Johnson Controls

P2000AE

Security Management System

Metasys® Integration

P2000AE

Security Management System

Metasys Integration

Version 4.1 and higher, December, 2008

24-10241-97 Revision B

Johnson Controls

Security Solutions
(805) 522-5555
www.johnsoncontrols.com

$$C\hspace{-0.3em}\in$$

Declaration of Conformity

This product complies with the requirements of the European Council Electromagnetic Compatibility Directive 2004/108/EEC and the Low Voltage Directive 2006/95/EEC.

This equipment must not be modified for any reason and it must be installed as stated in the Manufacturer's instruction.

If this shipment (or any part thereof) is supplied as second-hand equipment, equipment for sale outside the European Economic Area or as spare parts for either a single unit or system, it is not covered by the Directives.

TABLE OF CONTENTS

METASYS AND P2000AE INTEGRATION

OVERVIEW

The BACnet Interface allows the P2000AE system to be integrated into the Johnson Controls Metasys® building automation system. The P2000AE system can be monitored and controlled from a Metasys M3 or M5 workstation. This interface provides a BACnet gateway through which P2000AE hardware configuration and status information can be accessed. It allows an M3/M5 workstation to receive and acknowledge P2000AE alarms and events. In addition, the P2000AE software can be configured to cause actions to occur within the Metasys system when access is granted. Figure 1 on page 2 shows a logical architecture of the BACnet Interface.

NOTES

- *The screen captures and instructions in this manual may differ slightly, depending on the installation media and the software version you are using.*
- *"P2000AE" is also referred to as "P2000" throughout this manual.*

THEORY OF OPERATION

BACnet (**B**uilding **A**utomation and **C**ontrol **net**work) is a standard protocol from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). This protocol provides a standard for allowing computers and equipment controllers to transfer data between the devices in an object-oriented fashion. The BACnet standard defines the types of information and attributes that any device must maintain, and defines how BACnet messages are communicated between the various devices.

The attributes associated with a particular device are grouped together into "Objects." BACnet defines a standard set of objects, and a device may be represented by, or contain a number of these objects. A device **must** contain at least one BACnet object, called a Device Object. Objects have "attributes" and provide standardized functions to read and write those attributes. BACnet also provides defined methods to send event and alarms between equipment.

The BACnet objects associated with the P2000 system represent the P2000 hardware. There are objects for the P2000 host, counters, panels, terminals, readers, input points, and output points. Each of these objects has attributes that contain the configuration parameters and status for that object. For instance, commands to open doors and set output points are sent to

---

the P2000 system by writing specific attributes. The P2000 BACnet Interface also contains Notification Class objects. These objects hold the names of recipients for P2000 alarms and events.

The P2000 BACnet Interface that resides on the P2000 BACnet Host computer is called BNService. BNService is a Windows NT service, like the other P2000 communication services. BNService creates the BACnet objects that represent the P2000 hardware, and updates the hardware attributes and status in real time as changes occur in the P2000 system. BNService sends data to and receives data from the Metasys system over the network using the BACnet protocol.

BNService will read from the P2000 database any status information it needs, and will use the standard P2000 message routing service (RTL Route Service) to receive real time status and alarm changes. Figure 1 shows a logical view of this architecture using a CK722 controller.

Logical Architecture
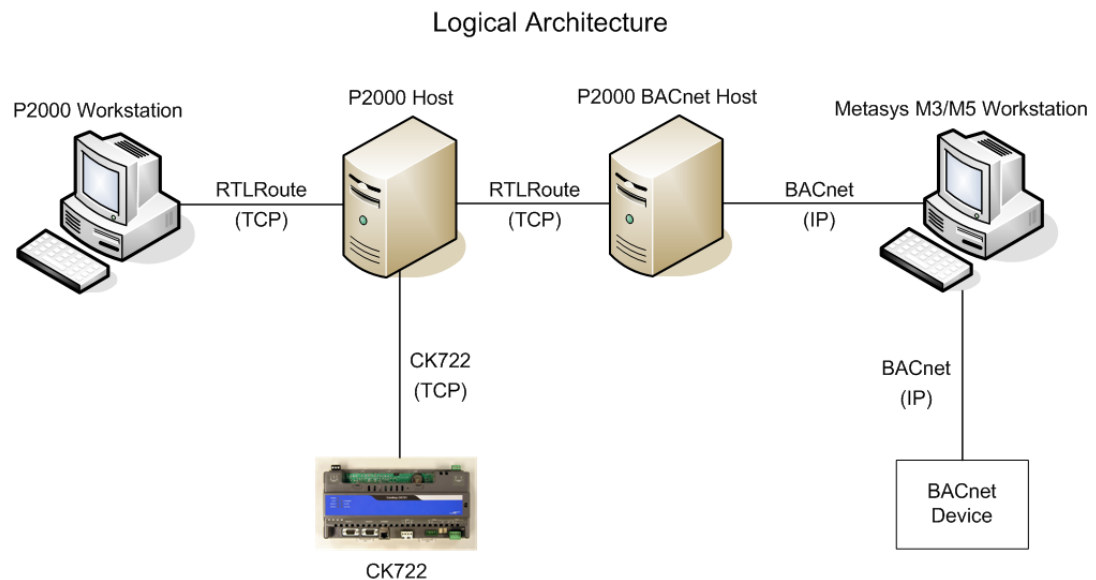
Figure 1: BACnet Interface Logical Architecture

