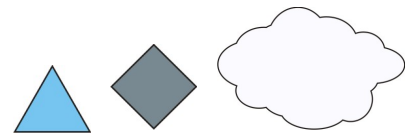




The BACnetIP Driver



The BACnetIP driver allows North to interface with a wide range of equipment supporting BACnet. The driver conforms to the standard device profile of BACnet Application Specific Controller. Available for Commander and ObSys.

This document relates to BACnetIP driver version 2.1 and 3.0

Please read the *Commander Manual* or *ObSys Manual* alongside this document, available from www.northbt.com

Contents

| | |
|--|----|
| Compatibility with the BACnet System..... | 3 |
| Equipment | 3 |
| Values..... | 4 |
| Prerequisites..... | 5 |
| Using the Driver | 6 |
| Starting the Interface | 6 |
| Setting up the Driver..... | 6 |
| Checking Communications | 6 |
| Object Specifications..... | 7 |
| Example Object Reference | 7 |
| Device Top-Level Objects | 7 |
| BACnet/IP Interface | 8 |
| Database Privilege Levels..... | 10 |
| Foreign Device | 11 |
| BACnet Network..... | 12 |
| BACnet Device..... | 13 |
| Device Information | 14 |
| BACnet Services Supported | 15 |
| BACnet Objects Types Supported | 16 |
| Analog Input..... | 17 |
| Analog Output..... | 18 |
| Analog Value | 20 |
| Binary Input | 21 |
| Binary Output | 22 |
| Binary Value | 23 |
| Multi-State Input..... | 24 |
| Multi-State Output..... | 25 |
| Multi-State Value | 26 |
| Value Table | 27 |
| BACnet Protocol Implementation Conformance Statement (PICS)..... | 28 |
| ObSys | 28 |
| Commander | 31 |
| Driver Versions | 34 |

Compatibility with the BACnet System

The BACnetIP driver allows North to interface with a wide range of equipment supporting BACnet. The driver conforms to the standard device profile of BACnet Application Specific Controller.

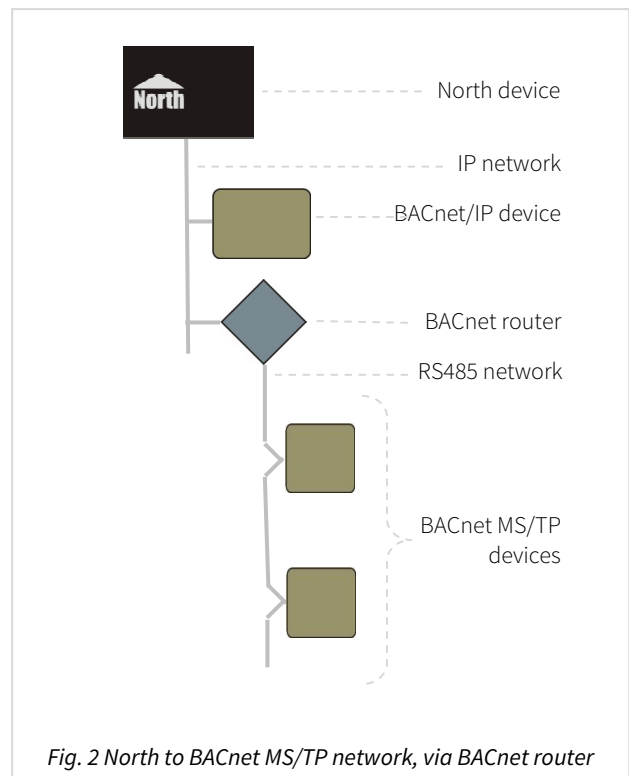
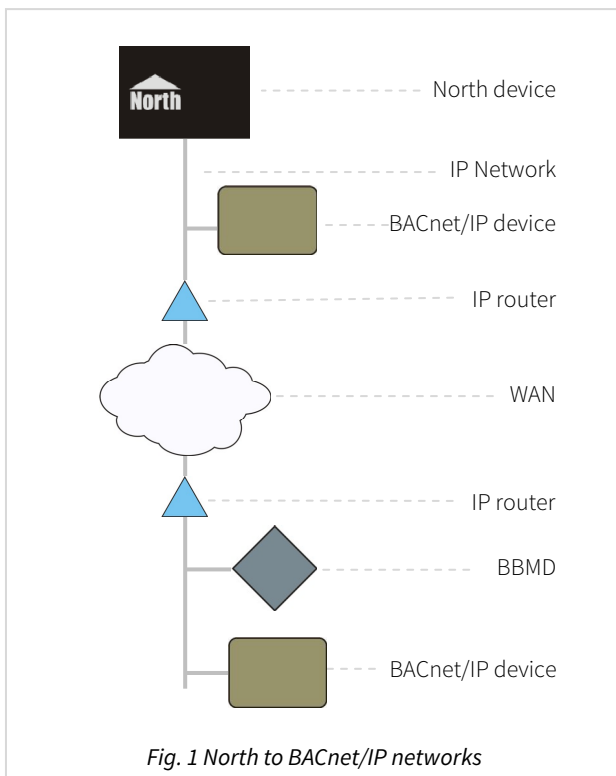
BACnet is an international, European, and American standard for data communication in building automation and control networks – BS EN ISO 16484-5 and ANSI/ASHRAE 135.

The standard defines object-orientated communications between building automation components; describing input, output and control elements, along with their properties and states. The standard also specifies the services used to read and write these elements.

BACnet uses a client-server model. The BACnetIP driver is capable of both requesting values from server devices (i.e. controllers), and providing values from Essential Data and Extra Data within the North device when requested by a client device (i.e. workstation).

The driver connects to an IP network, and is capable of accessing multiple BACnet/IP devices on this local network (Fig. 1). If BACnet/IP devices are located on another network segment, then BACnet broadcast management devices (BBMD) may be required.

BACnet is available over different physical layers including MS/TP (RS485), Point-to-Point (RS232), Ethernet, ARCNET, and LonTalk. To connect with these devices, a BACnet router is required (Fig. 2).



Equipment

Many different types of BACnet equipment are compatible with the driver, including: HVAC, thermostat, lighting, fire alarm, security, and access control systems.

Equipment is available from many different manufacturers, including: ABB, Alerton, Automated Logic, Cylon, Daikin, Delta Controls, Honeywell, Schneider, Siemens, Trane, Trend Controls, JCI, plus many more.

Values

The BACnetIP driver is capable of both requesting values from a BACnet controller, and providing values when requested by a BACnet workstation.

Values available from a BACnet Controller

Depending on the type of equipment, typically values from the following BACnet object types are available:

- Analog Input
- Analog Output
- Analog Value
- Binary Input
- Binary Output
- Binary Value
- Multi-state Input
- Multi-state Output
- Multi-state Value

Read the protocol implementation conformance statement (PICS), available from the equipment manufacturer, for the BACnet object types and interoperability building blocks (BIBBs) available from a specific device. The device must support data sharing BIBBs ending 'B'. A PICS for the North device is available at the end of this document.

