Public Review Draft

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ASHRAE® Standard

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

Second Public Review (September 2008)
(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, go to the ASHRAE website at **http://www.ashrae.org/technology/page/331** and access the online comment database. 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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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*l*-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 ~~strikethrough~~. 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.

135-2004*l*-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 135-2004*l*-1

[Add new Clauses **3.2.55**, and **3.2.56** and renumber following clauses, p. 5.]

> **3.2.55 standard object type:** *an object type defined by this standard where the numerical value is within the range reserved for ASHRAE.*

> **3.2.56 standard property:** *a required or optional property of a standard object type where the numerical value of the property identifier is within the range reserved for ASHRAE and the property is listed in the object type's properties table in Clause 12.*

[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

Object Type	Properties
Analog Input	Object_Name, Present_Value, Status_Flags, Units
Analog Output	Object_Name, Present_Value, Status_Flags, Units
Analog Value	Object_Name, Present_Value, Status_Flags, Units
Binary Input	Object_Name, Present_Value, Status_Flags, Active_Text, Inactive_Text
Binary Output	Object_Name, Present_Value, Status_Flags, Active_Text, Inactive_Text
Binary Value	Object_Name, Present_Value, Status_Flags, Active_Text, Inactive_Text
Accumulator	Object_Name, Present_Value, Status_Flags, Value_Before_Change, Value_Set, Pulse_Rate
Averaging	Object_Name, Minimum_Value, Average_Value, Maximum_Value
Command	Object_Name, Present_Value, In_Process, All_Writes_Successful
Device	Object_Name, System_Status
Event Enrollment	Object_Name, Event_State, Object_Property_Reference
Loop	Object_Name, Present_Value, Status_Flags, Setpoint
Multi-state Input	Object_Name, Present_Value, Status_Flags
Multi-state Output	Object_Name, Present_Value, Status_Flags
Multi-state Value	Object_Name, Present_Value, Status_Flags
Program	Object_Name, Program_State
Pulse Converter	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.

Actions taken by Device A when retrieval of a value for display fails are a local matter.

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 and any property defined by the standard as not readable via ReadProperty. 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

Property
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

Datatype	Requirement
Enumerated	Present the complete range of standard values defined for all standard enumeration types for the Protocol_Revision claimed by the A device. The actual presentation of the values is unrestricted (text, numeric, iconic, etc) as long as the individual values are distinguishable.
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 -2147483648...2147483647.
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 the complete range of standard values defined for all standard bit string types for the Protocol_Revision claimed by the A device. The actual presentation of the values is unrestricted (text, numeric, iconic, etc) as long as the individual values are distinguishable.
BOOLEAN	Present all valid values. The format is unrestricted as long as each valid value is distinguishable.
NULL	Present NULL values. The format is unrestricted as long as NULL is distinguishable from other values.
BACnetObjectIdentifier	Present all valid values. The format is unrestricted as long as each valid value is distinguishable. It is acceptable that BACnetObjectIdentifier values be replaced with unique object identification values such as the object's name, where available.

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

Property	Minumum Length
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.

Actions taken by Device A when retrieval of a value for display fails are a local matter.

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 – 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-X5.

Table K-X5. Standard Properties That DS-M-A Devices Shall Be Capable Of Writing

Object Type(s)	Properties
All object types from Table K.X1	Present_Value, Out_Of_Service
Accumulator	Value_Before_Change, Value_Set, Pulse_Rate
Loop	Setpoint
Program	Program_Change
Pulse Converter	Adjust_Value

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in Table K-X6.

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Table K-X6. 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..4294967295) 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	Valid values across the complete range of the datatype except the special values such as INF, -INF, NaN, etc. The presision of values that can be written may be restricted.
Double	Valid values across the complete range of the datatype except the special values such as INF, -INF, NaN, etc. The precision of values that can be written may be restricted.
Enumerated	The standard values defined for the property being modified as defined by the claimed protocol revision of the A device.
BACnetObjectIdentifier	All valid values.
Character String	Strings up to lengths described in Table K-X4.

A device claiming support for DS-M-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.X4**, p. 579.]

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

The A device is able to use WriteProperty to modify 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) 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-X6.

