Public Review Draft

Proposed Addendum *bx* to Standard 135-2016, BACnet® - A Data Communication Protocol for Building Automation and Control Networks

First Public Review (March 2019)
(Draft shows Proposed Changes to Current Standard)

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[This foreword and the "rationales" on the following pages 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.

135-2016*bx*-1. Add Device Address Proxy functions, p. 3

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2016 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 at this time. All other material in this document is provided for context only and is not open for public review comment except as it relates to the proposed changes.

The use of placeholders like X, Y, Z, X1, X2, N, NN, x, n, ?, etc., should not be interpreted as literal values of the final published version. These placeholders will be assigned actual numbers/letters only after final publication approval of the addendum.

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135-2016*bx*-1. Add Device Address Proxy functions

Rationale

Broadcast Who-Is requests and the resulting I-Am requests can affect the performance of large networks. This proposal provides a mechanism to minimize that traffic.

This addendum describes a mechanism by which a BACnet router can perform I-Am request proxying for any directly connected BACnet network.

[Change **Clause 6.3.2**, p. 62]

6.3.2 Broadcast Messages

Three forms of broadcast transmission are provided by BACnet: local, remote, and global. A local broadcast is received by all stations on the local network. A remote broadcast is received by all stations on a single remote network. A global broadcast is received by all stations on all networks comprising the BACnet internetwork.

A local broadcast makes use of the broadcast MAC address appropriate to the local network's LAN technology, i.e., X'FFFFFFFFFFFF' for Ethernet, X'00' for ARCNET, X'FF' for MS/TP, or X'00' in the DstSubnet field of Address Format 0 in LonTalk, X'FFFF' for Zigbee, and an IP address with all ones in the host portion for BACnet/IP.

A remote broadcast is made on behalf of the source device on a specific distant network by a router directly connected to that network. In this case, DNET shall specify the network number of the remote network and DLEN shall be set to zero.

A global broadcast, indicated by a DNET of X'FFFF', is sent to all networks through all routers. Upon receipt of a message with the global broadcast DNET network number, a router shall decrement the Hop Count. If the Hop Count is still greater than zero, then the router shall broadcast the message on all directly connected networks except the network of origin, using the broadcast MAC address appropriate for each destination network. If the Hop Count is zero, then the router shall discard the message. In order for the message to be disseminated globally, the originating device shall use a broadcast MAC address on the originating network so that all attached routers may receive the message and propagate it further.

If a BACnet router is acting as a device address proxy for one or more networks, Who-Is requests that would have been routed to those networks shall be processed as defined in Clause 19.Y

If a router has one or more ports that represent PTP connections as defined in Clause 10, global broadcasts shall be processed as follows. If the PTP connection is currently established, that is, the Connection State Machine is in the Connected state (see Clause 10.4.9), then the global broadcast message shall be transmitted through the PTP connection. If the PTP connection is not currently established, then no action shall be taken by the router to transmit the broadcast message through the PTP connection.

[Change **Clause 6.6**, p. 67]

6.6 BACnet Routers

BACnet routers are devices that interconnect two or more BACnet networks to form a BACnet internetwork. BACnet routers shall, at a minimum, implement the device requirements as specified in Clause 22.1.5. Table 6-1 specifies the maximum NPDU length of the different data link layer types. Routers shall be capable of routing the maximum sized NPDUs between any two of those data link layers supported by the router based on the destination data link maximum NPDU size. BACnet routers make use of BACnet network layer protocol messages to maintain their routing tables. Routers perform the routing tasks described in Clause 6.5. See Figure 6-12 for a flow chart of router operation.

If a BACnet router is acting as a device address proxy for one or more networks, Who-Is requests that would have been routed to those networks shall be processed as defined in Clause 19.Y.