Values available to a BACnet Workstation

The driver presents values from the North device's Essential Data and Extra Data as BACnet objects, accessible to any device on the BACnet network. Essential Data contains 640 values on Commander, and 1280 values on ObSys. If necessary, start the Extra Data driver (which requires an interface licence) for an additional 1024 values. Access to these values can be controlled by configuring privilege levels within the driver.

Depending on their configuration, values from Essential Data and Extra Data are presented as the following BACnet object types:

| BACnet Object Type | | Essential/Extra Data Object Type | Remote Action | Adjustable |
|---------------------------|----|----------------------------------|---------------|------------|
| Analog Input | 0 | Num or Float | Read | No |
| Analog Output | 1 | Num or Float | Write | Yes |
| Analog Value | 2 | Num or Float | None ‡ | Any |
| Binary Input | 3 | NoYes or OffOn | Read | No |
| Binary Output | 4 | NoYes or OffOn | Write | Yes |
| Binary Value | 5 | NoYes or OffOn | None ‡ | Any |
| Multi-state Input | 13 | ENum | Read | No |
| Multi-state Output | 14 | ENum | Write | Yes |
| Multi-state Value | 19 | ENum | None ‡ | Any |

‡ BACnet Value object types are presented from Essential/Extra Data when the remote action and adjustable settings do not match those of the BACnet Input or Output object types. E.g. a read remote action and adjustable.

Object instance numbers in the range 1...1280 are from Essential Data, and 2001...3024 are from Extra Data.

PICS are available at the end of this document for both ObSys and Commander, describing the BACnet objects and BIBBs supported by these products.

Prerequisites

All BACnet devices must be configured with a unique address on the network – set by the BACnet instance number. North devices are configured with a default address in the range 33000, plus the last part of the IP address.

The BACnetIP driver requires Essential Data v3.0 (build 01/09/2015) or later.

BACnet and IP Sub-networks

BACnet uses broadcast messages that will not easily travel between different IP sub-networks. If you are connecting devices across different sub-networks, then a BACnet Broadcast Management Device (BBMD) will be required for each sub-network.

The BBMD receives broadcast messages on one sub-network, and then re-sends the message to other BBMDs for broadcast onto their network segment.

The BACnetIP driver can also register as a Foreign Device with compatible BBMDs. This allows the driver to sit on its own sub-network and register with a BBMD on a remote network to receive broadcast messages.

BBMD functions are often available within some BACnet controllers, or a BACnet router.

BACnet Routers

The BACnetIP driver connects directly to an IP network, and supports BACnet/IP (Annex J).

BACnet is also available on devices supporting different physical layers. These include MS/TP (RS485), Point-to-Point (RS232), Ethernet, ARCNET, and LonTalk.

To connect with devices supporting a different physical layer, a BACnet router is required.

Two different BACnet routers are available from North – a BACnet/IP to MS/TP router (order code MISC/BACIP/MSTP), and a BACnet router supporting common physical layers (order code MISC/BACROUTER).

Using the Driver

On ObSys and Commander, the BACnetIP driver is pre-installed. On all of these North devices, you can use the driver to create an interface to a BACnet/IP network. Once started, you will need to set up the driver before it can communicate with the BACnet system.

The BACnetIP driver uses zero licence units.

Starting the Interface

- 📖 To start an interface using the BACnetIP driver, follow these steps:
 - **Start Engineering** your North device using ObSys
 - Navigate to **Configuration, Interfaces**, and set a unused **Interface** to 'BACnetIP' to start the particular interface
 - Navigate to the top-level of your North device, then rescan it

The driver setup object (Mc), labelled **BACnet/IP Interface**, should now be available.

Setting up the Driver

- 📖 To set up the driver, follow these steps:
 - Navigate to the **BACnet/IP Interface** object (Mc). For example, if you started interface 1 with the driver earlier, then the object reference will be 'M1'
 - Check the **BACnet Device Instance** object (BI) value is a unique address on the BACnet inter-network
 - On multi-homed devices, check the **Current IP Address** object (CIA) is using the correct IP network. If required, set the **Preferred IP Address** object (IA) to a different available IP address

Checking Communications

You can check the interface is communicating by reading the **BACnet Operational** object (DS). A value of 'yes' indicates the driver has opened a BACnet/IP port at the IP address indicated. If the value is 'no', then check that no other BACnet software is running.

The **Database Objects Available** object (EDC) indicates the maximum values available to a BACnet workstation from Essential and Extra Data.

Scan the **BACnet System** to discover other BACnet devices on the network.

Object Specifications

Once an interface is started, one or more extra objects become available within the top-level object of the device. As with all North objects, each of these extra objects may contain sub-objects, (and each of these may contain sub-objects, and so on) - the whole object structure being a multi-layer hierarchy. It is possible to navigate around the objects using the ObSys Engineering Software.

An example of a reference to an object in a different device: the IP network object contains

Each object is specified below, along with its sub-objects.

Example Object Reference

An example of a reference to an object in the same device: the BACnet/IP network (S1) contains a BACnet device at instance 150 (D150), which contains a value found in Analog Value 1 (AV1.V). Therefore, the complete object reference is 'S1.D150.AV1.V'.

An example of a reference to an object in a different device: the IP network object (IP) contains Default Commander object (CDIP), which contains the object above (S1.D150.AV1.V) – therefore the complete object reference is 'IP.CDIP.S1.D150.AV1.V'.

Device Top-Level Objects

When an interface is started using the BACnet/IP driver, the objects below become available within the top-level object of the device. For example, if interface 1 is started, then the object references 'M1' and 'S1' become available.

| Description | Reference | Type |
|---|-----------|--|
| BACnet/IP Interface Set up the BACnetIP driver, started on interface <i>c</i> (<i>c</i> is the interface number) | Mc | Fixed Container: On the Commander platform this will be <i>[CDM v20\BACnetIP v30]</i> On the ObSys platform this will be <i>[OSM v20\BACnetIP v30]</i> |
| BACnet Network Access BACnet system connected to interface <i>c</i> (<i>c</i> is the interface number) | Sc | Variable Container: <i>[BACnetIP v30]</i> |

BACnet/IP Interface

Object Type: [OSM v20\BACnetIP v30]

Object Type: [CDM v20\BACnetIP v30]

Object Type: [OSM v20\BACnetIP v21]

Object Type: [CDM v20\BACnetIP v21]

