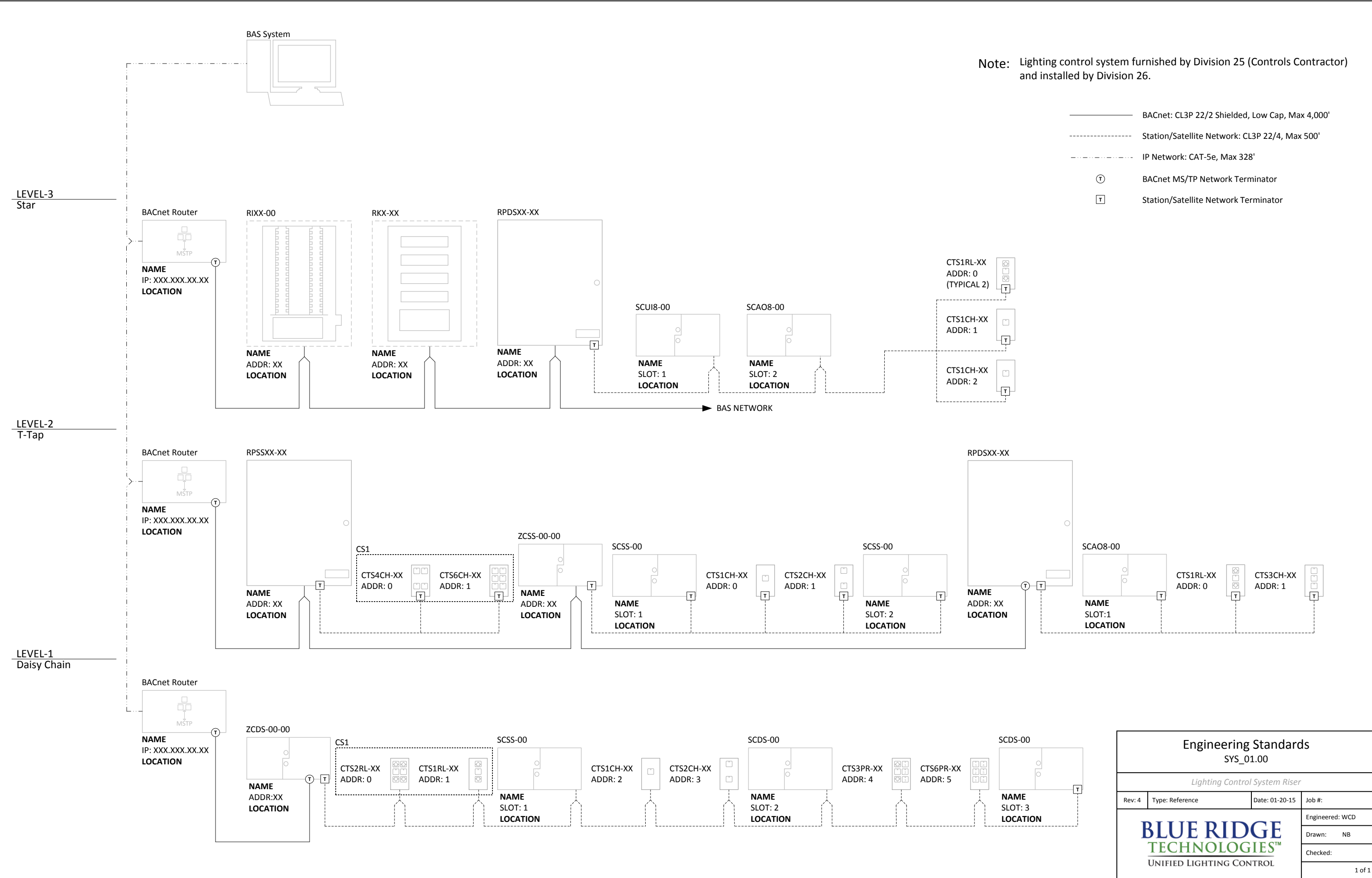






Tech Note 071014_02

Date: July 10, 2014

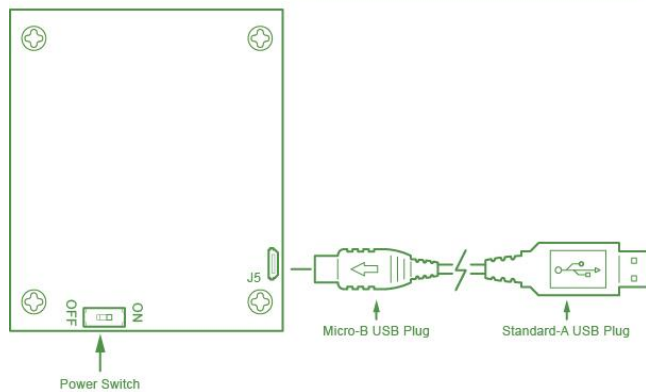
Product: TK-2.0

Subject: USB Cable and Driver Installation

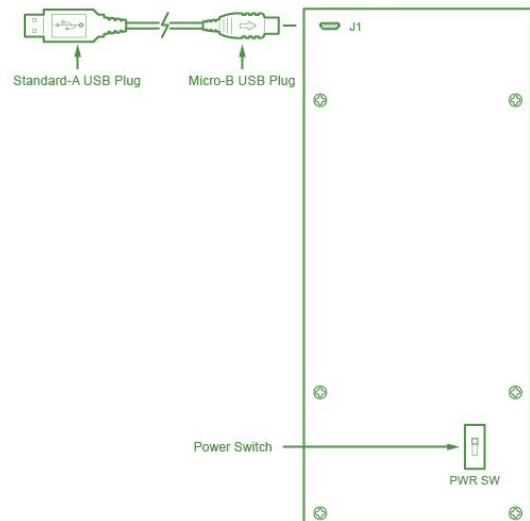
Note: Recommended USB Installation Procedure

1. Turn the Controller Board Power Switch "Off".
2. Insert the Standard-A USB connector into a USB 2.0 port on your computer.
3. Insert the Micro-B USB connector into the controller.
4. Turn the Controller Board Power Switch "On".

Controller Board Terminations (ZC)



Controller Board Terminations (RI / RK / RP)



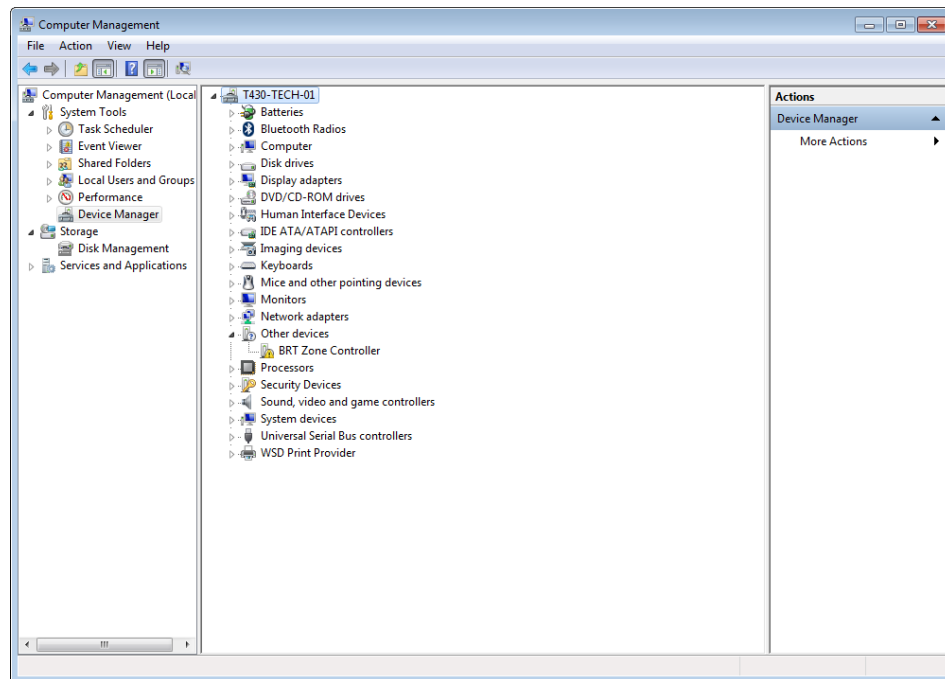
Recommended USB Cable Driver Installation