[Change **Table 12-13**, p. 211]

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Table 12-13. Properties of the Device Object Type

Property Identifier	Property Datatype	Conformance Code
…		
Active_COV_Multiple_Subscriptions	BACnetLIST of BACnetCOVMultipleSubscription	O[21]
Max_Proxied_I_Ams_Per_Second	*Unsigned*	*O[22]*
Tags	BACnetARRAY[N] of BACnetNameValue	O
Profile_Location	CharacterString	O
Deployed_Profile_Location	CharacterString	O[2223]
Profile_Name	CharacterString	O

> *…*

[21] This property is required if, and shall be present only if, the device supports execution of the SubscribeCOVPropertyMultiple service.

[22] *Required to be present and writable if the device supports device address proxying. See Clause 19.Y.*

[2223] This property is required to be writable if present.

[Add new **Clause 12.11.Y** to the Device object type, p. 220]

12.11.Y Max_Proxied_I_Ams_Per_Second

This property of type Unsigned, specifies the maximum number of I-Am unconfirmed requests per second that are permitted to be initiated by a device address proxy function.

This property shall be greater than zero.

Change **Table 12-71**, p. 517]

Table 12-71. Properties of the Network Port Object Type

Property Identifier	Property Datatype	Conformance Code
…		
Slave_Proxy_Enable	BOOLEAN	O[19,20]
Manual_Slave_Address_Binding	BACnetLIST of BACnetAddressBinding	O[19,20]
Auto_Slave_Discovery	BOOLEAN	O[20,21]
Slave_Address_Binding	BACnetLIST of BACnetAddressBinding	O[2120,22]
Device_Address_Proxy_Enable	*BOOLEAN*	*O[23]*
Device_Address_Proxy_Table	*BACnetLIST of BACnetDeviceAddressProxyTableEntry*	*O[24]*
Virtual_MAC_Address_Table	BACnetLIST of BACnetVMACEntry	O[2225]
Routing_Table	BACnetLIST of BACnetRouterEntry	O
Event_Detection_Enable	BOOLEAN	O[2326,2427]
Notification_Class	Unsigned	O[2326,2427]
Event_Enable	BACnetEventTransitionBits	O[2326,2427]
Acked_Transitions	BACnetEventTransitionBits	O[2326,2427]
Notify_Type	BACnetNotifyType	O[2326,2427]
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O[2326,2427]
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O[2427]
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	O[2427]
Event_State	BACnetEventState	O[2326]
Reliability_Evaluation_Inhibit	BOOLEAN	O
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R
Tags	BACnetARRAY[N] of BACnetNameValue	O
Profile_Location	CharacterString	O
Profile_Name	CharacterString	O

> …

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[20]   *Required if Network_Type is MSTP, Protocol_Level is BACNET_APPLICATION, and the port supports device address proxying.*

[20][21]   Required if Network_Type is MSTP, Protocol_Level is BACNET_APPLICATION, and the device is capable of being a Slave-Proxy device that implements automatic discovery of slaves.

[21][22]   Required if Network_Type is MSTP, Protocol_Level is BACNET_APPLICATION, and the device is capable of being a Slave-Proxy device.

[23]   *Required to be present and writable if the device supports device address proxying. See Clause 19.Y.*

[24]   *Required to be present if the device supports device address proxying. See Clause 19.Y.*

[22][25]   Required if the network represented by this object requires VMAC addressing.

[23][26]   These properties are required if the object supports intrinsic reporting.

[24][27]   These properties shall be present only if the object supports intrinsic reporting.

[Change **Table 12-74**, p. 522]

Table 12-74. Properties of the Network Port Object Type Only Used
when Protocol_Level is BACNET_APPLICATION.