A device claiming support for DS-AM-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-X7. Properties That AE-VM-A Devices Shall Be Capable Of Presenting and Modifying

Object Type	Properties
Accumulator	High_Limit, Low_Limit, Limit_Monitoring_Interval
Analog Input	High_Limit, Low_Limit, Deadband
Analog Output	High_Limit, Low_Limit, Deadband
Analog Value	High_Limit, Low_Limit, Deadband
Event Enrollment	Event_Parameters
Loop	Error_Limit
Pulse Converter	High_Limit, Low_Limit, 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 following standard object types:.

Table K-X8. Properties That AE-AVM-A Devices Shall Be Capable Of Presenting and Modifying

Object Type	Properties
Accumulator	Pulse_Rate, High_Limit, Low_Limit, Limit_Monitoring_Interval
Analog Input	Limit_Enable, High_Limit, Low_Limit, Deadband
Analog Output	Limit_Enable, High_Limit, Low_Limit, Deadband
Analog Value	Limit_Enable, High_Limit, Low_Limit, Deadband
Binary Input	Alarm_Value
Binary Output	Feedback_Value[2]
Binary Value	Alarm_Value
Event Enrollment	Object_Property_Reference, Event_Parameters, Notify_Type
Loop	Error_Limit
Multi-state Input	Alarm_Values, Fault_Values
Multi-state Output	Feedback_Value[2]
Multi-state Value	Alarm_Values, Fault_Values
Notification Class	Priority, Ack_Required, Recipient_List
Pulse Converter	Limit_Enable, High_Limit, Low_Limit, Deadband
All object types above[1]	Acked_Transitions[2], Event_State[2], Event_Enable, Notification_Class, Event_Time_Stamps[2], Time_Delay

[1] For object types that include these properties.
[2] AE-AVM-A devices need only be capable of presenting these properties; not modifying them.

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.

Actions taken by Device A when retrieval of a value for display fails are a local matter.

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.2.8**, p. 581, and renumber subsequent clauses.]

~~K.2.8 BIBB - Alarm and Event-Enrollment Summary-A (AE-ESUM-A)~~

~~Device A requests event enrollments from device B.~~

BACnet Service	Initiate	Execute
~~GetEnrollmentSummary~~	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~~	x	

[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	
GetEnrollmentSummary	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, AE-ESUM-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-X9. *Properties SCH-AVM-A That Devices Shall Be Capable Of Presenting and Modifying*

Object Type	Properties
Calendar	*Date_List*
Schedule	*Effective_Period, 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, and 12 BACnetTimeValue tuples per entry, 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
and shall be capable of changing the datatype that a Schedule object schedules. Schedule objects contain a number of properties that need to be consistent in the datatype of the values they contain. Devices claiming support for this BIBB shall be prepared to interact, allow display and modification of, Schedule objects that are self-inconsistent.

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.

Actions taken by Device A when retrieval of a value for display fails are a local matter.

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-X10. Properties That SCH-VM-A Devices Shall Be Capable Of Presenting and Modifying

Object Type	Properties
Calendar	Date_List
Schedule	Effective_Period, 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, and 12 BACnetTimeValue tuples per entry, 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 Clause **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-X11. Properties That SCH-WS-A Devices Shall Be Capable Of Presenting and Modifying

Object Type	Properties
Schedule	Weekly_Schedule

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.X3 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 via Schedule objects that do not contain Exception_Schedules. In addition to supporting the DS-RP-B and DS-WP-B BIBBs, each device claiming conformance to SCH-WS-I-B shall also be capable of possessing at least one Schedule object. Devices claiming conformance to SCH-WS-I-B shall also support either DM-TS-B or DM-UTC-B.

BACnet Service	Initiate	Execute
ReadProperty		x
WriteProperty		x
TimeSynchonization		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 (~~SCHED-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 ~~SCHED-I-B~~ *SCH-I-B* shall also *be capable of* possess*ing* at least one Calendar and one Schedule object. Devices claiming conformance to ~~SCHED-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 (~~SCHED-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 ~~SCHED-E-B~~ *SCH-E-B* shall also support ~~SCHED-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.X4, p. 582]

K.3.X4 BIBB - Scheduling-Readonly-B (SCH-R-B)

The B device provides read-only 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 Weekly_Schedule and Exception_Schedule properties of the Schedule object shall be read-only when accessed directly via BACnet services, but may be modifiable by other means.