To prevent unauthorized BACnet devices from accessing the P2000 system, the P2000 system will only communicate with those devices that have been configured as allowed BACnet Sources in the P2000 database. Communication attempts by other devices over the BACnet interface will cause the P2000 system to log a system error and deny communication. A device can also be configured in the P2000 software as a disallowed BACnet Source. In this case the P2000 system will not log any error messages but will deny the communication. Typical BACnet Sources are M3/M5 workstations and N30 controllers.

The BACnet Interface also provides a way for the P2000 system to initiate actions in other BACnet devices. This capability is called an Action Interlock. An Action Interlock is an action caused by a write of the specified value to a specific attribute of a specific BACnet object. This allows the P2000 software to initiate actions in an N30 controller or other BACnet device if the proper attribute is known. The P2000 system allows an identifier to be

assigned up to two actions (Action Interlocks) that are triggered when that identifier is granted access, and also allows Action Interlocks to be assigned as a Host Event Action. A typical use of an Action Interlock would be to cause the lights in a person's office to turn on when they are granted access at the door.

The P2000 software will send out its messages and alarms as BACnet event/alarm messages. In order to receive these BACnet event/alarm messages, a BACnet device must have been added to the recipient list contained in the appropriate Notification Class object. The P2000 BACnet Interface provides for the following event categories:

- Host Events

- Host Log

- Host Logic (not used in this version)

- Audit Log

- Panel Events

- Panel Hardware Status

- Input Status

- Output Status

- Access Grant

- Access Deny

- Access Trace

- Time and Attendance (not used in this version)

P2000 BACNET SOFTWARE OPTION INSTALLATION

Important notes:

- BACnet software has to be installed on a *different computer* than the P2000 server.

- BACnet software has to be installed *after* the P2000 server software installation has been completed.

Hardware Requirements

The hardware requirements for the BACnet server are the same as for the P2000 server. Refer to the *P2000AE Server/Workstation Software Installation Manual* for hardware requirement information.

Software Requirements

The BACnet server must be loaded with the following software:

- Operating system: Microsoft® Windows Server 2003 or Microsoft Windows XP®

- P2000 Prerequisites, version 4.1

- P2000 BACnet Software, version 4.1

Prerequisites Installation

For instructions on prerequisites installation, refer to the *P2000AE Server/Workstation Software Installation Manual*.

P2000 BACnet Software Option Installation

You will need:

- P2000 Server Applications and Services CD

➤ **To P2000 Install BACnet Option Software:**

1. Insert the CD.

   The P2000 Setup Launcher window appears.
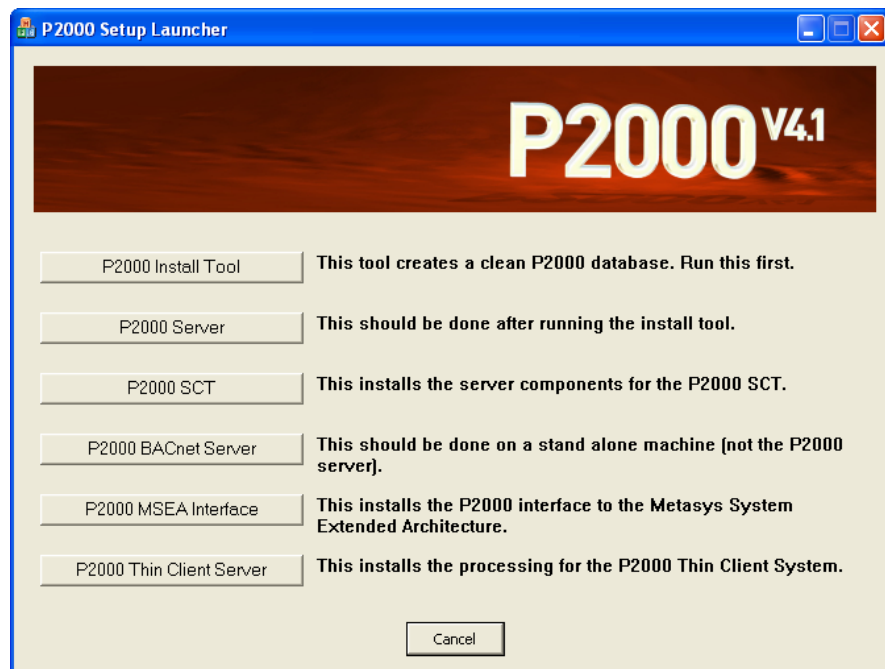
If this window does not appear, from Windows® Explorer, double-click to run the **Setup.exe** file, located at the root level of the CD.

