

Chiller BACnet Communication Module Configuration Tool

Introduction

The Chiller BACnet Communication Module Configuration Tool (Configuration Tool) is Microsoft® Windows® based tool used in conjunction with the MicroTech II BACnet Communication Module for Chiller Unit Controllers. The purpose of the Configuration Tool is to configure and test the BACnet Communication Module. The Configuration Tool displays the types and quantity of BACnet Communication Module objects and also what properties are supported. Additionally, it can be used to download new firmware or a new CSV (comma separated variable file), if necessary.

This document assumes you are familiar with BACnet and BACnet terminology and the use of Microsoft Windows.

BACnet Requirements

BACnet MAC Layer Support

The Configuration Tool supports the following BACnet Media Access Control (MAC) layers:

- BACnet ISO 8802-3 “Ethernet”
- BACnet/IP
- BACnet Master Slave/Token Passing (MS/TP) over EIA-485

The Configuration Tool as a BACnet Device

The Configuration Tool uses standard BACnet commands when communicating via a BACnet network. For example, it issues a ReadProperty or WriteProperty request to the device object (in this case, the Chiller Unit Controller). By default, the Configuration Tool is assigned the device instance 3333 and the MS/TP MAC address 1. This can be changed using the BACdoor OEM Client configuration dialog described in the BACdoor OEM Client Status window section of this document.

Windows and PC Requirements

Windows Requirements

The Configuration Tool is compatible with Windows 2000 through Windows 10™ (and above) operating systems.

PC Requirements

An EIA-485 interface is required for use with the Configuration Tool when connecting to a BACnet MS/TP communication module. An EIA-485 interface can be achieved by one of the following means:

- Insert an external EIA-485 converter into a USB port on your PC
- Connect an external EIA-232 to EIA-485 converter to an existing PC serial port.
- Insert an internal EIA-485 adapter into your PC.

Note: **Important:** The EIA 485 interface is not included with the BACnet Communication Module kit. It is available through B & B Electronics (www.bb-elec.com).

Getting Started

1. Download the Configuration Tool from www.daikinapplied.com, selecting Products, then Controls, then Downloads and finally locating and selecting BACnet Communication Module (BCM) Configuration Tool for chillers.
2. Install the Configuration Tool to your PC (see Windows and PC Requirements above). For support purposes, it is recommended that you install to the default directory.
3. Verify the BACnet Communication Module is installed in the Serial Slot of the MicroTech II Chiller Unit Controller. Refer to the installation section of this document for details.
4. Verify that the BACnet Communication Module is wired correctly to the PC.
5. Using the keypad, verify the “Protocol=” on the Network Config menu of the Chiller Unit Controller is set to BACnet MS/TP. Refer to the appropriate BACnet Communication Module Operation Manual (OM) listed in the Reference Documents section for more information about using the keypad.
6. Double-click on BCMCFG.exe from the folder in which it was installed (see Step 2 above). The default installation path is C:\Program Files\DaikinApplied\BCMCFG for Windows 32-bit installations or C:\Program Files (x86)\DaikinApplied\BCMCFG for Windows 64-bit installations. This path may be overridden at installation time.

Note: There are two configuration files used by BCMCFG.exe: BACLIB.INI and BCMCFG.INI. Normally these files are changed by BCMCFG.exe. Their on the PC’s disc is the so called “AppData” location. The “AppData” folder is dependent on the user that is logged into the PC. So if John Doe is logged in, then For Windows XP this folder is C:\Documents and Settings\John Doe\Application Data and for Windows 7 and all other versions this folder is C:\Users\John Doe\AppData\Roaming.
7. Select BACnet MS/TP from the MAC Layer Selection Window.
8. Once the Configuration Tool is open, enter the Device Instance of the BACnet Communication Module in the Device Instance box at the top of the screen.
9. The BACnet Communication Module is now ready to be customized for network communication.

Using the Configuration Tool

Introduction

The Configuration Tool is used to configure and test the BACnet Communication Module. It also can be used to download new firmware or CSV file to the BACnet Communication Module.

Overview of Components

There are four main components to the Configuration Tool:

1. The initial BCM Configuration MAC Layer Select dialog pop-up box.
2. The main application titled “Daikin BACnet Communication Module Configuration Tool”.
3. The BACdoor OEM Client Status icon and window.
4. The MS/TP MAC Layer Status icon and window.

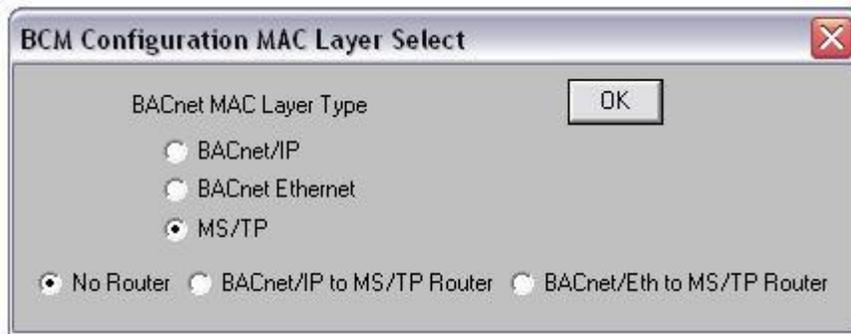
The remainder of this document provides a detailed description of the information contained in each of these four components.

BACnet MAC Layer Select

General

A dialog box appears each time the BCM Configuration Tool is opened, prompting you to select the desired BACnet MAC layer type: BACnet IP, BACnet Ethernet, or BACnet MS/TP (see Figure 1). Depending on the MAC layer type selected, additional dialogs may be activated.

Figure 1. BACnet MAC Layer Select Dialog Box



BACnet MS/TP

Table 1 contains the default setup parameters for the Configuration Tool.