Network_Type	Properties
ETHERNET ARCNET LONTALK PTP VIRTUAL <proprietary values>	*Device_Address_Proxy_Enable* *Device_Address_Proxy_Table*
ZIGBEE	Virtual_MAC_Address_Table *Device_Address_Proxy_Enable* *Device_Address_Proxy_Table*
MSTP	Slave_Proxy_Enable Manual_Slave_Address_Binding Auto_Slave_Discovery Slave_Address_Binding *Device_Address_Proxy_Enable* *Device_Address_Proxy_Table*
IPV4	BACnet_IP_Mode BACnet_IP_UDP_Port BACnet_IP_Multicast_Address BACnet_IP_NAT_Traversal BACnet_IP_Global_Address BBMD_Broadcast_Distribution_Table BBMD_Accept_FD_Registrations BBMD_Foreign_Device_Table FD_BBMD_Address FD_Subscription_Lifetime *Device_Address_Proxy_Enable* *Device_Address_Proxy_Table*
IPV6	BACnet_IPv6_Mode BACnet_IPv6_UDP_Port BACnet_IPv6_Multicast_Address BBMD_Broadcast_Distribution_Table BBMD_Accept_FD_Registrations BBMD_Foreign_Device_Table FD_BBMD_Address FD_Subscription_Lifetime *Device_Address_Proxy_Enable* *Device_Address_Proxy_Table*

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all	Network_Number
	Network_Number_Quality
	APDU_Length
	Routing_Table

[Change **Clause 12.56.14**, p. 527]

12.56.14 Command

…

Any of the following commands may be written to this property:

”” RESTART_SLAVE_DISCOVERY	The port shall restart the slave detection algorithm as described in Clauses 12.56.53 through 12.56.56, and ~~16.10.2~~*19.Y.1.2*. If the value of Network_Type is not MSTP, writing this value shall result in the return of a Result(-) with an 'Error Class' of PROPERTY and an 'Error Code' of VALUE_OUT_OF_RANGE. If the value of Network_Type is MSTP but the device does not support MS/TP Slave Proxy functionality, writing this value shall result in the return of a Result(-) with an 'Error Class' of PROPERTY and an 'Error Code' of OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED. The value of the Command property shall return to IDLE as soon as discovery has been initiated. The discovery process will typically require a significant amount of additional time.
… RESTART_PORT	This port shall attempt to restart and reconnect to the network as if the device were reinitialized. All data that was learned, cached, or otherwise automatically determined for the port's operation shall be cleared. *This includes but is not limited to MS/TP Slave and Device proxying functions.* All initialization, negotiation, and registration functions the port is expected to perform upon device initialization shall be performed again. If the restart fails, the value of the Reliability property shall be set to RESTART_FAILURE. It is a local matter whether the value of this property remains at RESTART_PORT until the restart has completed (whether in success or failure), and then returns to IDLE; or whether the property returns to IDLE once the restart process has been initiated and the object is prepared to accept another command. If the device cannot perform the restart of the port without a reinitialization of the entire device, writing this value shall result in the return of a Result(-) with an 'Error Class' of PROPERTY and an 'Error Code' of OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED.

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RESTART_DEVICE_DISCOVERY	*The port shall restart Device Address Proxying and the Device_Address_Proxy_Table shall be cleared as described in Claus 19.Y.*
	If the port does not support Device Address Proxying functionality, writing this value shall result in the return of a Result(-) with an 'Error Class' of PROPERTY and an 'Error Code' of OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED.
	The value of the Command property shall return to IDLE as soon as the algorithm has been initiated. The actual process will typically require a significant amount of additional time.
<Proprietary Enum Values>	A vendor may use other proprietary enumeration values to allow command values other than those defined by the standard. For proprietary extensions of this enumeration, see Clause 23.1 of this standard.
	A proprietary command failure shall result in the value of the Reliability property being set to PROPRIETARY_COMMAND_FAILURE and the value of this property being set to IDLE.
	It is a local matter whether the value of this property remains at the proprietary value until the proprietary action has completed (whether in success or failure), and then returns to IDLE; or whether the property returns to IDLE once the action has been initiated and the object is prepared to accept another command.

This enumerated value is extensible. Writing an unknown value to this property shall result in the return of a Result(-) with an 'Error Class' of PROPERTY and an 'Error Code' of VALUE_OUT_OF_RANGE.

