BACNET PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT

Date:	20 December 2018
Vendor Name:	Best Energy Reduction Technologies LLC
Vendor ID:	TBD
Product Name:	BERT BACnet Gateway
Product Model Number:	TBD
Application Software Version:	1.6 Firmware Revision: N/A BACnet Protocol Revision: 135-2016

The Bert BACnet Gateway is a physical device that functions as a BACnet router to a virtual BACnet IP Wi-Fi network of Bert plug load devices that communicate using the Bert Command Protocol over UDP. The virtual devices reside on a different BACnet network number than the physical gateway itself. The BACnet specification requires that the physical and virtual devices have separate Protocol Implementation Conformance Statements. This PICS describes the BACnet functionality of the virtual devices that reside on the physical Gateway.

BACnet Standardized Device Profiles Supported (Annex L):

☑ BACnet Application Specific Controller (B-ASC)
☑ BACnet Gateway (B-GW)

BACnet Interoperability Building Blocks Supported (Annex K):		
Paragraph	**Section**	**Description**
K1.2BIBB	Data Sharing	ReadProperty-B (DS-RP-B)
K1.4BIBB	Data Sharing	ReadPropertyMultiple-B (DS-RPM-B)
K1.8BIBB	Data Sharing	WriteProperty-B (DS-WP-B)
K1.10BIBB	Data Sharing	WritePropertyMultiple-B (DS-WPM-B)
K1.12BIBB	Data Sharing	Change of Value-B (DS-COV-B)
K1.14BIBB	Data Sharing	Change of Value Property-B (DS-COVP-B)
K2.2BIBB	Alarm and Event Management	Alarm and Event Notification Internal (AE-N-I-B)
K2.5BIBB	Alarm and Event Management	Alarm and Event Management Acknowledgement-B (AE-ACK-B)
K2.11BIBB	Alarm and Event Management	Alarm and Event Management Information-B (AE-INFO-B)
K2.25BIBB	Alarm and Event Management	Alarm and Event Management Configurable Recipient Lists-B (AE-CRL-B)
K5.2BIBB	Device and Network Management	Device Management-Dynamic Device Binding-B (DM-DDB-B)
K5.4BIBB	Device and Network Management	Device Management-Dynamic Object Binding-B (DM-DOB-B)
K5.6BIBB	Device and Network Management	Device Management-DeviceCommunicationControl-B (DM-DCC-B)

Devices claiming conformance to SCHED-I-B shall also support either DM-TS-B or DM-UTC-B. While the Gateway supports one schedule and one calendar object in each device, support for SCHED-I-B cannot be claimed because time synchronization from an external device is not supported. Time is automatically synchronized to the time used by the Windows operating system.

SEGMENTATION CAPABILITY:

- ☑ Able to transmit segmented messages Window Size 16
- ☑ Able to receive segmented messages Window Size 16

STANDARD OBJECT TYPES SUPPORTED:

MULTI-STATE INPUT OBJECT

1. Dynamically creatable using the CreateObject service - NO
2. Dynamically deletable using the DeleteObject service - NO
3. Optional properties supported - Description, Device Type, Reliability, State Text, Time Delay, Notification Class, Alarm Values, Fault Values, Event Enable, Acked Transitions, Notify Type, Event Time Stamps, Event Message Texts, Event Message Texts Config, Event Detection Enable, Time Delay Normal, Reliability Evaluation Inhibit, Profile Name
4. List of all properties that are writable where not otherwise required by this standard - None
5. List of all properties that are conditionally writable where not otherwise required by this standard - None
6. List of proprietary properties and for each its property identifier, datatype, and meaning - None
7. List of any property range restrictions - None

DEVICE OBJECT

1. Dynamically creatable using the CreateObject service - NO
2. Dynamically deletable using the DeleteObject service - NO
3. Optional properties supported - Description, Location, Max Segments Accepted, APDU Segment Timeout, Local Time, Local Date, Active COV Subscriptions, Time of Device Restart,
4. List of all properties that are writable where not otherwise required by this standard - None
5. List of all properties that are conditionally writable where not otherwise required by this standard - None
6. List of proprietary properties and for each its property identifier, datatype, and meaning - None
7. List of any property range restrictions - None

