

BACnet Protocol Implementation Conformance Statement (PICS)

Date: July 8, 2013
Vendor Name: Lutron Electronics Co., Inc.
Product Name: Quantum® BACnet Integration
Applications Software Version: 2.0
Firmware Revision: 2.6
BACnet Protocol Revision: 4
Vendor ID: 176



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Product Description

BACnet IP is embedded in the Quantum® processor. There are two types of BACnet devices available in Quantum®: subsystem devices and area devices. The subsystem devices are main BACnet devices; typically, one main device per floor of the building. The area devices are virtual BACnet devices of the subsystem device, typically one per room of the building. It is normal to have multiple subsystem devices and virtual devices in a project.

BACnet Interoperability Building Blocks Supported (Annex K):

| | | |
|-------------|-------------------|---|
| K.1.2 BIBB | Data Sharing | ReadProperty-B (DS-RP-B) |
| K.1.4 BIBB | Data Sharing | ReadPropertyMultiple-B (DS-RPM-B) |
| K.1.8 BIBB | Data Sharing | WriteProperty-B (DS-WP-B) |
| K.1.10 BIBB | Data Sharing | WritePropertyMultiple-B (DS-WPM-B) |
| K.1.12 BIBB | Data Sharing | COV-B (DS-COV-B) |
| K.5.2 BIBB | Device Management | DynamicDeviceBinding-B (DM-DDB-B) |
| K.5.4 BIBB | Device Management | DynamicObjectBinding-B (DM-DOB-B) |
| K.5.6 BIBB | Device Management | DeviceCommunicationControl-B (DM-DCC-B) |

BACnet Standardized Device Profile (Annex L):

BACnet Application Specific Controller (B-ASC)

Segmentation Capability:

Segmented requests supported? No. Window Size: n/a
Segmented responses supported? No. Window Size: n/a

Non-Standard Application Services:

Non-standard application services are not supported.

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| Job Name: | Model Numbers: |
| Job Number: | |

Standard Object Types Supported:

Device

1. Dynamically creatable using BACnet CreateObject service? **No.**
2. Dynamically deletable using BACnet DeleteObject service? **No.**
3. List of optional properties supported: **Active_COV_Subscriptions, Description, Location, Profile_Name.**
4. List of all properties that are writable where not otherwise required by this standard: **None.**
5. List of proprietary properties: **None.**
6. List of any property value range restrictions: **None.**

Analog Value

1. Dynamically creatable using BACnet CreateObject service? **No.**
2. Dynamically deletable using BACnet DeleteObject service? **No.**
3. List of optional properties supported: **COV_Increment (See Table for objects that support this property).**
4. List of all properties that are writable where not otherwise required by this standard: **None.**
5. List of proprietary properties: **None.**
6. List of any property value range restrictions: **See Table.**

Binary Value

1. Dynamically creatable using BACnet CreateObject service? **No.**
2. Dynamically deletable using BACnet DeleteObject service? **No.**
3. List of optional properties supported: **Active_Text, Inactive_Text.**
4. List of all properties that are writable where not otherwise required by this standard: **None.**
5. List of proprietary properties: **None.**
6. List of any property value range restrictions: **See Table.**

Multi-State Value

1. Dynamically creatable using BACnet CreateObject service? **No.**
2. Dynamically deletable using BACnet DeleteObject service? **No.**
3. List of optional properties supported: **State_Text.**
4. List of all properties that are writable where not otherwise required by this standard: **None.**
5. List of proprietary properties: **None.**
6. List of any property value range restrictions: **See Table.**

Data Link Layer Options:

Other: These devices are virtual devices and are represented by a six octet address equal to the 48-bit device instance of the virtual device.

Device Address Binding:

Is static device binding supported? **No.**

Networking Options:

BACnet / IP Annex J – non-BBMD functionality; the Quantum® processor is able to register as a foreign device. The Quantum® processor is able to initiate original-broadcast-NPDU.

Character Sets Supported:

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

- ANSI X3.4.

BACnet Routing:

The Quantum® processor is a BACnet router. All of the virtual area devices are routed through the main subsystem device

