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User Manual

# ASI BACport

By ASI Controls



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# ASI BACport

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## Introduction



The ASI BACport is a configurable BACnet/IP protocol interface that can be the primary access to the ASI network of controllers.

The BACport is a cost-effective interoperability solution, supporting up to 32 networked ASI controllers via the switch selectable RS-232 or RS-485 interface. The BACport works with both new and legacy ASI controllers, so almost any ASI Controls system can quickly and easily be BACnet enabled.

The BACport connects to the system bus of an ASIC/2-7540 or ASIC/2-8540 controller using either RS-232 or RS-485 connections. Or it can connect to a network of ASIC/1-8655, ASIC/1-8800, ASIC/1-6000 or other ASIC/1 controllers using the EtherLink/2 RS-485 cable.

BACport also works as a simple ASI message router for Expert and LinkOPC, but does not support Notify or Remote Point forwarding features of the EtherLink/2.



You must configure the BACport for the fixed IP address and serial communication parameters in the map.xml file before installing it in your system. Each BACport device must have a unique IP address, and a valid softkey in order to process BACnet messages..

BACport polls for ASI data as it is requested in a round-robin loop. BACport temporarily prioritizes ASI polling for those mapped properties which are queried with a ReadProperty or ReadPropertyMultiple request. The ASI poller interleaves one high priority poll message with every low priority poll guaranteeing 50% of the ASI polling bandwidth is high priority. The more BACnet devices and objects you map, the longer it takes to go around the loop.

The BACport meets and exceeds the minimum requirements to qualify as a BACnet Application Specific Controller (B-ASC). The following BACnet services are implemented:

Data Sharing:

- DS-WP-B (Write Property)
- DS-RP-B (Read Property)
- DS-RPM-B (Read Property Multiple)

Device and Network Management:

- D-DDB-B (Dynamic Binding)
- D-DOB-B (Dynamic Object Binding)
- D-DCC-B (Device Communication Control)
- D-TS-B (Time Synchronization)
- D-RD-B (Reinitialize Device)

BACport does not support COV subscriptions at this time.

## About this Document

This manual was produced using *Doc-To-Help*<sup>®</sup>, by Component One, LCC. This , ASI BACport User Manual, DOC-1702, and Windows<sup>™</sup> help system was last revised on 2011-06-02. ASI Controls is always working to improve our products. Please call, write, or e-mail us at:

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# Initial BACport Setup

The ASI BACport gets its initial configuration information from a map.xml, which is downloaded through the serial port using HyperTerminal. At the factory BACport is configured with no map.xml. The user must install the appropriate map file to assign IP addresses, baud rates, etc.. The map.xml file is discussed in detail in the next chapter. To assign an IP address the map file must contain at a minimum.

```
<XML>
<ASICnet address="121" baudrate="19200" gap="50"
gateway="192.168.1.1" ip="192.168.1.230" port="3001"
subnet="255.255.255.0">
  <ACCESS password="asi" user="asi"></ACCESS>
</ASICnet>
</XML>
```

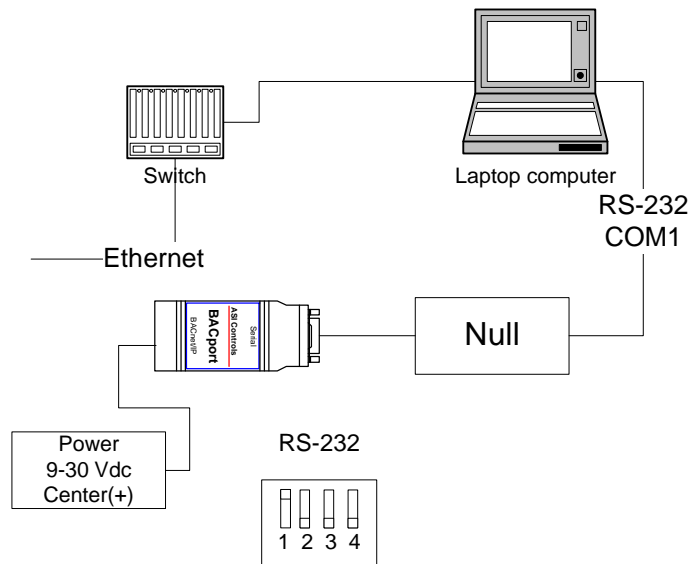
Where “address” is the BACnet Network Address, “baudrate” must match the ASI network baud rate. The message “gap” is the time to wait for a quiet line before initiating communication, typical 50 ms... The “port” 3001 is the default port address for ASI Expert and LinkOPC.

The Access user name and password protects against un-authorized changes.

The file must be named “map.xml”. The map.xml file is discussed in detail in the next chapter.

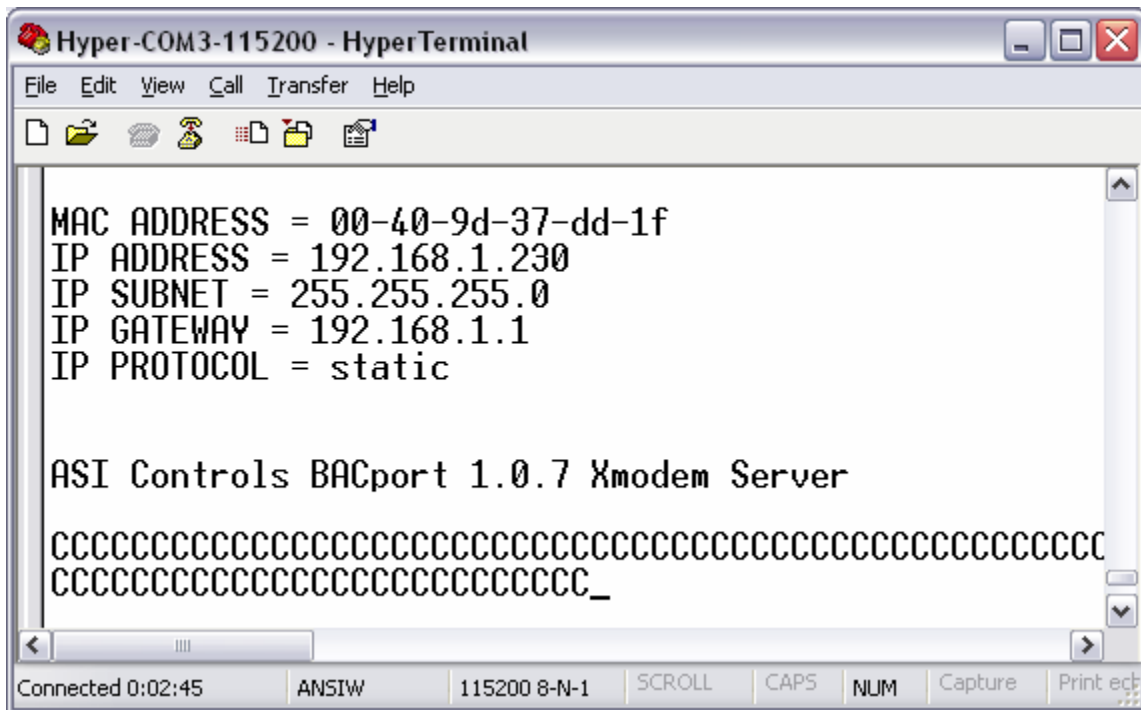
To download the map.xml file to the BACport, connect the BACport Serial port to the computer RS-232 port through a Null-Modem adapter.

Disconnect the BACport Ethernet connection! Cycle power to the BACport.

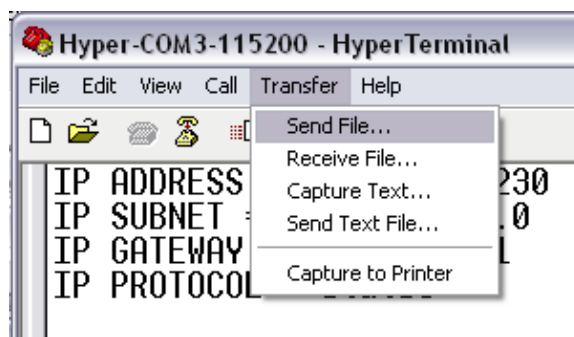


Launch HyperTerminal in you computer set to the COM port, at 115,200 baud, 1 stop-bit, and Hardware flow control.

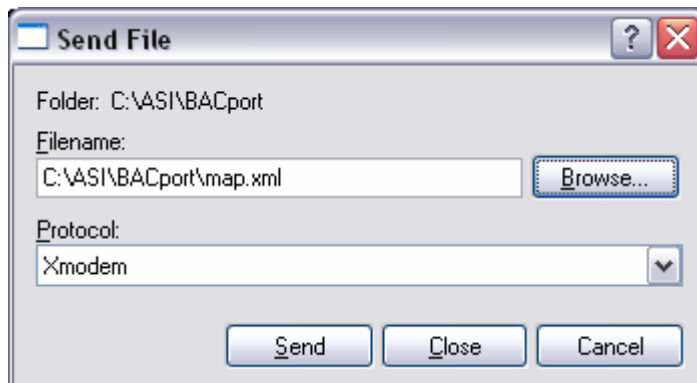




Within about 30 seconds of resetting power to the BACport you should see BACport Banner with IP parameters and BACport firmware version.. It will then send the character "C" on the serial port indicating that it is ready to receive a file.



You may now transfer the map.xml file using HyperTerminal "XMODEM" or "1K XMODEM" file transfer. "1K XMODEM" is faster.



Once the file transfer is complete, wait about 60 seconds while the BACport saves the map.xml file to flash memory.

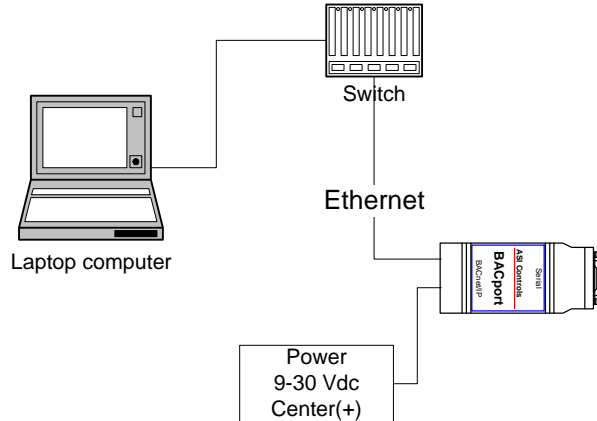
The parameters in the map.xml file are now active.

The BACport automatically resets when you connect the Ethernet cable. The parameters in the map.xml file are now active.

Ping for the IP address referenced in the map.xml file to verify that the new parameters are now active.

## Update map.xml over ftp

Once the BACport has a fixed and know IP address, you can update the map.xml file using ftp file transfer over Ethernet as you add BACnet points to the system. This service is also integrated in the ASI Atlas point mapping software for BACnet.



The mapping file to be downloaded must be named “map.xml” Place the latest map.xml file in your BACport folder, typically C:\ASI\BACport>

Connect to the BACport using ftp. Login with the correct user and password

```
C:\ASI\BACport>ftp 192.168.6.108
Connected to 192.168.6.108.
220 ASI Controls BACport 1.0 FTP
User (192.168.6.108:(none)): asi
331 User asi OK, send password.
Password:
230 Password OK.
```

You may now download the map.xml file.

```
ftp> put map.xml
200 PORT command Ok.
150 About to open data connection.
226 Transfer complete
ftp: 4040 bytes sent in 0.00Seconds.
ftp> quit
221 Goodbye.
C:\ASI\BACport>
```

Wait 30 seconds for the new file to be written to flash memory. The new map file is not yet active.

You will then need to restart the BACport so that the new map.xml file becomes active. This can be done using the bacnet\_reset command.

```
bacnet_reset [BACnet_ID] 1.
```

Where BACnet ID is the BACport is defined in the map file and 1 is soft reset.

If not defined the BACnet ID is 999.

# BACport map.xml

---

## Summary

The BACport acts as a virtual BACnet/IP Router to ASI control devices that appear as BACnet devices. The BACport configuration is stored in a map.xml file in XML format, which can be edited using any XML or text editor, such as Notepad++. ASI Atlas BACport Configuration and BACnet point mapping software is recommended and is described in this manual.

The map file contains the ASI Network Configuration data to assign IP addresses, baud rates, etc. This section is also used to store the copy protection data, user name and password, and to enable the relay ASIC/1 and ASIC/2 time synchronization.

The map file contains the BACnet Gateway Device Configuration that defines the ASI Devices that are mapped to BACnet Devices and the ASI Points that are mapped to BACnet Objects.

If the IP address has already been configured, then any FTP client including ASI Atlas can be used to retrieve or send the configuration file to the BACport device. By disconnecting the Ethernet connection, a new map.xml file can be downloaded over the BACport serial cable even if the IP address is not known.

BACport polls the serial bus for the latest values of ASI points and uses built-in functions to extract any ASI data value as a single byte, word, double-word, bit, and more. The extracted data is used for the Present Value of the specified BACnet Object.

Configurable scaling from raw to engineering units further simplifies the task of converting native ASI data values into BACnet friendly types. Specify optional BACnet units like percent, degrees Fahrenheit, cubic feet per minute, etc...

## map.xml

The map.xml file has the following sections:

XML Declaration <XML>

ASI Network Configuration <ASICnet>

BACport Software Copy Protection <SOFTKEY>

ASIC Time Synchronization <TIMESYNC>

BACport User and Password<ACCESS>

BACnet Gateway Device Configuration <BACnet>

ASI Device Definition <DEVICE>

Object Mapping <OBJECT>

“etc.”

Object Mapping <OBJECT>

ASI Device Definition <DEVICE>  
Object Mapping <OBJECT>

Object Mapping <OBJECT>

The map.xml file also supports comments for readability. Comments begin with "<COMMENT.>" and end with </COMMENT>

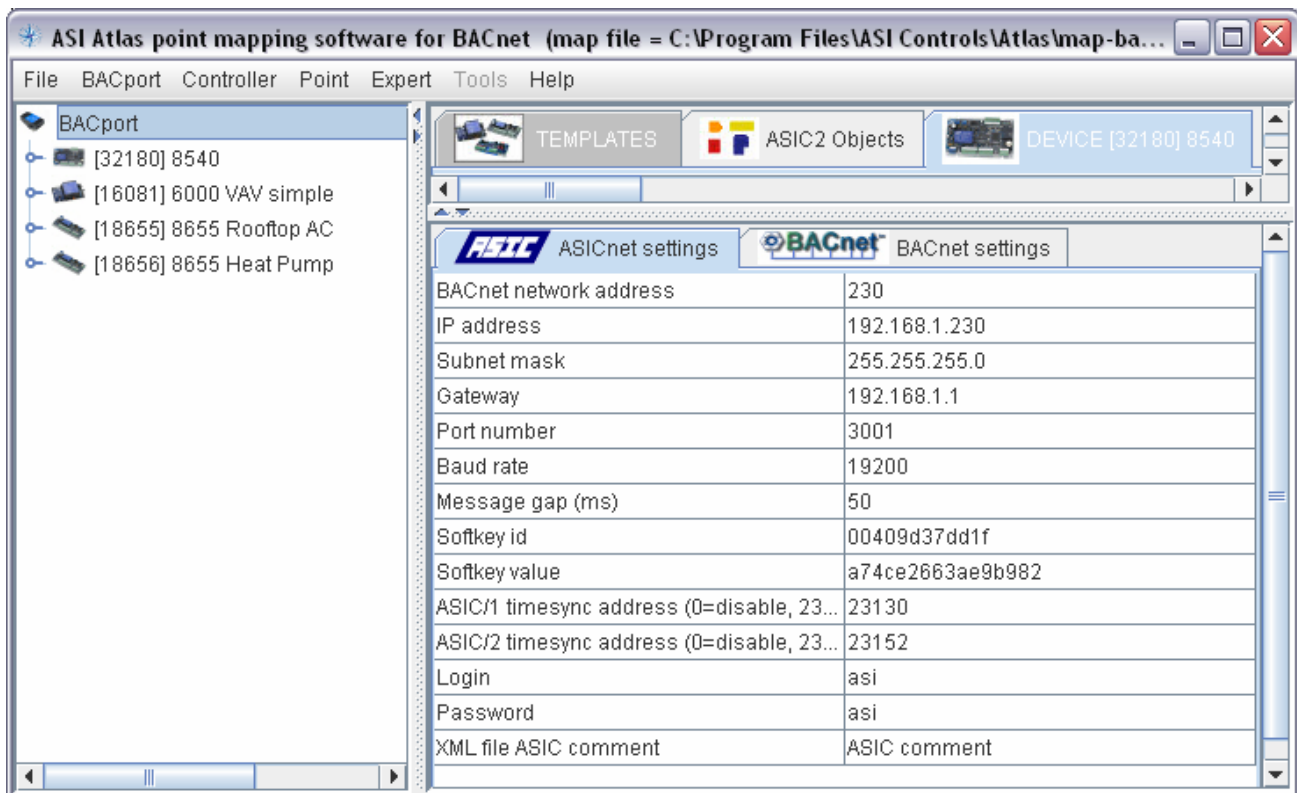
XML files generally ignore white space, that is extra spaces, line feeds, tabs, etc. that are inserted to make the document more readable.

Every XML tag has an opening tag <ASICnet> that begins and a closing tag, </ASICnet> that ends a section.

Note that XML tags are CASE SENSITIVE.

## <ASICnet> Settings

The map.xls file contains a initial section <ASICnet> that defines the ASI Network Configuration. Also in this section are tags for BACport Software Copy Protection <SOFTKEY>, ASIC Time Synchronization <TIMESYNC>, and BACport User and Password<ACCESS>



```
<ASICnet address="230" baudrate="19200" gap="50"
gateway="192.168.1.1" ip="192.168.1.230" port="3001"
subnet="255.255.255.0">

  <COMMENT>ASIC comment</COMMENT>
  <SOFTKEY id="00409d37dd1f">a74ce2663ae9b982</SOFTKEY>
  <TIMESYNC asic_1="23130" asic_2="23152"></TIMESYNC>
  <ACCESS password="asi" user="asi"></ACCESS>

</ASICnet>
```

The BACport has a fixed IP, Subnet, and Gateway address. Typically ASI messages are on port 3001 at 19200 baud. The message gap is the time in milliseconds that it waits for a quiet line on the serial port.

The following properties are supported:

BACnet network Address=230	network identifier.for BACnet
ip="192.168.1.230"	fixed IP address
subnet="255.255.255.0"	fixed Subnet Address
gateway="192.168.1.1"	Gateway IP Address
port="3001"	ASI IP Port [Default 3001]
baudrate="19200"	Serial Port Baud Rate
gap="50"	Message Gap in milliseconds

Note: If either the ip, subnet, or gateway addresses are missing or are 0.0.0.0, then the BACport reverts to DHCP to obtain an IP address.

### <SOFTKEY>

The BACport software is copy protected with a 16-hexdigit softkey generated based on the 12-Hexdigit BACport device MAC address

```
<SOFTKEY id="00409d37dd1f">a74ce2663ae9b982</SOFTKEY>
```

The following property is supported:

id="00409D374074"	Ethernet MAC address of BACport
-------------------	---------------------------------

The value between the open and closing tags is the SOFTKEY password to enable the device that is provided by ASI Technical support.

A valid softkey is needed to enable the BACnet features of the BACport. Without the softkey, BACport will continue to function as a simple ASI router.

### <TIMESYNC>

The BACport has the ability to relay BACnet time synchronization messages to ASIC/1 and ASIC/2 controllers on the serial port .

```
<TIMESYNC asic_1="23130" asic_2="23152"></TIMESYNC>
```

When the BACport receives a BACnet time synchronizer message (D-TS-A) on the BACnet/IP Port, it will pass the message on to the ASIC/1 or ASIC/2 addresses.

The following properties are supported:

asic_1="23130"	ASIC/1 Global Address
asic_2="23152"	ASIC/2 Global Address

### <ACCESS>

The BACport can be assigned a user name and password required for ftp login..

```
<ACCESS user="asi" password="asi"></ACCESS>
```

The following properties are supported:

user="asi"	User login name
password="asi"	User password

Note: If the <ACCESS> Tag is missing then BACport reverts to the default user, "asi" and password, "asi".

