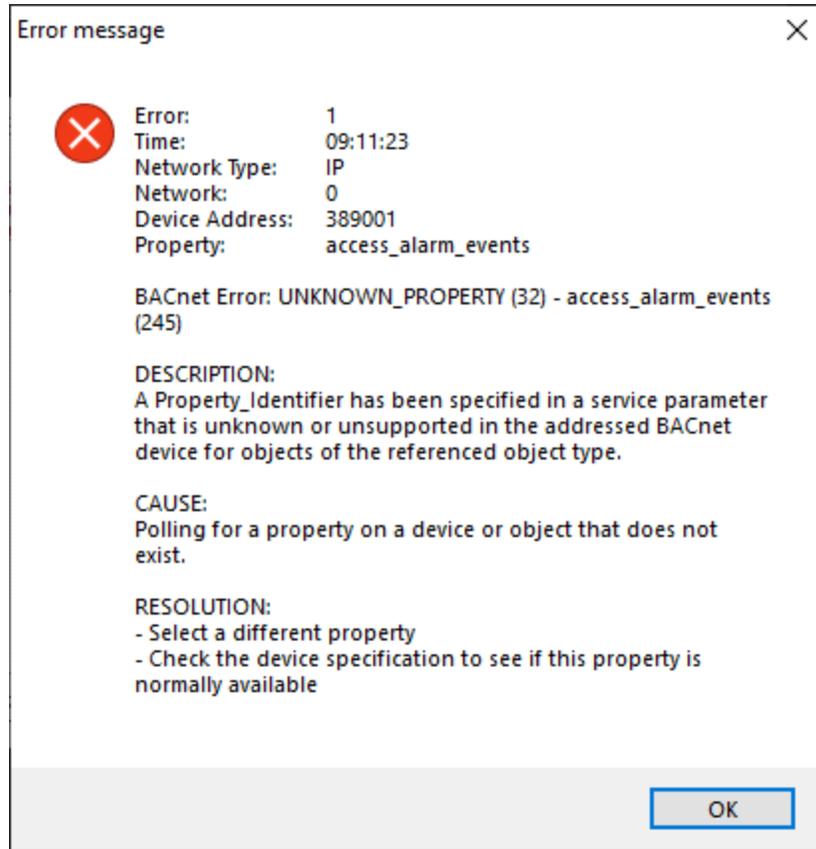


Figure 5.3-5 - Error Details

The “Popup on Error” checkbox, if checked, will cause the Error window to appear and gain focus if an error occurs. To disable this feature, uncheck the box.

Click on the “Exit” button to close the Error window.

5.4 Help

The Help menu items contains information about the application.

5.4.1 About

The About menu item opens the About window. See [Section 4.6 About](#).

5.4.2 Check for Updates

The Check for Updates menu item causes the CAS BACnet Explorer to check if there is an updated version of the application.

If no updates are available, you will see the following:

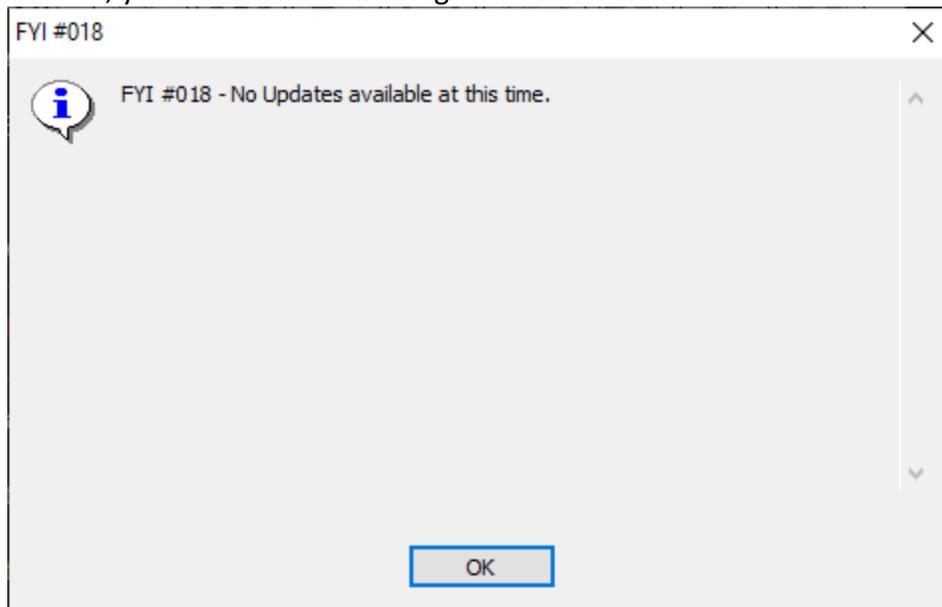


Figure 5.4-1 - FYI #18

6. Right-Click Menus

This section describes the functions of the right-click menu items.