ANALOG INPUT OBJECT

1. Dynamically creatable using the CreateObject service - NO
2. Dynamically deletable using the DeleteObject service - NO
3. Optional properties supported - Description, COV Increment, Time Delay, Time Delay Normal, High Limit, Low Limit, Deadband, Limit Enable, Notify Type, Event Enable, Event Time Stamps, Event Detection Enable, Event Message Texts, Event Message Texts Config., Ack. Transitions, Profile Name, Notification Class.
4. List of all properties that are writable where not otherwise required by this standard - None
5. List of all properties that are conditionally writable where not otherwise required by this standard - None
6. List of proprietary properties and for each its property identifier, datatype, and meaning - None
7. List of any property range restrictions – See table.

ANALOG VALUE OBJECT

1. Dynamically creatable using the CreateObject service - NO
2. Dynamically deletable using the DeleteObject service - NO
3. Optional properties supported - Description, Priority Array, Relinquish Default, COV Increment, Time Delay, Time Delay Normal, High Limit, Low Limit, Deadband, Limit Enable, Notify Type, Event Enable, Event Time Stamps, Event Detection Enable, Event Message Texts, Event Message Texts Config., Ack. Transitions, Profile Name, Notification Class.
4. List of all properties that are writable where not otherwise required by this standard - None
5. List of all properties that are conditionally writable where not otherwise required by this standard - None
6. List of proprietary properties and for each its property identifier, datatype, and meaning - None
7. List of any property range restrictions – See table.

BINARY INPUT OBJECT

1 Dynamically creatable using the CreateObject service - NO
2 Dynamically deletable using the DeleteObject service - NO
3 Optional properties supported - Description, Notification Class, Inactive Text, Active Text, Time Delay, Time Delay Normal, Minimum On Time, Minimum Off Time, Limit Enable, Notify Type, Event Enable, Event Time Stamps, Event Detection Enable, Event Message Texts, Event Message Texts Config., Ack. Transitions, Profile Name.
4 List of all properties that are writable where not otherwise required by this standard - None
5 List of all properties that are conditionally writable where not otherwise required by this standard - None
6 List of proprietary properties and for each its property identifier, datatype, and meaning - None
7 List of any property range restrictions – See table.

BINARY VALUE OBJECT

1 Dynamically creatable using the CreateObject service - NO
2 Dynamically deletable using the DeleteObject service - NO
3 Optional properties supported - Description, Priority Array, Relinquish Default, Notification Class, Inactive Text, Active Text, Time Delay, Time Delay Normal, Minimum On Time, Minimum Off Time, Limit Enable, Notify Type, Event Enable, Event Time Stamps, Event Detection Enable, Event Message Texts, Event Message Texts Config., Ack. Transitions, Profile Name.
4 List of all properties that are writable where not otherwise required by this standard - None
5 List of all properties that are conditionally writable where not otherwise required by this standard - None
6 List of proprietary properties and for each its property identifier, datatype, and meaning - None
7 List of any property range restrictions – See table.

SCHEDULE OBJECT

1 Dynamically creatable using the CreateObject service - NO
2 Dynamically deletable using the DeleteObject service - NO
3 Optional properties supported - Description, Weekly Schedule, Exception Schedule, Profile Name.
4 List of all properties that are writable where not otherwise required by this standard - None
5 List of all properties that are conditionally writable where not otherwise required by this standard - None
6 List of proprietary properties and for each its property identifier, datatype, and meaning - None
7 List of any property range restrictions – See table.

CALENDAR OBJECT

1 Dynamically creatable using the CreateObject service - NO
2 Dynamically deletable using the DeleteObject service - NO
3 Optional properties supported - Description, Profile Name.
4 List of all properties that are writable where not otherwise required by this standard - None
5 List of all properties that are conditionally writable where not otherwise required by this standard - None
6 List of proprietary properties and for each its property identifier, datatype, and meaning - None
7 List of any property range restrictions – See table.