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* View~~ing~~ and Modif~~ying~~ ~~Trends~~-A (~~T-VMT-A~~*T-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. Properties That T-AVM-A Devices Shall Be Capable Of Presenting and Modifying

Object Type	Properties
Trend Log	*Log_Enable, Start_Time, Stop_Time, Log_DeviceObjectProperty, Log_Interval, COV_Resubscription_Interval, Client_COV_Increment, Stop_When_Full, Buffer_Size, Record_Count, Total_Record_Count[1] Notification_Threshold, Last_Notify_Record[1], Event_State[1], Notification_Class, Event_Enable, Event_Time_Stamps[1]*

[1] *T-AVM-A devices need only be capable of presenting these properties; not modifying them.*

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 archives trend data from the B device. The A device shall support T-ATR-A and shall be capable of using the BUFFER_READY notifications to ensure that Trend Log data is retrieved using ReadRange and archived before the Trend Log data is removed from the Log_Buffer property due to the addition of newly collected samples. The archived data shall be stored in 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 internetwork that support 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 is capable of determining and presenting a list of all objects contained in any BACnet device. Devices claiming support for this BIBB shall also support DS-RP-A to retrieve and display the Object_Name property of any object in any BACnet device. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

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~~	~~x~~	

~~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~~	~~x~~	

~~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 TimeSynchronization and UTCTimeSynchronization services to recipients listed in the A device's Time_Synchronization_Recipients and UTC_Time_Synchronization_Recipients properties.

BACnet Service	Initiate	Execute
TimeSynchronization	x	
UTCTimeSynchronization	x	

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

A device claiming support for DM-ATS-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-MTS-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.X5**, p. 592.]

L.X5 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
• Alarm acknowledgment by operators
• Alarm summarization
• Adjustment of analog alarm limits

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.X6**, p. 592.]

L.X6 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

[Change Clause **L.7**, p. 593.]
[Note: The AE-LS-A BIBB was published in Addendum 135-2004*d*-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-OWS*	*B-OD*
Data Sharing	DS-RP-A,B	*DS-RP-A,B*	*DS-RP-A,B*
	DS-RPM-A	*DS-RPM-A*	
	DS-WP-A	*DS-WP-A*	*DS-WP-A*
	DS-WPM-A	*DS-WPM-A*	
	DS-AV-A	*DS-V-A*	*DS-V-A*
	DS-AM-A	*DS-M-A*	*DS-M-A*

	~~B-OWS~~ *B-AWS*	*B-OWS*	*B-OD*
Alarm & Event Mgmt	AE-N-A	*AE-N-A*	
	AE-ACK-A	*AE-ACK-A*	
	~~*AE-INFO-A*~~		
	~~*AE-ESUM-A*~~		
	AE-AS-A	*AE-AS-A*	
	AE-AVM-A	*AE-VM-A*	
	AE-AVN-A	*AE-VN-A*	*AE-VN-A*

	~~B-OWS~~ *B-AWS*	*B-OWS*	*B-OD*
Scheduling	~~SCHED-A~~ *SCH-AVM-A*	*SCH-VM-A*	

	~~B-OWS~~ *B-AWS*	*B-OWS*	*B-OD*
Trending	~~T-VMT-A~~ *T-AVM-A*	*T-V-A*	
	~~T-ATR-A~~		

	~~B-OWS~~ *B-AWS*	*B-OWS*	*B-OD*
Device & Network Mgmt	DM-DDB-A,B	*DM-DDB-A,B*	*DM-DDB-A,B*
	DM-ANM-A		
	DM-ADM-A		
	DM-DOB-~~A,~~B	*DM-DOB-B*	*DM-DOB-B*
	DM-DCC-A		
	~~DM-TS-A~~ *DM-MTS-A*	*DM-MTS-A*	
	~~DM-UTC-A~~		
	DM-OCD-A		
	DM-RD-A		
	DM-BR-A		
	NM-CE-A		

	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 Mgmt	AE-N-I-B	AE-N-I-B			
	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	SCH~~ED~~-E-B	SCH~~ED~~-I-B			

	B-BC	**B-AAC**	**B-ASC**	**B-SA**	**B-SS**
Trending	T-VM~~T~~-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				