6.1 General

These menu items are always available, no matter what BACnet tree node is selected.

6.1.1 Clear All

This menu item clears the entire BACnet tree. See [Section 5.1.5 Clear Tree](#).

6.1.2 Copy as Text

Copies the selected BACnet tree node's text to the clipboard.

6.1.3 Remove Item

Removes the selected BACnet tree node from the BACnet tree.

6.2 BACnet and Network Node

These menu items are available when right-clicking on one of the BACnet Nodes (BACnet IP, BACnet Ethernet, BACnet MSTP) or a Network Node.

6.2.1 Discover

Opens the Discover Dialog with the Discover Devices checked. See [Section 4.1 Discover](#) for more information.

6.2.2 Refresh

Refreshes the current node and all other sub-nodes. See [Section 4.3 Refresh](#) for more information.

6.2.3 Advanced

Who Is

Opens the Who Is Dialog. See [Section 5.2.1 Who Is](#) for more information.

Who Has

Opens the Who Has Dialog. See [Section 5.2.2 Who Has](#) for more information.

6.3 Device Node

These menu items are available when right-clicking on one of the BACnet Device nodes.

6.3.1 Discover

Open the Discover Dialog with the Discover device's properties and Discover objects checked. See [Section 4.1 Discover](#) for more information.

6.3.2 Refresh

Refreshes the Device's properties and its objects and objects' properties. See [Section 4.3 Refresh](#) for more information.

6.3.3 Export to EDE

Opens the Export to EDE Dialog. See [Section 5.1.2 Export to EDE](#) for more information.

6.3.4 Time Synchronization

Opens the Time Synchronization Dialog that allows users to send a BACnet Time Synchronization message to the selected device.

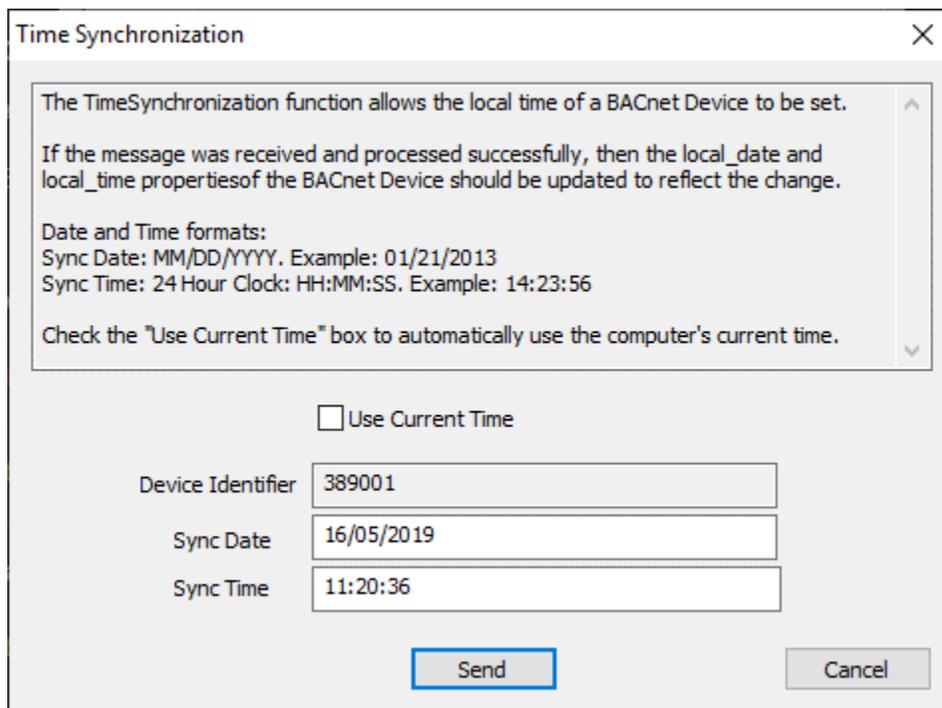


Figure 6.3-1 - Time Synchronization Dialog

Check the Use Current Time box to sync the device's time using the Computer's current time, or if unchecked, specify the Sync Date and Time.