The BACnet/IP Interface contains the following objects:

| Description | Reference | Type |
|---|-----------|--|
| <p>BACnet Operational</p> <p>Indicates if the BACnet/IP port is open. A value of 'No' indicates a problem, this could be caused by another application opening the BACnet/IP port, a BACnet device instance of 0, or an invalid IP address</p> | DS | Obj\NoYes |
| <p>Database Objects Available</p> <p>Count of maximum objects available from Essential Data and Extra Data. Available in driver version 3.0</p> | EDC | Obj\Num |
| <p>BACnet Device Instance</p> <p>The address on the BACnet network, from which it can be referenced by other devices. This number must be unique across the entire BACnet inter-network</p> | BI | Obj\Num; Adjustable; Range: 1...4194303 On initialization, set to 33000 + last part of IP address |
| <p>Current IP Address</p> <p>IP address currently opened by the driver</p> | CIA | Obj\IP |
| <p>Preferred IP Address</p> <p>If multiple IP networks are available, set which available IP address to use</p> | IA | Obj\IP; Adjustable |
| <p>BACnet Port Number</p> <p>All BACnet/IP devices must use the same UDP port number</p> | PN | Obj\Num; Adjustable; Range: 0...65535 Set to 47808 (0xBAC0) by default |
| <p>APDU Segment Timeout (ms)</p> <p>In order to achieve reliable communication, it is recommended that the APDU timeouts of all interconnecting devices should contain the same value. These values may also be configured by devices on the BACnet network</p> | ST | Obj\Num; Adjustable; Range: 500...60000 Set to 2000ms by default |
| <p>APDU Timeout (ms)</p> <p>It is recommended that an APDU timeout less than 4000ms is specified. See also note for APDU Segment Timeout</p> | AT | Obj\Num; Adjustable; Range: 500...60000 Set to 3000ms by default |
| <p>Device Communication</p> <p>Use to temporarily disable BACnet communication</p> | DC | Obj\Enum; Adjustable; Range: 0...2 Values: 0=Enabled, 1=Disable all Communication, 2=Disable client (outbound) requests |
| <p>Access Password</p> <p>The access password is used to restrict access to the BACnetIP driver from devices using the BACnet ReinitializeDevice and DeviceCommunicationControl services. Devices using these services will need to include the password as specified here</p> | PSW | Obj\Text: max 20 chars; Adjustable |

| Description | Reference | Type |
|--|-----------|---|
| <p>Default Character Encoding</p> <p>When writing a character string property to a device, or when a BACnet device reads a property from the driver, the value is encoded using the character encoding specified.</p> | CE | <p>On the Commander platform, this object is not available. Only ANSI x3.4 character encoding is supported.</p> <p>On the ObSys platform this will be: Obj\ENum; Range: 0..5; Adjustable Values: 0=ANSI x3.4 (recommended), 1=IBM/Microsoft DBCS, 4=UCS-2, 5=ISO 8859-1</p> |
| <p>Database Privilege Levels</p> <p>Configure privilege levels to control read and adjust access to Essential Data and Extra Data from a BACnet workstation</p> | S | <p>Fixed Container:</p> <p>On the Commander platform this will be <i>[CDM v20\BACnetIP v30\Security]</i></p> <p>On the ObSys platform this will be <i>[OSM v20\BACnetIP v30\Security]</i></p> |
| <p>Foreign Device</p> <p>Configure options for driver to register with a BBMD, on multi-network installations</p> | FD | <p>Fixed Container:</p> <p>On the Commander platform this will be <i>[CDM v20\BACnetIP v30\Foreign]</i></p> <p>On the ObSys platform this will be <i>[OSM v20\BACnetIP v30\Foreign]</i></p> |

Database Privilege Levels

Object Type: [CDM v20\BACnetIP v30\Security]

Object Type: [OSM v20\BACnetIP v30\Security]

Object Type: [CDM v20\BACnetIP v21\Security]

Object Type: [OSM v20\BACnetIP v21\Security]

Security Areas and Levels

Within the North security model, there are eight security areas. Security areas could be actual areas in a building, but are normally functional areas – for example, ‘environmental control’ and ‘North engineering’ areas would allow a user to have different privileges in controlling set points and engineering Commanders.

Typically, a user is assigned a privilege level in each of the eight areas. The level is in the range zero to seven, seven being the most powerful. When a user wishes to pass a door, his/her privilege level in the door’s area is checked against the minimum required for that area – and then either allowed to pass, or rejected.

The engineer must decide the use of the eight areas. The engineer must also decide the power of the privilege levels. Most systems use only a few levels per area: 0=None, 1=Guest, 2=User, 7=Administrator.

As an example, imagine a page of values in Essential Data. The page needs a user to have a minimum privilege level of 2 in area 1 before it can be viewed. The page is available in a Web browser that checks users with a security database. User A has privilege level 7 in area 1 – she can view the page. User B has privilege level 5 in area 1 – he can also view the page. User C has privilege level 1 in area 1 – she cannot view the page.

The example continues: within this page of values in Essential Data is a temperature set point object. Users need a minimum privilege level of 6 in area 1 to adjust it – therefore User A can adjust the set point, but User B cannot.

Specifying Access Security

Essential Data and Extra Data have Access Security objects to control who can view a page, and who can adjust an adjustable object.

Each Access Security object has a two-digit value. Each controls the access to a particular feature - such as viewing the page, or adjusting the value. The two-digit value is made up of the area digit (1-8), followed by the minimum privilege level (1-7) – for example, if the minimum privilege level is 6 in area 2, then the two digit value is 26. If the value is 00, then no security checks are made.

BACnet/IP Driver

The Database Privilege Levels object contains a privilege level for each of the eight security areas, representing a virtual user. The BACnetIP driver uses these to control access to Essential Data and Extra Data when reading or adjusting a value.

| Description | Reference | Type |
|--|-----------|-----------------------------------|
| Privilege Level in Area x The area, x, can be in the range 1...8 | Px | Obj\Num; Adjustable; Range: 0...7 |

Foreign Device

Object Type: [CDM v20\BACnetIP v30\Foreign]

Object Type: [OSM v20\BACnetIP v30\Foreign]

Object Type: [CDM v20\BACnetIP v21\Foreign]

Object Type: [OSM v20\BACnetIP v21\Foreign]

The BACnet/IP protocol uses IP broadcast messages. As most routers do not pass broadcast messages between sub-networks, a BACnet broadcast management device (BBMD) is required on each sub-network to perform this function.

If a BBMD is available on the same sub-network as the North device, then no configuration is required. The BBMD will automatically re-transmit broadcast messages.

If a BBMD is only available on a remote network, then configure that BBMD's IP address here and enable foreign device registration. The driver will then register with the BBMD so that it can communicate across sub-networks.

| Description | Reference | Type |
|---|-----------|-----------------------|
| Enable foreign device registration | E | Obj\NoYes; Adjustable |
| BBMD Server IP Address | SIP | Obj\IP; Adjustable |

BACnet Network

Object Type: *[BACnetIP v30]*

Object Type: *[BACnetIP v21]*

The BACnet network is a network of devices supporting the BACnet standard. It includes devices on the connected BACnet/IP network, and devices on different inter-connected networks including BACnet MS/TP, Point-to-Point, Ethernet, ARCNET, etc.

The BACnet network contains the following objects:

| Description | Reference | Type |
|--|-----------|--|
| Device Name The BACnet device number, x , is in the range 1...4194303 | Dx | Variable container: <i>[BACnetIP v30\Dev]</i> |
| Network a Network of devices available via a BACnet router. The BACnet network number, a , is in the range 1...65534 | Na | Variable container: <i>[BACnetIP v30]</i> |
| Broadcast Date & Time Update all devices with a date and time | BT | Obj\DateTime; Adjustable only |

BACnet Device

Object Type: *[BACnetIP v30\Dev]*

Object Type: *[BACnetIP v21\Dev]*

The driver supports the following type of BACnet objects from a device. Scan the device to discover the BACnet objects available.