## <BACnet> Settings

ASINet settings		BACnet settings	
Name	BACport 230 Mashuri		
BACnet port #	47808		
BACnet ID	230		
I am	0		
Who is	0		
Description	ASI Controls BACnet Gateway		
Location	San Ramon, CA		
XML file BACnet comment	BACnet Comment		

```

<BACnet description="ASI Controls BACnet Gateway" iam="0"
id="230" location="San Ramon, CA" name="BACport 230 test"
port="47808" whois="0">
    <COMMENT>BACnet Comment</COMMENT>
    . . .
</BACnet>

```

There is one pair of <BACnet> </BACnet> tags in the map.xml file.

The BACnet gateway configuration has the BACnet/IP port="47808"(0xBAC0) and a unique BACnet Device Instance number (id).

In addition it has the required Object Name and optional Location and Description.

It can also be configured to broadcast over BACnet/IP I-Am or Who-Is on an interval (in second), 0 is Off.

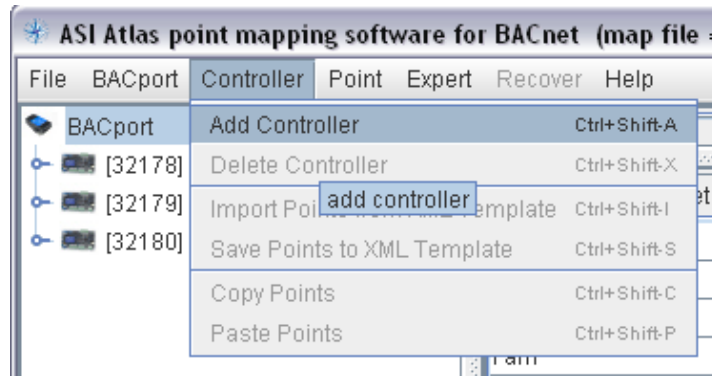
The following properties are supported:

port="47808"	BACnet Ethernet Port Number
id="230"	Unique Device Instance number
iam="0"	Enables I-Am service in seconds
whois="0"	Enables Who-Is service in seconds
description="ASI Controls BACnet Gateway"	Optional Description
location="San Ramon, CA"	Optional Location
name=" BACport 230 test"	Required Unique Device Name

<

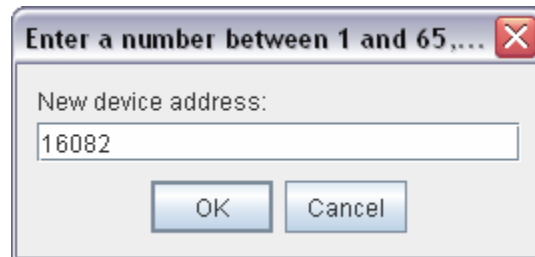
## <Device>

Each BACport device supports one or more ASI Devices with unique BACnet device identifiers, id. Each ASI controller on the serial bus will appear as a unique BACnet device with a unique BACnet Device instance and MAC address..

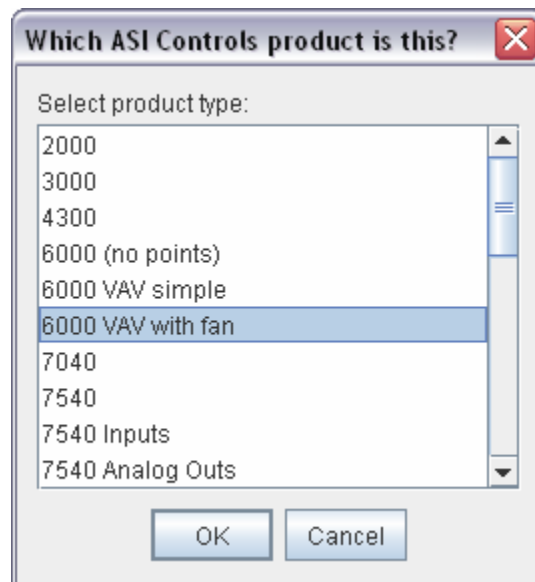


Select Add Controller from the Controller Menu.

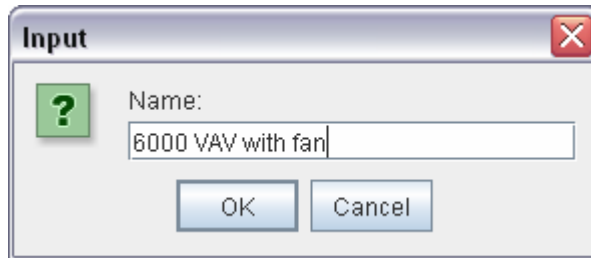
It will then ask for the Controller Address



Select ASI Product Type

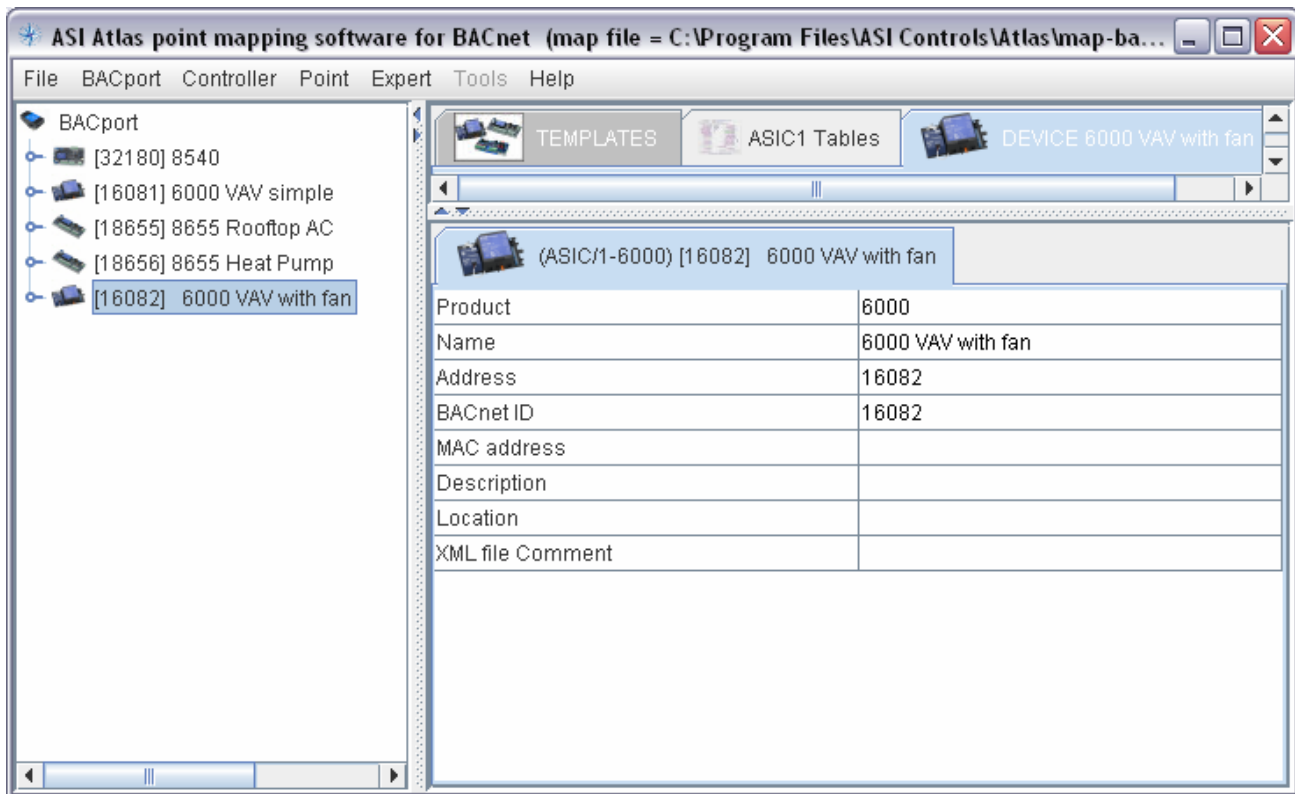


And controller name.



It will place the new device in the product tree in the left window and create a <Device> entry in the map.xml file. If you select a product with a name in parenthesis, it will also load the template file for that product.

The use of template files is discussed further in the next chapter.



Atlas assigns a BACnet ID to be identical with the ASI Device Address. Optional Description and Location Fields can also be used to identify the controller.

Note: The BACnet ID must be unique over the entire network of controllers for the project. A single BACport supports up to 32 devices. Each device must have a unique MAC address in the range from 1 to 127.

Each ASIC/2 Device has one or more BACnet objects defined with ASI Object references.

Each ASIC/1 device has one or more BACnet objects defined with ASI Table references as defined in the Atlas Template file that is selected.

Under the BACnet Gateway are a series of devices. <DEVICE> which includes a device instance, product, ASI address, description, location, and name.. BACport supports both ASIC/1, ASIC/2, and SINC/3 controllers.

```
<XML>
<ASICnet address="121" . . . >
</ASICnet>
  <BACnet description="ASI Controls BACnet Gateway" . . . >
```



```

<DEVICE address="32180" description="" id="32180"
location="" mac="1" name="[32180] 8540"
parentaddress="0" product="8540">

</DEVICE>

<DEVICE address="18655" description="" id="18655"
location="" mac="2" name="[18655] 8655 Rooftop AC"
parentaddress="32180" product="8655">

</DEVICE>

</BACnet>

</XML>

```

In the map.xml file there are a pair of <Device> </Device> tags for each ASIC/1 or ASIC/2 device in the ASI network being serviced by the BACport Gateway.. If the ASIC/1 controller is on the local bus of an ASIC/2, then the parent address identifies it's polling controller.

The <Device> tag includes the required unique BACnet Device Instance (id), the required device name and MAC address, and the optional description and location.

The < DEVICE > Tag also identifies the 4-digit Product Number, and the 16-bit ASI Device address which are required for communication with the device on the serial port. If the ASI Device address is group or global, then the device is "Write Only" and can be used by the BACnet client to write to multiple ASIC/1or ASIC/2 controllers.

The <DEVICE> tag supports the following properties:

address="18655"	ASI 16-bit Device Address
description=""	Optional Description
id="18655"	Unique Device BACnet Instance
location=""	Optional Location
mac="2"	Virtual Media Access address
name="[18655] 8655 Rooftop AC"	Required Unique Device Name
parentaddress="32180"	Used for Local Bus Controllers
product="8655"	ASI 4-digit Product Type



# BACport Points

Each Device has one or more BACnet objects which are configured using the <OBJECT> tag. BACport maps the value in the controller to the Present Value of the object instance. BACport supports the following BACnet object types:

- Analog Input, AI (0)
- Analog Output, AO (1)
- Analog Value, AV (2)
- Binary Input, BI (3)
- Binary Output, BO (4)
- Binary Value, BV(5)
- Device (8)

The <OBJECT> tag specifies the object type, required name, and the mapping to the equivalent ASIC/2 object, instance, and property, or ASIC/1 table, entry and property.

Each ASIC/2 Device has one or more BACnet objects defined with ASI Object references.

Each ASIC/1 device has one or more BACnet objects defined with ASI Table references.

There are several different methods of creating the <Object> Point definitions.

In this chapter we shall review the properties of the BACnet <Object> Point definitions. In the next chapter we shall explore the ways that Atlas BACnet Configuration Software Tool can be used to painlessly construct and install the map file in the BACport BACnet Gateway.

## <OBJECT> ASIC/2 Point

The ASIC/2 Point uses the <OBJECTt> tag.

```
<OBJECT datatype="WORD" instance="0" map="5:0:0:0" name="IN-01"
parameter="Present Value" type="AI" units="95">
  <SCALE max="32767" min="-32767" unit_max="327.67"
unit_min="-327.67"></SCALE>
</OBJECT>
```

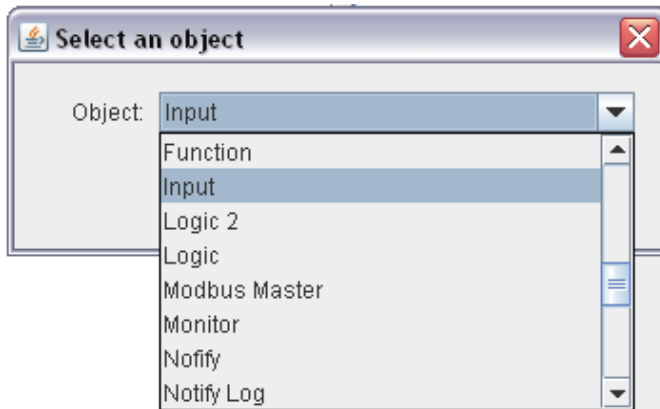
ai Point: Present Value from controller [32180] 8540	
Name	IN-01
BACnet Object Type	AI
BACnet Units	No Units
BACnet instance	0
ASI Object	
Map	5:0:0:0
ASI data type	WORD
Object instance	0
Parameter	Present Value
XML file comment	
Use scaling	<input checked="" type="checkbox"/>
Scale minimum value	-32767
Scale maximum value	32767
Scale unit minimum	-327.67
Scale unit maximum	327.67
Out of service	<input type="checkbox"/>

The < OBJECT> tag supports the following properties:

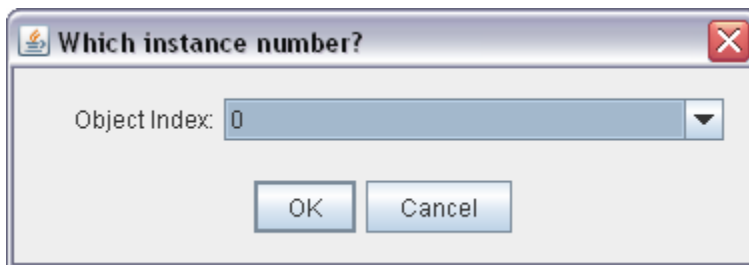
name="IN-01"	ASI Object Instance Name
type="AI"	BACnet Object Type
units="95"	BACnet Units
instance="0"	BACnet Instance
map="5:0:0:0"	ASIC/2 Object: : Instance : Attribute : Select
datatype="WORD"	ASI Data type - Information only
Parameter	ASI Parameter Present Value - Information only
XML file Comment	User Information about the point.
Use Scaling	An additional tag <SCALE> is used.

To add a BACnet Point highlight the ASIC/2 device and select Map Point from the Point Menu. You may also right-click on the device and select Map Point. Once the point is created you can edit the point to change its properties.

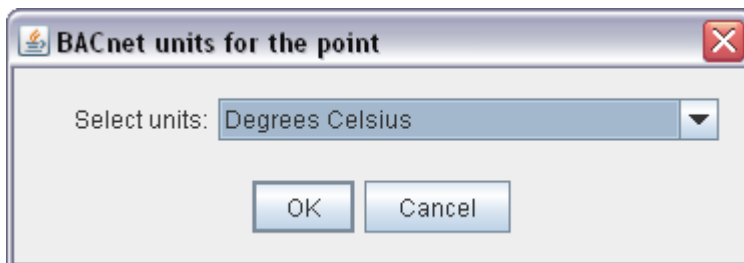
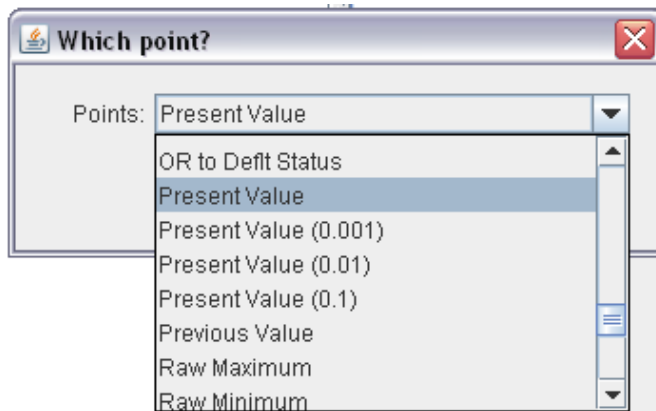
You are asked for an ASI Object (alphabetic order). You may need to reference the ASIC/2 Object Definitions to determine the specific property you wish to map.



ASI Instance number. If you have Refreshed from an Expert Project only instances defined in the controller allocation are allowed.



A list of possible properties are then displayed that can be mapped to the present value of the BACnet point. This list of points is taken from the ASIC2.mdb file used by ASI Expert.. For Inputs we typically select the present value.



Because we have selected Input, it will assume the Analog Input (AI) BACnet object type

## BACnet Object Instance

If the instance property is not specified for an object, then the BACnet instance numbers are assigned in the order that they appear in the map.xml file.

Otherwise you may specify an object instance number using the index property. Note care must be taken to assure that no two object instances in the same device are the same.

## ASIC/2 Mapping

The map="5:0:0:0" field ties this particular BACnet object instance with an ASI device, object, index, attribute, and select.

The <OBJECT> map property specifies the equivalent ASIC/2 object, instance, attribute, and select for the BACnet Present Value. ....

```
map="5:0:0:0" {OBJ:IDX:ATTRIBUTE:SELECT}
```

The Selector is a number which specifies the bit, nibble, byte, word or double word that is to be selected from the ASI controller and mapped into the present value of the object. The selector values are an extension of those used in ASI Expert and are listed in the appendix..

ASI Atlas allows limited editing of the Select. For example the Input present value could be changed from Unsigned to Signed.

Point: Present Value from controller [32180] 8540	
Name	IN-02
BACnet Object Type	AI
BACnet Units	No Units
BACnet instance	1
ASI Object	
Map	5:1:0:Word Unsigned
ASI data type	5:1:0:Word Signed
Object instance	5:1:0:Word Unsigned
Parameter	5:1:0:Double Word Signed
XML file comment	5:1:0:Double Word Unsigned
Use scaling	5:1:0:Word Unsigned

Or the ASI Object Index can be changed.

Map	5:1:0:9
ASI data type	Word Unsigned
Object instance	1
Parameter	0
XML file comment	1
Use scaling	2
Scale minimum value	3
Scale maximum value	4
Scale unit minimum	5
Scale unit maximum	6
Out of service	7

## <SCALE>

The Present value can be scaled where the raw ASI controller value is put in proper engineering units using the <SCALE> tag. Scaling takes the number presented in the ASI controller and calculates a present value using a linear relationship. For example, Temperatures are typically in units of 0.01 deg. The value 7234 can be converted to 72.34 degrees.

```
<OBJECT type="AI" name="AI.1.ZoneTemp" units="64" map="9:47:9" >
  <SCALE min="-32768" max="32767"
    unit_min="-327.68" unit_max="327.67" >
  </SCALE>
</OBJECT>
```

The optional <SCALE> tag supports the following properties:

min="-32768"	Minimum Raw Value
max="32767"	Maximum Raw Value
unit_min="-327.68"	Minimum Present Value
unit_max="327.67"	Maximum Present Value

## Binary Output Example

bO Point: Output Value from controller [32180] 8540	
Name	BO-03 OutputValue
BACnet Object Type	BO
BACnet Units	No Units
BACnet instance	2
ASI Object	
Map	3:2:0:3
ASI data type	LOBIT0
Object instance	2
Parameter	Output Value
XML file comment	
Text ON	On
Text OFF	Off
Out of service	<input type="checkbox"/>

## <TEXT>

Binary Input and Output support the Text on and Text off properties which can be declared.

```
<OBJECT datatype="LOBIT0" instance="2" map="3:2:0:3" name="BO-
03 OutputValue" parameter="Output Value" type="BO" units="95">
  <TEXT off="Off" on="On"></TEXT>
</OBJECT>
```

## **ASIC/2 Overrides**

ASIC/2 BO Outputs can be overridden using BACnet priority arrays. When last active priority is released, then the ASI O/R is restored to normal.

ASIC/2 Input, Analog Outputs, PID, and Schedule are overridden and released when you map the Present Value Attr-0.



---

## <OBJECT> ASIC/1 Point

The ASIC/1 Point uses the <OBJECTt> tag.