[Add new **Clause 12.56.V and 12.56.W**, p. 517]

12.56.V Device_Address_Proxy_Enable

This property of type BOOLEAN, specifies whether (TRUE) or not (FALSE) the device will perform device address proxying for this port. If the Network_Type is MSTP and Protocol_Level is BACNET_APPLICATION, this port shall also perform the functions of a Slave-Proxy. The value of this property shall be retained over a device restart. This property shall be present only if the device is capable of performing device address proxying on this port. See Clause 19.Y. If present, this property shall be writable.

12.56.W Device_Address_Proxy_Table

This read-only property, of type BACnetLIST of BACnetDeviceAddressProxyTableEntry, describes the set of devices capable of being proxied on this port as described in Clause 19.Y. The value of this property shall be zero or more BACnetDeviceAddressProxyTableEntry entries.

Each entry has data fields as follows:

Address   This field, of type BACnetAddress, shall indicate the BACnet address of the device on this port.

Online   This field, of type Boolean, shall indicate that the device is online (TRUE), or the device is no longer detected on this port (FALSE).

I Am   This field, of type I-Am-Request, consists of the body of the I-Am service. The content of this field is

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determined using the processes defined in Clause 19.Y.

[Change **Clauses 12.56.53 to 12.56.56**, pp. 537]

12.56.53   Slave_Proxy_Enable

This property, of type BOOLEAN, is an indication of whether (TRUE) or not (FALSE) the device will perform Slave-Proxy functions, *as described in Clause 19.Y.1.2,* for this port. This property shall be present and writable if the device is capable of performing the functions of a Slave-Proxy device on this port.

12.56.54   Manual_Slave_Address_Binding

This property, of type BACnetLIST of BACnetAddressBinding, describes the manually configured set of slave devices for which this device is acting as a Slave Proxy as described in Clause *19.Y.2.2.1*16.10.2. This property shall be present and writable if the device is capable of performing the functions of a Slave-Proxy device on this port.

This property is used to manually configure a set of slave devices connected to this port for which this device will be a proxy. This property allows a Slave Proxy that does not support automatic slave discovery to be configured with a set of slaves for which this device will be a proxy. It also allows a Slave-Proxy device to be a proxy for Slave devices that do not support the special object instance of 4194303 as described in Clause 12. When enabled, the Slave-Proxy device shall periodically check each device that is in this list, and not in the Slave_Address_Binding list, by reading the device's Protocol_Services_Supported property from the device's Device object using the ReadProperty service. If the device responds and indicates that it does not execute the Who-Is service, it shall be added to the Slave_Address_Binding property. The period at which the devices are checked is a local matter.

12.56.55   Auto_Slave_Discovery

This property, of type BOOLEAN, is an indication whether (TRUE) or not (FALSE) the device will perform automatic slave detection functions for this port. This property shall be present if the device is capable of performing the functions of a Slave-Proxy device on this port. *See Clause 19.Y.2.2.2.*

Slave detection shall be accomplished by the proxy device using ReadProperty services to read, at a minimum, the Device object's Protocol_Services_Supported property for each MAC address on the network connected to this port. The ReadProperty service shall use the special object instance of 4194303 as described in Clause 12. If the device is found to support execution of the Who-Is service, it is ignored; otherwise, the device shall be added to the Slave_Address_Binding property. The slave detection algorithm shall be repeated periodically. The period at which it is repeated is a local matter.

12.56.56   Slave_Address_Binding

This property, of type BACnetLIST of BACnetAddressBinding, describes the set of slave devices for which this device is acting as a Slave-Proxy on this port as described in Clause *19.Y.1.2*16.10.2. This property shall be present if the device is capable of performing the functions of a Slave-Proxy device on this port.

The set of devices described by the Slave_Address_Binding property consists of those devices described in the Manual_Slave_Address_Binding and those devices that are automatically discovered. When enabled, the Slave-Proxy device shall periodically check each device in this list by reading the device's Protocol_Services_Supported property from the device's Device object using the ReadProperty service. If the device fails to respond or indicates that it executes the Who-Is service, it shall be removed from the list. The period at which the devices are checked is a local matter.