Table 1: Configuration Tool Default Values

Property	Default Value
Communication Port	COM1
Baud Rate	38400
MS/TP Station Address	1
Max Master	127
Max Info Frames	10

These parameters can be changed using the BACdoor OEM Client (refer to the BACdoor OEM Client Status section of this document for details). The Max Master value should match the largest MS/TP Station Address value to provide maximum system efficiency. If you do not know the largest MS/TP Station Address on the network, use a Max Master value of 127. The Max Master value should always be set equal to or less than 127.

Note: If you have trouble opening the MS/TP portion of the Configuration Tool, make sure the COM port you are using on your PC is available and in working order. Then verify that the Configuration Tool is using the same com port. The default COM Port for the Configuration Tool is 1. See the Troubleshooting Guide for more information.

Automatic Selection of the MAC Layer

The Configuration Tool can be set up so that it bypasses the MAC Layer Select window and automatically opens using with the pre-defined BACnet MAC layer type. This can be accomplished by following these steps:

1. Locate the BACSET.INI in the “AppData” folder described in Note 6 in the Getting started section.
2. Using a text editor such as Notepad, add the following line any: MACtype=MSTP after the [General] line.
3. Save and close the file.

Configuration Tool Application

The main Configuration Tool application contains four tabs: BACnet Device, BACnet Objects, Test, and System. Table 2 gives a general overview of the information included on each tab, with additional details provided in the sections that follow.

Table 2: General Overview

Tab Name	Description
BACnet Device	Use this tab to read and write the BACnet properties of the Chiller Unit Controller's Device Object. The properties include: BACnet LAN type (IP or Ethernet), Device Instance, UDP Port, APDU Timeout, APDU Retries, and Daylight Savings Time. The firmware and application software versions are also displayed, along with a BACnet Communication Module reboot option.
BACnet Objects	Use this tab to read and configure the BACnet properties of the objects in the BCM device. Clicking Read reads all the properties for the BCM object that is selected in the pull-down object list. Any of the values for the writeable properties can be changed on the form and then committed to the BCM by clicking Write. The Write button is only displayed if the object has writeable properties.
Test	Use this table to test the reading of the BACnet properties of all the objects contained in the pull-down object list for the BCM. You must have clicked the Read Object List button before you click Read.
System	Use this tab to download new firmware or CSV files, reboot the BACnet Communication Module, and read the current firmware version.
Audit	Use this tab to activate and deactivate BACnet auditing functions and to upload the BACnet audit file .

BACnet Device

Use this tab to read and write the device properties of the Chiller Unit Controller (see Figure 2). Table 3 details the properties and buttons available in this tab. This tab also contains the ability to change from English to Metric units of measure.