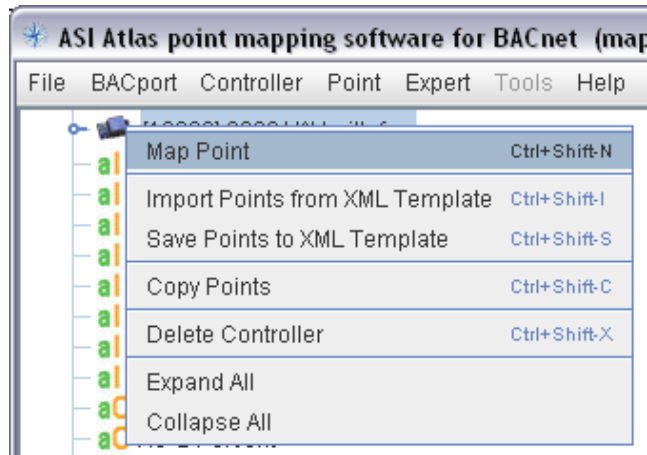
```
<OBJECT datatype="WORD" instance="0" map="9:47:0" name="IN-1
Zone Temp" parameter="Zone Temp IN-1" type="AI" units="64">
  <SCALE max="32767" min="-32767" unit_max="327.67"
  unit_min="-327.67"></SCALE>
</OBJECT>
```

a   Point: Zone Temp IN-1 from controller [16081] 6000 VAV simple	
Name	IN-1 Zone Temp
BACnet Object Type	AI
BACnet Units	Degrees Fahrenheit
BACnet instance	0
Table	9
Map	9:47:0
ASI data type	WORD
Parameter	Zone Temp IN-1
XML file comment	
Use scaling	<input checked="" type="checkbox"/>
Scale minimum value	-32767
Scale maximum value	32767
Scale unit minimum	-327.67
Scale unit maximum	327.67
Out of service	<input type="checkbox"/>

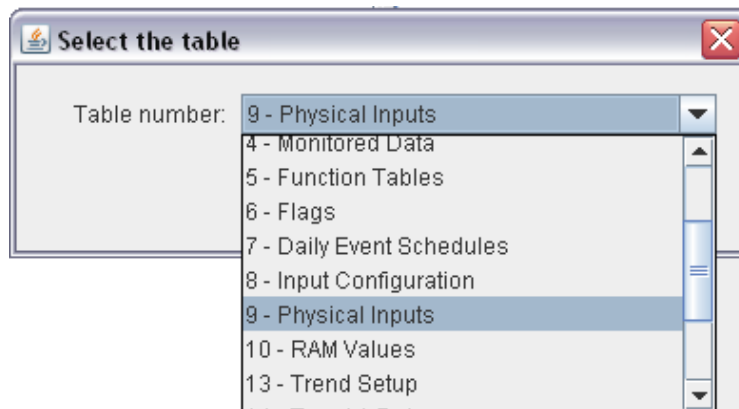
The ASIC/1 < OBJECT> tag supports the same properties as the ASIC/2 tag, except for the definition of the Map property. :

map="9:47:0"                      ASIC/1 Table : Entry : Select

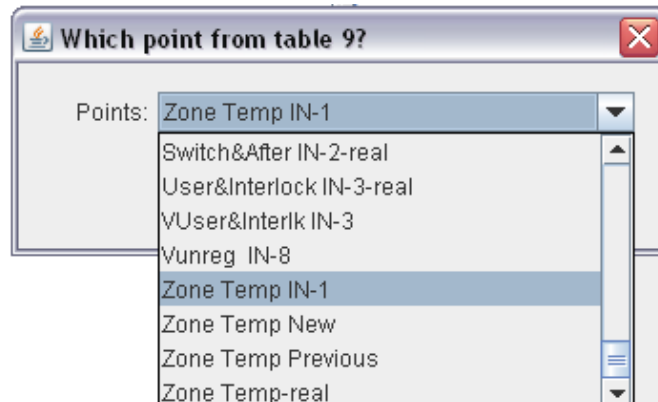
To add a BACnet Point highlight the ASIC/1 device and select Map Point from the Point Menu. You may also right-click on the device and select Map Point. Once the point is created you can edit the point to change its properties.



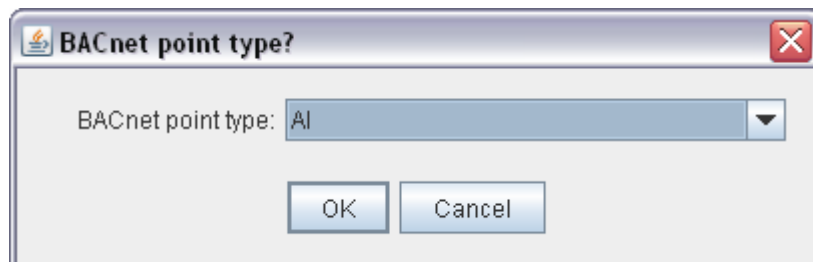
You are asked to select the Table and property. Table 9 is physical Inputs.



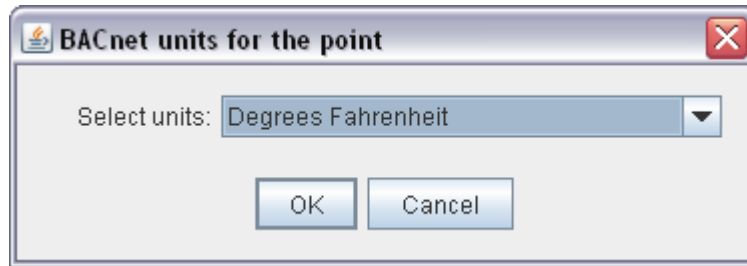
You are asked to select the property in Table 9.



The Type of BACnet Object Type



Select the Units



The new Point appears in the list and it can be edited.

### **ASIC/1 Mapping**

For ASIC/1 controllers the <OBJECT> map property specifies the equivalent ASIC/1 Table, entry and select value.

```
map="9:47:9" {TBL,ENTRY,SELECT}
```

ASI Atlas allows limited editing of the Select. For example the Input present value could be changed from Word Signed to Word Unsigned. .

Point: Zone Temp IN-1 from controller [18655] 8655 Rooftop AC	
Name	IN-1 Zone Temp
BACnet Object Type	AI
BACnet Units	Degrees Fahrenheit
BACnet instance	0
Table	9
Map	9:47:Word Signed
ASI data type	9:47:Word Signed
Parameter	9:47:Word Unsigned
XML file comment	9:47:Double Word Signed
Use scaling	9:47:Double Word Unsigned
Scale minimum value	9:47:WORD

```
<OBJECT datatype="WORD" map="9:47:0" name="Zone Temp IN-1" parameter="Zone Temp IN-1" type="AI" units="64"></OBJECT>
```

An optional units field in the Tag specifies the BACnet Units parameter as listed in the appendix. 64 = UNITS\_DEGREES\_FAHRENHEIT

### **ASIC/1 Special Table 0**

Special Table 0 entries are used in the mapping to ASIC/1 controllers to accomplish certain overrides by generating special ASI protocol messages. They are write-only (special Analog Input type with "out-of-service" always true, which in BACnet spec means present-value is writable).

#### **ASIC/1 Command Override**

```
<OBJECT type="AI" name="AI.OperatingState" map="0:1:0"> </OBJECT>
```

Sends ASIC/1 Command Override Message, MT=0x10, M1= action.

Valid Command OR values include:

- 03 - Set State to Night Setback
- 04 - Set State to Morning Ready
- 05 - Set State to Occupied [Default State]
- 06 - Set State to Unoccupied
- 07 - Restore State to Daily Event Schedule
- 08 - Set Changeover ON
- 09 - Set Changeover OFF
- 10 - Reset Changeover to Normal
- etc,

See ASIC/1 Engineering guide for complete list of actions.

### **ASIC/1 Emergency Override**

<OBJECT type="AI" name="AI.EmergencyState" map="0:2:0"></OBJECT>

Sends ASIC/1 Emergency Override Message, MT=0x12, M1=actions

Valid Action message bytes include:

- 1 - Assume Emergency 1 state
- 2 - Assume Emergency 2 state  
(EM1 must be cleared before EM2 can be used)
- 3 - Cancel ALL Emergency states

### **ASIC/1 Demand Override**

<OBJECT type="AI" name="AI.DemandLevel" map="0:3:0"></OBJECT>

Sends ASIC/1 Demand Limit Message, MT=0x16, M1,M2, where the present value represents:

- M1 = Least Significant Byte, Demand Level, 0 - Clear , 1-6
- and M2 = Most Significant Byte [0, ...,255] Demand Group

### **ASIC/1 Function Override**

<OBJECT type="AI" name="AI.FunctionOverride" map="0:4:0"></OBJECT>

Sends ASIC/1 Function Override Message, MT=0x21, M1=action

Valid Actions for ASIC/1-6000 & ASIC/1-8800 include:

- |    |                  |             |
|----|------------------|-------------|
| 01 | Force Heat OFF   | OR HT Off   |
| 02 | Force Heat ON    | OR HT On    |
| 03 | Restore Heat     | Restore HT  |
| 04 | Force FAN OFF    | OR FAN Off  |
| 05 | Force FAN ON     | OR FAN On   |
| 06 | Restore FAN      | Restore FAN |
| 07 | Force Lights OFF | OR LTG Off  |
| 08 | Force Lights ON  | OR LTG On   |
| 09 | Restore Lights   | Restore LTG |
|    | etc.             |             |

See ASIC/1 Engineering guide for complete list of actions. The function overrides differ somewhat by product.

## **ASIC/1 Overrides**

ASIC/1 Outputs can be overridden using BACnet priority arrays. When the value is mapped from Table 16, Entry 7 ASIC/1 BO overrides are also handled transparently as long as you use the table/entry pair (16, 7) from the example file.

ASIC/1 inputs and analog outputs are also overridden and released when you map the Present Value .



# BACport Atlas

---

## ASI Atlas



ASI has developed ASI Atlas, a BACport configuration and Point Mapping Software for BACnet to assist in building the map.xml file.

ASI Atlas is a java application program that assists in developing and maintaining the map file, and downloading from and uploading to the BACport.

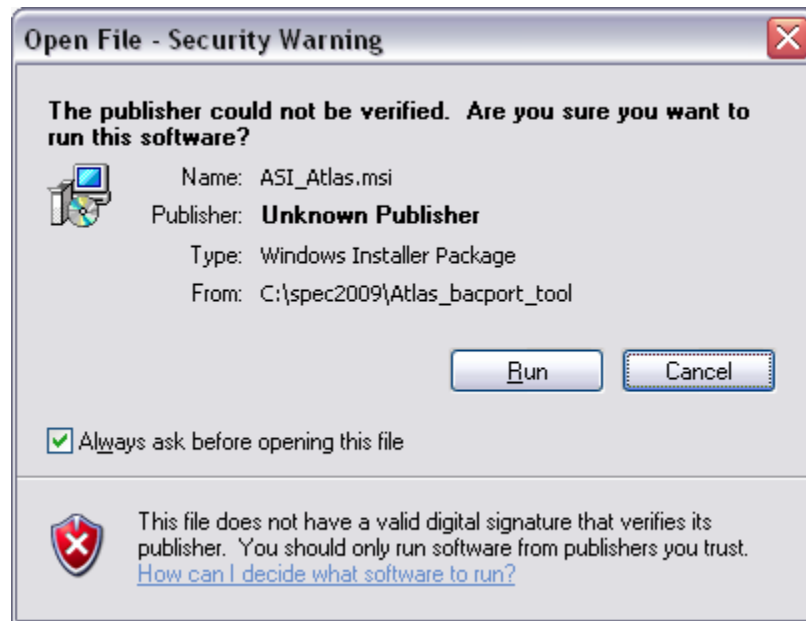
ASI Atlas facilitates the generation of the BACport map.xml file for a specific set of ASI Controllers on a single ASI communication network. Typically you connect to the ASI network of controllers using ASI Expert and generate an Expert project. The ASI Expert project file identifies all of the controllers on this network. You can then import the controller network into ASI Atlas, and then quickly configure the points required from each controller.

Atlas allows importing pre-configured template points, and building your own templates..

In this chapter we show how to install ASI Atlas and then review the features of ASI Atlas that can be used to generate the BACport map file.

## ASI Atlas Installation

ASI Atlas is released as a Microsoft install file ASI\_Atlas.msi which can be downloaded from the Integrator Center. Download the file, and double click to install.



The executable Atlas.jar file is installed in the C:\Program Files\ASI Controls\Atlas folder, with supporting image and templates in subfolders.

## Java Installation

The Map Tool uses Java(TM) Platform SE Standard Edition using run time Version 6 update 13 or later. It must be installed on your machine running the ASI Atlas Point Mapping Tool.

Java Runtime Environment can be downloaded from Sun Microsystems. <http://java.com/en/download/index.jsp> to a temporary folder.

```
jre-6u13-windows-i586-p.exe
```

Find that folder and click on the executable to install the Java Runtime Environment.

The ASI Atlas is a Java Application. Place the application file in a working folder, for example C:\ASI\BACport, . Double click on the Atlas.jar file to launch

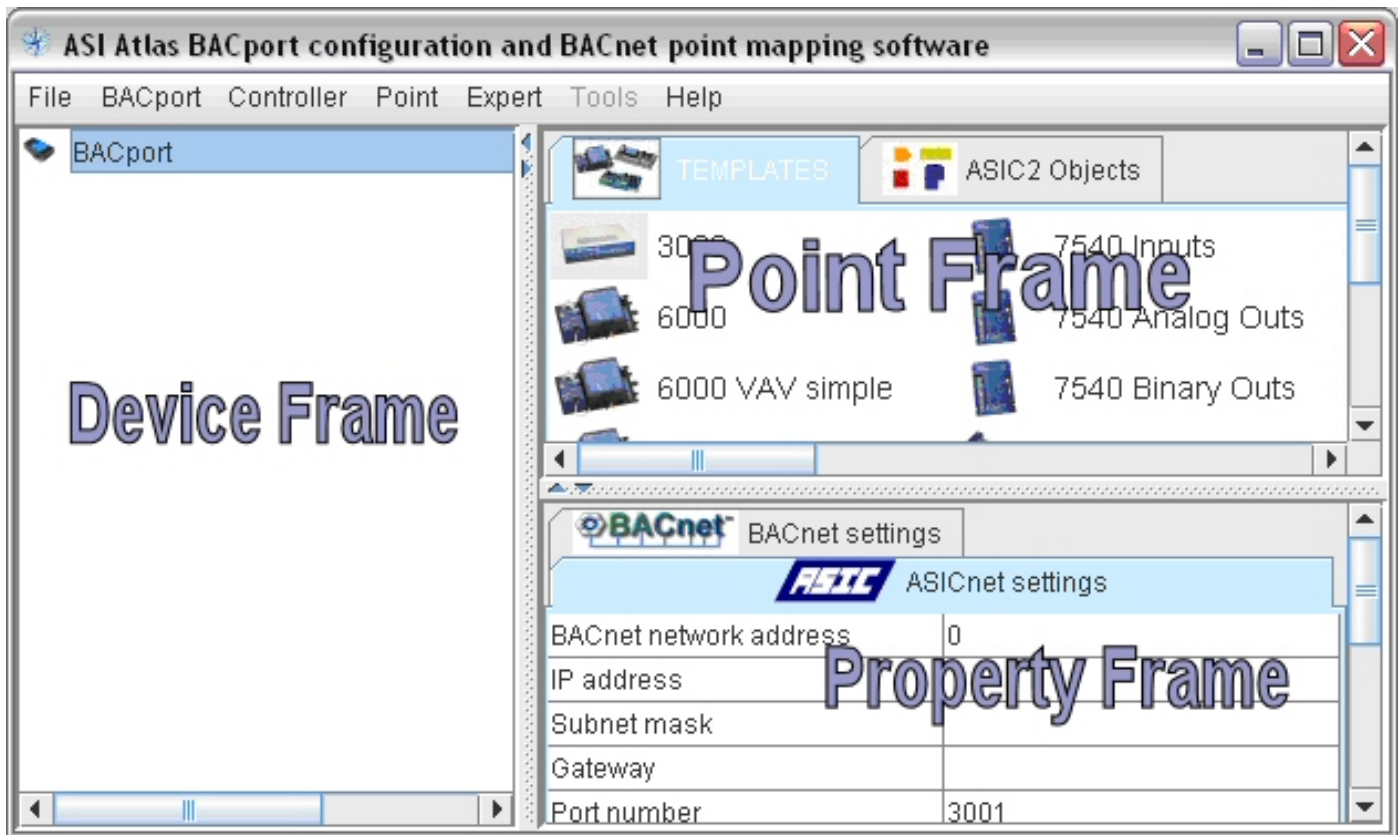
## Run Atlas



Atlas can be run from the Desktop Icon from the Start | All Programs | ASI Controls | Atlas, or by double clicking on Atlas.jar in C:\Program Files\ASI Controls\Atlas.

Atlas brings up a window with three frames. On the left is the Device Frame. Each device can be expanded to show the other devices and objects. On the bottom right is the property frame that shows values for the selected device or object. On the top right is the Point Frame that has multiple tabs to show the available device templates, the ASIC/2 objects or ASIC/1 tables, etc., depending on the context.

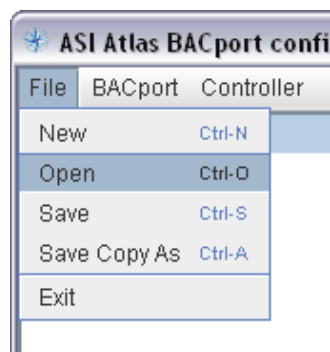




*Device Frame (left), Point Frame with Tabs ( upper right) and Property Frame (lower right)*

## File Menu

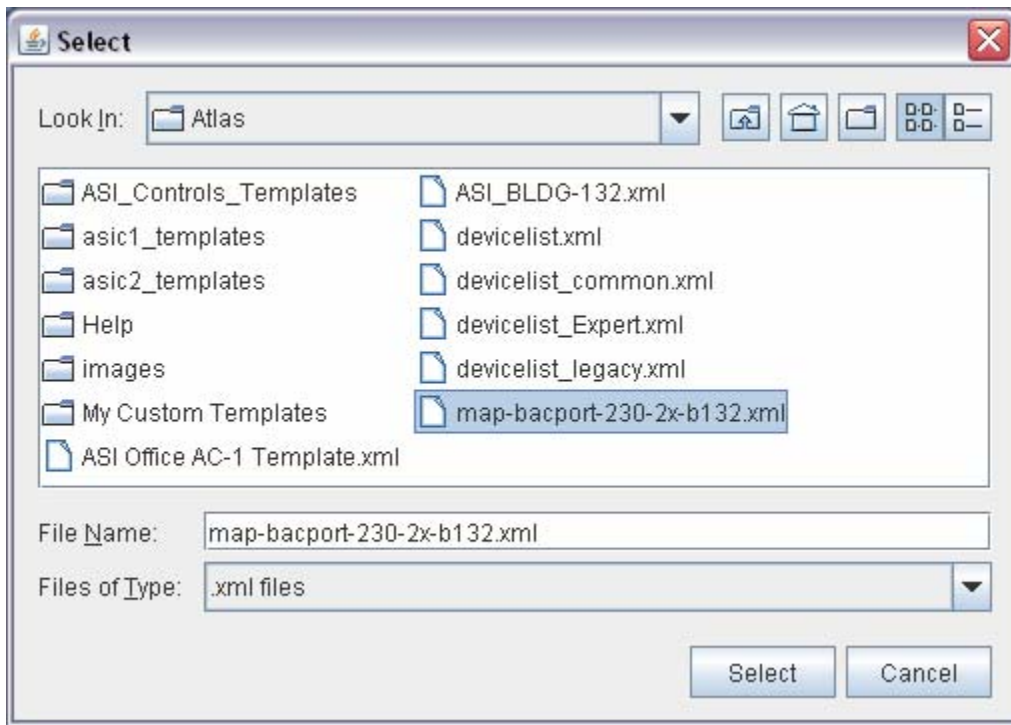
From the File Menu we can create a brand new BACport map file , Open an existing map file, or Save or Save a Copy of a specific map file on the computer. To close the ASI Atlas, select Exit.



### File Open

Selecting Open brings up a File Select dialog. By default, it starts in the current ASI Atlas folder, C:\Program Files\ASI Controls\Atlas. You may organize the map files in sub-folders by project.

Highlight the file you wish to open, and click “Select.”



## File Save

The first time you save a working map file, you are prompted for the file name, and then shows the file name in the Title bar.. Repeated saves assumes the same file name.

**(map file = C:\Program Files\ASI Controls\Atlas\map-bacport-230-2x-b132.xml)**

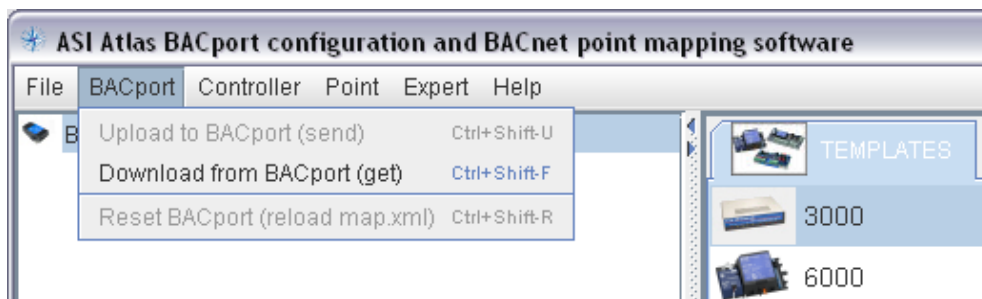
Use File Save as to save the file with a different name.

