

BSR/ASHRAE Addendum L
to ANSI/ASHRAE Standard 135-2004

Public Review Draft

ASHRAE® Standard

Proposed Addendum I to Standard 135-2004, *BACnet*®—A *Data Communication Protocol for Building Automation and Control Networks*

First Public Review (September 2007)
(Draft Shows Proposed Changes
to Current Standard)

This draft has been recommended for public review by the responsible project committee. To submit a comment on this proposed addendum, use the comment form and instructions provided with this draft. The draft is subject to modification until it is approved for publication by the responsible project committee, the ASHRAE Standards Committee, and the Board of Directors. Then it will be submitted to the American National Standards Institute Board of Standards Review (BSR) for approval. Until this time, the current edition of the standard (as modified by any published addenda on the ASHRAE web site) remains in effect. The current edition of any standard may be purchased from the ASHRAE Bookstore @ <http://www.ashrae.org> or by calling 404-636-8400 or 1-800-527-4723 (for orders in the U.S. or Canada).

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AMERICAN SOCIETY OF HEATING,
REFRIGERATING AND AIR-CONDITIONING
ENGINEERS, INC.
1791 Tullie Circle, NE · Atlanta GA 30329-2305



[This foreword and the “rationale” on the following page are not part of this standard. They are merely informative and do not contain requirements necessary for conformance to the standard.]

FOREWORD

The purpose of this addendum is to present a proposed change for public review. These modifications are the result of change proposals made pursuant to the ASHRAE continuous maintenance procedures and of deliberations within Standing Standard Project Committee 135. The proposed changes are summarized below.

135-2004-1. Add new workstation BIBBs and profiles, p. 1.

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2004 and Addenda is indicated through the use of *italics*, while deletions are indicated by ~~strike through~~. Where entirely new subclauses are proposed to be added, plain type is used throughout. Only this new and deleted text is open to comment as this time. All other material in this addendum is provided for context only and is not open for public review comment except as it relates to the proposed changes.

135-2004I-1. Add new workstation BIBBs and profiles.

Rationale
 The original B-OWS profile was deemed insufficient for specifying the minimum capabilities of a basic operator workstation; additional BIBBs are required. Also needed are new profiles for other kinds of workstations.

Addendum 135-2004I-1

[Add new clause **K.1.X1**, p.579.]

K.1.X1 BIBB - Data Sharing - View - A (DS-V-A)

The A device retrieves values from a minimum set of objects and properties and presents them to the user. Devices claiming conformance to DS-V-A shall support DS-RP-A. Device A shall be capable of using ReadProperty to retrieve any of the properties listed below. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
ReadProperty	x	

Devices claiming conformance to DS-V-A shall be capable of reading and displaying the object properties listed in Table K-X1.

Table K-X1: Properties For Which Presentation is Required

Analog Objects	Binary Objects	Accumulator	Averaging
Object_Name Present_Value Status_Flags Units	Object_Name Present_Value Status_Flags Active_Text Inactive_Text	Object_Name Present_Value Status_Flags Value_Before_Change Value_Set Pulse_Rate	Object_Name Minimum_Value Average_Value Maximum_Value
Command			
Object_Name Present_Value In_Process All_Writes_Successful	Object_Name System_Status	Object_Name Event_State Object_Property_Reference	Object_Name Present_Value Status_Flags Setpoint
Multi-state Objects			
Object_Name Present_Value Status_Flags	Object_Name Program_State	Object_Name Present_Value Status_Flags Adjust_Value	

The format of a presented property value is unrestricted; the intent of this BIBB is not to impose how, or in what form, a device displays data values. For example, enumerated values could be displayed as icons, references could be displayed using the referenced object's name, numerical values could be displayed graphically.

A device claiming support for DS-V-A is interoperable with devices that support DS-RP-B and support one or more of the objects listed in table K-X1.

[Add new clause **K.1.X2**, p.579.]

K.1.X2 BIBB - Data Sharing - Advanced View - A (DS-AV-A)

The A device retrieves property values and presents them to the user. Device A shall be capable of using ReadProperty to retrieve any standard property of any standard object type excluding the Life Safety and Access Control objects (e.g., Life Safety Point, Life Safety Zone, Access Door), except for those properties listed in Table K-X2. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
ReadProperty	x	

The information conveyed by the properties in Table K-X2 can be otherwise determined and as such need not be read and presented by devices claiming conformance to DS-AV-A.

Table K-X2: Excluded Standard Properties

Object_Identifier
Object_Type

In order to ensure that products that claim support for DS-AV-A are capable of presenting accurate data values across the full range of values for each data type, devices claiming support for DS-AV-A shall be able to meet the requirements described in Table K-X3.

Table K-X3: Presentation Requirements By Datatype

Enumerated	Present standard enumeration values for all standard enumeration types.
REAL, Double	Present the complete numeric value range, unless specifically restricted by the standard for the property being displayed.
Unsigned, Unsigned8, Unsigned16, Unsigned32	Present the complete value range, unless specifically restricted by the standard for the property being displayed. The minimum displayable range for Unsigned by DS-AV-A devices is the same as Unsigned32 with the exception of array indexes, which shall have a minimum displayable range of Unsigned16. In addition, any Unsigned property whose value is also used as an array index, such as a Multi-state object's Present_Value, shall have a minimum displayable range of Unsigned16.
INTEGER	Present the complete value range, unless specifically restricted by the standard for the property being displayed. The minimum displayable range for INTEGER shall be -2,147,483,648...2,147,483,647.
Date	Present all valid dates, including values that contain wildcards. Where the month, day and year fields all contain non-wildcard values, the content of the DayOfWeek field may be ignored. The format is unrestricted as long as each valid value is uniquely presented.
Time	Present all valid times, including values that contain wildcards. The format is unrestricted as long as each valid value is uniquely presented.
BIT STRING	Present standard bit string values for all standard bit string types.
BOOLEAN	Present all valid values. The format is unrestricted as long as each valid value is distinguishable.

