BACnet Protocol Implementation Conformance Statement

Date: 15-December-2015
Vendor Name: Control Solutions, Inc.
Product Name: Babel Buster BB2-3060
Product Model Number: BB2-3060
Applications Software Version: 3.65 **Firmware Revision:** 3.65 **BACnet Protocol Revision:** 7

Product Description:
Network gateway allowing Modbus TCP slave devices to be accessed via BACnet IP as a BACnet slave.

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)**

List all BACnet Interoperability Building Blocks Supported (Annex K):
```
DS-RP-A DS-RP-B DS-RPM-B DS-WP-A DS-WP-B DS-WPM-B DS-COV-B DS-COVP-B
DM-DDB-A DM-DDB-B DM-DOB-B DM-DCC-B DM-RD-B DM-R-B
```

Segmentation Capability:

☑ Segmented requests supported	Window Size: 16
☑ Segmented responses supported	Window Size: 16

Standard Object Types Supported:

An object type is supported if it may be present in the device. For each standard Object Type supported provide the following data:

1) Whether objects of this type are dynamically creatable using the CreateObject service
2) Whether objects of this type are dynamically deletable using the DeleteObject service
3) List of the optional properties supported
4) List of all properties that are writable where not otherwise required by this standard
5) List of proprietary properties and for each its property identifier, datatype, and meaning
6) List of any property range restrictions

Object types: AI, AO, AV, BI, BO, BV, MSI, MSO, MSV, DEV (all static)

Property (AI, AO, AV, BI, BO, BV, MSI, MSO, MSV)	Encoding
Object_Identifier (75)	BACnetObjectIdentifier
Object_Name (77) (W)	CharacterString “Analog Input *n*”
Object_Description (28) (W)	Character String Same as Object_Name, is only alias for Object_Name
Object_Type (79)	BACnetObjectType ENUMERATED: analog-input (0)

	analog-output (1) analog-value (2) binary-input (3) binary-output (4) binary-value (5) multi-state-input (13) multi-state-output (14) multi-state-value (19)
Present_Value (85) (W)	REAL (analog objects) ENUMERATED (binary objects) Unsigned (multi-state objets) (no index) (priority required when writing commandable objects) (input objects writeable only when out of service)
Status_Flags (111)	BACnetStatusFlags BIT STRING: fault(1), out-of-service(3)
Event_State (36)	BACnetEventState ENUMERATED: normal(0), fault(1)
Reliability (103)	BACnetReliability ENUMERATED: normal(0) *Vendor specific:* no response (64) crc error (65) exception, illegal function code (66) exception, illegal data address (67) exception, illegal data value (68) exception, code+65, rarely used (69..79) configuration property fault (80) exception, code not recognized (81) BACnet client read/write timeout (82) BACnet client received error response from slave (83)
Out_Of_Service (81) (W)	BOOLEAN
COV_Increment (22) (W)	REAL (analog objects only)
Priority_Array (87)	BACnetPriorityArray (commandable objects only) SEQUENCE SIZE (16) OF BACnetPriorityValue REAL (each element, analog output objects) ENUMERATED (each element, binary output objects) Unsigned (each element, multi-state output objects)
Relinquish_Default (104) (W)	REAL (analog objects) ENUMERATED (binary objects) Unsigned (multi-state objets)
Polarity (84)	BACnetPolarity (binary objects only) ENUMERATED: normal(0)
Number_Of_States (74)	Unsigned (multi-state objects only)
Units (117)	BACnetEngineeringUnits (analog objects only)
Vendor Specific Object Properties:	

Object_Map_Usage (801) (W)	BIT STRING: (0) object is mapped to Modbus (1) object included in packed group (2) object included in mixed type packed group (3) reserved (4) set default on power-up (5) set default on comm. fail (6) read periodic (7) write periodic (8) write on delta (9) enable max quiet (10) object is mapped to BACnet
Poll_Period (802) (W)	Unsigned Modbus poll/update time in seconds
Note: Properties 803 through 808 can only be written when bit 0 of the Object_Map_Usage bit string is set. Properties 819 through 826 can only be written when bit 10 of the Object_Map_Usage bit string is set. Bits 0 and 10 of the Object_Map_Usage bit string cannot both be set at the same time (doing so will cause unpredictable behavior).	
Register_Number (803) (W)	Unsigned Modbus register number 1..65535
Register_Type (804) (W)	ENUMERATED: none(0), coils(1), discrete-input(2), input-register(3), holding-registers(4), coil (5), (write single, FC5) holding-register (6) (write single, FC6)
Register_Format (805) (W)	ENUMERATED: none(0), signed-integer(1), unsigned-integer(2), double-signed-integer(3), double-unsigned-integer(4), floating-point(5), bit(6), double-signed-integer-swapped(7), double-unsigned-integer-swapped(8), floating-point-swapped(9)
Modbus_Slave_ID (806) (W)	ENUMERATED: 1..MAX_TCP_DEVICE
Register_Bit_Mask (807) (W)	Unsigned
Register_Bit_Fill (808) (W)	Unsigned

Slope (809) (W)	REAL
	BACnet = Modbus * slope + intercept
	Modbus = (BACnet – intercept) / slope

Intercept (810) (W)	REAL
Default_Value (811) (W)	REAL (analog objects)