## File New

To close the file, select New to Restart ASI Atlas to open a new map file, or Exit

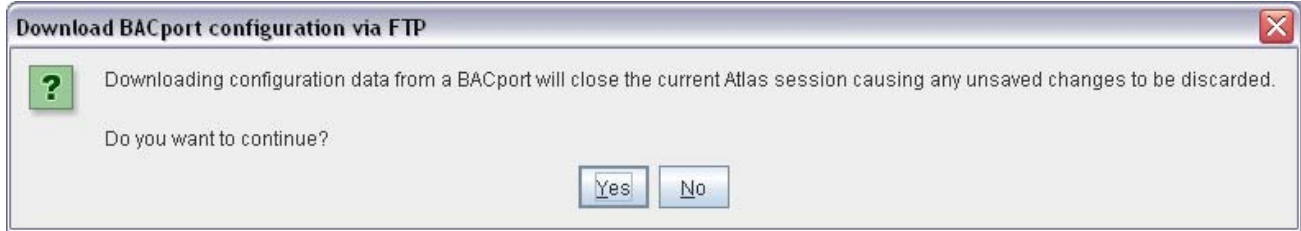
## BACport Menu

From the BACport menu we can Upload (Send) the configuration to the BACport, and Download (Get) the configuration from the BACport.

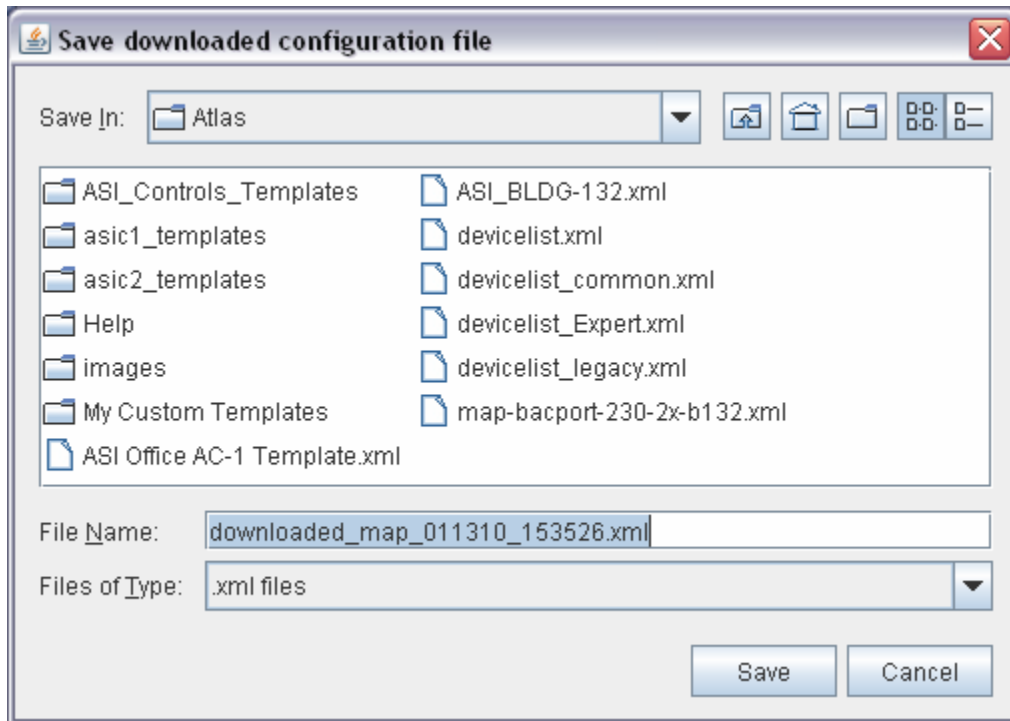


## Download from BACport (get)

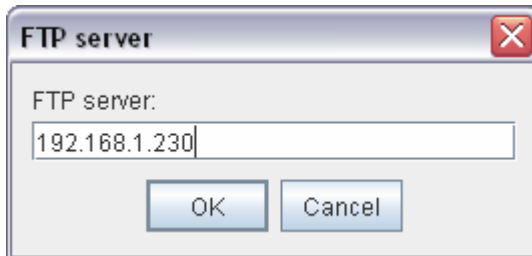
You may retrieve the current map file from the BACport using “Download from BACport”. Atlas uses ftp to get the map.xml file from the BACport. Downloading will start a new session and load the file.



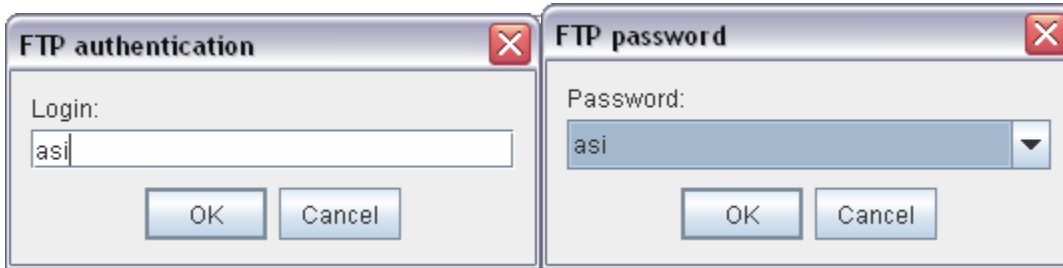
ASI Atlas gets the map file and saves it to the current folder. The suggested local file name is based on the date and time, map\_MMDDYY\_hhmmss.xml



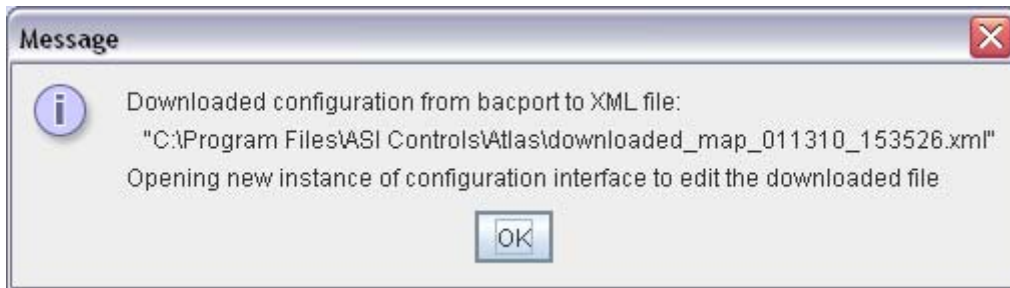
You must have an Ethernet connection and know the BACport IP address, login and password.



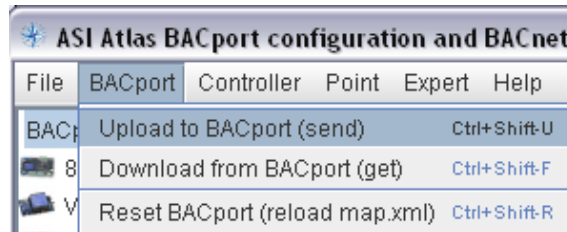
ASI Atlas uses ftp, File Transfer Protocol . Enter the BACport IP address  
Enter the login and password.



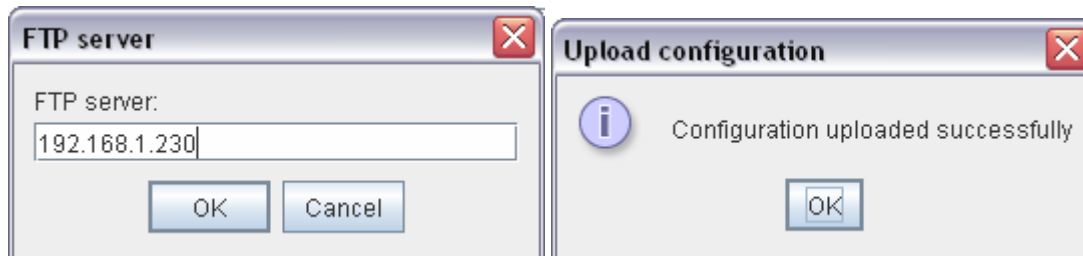
The download from the BACport is confirmed.



### Upload to BACport (send)



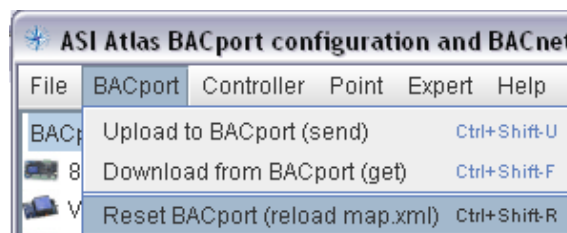
You may also send the current map file to the BACport. You will need to enter the IP address, login and password.



Atlas firms the BACport upload(send)

### Reset BACport (reload map.xml)

After sending the map file to the BACport you **must** Reset BACport so that the new map file becomes active.

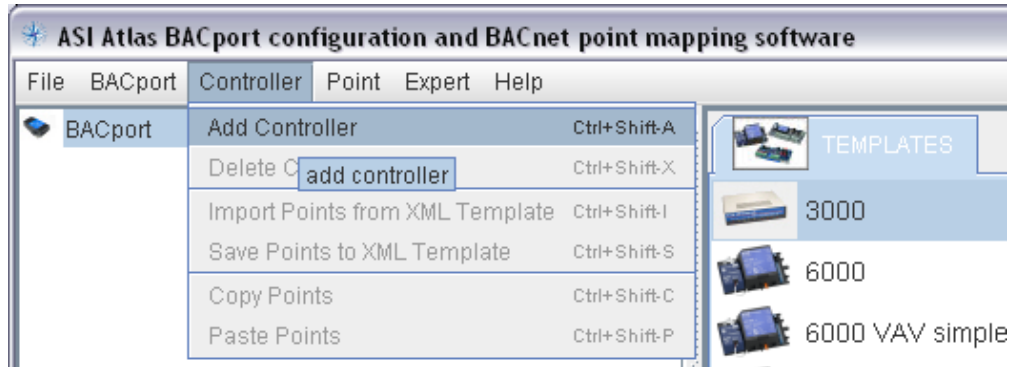


# Controller Menu

The Controller menu allows adding or deleting controller devices . It also allows Importing points from an XML Template or saving the current controller as a new XML Template.

## Add Controller

Add Controller allows adding an ASIC/1 or ASIC/2 device From BACport device select Add Controller. Enter a New (ASI) device address.

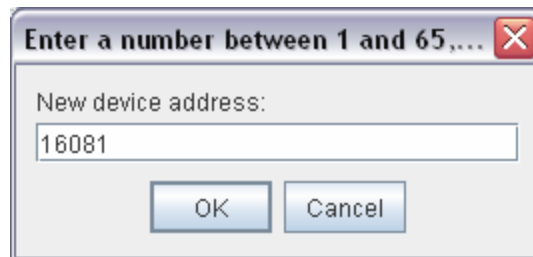


Note: If you Add the Controller to BACport, then the controller is in the top level. If you Add the Controller to one of the Devices, then the new controller becomes a child device.

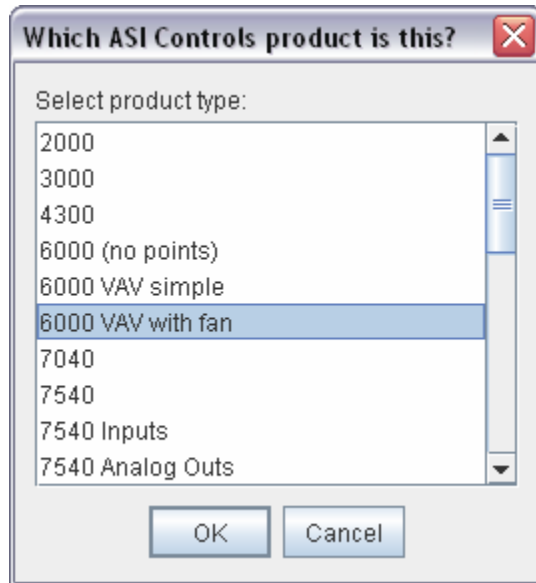
You may also Right Click on the Tree in the Device Frame and select Add Controller.



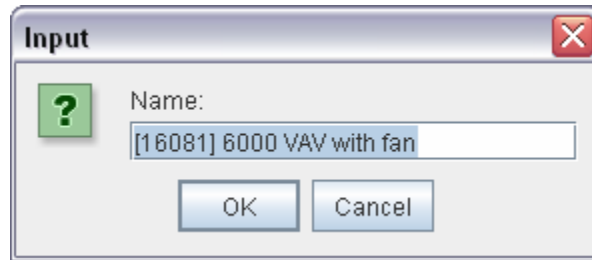
Enter a New Device Address. The ASI Device address is unique for the network of ASI Controllers and is used as the default BACnet DeviceID. The BACnet DeviceID must be unique across BACnet networks that are connected. The ASI Device address, and the BACnet DeviceID do not have to be the same.



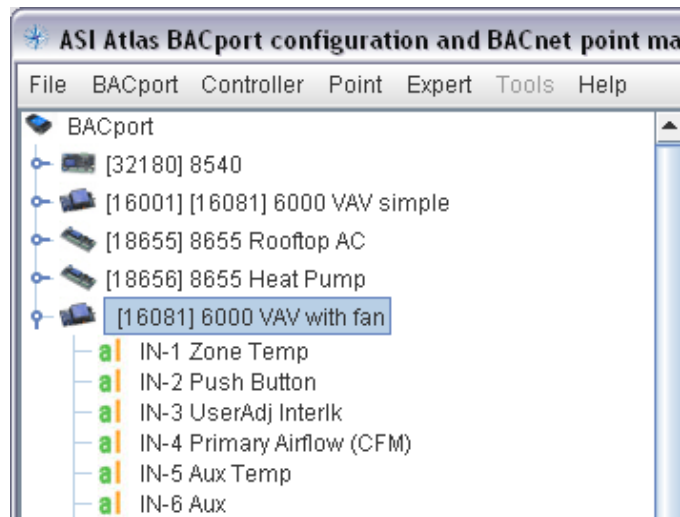
Select a product type. You may select an empty controller and later build the map file, or you may select one of the preconfigured templates.



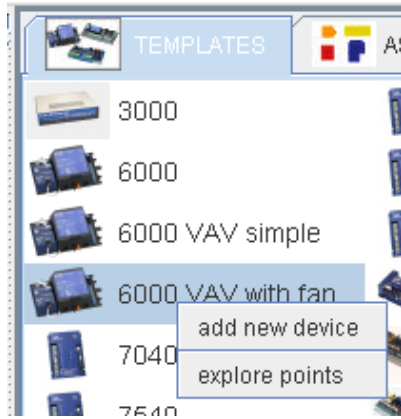
You may give the device a name, or accept the default name..



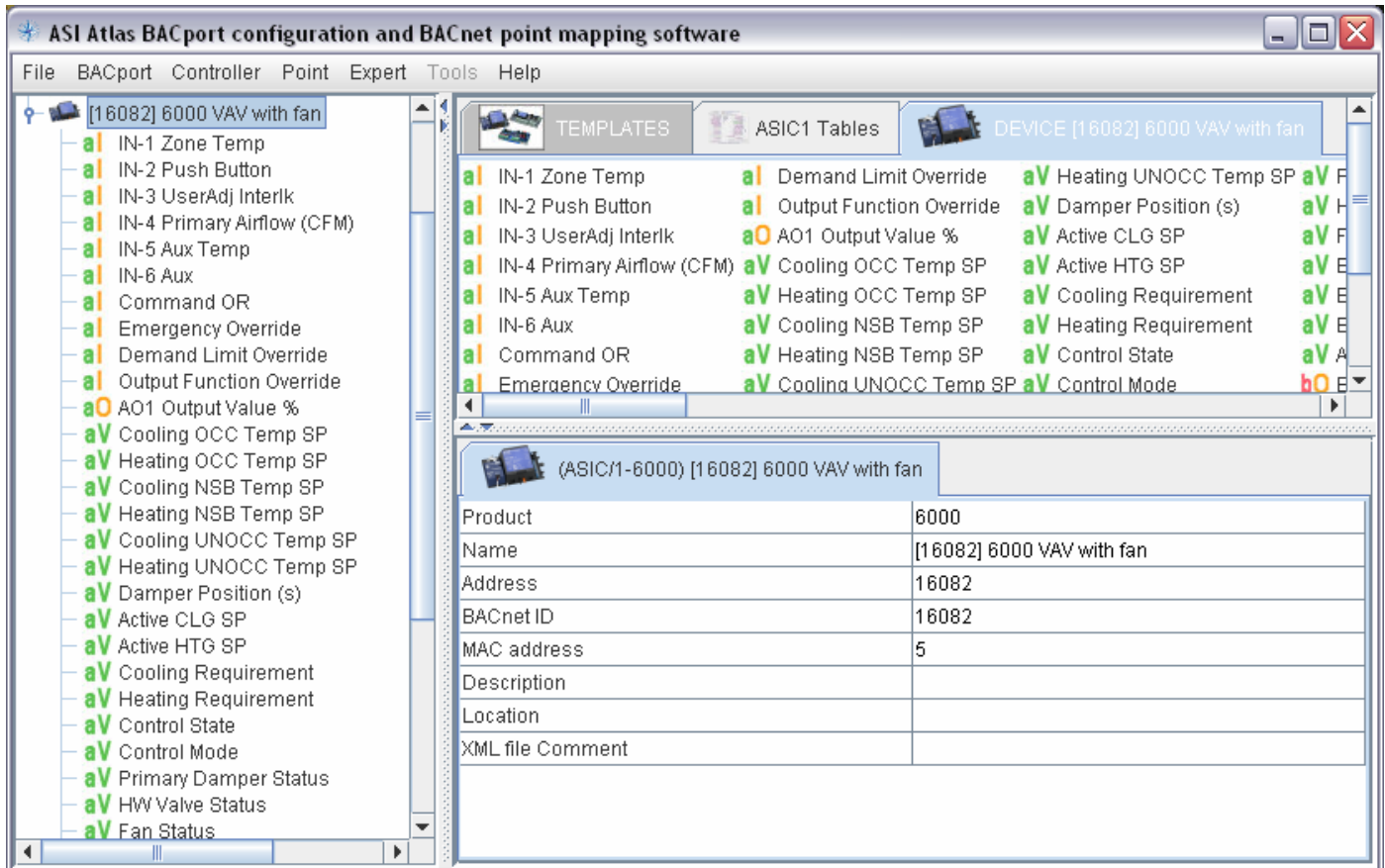
The controller is added to the tree in the Device Frame which can expand to show the list of points. The right upper Point Frame shows the Analog and Binary Input, Output, and Value BACnet points added to the map file.



You may also add a new controller by selecting and right-clicking on a template and selecting add new device. This adds the new controller with all of the points that have been defined in the template file.

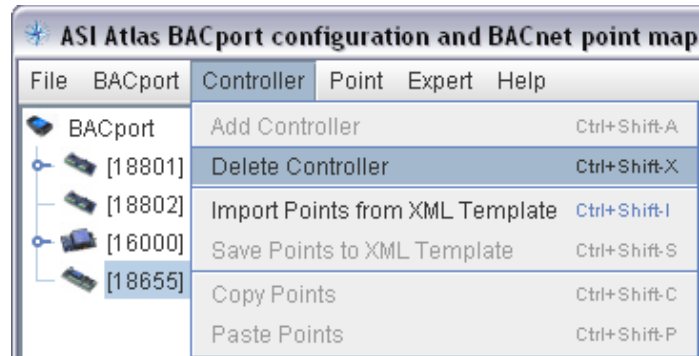


The right lower Property Frame shows the Device properties and attributes.