For Character String property values, the A device shall be capable of presenting string values for specific BACnet properties with at least the number of characters, independent of their encoding, specified in Table K-X4.

Table K-X4: Minimum Character String Lengths

Action_Text	32
Application_Software_Version	64
Description	255
Description_Of_Halt	64
Device_Type	64
File_Type	32

Firmware_Revision	64
Inactive_Text/Active_Text	32
Instance_Of	64
Location	64
Model_Name	64
Object_Name	64
Profile_Name	64
State_Text	32
Vendor_Name	64
All other character string properties	32

The above presentation requirements are not required to be applied in all circumstances, but rather shall be available for every property value in the system. This should allow a product to restrict its presentation under specific conditions yet still allow the user full access to any specific property value.

Where a property value contains a CHOICE construct, the A device shall be capable of reading and presenting all standard forms of the datatype as defined per the A device's claimed protocol revision.

A device claiming support for DS-AV-A is interoperable with devices that support DS-RP-B.

[Add new clause **K.1.X3**, p.579.]

K.1.X3 BIBB - Data Sharing - Proprietary View - A (DS-PV-A)

The A device retrieves values of simple proprietary properties from in standard and proprietary objects. A device that claims conformance to this BIBB shall be able to read any property from any object in any device.

Devices claiming conformance to DS-PV-A shall support DS-RP-A. Device A shall be capable of using ReadProperty to retrieve any property from any object in any device. If the value returned is a single element of one of BACnet's basic datatypes, the A device shall be able to present the value to the user. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
ReadProperty	x	

In order to ensure that products that claim support for DS-PV-A are capable of presenting accurate data values across the full range of values for each data type, devices claiming support for DS-PV-A shall comply with the requirements of Table K-X5.

Table K-X5: Presentation Requirements By Datatype

Enumerated	Present enumeration values in the range (0...65535).
REAL, Double	Present the complete numeric value range, unless specifically restricted by the standard for the property being displayed.
Unsigned, Unsigned8, Unsigned16, Unsigned32	Present the complete value range, unless specifically restricted by the standard for the property being displayed. The minimum displayable range for Unsigned by DS-PV-A devices is the same as Unsigned32.
INTEGER	Present the complete value range (-2,147,483,648...2,147,483,647).
Date	Present all valid dates, including values that contain wildcards. Where the month, day and year fields all contain non-wildcard values, the content of the DayOfWeek field may be ignored. The format is unrestricted as long as each valid value is uniquely presented.
Time	Present all valid times, including values that contain wildcards. The format is unrestricted as long as each valid value is uniquely presented.
BIT STRING	Present bit string values for bit strings up to 4 octets in length

	(excluding the unused-bits octet).
BOOLEAN	Present all valid values. The format is unrestricted as long as each valid value is distinguishable.
Character String	Present Character Strings up to 255 characters in length.
Octet String	Present Octet Strings up to 255 octets in length.
Object Identifier	Present all values.

The format of a presented property value is unrestricted; the intent of this BIBB is not to impose how, or in what form, a device displays data values. For example, enumerated values could be displayed as icons, references could be displayed using the referenced object's name, or numerical values could be displayed graphically.

A device claiming support for DS-PV-A is interoperable with devices that support DS-RP-B and support one or more proprietary properties.

[Add new clause **K.1.X4**, p. 579.]

K.1.X4 BIBB - Data Sharing –Modify - A (DS-M-A)

The A device writes properties that are generally expected to be adjusted during normal operation of the system. Devices claiming support for this BIBB are not expected to be capable of fully configuring BACnet devices, although they are not inherently restricted from doing so.

BACnet Service	Initiate	Execute
WriteProperty	x	

Devices claiming conformance to DS-M-A shall be capable of commanding and relinquishing standard commandable properties at priority 8 (other priorities may also be supported), and writing the properties listed in Table K-X6.

Table K-X6: Standard Properties That DS-M-A Devices Shall Be Capable Of Writing

All Object Types (from Table K.X2)	Accumulator	Averaging
Present_Value Out_Of_Service	Value_Before_Change Value_Set Pulse_Rate	Attempted_Samples Window_Interval Window_Samples
Loop	Program	Pulse Converter
Setpoint	Program_Change	Adjust_Value

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in Table K-X7.

Table K-X7: Minimum Writable Value Ranges

Datatype	Value Range
NULL	NULL
Boolean	All valid values.
Unsigned8	The complete value range (0..255).
Unsigned16	The complete value range (0..65535).
Unsigned, Unsigned32	The complete value range (0..4,294,967,295) with the exception of array indexes which shall have a minimum writable range of Unsigned16. In addition, any Unsigned property whose value is also used as an array index, such as a Multi-state object's Present_Value, shall have a minimum writable range of Unsigned16.