	ENUMERATED (binary objects) Unsigned (multi-state objects)
Max_Quiet_Time (812) (W)	Unsigned
BACnet_Slave_Timeout (813) (W)	Unsigned
Max_Read_Fail_Count (814) (W)	Unsigned
Send_On_Delta (815) (W)	REAL (analog objects only)
Initial_COV_Increment (816) (W)	REAL (analog objects only)
Initial_Relinquish_Default (818) (W)	REAL (analog objects) ENUMERATED (binary objects) Unsigned (multi-state objects)
BACnet_Slave_Device (819) (W)	Unsigned
Slave_Object_Type (820) (W)	ENUMERATED
Slave_Object_Instance (821) (W)	Unsigned
Slave_Index (822) (W)	Unsigned (value is index+1, 0=no index)
Slave_Priority (823) (W)	ENUMERATED (1..16)
Slave _Property_Type (824) (W)	ENUMERATED (see BACnet protocol specification for type codes)
Slave_Data_Encoding (825) (W)	ENUMERATED (0) Null, (1) Boolean, (2) Unsigned integer, (3) Signed Integer, (4) Real (floating point), (8) Bit string, (9) Enumerated
Slave _Bit_Position (826) (W)	ENUMERATED
Error_Class (830)	Unsigned
Error_Code (831)	Unsigned
Config_Write_Command (832) (W)	ENUMERATED (1) write config to EEPROM

Property (DEV)	Encoding
Object_Identifier (75)	BACnetObjectIdentifier
Object_Name (77)	CharacterString
Object_Type (79)	BACnetObjectType ENUMERATED: device (8)

System_Status (112)	BACnetDeviceStatus
Vendor_Name (121)	CharacterString
Vendor_Identifier (120)	Unsigned16 (should always return 208)
Model_Name (70)	CharacterString
Fimrware_Revision (44)	CharacterString
Application_Software_Version (12)	CharacterString
Protocol_Version (98)	Unsigned
Protocol_Revision (139)	Unsigned
Protocol_Services_Supported (97)	BACnetServicesSupported
Protocol_Object_Types_Supported (96)	BACnetObjectTypesSupported
Object_List (76)	BACnetARRAY[N] of BACnetObjectIdentifier
Max_APDU_Length_Accepted (62)	Unsigned
Segmentation_Supported (107)	BACnetSegmentation
APDU_Timeout (11)	Unsigned
Number_Of_APDU_Retries (73)	Unsigned
Device_Address_Binding (30)	List of BACnetAddressBinding
Database_Revision (155)	Unsigned
Vendor Specific Object Properties:	
TCP_Config (852) (W)	BITSTRING: (0) double registers are swapped (1) gateway is slave (disables TCP client)
TCP_Unit (854) (W)	ENUMERATED (1..MAX_TCP_DEVICE)
TCP_Message_Count (861) (W*)	Unsigned Index: 1..MAX_TCP_DEVICE
TCP_Exception_Count (862) (W*)	Unsigned Index: 1..MAX_TCP_DEVICE
TCP_No_Response_Count (864) (W*)	Unsigned Index: 1..MAX_TCP_DEVICE
W* -- Registers are “writeable” for purposes of resetting error counts. Writing any value will reset count to zero. Total message count will stop at 65535. Error counts will stop at 255. Counting will resume when reset to zero.	
TCP_Error_Scan (865) (W)	Unsigned Index: 1..MAX_TCP_DEVICE (index is starting point to scan for next device with errors) (returns next index and error count, or zero) (write index to reset errors for that device, or zero to reset all)

TCP_IP_Address (891) (W)	OCTET_STRING Bytes 0..3: IP Address of gateway's TCP port Bytes 4..7: Subnet mask Bytes 8..11: Network gateway IP address Bytes 12..13: Modbus TCP port (MSB first) (See Notes 1, 2)
TCP_Reboot_Request (892) (W)	Unsigned (write device instance to invoke TCP server reboot)
TCP_Remote_Device (893) (W)	OCTET_STRING Index: 1..MAX_TCP_DEVICE Byte 0: First unit number in gateway Byte 1: Last unit number in gateway Byte 2: First corresponding unit number on TCP network Bytes 3..6: Remote Modbus TCP device's IP address Bytes 7..8: Modbus TCP port used by remote device (e.g. 502, MSB first)
TCP_Software_Rev (894)	CharacterString (returns TCP server firmware revision string) (See Note 2)
TCP_MAC_Address (895) (W)	OCTET_STRING Bytes 0..5: MAC address of TCP server (See Notes 1, 2)
TCP_Root_Password (896) (W)	CharacterString (root password needed for firmware update of server) (can set password, but cannot read present password, will return null)
MSTP_Port_Baud_Rate (1201) (W)	ENUMERATED: (9600, 19200, 38400, 76800) NOTE: Changes to port settings will take effect only after a COLDSTART or WARMSTART command is issued.
MSTP_Station_ID (1202) (W)	Unsigned
Enable_Auto_Reset (1203) (W)	BOOLEAN (True if reliability codes should auto return to zero)
Enable_Alt_Map (1204) (W)	BOOLEAN Enables alternate Modbus slave map if set.

Note 1: Need to reboot server before new setting will take effect after writing this property.
Note 2: Will return empty string until server subsystem boots up and parameter can be read from server.

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), baud rate(s) ____________
☑ MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400,76800
□ MS/TP slave (Clause 9), baud rate(s): 9600, 19200, 38400,76800
□ Point-To-Point, EIA 232 (Clause 10), baud rate(s):_______

□ Point-To-Point, modem, (Clause 10), baud rate(s): _______
□ LonTalk, (Clause 11), medium: __________
□ 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

Character Sets Supported:

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

☑ ANSI X3.4
□ ISO 10646 (UCS-2)
□ IBM™/Microsoft™ DBCS
□ ISO 10646 (UCS-4)
□ ISO 8859-1
□ JIS C 6226

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

Modbus TCP: BACnet slave device functions as Modbus TCP master or slave. Can also function as MS/TP client with Modbus TCP master.