Computer Requirements

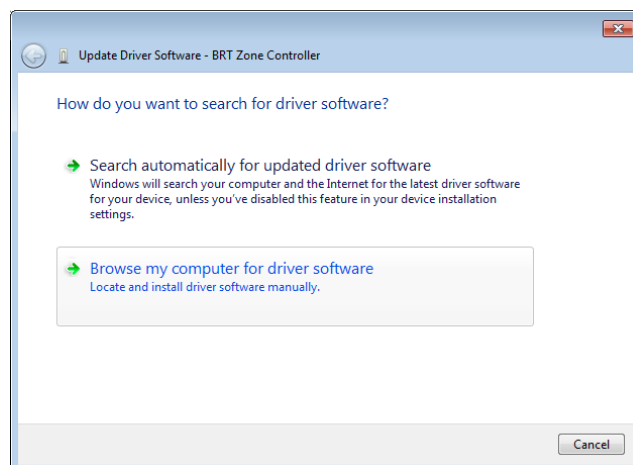
Operating System: Windows 7 (32/64-bit)

USB: Standard-A USB 2.0 port

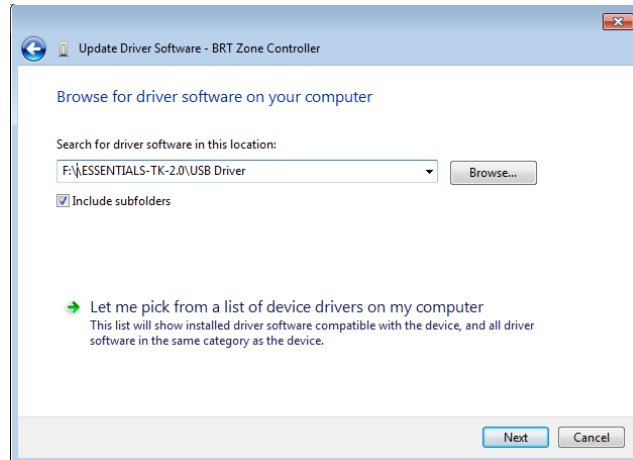
1. Click the **Start** button, then right click on **Computer** and click **Manage**.
2. Under “System Tools” click **Device Manager**. (The cable will populate under “Other devices”)
3. Right click on **BRT Zone Controller** and click **Update Driver Software**.



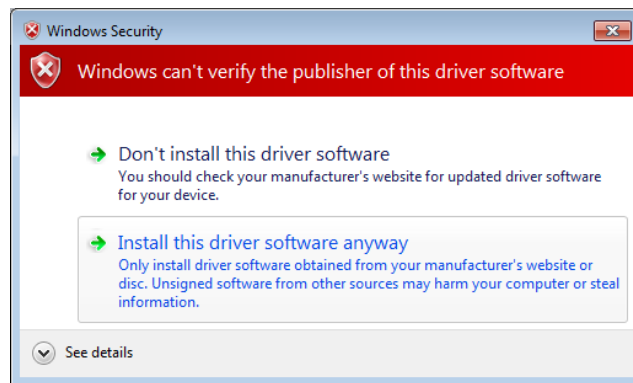
4. Click **Browse my computer for driver software**.



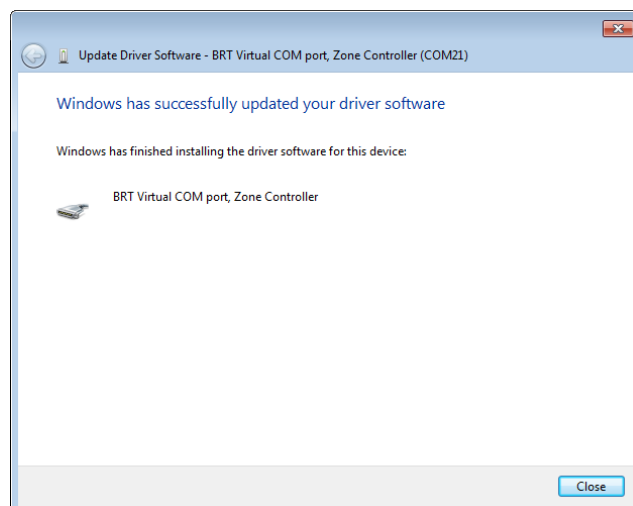
5. Browse for USB driver location and click **Next**.



6. The Blue Ridge Technologies driver package has not been digitally signed yet, click **Install this driver software anyway**.



7. In the Update Driver Software pop-up window, Windows has successfully updated your driver software.





Overview

Tech Kit 2.0 (TK-2.0) includes all components for USB and Bluetooth wireless configuration of the Aperio Open Control Platform. TK-2.0 facilitates Controller Board setup, programing, firmware updates, and firmware restoration. The kit features Blue Ridge Technologies Essentials (BRT Essentials) software on a 1GB flash drive, a Bluetooth Dongle, a Bluetooth Module, a 12'(3.66m) Tech Cable (TC), a screwdriver, and a Carry Bag.

Features

Configures RI, RK, RP, ZC and related Satellite/Station components:

- Satellite
- Capacitive Touch Station (CTS)
- USB and Bluetooth wireless communication
- Complete BRT Essentials software

Warranty

Two (2) year limited manufacturer warranty from date of shipment (extended warranty optional)

Computer Requirements

- Operating System: Windows 7 (32/64-bit)
- Java: Java 1.7 (JRE) or greater
- Bluetooth: Microsoft Bluetooth Stack
- USB: Standard-A USB 2.0 port

Flash Drive Specifications

Capacity: 1GB

Contents:

- BRT Essentials software
- BRT Essentials Template Files
- USB Drivers
- Supporting Documents

Bluetooth Specifications

Dongle Connection

- Hardware: Standard-A USB port on computer
- Wireless: Supports multiple device connections

Module Connection

- Hardware: Bluetooth Plug on Controller Board
- Wireless: PTP connection
- Wireless Type: Bluetooth v2.0+EDR Class 1
- Wireless Range: Open air 328' (100m)
- Wireless Compatibility: BRT Essentials software (API available from Blue Ridge for interface development)

Tech Cable Specifications

- Type: USB 2.0
- Dimensions: 12'(3.66m)L
- Computer Connection: Standard-A USB port
- Controller Board Connection: Micro-B USB port