NOTIFICATION CLASS OBJECT

1 Dynamically creatable using the CreateObject service - NO
2 Dynamically deletable using the DeleteObject service - NO
3 Optional properties supported - Description, Profile Name.
4 List of all properties that are writable where not otherwise required by this standard - None
5 List of all properties that are conditionally writable where not otherwise required by this standard - None
6   List of proprietary properties and for each its property identifier, datatype, and meaning - None
7 List of any property range restrictions – See table.

Each virtual device supports the properties required by the BACnet standard. Some of the properties for each virtual device are described in the table below with notes on how they relate to the BERT Property.

Property	Description	Read	Write	Notes
Object Identifier (75)	Unique ID number of the device on the virtual BACnet network	X		Automatically set by the gateway based on the individual device MAC address.
Object_Name (77)	Unique name of a device on the virtual network	X	X	Limited to 20 characters and matches the name in the BERT.
Vendor_Name (121)	Identifies the manufacturer of the virtual device	X		Best Energy Reduction Technologies
Description (28)	Locally desired descriptive information	X		Contains the text "BERT Plug Load" plus the MAC address and IP address of the BERT on the BERT network.
Model_Name (70)	Identifies the model name of the virtual device.	X		Based on the model name of the BERT device
Firmware_Revision (44)	The level of the firmware in the virtual device	X		Based on the BERT firmware version
Application_ Software_Version (12)	The version level of the application software.	X		Based on the application software in the Gateway.
Protocol_Version (98)	Represents the version of the BACnet protocol supported by this device.	X		Based on the BACnet protocol stack used in the Gateway.
Protocol_Revision (139)	Represents the minor revision level of the BACnet protocol supported	X		Based on the BACnet protocol stack used in the Gateway.
Local_Time (57)	The time of day to the best of the virtual device's knowledge	X		Time is automatically synchronized to the time used by the Windows operating system.
Local_Date (56)	The date to the best of the virtual device's knowledge	X		The date is automatically synchronized to the date used by the Windows operating system.

OBJECTS SUPPORTED IN EACH DEVICE.

Type/Instance	Name	Units	Read	Write	COV	Active Text	Inactive Text	Notes
AI1	BERT Temperature	°F	X		X			Range limit is 0-99, Only functional in firmware version 45 and up when AV1 BERT Calibration Temperature has been written.
AI2	BERT RSSI	decibel	X		X			
AI3	BERT Power Measurement	Milli-watts	X		X			
AI4	BERT Voltage Measurement	Volts	X		X			
AI5	BERT Current Measurement	Milli-amps	X		X			
AI6	BERT Reliability Count Down	none	X					The count starts at 4 and each count represents 30 seconds. When the count reaches zero the reliability of objects based on the heartbeat is set to communications failure. For each heartbeat received the object name is updated with the last time communication was received from the BERT.
AV1	BERT Calibration Temp.	°F	X	X				Range limit is 0-99
AV2	BERT Power Threshold	Watts	X	X	X			Range limit is 2-999, 0 turns the feature off, 1 results in a configuration error.
AV3	BERT High Temperature Threshold	°F	X	X				Optional high temperature threshold setting that requires AV1 to have been previously set to function. Must be written after writing BV4, BV5 and AV4. The write to the high temperature threshold (AV3) causes the UDP message to be sent on the BERT Network.
AV4	BERT Low Temperature Threshold	°F	X	X				Optional low temperature threshold setting that requires AV1 to have been previously set to function. Must be written along with BV4 and BV5 prior to AV3 write which causes UDP message on BERT Network.
MSI1	Last Bert Response Code	none	X					It indicates the validity of the last response message, present values of 22 and above are not errors.
BI1	BERT Temperature Measurement Enabled Status		X		X	ON	OFF	
BI2	BERT Static IP Address		X			N/A	N/A	This is a non-functional binary value that can be used to obtain the BERT Static IP address by reading the object name property.