The object instance number, *x*, for the following objects is dependent upon engineering within the device.

| Description | Reference | Type |
|--------------------------------|-----------|--|
| Device Information | I | Fixed container: <i>[BACnetIP v30\PIC]</i> |
| Analog Input Name | AIx | Fixed container: <i>[BACnetIP v30\AnIn]</i> |
| Analog Output Name | AOx | Fixed container: <i>[BACnetIP v30\AnOut]</i> |
| Analog Value Name | AVx | Fixed container: <i>[BACnetIP v30\AnVal]</i> |
| Binary Input Name | BIx | Fixed container: <i>[BACnetIP v30\BinIn]</i> |
| Binary Output Name | BOx | Fixed container: <i>[BACnetIP v30\BinOut]</i> |
| Binary Value Name | BVx | Fixed container: <i>[BACnetIP v30\BinVal]</i> |
| Multi-state Input Name | MIx | Fixed container: <i>[BACnetIP v30\MultiIn]</i> |
| Multi-state Output Name | MOx | Fixed container: <i>[BACnetIP v30\MultiOut]</i> |
| Multi-state Value Name | MVx | Fixed container: <i>[BACnetIP v30\MultiVal]</i> |

Device Information

Object Type: [BACnetIP v30\PIC]

Object Type: [BACnetIP v21\PIC]

Device Information contains a summary of the device's BACnet Protocol Implementation Conformance Statement (PICS), and contains the following objects:

| Description | Reference | Type |
|---|-----------|---|
| Name | N | Obj\Text |
| Location Device support for this object is optional | L | Obj\Text |
| Description Device support for this object is optional | D | Obj\Text |
| Status | S | Obj\Enum; Range: 0...4 Values: 0=Operational, 1=Operational (read-only), 3=Download in progress, 4=Non-operational |
| Reinitialize Device | RST | Obj\Enum; Range: 0...1; Adjustable-only Values: 0=Cold start, 1=Warm start Some devices require an optional password. This text should be included when adjusting the value in the format '<restart-type> <password>' |
| Local Date Device support for this object is optional | LD | Obj\Date |
| Local Time Device support for this object is optional | LT | Obj\Time |
| Set Date/Time | TIME | Obj\DateTime; Adjustable-only |
| Vendor Name | VN | Obj\Text |
| Vendor ID A list of BACnet vendor identifiers is available from www.bacnet.org | VI | Obj\Num; Range: 0...65535 |
| Model Name | MN | Obj\Text |
| Firmware Version | FV | Obj\Text |
| Software Version | SV | Obj\Text |
| Database Revision | DR | Obj\Num; Range: 0...255 |
| BACnet Version | PV | Obj\Num |
| BACnet Revision | PR | Obj\Num |
| Segmentation Supported | SS | Obj\Enum; Range: 0...3 Values: 0=Both (transmit/receive), 1=Transmit only, 2=Receive only, 3=None |
| Maximum Segments Supported Device support for this object is optional | MS | Obj\Num |
| Maximum APDU Length | AL | Obj\Num; Range: 50...1476 |
| APDU Timeout (milliseconds) In order to achieve reliable communication, it is recommended that the APDU timeouts of all interconnecting devices should contain the same value | AT | Obj\Num; Adjustable; Range: 3000...10000 |
| APDU Segment Timeout (milliseconds) Device support for this object is optional. In order to achieve reliable communication, it is recommended that the APDU timeouts of all interconnecting devices should contain the same value | ST | Obj\Num; Adjustable; Range: 2000...10000 |
| APDU Retries | AR | Obj\Num; Adjustable; Range: 0...99 |
| Services Supported | PS | Fixed container: [BACnetIP v30\PIC\Svc] |
| Object Types Supported | PO | Fixed container: [BACnetIP v30\PIC\Obj] |

BACnet Services Supported

Object Type: [BACnetIP v30\PIC\Svc]

Object Type: [BACnetIP v21\PIC\Svc]

The BACnet Services Supported lists a summary of the device's PICS, listing the types of services supported:

| Description | Reference | Type |
|---------------------------------------|-----------|-----------|
| Read Property | B12 | Obj\NoYes |
| Read Property Multiple | B14 | Obj\NoYes |
| Read Property Conditional | B13 | Obj\NoYes |
| Write Property | B15 | Obj\NoYes |
| Write Property Multiple | B16 | Obj\NoYes |
| Subscribe COV | B5 | Obj\NoYes |
| Subscribe COV Property | B38 | Obj\NoYes |
| Confirmed COV Notification | B1 | Obj\NoYes |
| Unconfirmed COV Notification | B28 | Obj\NoYes |
| Confirmed Event Notification | B2 | Obj\NoYes |
| Unconfirmed Event Notification | B29 | Obj\NoYes |
| Acknowledge Alarm | B0 | Obj\NoYes |
| Get Alarm Summary | B3 | Obj\NoYes |
| Get Enrolment Summary | B4 | Obj\NoYes |
| Get Event Information | B39 | Obj\NoYes |
| Life Safety Operation | B37 | Obj\NoYes |
| Read Range | B35 | Obj\NoYes |
| Who-Is | B34 | Obj\NoYes |
| I-Am | B26 | Obj\NoYes |
| Who-Has | B33 | Obj\NoYes |
| I-Have | B27 | Obj\NoYes |
| Device Communication Control | B17 | Obj\NoYes |
| Confirmed Text Message | B19 | Obj\NoYes |
| Unconfirmed Text Message | B31 | Obj\NoYes |
| Time Synchronisation | B32 | Obj\NoYes |
| UTC Time Synchronisation | B36 | Obj\NoYes |
| Reinitialize Device | B20 | Obj\NoYes |
| Atomic Read File | B6 | Obj\NoYes |
| Atomic Write File | B7 | Obj\NoYes |
| Add List Element | B8 | Obj\NoYes |
| Remove List Element | B9 | Obj\NoYes |
| Create Object | B10 | Obj\NoYes |
| Delete Object | B11 | Obj\NoYes |
| Virtual Terminal Open | B21 | Obj\NoYes |
| Virtual Terminal Close | B22 | Obj\NoYes |
| Virtual Terminal Data | B23 | Obj\NoYes |
| Authenticate | B24 | Obj\NoYes |
| Request Key | B25 | Obj\NoYes |
| Confirmed Private Transfer | B18 | Obj\NoYes |
| Unconfirmed Private Transfer | B30 | Obj\NoYes |

BACnet Objects Types Supported

Object Type: [BACnetIP v30\PIC\Obj]

Object Type: [BACnetIP v21\PIC\Obj]