Figure 2. BACnet Device Tab

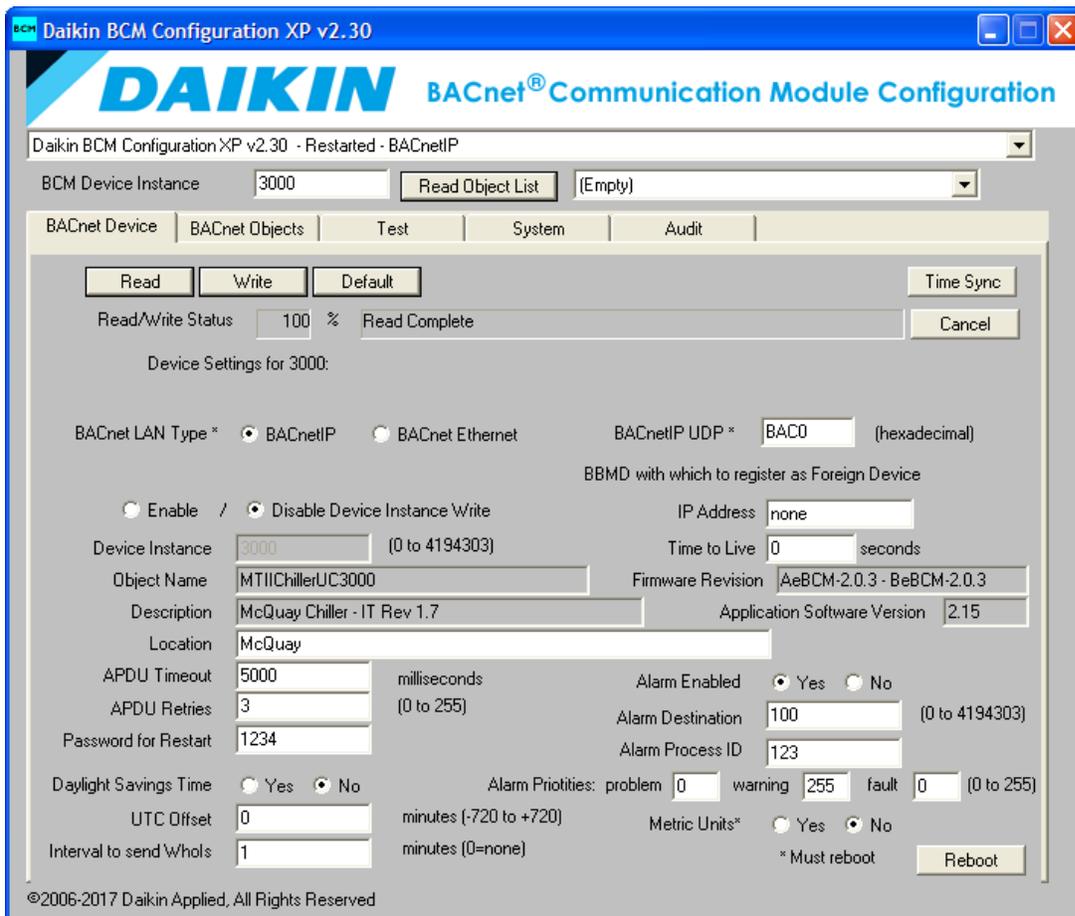


Table 3: BACnet Device Details

Property/Button	Description
BCM Device Instance	The Device Instance of the BACnet Communication Module (appears on the top of all tabs).
Read Object List Button	Select the object to read from the drop-down arrow (appears on the top of all tabs).
Read Button	Reads all the properties of the Chiller Unit Controller Device Object. Before clicking Read, verify that the Device Instance at the top of the screen is correct.
Write Button	Writes any value on the BACnet Device tab to the Chiller Unit Controller. Before clicking Write, verify that the Device Instance at the top of the screen is correct.
Default Button	Resets all values on the BACnet Device tab to their default (i.e. factory) values. The factory settings are not written to the Chiller Unit Controller until the Write button is clicked.
Time Sync Button	Synchronizes the BACnet Communication Module clock with the current time. Pushing this button will set the clock in the BCM, but since this is an unacknowledged BACnet command, there will be no feedback when this button is pushed. Use your BACnet front end to verify the date and time.
Reboot Button	Restarts the BACnet Communication Module if the Password field matches the Password property of the Chiller Unit Controller's Device Object.
MS/TP Baud Rate	This variable defines the MS/TP baud rate for the BACnet Communication Module.
MS/TP Station Address	This is the MS/TP address of the BACnet Communication Module. Each device on the BACnet network must have a unique MS/TP address.
Max Master	MS/TP Only. This variable specifies the highest possible address for master nodes and must be less than or equal to 127.
Max Info Frames	MS/TP Only. This variable specifies the maximum number of information frames the BACnet Communication Module may send before it must pass the token.
Enable/Disable Device Instance Write	Allows modification of the Device Instance. Selecting Disable Device Instance Write prevents modification of the Device Instance.
Device Instance	0-4194303/Device Instance of the BACnet Communication Module. This must be unique throughout the entire BACnet network. Default=3000. Changes to the Device Instance are made immediately after pressing Write. Upon exiting the Configuration Tool, the last BCM Device Instance is saved. This field will be populated with that Device Instance when the Configuration Tool is re-opened.
Object Name	This is the Object_Name of the device and must be unique throughout the network.
Description	Describes the application running in the BACnet device.
Location	This changeable property indicates the physical location of the Chiller Unit.
APDU Timeout	The amount of time, in milliseconds, between retransmissions of an APDU (Application Layer Protocol Data Unit) requiring acknowledgment for which no acknowledgement has been received. Default=3000milliseconds
APDU Retries	The maximum number of times that an APDU shall be retransmitted. Default=3.
Password for Restart	Allows the BACnet Communication Module to be reinitialized from the network. Default=1234. Leaving this field blank indicates that no password is required. If this field is modified, a password is then required before a BACnet client can reinitialize the BACnet Communication Module.
Daylight Savings Time	Must be set to No for a BACnet client to synchronize the time on the network. Default=No.
UTC Offset	Difference in minutes of the UTC and local time (-720 to + 720.) Default=0Min
Interval to send Whols	Frequency, in minutes, at which the BACnet Communication Module sends WhoIs Requests. Default=1Min
Firmware Revision	BACnet Communication Module firmware version.
Application Software Version	This is the BACnet Application_Software_Version property of the Device Object. It reflects the current version of the BACnet component of the BCM.
Alarm Enabled	Selecting Yes enables the BACnet Communication Module to send a ConfirmedEventNotification message to a single BACnet device whenever an alarm occurs in the MicroTech II Chiller. This message has an Event Type = Complex Event and has proprietary properties in its Event Values section. Not all BACnet devices can accept this message.
Alarm Destination	Device Object Instance of the BACnet device that receives the alarm notification
Alarm Process ID	Process ID used at the receiving BACnet device to determine the response action to the alarm notification. May be changed to suit the BAS preference.
Alarm Priorities Problem	Priority for Problem Alarms (0-255)
Alarm Priorities Fault	Priority for Fault Alarms (0-255)
Alarm Priorities Warning	Priority for Warning Alarms (0-255)
Metric Units	Selecting Yes converts the Units and Relinquish Default properties to Metric units. Selecting No converts these properties to English units. Changing this property does not affect the Present Value property read from the chiller. For Centrifugal Chillers, the units can be changed via the keypad.

BACnet Objects Tab

Use the BACnet Objects tab to read and configure the BACnet properties of the objects in the BACnet Communication Module (see Figure 3). Different properties will appear depending on the type of object that is selected in the pull-down list. Table 4 details the properties and buttons available on this tab.