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| Job Name: | Model Numbers: |
| Job Number: | |

| Object Name | Type | Instance | Read | Write | COV | Units | Min PV | Max PV | Inactive Text (0) | Active Text (1) | State Text (Multi-State) | Notes |
|--------------------------|--------|-----------------------------|------|-------|-----|-------|--------|--|-------------------|-----------------|--------------------------|---|
| {AreaName} {Instance} | DEVICE | {Base} + {System} + 1 | X | — | — | — | — | — | — | — | — | The Area Name is the logical name that typically corresponds to a physical location in a building. The Instance is the same as the unique Device ID assigned to each area. |
| Lighting Level | AV | 2 | X | X | X | % | 0 | 100 | — | — | — | The intensity level of all lighting fixtures in the area. The light level will be an analog value between 0% and 100%. If the lighting fixtures in the area are at different light levels, this value will be set to the level of the highest intensity in that area. |
| Lighting State | BV | 3 | X | X | X | — | 0 | 1 | Off | On | — | The Lighting State will be On if any of the lighting fixtures in the area are in the on state; if all lighting fixtures are off, the Lighting State will be set to Off. |
| Lighting Scene | MSV | 4 | X | X | — | — | 1 | Number of scenes defined for this area in Q-Design | — | — | {SceneName} | The lighting preset that the lighting fixtures in that area are currently set to. If the value is set to 1, the Off Scene will be selected, which will turn all lights to off. All other scenes are defined within the Lutron® Quantum® software suite. If lights are currently not set to a valid lighting scene, then the value will be set to an unknown preset level. |
| Daylighting Enabled | BV | 5 | X | X | — | — | 0 | 1 | Disabled | Enabled | — | When set to Enabled, any daylight sensors programmed to control that area will limit the light level that the lighting fixtures in the area can produce. When set to Disabled, daylight sensors will not affect the lighting fixtures in that area. |
| Daylighting Level | AV | 6 | X | X | — | % | 0 | 100 | — | — | — | A target value between 0% and 100% that limits all lighting fixtures in the area that are controlled by a daylight sensor to a maximum value when daylighting is enabled. When set to 100%, lights will be at their maximum level. When set to 0% lights will be at their minimum level. |
| Disable Occupancy | BV | 7 | X | X | — | — | 0 | 1 | False | True | — | When set to True, occupancy sensors will not affect the lights in the area. When set to False, occupancy sensors will affect the lights in the area as programmed. |

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AV = Analog Value, BV = Binary-Value, MSV = Multi-State-Value

{AreaName} is a text string defined in the Lutron® Quantum® system configuration software

{Instance} is a number defined in the Lutron® Quantum® system configuration software that is equal to the {Base} number + {System} number +1

{Base} is a 22-bit value set in the Lutron® Quantum® system configuration software (default 1760000)

{System} is an 8-bit value set in the Lutron® Quantum® system configuration software (0 to 127)

{SceneName} is a text string of the name of each scene that is defined in the Lutron® Quantum® system configuration software

PV = Present-Value

LUTRON® SPECIFICATION SUBMITTAL

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| Job Name: | Model Numbers: |
| Job Number: | |

| Object Name | Type | Instance | Read | Write | COV | Units | Min PV | Max PV | Inactive Text (0) | Active Text (1) | State Text (Multi-State) | Notes |
|-----------------------------|------|----------|------|-------|-----|-------|--------|--------|-------------------|-----------------|---|---|
| Occupancy State | MSV | 8 | X | — | X | — | 1 | 4 | — | — | 1 = Unoccupied 2 = Occupied 3 = Inactive 4 = Unknown | A read-only property indicates the occupancy of the entire area. Occupied means that at least one sensor in the area is indicating occupancy or afterhours is enabled and the lights were turned on via a keypad. Unoccupied means that all of the sensors in the area are indicating unoccupied or afterhours is enabled and the area is unoccupied because of the timeout. Inactive indicates that the area is controlled by Afterhours programming, not occupancy sensor-controlled, and that Afterhours mode is not currently active. Unknown indicates that not all of the sensors in the area have reported their status. |
| Unoccupied Level | AV | 9 | X | X | — | — | 0 | 216 | — | — | — | The light level that the lights in the area will be set to when an area transitions to unoccupied. Values: 0 = Off (default) 1 - 100 = Light Level Percentage (Default = 100) 101 = Unaffected 102 = Daylighting 200 = Off Scene 201 - 216 = Scene 1 through 16 |
| Occupied Level | AV | 10 | X | X | — | — | 0 | 216 | — | — | — | The light level to which the lights in the area will be set when an area transitions to occupied. Values: 0 = Off 1 - 100 = Light Level Percentage 101 = Unaffected 102 = Daylighting 200 = Off Scene 201 - 216 = Scene 1 through 16 (100 = default) |
| Additional Occupied Timeout | AV | 11 | X | X | — | min | 0 | 300 | — | — | — | After all sensors in the area indicate unoccupied, this value will indicate the number of additional minutes that the system will wait before changing the lights to the unoccupied level. Note: the sensor itself has a built-in timeout as well. |
| Loadshed Allowed | BV | 12 | X | X | — | — | 0 | 1 | No | Yes | — | When Loadshed Allowed is set to YES, this area will be affected when Loadshed is enabled. When set to NO, this area will not be affected when Loadshed is enabled |
| Loadshed Goal | AV | 13 | X | X | — | — | 0 | 90 | — | — | — | When Loadshed is enabled and Loadshed Allowed is set to YES, the light level will be reduced by the percentage specified. The Range is 0% to 90% |