The BACnet Object Types Supported lists a summary of the device's PICS, listing the types of objects supported:

| Description | Reference | Type |
|---------------------------|-----------|-----------|
| Access Door | B30 | Obj\NoYes |
| Accumulator | B23 | Obj\NoYes |
| Analog Input | B0 | Obj\NoYes |
| Analog Output | B1 | Obj\NoYes |
| Analog Value | B2 | Obj\NoYes |
| Averaging | B18 | Obj\NoYes |
| Binary Input | B3 | Obj\NoYes |
| Binary Output | B4 | Obj\NoYes |
| Binary Value | B5 | Obj\NoYes |
| Calendar | B6 | Obj\NoYes |
| Command | B7 | Obj\NoYes |
| Device | B8 | Obj\NoYes |
| Event Enrolment | B9 | Obj\NoYes |
| Event Log | B25 | Obj\NoYes |
| File | B10 | Obj\NoYes |
| Group | B11 | Obj\NoYes |
| Life-safety Point | B21 | Obj\NoYes |
| Life-safety Zone | B22 | Obj\NoYes |
| Load Control | B28 | Obj\NoYes |
| Loop | B12 | Obj\NoYes |
| Multi-state Input | B13 | Obj\NoYes |
| Multi-state Output | B14 | Obj\NoYes |
| Multi-state Value | B19 | Obj\NoYes |
| Notification Class | B15 | Obj\NoYes |
| Program | B16 | Obj\NoYes |
| Pulse Converter | B24 | Obj\NoYes |
| Schedule | B17 | Obj\NoYes |
| Structured View | B29 | Obj\NoYes |
| Trend Log | B20 | Obj\NoYes |
| Trend Log Multiple | B27 | Obj\NoYes |

Analog Input

Object Type: [BACnetIP v30\AnIn]

Object Type: [BACnetIP v21\AnIn]

An Analog Input contains the following objects:

| Description | Reference | Type |
|--|-----------|--|
| Name Unique object name within the device | N | Obj\Text |
| Present Value Current value of the analogue input | V | Obj\Float; Adjustable (only when the object is 'Out-of-Service') |
| Units | U | Obj\Text |
| Description Device support for this object is optional | D | Obj\Text |
| Device Type Description of the physical device connected to the analogue input. Device support for this object is optional | DT | Obj\Text |
| Status Flag b Health of the analogue input. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Present Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0...12 Values: 0=Ok, 1=No Sensor, 2=Over range, 3=Under range, 4=Open loop, 5=Short loop, 7=Unreliable, 12=Communication failure |
| Out of Service Indicates if the input is not in service decoupling the Present Value from the physical input | US | Obj\NoYes; Adjustable |
| Value Resolution Smallest recognizable change in value. Device support for this object is optional | VR | Obj\Float |
| Value High Maximum value that can be obtained from Present Value. Device support for this object is optional | VH | Obj\Float |
| Value Low Minimum value that can be obtained from Present Value. Device support for this object is optional | VL | Obj\Float |
| Alarm High Device support for this object is optional | AH | Obj\Float; Adjustable |
| Alarm Low Device support for this object is optional | AL | Obj\Float; Adjustable |

Analog Output

Object Type: [BACnetIP v30\AnOut]

Object Type: [BACnetIP v21\AnOut]

An Analog Output contains the following objects:

| Description | Reference | Type |
|---|-----------|--|
| Name Unique object name within the device | N | Obj\Text |
| Present Value – Priority <i>p</i> Within a BACnet device, the present value is stored in a priority array table. Various applications can send a new value to the object, along with a priority. From this table, the value with the highest priority becomes the current value. On adjusting the value a priority, <i>p</i> , is required in the range 1 (high) to 16 (low). On reading, the priority is ignored and the highest priority value returned. See Value Table for more information. | V.Pp | Obj\Float; Adjustable To release or clear a value for a priority, set the value to " or '[NULL]' |
| Value Table Priority array table containing the value for each priority | VT | Fixed container: [BACnetIP v30\AnOut\ValTable] |
| Default Value When there are no values in the priority array, the default value is used | DV | Obj\Float; Adjustable |
| Units | U | Obj\Text |
| Description Device support for this object is optional | D | Obj\Text |
| Device Type Description of the physical device connected to the analogue output. Device support for this object is optional | DT | Obj\Text |
| Status Flag <i>b</i> Health of the analogue value. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Prevent Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0...12 Values: 0=Ok, 4=Open loop, 5=Short loop, 6= No Output, 7=Unreliable, 12=Communication failure |
| Out of service Indicates if the output is not in service, decoupling the Present Value from the physical output | US | Obj\NoYes; Adjustable |
| Value Resolution Smallest recognizable change in value. Device support for this object is optional | VR | Obj\Float |
| Value High Maximum value that can be obtained from Present Value. Device support for this object is optional | VH | Obj\Float |

| Description | Reference | Type |
|---|-----------|-----------------------|
| Value Low Minimum value that can be obtained from Present Value. Device support for this object is optional | VL | Obj\Float |
| Alarm High Device support for this object is optional | AH | Obj\Float; Adjustable |
| Alarm Low Device support for this object is optional | AL | Obj\Float; Adjustable |

Analog Value

Object Type: [BACnetIP v30\Anval]

Object Type: [BACnetIP v21\Anval]

An Analog Value contains the following objects:

| Description | Reference | Type |
|--|-----------|---|
| Name Unique object name within the device | N | Obj\Text |
| Present Value – Priority p Within a BACnet device, the present value is stored in a priority array table. Various applications can send a new value to the object, along with a priority. From this table, the value with the highest priority becomes the current value. On adjusting the value a priority, p , is required in the range 1 (high) to 16 (low). On reading, the priority is ignored and the highest priority value returned. See Value Table for more information. | V.Pp | Obj\Float; Adjustable To release or clear a value for a priority, set the value to " or '[NULL]' |
| Value Table Priority array table containing the value for each priority Device support for this object is only required if present value is adjustable | VT | Fixed container: [BACnetIP v30\AnOut\ValTable] |
| Default Value When there are no values in the priority array, the default value is used. Device support for this object is only required if present value is adjustable | DV | Obj\Float; Adjustable |
| Units | U | Obj\Text |
| Description Device support for this object is optional | D | Obj\Text |
| Status Flag b Health of the analogue value. Status Flag, b , is a number in the range 0..3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0..5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Prevent Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0..12 Values: 0=Ok, 2=Over range, 3=Under range, 7=Unreliable, 12=Communication failure |
| Out of Service Indicates if the value is prevented from being modified by software local to the device | US | Obj\NoYes; Adjustable |
| Alarm High Device support for this object is optional | AH | Obj\Float; Adjustable |
| Alarm Low Device support for this object is optional | AL | Obj\Float; Adjustable |

Binary Input

Object Type: [BACnetIP v30\BinIn]

A Binary Input contains the following objects:

| Description | Reference | Type |
|--|-----------|---|
| Name Unique object name within the device | N | Obj\Text |
| Present Value Current value of the binary input | V | Obj\Float; Adjustable (only when the object is 'Out-of-Service') |
| Description Device support for this object is optional | D | Obj\Text |
| Device Type Description of the physical device connected to the binary input. Device support for this object is optional | DT | Obj\Text |
| Status Flag b Health of the binary input. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Present Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0...12 Values: 0=Ok, 1=No Sensor, 4=Open loop, 5=Short loop, 7=Unreliable, 12=Communication failure |
| Out of Service Indicates if the input is not in service decoupling the Present Value from the physical input | US | Obj\NoYes; Adjustable |
| Polarity Reversed | P | Obj\NoYes |
| Off State Text Device support for this object is optional | FL | Obj\Text |
| On State Text Device support for this object is optional | TL | Obj\Text |