Accessory Specifications

Screwdriver

- Type: 0.4 x 2.5mm slot head

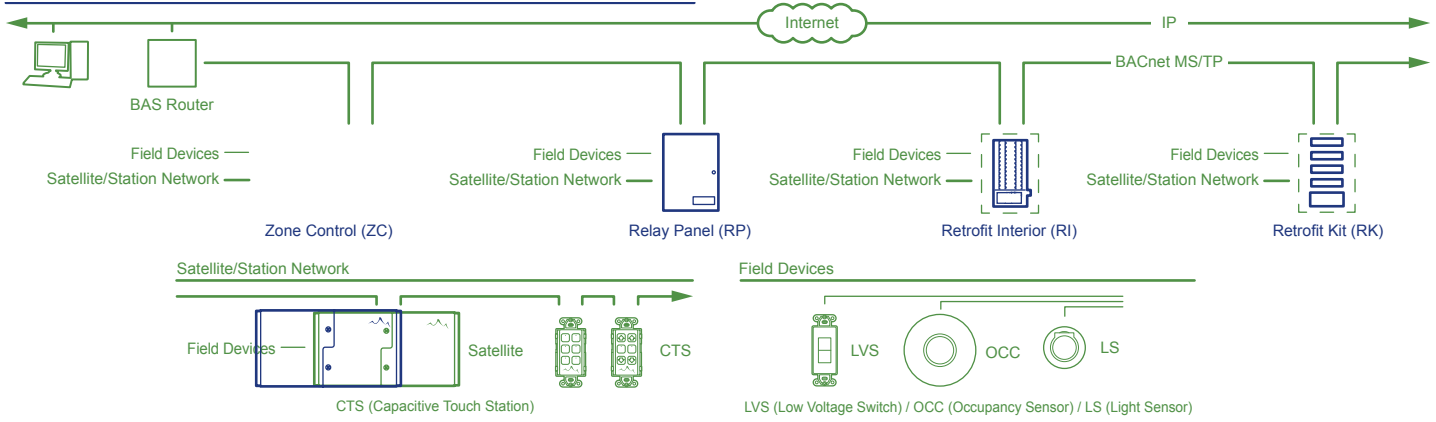
Carry Bag

- Type: Flat cloth with zipper closure
- Dimensions: 7.25"(184mm)H x 9.50"(241mm)W

Tech Kit 2.0

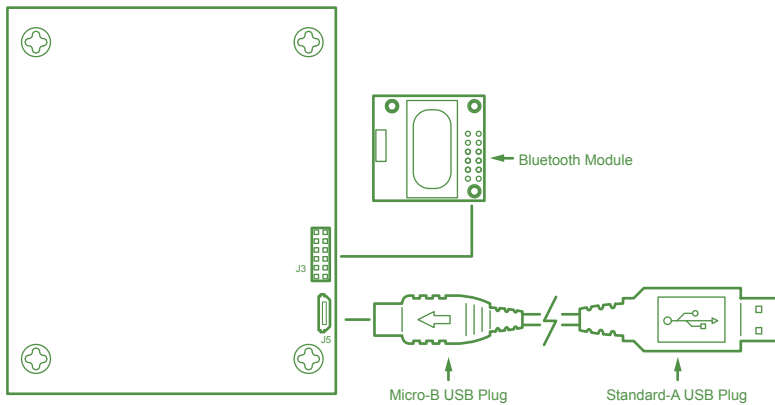
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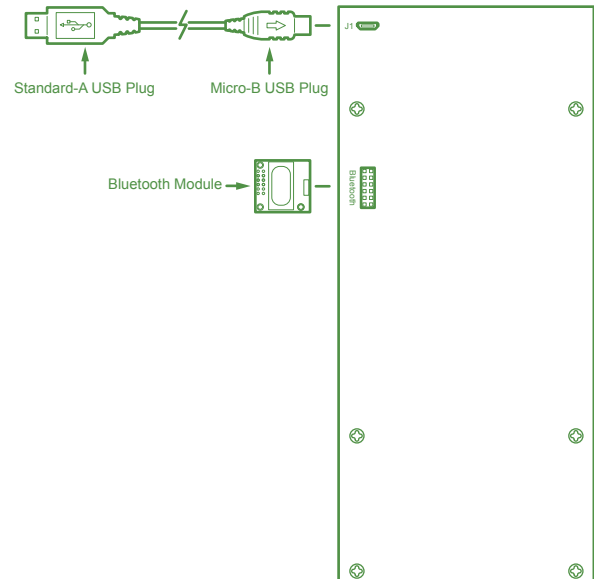


General Architecture

Controller Board Terminations (ZC)

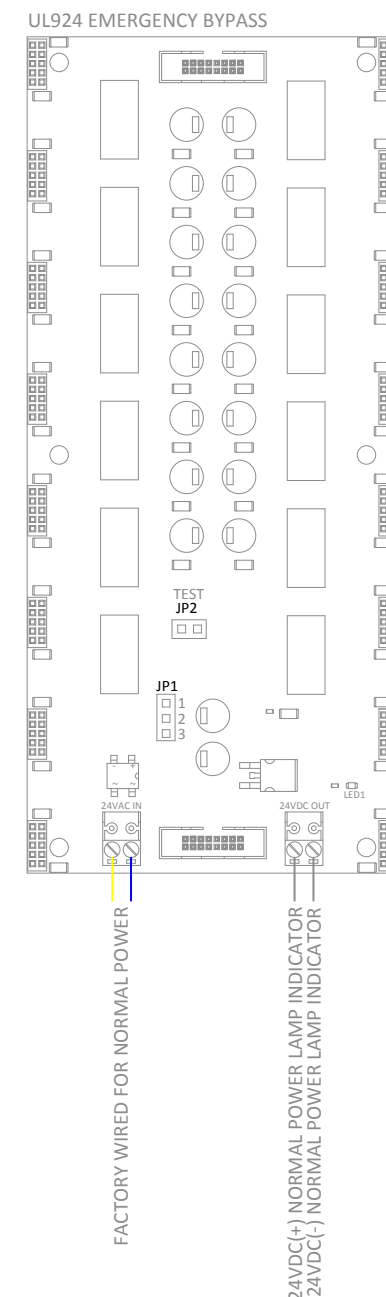


Controller Board Terminations (RI / RK / RP)