Click the "Send" button to send the Time Synchronization message or click the "Cancel" button to simply close the dialog.

6.3.5 Add this object to monitor list

Adds the device as an object to the monitor list.

6.3.6 Add this device's objects to monitor list

Adds all this device's objects to the monitor list.

6.3.7 **Advanced**

Who Is

Opens the Who Is Dialog. See [Section 5.2.1 Who Is](#) for more information.

Who Has

Opens the Who Has Dialog. See [Section 5.2.2 Who Has](#) for more information.

Read Property

Opens the Read Property Dialog. See [Section 5.2.4 Read Property](#) for more information.

Read Property Index

Opens the Read Property Index Dialog. See [Section 5.2.3 Read Property Index](#) for more information.

6.4 **Object Node**

These menu items are available by right-clicking on a BACnet object node.

6.4.1 **Discover**

Open the Discover Dialog with the Discover objects and Discover object's properties checked. See [Section 4.1 Discover](#) for more information.

6.4.2 **Refresh**

Refreshes this object and its properties. See [Section 4.3 Refresh](#) for more information.

6.4.3 **Add this object to monitor list**

Adds this object to the monitor list.

6.4.4 **Add this device's objects to monitor list**

Adds all the objects from the device that this object belongs to the monitor list.

6.4.5 **Advanced**

Who Is

Opens the Who Is Dialog. See [Section 5.2.1 Who Is](#) for more information.

Who Has

Opens the Who Has Dialog. See [Section 5.2.2 Who Has](#) for more information.

Read Property

Opens the Read Property Dialog. See [Section 5.2.4 Read Property](#) for more information.

Read Property Index

Opens the Read Property Index Dialog. See [Section 5.2.3 Read Property Index](#) for more information.

Write Property

Opens the Write Property Dialog. See [Section 5.2.5 Write Property](#) for more information.

6.5 Property Node

These menu items are available by right-clicking on a BACnet property node.

6.5.1 Discover

Open the Discover Dialog with the Discover object’s properties checked. See [Section 4.1 Discover](#) for more information.

6.5.2 Refresh Object

Refreshes this object and its properties. See [Section 4.3 Refresh](#) for more information.

6.5.3 Refresh Property

Refreshes this property only. See [Section 4.3 Refresh](#) for more information.

6.5.4 Write Property

Opens the Write Property Dialog. See [Section 5.2.5 Write Property](#) for more information.

6.5.5 Relinquish Property

Opens the Relinquish Property Dialog. Should only be used on the Present Value property of an object that uses priority arrays (Analog Output, Binary Output, Multi-State Output, and others).

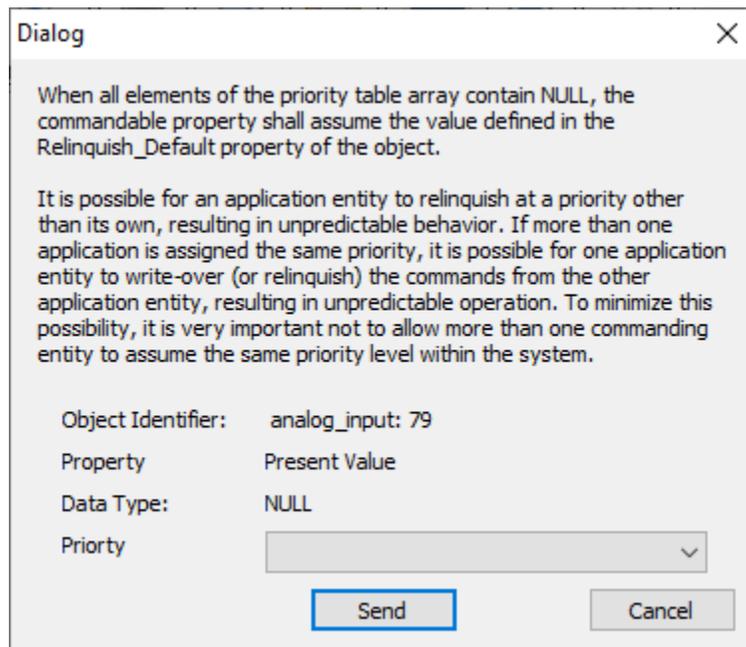


Figure 6.5-1 - Relinquish Property Dialog

The Relinquish Property will attempt to write a null value at a specific priority.