Binary Output

Object Type: [BACnetIP v30\BinOut]

Object Type: [BACnetIP v21\BinOut]

A Binary Output contains the following objects:

| Description | Reference | Type |
|---|-----------|--|
| Name Unique object name within the device | N | Obj\Text |
| Present Value – Priority <i>p</i> Within a BACnet device, the present value is stored in a priority array table. Various applications can send a new value to the object, along with a priority. From this table, the value with the highest priority becomes the current value. On adjusting the value a priority, <i>p</i> , is required in the range 1 (high) to 16 (low). On reading, the priority is ignored and the highest priority value returned. See Value Table for more information. | V.Pp | Obj\NoYes; Adjustable To release or clear a value for a priority, set the value to " or '[NULL]' |
| Value Table Priority array table containing the value for each priority | VT | Fixed container: [BACnetIP v30\BinOut\ValTable] |
| Default Value When there are no values in the priority array, the default value is used | DV | Obj\OffOn; Adjustable |
| Description Device support for this object is optional | D | Obj\Text |
| Device Type Description of the physical device connected to the binary output. Device support for this object is optional | DT | Obj\Text |
| Status Flag <i>b</i> Health of the binary value. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Prevent Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0...12 Values: 0=Ok, 4=Open loop, 5=Short loop, 6= No Output, 7=Unreliable, 12=Communication failure |
| Out of service Indicates if the output is not in service, decoupling the Present Value from the physical output | US | Obj\NoYes; Adjustable |
| Polarity Reversed | P | Obj\NoYes |
| Off State Text Device support for this object is optional | FL | Obj\Text |
| On State Text Device support for this object is optional | TL | Obj\Text |

Binary Value

Object Type: [BACnetIP v30\BinVal]

Object Type: [BACnetIP v21\BinVal]

A Binary Value contains the following objects:

| Description | Reference | Type |
|--|-----------|---|
| Name Unique object name within the device | N | Obj\Text |
| Present Value – Priority p Within a BACnet device, the present value is stored in a priority array table. Various applications can send a new value to the object, along with a priority. From this table, the value with the highest priority becomes the current value. On adjusting the value a priority, p , is required in the range 1 (high) to 16 (low). On reading, the priority is ignored and the highest priority value returned. See Value Table for more information. | V.Pp | Obj\Float; Adjustable To release or clear a value for a priority, set the value to " or '[NULL]' |
| Value Table Priority array table containing the value for each priority Device support for this object is only required if present value is adjustable | VT | Fixed container: [BACnetIP v30\BinOut\ValTable] |
| Default Value When there are no values in the priority array, the default value is used. Device support for this object is only required if present value is adjustable | DV | Obj\OffOn; Adjustable |
| Description Device support for this object is optional | D | Obj\Text |
| Status Flag b Health of the binary value. Status Flag, b , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Prevent Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0...12 Values: 0=Ok, 7=Unreliable, 12=Communication failure |
| Out of Service Indicates if the value is prevented from being modified by software local to the device | US | Obj\NoYes; Adjustable |
| Off State Text Device support for this object is optional | FL | Obj\Text |
| On State Text Device support for this object is optional | TL | Obj\Text |

Multi-State Input

Object Type: [BACnetIP v30\MultiIn]

Object Type: [BACnetIP v21\MultiIn]

A Multi-State Input contains the following objects:

| Description | Reference | Type |
|---|-----------|---|
| Name Unique object name within the device | N | Obj\Text |
| Present Value Current value of the multi-state input | V | Obj\Num; Range 1...number of states; Adjustable (only when the object is 'Out-of-Service') |
| Description Device support for this object is optional | D | Obj\Text |
| Device Type Description of the physical device connected to the binary input. Device support for this object is optional | DT | Obj\Text |
| Status Flag <i>b</i> Health of the binary input. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\Enum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Present Value is reliable. Device support for this object is optional | RS | Obj\Enum; Range: 0...12 Values: 0=Ok, 1=No Sensor, 2=Over range, 3=Under range, 4=Open loop, 5=Short loop, 7=Unreliable, 9=Multi-state fault, 12=Communication failure |
| Out of Service Indicates if the input is not in service decoupling the Present Value from the physical input | US | Obj\NoYes; Adjustable |
| Number of States | NS | Obj\Num |
| State <i>e</i> Text Text description of the state value. The state number, <i>e</i> , is in the range 1...number of states. Device support for this object is optional | A.Ee | Obj\Text |

Multi-State Output

Object Type: *[BACnetIP v30\MultiOut]*

Object Type: *[BACnetIP v21\MultiOut]*

A Multi-State Output contains the following objects:

| Description | Reference | Type |
|--|-----------|--|
| Name Unique object name within the device | N | Obj\Text |
| Present Value – Priority <i>p</i> Within a BACnet device, the present value is stored in a priority array table. Various applications can send a new value to the object, along with a priority. From this table, the value with the highest priority becomes the current value. On adjusting the value a priority, <i>p</i> , is required in the range 1 (high) to 16 (low). On reading, the priority is ignored and the highest priority value returned. See <i>Value Table</i> for more information. | V.Pp | Obj\Num; Adjustable To release or clear a value for a priority, set the value to " or '[NULL]' |
| Value Table Priority array table containing the value for each priority | VT | Fixed container: <i>[BACnetIP v30\MultiOut\ValTable]</i> |
| Default Value When there are no values in the priority array, the default value is used | DV | Obj\Num; Adjustable |
| Description Device support for this object is optional | D | Obj\Text |
| Device Type Description of the physical device connected to the multi-state output. Device support for this object is optional | DT | Obj\Text |
| Status Flag <i>b</i> Health of the multi-state value. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\ENum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Prevent Value is reliable. Device support for this object is optional | RS | Obj\ENum; Range: 0...12 Values: 0=Ok, 4=Open loop, 5=Short loop, 6= No Output, 7=Unreliable, 12=Communication failure |
| Out of service Indicates if the output is not in service, decoupling the Present Value from the physical output | US | Obj\NoYes; Adjustable |
| Number of States | NS | Obj\Num |
| State <i>e</i> Text Text description of the state value. The state number, <i>e</i> , is in the range 1...number of states. Device support for this object is optional | A.Ee | Obj\Text |

Multi-State Value

Object Type: [BACnetIP v30\MultiVal]

Object Type: [BACnetIP v21\MultiVal]