Figure 3. BACnet Objects Tab

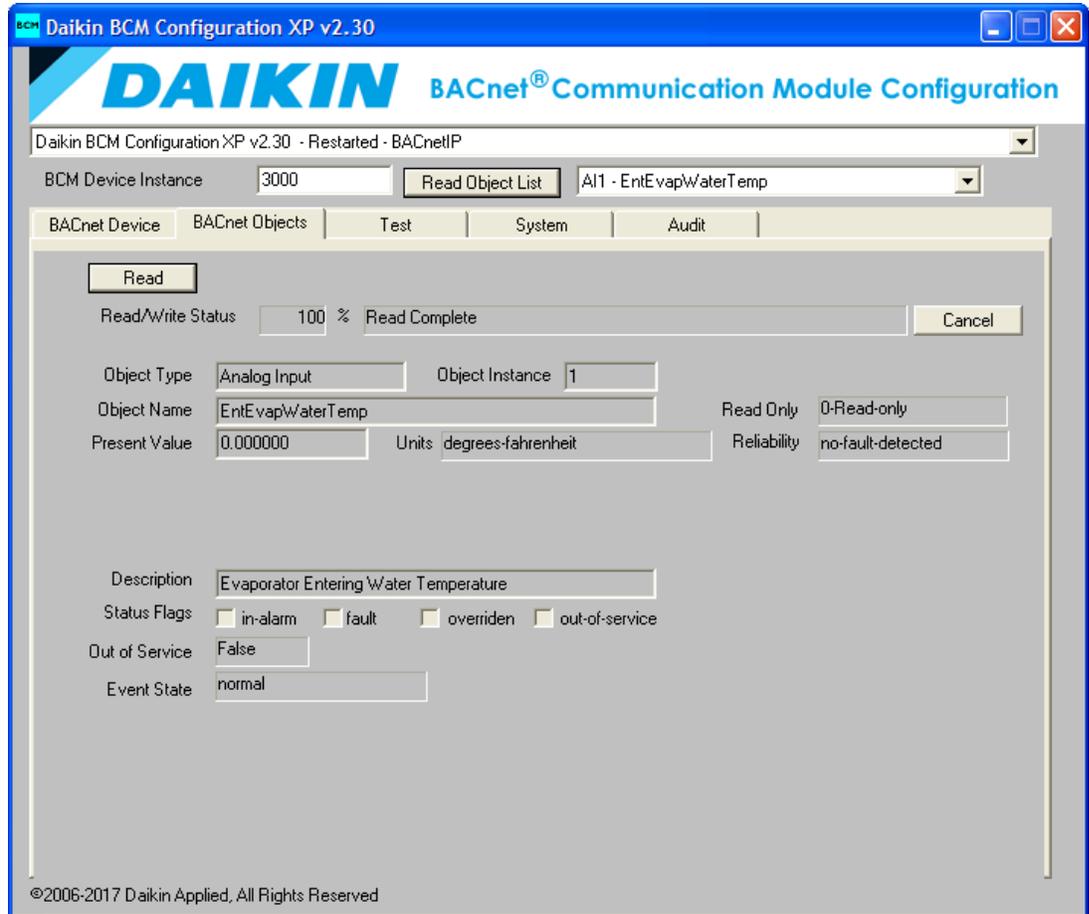


Table 4: BACnet Objects Tab Details

Property/Button	Description
Read Button	Reads all the properties for the object that is selected in the pull-down list.
Read/Write Status	Displays the progress of the read/write command as a percentage (%).
Object Type	Displays the object type selected from the drop-down list.
Object Instance	Displays the instance number of the object selected from the drop-down list.
Object Name	This is the Object_Name of the device and must be unique throughout the network.
Present Value	Indicates the present value for the item selected in the pull-down list.
Cancel Button	Cancels the read or write if still in progress

Test Tab

The Test tab is used to test the reading of the BACnet properties of all the objects contained in the pull-down object list for the Chiller Unit Controller (see Figure 4). You must have clicked the Read Object List button before you click Read. Table 5 details fields available on this tab.

Figure 4. Test Tab

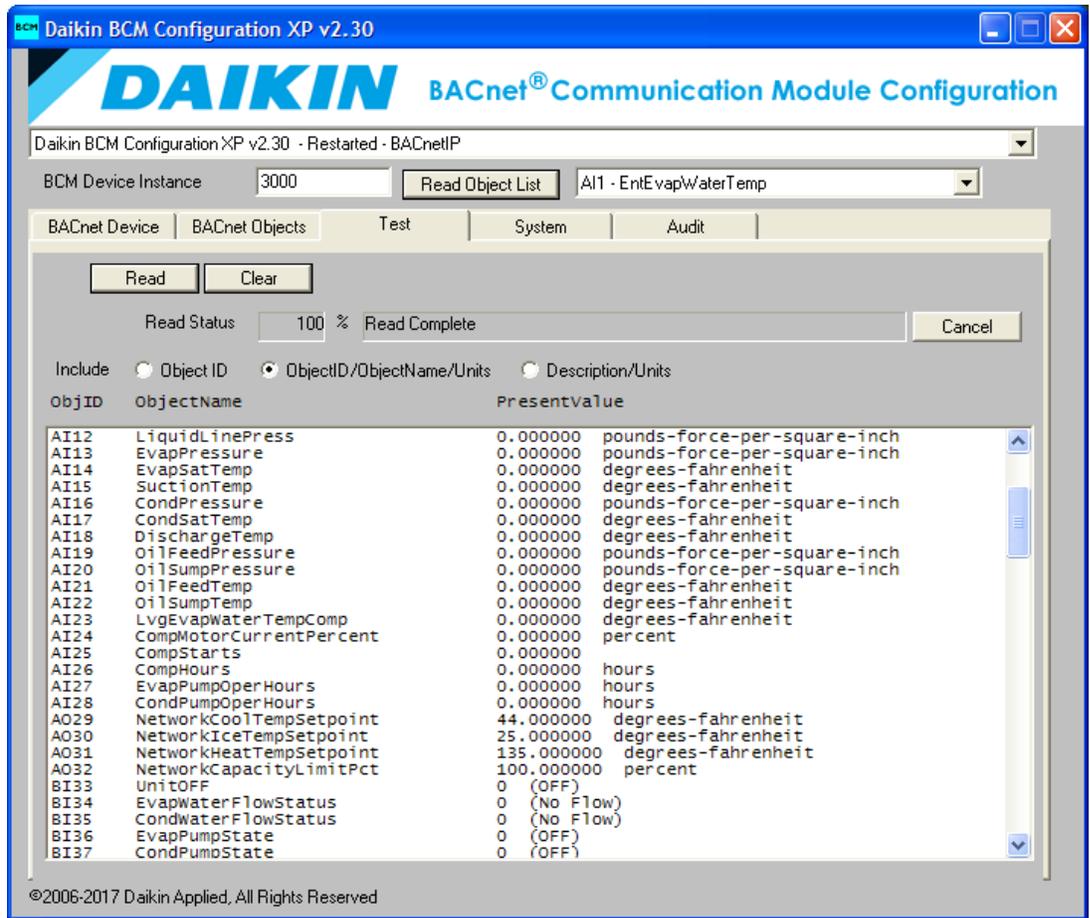


Table 5: BACnet Test Tab Details

Property/Button	Description
Read Button	Reads all the properties for every object that is selected in the pull-down list.
Clear Button	Clears the information displayed on the screen for the current object.
Read Status	Displays the progress of the read command as a percentage (%).
Object ID Radio Button	Displays the Object_Identifier and Present_Value properties of every object in the object list.
Object ID/ObjectName/Units Radio Button	Displays the Object_Identifier, Object_Name, Present_Value and Unit properties of every object in the object list
Description/Units Radio Button	Displays the Description, Present_Value and Unit properties of every object in the object list.
Cancel Button	Cancels the read or write if still in progress

System Tab

The System tab allows you to download new firmware or CSV files, reboot the BACnet Communication Module, and view the firmware version (see Figures 5 and 6). Table 6 describes the properties and buttons available on this tab.