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| Job Name: | Model Numbers: |
| Job Number: | |

| Object Name | Type | Instance | Read | Write | COV | Units | Min PV | Max PV | Inactive Text (0) | Active Text (1) | State Text (Multi-State) | Notes |
|----------------------------------|------|----------|------|-------|-----|-------|--------|--------|-------------------|-----------------|---|--|
| Occupancy Mode | MSV | 14 | X | X | — | — | 1 | 4 | — | — | 1 = Inactive 2 = Automatic ON and Automatic OFF 3 = Manual ON and Automatic OFF 4 = Not Applicable | Determines the way that the occupancy sensors control the lights. When set to Inactive, the occupancy mode will not control the lights in the area. When set to Automatic ON and Automatic OFF, the sensors will turn lights to their occupied level when occupied and to their unoccupied level when unoccupied. When set to Manual ON and Automatic OFF, the sensors will set lights to the unoccupied level only when an area changes to unoccupied. Not Applicable indicates that the area is not controlled by occupancy. |
| Number of Lamp Failures | AV | 15 | X | — | X | — | 0 | none | — | — | — | For all digitally-controlled EcoSystem® or DALI® fluorescent ballasts and LED drivers controlled by an Energi Savr Node™ or Quantum® Bus supply, the number of ballasts with lamp failures in the area will be displayed. If the value is 0, there are no lamp failures for the area. |
| Number of Devices Not Responding | AV | 16 | X | — | X | — | 0 | none | — | — | — | For any QS device, EcoSystem® or DALI® digital fluorescent ballast or LED drivers controlled by an Energi Savr Node™, or Quantum® Bus Supply. This value indicates the number of devices that are programmed into the system but are not responding. If the value is 0, there are no device failures for the area. |
| Hyperion™ Enabled | BV | 17 | X | X | — | — | 0 | 1 | Disabled | Enabled | — | When set to Enabled, the Hyperion™ feature of the Quantum® system will control the Lutron® Sivoia® QS roller shades and set their level automatically depending on the position of the sun and the status of the radio window sensor. When set to Disabled, in an area of the subsystem, the shades will not be controlled automatically by the Hyperion™ feature and will not respond to radio window sensors. |
| Total Power | AV | 18 | X | — | X | watts | 0 | none | — | — | — | A calculated value that indicates the total instantaneous power consumption for all of the lighting loads in the area. |
| Maximum Power | AV | 19 | X | — | — | watts | 0 | none | — | — | — | The maximum connected lighting load of the area. This value is the maximum value that Total Power can achieve. Maximum Power minus Total Power equals the power being saved. This value typically does not change. |

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| Job Name: | Model Numbers: |
| Job Number: | |

| Object Name | Type | Instance | Read | Write | COV | Units | Min PV | Max PV | Inactive Text (0) | Active Text (1) | State Text (Multi-State) | Notes |
|---|------|----------|------|-------|-----|-------|--------|--------|-------------------|-----------------|--------------------------|---|
| Roof-Mount Cloudy Day Sensor: Area Status | BV | 20 | X | X | — | — | 0 | 1 | Dark | Sunny | — | A Lutron® roof-mounted, wired Cloudy Day Sensor or a BMS system sensor is used to override all Hyperion™ controlled shades in the area. Sunny indicates that the Hyperion™ feature is in control of the shades; Dark indicates that the shades are overridden to open. This feature is independent of the radio window sensor feature. |
| Radio Window Sensor State | BV | 21 | X | X | X | — | 0 | 1 | Disabled | Enabled | — | When set to Enable, the Radio Window Sensor feature will automatically override the Hyperion™ feature control depending on the outside light conditions. When set to Disabled, the sensor will have no effect on the system. Note: the Hyperion™ Enabled feature (Instance 17) needs to be enabled for the Hyperion™ feature sensor to take effect. |
| Light Level Discrepancy | BV | 22 | X | — | X | — | 0 | 1 | False | True | — | This feature uses a photo sensor to determine if the electric light level in the area is at the correct level per the area's timeclock schedule. The value will be true when either the timeclock is programmed to turn lights on and the sensor is reading above the threshold, or the timeclock is programmed to lights off, and the sensor is reading below the threshold. If the sensor reading does not correlate with the timeclock, the value will be false. |
| Number of Wireless Input Device Failures | AV | 23 | X | — | X | — | None | — | — | — | — | If a wireless input (keypad, occupancy sensor, or light sensor) that is connected to the system, is no longer communicating with the Quantum® system, then the device output will be greater than 0. The value will be equal to the number of failures in the area. This could be due to battery failure, the device being out of range of the QSM, or the device has failed. If the value equals 0 then all wireless inputs in the area are reporting properly. |