A Multi-State Value contains the following objects:

| Description | Reference | Type |
|---|-----------|---|
| Name Unique object name within the device | N | Obj\Text |
| Present Value – Priority <i>p</i> Within a BACnet device, the present value is stored in a priority array table. Various applications can send a new value to the object, along with a priority. From this table, the value with the highest priority becomes the current value. On adjusting the value a priority, <i>p</i> , is required in the range 1 (high) to 16 (low). On reading, the priority is ignored and the highest priority value returned. See Value Table for more information. | V.Pp | Obj\Num; Adjustable To release or clear a value for a priority, set the value to " or '[NULL]' |
| Value Table Priority array table containing the value for each priority Device support for this object is only required if present value is adjustable | VT | Fixed container: [BACnetIP v30\MultiOut\ValTable] |
| Default Value When there are no values in the priority array, the default value is used. Device support for this object is only required if present value is adjustable | DV | Obj\Num; Adjustable |
| Description Device support for this object is optional | D | Obj\Text |
| Status Flag <i>b</i> Health of the multi-state value. Status Flag, <i>b</i> , is a number in the range 0...3, where: 0=In Alarm, 1=In Fault, 2=Value Overridden, 3=Out of Service | SF.Bb | Obj\NoYes |
| Event State Indicates if the object has an active event state associated with it | ES | Obj\ENum; Range: 0...5 Values: 0=Normal, 1=Fault, 2=Off-normal, 3=High limit, 4=Low limit, 5=Life safety |
| Reliability Indicates if the Prevent Value is reliable. Device support for this object is optional | RS | Obj\ENum; Range: 0...12 Values: 0=Ok, 7=Unreliable, 9=Multi-state fault, 12=Communication failure |
| Out of Service Indicates if the value is prevented from being modified by software local to the device | US | Obj\NoYes; Adjustable |
| Number of States | NS | Obj\Num |
| State <i>e</i> Text Text description of the state value. The state number, <i>e</i> , is in the range 1...number of states. Device support for this object is optional | A.Ee | Obj\Text |

Value Table

Object Type: [BACnetIP v30\AnOut\ValTable]

Object Type: [BACnetIP v30\BinOut\ValTable]

Object Type: [BACnetIP v30\MultiOut\ValTable]

Object Type: [BACnetIP v21\AnOut\ValTable]

Object Type: [BACnetIP v21\BinOut\ValTable]

Object Type: [BACnetIP v21\MultiOut\ValTable]

A Value Table is a BACnet priority array, containing a read-only list of prioritized commands.

For BACnet objects that have an adjustable value, values are prioritized based on a fixed number of priorities that are assigned to the application issuing the command. The priority ranges from 1 (highest) to 16 (lowest).

An object stores a priority array containing either a value or a null for each priority. The highest priority value becomes the Present Value for the object.

Applications adjusting an object's value are assigned one of the 16 possible priority levels. The following are standard priorities; however, the assignment of most priorities is site dependent:

| Priority | Application |
|----------|----------------------------|
| 1 | Manual Life Safety |
| 2 | Automatic Life Safety |
| 3 | available |
| 4 | available |
| 5 | Critical Equipment Control |
| 6 | Minimum On/Off |
| 7 | available |
| 8 | Manual Operator |
| 9 | available |
| ... | |
| 16 | |

Other applications that need prioritization include temperature override, demand lighting, optimum stop/start, duty cycling, and scheduling. The relative priorities of these applications may vary from site to site and are not standardized. For interoperability at any particular site, the only requirement is that all devices implement the same priority scheme.

| Description | Reference | Type |
|---|-----------|---|
| Value - Priority p The priority, p , is in the range 1...16. See table above | E_p | Depends on BACnet object, one of the following: Analog objects Obj\Float Binary objects Obj\OffOn Multi-state objects Obj\Num |

BACnet Protocol Implementation Conformance Statement (PICS)

ObSys

| | | | |
|-------------------------------------|----------------------------------|---------------------------------|----------|
| Date | February 3, 2016 | | |
| Vendor Name | North Building Technologies Ltd. | | |
| Product Name | ObServer BACnetIP interface | | |
| Product Model Number | BACnetIP OSM | | |
| Application Software Version | BACnetIP v3.0 | Firmware Revision | OSM v2.0 |
| | | BACnet Protocol Revision | 7 |

Product Description

ObSys is a software package for integrating systems, controlling equipment, displaying information, and analysing data from a variety of building services, across one site or many.

ObServer is the core of ObSys, and includes North Interface Technology to integrate with third-party systems. This technology enables different sub-systems within a building to be fused together to form a single coherent system.

The BACnet/IP interface for ObServer can retrieve and modify the values of BACnet objects from other devices, in addition to providing and allowing the modification of its BACnet objects.

The interface can work alongside the North Essential Data module, collecting values from any of the attached systems and presenting them as up to 960 BACnet objects.

BACnet Standardized Device Profile (Annex L)

- BACnet Operator Workstation (B-OWS)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

BACnet Interoperability Building Blocks Supported (Annex K)

BACnet Interoperability Building Blocks (BIBBs) are collections of one or more BACnet services. The services are described in terms of an 'A' and a 'B' device. Both of these devices are nodes on a BACnet inter-network. In most cases 'A' will act as the user of data (like a BAS Server) and the 'B' device will be the provider of this data (like a field control module or router).

| BIBB Name | Designation |
|--|--------------------|
| Data Sharing – ReadProperty – A | DS-RP-A |
| Data Sharing – ReadProperty – B | DS-RP-B |
| Data Sharing – WriteProperty – A | DS-WP-A |
| Data Sharing – WriteProperty – B | DS-WP-B |
| Device Management – Dynamic Device Binding – A | DM-DDB-A |
| Device Management – Dynamic Device Binding – B | DM-DDB-B |
| Device Management – Dynamic Object Binding – A | DM-DOB-B |
| Device Management – DeviceCommunicationControl – B | DM-DCC-B |
| Device Management – TimeSynchronization – A | DM-TS-A |

| BIBB Name | Designation |
|---|-------------|
| Device Management – TimeSynchronization – B | DM-TS-B |
| Device Management – ReinitializeDevice – A | DM-RD-A |
| Device Management – ReinitializeDevice – B | DM-RD-B |

BACnet Standard Application Services Supported

| BACnet Service | Initiate | Execute |
|----------------------------|-------------------------------------|-------------------------------------|
| ReadProperty | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| WriteProperty | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Who-Is | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| I-Am | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Who-Has | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| I-Have | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| DeviceCommunicationControl | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| TimeSynchronization | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| ReinitializeDevice | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Segmentation Capability

- Segmented requests supported Window Size: 1
- Segmented responses supported Window Size: 1

Standard Object Types Supported

| Object Type | Optional Properties Supported | Writable Properties Supported |
|--------------------|---|------------------------------------|
| Analog Input | Description, Reliability, Min Pres Value, Max Pres Value, Resolution, High Limit, Low Limit | |
| Analog Output | Description, Reliability, Min Pres Value, Max Pres Value, Resolution, High Limit, Low Limit | Present Value |
| Analog Value | Description, Reliability, High Limit, Low Limit | Present Value |
| Binary Input | Description, Reliability, Inactive Text, Active Text | |
| Binary Output | Description, Reliability, Inactive Text, Active Text | Present Value |
| Binary Value | Description, Reliability, Inactive Text, Active Text | Present Value |
| Device | Description | APDU Segment Timeout, APDU Timeout |
| Multi-state Input | Description, Reliability, State Text | |
| Multi-state Output | Description, Reliability, State Text | Present Value |
| Multi-state Value | Description, Reliability, State Text | Present Value |

This device does not support the dynamic creation or deletion of objects via BACnet.