[Change **Clause 16.10.2**, pp. 720]

16.10.2 Service Procedure

The sending BACnet-user shall transmit the Who-Is unconfirmed request, normally using a broadcast address. If the 'Device Instance Range Low Limit' and 'Device Instance Range High Limit' parameters are omitted, then all receiving BACnet-users shall return their Device Object_Identifier in individual responses using the I-Am service. If the 'Device Instance Range Low Limit' and 'Device Instance Range High Limit' parameters are present, then only those receiving BACnet-users whose Device

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Object_Identifier instance number falls within the range greater than or equal to 'Device Instance Range Low Limit' and less than or equal to 'Device Instance Range High Limit' shall return their Device Object_Identifier using the I-Am service.

See Clause 19.Y on how device address proxying affects this service. ~~If the receiving BACnet-user has a Slave_Proxy_Enable property and the Slave_Proxy_Enable for the receiving port is TRUE, then the BACnet-user shall respond with an I-Am unconfirmed request for each of the slave devices on the MS/TP network that are present in the Slave_Address_Binding property and that match the device range parameters. The I-Am unconfirmed requests that are generated shall be generated as if the slave device originated the service. If the I-Am unconfirmed request is to be placed onto the MS/TP network on which the slave device resides, then the MAC address included in the packet shall be that of the slave device. In the case where the I-Am unconfirmed request is to be placed onto a network other than that on which the slave device resides, then the network layer shall contain SLEN and SNET filled in with the slave device's MAC address as if it were routing a packet originally generated by the slave device.~~

[Add new **Clause 19.Y**, pp. 756]

19.Y   Device Address Proxying

When a BACnet client requires information from another device it must learn its BACnet address by generating a global Who-Is request for that device. The Who-Is request must be routed to all networks in a building control system. A single broadcast Who-Is request is not a concern but if there are offline devices or misconfigured clients, these Who-Is requests can have significant impact on the entire system.

BACnet device discovery of a large building control system can have an adverse effect on the throughput of constrained or busy networks and, in some cases, device discovery of the entire system can fail if more I-Am requests are received by a BACnet router then it can successfully route.

Implementing device address proxying in a BACnet router can mitigate these and other issues. The following clauses describe a process to proxy devices.

19.Y.1   Proxying

Device address proxying provides a mechanism to allow a BACnet-user to proxy I-Am unconfirmed requests for all devices that reside on a proxied network. The discovery of devices on a proxied network is described in Clause 19.Y.2.

19.Y.1.1 General Process

This clause describes the process used to provide device address proxying for any device on any network except slave devices on MS/TP networks. See Clause 19.Y.1.2.

If the Network Port object contains the Device_Address_Proxy_Enable property and the Device_Address_Proxy_Enable is FALSE, the Device_Address_Proxy_Table shall return a zero-length list. The BACnet-user shall not proxy any devices and the network layer entity shall route Who-Is requests as specified in Clause 16.10.

If the Device_Address_Proxy_Enable is TRUE, the BACnet-user shall respond with a unicast I-Am unconfirmed request for each of the devices on the proxied networks whose 'Online' field of the Device_Address_Proxy_Table entry is TRUE and matches the device range parameters of a Who-Is request. The I-Am unconfirmed requests that are generated shall be generated as if the device originated the service. If the I-Am unconfirmed request is to be placed onto the proxied network on which the device resides, then the BACnet-user shall not initiate an I-Am unconfirmed request unless the BACnet-user is providing its own I-Am. In the case where the I-Am unconfirmed request is to be placed onto a network other than that on which the device resides, the network layer shall contain SLEN and SNET filled in with the device's MAC address as if it were routing a packet originally generated by the device.

If the BACnet-user is homed on the proxied network, an entry shall be included in the Device_Address_Proxy_Table with the 'Online' field set to TRUE, the 'Address' field set to the BACnet-user's BACnet Address for this port, and the 'I Am' field containing the I-Am request parameters of the BACnet-user.

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If the proxied network contains one or more other BACnet routers, and the device range of a received Who-Is request specifies any device that is not contained in the Device_Address_Proxy_Table, or there is no device range provided, the BACnet-user shall forward the received Who-Is unconfirmed request with a local unicast MAC to those BACnet routers.