INTEGER	The complete value range (-32768...32767).
REAL	All valid values except the special values such as INF, -INF, NaN, etc.
Double	All valid values except the special values such as INF, -INF, NaN, etc.
Enumerated	The standard values defined for the property being modified as defined by the claimed protocol revision of the A device.

Devices capable of writing to properties that are not required to be writable by the standard should be prepared to receive errors from some devices.

A device claiming support for DS-V-A is interoperable with devices that support DS-WP-B and support one or more of the objects listed in table K-X1.

[Add new clause **K.1.X5**, p. 579.]

K.1.X5 BIBB - Data Sharing – Advanced Modify - A (DS-AM-A)

The A device uses WriteProperty to modify all standard properties of the object types listed in DS-AV-A where the property is not required to be read-only, or to which access is otherwise restricted by the standard (e.g. Log_Buffer). Devices shall be capable of commanding and relinquishing standard commandable properties at any priority. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
WriteProperty	x	

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in Table K-X7.

A device claiming support for DS-V-A is interoperable with devices that support DS-WP-B and support one or more of the objects listed in table K-X1.

[Add new clause **K.2.X1**, p. 582.]

K.2.X1 BIBB - Alarm and Event Management – View Notifications - A (AE-VN-A)

Device A presents basic alarm and event notifications to the user. Device A shall support AE-N-A and shall be capable of presenting any alarm or event notifications covered by AE-N-A to the user. The information conveyed to the user shall include identification of the event-generating object or the monitored object, the event's timestamp and the event's Message Text. Any other information conveyed to the user shall be consistent with the data contained in the notification.

BACnet Service	Initiate	Execute
ConfirmedEventNotification		x
UnconfirmedEventNotification		x

Device A shall be capable of presenting at least 32 characters of Message Text, although it is suggested that devices claiming this BIBB be capable of displaying 255 characters of Message Text.

A device claiming support for AE-VN-A is interoperable with devices that support AE-N-B.

[Add new clause **K.2.X2**, p. 582.]

K.2.X2 BIBB - Alarm and Event Management – Advanced View Notifications - A (AE-AVN-A)

Device A presents complete alarm and event notifications to the user. Device A shall support AE-VN-A. In addition to the requirements of AE-VN-A, Device A shall be capable of presenting the event Notification Class, Priority, Notify Type, Ack Required, To State and Event Values to the user. Device A shall be capable of presenting at least 255 characters of Message Text.

BACnet Service	Initiate	Execute
ConfirmedEventNotification		x
UnconfirmedEventNotification		x

A device claiming support for AE-AVN-A is interoperable with devices that support AE-N-B.

[Add new clause **K.2.X3**, p. 582.]

K.2.X3 BIBB - Alarm and Event Management - View and Modify - A (AE-VM-A)

Device A displays and modifies high and low limits in alarm generating objects.

Device A shall support DS-RP-A and DS-WP-A. The A device shall be capable of using ReadProperty to retrieve and WriteProperty to modify any of the properties listed below. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
ReadProperty	x	
WriteProperty	x	

Devices claiming conformance to AE-VM-A shall be capable of reading, presenting and writing alarming related properties from the following standard object types:

Table K-X8: Object Types For Which Presentation is Required

Accumulator	Event Enrollment
Analog Input	Loop
Analog Output	Pulse Converter
Analog Value	

Table K-X9: Properties AE-VM-A That Devices Shall Be Capable Of Presenting and Modifying

Accumulator	Analog Objects	Event Enrollment	Loop	Pulse Converter
High_Limit	High_Limit	Event_Parameters	Error_Limit	High_Limit
Low_Limit	Low_Limit			Low_Limit
Limit_Monitoring_Interval	Deadband			Deadband

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in Tables K-X3 and K-X4. Such devices need only be capable of presenting and modifying Event_Parameters for the standard algorithms that have high and low numerical limits, such as OUT_OF_RANGE, and FLOATING_LIMIT

A device claiming support for AE-VM-A is interoperable with devices that support AE-N-B.

[Add new clause **K.2.X4**, p. 582.]

K.2.X4 BIBB - Alarm and Event Management - Advanced View and Modify - A (AE-AVM-A)

Device A configures alarm generating objects and Notification class objects in Device B. Device A shall support DS-RP-A, DS-WP-A, and DM-OCD-A. The A device shall be capable of using ReadProperty to retrieve and WriteProperty to modify any of the properties listed below. Device A may use alternate services where support for execution of the alternate service is supported by Device B. Device A shall be capable of creating/deleting Event Enrollment and Notification Class objects in a B device that supports creation/deletion of those object types.

BACnet Service	Initiate	Execute
CreateObject	x	
DeleteObject	x	

ReadProperty	x	
WriteProperty	x	

Devices claiming conformance to AE-AVM-A shall be capable of reading, presenting and writing alarming-related properties from the standard object types listed in Table X-10.