Figure 5. System Tab

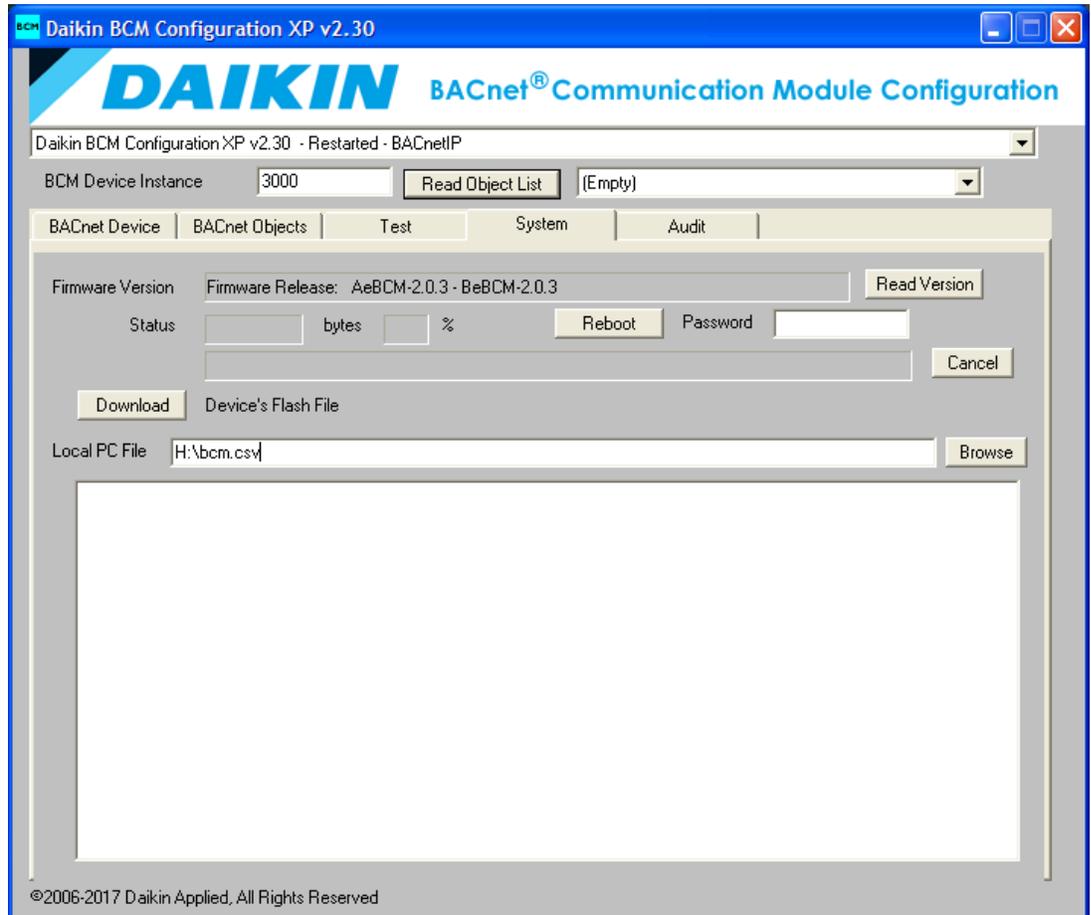


Figure 6. System Tab

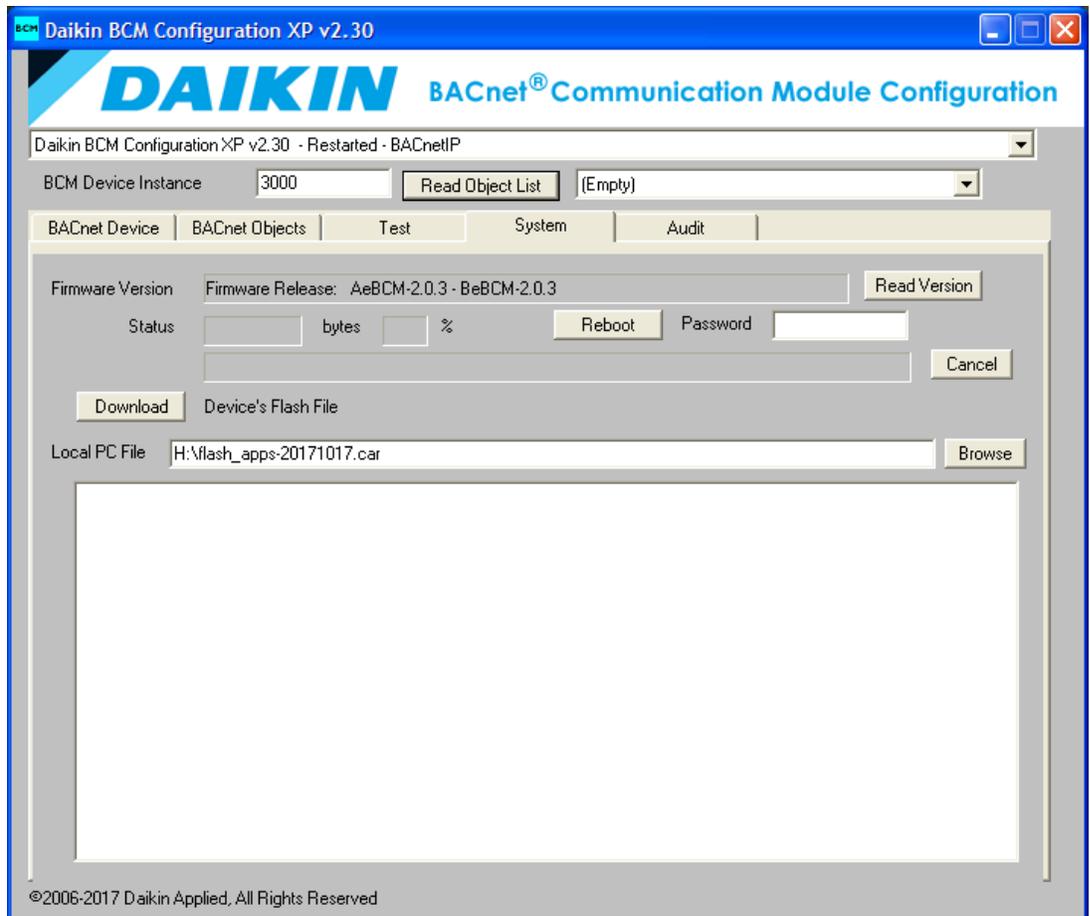


Table 6: System Tab Details

Property/Button	Description
Firmware Version	BACnet Communication Module firmware version.
Read Version Button	Reads the firmware version of the BACnet Communication Module.
Status bytes %	Indicates the download progress in bytes and as a percentage (%) of the total bytes to be downloaded.
Password	Password property of the Device Object.
Reboot Button	Restarts the BACnet Communication Module if the Password matches the Password property of the Device Object. Reboot does not restart the Chiller Unit Controller.
Download Button	Writes the PC file from the Local PC File field to the flash_apps.bin or flash_sys.bin firmware file or the bcm.csv or bcmmap.csv CIT file on the BACnet Communication Module.
Local PC File	Contains the location of the file to be downloaded.
Browse Button	<p>Allows you to select the file to download. Another option is to type the complete file name into the Local PC File field.</p> <p>The type of file to be downloaded depends on the filename and its extension. Typical Filenames are:</p> <ul style="list-style-type: none"> • flash_apps.bin • flash_sys.bin • flash_apps-20170101.car • bcm.csv <p>These files do not need to be updated unless instructed by the Daikin Applied Controls group.</p>

Audit Tab

BACnet auditing/Logging is supported in BACnet/IP versions of the Chiller Unit Controllers with Application Software Data 2.10 and later. The Audit tab allows you to read and select which audit features are selected and also allows you to upload and clear BACnet Audit/Data files.

Figure 7. Audit Tab

The screenshot shows the 'Audit' tab of the 'Daikin BCM Configuration XP v2.30' software. The window title is 'Daikin BCM Configuration XP v2.30'. The main header displays the 'DAIKIN BACnet® Communication Module Configuration' logo. Below the header, there is a dropdown menu showing 'Daikin BCM Configuration XP v2.30 - Restarted - BACnetIP'. The 'BCM Device Instance' is set to '3000', and the 'BACnet Audit File' is 'F1100 - F1100 (BACnet Audit File)'. A 'Read Object List' button is visible. The 'Audit' tab is selected, showing a list of audited activities: (1) BACnet WriteProperty requests for AO, BV and MO Present_Value