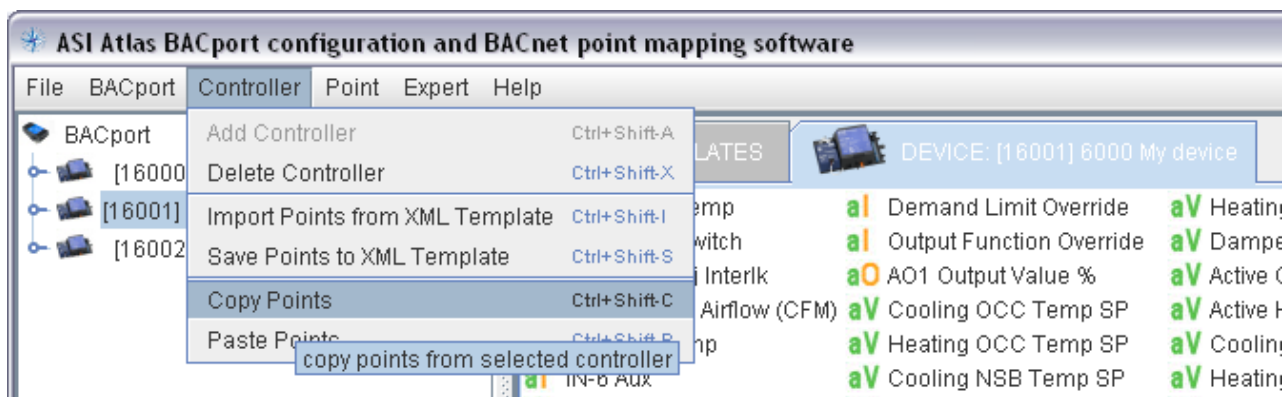
## Delete Controller

You may also Delete a controller from the Device tree. Note that all points configured for that device are also removed.

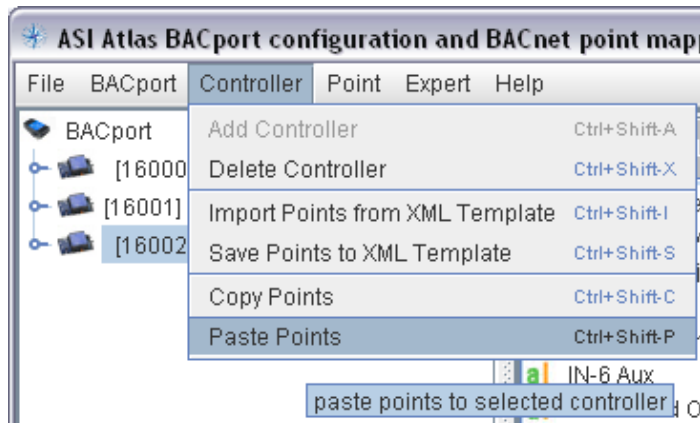


## Copy Points, Paste Points

You may copy all the points from one controller and paste them to another controller of the same type. Select the device you wish to copy. Right Click on the device or go to the Controller Menu and select “Copy Points.” All of the points for the selected device are copied to the clipboard.



Select the target device. Select Controller menu, and select “Paste Points”.



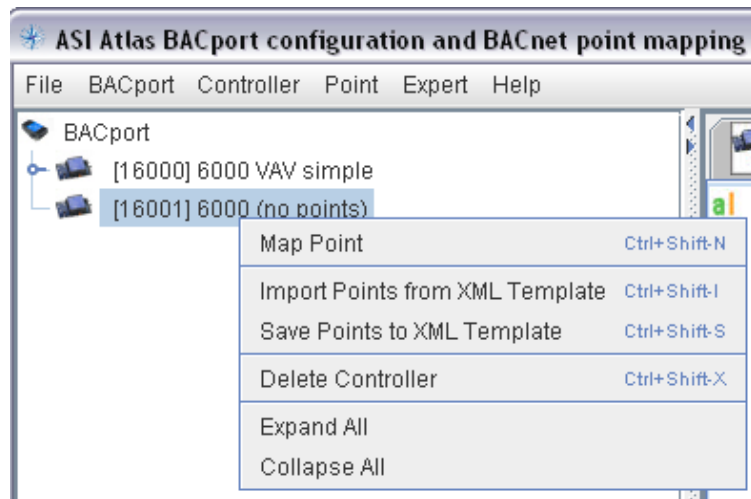
The entire set of points is copied to the new device.

## Import Points from XML Template

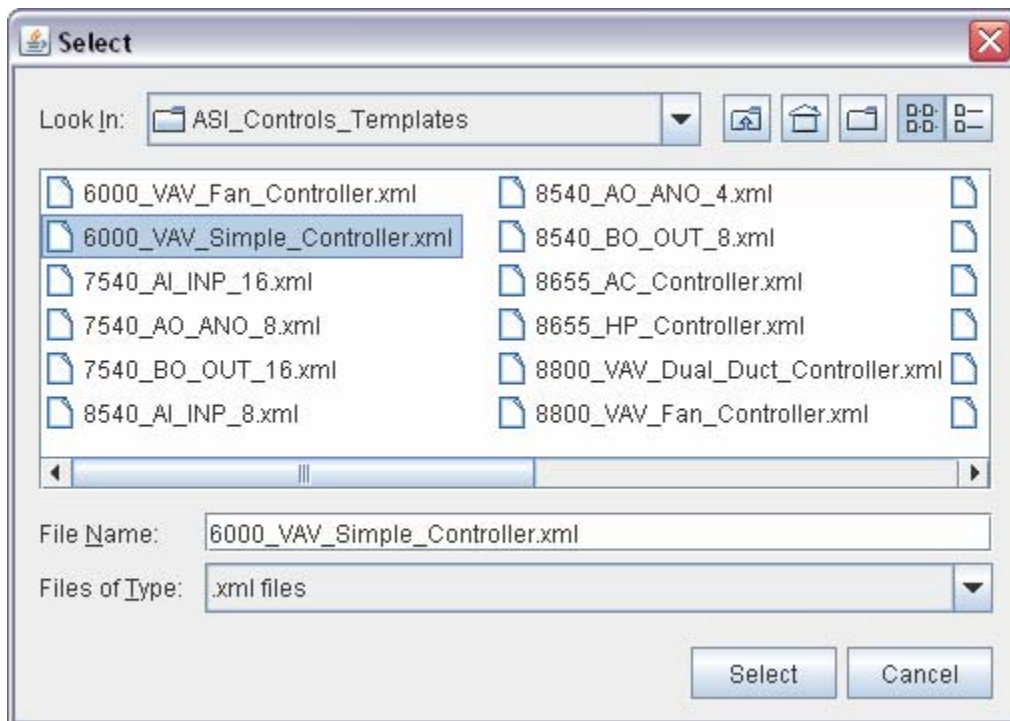
You may Import points from XML Template, which brings in a standard set of points for the device.

Select the Device in the Device Frame and select “Import Points from XML Template” from the Controller Menu or Right-Click on the Device”



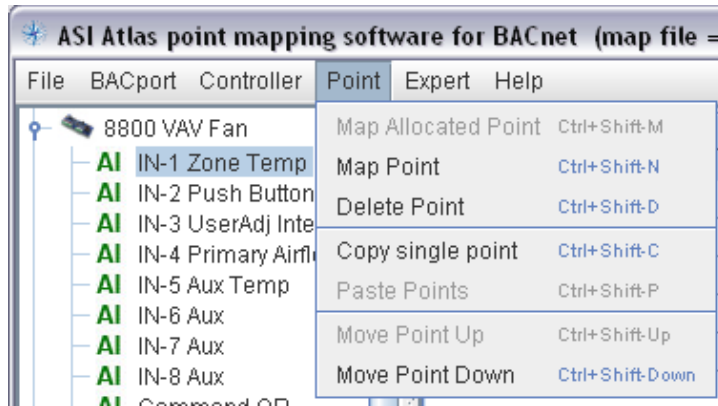


Select the Template folder, asic1\_templates, and the device template that you wish to import.



Note: Only the points are imported. The device properties are not changed.

## Point Menu

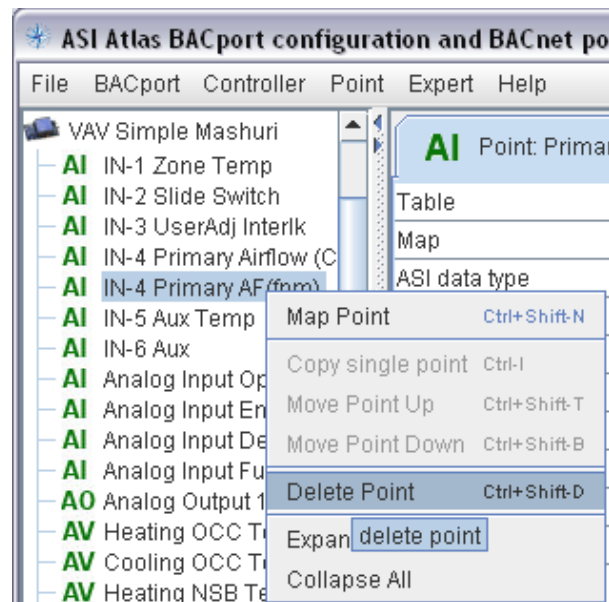


From the Point Menu you may Delete a Point, Copy a single Point, Paste Points, or Move a Point Up or Down within points of the same type.

## Map Point

The details of point mapping have been discussed in the previous chapter.

## Delete Point

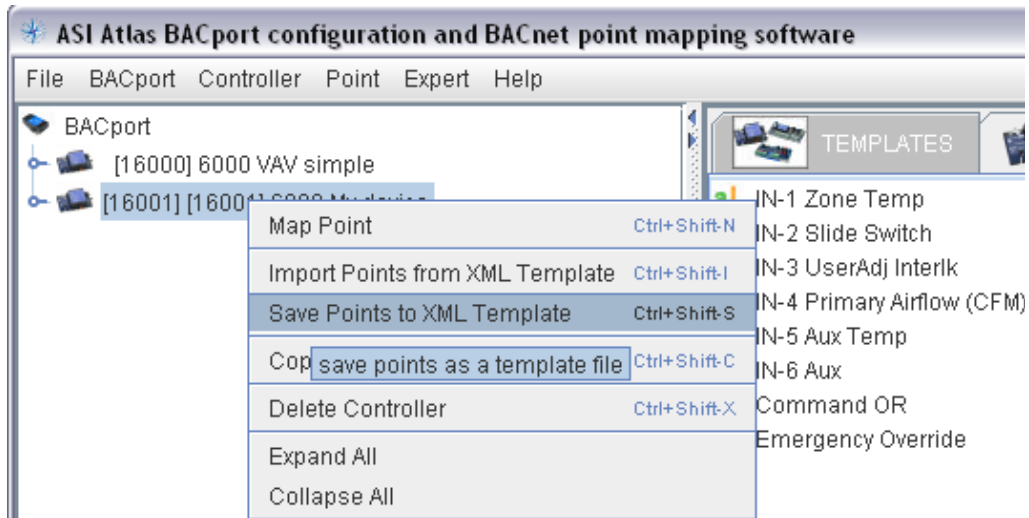


Select the Point, then Right-Click and select Delete Point.

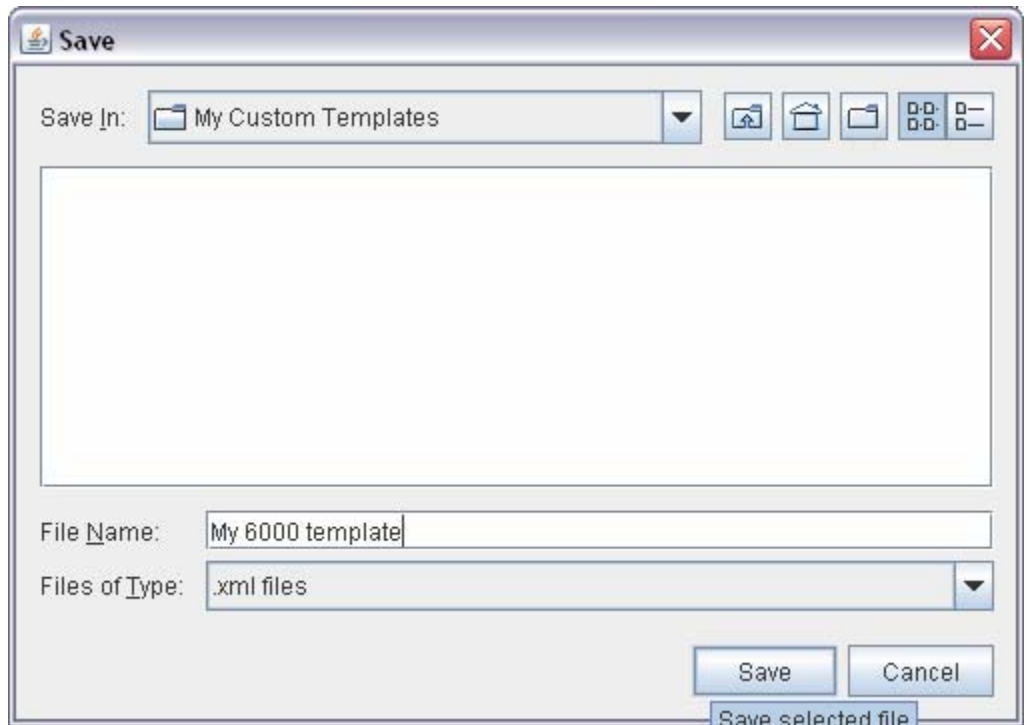
## Save Points to XML Template

Once you have configured a controller that is typical of your application you may wish to save those points as a custom XML Template.

Select the Controller in the Device Frame. Use the Controller Menu, or Right-Click and choose Save Points to XML Template.



You may select or create a custom folder. You may not save custom templates to the read-only ASI\_Controls\_Templates folder.



# Point Frame

The upper-right Point Frame has several tabs that change depending on context.

The Template Tab shows the standard ASI Templates.

The Device Tab shows the present points configured for the ASIC/1 or ASIC/2 device.

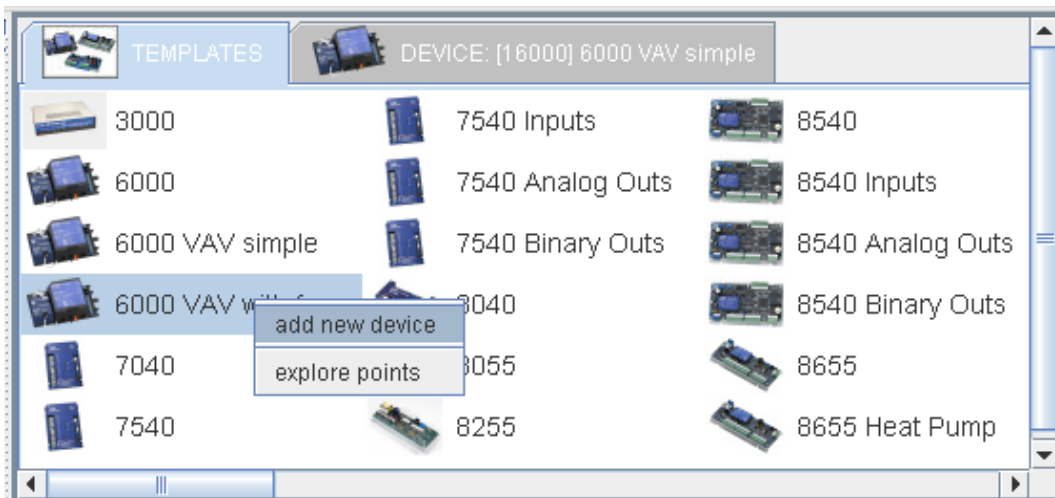
The ASIC/2 objects tab or the ASIC/1 table tab allows one to map a point by choosing an object or table and then selecting a named parameter.

The Parameter Tab then shows the available ASIC/1 or ASIC/2 parameters that can be mapped to BACnet points.

## Template Tab

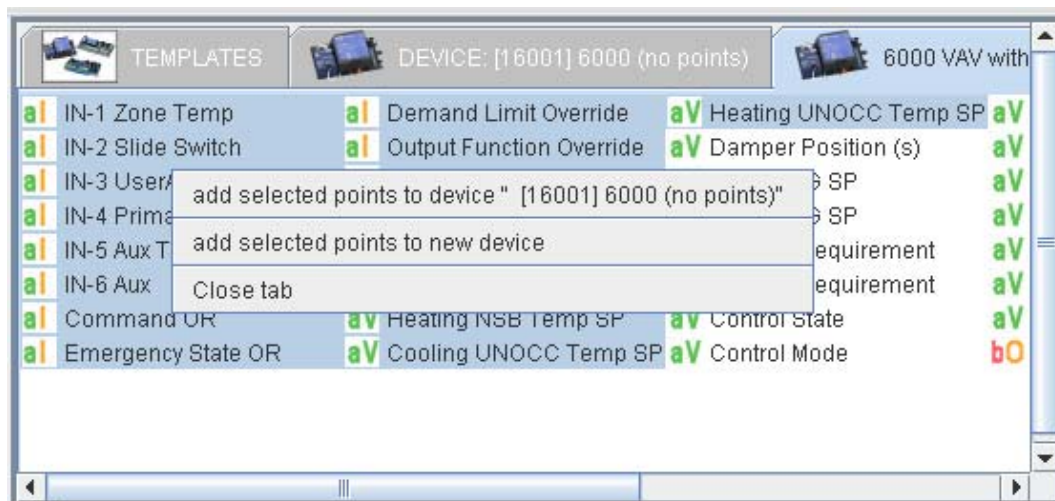
Atlas installs with a set of standard XML Template files covering a range of products, that are kept in a read-only folder: C:\Program Files\ASI Controls\Atlas\ASI\_Controls\_Templates

These templates are also displayed in the upper right Point Frame under the Templates Tab



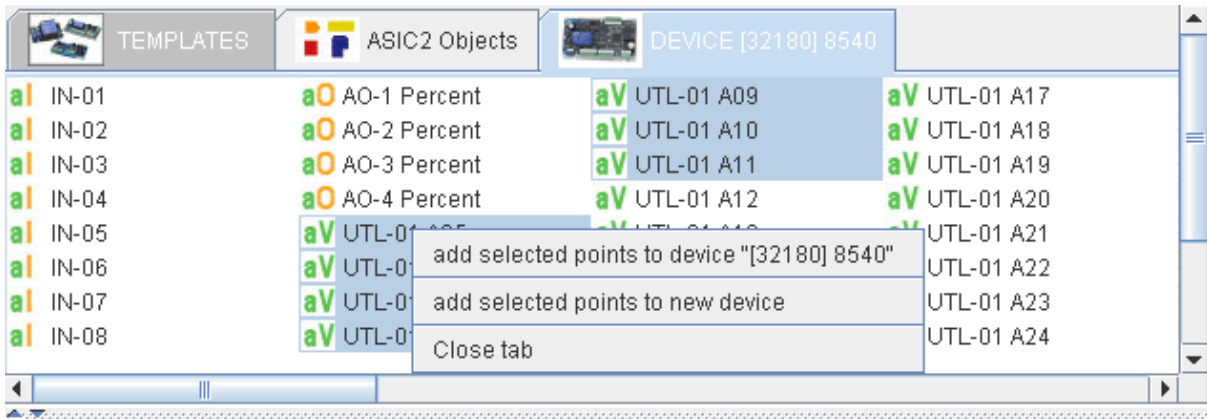
By right-clicking on a template you may “add new device” below the selected device in the tree, or you may explore points in the template.

Explore points displays all of the points defined in the template. You may select any or all of the points. Right-Click allows you to add the selected points to the selected device, or to a new device, or close the tab. .



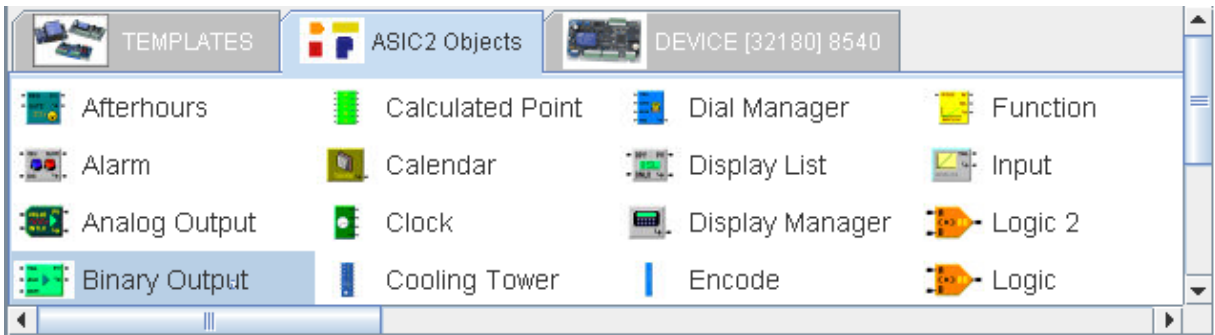
## ASIC/2 Device Tab

The Device Tab shows the points that have been defined for the selected ASIC/2 device. You may select from this group of points and add them to the selected device or to a new device.