Table K-X10: Object Types For Which Presentation is Required

Accumulator	Binary Output	Multi-state Output
Analog Input	Binary Value	Multi-state Value
Analog Output	Event Enrollment	Notification Class
Analog Value	Loop	Pulse Converter
Binary Input	Multi-state Input	

Table K-X11: Properties AE-AVM-A That Devices Shall Be Capable Of Presenting and Modifying

All Object Types (from Table K-X10)	Accumulator	Analog Objects
Event_State Event_Enable Notification_Class Event_Time_Stamps Time_Delay	Pulse_Rate High_Limit Low_Limit Limit_Monitoring_Interval	Limit_Enable High_Limit Low_Limit Deadband
Binary Input, Binary Value	Binary Output	Event Enrollment
Alarm_Value	Feedback_Value	Object_Property_Reference Event_Parameters Notify_Type
Loop	Multi-state Input, Multi-state Output	Multi-state Output
Error_Limit	Alarm_Values Fault_Values	Feedback_Value
Notification Class	Pulse Converter	
Priority Ack_Required Recipient_List	Limit_Enable High_Limit Low_Limit Deadband	

Devices claiming support for this BIBB shall be capable of writing the full range of values as defined in Tables K-X3 and K-X4. Such devices shall also be capable of writing any standard form of the Event_Parameters property to any Event Enrollment object (excluding BUFFER_READY) and any standard form of BACnetDestination to any Notification Class object's Recipient_List property.

A device claiming support for AE-AVM-A is interoperable with devices that support AE-N-B.

[Delete clause K.2.6, p.580, and renumber subsequent clauses.]

K.2.6 BIBB – Alarm and Event Alarm Summary A (AE-ASUM-A)

Device A requests summaries of alarms from device B.

BACnet Service	Initiate	Execute
GetAlarmSummary	x	

[Delete clause K.2.10, p. 581, and renumber subsequent clauses.]

K.2.10 BIBB – Alarm and Event Information A (AE-INFO-A)

Device A requests event information from device B.

BACnet Service	Initiate	Execute
GetEventInformation	*	

[Add new clause K.2.X5, p. 582.]

K.2.X5 BIBB - Alarm and Event Management - Alarm Summary View - A (AE-AS-A)

Device A presents alarm summary information to the user. Device A uses GetEventInformation to retrieve or update alarm summary information presented to the user. When confronted with a device that does not support execution of GetEventInformation, Device A uses GetAlarmSummary instead. Device A may use alternate alarm and event summary services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
GetEventInformation	x	
GetAlarmSummary	x	

Device A is not required to rely solely on the event summary services for retrieval of event information. It may use the information contained in received event notifications to build the alarm summary. In such a case, a device claiming conformance to this BIBB shall use the summarization services to update this information. Presentation content and format is a local matter.

A device claiming support for AE-AS-A is interoperable with devices that support AE-INFO-B or AE-ASUM-B.

[Change clause K.3.1, p. 582.]

K.3.1 BIBB - Scheduling-Advanced View Modify-A (~~SCHED-A~~ SCH-AVM-A)

The A device manipulates schedules and calendars on the B device. The A device ~~must~~ shall support the DM-OCD-A, DS-RP-A and DS-WP-A BIBBs.

BACnet Service	Initiate	Execute
CreateObject	x	
DeleteObject	x	
ReadProperty	x	
WriteProperty	x	

The A device uses ReadProperty to retrieve for presentation and WriteProperty to modify each of the Schedule and Calendar properties listed below. The A device shall be capable of using the CreateObject and DeleteObject services to create and delete Schedule and Calendar objects on the B device. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

Table K-X12: Properties SCH-AVM-A That Devices Shall Be Capable Of Presenting and Modifying

Schedule	Calendar
Effective_Period	Date_List
Weekly_Schedule	
Exception_Schedule	
Schedule_Default	
List_Of_Object_Property_References	
Priority_For_Writing	
Out_Of_Service	

The A device shall support the creation, presentation and modification of all forms of the *Weekly_Schedule*, *Exception_Schedule* and *Date_List* properties with the following limitations. At a minimum, the A device shall be capable of handling *Exception_Schedule* properties with up to 255 entries, *Weekly_Schedule* properties with up to 6 entries per day, and *Date_List* properties with up to 32 entries.

Devices claiming support for this BIBB shall be capable of creating, deleting, presenting, and modifying Schedule objects that schedule any of the following types:

REAL, ENUMERATED, Unsigned32, NULL

The A device shall be capable of creating, deleting, presenting and modifying schedules in any B device regardless of the B device's claimed *Protocol_Revision*.

The A device shall be capable of creating, deleting, presenting and modifying schedule objects that do not contain an *Exception_Schedule*.

Devices claiming support for this BIBB shall be capable of providing values in the time/value pairs within the full range as defined in Tables K-X3 and K-X4.

A device claiming support for SCH-AVM-A is interoperable with devices that support any of the B side schedule BIBBs.

[Add new clause **K.3.X1**, p. 582.]

K.3.X1 BIBB - Scheduling-View Modify-A (SCH-VM-A)

The A device manipulates schedules and calendars on the B device. The A device shall support the DS-RP-A and DS-WP-A BIBBs.

BACnet Service	Initiate	Execute
ReadProperty	x	
WriteProperty	x	

Device A shall be capable of using ReadProperty to retrieve for presentation and WriteProperty to modify each of the Schedule and Calendar properties listed below. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

Table K-X13: Properties SCH-VM-A That Devices Shall Be Capable Of Presenting and Modifying.

Schedule	Calendar
Effective_Period	Date_List
Weekly_Schedule	
Exception_Schedule	

The A device shall support the presentation and modification of all forms of the *Weekly_Schedule*, *Exception_Schedule* and *Date_List* properties with the following limitations. At a minimum, the A device shall be capable of handling *Exception_Schedule* properties with up to 255 entries, *Weekly_Schedule* properties with up to 6 entries per day, and *Date_List* properties with up to 32 entries.