and Relinquish_Default properties; (2) BACnet WriteProperty requests DE ObjectIdentifier, APDU_Timeout, Number_of_APDU_Retries and Password properties; (3) DeviceCommunicationControl and ReinitializeDevice requests; (4) Any BACnet.AtomicWriteFile request to update firmware or operating parameters for the device. Below this, a note states: 'The Object List must be read and a FI object must be selected before performing any function on this form'. The current audit file is 'F1100 - F1100 (BACnet Audit File)'. The 'Audit' section has four checked checkboxes: 'WriteProperty', 'DeviceCommControl', 'ReinitializedDevice', and 'AtomicWriteFile'. There are 'Read' and 'Write' buttons. The 'BACnet Audit File' section shows 'Upload' and 'Cancel' buttons, with 'Status' at '3245 bytes' and '100 %', and 'File Size' at '3245'. A 'Clear Audit Data' button is also present. The 'Local PC File' is 'D:\temp\t.txt' with a 'Browse' button. A message box says 'File Upload Complete'. The footer contains '©2006-2017 Daikin Applied, All Rights Reserved'.

Table 7: Audit Tab Details

Property/Button	Description
(Audit)WriteProperty	Indicates if all WriteProperty requests to the PresentValue property of all commandable objects and to the ObjectIdentifier of the Device Object are logged
(Audit)DeviceComm Control	Indicates if all DeviceCommunicationControl requests are logged
(Audit)Reinitialize Device	Indicates if all ReinitializeDevice requests are logged
(Audit)AtomicWrite File	Indicates if all AtomicWriteFile requests for firmware updates and CSV file downloads are logged
Read Button	Reads the all the Audit properties for the device.
Write Button	Writes the all the writeable Audit properties for the device except for the File_Size.
Browse Button	Allows you to select the Audit/Log file to upload into. Another option is to type the complete file name into the Local PC File field.
Local PC File	Contains the location of the file to be downloaded.
Upload Button	Reads the BACnet (log) file selected in the Object List into the PC file selected in the Local PC File field.
Status bytes %	Indicates the upload progress in bytes and as a percentage (%) of the total bytes to be downloaded.
Clear Audit Data Button	Clears the data in the Audit/Log file selected in the Object List for the BCM Device by writing 0 to the File Size