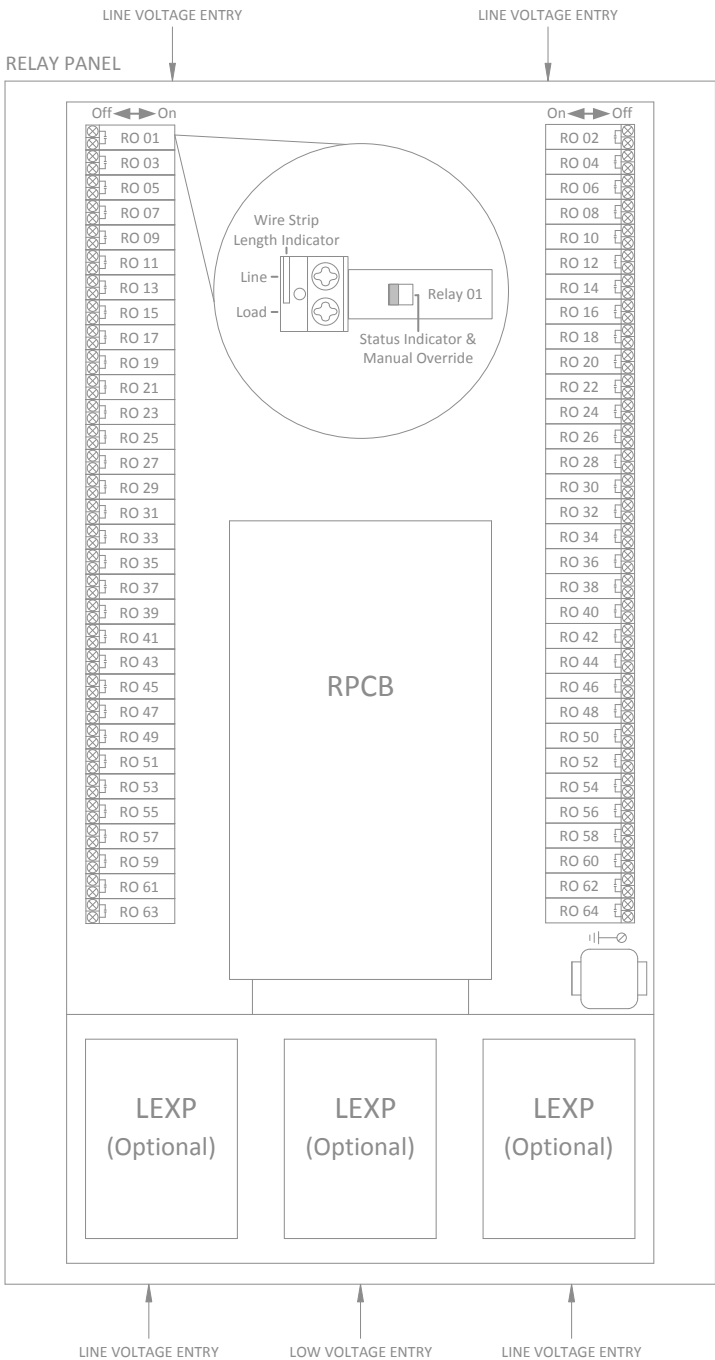
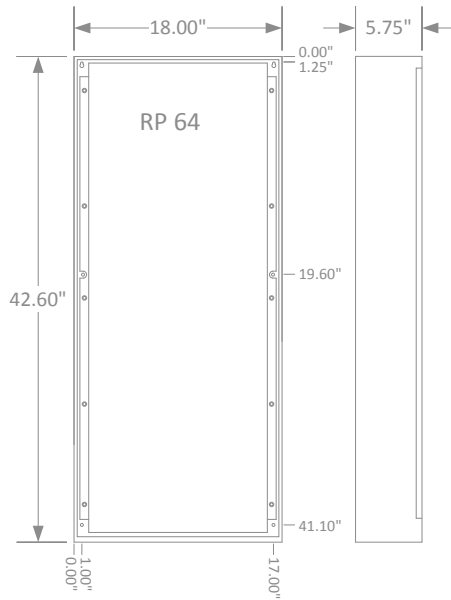
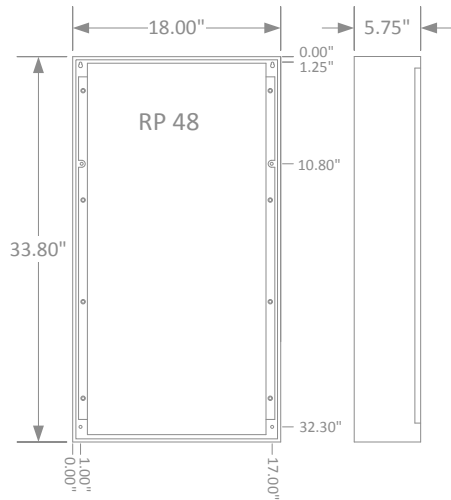
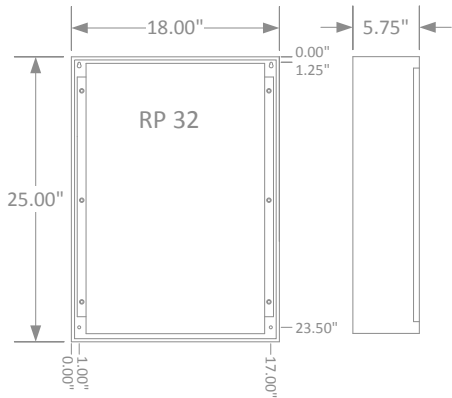
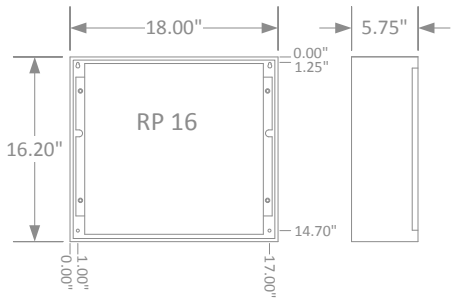
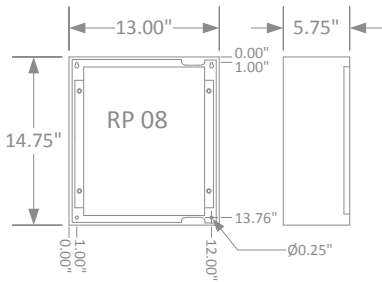


Ordering Information

Part Number	Description
TK-2.0	Tech Kit 2.0 (Micro-USB Cable, USB flash drive with BRT Essentials software, Bluetooth Dongle, Bluetooth Module, Screwdriver, and Carry Bag)



RP16:	UL924 Controls RO 1-16
RP32:	UL924 Controls RO 17-32
RP48:	UL924 Controls RO 33-48
RP64:	UL924 Controls RO 49-64

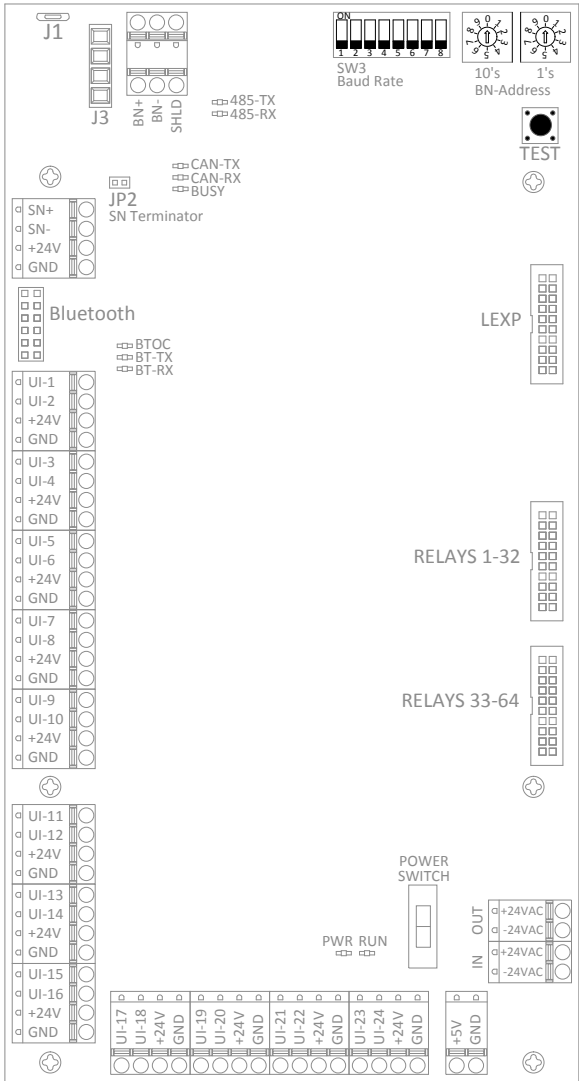


RELAY OUTPUTS (RO)

