



Product Implementation Conformance Statement b4920

Date: May 6, 2004
Vendor Name: Andover Controls Corporation
Product Name: Continuum
Product Model Number: b4920
Applications Software Version: 4.2 **Firmware Revision:** 4.2
BACnet Protocol Version: 1 **BACnet Protocol Revision:** 2

Product Description

b4920 is BACnet protocol controller with 16 universal inputs, 8 analog outputs, and 8 digital outputs, any 2 of which could be configured as a tri-state output. Through the use of expansion modules, it can have both its inputs and outputs expanded beyond these initial I/O counts. In addition, the b4920 performs BACnet routing functions between its BACnet/IP port and its BACnet MS/TP port.

BACnet Standardized Device Profile (Annex L)

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

BACnet Interoperability Building Blocks Supported (BIBBs)

BIBB	Name	BACnet Service	Init	Exec
DS-RP-A	Data Sharing - ReadProperty-A	ReadProperty	X	
DS-RP-B	Data Sharing - ReadProperty-B	ReadProperty		X
DS-RPM-B	Data Sharing - ReadPropertyMultiple-B	ReadPropertyMultiple		X
DS-RPC-B	Data Sharing - ReadPropertyConditional-B	ReadPropertyConditional		X
DS-WP-A	Data Sharing - WriteProperty-A	WriteProperty	X	
DS-WP-B	Data Sharing - WriteProperty-B	WriteProperty		X
DS-WPM-B	Data Sharing - WritePropertyMultiple-B	WritePropertyMultiple		X
DS-COV-A	Data Sharing - COV-A	SubscribeCOV	X	
		ConfirmedCOVNotification		X
		UnconfirmedCOVNotification		X
DS-COV-B	Data Sharing - COV-B	SubscribeCOV		X
		ConfirmedCOVNotification	X	
		UnConfirmedCOVNotification	X	
AE-N-I-B	Alarm and Event-Notification-B	ConfirmedEventNotification	X	
		UnconfirmedEventNotification	X	
AE-ACK-B	Alarm and Event-ACK-B	AcknowledgeAlarm		X
AE-INFO-B	Alarm and Event-Information-B	GetEventInformation		X
SCHED-I-B	Scheduling-Internal-B			X
DM-DDB-A	Device Management-Dynamic Device Binding-A	Who-Is	X	
		I-Am		X
DM-DDB-B	Device Management-Dynamic Device Binding-B	Who-Is		X
		I-Am	X	
DM-DOB-B	Device Management-Dynamic Object Binding-B	Who-Has		X
		I-Have	X	
DM-DCC-B	Device Management-DeviceCommunicationControl-B	DeviceCommunicationControl		X
DM-TS-A	Device Management-TimeSynchronization-A	TimeSynchronization	X	
DM-TS-B	Device Management-TimeSynchronization-B	TimeSynchronization		X
DM-UTC-B	Device Management-UTCTimeSynchronization-B	UTCTimeSynchronization		X
DM-RD-B	Device Management-ReinitializeDevice-B	ReinitializeDevice		X
DM-BR-B ¹	Device Management-Backup and Restore-B	AtomicReadFile		X
		AtomicWriteFile		X
		ReinitializeDevice		X
DM-OCD-B	Device Management-Object Creation and Deletion-B	CreateObject		X
		DeleteObject		X
NM-RC-B	Network Management-Router Configuration-B	Who-Is-Router-To-Network	X	X
		I-Am-Router-To-Network	X	X
		Initialize-Routing-Table		X
		Initialize-Routing-Table-Ack	X	

¹ A single stream-based file object is provided, to support Backup and Restore. Record-based access is *not* supported. The file has a proprietary format, which is produced by the controller during a Backup operation. Any attempt to write the file using data not obtained by reading it, will result in an error.

Segmentation Capability

X	Able to transmit segmented messages	Window Size: 1
X	Able to receive segmented messages	Window Size: 1

Standard Object Types Supported

Object Type	Supported	Creatable ¹	Deletable ¹
Analog Input	X		
Analog Output	X		
Analog Value	X		
Binary Input	X		
Binary Output	X		
Binary Value	X		
Calendar	X	X	X
Device	X		
Event Enrollment	X	X	X
File	X		
Multi-state Input	X		
Multi-state Output	X		
Multi-state Value	X		
Notification Class	X	X	X
Program	X		
Schedule	X	X	X

¹ Except for Device and File, instances of all supported object types can be created, deleted and configured using CyberStation.

Object Types and Properties Supported

(Items in **bold** indicate supported optional properties. Items in *italics* indicate writable properties.)
 (See Restrictions on Object Identifiers, below.)