BACdoor OEM Client Status

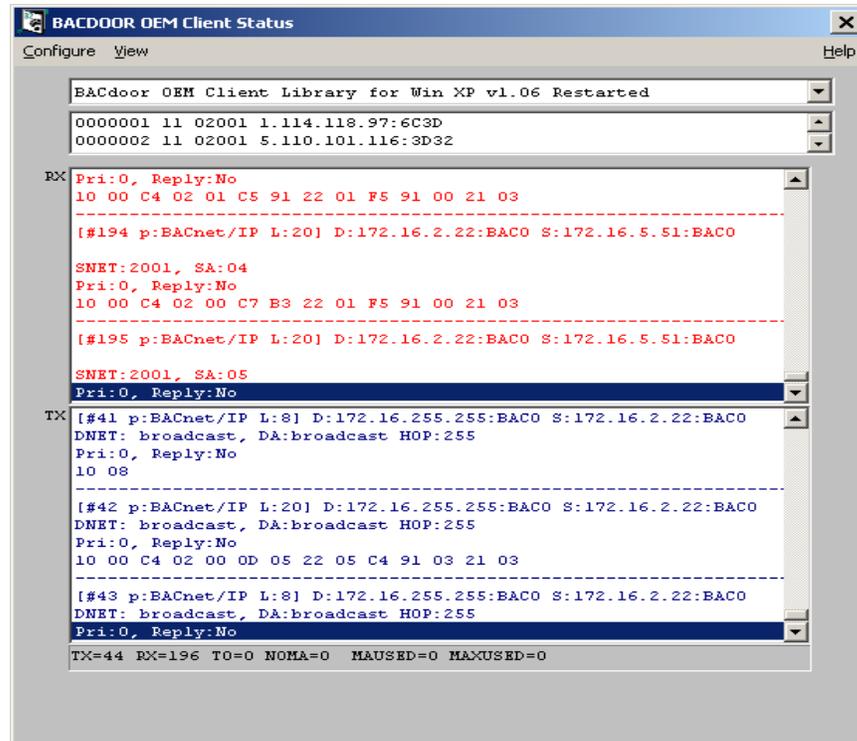
General

The BACdoor OEM Client Status is used to configure the BCM Configuration Tool. The BACdoor OEM Client Status window is minimized into the Windows Task Bar at the lower right side of your

display screen and is indicated by the  icon. Clicking on the icon makes the Status window visible (see Figure 8).

This window displays the status of BACnet packets as they are being exchanged between the BCM Configuration Tool, the BACnet Communication Module, and any other BACnet Devices on the network. It also displays a list of all BACnet Devices that initiate BACnet I_Am service packets.

Figure 8. BACdoor OEM Client Status Window



Configuration Using BACdoor OEM Client Status

Once the BACdoor OEM Client Status window is open, click on Configure to initiate a popup dialog box for setting operating parameters of the **BCM Configuration Tool**. Typically the BACdoor OEM Client Status window can remain minimized in the Task Bar. It is available only for diagnostic purposes and configuration of the BCM Configuration Tool itself (see Figure 9).

Figure 9. BACdoor OEM Client Status Configuration Window

BACDOOR OEM Client Library Configuration

Our Device Instance:

Our Object Name:

Our Description:

Our Location:

Whols/IAm Interval: Minutes (0=None)

BACnet/IP Parameters

UDP port: Subnet:

MS/TP Parameters

Com Port: Baud (restart): (no parity, 8 data, 1 stop)

TS (MS/TP Node): MaxMaster: MaxInfoFrames:

INI File Path

The BACdoor OEM Client Status is separated from the BCM Configuration Tool for two reasons:

- The BCM Configuration Tool rarely requires changes.
- To help differentiate the BCM Configuration Tool parameters from the BACnet Communication Module properties.

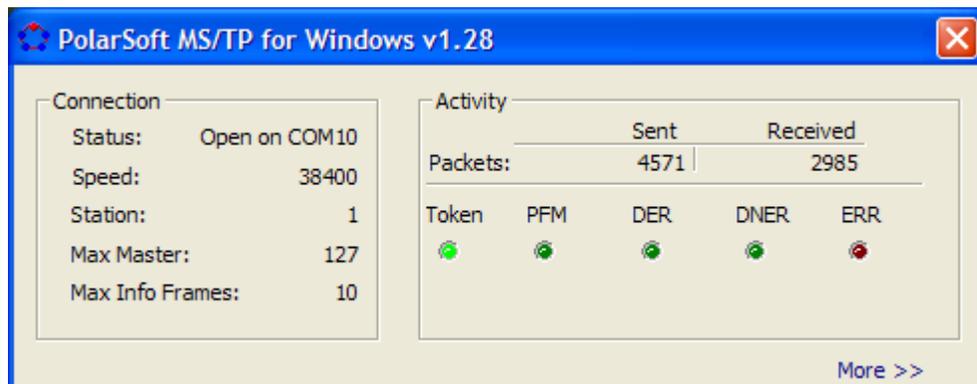
Note: If you change the MS/TP baud rate, you must restart the BCM Configuration Tool for it to take effect.

BACnet MS/TP MAC Layer Status

General

The BACnet MS/TP MAC Layer Status window is minimized into the Windows Tool Bar at the bottom of your display screen and is indicated by the  icon. Click the icon to make the BACnet MS/TP MAC Layer Status window visible (see Figure 10).