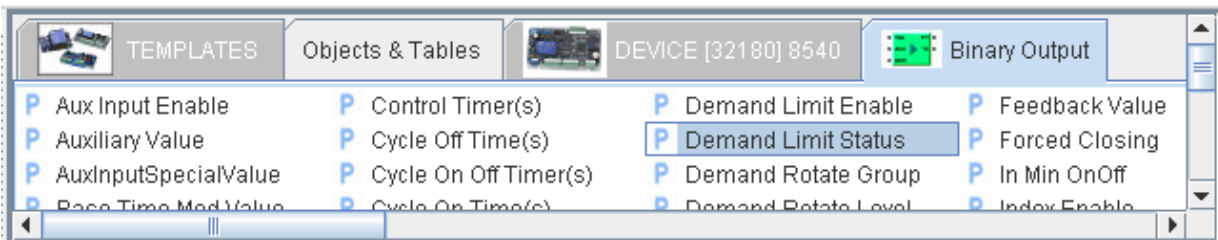


## ASIC/2 Objects Tab

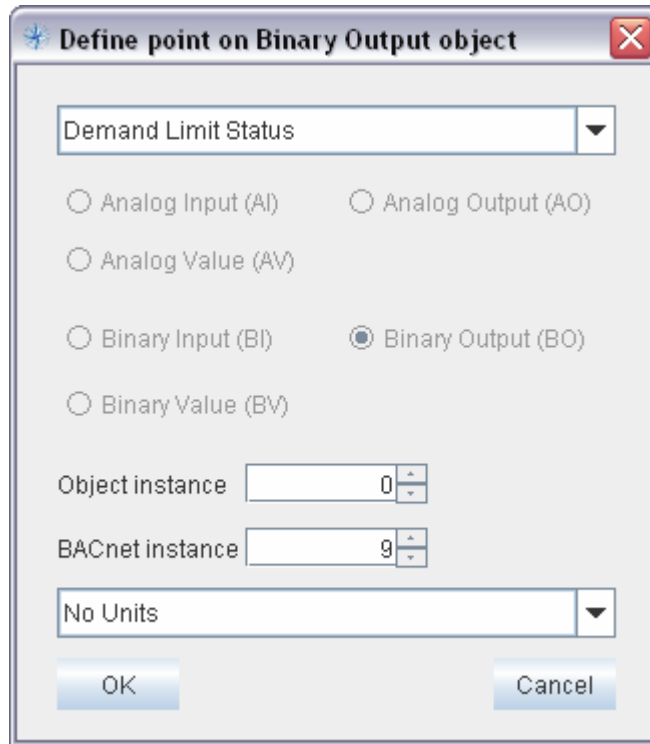
If you have selected an ASIC/2 device, then the ASIC/2 Objects Tab appears.



Click on an ASI Object brings up a list of all parameters available in that object.



Click on a parameter to bring up a detailed dialog to assign ASI instance and BACnet object type and instance

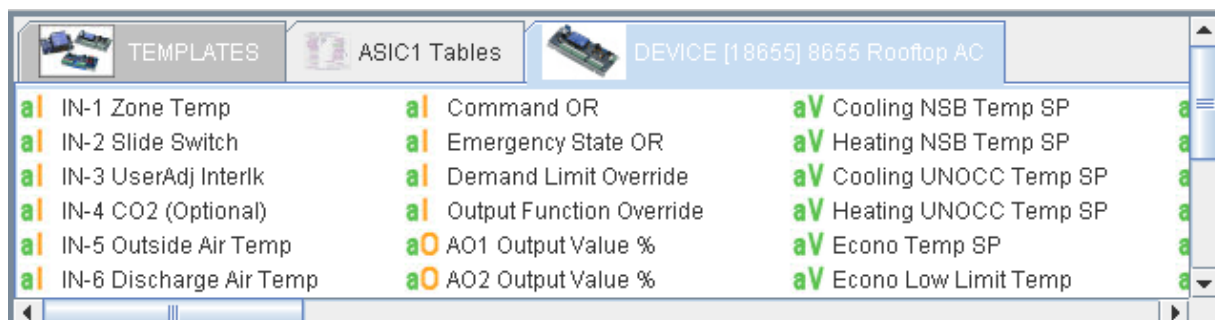


Click OK to save the point under the device.

Name	Demand Limit Status
BACnet Object Type	BO
BACnet Units	No Units
BACnet instance	9
ASI Object	
Map	3:0:2:179
ASI data type	HIBIT3

## ASIC/1 Device Tab

The Device Tab shows the points that have been defined for the selected ASIC/1 device. You may select from this group of points and add them to the selected device or to a new device.

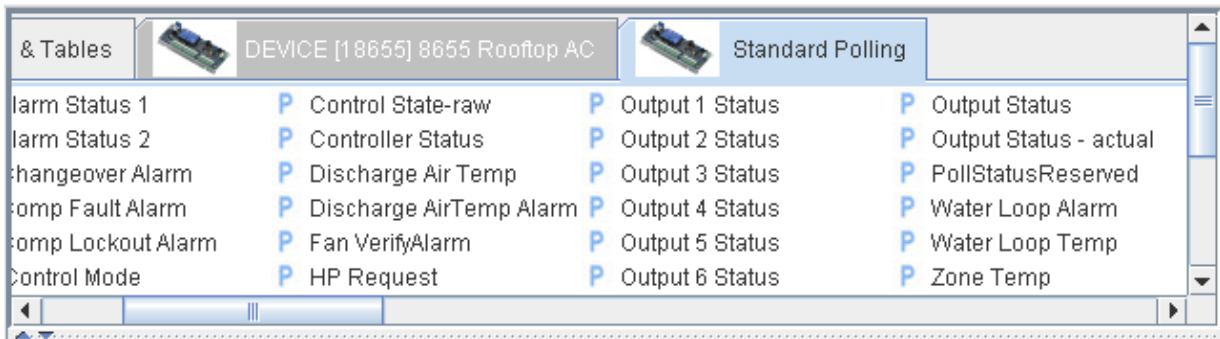


## ASIC/1 Tables Tab

If you have selected an ASIC/1 device, then the ASIC/1 Tables Tab appears.



Click on an ASI Table brings up a list of all parameters available in that table for that product.



Selecting a parameter brings up a point configuration dialog for that device, that table, and that property.

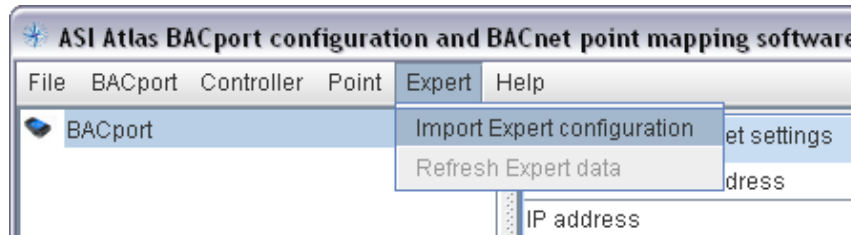
## Expert Menu

ASI Atlas is integrated with ASI Expert projects. ASI Atlas can read the ASI Expert project.mdb file to build the list of devices on the network. Select Import Expert Configuration.

Atlas builds the device tree, and does not import points for the devices.

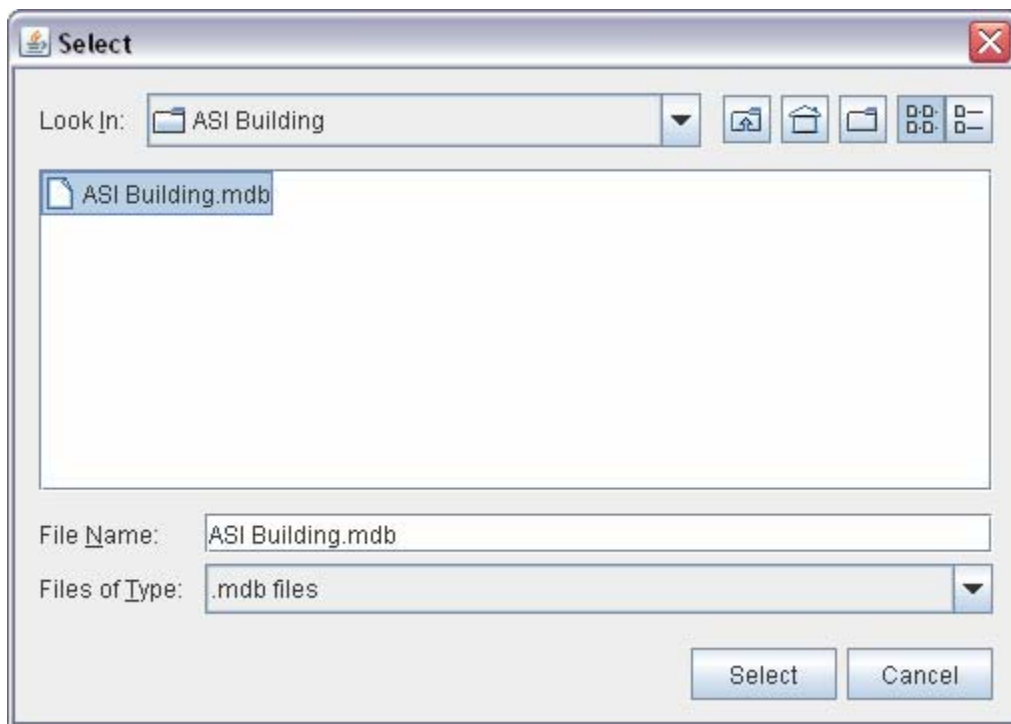
Once the devices have been imported, then you may Import Points from XML Templates to fill out the map file.

Note: If the project has already been read-in, you should select Refresh Expert Data. which will only refresh devices that have been added or changed.



Select Expert Project .mdb file.

```
C:\Program Files\ASI Controls\Projects\Applications\ASI Building\ASI Building.mdb
```



ASI Atlas builds a tree which also shows child controllers that are on the local bus of a parent ASIC/2 controller.

The <DEVICE> property parentaddress specifies the address of the ASIC/2 controller. parentaddress="0" indicates that the device is at the top level.

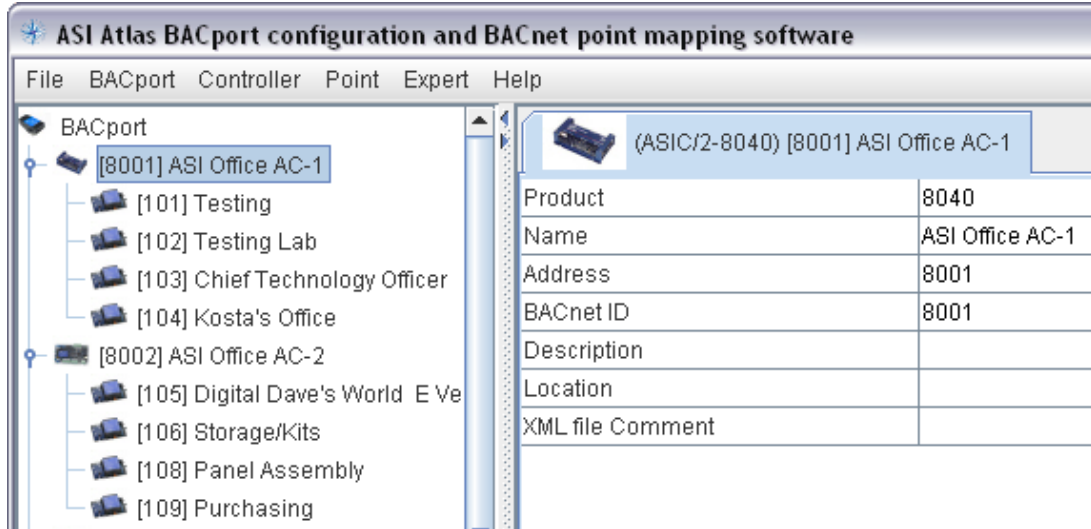
You will then have to add the point configuration either individually or from templates.

Atlas places an additional entry in the map.xml file that references the location of the Expert project file.

```
<XML>  
<ExpertProject date="2010/01/11 15:25:13" path="C:\Program Files\ASI
```



```
Controls\Projects\Applications\ASI Building\ASI Building.mdb">
</ExpertProject>
. . . .
```



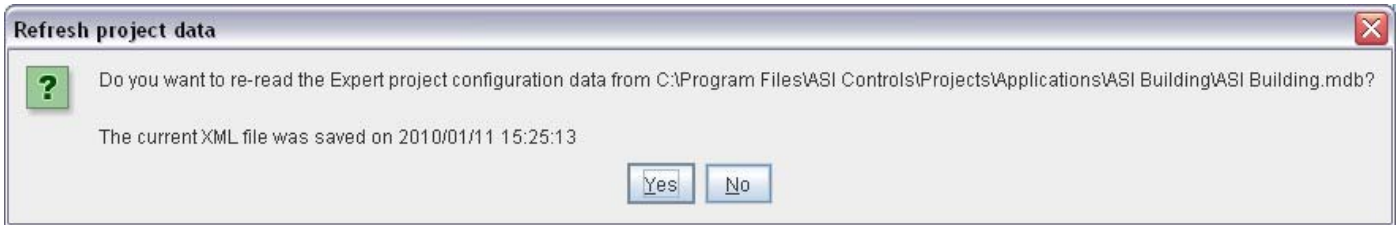
Since every controller in an ASI network has a unique address, the device address is assigned as the default BACnet ID for each controller.

The device product, name, and address are pulled from the project mdb file. You will have to assign a unique mac address in the range 1..63 for each Device. The BACport is a virtual BACnet/IP to MSTP router.

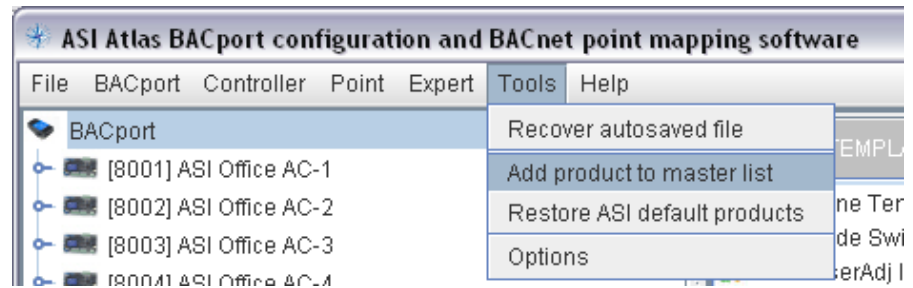
```
<BACnet description="" iam="0" id="0" location="" name="default name" port="0" whois="0">
  <DEVICE address="8001" description="" id="8001" location="" mac="10" name="ASI Office AC-1" parentaddress="0" product="8540"></DEVICE>
  <DEVICE address="8002" description="" id="8002" location="" mac="20" name="ASI Office AC-2" parentaddress="0" product="8540"></DEVICE>
  <DEVICE address="8003" description="" id="8003" location="" mac="30" name="ASI Office AC-3" parentaddress="0" product="8540"></DEVICE>
  <DEVICE address="32102" description="" id="32102" location="" mac="1" name="S3 FW300b 2.9 ASI BLDG" parentaddress="0" product="3000"></DEVICE>
  <DEVICE address="101" description="" id="101" location="" mac="11" name="Testing" parentaddress="8001" product="6000"></DEVICE>
  <DEVICE address="102" description="" id="102" location="" mac="12" name="Testing Lab" parentaddress="8001" product="6000"></DEVICE>
  <DEVICE address="103" description="" id="103" location="" mac="13" name="Chief Technology Officer" parentaddress="8001" product="6000"></DEVICE>
  <DEVICE address="104" description="" id="104" location="" mac="14" name="Kosta's Office" parentaddress="8001" product="6000"></DEVICE>
  <DEVICE address="105" description="" id="105" location="" mac="21" name="Digital Dave's World" parentaddress="8002" product="6000"></DEVICE>
  <DEVICE address="106" description="" id="106" location="" mac="22" name="Storage/Kits" parentaddress="8002" product="6000"></DEVICE>
  <DEVICE address="108" description="" id="108" location="" mac="23" name="Panel Assembly" parentaddress="8002" product="6000"></DEVICE>
  <DEVICE address="109" description="" id="109" location="" mac="24" name="Purchasing" parentaddress="8002" product="6000"></DEVICE>
  . . .
</BACnet>
```

Importing an Expert project only <DEVICE> properties. You still must map the points by importing Templates, or selecting individual points.

When you open a saved XML file, Atlas asks if you wish to refresh the Expert Project configuration data.

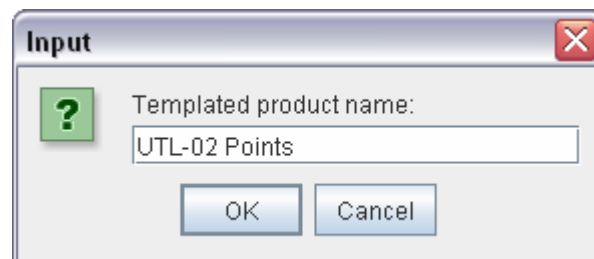


# Tools Menu



## Recover Autosaved File

Atlas periodically automatically saves back-up copies of the current working file.



Give the template a name.



After restart the new devices will appear on the product template Tab

The Product Template List is stored in the file devicelist\_user.xml and copies of the Device templates are saved in

C:\Program Files\ASI Controls\Atlas\ASI\_Controls\_Templates\User\_Devices

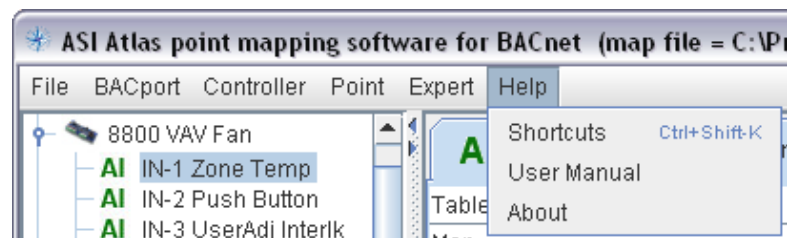
## Add Product to master list

## Restore ASI Default Products

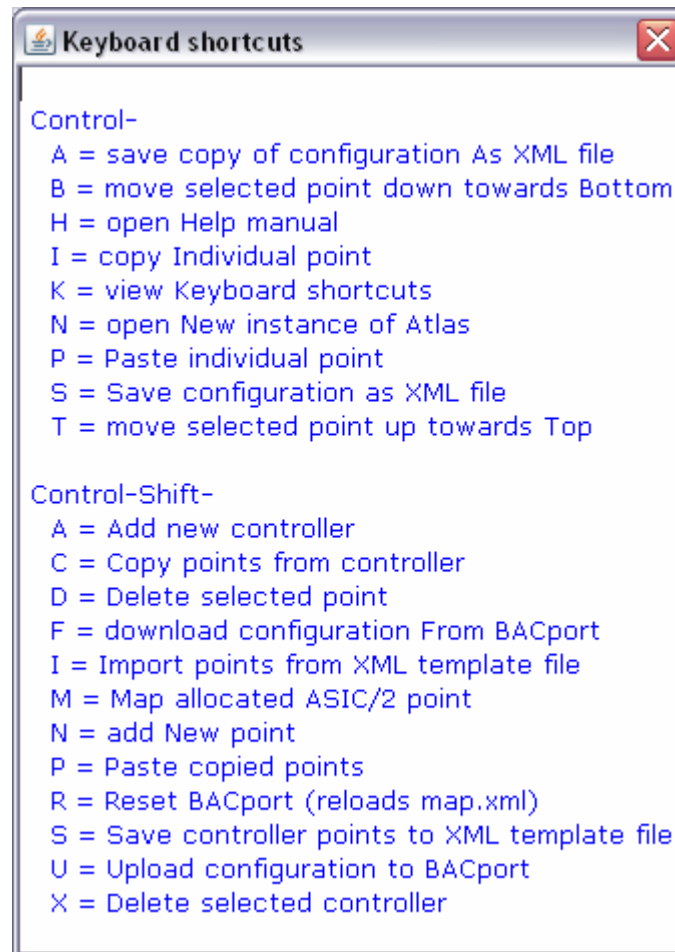
## Options

---

## Help Menu



## Help | Shortcuts



## Help | User Manual

This manual is displayed in help format.