19.Y.1.2 MS/TP Slave Process

This clause describes the specific process used to provide slave device address proxying on an MS/TP network.

If the Network Port object contains the Slave_Proxy_Enable property and the Slave_Proxy_Enable for the port is TRUE, then the Slave-proxy device shall respond with an I-Am unconfirmed request for each of the slave devices on the MS/TP network that are present in the Slave_Address_Binding property and that match the device range parameters of a Who-Is request. The I-Am unconfirmed requests that are generated shall be generated as if the slave device originated the service. If the I-Am unconfirmed request is to be placed onto the MS/TP network on which the slave device resides, then the MAC address included in the packet shall be that of the slave device. In the case where the I-Am unconfirmed request is to be placed onto a network other than that on which the slave device resides, then the network layer shall contain SLEN and SNET filled in with the slave device's MAC address as if it were routing a packet originally generated by the slave device.

If the Network Port object contains the Device_Address_Proxy_Enable property and the Device_Address_Proxy_Enable is TRUE, proxied slave devices shall be included in the Device_Address_Proxy_Table with the 'Online' field set to TRUE, the 'Address' field set to the device's BACnet Address, and the 'I Am' field containing the I-Am request parameters corresponding to the slave device. If a proxied slave device is no longer online, the 'Online' field of the Device_Address_Proxy_Table entry shall change to FALSE. Slave devices shall not be included in the Device_Address_Proxy_Table until the 'I Am' field has been ascertained.

19.Y.2 Discovery

This clause describes the process used to discover and monitor devices on any network.

Unless otherwise specified in this clause or one of the sub-clauses, it is a local matter how the BACnet-user discovers new devices, monitors existing devices, and determines when a device is no longer online. It is also a local matter how often the I-Am information in the Device_Address_Proxy_Table property is validated.

19.Y.2.1 MS/TP Master Device Discovery

The clause describes the specific procedure to discover master devices on an MS/TP network.

The BACnet-user shall monitor the MS/TP Token and Reply To Poll For Master frames to detect if a master device exists on the network. The BACnet-user shall use this process to monitor for new master devices during discovery and while proxying.

Once detected, the BACnet-user shall use the Who-Is and I-Am services to acquire the information necessary to proxy the master device. This information shall be added to the 'I Am' field of the Device_Address_Proxy_Table property and the 'Online' field of the entry set to TRUE. The 'Address' field shall be set to the device's BACnet Address.

An MS/TP master device is no longer online when it stops processing the MS/TP token and N_{poll} unanswered Poll-For-Master frames have been sent to the device. If this occurs, the 'Online' field for this entry in the Device_Address_Proxy_Table property shall indicate a value of FALSE. If the device again is determined to be online, a local unicast Who-Is request shall be sent to the device to update the information in the Device_Address_Proxy_Table before the 'Online' field transitions to TRUE.

19.Y.2.2 MS/TP Slave Device Discovery

The clause describes the specific procedure to discover slave devices on an MS/TP network.

The Slave-Proxy device shall periodically check each device in the Slave_Address_Binding property by reading the device's Protocol_Services_Supported property from the device's Device object using the ReadProperty service. If the device fails to respond or indicates that it executes the Who-Is service, it shall be removed from the Slave_Address_Binding list.

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19.Y.2.2.1 Manual Slave Configuration

The Manual_Slave_Address_Binding property is used to manually configure a set of slave devices connected to the port for which this device will be a proxy. This property allows a Slave-Proxy that does not support automatic slave discovery to be configured with a set of slaves for which this device will be a proxy. It also allows a Slave-Proxy device to be a proxy for Slave devices that do not support the special object instance of 4194303 as described in Clause 12. When enabled, the Slave-Proxy device shall periodically check each device that is in this list, and not in the Slave_Address_Binding list, by reading the device's Protocol_Services_Supported property from the device's Device object using the ReadProperty service. If the device responds and indicates that it does not execute the Who-Is service, it shall be added to the Slave_Address_Binding property.