LOAD RATINGS: Short Circuit Current Rating 30,000A at 277 VAC
20A Tungsten at 347 VAC 30A Ballast at 347 VAC
20A Resistive at 347 VAC 1.5 HP at 120 VAC

WIRE: (2) 14-10 AWG or (1) 8AWG (Solid or Stranded Copper Wire)

RELAY PANEL CONTROL BOARD (RPCB)



UNIVERSAL INPUTS (UI)

POWER: 24 VDC, 200 mA Total All Inputs

WIRE: 18 AWG Solid or Stranded, 500' Max

TORQUE SPECIFICATIONS

RO SCREW TERMINALS: 36in-lbs

GROUND LUG: 20in-lbs

4-40 FASTENERS: 5in-lbs (Max) for RO and Relay Voltage Divider Fasteners

6-32 FASTENERS: 10in-lbs (Max) for RPCB and LEXP Fasteners

BAUD RATE SELECTION-BN



BACnet MS/TP NETWORK-BN

TOPOLOGY: RS-485, (Half Duplex) Daisy Chain

WIRE: CL3P 22/2 Shielded, Low Cap, 4000' Max

STATION/SATELLITE NETWORK-SN

TOPOLOGY: Daisy Chain Only

WIRE: CL3P 22/4 Unshielded Low Cap, 500' Max

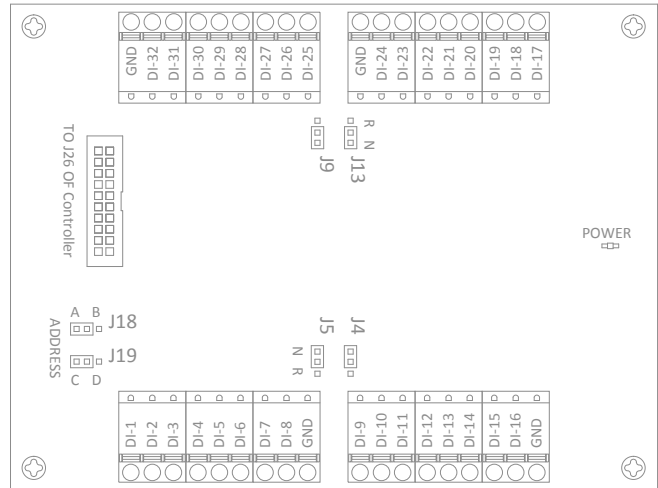
TERMINATION-BN

Plug EOL Resistor into J3 to Terminate BACnet

TERMINATION-SN

(Un-terminated) (Terminated)

DI EXPANDER (LEXP)



DIGITAL INPUTS (DI)

POWER: 24 VDC Externally Powered or Dry Contact

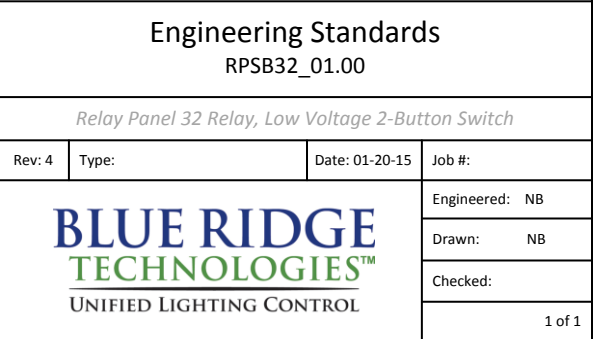
WIRE: 18 AWG Solid or Stranded, 500' Max

Engineering Standards

RPDTL_01.00

Relay Panel Details, Standard

Rev: 4	Type:	Date: 01-09-14	Job #:
			
Engineered: NB			Drawn: NB
Checked: WCD			1 of 1



Master BACnet Points List

Description	Name	Object Type	ID
Analog Input	ANALOG_INPUT_100ssxx	ANALOG_VALUE	100ssxx
Digital Input	DIGITAL_INPUT_100ssxx	BINARY_VALUE	100ssxx
Load Status	LOAD_STATUS_110ssxx	BINARY_VALUE	110ssxx
Line Voltage Input	LINE_VOLTAGE_INPUT_120ssxx	BINARY_VALUE	120ssxx
Device	nnnn_DEVICE_OBJECT_132aaa	DEVICE	132aaa
Channel Status	CHANNEL_STATUS_200zzcc	BINARY_VALUE	200zzcc
Channel Level	CHANNEL_LEVEL_201zzcc	ANALOG_VALUE	201zzcc
Occupancy Timer Occupied Mode	OCC_TIMER_OCC_MODE_210zzcc	ANALOG_VALUE	210zzcc
Occupancy Timer Unoccupied Mode	OCC_TIMER_UNOCC_MODE_211zzcc	ANALOG_VALUE	211zzcc
Timer Unoccupied Mode	TIMER_UNOCC_212zzcc	ANALOG_VALUE	212zzcc
Timer Occupied Mode	TIMER_OCC_213zzcc	ANALOG_VALUE	213zzcc
Daylight Harvesting Setpoint	DAY_HARVEST_SETPT_220zzcc	ANALOG_VALUE	220zzcc
Run Command	RUN_COMMAND_300zz00	BINARY_VALUE	300zz00
Schedule	SCHEDULE_310zz00	SCHEDULE	310zz00
Occupied/Unoccupied Mode Source	OCCUNOCC_MODE_SOURCE_330zzcc	MULTISTATE_VALUE	330zzcc
Virtual Station On Off	VS_ON_OFF_340tttb	MULTISTATE_VALUE	340tttb
Virtual Station Indicator LED	VS_BUTTON_INDICATOR_341tttb	MULTISTATE_VALUE	341tttb
Virtual Station Level Set	VS_LEVEL_SET_342tttb	MULTISTATE_VALUE	342tttb

Note - BACnet Object ID and Object Name must be turned on with BRT Essentials

Master BACnet Points List

Product	b - Button or Button Set	zz -Zone	cc - Channel	ss - Slot	Station ttt - Address	Device aaa - Address	Device Name nnnn - Name	Digital Input xx - Instance	Load Status xx - Instance	Line Voltage Input xx - Instance	Analog Input xx - Instance
ZCSB	NA	01	01 - 08	00	000	000 - 099	ZCSB	01 - 06	01 - 02	01 - 02	01 - 06
ZCSS	NA	01 - 02	01 - 08	00 - 03	000 - 006	000 - 099	ZCSS	01 - 06	01 - 02	01 - 02	01 - 06
ZCDS	NA	01 - 02	01 - 08	00 - 03	000 - 006	000 - 099	ZCDS	01 - 06	01 - 02	01 - 02	01 - 06
ZCDE	NA	01 - 04	01 - 08	00 - 07	000 - 012	000 - 099	ZCDE	01 - 06	01 - 02	01 - 02	01 - 06
RPSB	NA	01 - 64	01 - 08	00	000	000 - 099	RPSB	01 - 24	NA	NA	01 - 24
RPSS	NA	01 - 64	01 - 08	00 - 16	000 - 064	000 - 099	RPSS	01 - 24	NA	NA	01 - 24
RPDS	NA	01 - 64	01 - 08	00 - 16	000 - 064	000 - 099	RPDS	01 - 24	NA	NA	01 - 24
RKUN	NA	01 - 64	01 - 08	00 - 04	000 - 064	000 - 099	RKUN	01 - 24	NA	NA	01 - 24
RKUS	NA	01 - 64	01 - 08	00 - 04	000 - 064	000 - 099	RKUS	01 - 24	01 - 64	NA	01 - 24
SCSS	NA	NA	NA	NA	NA	NA	NA	01 - 06	01 - 02	01 - 02	01 - 06
SCDS	NA	NA	NA	NA	NA	NA	NA	01 - 06	01 - 02	01 - 02	01 - 06
MIO-AO08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MIO-UI16	NA	NA	NA	NA	NA	NA	NA	01 - 16	NA	NA	01 - 16
RP-FI1-C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RK-FI1-A	NA	NA	NA	NA	NA	NA	NA	01 - 64	NA	NA	NA
LEXP32	NA	NA	NA	NA	NA	NA	NA	01 - 32	NA	NA	NA
CTS1CH	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS2CH	1 - 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS3CH	1 - 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS4CH	1 - 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS6CH	1 - 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS1RL	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS2RL	1 - 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS3PR	1 - 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CTS6PR	1 - 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Master BACnet Points List