Choose the Priority to write to and click the “Send” button to send the message. Otherwise, click the “Cancel” button to close the dialog.

6.5.6 **Add this object to monitor list**

Adds this object to the monitor list.

6.5.7 **Advanced**

Who Is

Opens the Who Is Dialog. See [Section 5.2.1 Who Is](#) for more information.

Who Has

Opens the Who Has Dialog. See [Section 5.2.2 Who Has](#) for more information.

Read Property

Opens the Read Property Dialog. See [Section 5.2.4 Read Property](#) for more information.

Read Property Index

Opens the Read Property Index Dialog. See [Section 5.2.3 Read Property Index](#) for more information.

Write Property

Opens the Write Property Dialog. See [Section 5.2.5 Write Property](#) for more information.

7. BACNET FUNCTIONALITY

This section contains instructions on how to perform various BACnet requests. All this information can already be found in the previous sections, but this section is more stream-lined towards providing instructions on how to send a specific BACnet message.

7.1 Sending a Who-Is Message

There are two ways of sending a BACnet Who-Is message in the CAS BACnet Explorer.

- 1) Use the Discover dialog to discover any devices. See [Section 4.1 Discover](#) for more information.
- 2) Use the Advanced menu Who-Is option or the right-click menu to open the Who-Is Dialog. See [Section 5.2.1 Who Is](#) for more information.

7.2 Sending a Who-Has Message

To send a BACnet Who-Has message, either use the Advanced menu Who-Has option or the right-click menu to open the Who-Has Dialog. See [Section 5.2.2 Who Has](#) for more information.

7.3 Sending a Read Property or Read Property Multiple Message

There are 3 ways of sending a BACnet Read Property or Read Property Multiple Message.

- 1) Use the Discover dialog to discover device properties, objects, or object properties. All of these options will cause the CAS BACnet Explorer to send a Read Property Multiple message (if enabled) or Read Property messages to get all the values. See [Section 4.1 Discover](#) for more information.
- 2) Use the Advanced menu Read Property option or the right-click menu to open the Read Property Dialog. See [Section 5.2.4 Read Property](#) for more information.
- 3) Use the Advanced menu Read Property Index option or the right-click menu to open the Read Property Index Dialog. See [Section 5.2.3 Read Property Index](#) for more information.

7.4 Sending a Write Property Message

To send a BACnet Write Property message, either use the Advanced menu Write Property option, the right-click menu option to Write Property, or double-click on the property in the BACnet tree. See [Section 5.2.5 Write Property](#) for more information.

7.5 Sending a Time Synchronization Message

To send a BACnet Time Synchronization message, right-click on a Device in the BACnet tree and select the Time Synchronization option. See [Section 6.3.4 Time Synchronization](#) for more information.

8. TROUBLESHOOTING

8.1 BACnet Network Status

The health and status of the different BACnet networks can be seen in the icons in the lower right corner of the application.



Figure 8.1-1 - Network Status

The color of the icons has the following meanings:

- Green – network is healthy and working properly.
- Red – network is not reliable or is in error.
- Grey – network is not enabled.

Clicking on any of the icons will open the statistics for those networks.

8.2 BACnet Network Stats

Clicking on the IP or Eth Icons described above will open the Network Stats page. You can also open the page by clicking on the Network Stats menu item in the Diagnostics menu.

The Network Stats page contains information on the number of different BACnet messages received by the CAS BACnet Explorer. See [Section 5.3.3 Network Stats](#) for more information.

Clicking on the MSTP icon described above will open the MSTP Network Status page. You can also open the page by clicking on the MSTP Network Status menu item in the Diagnostics menu.

The MSTP Network Status page contains information about the MSTP state engine running in the CAS BACnet Explorer as well as provide any suggestions of why the MSTP network may not be healthy. See [Section 5.3.1 MSTP Network Status](#) for more information.