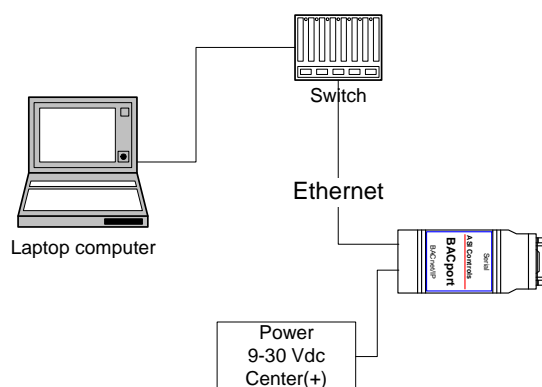
## Help | About





# BACport Appendix

## BACport Upgrade



You may upgrade the firmware in the BACport by establishing an ftp connection with the device and loading new firmware. [Do NOT try to upgrade an ASI EtherLink/2.] The latest version will be in a zip file with the version name, bacport\_1xx.zip, which can be downloaded from the BACport page of the ASI Integrator Center.. Unzip the file bacport.bin to the \ASI\BACport folder.

Note: The bacport.bin file CAN NOT be renamed.

- 1) Connect ASI BACport to Ethernet and Power
- 2) Ping known IP Address to Verify Connection

```
ping 192.168.1.201
```

- 3) Connect using ftp from command line prompt. You will be asked for the user name and password. The default user name is "asi" and the default password is "asi".

```
Run cmd
cd \asi\BACport
ftp 192.168.1.201
    Connected to 192.168.1.201.
    220 ASI Controls BACport 1.0 FTP
    User (192.168.1.201:(none)): asi
    331 User asi OK, send password.
    Password: [asi]
    230 Password OK.
ftp >
```

- 4) At the ftp> prompt

```
ftp> bin [This step is EXTREMELY IMPORTANT]
    200 Type set to I.
ftp> put bacport.bin
    200 PORT command Ok.
    150 About to open data connection.
```

```
226 Transfer complete
ftp: 449326 bytes sent
```

5) Quit ftp

```
ftp> quit
221 Goodbye.
```

6) Wait 60 seconds.

The device will automatically reboot after it completes the flash write. Device is now running the latest BACport firmware.

7) Ping IP Address to Verify Connection

You may continuously ping the device. Wait until reset is complete. Ctrl-C to cancel.

```
ping 192.168.1.201 -t
```

---

## BACnet Object Properties Supported

The following BACnet properties are supported for the different BACnet object types..

### "AI"(0) = ANALOG INPUT (r/ovr)

AnalogInput.Description	String (28)
AnalogInput.EventState	Dword (36)
AnalogInput.ObjectIdentifier	Dword (75)
AnalogInput.ObjectName	String (77)
AnalogInput.ObjectType	Dword (79)
AnalogInput.OutOfService	Boolean (81)
AnalogInput.PresentValue	Float (85)
AnalogInput.StatusFlags	Word (111)
AnalogInput.Units	Dword (117)

### "AO"(1) = ANALOG OUTPUT (r/w/ovr)

AnalogOutput.Description	String (28)
AnalogOutput.EventState	DWord (36)
AnalogOutput.ObjectIdentifier	Dword (75)
AnalogOutput.ObjectName	String (77)
AnalogOutput.ObjectType	Dword (79)
AnalogOutput.OutOfService	Boolean (81)
AnalogOutput.PresentValue	Float (85)
AnalogOutput.PresentValueRel	Boolean
AnalogOutput.PriorityArray	String (87)
AnalogOutput.RelinquishDefault	Float (104)
AnalogOutput.StatusFlags	Word (111)
AnalogOutput.Units	Dword (117)

### "AV"(2) = ANALOG VALUE (r/w)

AnalogValue.Description	String (28)
AnalogValue.EventState	DWord (36)
AnalogValue.ObjectIdentifier	Dword (75)
AnalogValue.ObjectName	String (77)
AnalogValue.OutOfService	Boolean (81)
AnalogValue.PresentValue	Float (85)
AnalogValue.PresentValueRel	Boolean
AnalogValue.PriorityArray	String (87)
AnalogValue.RelinquishDefault	Float (104)
AnalogValue.StatusFlags	Word (111)
AnalogValue.Units	Dword (117)



## "BI"(3) = BINARY INPUT

BinaryInput.ObjectIdentifier	DWord (75)
BinaryInput.ObjectName	String (77)
BinaryInput.ObjectType	DWord (81)
BinaryInput.PresentValue	Boolean (85)
BinaryInput.Description	String (28)
BinaryInput.StatusFlags	Word (111)
BinaryInput.EventState	DWord (36)
BinaryInput.OutOfService	Boolean (81)
BinaryInput.Polarity	Boolean (84)
BinaryInput.InactiveText	String (46)
BinaryInput.ActiveText	String (4)

## "BO"(4) = BINARY OUTPUT (r/w/ovr)

BinaryOutput.ActiveText	String (4)
BinaryOutput.Description	String (28)
BinaryOutput.EventState	DWord (36)
BinaryOutput.InactiveText	String (46)
BinaryOutput.ObjectIdentifier	DWord (75)
BinaryOutput.ObjectName	String (77)
BinaryOutput.ObjectType	DWord (81)
BinaryOutput.OutOfService	Boolean (81)
BinaryOutput.Polarity	Boolean (84)
BinaryOutput.PresentValue	Boolean (85)
BinaryOutput.PresentValueRel	Boolean
BinaryOutput.PriorityArray	String (87)
BinaryOutput.RelinquishDefault	Boolean (104)
BinaryOutput.StatusFlags	Word (111)

## "BV"(5) = BINARY VALUE (r/w)

BinaryValue.ActiveText	String (4)
BinaryValue.Description	String (28)
BinaryValue.EventState	DWord (36)
BinaryValue.InactiveText	String (46)
BinaryValue.ObjectIdentifier	DWord (75)
BinaryValue.ObjectName	String (77)
BinaryValue.ObjectType	DWord (81)
BinaryValue.OutOfService	Boolean (81)
BinaryValue.PresentValue	Boolean (85)
BinaryValue.PresentValueRel	Boolean
BinaryValue.PriorityArray	String (87)
BinaryValue.RelinquishDefault	Boolean (104)
BinaryValue.StatusFlags	Word (111)

## Device (8) (BACport)

Device.APDUTimeout	(11) 3000
Device.ApplicationSoftwareVersion	(12) "1.0.8 BETA_3"
Device.DatabaseRevision	(155) 0
Device.Description	(28) "ASIC/2-8540 BACport"
Device.FirmwareRevision	(44) "0.4.6"
Device.Location	(58) "Optional Location"
Device.MaxAPDULengthAccepted	(62) 480
Device.MaxInfoFrames	(63) 1
Device.MaxMaster	(64) 127
Device.ModelName	(70) " ASIC/2-8540"
Device.NumberOfAPDURetries	(73) 3
Device.ObjectIdentifier	(75 (Device, 32180)

Device.ObjectName	(77) " [32180] 8540""
Device.ObjectType	(79) Device
Device.ProtocolRevision	(139) 5
Device.ProtocolVersion	(98) 1
Device.protocol-services-supported	(97)
Device.protocol-object-types-supported	(96)"
Device.object-list	(76 0)" 94
Device.object-list	(76)
	{(Device, 32180),(Analog Input, 0), ....}
Device.SegmentationSupported	(107) no-segmentation
Device.SystemStatus	(112) operational
Device.VendorIdentifier	(120) 162
Device.VendorName	(121) " ASI Controls"

---

## ASI Handle Select Types:

(000) WordValueSigned = 0x00	(004) LoBit0Clear = 0x04
(001) WordNotZero = 0x01	(020) LoBit1Clear = 0x14
(002) WordZero = 0x02	(036) LoBit2Clear = 0x24
(005) LoByte = 0x05	(052) LoBit3Clear = 0x34
(006) HiByte = 0x06	(068) LoBit4Clear = 0x44
(007) BytesSwapped = 0x07	(084) LoBit5Clear = 0x54
(009) WordUSigned = 0x09	(100) LoBit6Clear = 0x64
	(116) LoBit7Clear = 0x74
(008) LoByteLSN = 0x08	(132) HiBit0Clear = 0x84
(024) LoByteMSN = 0x18	(148) HiBit1Clear = 0x94
(040) HiByteLSN = 0x28	(164) HiBit2Clear = 0xa4
(056) HiByteMSN = 0x38	(180) HiBit3Clear = 0xb4
	(196) HiBit4Clear = 0xc4
(208) DoubleWordSigned = 0xd0	(212) HiBit5Clear = 0xd4
(209) DoubleWordNotZero = 0xd1	(228) HiBit6Clear = 0xe4
(210) DoubleWordZero = 0xd2	(244) HiBit7Clear = 0xf4
(003) LoBit0Set = 0x03	(010) Bits0,1 = 0x0A
(019) LoBit1Set = 0x13	(026) Bits1,2 = 0x1A
(035) LoBit2Set = 0x23	(042) Bits2,3 = 0x2A
(051) LoBit3Set = 0x33	(058) Bits3,4 = 0x3A
(067) LoBit4Set = 0x43	(074) Bits4,5 = 0x4A
(083) LoBit5Set = 0x53	(090) Bits5,6 = 0x5A
(099) LoBit6Set = 0x63	(106) Bits6,7 = 0x6A
(115) LoBit7Set = 0x73	(122) Bits7,8 = 0x7A
(131) HiBit0Set = 0x83	(138) Bits8,9 = 0x8A
(147) HiBit1Set = 0x93	(154) Bits9,10 = 0x9A
(163) HiBit2Set = 0xa3	(170) Bits10,11 = 0xAA
(179) HiBit3Set = 0xb3	(186) Bits11,12 = 0xBA
(195) HiBit4Set = 0xc3	(202) Bits12,13 = 0xCA
(211) HiBit5Set = 0xd3	(218) Bits13,14 = 0xDA
(227) HiBit6Set = 0xe3	(234) Bits14,15 = 0xEA
(243) HiBit7Set = 0xf3	

---

## ASI Handle Select Types (Numeric)

(000) WordValueSigned = 0x00	(067) LoBit4Set = 0x43	(179) HiBit3Set = 0xb3
(001) WordNotZero = 0x01	(068) LoBit4Clear = 0x44	(180) HiBit3Clear = 0xb4
(002) WordZero = 0x02	(074) Bits4,5 = 0x4A	(186) Bits11,12 = 0xBA
(003) LoBit0Set = 0x03		
(004) LoBit0Clear = 0x04	(083) LoBit5Set = 0x53	(195) HiBit4Set = 0xc3
(005) LoByte = 0x05	(084) LoBit5Clear = 0x54	(196) HiBit4Clear = 0xc4
(006) HiByte = 0x06	(090) Bits5,6 = 0x5A	(202) Bits12,13 = 0xCA
(007) BytesSwapped = 0x07		
(008) LoByteLSN = 0x08	(099) LoBit6Set = 0x63	(208) DoubleWordSigned = 0xd0
(009) WordUSigned = 0x09	(100) LoBit6Clear = 0x64	(209) DoubleWordNotZero = 0xd1
(010) Bits0,1 = 0x0A	(106) Bits6,7 = 0x6A	(210) DoubleWordZero = 0xd2
		(211) HiBit5Set = 0xd3
(019) LoBit1Set = 0x13	(115) LoBit7Set = 0x73	(212) HiBit5Clear = 0xd4
(020) LoBit1Clear = 0x14	(116) LoBit7Clear = 0x74	(218) Bits13,14 = 0xDA
(024) LoByteMSN = 0x18	(122) Bits7,8 = 0x7A	
(026) Bits1,2 = 0x1A		(227) HiBit6Set = 0xe3
	(131) HiBit0Set = 0x83	(228) HiBit6Clear = 0xe4
(035) LoBit2Set = 0x23	(132) HiBit0Clear = 0x84	(234) Bits14,15 = 0xEA
(036) LoBit2Clear = 0x24	(138) Bits8,9 = 0x8A	
(040) HiByteLSN = 0x28		(243) HiBit7Set = 0xf3
(042) Bits2,3 = 0x2A	(147) HiBit1Set = 0x93	(244) HiBit7Clear = 0xf4
	(148) HiBit1Clear = 0x94	
(051) LoBit3Set = 0x33	(154) Bits9,10 = 0x9A	
(052) LoBit3Clear = 0x34		
(056) HiByteMSN = 0x38	(163) HiBit2Set = 0xa3	
(058) Bits3,4 = 0x3A	(164) HiBit2Clear = 0xa4	
	(170) Bits10,11 = 0xAA	

---

## BACnet Units Enumeration: (Functional)

```
/* Acceleration */
UNITS_METERS_PER_SECOND_PER_SECOND =
166,
/* Area */
UNITS_SQUARE_METERS = 0,
UNITS_SQUARE_CENTIMETERS = 116,
UNITS_SQUARE_FEET = 1,
UNITS_SQUARE_INCHES = 115,
/* Currency */
UNITS_CURRENCY1 = 105,
UNITS_CURRENCY2 = 106,
UNITS_CURRENCY3 = 107,
UNITS_CURRENCY4 = 108,
UNITS_CURRENCY5 = 109,
UNITS_CURRENCY6 = 110,
UNITS_CURRENCY7 = 111,
UNITS_CURRENCY8 = 112,
UNITS_CURRENCY9 = 113,
UNITS_CURRENCY10 = 114,
/* Electrical */
UNITS_MILLIAMPERES = 2,
UNITS_AMPERES = 3,
UNITS_AMPERES_PER_METER = 167,
UNITS_AMPERES_PER_SQUARE_METER = 168,
UNITS_AMPERE_SQUARE_METERS = 169,
UNITS_FARADS = 170,
UNITS_HENRYS = 171,
UNITS_OHMS = 4,
UNITS_OHM_METERS = 172,
UNITS_MILLIOHMS = 145,
UNITS_KILOHMS = 122,
```

UNITS\_MEGOHMS = 123,  
 UNITS\_SIEMENS = 173, /\* 1 mho equals 1 siemens \*/  
 UNITS\_SIEMENS\_PER\_METER = 174,  
 UNITS\_TESLAS = 175,  
 UNITS\_VOLTS = 5,  
 UNITS\_MILLIVOLTS = 124,  
 UNITS\_KILOVOLTS = 6,  
 UNITS\_MEGAVOLTS = 7,  
 UNITS\_VOLT\_AMPERES = 8,  
 UNITS\_KILOVOLT\_AMPERES = 9,  
 UNITS\_MEGAVOLT\_AMPERES = 10,  
 UNITS\_VOLT\_AMPERES\_REACTIVE = 11,  
 UNITS\_KILOVOLT\_AMPERES\_REACTIVE = 12,  
 UNITS\_MEGAVOLT\_AMPERES\_REACTIVE = 13,  
 UNITS\_VOLTS\_PER\_DEGREE\_KELVIN = 176,  
 UNITS\_VOLTS\_PER\_METER = 177,  
 UNITS\_DEGREES\_PHASE = 14,  
 UNITS\_POWER\_FACTOR = 15,  
 UNITS\_WEBERS = 178,  
 /\* Energy \*/  
 UNITS\_JOULES = 16,  
 UNITS\_KILOJOULES = 17,  
 UNITS\_KILOJOULES\_PER\_KILOGRAM = 125,  
 UNITS\_MEGAJOULES = 126,  
 UNITS\_WATT\_HOURS = 18,  
 UNITS\_KILOWATT\_HOURS = 19,  
 UNITS\_MEGAWATT\_HOURS = 146,  
 UNITS\_BTUS = 20,  
 UNITS\_KILO\_BTUS = 147,  
 UNITS\_MEGA\_BTUS = 148,  
 UNITS\_THERMS = 21,  
 UNITS\_TON\_HOURS = 22,  
 /\* Enthalpy \*/  
 UNITS\_JOULES\_PER\_KILOGRAM\_DRY\_AIR = 23,  
 UNITS\_KILOJOULES\_PER\_KILOGRAM\_DRY\_AIR = 149,  
 UNITS\_MEGAJOULES\_PER\_KILOGRAM\_DRY\_AIR = 150,  
 UNITS\_BTUS\_PER\_POUND\_DRY\_AIR = 24,  
 UNITS\_BTUS\_PER\_POUND = 117,  
 /\* Entropy \*/  
 UNITS\_JOULES\_PER\_DEGREE\_KELVIN = 127,  
 UNITS\_KILOJOULES\_PER\_DEGREE\_KELVIN = 151,  
 UNITS\_MEGAJOULES\_PER\_DEGREE\_KELVIN = 152,  
 UNITS\_JOULES\_PER\_KILOGRAM\_DEGREE\_KELVIN = 128,  
 /\* Force \*/  
 UNITS\_NEWTON = 153,  
 /\* Frequency \*/  
 UNITS\_CYCLES\_PER\_HOUR = 25,  
 UNITS\_CYCLES\_PER\_MINUTE = 26,  
 UNITS\_HERTZ = 27,  
 UNITS\_KILOHERTZ = 129,  
 UNITS\_MEGAHERTZ = 130,  
 UNITS\_PER\_HOUR = 131,  
 /\* Humidity \*/  
 UNITS\_GRAMS\_OF\_WATER\_PER\_KILOGRAM\_DRY\_AIR = 28,  
 UNITS\_PERCENT\_RELATIVE\_HUMIDITY = 29,  
 /\* Length \*/  
 UNITS\_MILLIMETERS = 30,  
 UNITS\_CENTIMETERS = 118,  
 UNITS\_METERS = 31,  
 UNITS\_INCHES = 32,  
 UNITS\_FEET = 33,  
 /\* Light \*/  
 UNITS\_CANDELAS = 179,  
 UNITS\_CANDELAS\_PER\_SQUARE\_METER = 180,  
 UNITS\_WATTS\_PER\_SQUARE\_FOOT = 34,  
 UNITS\_WATTS\_PER\_SQUARE\_METER = 35,  
 UNITS\_LUMENS = 36,  
 UNITS\_LUXES = 37,  
 UNITS\_FOOT\_CANDLES = 38,  
 /\* Mass \*/  
 UNITS\_KILOGRAMS = 39,  
 UNITS\_POUNDS\_MASS = 40,  
 UNITS\_TONS = 41,  
 /\* Mass Flow \*/  
 UNITS\_GRAMS\_PER\_SECOND = 154,  
 UNITS\_GRAMS\_PER\_MINUTE = 155,  
 UNITS\_KILOGRAMS\_PER\_SECOND = 42,  
 UNITS\_KILOGRAMS\_PER\_MINUTE = 43,  
 UNITS\_KILOGRAMS\_PER\_HOUR = 44,  
 UNITS\_POUNDS\_MASS\_PER\_SECOND = 119,  
 UNITS\_POUNDS\_MASS\_PER\_MINUTE = 45,  
 UNITS\_POUNDS\_MASS\_PER\_HOUR = 46,  
 UNITS\_TONS\_PER\_HOUR = 156,  
 /\* Power \*/  
 UNITS\_MILLIWATTS = 132,  
 UNITS\_WATTS = 47,  
 UNITS\_KILOWATTS = 48,  
 UNITS\_MEGAWATTS = 49,  
 UNITS\_BTUS\_PER\_HOUR = 50,  
 UNITS\_KILO\_BTUS\_PER\_HOUR = 157,  
 UNITS\_HORSEPOWER = 51,  
 UNITS\_TONS\_REFRIGERATION = 52,  
 /\* Pressure \*/  
 UNITS\_PASCALS = 53,  
 UNITS\_HECTOPASCALS = 133,  
 UNITS\_KILOPASCALS = 54,  
 UNITS\_MILLIBARS = 134,  
 UNITS\_BARS = 55,  
 UNITS\_POUNDS\_FORCE\_PER\_SQUARE\_INCH = 56,  
 UNITS\_CENTIMETERS\_OF\_WATER = 57,  
 UNITS\_INCHES\_OF\_WATER = 58,  
 UNITS\_MILLIMETERS\_OF\_MERCURY = 59,  
 UNITS\_CENTIMETERS\_OF\_MERCURY = 60,  
 UNITS\_INCHES\_OF\_MERCURY = 61,  
 /\* Temperature \*/  
 UNITS\_DEGREES\_CELSIUS = 62,  
 UNITS\_DEGREES\_KELVIN = 63,

```

UNITS_DEGREES_KELVIN_PER_HOUR = 181,
UNITS_DEGREES_KELVIN_PER_MINUTE = 182,
UNITS_DEGREES_FAHRENHEIT = 64,
UNITS_DEGREE_DAYS_CELSIUS = 65,
UNITS_DEGREE_DAYS_FAHRENHEIT = 66,
UNITS_DELTA_DEGREES_FAHRENHEIT = 120,
UNITS_DELTA_DEGREES_KELVIN = 121,
  /* Time */
UNITS_YEARS = 67,
UNITS_MONTHS = 68,
UNITS_WEEKS = 69,
UNITS_DAYS = 70,
UNITS_HOURS = 71,
UNITS_MINUTES = 72,
UNITS_SECONDS = 73,
UNITS_HUNDREDTHS_SECONDS = 158,
UNITS_MILLISECONDS = 159,
  /* Torque */
UNITS_NEWTON_METERS = 160,
  /* Velocity */
UNITS_MILLIMETERS_PER_SECOND = 161,
UNITS_MILLIMETERS_PER_MINUTE = 162,
UNITS_METERS_PER_SECOND = 74,
UNITS_METERS_PER_MINUTE = 163,
UNITS_METERS_PER_HOUR = 164,
UNITS_KILOMETERS_PER_HOUR = 75,
UNITS_FEET_PER_SECOND = 76,
UNITS_FEET_PER_MINUTE = 77,
UNITS_MILES_PER_HOUR = 78,
  /* Volume */
UNITS_CUBIC_FEET = 79,
UNITS_CUBIC_METERS = 80,
UNITS_IMPERIAL_GALLONS = 81,
UNITS_LITERS = 82,
UNITS_US_GALLONS = 83,
  /* Volumetric Flow */
UNITS_CUBIC_FEET_PER_SECOND = 142,
UNITS_CUBIC_FEET_PER_MINUTE = 84,
UNITS_CUBIC_METERS_PER_SECOND = 85,
UNITS_CUBIC_METERS_PER_MINUTE = 165,
UNITS_CUBIC_METERS_PER_HOUR = 135,

UNITS_IMPERIAL_GALLONS_PER_MINUTE = 86,
UNITS_LITERS_PER_SECOND = 87,
UNITS_LITERS_PER_MINUTE = 88,
UNITS_LITERS_PER_HOUR = 136,
UNITS_US_GALLONS_PER_MINUTE = 89,
  /* Other */
UNITS_DEGREES_ANGULAR = 90,
UNITS_DEGREES_CELSIUS_PER_HOUR = 91,
UNITS_DEGREES_CELSIUS_PER_MINUTE = 92,
UNITS_DEGREES_FAHRENHEIT_PER_HOUR = 93,
UNITS_DEGREES_FAHRENHEIT_PER_MINUTE = 94,
UNITS_JOULE_SECONDS = 183,
UNITS_KILOGRAMS_PER_CUBIC_METER = 186,
UNITS_KW_HOURS_PER_SQUARE_METER = 137,
UNITS_KW_HOURS_PER_SQUARE_FOOT = 138,
UNITS_MEGAJOULES_PER_SQUARE_METER = 139,
UNITS_MEGAJOULES_PER_SQUARE_FOOT = 140,
UNITS_NO_UNITS = 95,
UNITS_NEWTON_SECONDS = 187,
UNITS_NEWTONS_PER_METER = 188,
UNITS_PARTS_PER_MILLION = 96,
UNITS_PARTS_PER_BILLION = 97,
UNITS_PERCENT = 98,
UNITS_PERCENT_OBSCURATION_PER_FOOT = 143,
UNITS_PERCENT_OBSCURATION_PER_METER = 144,
UNITS_PERCENT_PER_SECOND = 99,
UNITS_PER_MINUTE = 100,
UNITS_PER_SECOND = 101,
UNITS_PSI_PER_DEGREE_FAHRENHEIT = 102,
UNITS_RADIANS = 103,
UNITS_RADIANS_PER_SECOND = 184,
UNITS_REVOLUTIONS_PER_MINUTE = 104,
UNITS_SQUARE_METERS_PER_NEWTON = 185,
UNITS_WATTS_PER_METER_PER_DEGREE_KELVIN = 189,
UNITS_WATTS_PER_SQUARE_METER_DEGREE_KELVIN = 141