Data Link Layer Options

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8)
- MS/TP master (Clause 9)
- MS/TP slave (Clause 9)
- Point-To-Point, EIA 232 (Clause 10), baud rates: 9600-38400
- Point-To-Point, modem, (Clause 10)
- LonTalk, (Clause 11)

Device Address Binding

Is static device binding supported? Yes No
(necessary for two-way communication with MS/TP slaves and certain other devices)

Networking Options

- Router, Clause 6
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)

Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> ANSI X3.4 | <input checked="" type="checkbox"/> IBM/Microsoft DBCS | <input checked="" type="checkbox"/> ISO 8859-1 |
| <input checked="" type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4) | <input checked="" type="checkbox"/> UTF-8 |

Outgoing character strings are communicated in the selected character set. Incoming character strings will be mapped to ANSI X3.4 internally.

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:

This product allows values between the BACnet inter-network and other non-BACnet systems to be shared.

North Interface Technology supports thousands of different third-party systems. Visit www.northbt.com/go/drivers for the latest driver list.

Commander

| | | | |
|-------------------------------------|----------------------------------|---------------------------------|----------|
| Date | February 3, 2016 | | |
| Vendor Name | North Building Technologies Ltd. | | |
| Product Name | Commander BACnetIP interface | | |
| Product Model Number | BACnetIP CDM | | |
| Application Software Version | BACnetIP v3.0 | Firmware Revision | CDM v2.0 |
| | | BACnet Protocol Revision | 7 |

Product Description

Commander is the smallest of North's family of building controllers. Commander can work as a stand-alone controller, or alongside other North controllers and display systems, becoming part of a larger control or monitoring solution.

Commander contains North Interface Technology to integrate with third-party systems. This technology enables different sub-systems within a building to be fused together to form a single coherent system.

The BACnet/IP interface for Commander can retrieve and modify the values of BACnet objects from other devices, in addition to providing and allowing the modification of its BACnet objects.

The interface can work alongside the North Essential Data module, collecting values from any of the attached systems and presenting them as BACnet objects.

BACnet Standardized Device Profile (Annex L)

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- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
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- BACnet Smart Actuator (B-SA)

BACnet Interoperability Building Blocks Supported (Annex K)

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| BIBB Name | Designation |
|--|--------------------|
| Data Sharing – ReadProperty – A | DS-RP-A |
| Data Sharing – ReadProperty – B | DS-RP-B |
| Data Sharing – WriteProperty – A | DS-WP-A |
| Data Sharing – WriteProperty – B | DS-WP-B |
| Device Management – Dynamic Device Binding – A | DM-DDB-A |
| Device Management – Dynamic Device Binding – B | DM-DDB-B |
| Device Management – Dynamic Object Binding – A | DM-DOB-B |
| Device Management – DeviceCommunicationControl – B | DM-DCC-B |
| Device Management – TimeSynchronization – A | DM-TS-A |
| Device Management – TimeSynchronization – B | DM-TS-B |
| Device Management – ReinitializeDevice – A | DM-RD-A |
| Device Management – ReinitializeDevice – B | DM-RD-B |

BACnet Standard Application Services Supported

| BACnet Service | Initiate | Execute |
|----------------------------|-------------------------------------|-------------------------------------|
| ReadProperty | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| WriteProperty | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Who-Is | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| I-Am | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Who-Has | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| I-Have | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| DeviceCommunicationControl | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| TimeSynchronization | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| ReinitializeDevice | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Segmentation Capability

- Segmented requests supported Window Size: 1
- Segmented responses supported Window Size: 1

Standard Object Types Supported

| Object Type | Optional Properties Supported | Writable Properties Supported |
|--------------------|---|------------------------------------|
| Analog Input | Description, Reliability, Min Pres Value, Max Pres Value, Resolution, High Limit, Low Limit | |
| Analog Output | Description, Reliability, Min Pres Value, Max Pres Value, Resolution, High Limit, Low Limit | Present Value |
| Analog Value | Description, Reliability, High Limit, Low Limit | Present Value |
| Binary Input | Description, Reliability, Inactive Text, Active Text | |
| Binary Output | Description, Reliability, Inactive Text, Active Text | Present Value |
| Binary Value | Description, Reliability, Inactive Text, Active Text | Present Value |
| Device | Description | APDU Segment Timeout, APDU Timeout |
| Multi-state Input | Description, Reliability, State Text | |
| Multi-state Output | Description, Reliability, State Text | Present Value |
| Multi-state Value | Description, Reliability, State Text | Present Value |

This device does not support the dynamic creation or deletion of objects via BACnet.

Data Link Layer Options

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8)
- MS/TP master (Clause 9)
- MS/TP slave (Clause 9)
- Point-To-Point, EIA 232 (Clause 10), baud rates: 9600-38400
- Point-To-Point, modem, (Clause 10)
- LonTalk, (Clause 11)

Device Address Binding

Is static device binding supported? Yes No
 (necessary for two-way communication with MS/TP slaves and certain other devices)

Networking Options

- Router, Clause 6
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)

Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- | | | |
|---|---|---|
| <input checked="" type="checkbox"/> ANSI X3.4 | <input type="checkbox"/> IBM/Microsoft DBCS | <input type="checkbox"/> ISO 8859-1 |
| <input type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4) | <input checked="" type="checkbox"/> UTF-8 |

Outgoing character strings are communicated in the ANSI X3.4 character set. Incoming character strings will be mapped to ANSI X3.4 internally.

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:

This product allows values between the BACnet inter-network and other non-BACnet systems to be shared.

North Interface Technology supports thousands of different third-party systems. Visit www.northbt.com/go/drivers for the latest driver list.

Driver Versions

| Version | Build Date | Details |
|---------|------------|---|
| 1.0 | 14/08/2006 | Driver released based on BACnet v12 |
| 2.0 | 01/03/2009 | Changes in IP address driver uses now detected, link to Essential Data added for client device support, UTF-8 encoding added, and reworked internal driver operation |
| 2.1 | 01/07/2011 | Driver released on Commander platform |
| 2.1 | 25/04/2012 | Multistate values are now base 1 as per the BACnet standard, and not 0. Essential Data ENum values translated to this range. |
| 2.1 | 18/01/2013 | Commander support for ISO 8859-1 added, “?” now returned if character set not supported |
| 2.1 | 24/01/2014 | On Commander platform, BVLC_FORWARD messages from BBMD replied to wrong IP address. Objects now include Essential Data object label in addition to ‘Px.Ox’ reference. Enforce Essential Data write inhibit field when writing from BACnet. Clear BACnet device address table on restart. |
| 3.0 | 01/09/2015 | Updated to support Essential Data v3.0 and Extra Data driver. |

Next Steps...

If you require help, contact support on 01273 694422 or visit www.northbt.com/support



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