Device	Description	Type	Default	Access
Object_Identifier	BACnet device object for the controller.	BACnetObjectIdentifier	132aaa	Read
Object_Name		CharacterString	nnnn_DEVICE_OBJECT_132aaa	Read
Object_Type		BACnetObjectType	DEVICE	Read
System_Status		BACnetDeviceStatus		Read
Vendor_Name		CharacterString	Blue Ridge Technologies International, LLC	Read
Vendor_Identifier		Unsigned16	132	Read
Model_Name		CharacterString		Read
Firmware_Revision		CharacterString		Read
Application_Software_Version		CharacterString		Read
Protocol_Version		Unsigned		Read
Protocol_Revision		Unsigned		Read
Protocol_Services_Supported		BACnetServicesSupported		Read
Protocol_Object_Types_Supported		BACnetObjectTypesSupported		Read
Object_List		BACnetARRAY[N] of BACnetObjectIdentifier		Read
Max_APDU_Length_Accepted		Unsigned		?
Segmentation_Supported		BACnetSegmentation	NO_SEGMENTATION	Read
Local_Time		Time		Read/Write
Local_Date		Date		Read/Write
UTC_Offset		INTEGER		Read/Write
Daylight_Savings_Status		BOOLEAN		Read/Write
APDU_Timeout		Unsigned	6000	Read/Write
Number_Of_APDU_Retries		Unsigned	3	Read/Write
Max_Master		Unsigned (1..127)	99	Read/Write
Max_Info_Frames		Unsigned	10	Read/Write
Device_Address_Binding		BACnetList of BACnetAddressBinding		Read
Database_Revision		Unsigned		Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Digital Input	Description	Type	Default	Access
Object_Identifier	Indicates the status of a binary input, either on or off.	BACnetObjectIdentifier	100ssxx	Read
Object_Name		CharacterString	DIGITAL_INPUT_100ssxx	Read
Object_Type		BACnetObjectType	BINARY_VALUE	Read
Present_Value		Any	0	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Master BACnet Points List

Load Status	Description	Type	Default	Access
Object_Identifier	Indicates whether a given load relay is open or closed. On indicates the relay is closed. Off indicates the relay is open.	BACnetObjectIdentifier	110ssxx	Read
Object_Name		CharacterString	LOAD_STATUS_110ssxx	Read
Object_Type		BACnetObjectType	BINARY_VALUE	Read
Present_Value		Any	0	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Line Voltage Input	Description	Type	Default	Access
Object_Identifier	Indicates the status of a line voltage input, either on or off.	BACnetObjectIdentifier	120ssxx	Read
Object_Name		CharacterString	LINE_VOLTAGE_INPUT_120ssxx	Read
Object_Type		BACnetObjectType	BINARY_VALUE	Read
Present_Value		Any	0	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Channel Status	Description	Type	Default	Access
Object_Identifier	Indicates the status of a Channel, either lights on or lights off.	BACnetObjectIdentifier	200zzcc	Read
Object_Name		CharacterString	CHANNEL_STATUS_200zzcc	Read
Object_Type		BACnetObjectType	BINARY_VALUE	Read
Present_Value		Any	0	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Run Command	Description	Type	Default	Access
Object_Identifier	Controls mode of operation. On is when occupants are expected present. Off when occupants are expected not present.	BACnetObjectIdentifier	300zz00	Read
Object_Name		CharacterString	RUN_COMMAND_300zz00	Read
Object_Type		BACnetObjectType	BINARY_VALUE	Read
Present_Value		Any	1	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		BACnetBinaryPV	1	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Master BACnet Points List

Analog Input	Description	Type	Default	Access
Object_Identifier	Indicates the status value of an analog input. Units and range are configured within BRT Essentials.	BACnetObjectIdentifier	100ssxx	Read
Object_Name		CharacterString	ANALOG_INPUT_100ssxx	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	0	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Units		BACnetEngineeringUnits		Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Channel Level	Description	Type	Default	Access
Object_Identifier	Indicates the lighting output level in % for a channel.	BACnetObjectIdentifier	201zzcc	Read
Object_Name		CharacterString	CHANNEL_LEVEL_201zzcc	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	0	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Units		BACnetEngineeringUnits	percent	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Occupancy Timer Occupied Mode	Description	Type	Default	Access
Object_Identifier	Timer value in minutes used to count down time during occupied mode as occupancy timer times out.	BACnetObjectIdentifier	210zzcc	Read
Object_Name		CharacterString	OCC_TIMER_OCC_MODE_210zzcc	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	30	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Units		BACnetEngineeringUnits	minutes	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		BACnetBinaryPV	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Master BACnet Points List

Occupancy Timer Unoccupied Mode	Description	Type	Default	Access
Object_Identifier	Timer value in minutes used to count down time during unoccupied mode as occupancy timer times out.	BACnetObjectIdentifier	211zzcc	Read
Object_Name		CharacterString	OCC_TIMER_UNOCC_MODE_211zzcc	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	30	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Units		BACnetEngineeringUnits	minutes	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		BACnetBinaryPV	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Timer Unoccupied Mode	Description	Type	Default	Access
Object_Identifier	Timer value in minutes used to count down time when override is initiated by the space occupant during Unoccupied Mode.	BACnetObjectIdentifier	212zzcc	Read
Object_Name		CharacterString	TIMER_UNOCC_212zzcc	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	120	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Units		BACnetEngineeringUnits	minutes	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		BACnetBinaryPV	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Timer Occupied Mode	Description	Type	Default	Access
Object_Identifier	Timer value in minutes used to count down time when override is initiated by the space occupant during Occupied Mode.	BACnetObjectIdentifier	213zzcc	Read
Object_Name		CharacterString	TIMER_OCC_213zzcc	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	120	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	TRUE	Read
Units		BACnetEngineeringUnits	minutes	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		BACnetBinaryPV	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Daylight Harvesting Setpoint	Description	Type	Default	Access
Object_Identifier	Daylight harvesting setpoint in foot candles.	BACnetObjectIdentifier	220zzcc	Read
Object_Name		CharacterString	DAY_HARVEST_SETPT_220zzcc	Read
Object_Type		BACnetObjectType	ANALOG_VALUE	Read
Present_Value		Any	0	Read/Write
Status_Flags		BACnetStatusFlags	0	Read

Master BACnet Points List

Event_State	BACnetEventState	NORMAL	Read
Out_Of_Service	BOOLEAN	TRUE	Read
Units	BACnetEngineeringUnits	foot candles	Read
Priority_Array	BACnetPriorityArray		Read
Relinquish_Default	BACnetBinaryPV	0	Read/Write
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Master BACnet Points List