Devices claiming support for this BIBB shall be capable of presenting, and modifying Schedule objects that schedule any of the following types:

REAL, ENUMERATED, Unsigned32, NULL

The A device shall be capable of presenting and modifying schedules in any B devices regardless of the B device's claimed *Protocol_Revision*.

The A device shall be capable of presenting and modifying schedule objects that do not contain an *Exception_Schedule*.

Devices claiming support for this BIBB shall be capable of providing values in the time/value pairs within the full range as defined in Table K-X3.

A device claiming support for SCH-VM-A is interoperable with devices that support any of the B-side schedule BIBBs.

[Add new **K.3.X2**, p. 582.]

K.3.X2 BIBB - Scheduling-Weekly Schedule-A (SCH-WS-A)

The A device manipulates the weekly schedule portion of schedules on the B device. The A device shall support the DS-RP-A and DS-WP-A BIBBs.

BACnet Service	Initiate	Execute
ReadProperty	x	
WriteProperty	x	

The A device shall be capable of using ReadProperty to retrieve for presentation and WriteProperty to modify each of the Schedule properties listed below. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

Table K-X14: Properties SCH-WS-A That Devices Shall Be Capable Of Presenting and Modifying

Schedule
Weekly_Schedule
Schedule_Default

The A device shall support the presentation and modification of all forms of the Weekly_Schedule, property with the following limitations. At a minimum, the A device shall be capable of handling Weekly_Schedule properties with up to 6 entries per day.

Devices claiming support for this BIBB shall be capable of presenting, and modifying Schedule objects that schedule any of the following types:

ENUMERATED, REAL, NULL

The A device shall be capable of presenting and modifying schedules in B devices that claim a Protocol_Revision less than or equal to that of the A device.

[Add new clause **K.3.X3**, p. 582.]

K.3.X4 BIBB - Scheduling-Weekly Schedule Internal-B (SCH-WS-I-B)

The B device provides weekly scheduling of the values of specific properties of specific objects within the device. In addition to supporting the DS-RP-B and DS-WP-B BIBBs, each device claiming conformance to SCH-WSI-B shall also be capable of possessing at least one Schedule object. Devices claiming conformance to SCH-WSI-B shall also support either DM-TS-B or DM-UTC-B.

BACnet Service	Initiate	Execute
ReadProperty		x
WriteProperty		x
TimeSynchronization		x
UTCTimeSynchronization		x

The Schedule object shall support at least 6 entries per day in the Weekly_Schedule property. The schedule shall support the scheduling of BACnetBinaryPV values. The Priority_For_Writing property in the Schedule object shall be writable.

[Change clause **K.3.2**, p. 582.]

K.3.2 BIBB - Scheduling-Internal-B (~~SCHEM-I-B~~ SCH-I-B)

The B device provides date and time scheduling of the values of specific properties of specific objects within the device. In addition to supporting the DS-RP-B and DS-WP-B BIBBs, each device claiming conformance to ~~SCHEM-I-B~~ SCH-I-B shall also *be capable of* possessing at least one Calendar and one Schedule object. Devices claiming conformance to ~~SCHEM-I-B~~ SCH-I-B shall also support either DM-TS-B or DM-UTC-B.

The Schedule object ~~must~~ shall support a writable Weekly_Schedule property and at least 6 entries per day. ~~The List_of_Object_Property_References property shall support at least one entry.~~ The Schedule object ~~must~~ shall support a writable, non-empty Exception_Schedule property. The Priority_For_Writing property in the Schedule object shall be writable.

[Change clause K.3.3, p. 582.]

K.3.3 BIBB - Scheduling-External-B (~~SCHEM-E-B~~ SCH-E-B)

The B device provides date and time scheduling of the values of specific properties of specific objects in other devices. Devices claiming conformance to ~~SCHEM-E-B~~ SCH-E-B shall also support ~~SCHEM-I-B~~ SCH-I-B and DS-WP-A. The List_of_Object_Property_References property shall support references to objects in external devices *and be writable*.

[Add new Clause K.3.4, p. 582]

K.3.4 BIBB - Scheduling-Readable-B (SCH-R-B)

The B device provides readable Schedule object(s). Each device claiming conformance to SCH-R-B shall be capable of possessing at least one Schedule object, support DS-RP-B and either DM-TS-B or DM-UTC-B. The Schedule object is not required to be modifiable via BACnet services in order to claim support for this BIBB.

This BIBB is primarily included in the BACnet standard to allow gateway devices to indicate support for exposing the content of schedules found in devices from other protocols.

[Change clause K.4.1, p. 582.]

K.4.1 BIBB - Trending-Advanced Viewing and Modifying Trends-A (~~T-VMT-AT-AVM-A~~)

The A device displays trend data from the B device and manipulates trend log collection parameters in the B device. *Devices claiming support for this BIBB shall support DS-RP-A and DS-WP-A.*

BACnet Service	Initiate	Execute
CreateObject	x	
DeleteObject	x	
ReadProperty	x	
ReadRange	x	
WriteProperty	x	

The A device shall be capable of using ReadRange to retrieve and display the Trend Log's Log_Buffer property, ReadProperty to retrieve and display Trend Log properties, WriteProperty to modify Trend Log properties, and CreateObject and DeleteObject to create and delete Trend Log, Event Enrollment and Notification Class objects. The properties that the A device shall be capable of reading and writing are listed below. Device A may use alternate services where support for execution of the alternate service is supported by the B Device.