19.Y.2.2.2 Auto Slave Discovery

If the Auto_Slave_Discovery property is TRUE, slave detection shall be accomplished by the Slave-Proxy device using ReadProperty services to read, at a minimum, the Device object's Protocol_Services_Supported property for each MAC address on the network connected to this port. The ReadProperty service shall use the special object instance of 4194303 as described in Clause 12. If the device is found to support execution of the Who-Is service, it is ignored; otherwise, the device shall be added to the Slave_Address_Binding property. The slave detection algorithm shall be repeated periodically.

[Add new ASN.1 Productions in **Clause 21** maintaining the alphabetical order, pp. 812]

BACnetDeviceAddressProxyTableEntry *::= SEQUENCE {*
      address   *[0] BACnetAddress*
      online   *[1] BOOLEAN,*
      i-am   *[2] I-Am-Request*
      }

[Update ASN.1 Productions in **Clause 21**, pp. 836]

BACnetNetworkPortCommand ::= ENUMERATED {
      …
      restart-port   (7),
      restart-device-discovery   *(x)*
      ...
      }

BACnetReliability ::= ENUMERATED {
      …
      referenced-object-fault   (24),
      proxy-fault   *(x),*
      …
      }
      -- Enumerated values 0-63 are reserved for definition by ASHRAE. Enumerated values
      -- 64-65535 may be used by others subject to the procedures and constraints described
      -- in Clause 23.

[Add new BIBBs to **Clause K.5**, pp. 1076]

K.5.X BIBB - Device Management-Device Address Proxying-View and Modify-A (DM-DAP-VM-A)

The A device displays and modifies the proxy related properties in a device capable of proxying.

BACnet Service	Initiate	Execute

BSR/ASHRAE Addendum *bx* to ANSI/ASHRAE Standard 135-2016,
BACnet — *A Data Communication Protocol for Building Automation and Control Networks*
First Public Review

ReadProperty	x	
ReadRange	x	
WriteProperty	x	

Devices claiming conformance to DM-DAP-VM-A shall be able to read and present the Device_Address_Proxy_Enable and the Device_Address_Proxy_Table properties of Network Port object types.

The Device_Address_Proxy_Table property can contain a very large list of values. For this reason, the A device shall support initiation of the ReadRange service to ensure the retrieval of all values for this property.

The A device shall be capable of configuring the Device_Address_Proxy_Enable property. The A device shall be capable of restarting the device discovery process by writing RESTART_DEVICE_DISCOVERY to the Command property of the Network Port objects.

A device claiming support for DM-DAP-VM-A is interoperable with devices that support DM-DAP-B.

K.5.Y BIBB - Device Management-Device Address Proxying-B (DM-DAP-B)

The B device implements proxying functionality and provides I-Am messages on behalf of proxied devices.

BACnet Service	Initiate	Execute
ReadProperty	x	x
ReadRange		x
WriteProperty		x
Who-Is	x	x
I-Am	x	x

Devices claiming conformance to DM-DAP-B shall support the Device_Address_Proxy_Enable and the Device_Address_Proxy_Table properties of Network Port object types. Proxies shall be capable of performing the device address proxying on one or more directly connected networks. Devices claiming conformance to DM-DAP-B shall also support DM-SP-B and NM-RC-B.

Devices claiming conformance to this BIBB shall be capable of proxying for all devices on the directly connected network designated for proxying.

The Device_Address_Proxy_Table property can contain a very large list of values. For this reason, the B device shall support execution of the ReadRange service.

A device claiming support for DM-DAP-B is interoperable with devices that support DM-DAP-VM-A.

[Add a new entry to **History of Revisions**, p. 1349]

HISTORY OF REVISIONS

. . .	. . .	. . .
1	X	**Addendum *bx* to ANSI/ASHRAE Standard 135-2016** Approved by ASHRAE on MONTH DAY, 20XX; and by the American National Standards Institute on MONTH DAY, 20XX. 1. Add Device Address Proxy functions