Schedule	Description	Type	Default	Access
Object_Identifier	Controls mode of operation based on schedule. On is when occupants are expected present. Off when occupants are expected not present.	BACnetObjectIdentifier	310zz00	Read
Object_Name		CharacterString	SCHEDULE_310zz00	Read
Object_Type		BACnetObjectType	SCHEDULE	Read
Present_Value		Any	0	Read
Effective_Period		BACnetDateRange		Read/Write
Weekly_Schedule		BACnetARRAY[7] of BACnetDailySchedule		Read/Write
Exception_Schedule		BACnetARRAY[N] of BACnetSpecialEvent		Read/Write
Schedule_Default		Any	0	Read
List_Of_Object_Property_References		BACnetLIST of BACnetDeviceObjectPropertyReference		Read
Priority_For_Writing		Unsigned (1..16)	16	Read
Status_Flags		BACnetStatusFlags		Read
Reliability		BACnetReliability		Read
Out_Of_Service		BOOLEAN	FALSE	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Occupied/Unoccupied Mode Source	Description	Type	Default	Access
Object_Identifier	Determines whether the Channel's mode is determined by Remote Command, Schedule or Remote Command with Schedule Fallback. In the later instance, Fallback is initiated when the Remote Command is not refreshed within 2 minutes.	BACnetObjectIdentifier	330zzcc	Read
Object_Name		CharacterString	OCCUNOCC_MODE_SOURCE_330zzcc	Read
Object_Type		BACnetObjectType	MULTISTATE_VALUE	Read
Present_Value		Unsigned	1	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	FALSE	Read
Number_Of_States		Unsigned	3	Read
State_Text		BACnetARRAY[N] of CharacterString	[1]Remote Command [2]Local Schedule [3]Remote with Local Schedule Fallback	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		Unsigned	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Master BACnet Points List

Virtual Station On Off	Description	Type	Default	Access
Object_Identifier	This commandable object is used to either toggle the on/off state of the channel, or to directly set the state to either on or off. The purpose is to allow the system designer to provide a virtual on/off button from a BACnet source other than a physical station.	BACnetObjectIdentifier	340tttb	Read
Object_Name		CharacterString	VS_ON_OFF_340tttb	Read
Object_Type		BACnetObjectType	MULTISTATE_VALUE	Read
Present_Value		Unsigned	1	Read/Write
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	FALSE	Read
Number_Of_States		Unsigned	3	Read
State_Text		BACnetARRAY[N] of CharacterString	[1]Toggle [2]On [3]Off	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		Unsigned	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Virtual Station Indicator LED	Description	Type	Default	Access
Object_Identifier	This object provides indication as to whether the Station Button should light or unlight its indicator LED.	BACnetObjectIdentifier	341tttb	Read
Object_Name		CharacterString	VS_BUTTON_INDICATOR_341tttb	Read
Object_Type		BACnetObjectType	MULTISTATE_VALUE	Read
Present_Value		Unsigned	1	Read
Status_Flags		BACnetStatusFlags	0	Read
Event_State		BACnetEventState	NORMAL	Read
Out_Of_Service		BOOLEAN	FALSE	Read
Number_Of_States		Unsigned	3	Read
State_Text		BACnetARRAY[N] of CharacterString	[1]Off [2]On [3]Flash [4]Dim	Read
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Master BACnet Points List

Virtual Station Level Set	Description	Type	Default	Access
Object_Identifier	This commandable object is used to	BACnetObjectIdentifier	342tttb	Read
Object_Name	either set the channel light level	CharacterString	VS_LEVEL_SET_342tttb	Read
Object_Type	percentage directly, or to increment	BACnetObjectType	MULTISTATE_VALUE	Read
Present_Value	the level up or down by a fixed	Unsigned	0	Read/Write
Status_Flags	percentage. The purpose is to allow	BACnetStatusFlags	0	Read
Event_State	the sytsem designer to provide	BACnetEventState	NORMAL	Read
Out_Of_Service	raise/lower functionality from a BACnet	BOOLEAN	FALSE	Read
Number_Of_States	source other than a physical station.	Unsigned	110	Read
State_Text		BACnetARRAY[N] of CharacterString	[1]1 percent [2]2 percent ... [100]100 percent [101]-5 percent change [102]-4 percent change [103]-3 percent change [104]-2 percent change [105]-1 percent change [106]+1 percent change [107]+2 percent change [108]+3 percent change [109]+4 percent change [110]+5 percent change	Read
Priority_Array		BACnetPriorityArray		Read
Relinquish_Default		Unsigned	0	Read/Write
Property_List		BACnetARRAY[N] of BACnetPropertyIdentifier		Read

Note - Whether a given input is exposed as a BV or an AV is based on input configuration.

BACnet Protocol Implementation Conformance Statement

Date: March 30, 2015

Vendor Name: Blue Ridge Technologies International

Product Name: Aperio

Product Model Number: ZC, RP, RK, RI

Application Software Version: NA **Firmware Revision:** 1.3.x **BACnet Protocol Revision:** 135-2010 rev. 12

Product Description:

The Aperio Controller Board is a general purpose lighting controller used across the Blue Ridge Technologies product line. This product supports native BACnet connecting directly to the MS/TP LAN. All standard MS/TP baud rates are supported. All B-AAC required objects are supported. The quantities of each object available are dependent upon factory configuration since this Aperio Controller Board can be provided in products with differing lighting zone and channel capacities.

BACnet Standardized Device Profile (Annex L):

- ☐ BACnet Operator Workstation (B-OWS)
- ☐ BACnet Advanced Operator Workstation (B-AWS)
- ☐ BACnet Operator Display (B-OD)
- ☐ 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)

List all BACnet Interoperability Building Blocks Supported (Annex K): DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DS-COVU-B, AE-N-I-B, AE-ACK-B, AE-INFO-B, SCHED-I-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B

Segmentation Capability:

- ☐ Able to transmit segmented messages Window Size _____
- ☐ Able to receive segmented messages Window Size _____

Standard Object Types Supported:

Objects are not creatable nor deletable using the CreateObject or the DeleteObject services.

Object/Property Support Matrix

The following table summarizes the Object Types/Properties supported:

Property	Object Type				
	Device	Binary Value	Analog Value	Multi State Value	Schedule
Object_Identifier	X	X	X	X	X
Object_Name	X	X	X	X	X

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Object_Type	X	X	X	X	X
System_Status	X				
Vendor_Identifier	X				
Model_Name	X				
Firmware_Revision	X				
Application_Software_Version	X				
Protocol_Version	X				
Protocol_Revision	X				
Protocol_Services_Supported	X				
Object_Types_Supported	X				
Object_List	X				
Max_APDU_Length_Accepted	X				
Segmentation_Supported	X				
Local_Time	X				
Local_Date	X				
UTC_Offset	X				
Daylight_Savings_Status	X				
APDU_Timeout	X				
Number_Of_APDU_Retries	X				
Max_Master	X				
Max_Info_Frames	X				
Device_Address_Binding	X				
Database_Revision	X				
Configuration_Files	X				
Last_Restore_Time	X				
Backup_Failure_Timeout	X				
Present_Value		X	X	X	X
Status_Flags		X	X	X	X
Event_State		X	X	X	
Out_Of_Service		X	X	X	
Number_Of_States				X	
Priority_Array		X*	X*	X*	
Relinquish_Default		X*	X*	X*	
Units			X		
Date_List					
Effective_Period					X
Weekly_Schedule					X
Execption_Schedule					X
Schedule_Default					X
List_Of_Object_Property_Ref					X
Priority_For_Writing					X
Reliability					X
Out_Of_Service					X
Notification_Class		X	X		
Event_Enable		X	X		
Acked_Transitions		X	X		
Notify_Type		X	X		
Event_Time_Stamps		X	X		
Time_Delay		X	X		
Alarm_Value		X			
High_Limit			X		
Low_Limit			X		
Deadband			X		

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Limit_Enabled			X		
Property_List	X	X	X	X	X

* For commandable values only.