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{ZoneName} is a text string defined in the Lutron® Quantum® system configuration software

{ShadeGroupName} is a text string defined in the Lutron® Quantum® system configuration software

{PresetName} is a text string defined in the Lutron® Quantum® system configuration software

PV = Present-Value

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| Job Name: | Model Numbers: |
| Job Number: | |

| Object Name | Type | Instance | Read | Write | COV | Units | Min PV | Max PV | Inactive Text (0) | Active Text (1) | State Text (Multi-State) | Notes |
|--|------|--------------|------|-------|-----|-------|--------|--------|-------------------|-----------------|--------------------------|---|
| Number of Loads with Lamps Nearing End of Life | AV | 25 | X | — | X | — | 0 | — | — | — | — | Indicates when the load(s) in the area are close to being in an ON state for the duration of hours programmed in the Quantum® software. This is typically used to proactively indicate when re-lamping of an area should occur. When the value is 0, there are no end of life lamps in the area. When the value is greater than 0, the value indicates the number of loads in the area that have lamps at end of life. Note: Each load may have more than 1 lamp connected to it. |
| {ZoneName} Level | AV | 1000 to 1999 | X | X | — | % | 0 | 100 | — | — | — | The light level intensity of a specific zone of lighting within an area. The light level will be an analog value between 0% and 100%. There can be multiple lighting zones defined within each area. Each lighting fixture in the area will be assigned to one and only one lighting zone. Each will have a unique instance ID from 1000 to 1999. |
| {ShadeGroupName} Level | AV | 2000 to 2999 | X | X | — | % | 0 | 100 | — | — | — | The shade level of a specific shade group of Lutron® Sivoia® QS shades within an area. The shade level will be an analog value between 0% and 100%. 100% equals fully open; 0% equals fully closed. There can be multiple shade groups within each area; each group will have a unique instance ID from 2000 to 2999. |
| {ShadeGroupName} Preset | MSV | 3000 to 3999 | X | X | — | — | 1 | 34 | — | — | {PresetName} | Displays which shade preset the shade motors of each shade group in an area are currently set to. The values correspond to: 1 = Open 2 - 30 = User programmable presets 31 = Closed 32 - 33 = Not used 34 = Undefined (Shade levels do not match any presets) |

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AV = Analog Value, BV = Binary-Value, MSV = Multi-State-Value

{ShadeGroupName} is a text string defined in the Lutron® Quantum® system configuration software

PV = Present-Value

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|-------------|----------------|
| Job Name: | Model Numbers: |
| Job Number: | |

| Object Name | Type | Instance | Read | Write | COV | Units | Min PV | Max PV | Inactive Text (0) | Active Text (1) | State Text (Multi-State) | Notes |
|---|------|--------------|------|-------|-----|-------|--------|--------|-------------------|-----------------|--------------------------------------|---|
| {ShadeGroupName} Radio Window Sensor Shade Group Status | MSV | 4000 to 4999 | X | — | — | — | 1 | 3 | — | — | 1 = Unknown 2 = Sunny 3 = Dark | Indicates the current status based on the light conditions as seen by the radio window sensor associated with the shade group. The state is based on the thresholds defined in the Q-Admin™ software. Assuming that Hyperion™ is enabled, if the state is Dark, the shades in the area will automatically move to the cloudy level. If the state is Sunny, the shades will move to the position defined by Hyperion™. If the state is Unknown the sensor is not communicating properly. |
| {3-Wire Motor Zone Name} | MSV | 5000 to 5999 | X | X | X | — | 1 | 3 | — | — | 1 = Stop 2 = Open 3 = Close | Displays the current state of a 3-wire motor output within a specific area. If the value is set to 1, the output will be in the stopped state (both relays open). If the value is set to 2, the output will be opening (open relay active). If the value is set to 3, the output will be closing (close relay active). |
| Light Sensor Value | AV | 6000 to 6999 | X | — | X | fc | 0 | — | — | — | — | Displays a real-time foot candle value for each sensor in a specific area. The output value will vary up to 20% depending on sensor type. The tolerance of this value is ± 200% depending on the sensor type. |

AV = Analog Value, BV = Binary-Value, MSV = Multi-State-Value

fc = foot candles

{ShadeGroupName} is a text string defined in the Lutron® Quantum® system configuration software

{3-Wire Motor Zone Name} is a text string defined in the Lutron® Quantum® system configuration software

PV = Present-Value

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|-------------|----------------|
| Job Name: | Model Numbers: |
| Job Number: | |