8.3 Common Error Messages

The following are a list of common BACnet error messages that the CAS BACnet Explorer may receive. To see the errors in the CAS BACnet Explorer, click on the Show Errors menu item in the Diagnostics menu.

Abort: Segmentation Not Supported

This is sent by BACnet devices usually in response to Read Property Multiple all messages when the CAS BACnet Explorer is discover all the device's properties. This can occur if there are too many properties or too many objects of the device and all the information cannot fit in a single packet. The CAS BACnet Explorer will automatically try again using the Read Property index method and poll for the properties individually.

Error: Unknown Property or Unknown Object

This is sent by BACnet devices usually in response to a Read Property or Read Property Multiple message that is querying an object or property that does not exist in a device.

Duplicate Devices Found on Network

This can occur if there are multiple devices on the BACnet network that have the same BACnet Device Instance number. BACnet spec stipulates that all BACnet devices connected to the same BACnet intra-network must all have unique BACnet Device Instance numbers.

You can double-click on the error to see more information, specifically the IP Addresses of the two conflicting devices.

Error: Write Access Denied

This can occur if you attempt to send a Write Property message to a device where the object's property is not writable.

8.4 Common FYI Messages

The following are a list of common FYI messages that may appear in the CAS BACnet Explorer.

FYI #080 No BACnet devices detected

No BACnet Devices have been detected on the enabled networks.

Check that you have enabled the correct BACnet networks (MSTP/IP/Ethernet). Check that you have selected the right network device (Correct Network card or Comm port). Check that there is a connection between you and your BACnet devices.

Click the refresh button to attempt to rediscover the BACnet devices on your network

FYI #084 This device has gone online and offline one or more times

This device has not responded to one or more of our polls within a certain amount of time since we first detected it. This can cause some of the properties of the object to be missing or out of date.

To change the time, it takes for a device to time out, click the settings button and change the device timeout option.

The default timeout is 30 seconds.

FYI #086 Reject Read Property Multiple messages, using the alternative method

This device has rejected a certain type of message Read Property Multiple as unsupported.

We have an alternative method for discovering a device's properties. This method is much slower and requests each property one by one but is supported by my most devices.

To select what properties to poll for on each device:

- Click the settings button the main dialog

- Under the General settings tab on the left click Property Types
- Select the property types that you would like to poll for.



Note: The more properties that you select the longer it will take to discover each device.

FYI #093 Click the Refresh button to update the list of BACnet devices

You have either changed an option that required CAS BACnet Explorer to reset the BACnet tree or there are no detected BACnet devices.

Click the refresh button to attempt to rediscover the BACnet devices on your network.

FYI #095 More than 50 properties are set to be scanned for, this may cause performance issues

You have selected more than 50 object properties to scan for if a device does not support read property mutable.

With so many properties selected it could cause performance issues especially if the property does not exist on the device.

We strongly suggest that you only include the properties that you need or limit the number of properties to less than 50.

To change the selected properties to scan for:

- Click the settings button the main dialog
- Select the property types tab beneath the general settings tab on the left
- Select or deselect properties

FYI #098 Your current network device is invalid

Your network device has become invalid.

This could have happened if you recently changed your IP address or installed/Enabled a new network card.

To change your network device:

- Click the settings button the main dialog
- Select network from the left
- Select a new network device, it should be the device that is connected to your BACnet network and it should have an up address that does not equal 0.0.0.0

FYI #101 This is not a full list of properties (Override)

The list of properties associated with this object may not be completed because that use property list override has been enabled.

This option caused CAS BACnet Explorer to only poll for certain selected properties.

To enable or disable the use property list override or change what properties get polled:

- Click the settings button the main dialog
- Open the General settings tab on the left
- Select the Property types tab beneath the General settings tab on the left

APPENDIX A: FAQ

The report is taking a long time, Why?

The report function is dependent on;

- The number of devices and objects you have. For each device and object at least 2 messages are sent. (What are your properties? Do you have any objects?)
- The poll delay, the poll delay is the amount of time that the utility waits before sending another command. The poll delay can be found in the settings menu.
- The time that it takes for your device to respond to our polls. Some devices take a while to respond to a poll, especially if they are MSTP devices.
- The types of messages that your device accepts. If your device does not accept READ_PROPERTY_ALL, then the utility will switch to the alternative method for retrieving an object's properties. This method is a lot slower, but it is supported on most devices.