Device Object Summary

The following table summarizes the Device Object supported (see Instance Key for values of nnnn and aaa):

Instance ID	Object Name
132aaa	nnnn_DEVICE_OBJECT_132aaa

Binary Value Instance Summary

The following table summarizes the Binary Value Objects supported (see Instance Key for values of ss, xx, zz and cc):

Instance ID	Object Name	Description	Present Value Access Type
100ssxx	DIGITAL_INPUT_100ssxx	Indicates the status of a binary input, either on or off.	R
110ssxx	LOAD_STATUS_110ssxx	Indicates whether a given load relay is open or closed. On indicates the relay is closed. Off indicates the relay is open.	R
120ssxx	LINE_VOLTAGE_INPUT_120ssxx	Indicates the status of a line voltage input, either on or off.	R
200zzcc	CHANNEL_STATUS_200zzcc	Indicates the status of a Channel, either lights on or lights off.	R
300zz00	RUN_COMMAND_300zz00	Controls mode of operation. On is when occupants are expected present. Off when occupants are expected not present.	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays and relinquish defaults.

Analog Value Instance Summary

The following table summarizes the Analog Value Objects supported (see Instance Key for values of ss, xx, zz and cc):

Instance ID	Object Name	Description	Units	Present Value Access Type
100ssxx	ANALOG_INPUT_100ssxx	Indicates the status value of an analog input.		R
201zzcc	CHANNEL_LEVEL_201zzcc	Indicates the lighting output level for a channel.	Percent	
210zzcc	OCC_TIMER_OCC_MODE_210zzcc	Timer value used to count down time during occupied mode as occupancy timer	Minutes	C

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		times out.		
211zzcc	OCC_TIMER_UNOCC_MODE_211zzcc	Timer value used to count down time during unoccupied mode as occupancy timer times out.	Minutes	C
212zzcc	TIMER_UNOCC_212zzcc	Timer value in minutes used to count down time when override is initiated by the space occupant during Unoccupied Mode.	Minutes	C
213zzcc	TIMER_OCC_213zzcc	Timer value in minutes used to count down time when override is initiated by the space occupant during Occupied Mode.	Minutes	C
220zzcc	DAY_HARVEST_SETPT_220zzcc	Daylight harvesting setpoint.	Foot Candles	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays and relinquish defaults.

Schedule Instance Summary

The following table summarizes the Schedule Objects supported (see Instance Key for values of zz):

Instance ID	Object Name	Description	Date_List Access Type
310zz00	SCHEDULE_310zz00	Schedules to be assigned to lighting zones.	W

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays and relinquish defaults.

Occupied/Unoccupied Mode Source Instance Summary

The following table summarizes the Occupied/Unoccupied Mode Sources supported (see Instance Key for values of zz and cc):

Instance ID	Object Name	Description	Date_List Access Type
330zzcc	OCCUNOCC_MODE_SOURCE_330zzcc	Occupied/Unoccupied mode	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays and relinquish defaults.

Virtual Station Instance Summary

The following table summarizes the Virtual Stations supported (see Instance Key for values of ttt and b):

Instance ID	Object Name	Description	Date_List Access
-------------	-------------	-------------	------------------

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			Type
340tttb	VS_ON_OFF_340tttb	Virtual Station On/Off	C
341tttb	VS_BUTTON_INDICATOR_341tttb	Virtual Station Indicator LED	R
342tttb	VS_LEVEL_EST_342tttb	Virtual Station Level Set	C

NOTE: For Present Value Access Types, R = Read-only, W = Writeable, C = Commandable. Commandable values support priority arrays and relinquish defaults.

Instance Key

The following tables provide range of values exposed in BACnet Object IDs and Object Names by Product:

Product	zz - Zone	cc - Channel	ss - Slot	Device aaa - Address	Device Name nnnn - Name
ZCSB	01	01 - 08	00	000 - 099	ZCSB
ZCSS	01 - 02	01 - 08	00 - 03	000 - 099	ZCSS
ZCDS	01 - 02	01 - 08	00 - 03	000 - 099	ZCDS
ZCDE	01 - 04	01 - 08	00 - 07	000 - 099	ZCDE
RPSB	01 - 64	01 - 08	00	000 - 099	RPSB
RPSS	01 - 64	01 - 08	00 - 16	000 - 099	RPSS
RPDS	01 - 64	01 - 08	00 - 16	000 - 099	RPDS
RKUN	01 - 64	01 - 08	00 - 16	000 - 099	RKUN
RKUS	01 - 64	01 - 08	00 - 16	000 - 099	RKUS

Product	Digital Input xx - Instance	Load Status xx - Instance	Line Voltage Input xx - Instance	Analog Input xx - Instance
ZCSB	01 - 06	01 - 02	01 - 02	01 - 06
ZCSS	01 - 06	01 - 02	01 - 02	01 - 06
ZCDS	01 - 06	01 - 02	01 - 02	01 - 06
ZCDE	01 - 06	01 - 02	01 - 02	01 - 06
RPSB	01 - 24	NA	NA	01 - 24
RPSS	01 - 24	NA	NA	01 - 24
RPDS	01 - 24	NA	NA	01 - 24
RKUN	01 - 24	NA	NA	01 - 24
RKUS	01 - 24	NA	NA	01 - 24
SCSS	01 - 06	01 - 02	01 - 02	01 - 06
SCDS	01 - 06	01 - 02	01 - 02	01 - 06
LEXP32	01 - 32	NA	NA	NA

Product	b – Button or Button Set
CTS1CH	1
CTS2CH	1 - 2
CTS3CH	1 - 3
CTS4CH	1 - 4

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CTS6CH	1 - 6
CTS1RL	1
CTS2RL	1 - 2
CTS3PR	1 - 4
CTS6PR	1 - 6

Data Link Layer Options:

- ☐ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), Foreign Device
- ☐ ISO 8802-3, Ethernet (Clause 7)
- ☐ ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ☐ ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s) _____
- ☒ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
- ☐ 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): _____
- ☐ LonTalk, (Clause 11), medium: _____
- ☐ BACnet/ZigBee (ANNEX O)
- ☐ 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:

- ☐ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- ☐ Annex H, BACnet Tunneling Router over IP
- ☐ BACnet/IP Broadcast Management Device (BBMD)
 - Does the BBMD support registrations by Foreign Devices? ☐ Yes ☐ No
 - Does the BBMD support network address translation? ☐ Yes ☐ No

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)

Character Sets Supported:

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

- ☒ ISO 10646 (UTF-8)
- ☐ IBM™/Microsoft™ DBCS
- ☐ ISO 8859-1

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☐ ISO 10646 (UCS-2) ☐ ISO 10646 (UCS-4) ☐ JIS X 0208

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