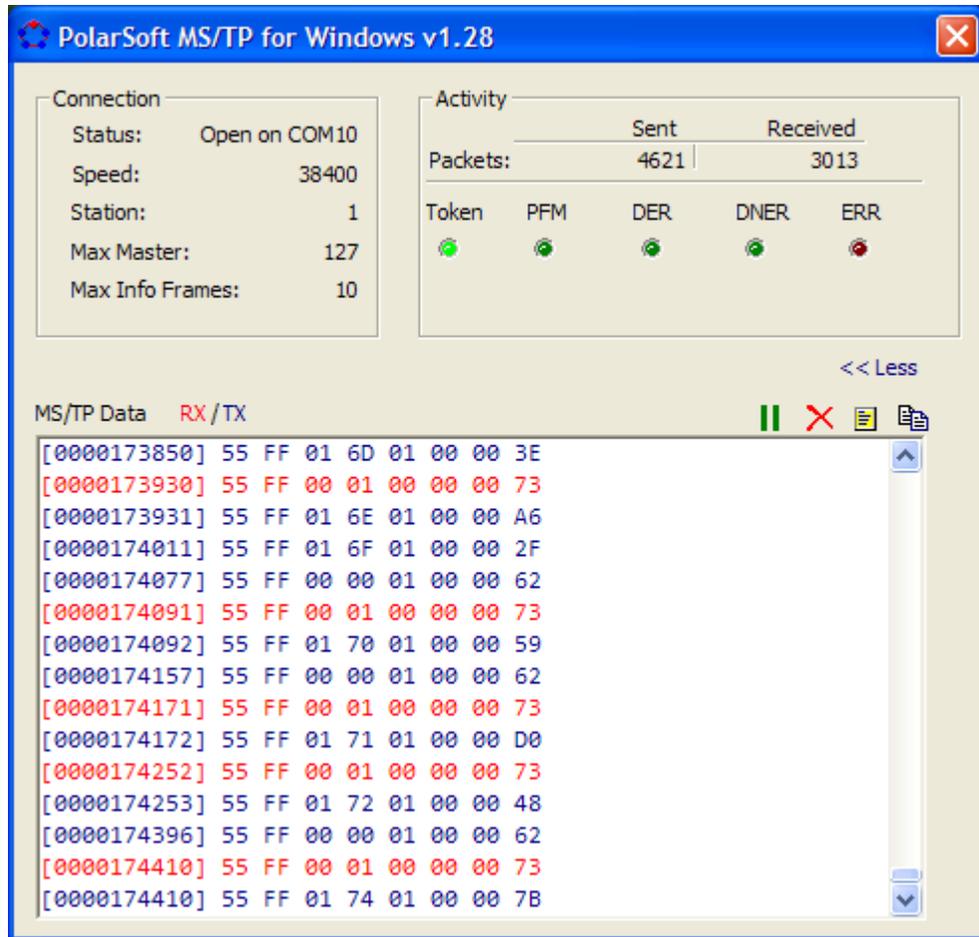
Figure 10. BACnet MS/TP MAC Layer Status Window



Select More>> to expand the information available from the BACnet MS/TP MAC Layer Select (see Figure 11). The BACnet MS/TP MAC Layer Status expanded window now displays the status of MS/TP packets as they are being exchanged between the BCM Configuration Tool, the BACnet Communication Module, and any other BACnet MS/TP Devices on the network. It is recommended that you use the BACnet MS/TP MAC Layer Status for diagnostic purposes only because it can impact BACnet MS/TP operation, especially at higher baud rates.

Note: Minimize the BACnet MS/TP Layer Select during an image upload.

Figure 7. MS/TP MAC Layer Status Expanded Window



Troubleshooting Guide

Table 8 summarizes several potential problems and corresponding solutions. Contact the Daikin Applied Controls Customer Support group at DaikinControls@daikinapplied.com for additional assistance.

Table 8: Common Problems and Solutions

Error/Condition	Problem	Solution
You are unable to read/write to the Chiller Unit Controller via the BACnet Communication Module.	This can be due to several reasons such as wiring or setup.	<ul style="list-style-type: none"> • Verify the BACnet Communication Module is installed correctly and the LEDs are functioning correctly. • Verify the wiring. • Verify the Chiller Unit Controller is set up to communicate BACnet using the keypad. Refer to the proper Chiller Unit Controller OM for details on using the keypad. • Verify connection to the correct MAC Layer Type (MS/TP). • Verify that you are attempting to read the correct Device Instance number. • Verify the Device Instance for the BACnet Communication Module is unique on the BACnet network and does not match the Device Instance of the Configuration Tool. Refer to the Configuration Using BACdoor OEM Client Status section of this document. • Verify the baud rate of the BCM Configuration Tool is the same baud rate of the BACnet Communication Module. Also verify the MS/TP device instance is unique.
Cannot change the Device Instance	The Device Instance Write property is disabled.	Select Enable from the BACnet Device tab to enable the Device Instance Write property. You can now change the Device Instance.
When selecting MS/TP for the MAC Layer Selection, you get a series of three errors including: "Error: [5] Access is denied.", "MS/TP Init Failed (-306)" and "BACLIBinit failed".	The serial port is already in use by another program or the Configuration Tool is trying to use a serial port that is not present or working.	<p>Close any programs that are using the serial port and restart the Configuration Tool. If the problem persists, verify that the BCM Configuration Tool is using the correct serial port by following these steps:</p> <ul style="list-style-type: none"> • Open the Configuration Tool by selecting BACnet IP as the MAC Layer Type. • In the lower right corner of your task bar, click on the BACdoor OEM Client icon. • Click Configure. • Change COM Port to the COM Port you are using on your PC. • Restart the BCM Configuration Tool by choosing MS/TP as the MAC Layer Type.
When using the Configuration Tool, you get a "?Write Error [-111]?: Timeout at MS/TP Station Address" error when trying to modify the MS/TP Station Address.	This could mean that you are trying to write an MS/TP Station Address that already exists.	Change the MS/TP Node Address of the Configuration Tool using the BACdoor OEM Client. This address needs to be unique on the network and is likely set at the address you are trying to write to the BCM.
When using the MS/TP mode you are occasionally dropping MS/TP packets and/or are occasionally timing out when reading BACnet objects.	This could mean that the latency of the COM port must be lowered.	Using the Control Panel – Device Manager, select the COM port – Properties – Port Settings and click the Advanced button. Adjust the Latency Timer (msec) to 1. Make sure the Timeouts are both 0.

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