Table K-X12: Trend Log Object Properties T-AVM-A That Devices Shall Be Capable Of Presenting and Modifying

Log_Enable	Record_Count
Start_Time	Total_Record_Count (retrieve only)
Stop_Time	Notification_Threshold
Log_DeviceObjectProperty	Last_Notify_Record (retrieve only)

<i>Log_Interval</i> <i>COV_Resubscription_Interval</i> <i>Client_COV_Increment</i> <i>Stop_When_Full</i> <i>Buffer_Size</i>	<i>Event_State (retrieve only)</i> <i>Notification_Class</i> <i>Event_Enable</i> <i>Event_Time_Stamps (retrieve only)</i>
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In addition, devices claiming support for T-AVM-A shall be capable of creating and configuring Event Enrollment objects to monitor Trend Log objects using the BUFFER_READY algorithm. The A device shall also be capable of creating and configuring Notification Class objects (as described in AE-AVM-A) for setup of Automated Trend Retrieval.

Devices claiming support for this BIBB shall be capable of presenting Trend Logs containing data of the following types:

BOOLEAN, REAL, ENUMERATED, Unsigned32, INTEGER, BIT STRING, NULL

The A device shall be capable of interoperating with Trend Logs in devices claiming Protocol_Revision 3 or higher.

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in tables K-X3 and K-X4.

A device claiming support for T-AVM-A is interoperable with devices that support T-VM-I-B.

[Change clause **K.4.2**, p. 582.]

K.4.2 BIBB - Trending- ~~Viewing and Modifying Trends~~ View and Modify-Internal-B (~~T-VMT-I-B~~) (T-VM-I-B)

[Change clause **K.4.3**, p. 582.]

K.4.3 BIBB - Trending- ~~Viewing and Modifying Trends~~ View and Modify-External-B (~~T-VMT-E-B~~) (T-VM-E-B)

[Add new clause **K.4.X1**, p. 583.]

K.4.X1 BIBB - Trending – View - A (T-V-A)

The A device displays trend data from the B device.

BACnet Service	Initiate	Execute
ReadRange	x	

The A device uses ReadRange to retrieve and display the Trend Log object’s Log_Buffer property.

Devices claiming support for this BIBB shall be capable of presenting data from Trend Log objects containing data of the following types:

BOOLEAN, REAL, ENUMERATED, Unsigned32, INTEGER, BIT STRING, NULL

The A device shall be capable of retrieving data from Trend Log objects in devices claiming Protocol_Revision 3 or higher.

A device claiming support for T-V-A is interoperable with devices that support T-VM-I-B.

[Add new clause **K4.X2**, p. 583.]

K.4.X2 BIBB - Trending-Archival-A (T-A-A)

The A device supports T-ATR-A for the purpose of archiving trend data. The A device shall retrieve Trend Log data using ReadRange and archive the data using non-volatile storage for future access.

A device claiming support for T-A-A is interoperable with devices that support T-ATR-B.

[Add new clause **K5.X1**, p. 589.]

K.5.X1 BIBB - Device Management-Automatic Network Mapping-A (DM-ANM-A)

The A device finds all devices currently connected to the BACnet inter-network that are capable of executing Who-Is (DM-DDB-B) and presents the list of those devices to the user. A device claiming support for this BIBB shall support DM-DDB-A.

The A device is not required to report the presence of devices located on the far side of a non-connected PTP link.

A device claiming support for DM-ANM-A is interoperable with devices that support DM-DDB-B.

[Add new clause **K5.X2**, p. 589.]

K.5.X2 BIBB - Device Management-Automatic Device Mapping-A (DM-ADM-A)

The A device determines and presents the list of all objects contained in any BACnet device. Devices claiming support for this BIBB shall also support DS-AV-A to allow the presentation of the properties of any object in any BACnet device.

A device claiming support for DM-ADM-A is interoperable with all BACnet devices.

[Delete clause **K.5.11**, p. 585, and renumber subsequent clauses.]

~~**K.5.11 BIBB - Device Management TimeSynchronization-A (DM-TS-A)**~~

~~The A device provides time synchronization to B devices. The time parameter contained in the service request contains the date and time as determined by the clock in the device issuing the service request. Normally this will be "local time," i.e., the time in the local time zone corrected for daylight savings time as appropriate.~~

BACnet Service	Initiate	Execute
TimeSynchronization	✗	

~~Devices claiming conformance to DM-TS-A must support the Time_Synchronization_Recipients property of the Device object.~~

[Delete clause **K.5.13**, p. 585, and renumber subsequent clauses.]

~~**K.5.13 BIBB - Device Management-UTCTimeSynchronization-A (DM-UTC-A)**~~

~~The A device provides time synchronization to B devices. The time parameter contained in the service request contains "Coordinated Universal Time" (UTC). For all practical purposes, UTC is synonymous with Greenwich Mean Time, the time at the zero or Greenwich meridian.~~

BACnet Service	Initiate	Execute
UTCTimeSynchronization	✗	

~~Devices claiming conformance to DM-TS-A must support the Time_Synchronization_Recipients property of the Device object.~~

[Add new clause **K5.X3**, p. 589.]