Analog Input	Analog Output	Analog Value
<p><i>COV_Increment</i> Description¹ <i>Event_State</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service²</i> <i>Present_Value</i> Status_Flags <i>Units</i></p>	<p><i>COV_Increment</i> Description¹ <i>Event_State</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service²</i> <i>Present_Value</i> Priority_Array <i>Relinquish_Default</i> Status_Flags <i>Units</i></p>	<p><i>COV_Increment</i> Description¹ <i>Event_State</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service</i> <i>Present_Value</i> Priority_Array <i>Relinquish_Default</i> Status_Flags <i>Units</i></p>
Binary Input	Binary Output	Binary Value
<p>Description¹ <i>Event_State</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service²</i> <i>Polarity</i> <i>Present_Value</i> Status_Flags</p>	<p>Description¹ <i>Event_State</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service²</i> <i>Polarity</i> <i>Present_Value</i> Priority_Array <i>Relinquish_Default</i> Status_Flags</p>	<p>Description¹ <i>Event_State</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service</i> <i>Present_Value</i> Priority_Array <i>Relinquish_Default</i> Status_Flags</p>

¹ Limited to 32 Characters

² Cannot be set to false if Channel not configured

Object Types and Properties Supported (cont.)

(Items in **bold** indicate supported optional properties. Items in *italics* indicate writable properties.)

(See Restrictions on Object Identifiers, below.)

Device	Schedule	Event Enrollment
Active_COV_Subscriptions	Description ¹	Acked_Transitions
APDU_Segment_Timeout	<i>Effective_Period</i> ¹⁰	<i>Notification_Class</i>
APDU_Timeout	Exception_Schedule ¹⁰	Description ¹
Application_Software_Version	Following_Transition_Time ²	<i>Event_Enable</i>
Database_Revision	<i>List_Of_Object_Property_References</i> ³	<i>Event_Parameters</i>
Daylight_Savings_Status	Next_Transition_Time ²	Event_State
Description ¹	Object_Identifier	Event_Time_Stamps
Device_Address_Binding	<i>Object_Name</i>	<i>Event_Type</i> ⁴
Firmware_Revision	Object_Type	<i>Notify_Type</i>
Local_Date	Present_Value	Object_Identifier
Local_Time	Previous_Transition_Time ²	<i>Object_Name</i>
Location ¹	<i>Priority_For_Writing</i>	<i>Object_Property_Reference</i> ⁵
Max_APDU_Length_Accepted	<i>Weekly_Schedule</i>	Object_Type
<i>Max_Info_Frames</i> ⁷		
Max_Master		
Max_Segments_Accepted	Calendar	File
Model_Name		
<i>Number_Of_APDU_Retries</i> ⁹	<i>Date_List</i> ¹⁰	Object_Identifier
Object_Identifier	Description ¹	Object_Name
Object_List	Object_Identifier	Object_Type
<i>Object_Name</i>	<i>Object_Name</i>	File_Type
Object_Type	Object_Type	<i>File_Size</i> ⁸
Protocol_Object_Types_Supported	Present_Value	Modification_Date
Protocol_Revision		<i>Archive</i>
Protocol_Services_Supported		Read_Only
Protocol_Version		File_Access_Method
Segmentation_Supported		
System_Status		
<i>UTC_Offset</i>		
Vendor_Identifier		
Vendor_Name		
Configuration_Files		
<i>Backup_Failure_Timeout</i>		
Last_Restore_Time		
<i>Time_Synchronization_Recipients</i>		

¹ Limited to 32 characters

² Proprietary property – See “Support for Optimum Start-Stop” below

³ Limited to internal objects

⁴ Limited to Change_Of_State, Change_Of_Value, Floating_Limit, Out_Of_Range

⁵ Must reference Present_Value of point in same controller

⁸ Writable when in Restore mode. Values limited to zero and current file size.

⁹ Number_Of_APDU_Retries is limited to the range 0..255.

¹⁰ Dates are restricted to the years 1989 - 2105. See also the Interpretation of Wildcards in Dates, below.

Object Types and Properties Supported (cont.)

(Items in **bold** indicate supported optional properties. Items in *italics* indicate writable properties.)
 (See Restrictions on Object Identifiers, below.)

Multi-state Input	Multi-state Output	Multi-state Value
<p><i>Description¹</i> Event_State Number_Of_States Object_Identifier Object_Name Object_Type <i>Out_Of_Service²</i> <i>Present_Value</i> Status_Flags State_Text³</p>	<p><i>Description¹</i> Event_State Number_Of_States Object_Identifier Object_Name Object_Type <i>Out_Of_Service²</i> <i>Present_Value</i> Priority_Array <i>Relinquish_Default</i> Status_Flags State_Text</p>	<p><i>Description¹</i> Event_State Number_Of_States Object_Identifier Object_Name Object_Type <i>Out_Of_Service</i> <i>Present_Value</i> Priority_Array <i>Relinquish_Default</i> Status_Flags State_Text³</p>
Notification Class	Program	
<p><i>Ack_Required</i> Notification_Class <i>Description¹</i> Object_Identifier <i>Object_Name</i> Object_Type <i>Priority</i> <i>Recipient_List⁵</i></p>	<p><i>Description¹</i> Object_Identifier Object_Name Object_Type <i>Out_Of_Service</i> <i>Program_Change⁴</i> Program_State Status_Flags</p>	

NOTE: For all object types, the Object_Name is limited to 16 characters. The first character must be alphabetic, and the remaining characters must be alphabetic, numeric, or one of ‘_’ or ‘.’.