Type/ Instance	Name	Units	Read	Write	COV	Active Text	Inactive Text	Notes
B13	BERT Relay Status		X		X	ON	OFF	Indicates the relay status as received in the heartbeat. If it does not match BV1, the updated heartbeat was not received yet, the command was not responded to, or the Bert is overriding the command internally due to a programmed temperature or vendor threshold control.
B14	BERT SSID		X			ON	OFF	This is a non-functional binary value that can be used to obtain the BERT SSID by reading the object name property.
BV1	BERT Relay Control		X	X	X	ON	OFF	This object will contain the relay control command that was sent via BACnet and forwarded to the Bert via the Gateway.
BV2	BERT Hardware Switch Disable		X	X		ON	OFF	Set BV2 to BACnetBinaryPVInactive then set BV3 to BACnetBinaryPVActive to allow usage of manual switch on BERT Device.
BV3	BERT Toggle via Switch Enable		X	X		ON	OFF	Set BV2 to BACnetBinaryPVInactive then set BV3 to BACnetBinaryPVActive to allow usage of manual switch on BERT Device.
BV4	BERT High Temperature Threshold Action		X	X		ON	OFF	Optional high temperature threshold action setting that requires AV1 to have been previously set to function. Sets ON(1) or OFF(0) action when high temperature threshold is reached. Must be written along with BV5 and AV4 prior to AV3 write which causes UDP message on BERT Network.
BV5	BERT Low Temperature Threshold Action		X	X		ON	OFF	Optional low temperature threshold action setting that requires AV1 to have been previously set to function. Sets ON(1) or OFF(0) action when low temperature threshold is reached. Must be written along with BV4 and AV4 prior to AV3 write which causes UDP message on BERT Network.
BV6	BERT Schedule Download		X	X		N/A	N/A	When a value of 1 is written to BV6 it triggers a transfer of the weekly schedule property of the schedule object to the internal Bert schedule. The BACnet schedule should not be enabled when using this option.
CAL1	CAL1		X	X				1 Calendar Object for each BERT
NC1	NC1		X	X				1 Notification Object for each BERT
TS1	TS1		X	X				1 Time Schedule Object for each BERT

DATA LINK LAYER OPTIONS:

The device can communicate as a direct BACnet/IP device and can register as a foreign BACnet/IP device.

- ☐ ARCNET (ATA 878.1), 2.5 Mb. (Clause 8)
- ☐ ARCNET (ATA 878.1), EIA-485 (Clause 8), baud rate(s) _____
- ☑ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), BACnet Broadcast Management Device (BBMD)
- ☐ BACnet IP, (Annex J), Network Address Translation (NAT Traversal)
- ☐ BACnet IPv6, (Annex U)
- ☐ BACnet IPv6, (Annex U), BACnet Broadcast Management Device (BBMD)
- ☐ BACnet/ZigBee (Annex O) _____
- ☐ Ethernet, ISO 8802-3 (Clause 7)
- ☐ LonTalk, ISO/IEC 14908.1 (Clause 11), medium: _____
- ☐ MS/TP master (Clause 9), baud rate(s):
- ☐ MS/TP slave (Clause 9), baud rate(s):
- ☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s):
- ☐ Point-To-Point, modem, (Clause 10), baud rate(s):
- ☐ Other:

DEVICE ADDRESS BINDING:

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

NETWORKING OPTIONS:

- ☐ ARouter, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- ☐ AAnnex H, BACnet Tunneling Router over IP

CHARACTER SETS SUPPORTED:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously. ANSI X3.4, IBM Microsoft DBCS, ISO 8859-1

- ☑ ANSI X3.4
- ☐ IBM Microsoft DBCS
- ☐ ISO 8859-1

GATEWAY OPTIONS:

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports: This gateway supports the following BERT products: BERT 220 I, BERT 220 IR, BERT 110 I, BERT 110 IR, BERT 277 I, BERT 110 M and BERT 110 E.

NETWORK SECURITY OPTIONS:

- ☑ Non-secure Device - is capable of operating without BACnet Network Security
- ☐ Secure Device - is capable of using BACnet Network Security (NS-SD BIBB)
- ☐ Multiple Application-Specific Keys
- ☐ Supports encryption (NS-ED BIBB)
- ☐ Key Server (NS-KS BIBB)