K.5.X3 BIBB - Device Management-Automatic Time Synchronization-A (DM-ATS-A)

The A device provides periodic time synchronization to B devices. In order to support all types of BACnet devices, the A device shall be capable of periodically sending both TimeSynchronization and UTCTimeSynchronization services to all recipients listed in the A device’s Time_Synchronization_Recipients property.

BACnet Service	Initiate	Execute
TimeSynchronization	x	
UTCTimeSynchronization	x	

Devices claiming conformance to DM-ATS-A shall support a non-empty Time_Synchronization_Recipients property in its Device object and shall support all forms of the BACnetRecipient in the property.

A device claiming support for DM-ANM-A is interoperable with devices that support DM-TS-B or DM-UTC-B.

[Add new clause **K5.X4**, p. 589.]

K.5.X4 BIBB - Device Management-Manual Time Synchronization-A (DM-MTS-A)

The A device provides time synchronization to B devices at the request of the operator. In order to support all types of BACnet devices, the A device shall be capable of sending both TimeSynchronization and UTCTimeSynchronization services to any, or all, BACnet devices in the BACnet internetwork.

BACnet Service	Initiate	Execute
TimeSynchronization	x	
UTCTimeSynchronization	x	

A device claiming support for DM-ANM-A is interoperable with devices that support DM-TS-B or DM-UTC-B.

[Change clause **L.1**, p. 590.]

L.1 BACnet Advanced Operator Workstation (~~B-OWS~~) (B-AWS)

The ~~B-OWS~~ B-AWS is the *advanced* operator's window into a BACnet system. ~~While it~~ It is primarily used for the to monitor the *performance of a system and to modify parameters that affect the operation of a system, it system*. It may also be used for configuration activities that are beyond the scope of this standard. ~~It is not intended to perform direct digital control.~~

The B-AWS profile is targeted at a building operator or technician with a higher level of technical ability. It provides support for limited configuration actions and ongoing commissioning activities.

The B-AWS profile ~~it~~ enables the specification of the following:

Data Sharing

- ~~Ability to provide the values of any of its BACnet objects~~
- ~~Archival storage of data~~
- Presentation of data (i.e., reports and graphics)
- Ability to monitor the value of all BACnet object types, including all required and optional properties
- Ability to modify setpoints and parameters

Alarm and Event Management

- Operator notification and presentation of event information
- Alarm acknowledgment by operators
- Alarm summarization
- Adjustment of alarm limits
- Adjustment of alarm routing
- *Creation of new Event Enrollment and Notification Class objects*

Scheduling

- Modification of *calendars and schedules*
- Display of the start and stop times (schedule) of scheduled devices
- *Display of calendars*
- *Creation of new calendars and schedules*

Trending

- Modification of the parameters of a trend log
- Display ~~and archive~~ of trend data
- *Creation of new Trend Log objects*

Device and Network Management

- *Ability to find other BACnet devices*
- *Ability to find all objects in BACnet devices*
- Display of information about the status of any device on the BACnet internetwork
- Display of information about any object in the BACnet internetwork
- Ability to silence a device on the network that is transmitting erroneous data
- Ability to synchronize the time in devices across the BACnet internetwork *at the request of the operator*
- Ability to cause a remote device to reinitialize itself
- Ability to backup and restore the configuration of other devices
- Ability to command half-routers to establish and terminate connections
- Ability to query and change the configuration of half-routers and routers

[Add new clause **L.X1**, p. 592.]

L.X1 BACnet Operator Workstation (B-OWS)

The B-OWS is an operator interface with limited capabilities relative to a B-AWS. The B-OWS is used for monitoring and basic control of a system, but differs from a B-AWS in that it does not support configuration activities, nor does it provide advanced troubleshooting capabilities. ~~It is not intended to perform direct digital control.~~

The B-OWS profile is targeted at the daily operator who needs the ability to monitor basic system status and to perform simple modifications to the operation of the system.

The B-OWS profile enables the specification of the following:

Data Sharing

- Presentation of basic data
- Ability to modify setpoints and parameters

Alarm and Event Management

- Operator notification and presentation of event information

Scheduling

- Modification of calendars and schedules
- Display of the start and stop times (schedule) of scheduled devices
- Display of calendars

Trending

- Display of trend data

Device and Network Management

- Ability to respond to queries about its status
- Ability to find other BACnet devices
- Ability to synchronize the time in devices across the BACnet internetwork at the request of the operator

[Add new clause **L.X2**, p. 592.]

L.X2 BACnet Operator Display (B-OD)

The B-OD is a basic operator interface with limited capabilities relative to a B-OWS. It is not intended to perform direct digital control. The B-OD profile could be used for wall-mounted LCD devices, displays affixed to BACnet devices; hand-held terminals or other very simple user interfaces.

The B-OD profile enables the specification of the following:

Data Sharing

- Presentation of basic data
- Ability to modify setpoints and parameters

Alarm and Event Management

- Operator notification and presentation of event information

Scheduling

- No minimum requirements

Trending

- No minimum requirements

Device and Network Management

- Ability to respond to queries about its status
- Ability to find other BACnet devices

[Add new clause **L.X3**, p. 592.]