You can increase the speed of the report function by;

- Reducing the poll delay
- Scanning only one network type at a time (BACnet IP only instead of Both)

I cannot see any of my BACnet devices, Why?

This could happen for a few different reasons:

- The network device you have selected is not connected to your BACnet network. (Using the wrong network card). Click network on the main dialog and select a different network device.



Note: Most wireless cards are NOT supported.

- The network type you have selected does not have any devices, try using Both (BACnet IP and BACnet Ethernet)
- There are no BACnet devices on your network.

Do you support BACnet IP networks?

Yes

Do you support BACnet/Ethernet networks?

Yes

Do you support BACnet/MSTP networks?

Yes

What is WinpCap and why do I need to install it?

WinpCap is a windows packet capture library that allows CAS BACnet explorer to capture BACnet/IP and BACnet/Ethernet packets.

You can find more information about WinpCap from there website <http://www.winpcap.org/>

Where can I go for support with WinpCap?

Webpage <http://www.winpcap.org/>

FAQ: <http://www.winpcap.org/misc/faq.htm>

Is my network card supported by your BACnet browser?

CAS BACnet explore supports all network cards that WinpCap supports.

A pretty complete list of supported adapters can be found here: <http://www.mirrorservice.org/sites/ftp.wiretapped.net/pub/security/packet-capture/winpcap/misc/faq.htm#Q-16>

I found a bug, what do I do?

You can report the bug in several ways

- By contacting us directly, [Contact us](#)
- Or by reporting it from with inside the application itself on the about box

Please provide contact information.

I can see that you are sending messages from the application to Chipkin.com why?

These messages are used to check to see if there is a new version of this application or to validate your product key or sending feedback.

You can disable the auto update feature by un-checking the automatically check for updates check box on the main display

I want feature XYZ

We are always open to suggestions please contact us:

- By contacting us directly, [Contact us](#)
- Or by reporting it from with inside the application itself on the about box.

I cannot find the product key email, have you send it?

We send the product key immediately and it should arrive within 1-10min. if you are using an online account like Yahoo, Gmail, AOL the product key email may have been detected as spam, please check your spam folder.

if you still have not received your product key email please [contact us](#).

Why am I being asked for a product key, I thought that this program was free?

This program is free for personal and testing use only. The free product key can be obtained from within the program itself and should be delivered within 1-10min Settings -> License -> Request key

Why do the product keys expire so fast?

The free personal use key lasts for 30 day or 1 hour of running time, after this time you can request another free personal use key.



Note: You can only request a total of 3 free keys. Please contact Chipkin if you require more time, or to purchase a license.

Can I get a product key that lasts longer?

Yes, please [contact us](#).

What is the priority array?

When a device receives a request for the present value to change it looks at the priority the request was sent at. If the requests priority is equal to or higher than the present values priority, then the new value will be accepted otherwise it is ignored.

Why shouldn't I just write with a priority of 1?

If you were to write a objects present value with the priority of 1 then only other write with the priority of 1 would be able to overwrite it. In the field, most devices write at priority 15-6 and would not be able to change the value.

THANK YOU

Thanks for choosing Chipkin's protocol gateways, data clients and integration services to meet your building and industrial automation requirements!

Chipkin Automation Systems™ (Chipkin) is a building and industrial automation protocol expert. We develop, configure, install and support gateways (protocol converters), data loggers and remote monitor and controlling applications.

Founded in October 2000, Chipkin provides expert solutions for converting BACnet®, Modbus®, and Lonworks®—to name just a few—and enabling interfaces for HVAC, fire, siren, intercom, lighting, transportation and fuel systems. The high-quality products we offer (including those from other vendors) interface with Simplex™, Notifier™, McQuay™, GE™ and many others—so you can rest assured that we will select the most appropriate solution for your application.

With Chipkin you are buying a solution. Our configuration expertise in this field combined with free BACnet tools and other tools ensure your success; and our customer support via phone, email and remote desktop tools means that we're there when you need us. Chipkin is a small responsive company, and we live or die by the quality of our service—and with offices in two-time zones—we can provide support when you need it. Give us a call now!

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