```

---

## BACnet Units Enumeration: (Numeric)

square-meters	(0),	volt-amperes	(8),
square-feet	(1),	kilovolt-amperes	(9),
milliamperes	(2),	megavolt-amperes	(10),
amperes	(3),	volt-amperes-reactive	(11),
ohms	(4),	kilovolt-amperes-reactive	(12),
volts	(5),	megavolt-amperes-reactive	(13),
kilovolts	(6),	degrees-phase	(14),
megavolts	(7),	power-factor	(15),
		joules	(16),

kilojoules	(17),	
watt-hours	(18),	
kilowatt-hours	(19),	
btus	(20),	
therms	(21),	
ton-hours	(22),	
joules-per-kilogram-dry-air	(23),	
btus-per-pound-dry-air	(24),	
cycles-per-hour	(25),	
cycles-per-minute	(26),	
hertz	(27),	
grams-of-water-per-kilogram-dry-air	(28),	
percent-relative-humidity	(29),	
millimeters	(30),	
meters	(31),	
inches	(32),	
feet	(33),	
watts-per-square-foot	(34),	
watts-per-square-meter	(35),	
lumens	(36),	
luxes	(37),	
foot-candles	(38),	
kilograms	(39),	
pounds-mass	(40),	
tons	(41),	
kilograms-per-second	(42),	
kilograms-per-minute	(43),	
kilograms-per-hour	(44),	
pounds-mass-per-minute	(45),	
pounds-mass-per-hour	(46),	
watts	(47),	
kilowatts	(48),	
megawatts	(49),	
btus-per-hour	(50),	
horsepower	(51),	
tons-refrigeration	(52),	
pascals	(53),	
kilopascals	(54),	
bars	(55),	
pounds-force-per-square-inch	(56),	
centimeters-of-water	(57),	
inches-of-water	(58),	
millimeters-of-mercury	(59),	
centimeters-of-mercury	(60),	
inches-of-mercury	(61),	
degrees-Celsius	(62),	
degrees-Kelvin	(63),	
degrees-Fahrenheit	(64),	
degree-days-Celsius	(65),	
degree-days-Fahrenheit	(66),	
years	(67),	
months	(68),	
weeks	(69),	
days	(70),	
hours	(71),	
minutes	(72),	
seconds	(73),	
meters-per-second	(74),	
kilometers-per-hour	(75),	
feet-per-second	(76),	
feet-per-minute	(77),	
miles-per-hour	(78),	
cubic-feet	(79),	
cubic-meters	(80),	
imperial-gallons	(81),	
liters	(82),	
us-gallons	(83),	
cubic-feet-per-minute	(84),	
cubic-meters-per-second	(85),	
imperial-gallons-per-minute	(86),	
liters-per-second	(87),	
liters-per-minute	(88),	
us-gallons-per-minute	(89),	
degrees-angular	(90),	
degrees-Celsius-per-hour	(91),	
degrees-Celsius-per-minute	(92),	
degrees-Fahrenheit-per-hour	(93),	
degrees-Fahrenheit-per-minute	(94),	
no-units	(95),	
parts-per-million	(96),	
parts-per-billion	(97),	
percent	(98),	
percent-per-second	(99),	
per-minute	(100),	
per-second	(101),	
psi-per-degree-Fahrenheit	(102),	
radians	(103),	
revolutions-per-minute	(104),	
currency1	(105),	
currency2	(106),	
currency3	(107),	
currency4	(108),	
currency5	(109),	
currency6	(110),	
currency7	(111),	
currency8	(112),	
currency9	(113),	
currency10	(114),	
square-inches	(115),	
square-centimeters	(116),	
btus-per-pound	(117),	
centimeters	(118),	
pounds-mass-per-second	(119),	
delta-degrees-Fahrenheit	(120),	
delta-degrees-Kelvin	(121),	
kilohms	(122),	
megohms	(123),	
millivolts	(124),	
kilojoules-per-kilogram	(125),	
megajoules	(126),	
joules-per-degree-Kelvin	(127),	
joules-per-kilogram-degree-Kelvin	(128),	

kilohertz(129),  
 megahertz (130),  
 per-hour (131),  
 milliwatts (132),  
 hectopascals (133),  
 millibars(134),  
 cubic-meters-per-hour (135),  
 liters-per-hour (136),  
 kilowatt-hours-per-square-meter (137),  
 kilowatt-hours-per-square-foot (138),  
 megajoules-per-square-meter (139),  
 megajoules-per-square-foot (140),  
 watts-per-square-meter-degree-kelvin (141),  
 cubic-feet-per-second (142),  
 percent-obscurtion-per-foot (143),  
 percent-obscurtion-per-meter (144),  
 milliohms (145),  
 megawatt-hours (146),  
 kilo-btus(147),  
 mega-btus (148),  
 kilojoules-per-kilogram-dry-air (149),  
 megajoules-per-kilogram-dry-air (150),  
 kilojoules-per-degree-Kelvin (151),  
 megajoules-per-degree-Kelvin (152),  
 newton (153),  
 grams-per-second(154),  
 grams-per-minute(155),  
 tons-per-hour (156),  
 kilo-btus-per-hour (157),  
 hundredths-seconds (158),  
 milliseconds (159),  
 newton-meters (160),  
 millimeters-per-second (161),  
 millimeters-per-minute (162),  
 meters-per-minute (163),  
 meters-per-hour (164),  
 cubic-meters-per-minute (165),  
 meters-per-second-per-second (166),  
 amperes-per-meter (167),  
 amperes-per-square-meter (168),  
 ampere-square-meters (169),  
 farads (170),  
 henrys (171),  
 ohm-meters (172),  
 siemens (173),  
 siemens-per-meter (174),  
 teslas (175),  
 volts-per-degree-Kelvin (176),  
 volts-per-meter (177),  
 webers (178),  
 candelas (179),  
 candelas-per-square-meter (180),  
 degrees-Kelvin-per-hour (181),  
 degrees-Kelvin-per-minute (182),  
 joule-seconds (183),  
 radians-per-second (184),  
 square-meters-per-Newton(185),  
 kilograms-per-cubic-meter(186),  
 newton-seconds (187),  
 newtons-per-meter (188),  
 watts-per-meter-per-degree-Kelvin (189),  
 micro-siemens (190),  
 cubic-feet-per-hour (191),  
 us-gallons-per-hour (192),

---

## Command Window Tools

A set of BACnet tools that operate from a command window are available to allow testing of communications.

BACnet Tools are binary demo application command line utilities that use BACnet/IP to perform a variety of BACnet services. Some tools use BACnet WhoIs to bind to devices, but can also use a static binding file address\_cache.

Most of the tools have help (--help option), and use environment variables to configure the datalink.

### bacwi- BACnet WhoIs service

The BACnet WhoIs service command sends a BACnet WhoIs service request to a device or multiple devices, and waits for responding I-Am Request messages. It then displays any devices found and their network information. . BACnet WhoIs elicits responses from ALL BACnet devices reachable on the network.

```
bacwi id1 [id2]
```

Where the range of Device ID is from “id1” to “id2” The BACnet Device Object Instance number (DeviceID) is in the range of 0 to 4194303. A range of values can also be specified by using a minimum value and a maximum value. A value of -1 indicates all devices.

```
C:\ASI\BACRT>bacwi -1
Received I-Am Request from 32180, MAC = 192.168.1.230.186.192
Received I-Am Request from 18655, MAC = 192.168.1.230.186.192
Received I-Am Request from 18656, MAC = 192.168.1.230.186.192
Received I-Am Request from 16081, MAC = 192.168.1.230.186.192
Received I-Am Request from 230, MAC = 192.168.1.230.186.192

;Device  MAC                SNET  SADR    APDU
;-----
 32180    C0:A8:01:E6:BA:C0  230   01      1476
 18655    C0:A8:01:E6:BA:C0  230   02      1476
 18656    C0:A8:01:E6:BA:C0  230   03      1476
 16081    C0:A8:01:E6:BA:C0  230   0A      1476
 230      C0:A8:01:E6:BA:C0  0      0       1476
```

You may use this message to create a static binding file address\_cache

```
C:\ASI\BACRT>bacwi -1 > address_cache
```

## bdt - BACnet Discovery Tool

The BACnet Discovery Tool sends a global BACnet WhoIs service request, waits for a reply and summarizes the resulting information.

```
C:\ASI\BACRT>bdt
BACnet Discovery Tool v1.1
Contemporary Controls Copyright (C) 2008
portions copyright (C) 2005 Steve Karg

Broadcast: FFFFFFFFC0BA
Address: 6E01A8C0C0BA

Sending Global Who-Is

Received I-Am Response from 32180 (vendor 162)
Received I-Am Response from 18655 (vendor 162)
Received I-Am Response from 18656 (vendor 162)
Received I-Am Response from 16081 (vendor 162)
Received I-Am Response from 230 (vendor 162)

Device  MAC                MaxAPDU Net
32180    C0A801E6BAC0  1476   230
18655    C0A801E6BAC0  1476   230
18656    C0A801E6BAC0  1476   230
16081    C0A801E6BAC0  1476   230
```

This returns the Device ID, the MAC address of the BACport  
C0A801E6BAC0 = 192.168.1.230: 47808  
and the BACnet network address.

## bacrp - BACnet ReadProperty service

The BACnet ReadProperty command can be used to return BACnet object properties.

```
bacrp device-instance object-type object-instance property [index]
```



device-instance is BACnet Device Object Instance number is also called the Device ID used to bind with the device using Who-Is and I-Am services.

object-type: is the integer value of the BACNET\_OBJECT\_TYPE:  
0 = AI, 1=AO, 2=AV, 3=BI, 4=BO, 5=BV, and 8=Device.. It is the BACnet object that you are reading.

object-instance is the object instance number of the object that you are reading. For example, if you were reading controller Binary Output 3 you would be reading object type 4 object-instance 3.

property is an integer value, of the BACnet property for the BACnet object that you are reading. For example, 85= Present Value property..

index: is used if the property is an array to read individual elements by giving the index number of an array. . If this parameter is missing and the property is an array, the entire array will be read

## bacwh – BACnet WhoHas service

The BACnet Who Has command returns the Device Id of those BACnet devices that have a particular object and instance or that have a particular object name

```
bacwh object-type object-instance
```

or

```
bacwh object-name
```

Example: Find the device with name "AV:0:15 UTL:00:06:00"

```
C:\ASI\BACRT> bacwh "AV:0:15 UTL:00:06:00"  
I-Have: Analog Value 15 from Device 28543!
```

I can confirm this by asking for the object-name of Analog Value from my device.

```
C:\ASI\BACRT> bacrp 28543 2 15 77  
"AV:0:15 UTL:00:06:00"
```

Example: find of the devices with (Analog Value, 15)

```
C:\ASI\BACRT> bacwh 2 15  
I-Have: Analog Value 15 from Device 28540!  
I-Have: Analog Value 15 from Device 28543!
```

## bacts - BACnet TimeSynchronization service

Sends the PC time out Globally (65535) to anyone on any network (192.168.1.255)

There are no arguments

## bacwp - BACnet WriteProperty service

The WriteProperty command can be used to write new values BACnet object properties.

```
bacwp device-instance object-type object-instance property priority  
index tag value [tag value...]
```

**device-instance** is BACnet Device Object Instance number is also called the Device ID used to bind with the device using Who-Is and I-Am services.

**object-type** is the integer value of the BACNET\_OBJECT\_TYPE:  
0 = AI, 1=AO, 2=AV, 3=BI, 4=BO, 5=BV, and 8=Device.. It is the BACnet object that you are reading.

**object-instanc** is the object instance number of the object that you are reading. For example, if you were reading controller Binary Output 3 you would be reading object type 4 object-instance 3.

**property** - The property is an integer value, of the BACnet property for the BACnet object thaty you are reading. For example, 85= Present Value property,.

**index** – The index: is used if the property is an array to read individual elements by giving the index number of an array. . If this parameter is -1, the index is ignored..

**priority**- Priority is used for setting the priority of the write. If Priority 0 is given, no priority is sent. The BACnet standard states that the value is written at the lowest priority (16) if the object property supports priorities when no priority is sent.

**tag** - The tag is the integer value of the enumeration BACNET\_APPLICATION\_TAG It is the data type of the value that you are writing. For example, if you were writing a REAL value, you would use a tag of 4. Context tags are created using two tags in a row. The context tag is preceded by a C. Ctag tag. C2 4 creates a context 2 tagged REAL.

**value** - The value is an ASCII representation of some type of data that you are writing. It is encoded using the tag information provided. For example, if you were writing a REAL value of 100.0, you would use 100.0 as the value.

## **bacrd - BACnet ReinitializeDevice service**

Send BACnet ReinitializeDevice service to device.

```
bacrd device-instance state [password]
```

**device-instance** - The device-instance or BACnetID can be 0 to 4194302.

**state** - Possible state values: 0=coldstart; 1=warmstart.

**password** - The optional password is a character string of 1 to 20 characters.

If you make any changes in the ASIC/2 configuration that will affect the point mapping you need to reset the Expansion Modulate:

To do a warm reset of just the BACport interface, device ID, 245: run:

```
bacrd 245 1 ASI
```

To do a cold reset of both the BACport interface, device ID, 245; run:

```
bacrd 245 0 ASI
```

---

## Other BACnet Utilities

ASI has developed several BACnet utilities to help with the BACnet setup: These utilities run in a command window. Run | cmd. `bacnet_reset.exe` (2008-08-18), `bacnet_whois.exe` (2008-10-31), and `bacnet_timesync.exe` (2008-08-20)

The BACport utility zip file can be downloaded from the BACport page in the ASI Integrator Center, and unzipped to the `c:\ASI\BACport` folder.

### bacnet\_whois

BACnet WhoIs utility finds all of the ASI Controls BACnet devices on your network including the BACport gateway and all virtual BACnet devices connected to the BACport gateway. It takes a little time to finish. For each device it reports the ASI product, the BACport firmware version, the Device Id found, and the Device Description.

Note: Every BACnet device on the network must have a unique Device Id!

```
C:\ASI\BACRT>bacnet_whois
BACport 1.0.8 BETA_3 -- [230] BACport 230 test
ASIC/2-8540 1.0.8 BETA_3 -- [32180] [32180] 8540
ASIC/1-8655 1.0.8 BETA_3 -- [18656] [18656] 8655 Heat Pump
ASIC/1-8655 1.0.8 BETA_3 -- [18655] [18655] 8655 Rooftop AC
ASIC/1-6000 1.0.8 BETA_3 -- [16082] [16082] 6000 VAV with fan
ASIC/1-6000 1.0.8 BETA_3 -- [16081] [16081] 6000 VAV simple
```

### bacnet\_reset [device\_id] [reset\_type]

After updating a new "map.xml" file, the BACport does not automatically reset itself when you quit FTP, so that the BACport would keep working from the map file in memory until you decide you want to force a reset.

The optional reset type is 0 = cold restart (hard reboot), or 1 = soft restart. The soft reboot is a little faster, for example,

```
C:\ASI\BACport>bacnet_reset 98 0
ReinitializeDevice Acknowledged!
```

The BACnet device identifier is specified in the map.xml file. The default BACnet device identifier, 999, is used by the BACport when the map.xml has not been installed.

### bacnet\_timesync

BACnet Time Synchronize utility sends a global BACnet message with the present PC time to the ASI BACport gateway.

```
bacnet_timesync
```

BACnet timesync only comes into play if you have the ASI controllers using their own hardware/software clocks for scheduling.

When received, an ASI time synchronize message will be sent to ASIC\_1 and/or ASIC\_2 addresses as specified in the map.xml file in "TIMESYNC" section.

---

## BACnet Interoperability Building Blocks BIBBs

The BACport conforms to the BACnet Application Specific Controller (B-ASIC) device profile. The following BACnet INTEROPERABILITY BUILDING BLOCKS (BIBBs) are supported:

Data Sharing:

- DS-WP-B (Write Property)
- DS-RP-B (Read Property)
- DS-RPM-B (Read Property Multiple)

Device and Network Management:

- D-DDB-A (Dynamic Dynamic Binding)
- D-DDB-B (Dynamic Dynamic Binding)
- D-DOB-B (Dynamic Object Binding)
- D-DCC-B (Device Communication Control)
- D-TS-B (Time Synchronization)
- D-RD-B (Reinitialize Device)

BACport does not support COV subscriptions at this time.