L.X3 BACnet Life-safety Workstation (B-LSWS)

The B-LSWS is an advanced operator workstation that supports the life-safety features of BACnet. It enables the specification of the B-AWS functionality as well as the following:

Data Sharing

- Presentation of life-safety data

Alarm and Event Management

- Operator notification and presentation of life-safety event information
- Life-safety silence and reset operations by operators

[Change clause **L.7**, p. 593.]

[Note: The AE-LS-A BIBB was published in Addendum 135-2004d-4.]

L.7 Profiles of the Standard BACnet Devices

The following tables indicate which BIBBs ~~must~~ *shall* be supported by each device type for each interoperability area.

	B-OWS-B-AWS	B-LSWS	B-OWS	B-OD
Data Sharing	DS-RP-A,B	<i>DS-RP-A,B</i>	<i>DS-RP-A,B</i>	<i>DS-RP-A,B</i>
	DS-RPM-A	<i>DS-RPM-A</i>	<i>DS-RPM-A</i>	
	DS-WP-A	<i>DS-WP-A</i>	<i>DS-WP-A</i>	<i>DS-WP-A</i>
	DS-WPM-A	<i>DS-WPM-A</i>	<i>DS-WPM-A</i>	
	<i>DS-AV-A</i>	<i>DS-AV-A</i>	<i>DS-V-A</i>	<i>DS-V-A</i>
	<i>DS-AM-A</i>	<i>DS-AM-A</i>	<i>DS-M-A</i>	<i>DS-M-A</i>

	<i>DS-PV-A</i>			
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	B-OWS-B-AWS	B-LSWS	B-OWS	B-OD
Alarm & Event	<i>AE-N-A</i>	<i>AE-N-A</i>	<i>AE-N-A</i>	
Mgmt	<i>AE-ACK-A</i>	<i>AE-ACK-A</i>	<i>AE-ACK-A</i>	
	<i>AE-INFO-A</i>			
	<i>AE-ESUM-A</i>			
	<i>AE-AS-A</i>	<i>AE-AS-A</i>	<i>AE-AS-A</i>	
	<i>AE-AVM-A</i>	<i>AE-AVM-A</i>	<i>AE-VM-A</i>	
	<i>AE-AVN-A</i>	<i>AE-AVN-A</i>	<i>AE-VN-A</i>	<i>AE-VN-A</i>
		<i>AE-LS-A</i>		

	B-OWS-B-AWS	B-LSWS	B-OWS	B-OD
Scheduling	<i>SCHED-A</i> <i>SCH-AVM-A</i>	<i>SCH-AVM-A</i>	<i>SCH-VM-A</i>	

	B-OWS-B-AWS	B-LSWS	B-OWS	B-OD
Trending	<i>T-VMT-A</i> <i>T-AVM-A</i>	<i>T-AVM-A</i>	<i>T-V-A</i>	
	<i>T-ATR-A</i>			

	B-OWS-B-AWS	B-LSWS	B-OWS	B-OD
Device & Network Mgmt	<i>DM-DDB-A,B</i>	<i>DM-DDB-A,B</i>	<i>DM-DDB-A,B</i>	<i>DM-DDB-A,B</i>
	<i>DM-ANM-A</i>			
	<i>DM-ADM-A</i>			
	<i>DM-DOB-A,B</i>	<i>DM-DOB-B</i>	<i>DM-DOB-B</i>	<i>DM-DOB-B</i>
	<i>DM-DCC-A</i>	<i>DM-DCC-A</i>		
	<i>DM-TS-A</i> <i>DM-MTS-A</i>	<i>DM-MTS-A</i>	<i>DM-MTS-A</i>	
	<i>DM-UTC-A</i>			
	<i>DM-OCD-A</i>	<i>DM-OCD-A</i>		
	<i>DM-RD-A</i>	<i>DM-RD-A</i>		
	<i>DM-BR-A</i>	<i>DM-BR-A</i>		
	<i>NM-CE-A</i>	<i>NM-CE-A</i>		

	B-BC	B-AAC	B-ASC	B-SA	B-SS
Data Sharing	DS-RP-A,B	DS-RP-B	DS-RP-B	DS-RP-B	DS-RP-B
	DS-RPM-A,B	DS-RPM-B	DS-WP-B	DS-WP-B	
	DS-WP-A,B	DS-WP-B			
	DS-WPM-B	DS-WPM-B			
	DS-COVU-A,B				

	B-BC	B-AAC	B-ASC	B-SA	B-SS
Alarm & Event	AE-N-I-B	AE-N-I-B			
Mgmt	AE-ACK-B	AE-ACK-B			
	AE-INFO-B	AE-INFO-B			
	AE-ESUM-B				

	B-BC	B-AAC	B-ASC	B-SA	B-SS
Scheduling	SCHED-E-B	SCHED-I-B			

	B-BC	B-AAC	B-ASC	B-SA	B-SS
Trending	T-VMF-I-B				
	T-ATR-B				

	B-BC	B-AAC	B-ASC	B-SA	B-SS
Device & Network Mgmt	DM-DDB-A,B	DM-DDB-B	DM-DDB-B		
	DM-DOB-A,B	DM-DOB-B	DM-DOB-B		
	DM-DCC-B	DM-DCC-B	DM-DCC-B		
	DM-TS-B or DM-UTC-B	DM-TS-B or DM-UTC-B			
	DM-RD-B	DM-RD-B			
	DM-BR-B				
	NM-CE-A				