¹ Limited to 32 Characters

² Cannot be set to false if Channel not configured

³ Cyberstation can configure the State_Text

⁴ Read_Property always returns Ready

⁵ Any destination that is specified as a MAC address will be treated as broadcast

Data Link Layer Options

X	BACnet IP
X	BACnet IP, Foreign Device ISO 8802_3, Ethernet ANSI/ATA 878.1, 2.5 MB ARCNET ANSI/ATA 878.1, RS_485, baud rate(s)_____
X	MS/TP master, baud rate(s)_____9600,19200,38400,76800_____
	MS/TP slave, baud rate(s)_____
	Point-To-Point, EIA 232, baud rate(s)_____
	Point-To-Point, modem, baud rate(s)_____
	LonTalk, medium: _____
	Other

Device Address Binding

Static Device Binding Supported Yes No

Networking Options

<input checked="" type="checkbox"/>	Router	List all routing configurations __BACnet IP, MS/TP_____
<input type="checkbox"/>	Annex H, BACnet Tunneling Router over IP	
<input type="checkbox"/>	BACnet/IP Broadcast Management Device (BBMD)	
<input type="checkbox"/>	Support registrations by foreign devices	

Character Sets Supported

<input checked="" type="checkbox"/>	ANSI X3.4	<input checked="" type="checkbox"/>	ISO 8859-1
<input type="checkbox"/>	ISO 10646 (UCS-2)	<input type="checkbox"/>	ISO 10646 (UCS-4)
<input type="checkbox"/>	IBM /Microsoft DBCS	<input type="checkbox"/>	JIS C 6626

Support for Optimum Start-Stop

The b4920 controller includes a proprietary extension that can be used, together with Plain English programming, to optimize the start and stop times for heating and cooling systems based on scheduled occupancy times. The extension consists of three proprietary properties of the Schedule object type:

Name	Identifier	Meaning
Previous_Transition_Time	512	The time when the Schedule's Present_Value most recently changed value
Next_Transition_Time	513	The time when the Schedule's Present_Value is next scheduled to change value
Following_Transition_Time	514	The time when the Schedule's Present_Value is next scheduled to change value after the time indicated by Next_Transition

These properties are unsigned integer values, each giving a date and time expressed as the number of seconds after midnight, January 1, 1970. The Plain English language, which is used to specify the behavior of Program objects, includes the ability to compare these times with the present time, and to compute time intervals.

Each transition indicates a scheduled change in the value of the Schedule's Present_Value attribute. When determining a transition, time-value pairs that specify the same value as the Schedule's Present_Value (i.e. do not change the value) are not considered transitions. Similarly, if two or more time-value pairs have the same time, only the last pair with that time is used for determining a transition.

Restrictions on Object Identifiers

The instance number portion of the Object_Identifier property has a restricted range, which depends to some extent on the object type. The valid range of instance numbers is given by the following table:

Object Type	Minimum	Maximum
Device	1	4194303
File ¹	1	1
All others	7000	65535

¹ Only one file object exists (for backup and restore) and objects of this type are not created by users.

Interpretation of Wildcards in Dates

The BACnet specification [ANSI/ASHRAE Standard 135-2001] is open to multiple interpretations regarding the meaning of wildcards in dates, especially when used to specify date ranges. The following describes how wildcards are interpreted by the controllers, especially in the context of the Schedule properties Exception_Schedule and Effective_Period, and the Calend property Date_List.

For purposes of comparing dates, the day-of-week fields are not used. That is, they are totally redundant. When comparing dates, a wildcard field is considered equal to the corresponding field in the date being compared. A date falls within the range if it is not before the StartDate and not after the endDate.

Because the day-of-week field is redundant, its value must be either unspecified or consistent with the other fields. Because it can be consistent with those fields only if they are specified, the controllers allow the day-of-week to be specified only if the other three fields are specified as well.

Accordingly, the following conditions in a date range are treated as errors and will prevent a WriteProperty from completing:

1. A day-of-week is specified but two or fewer of the other fields in the Date are specified.
2. A day-of-week is specified, but is inconsistent with the Date specified by the other fields.
3. A year field is specified, which is outside the range limit of 1989 – 2105.
4. The EndDate is earlier than the StartDate.
5. Any of the specified fields are out of range (e.g., 31st day of February).