2. On the P2000 Setup Launcher window, click the **P2000 BACnet Server** button.

3. On the Welcome screen, click **Next**.
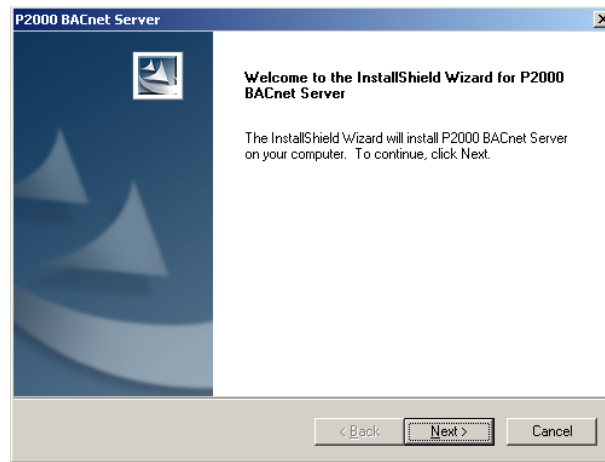
4. Verify that the **Typical** radio button is selected; click **Next**.
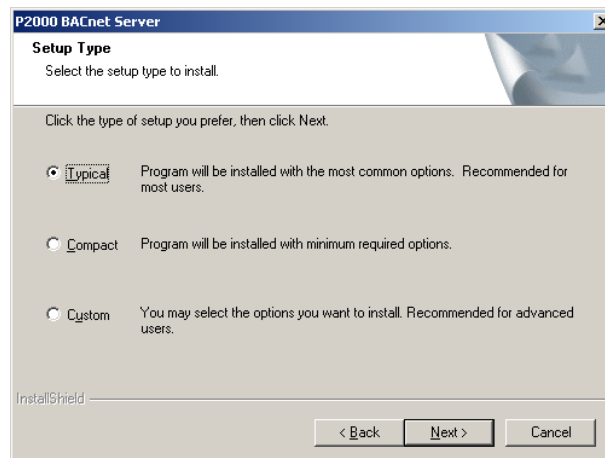
5. From the drop-down list select the computer name of the machine where the SQL and P2000 server software are installed.
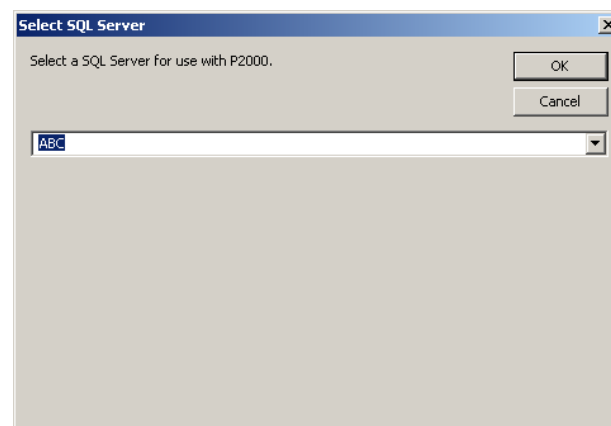
6. Click **OK**.

7. Verify the settings and click **Next**.
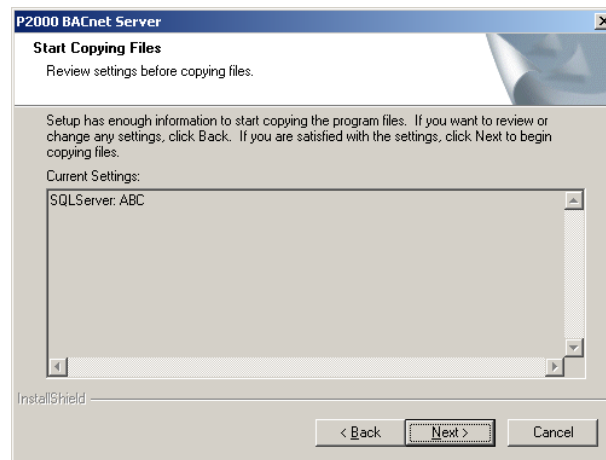
8. Click **Yes** to the message about the Distributed Transaction Coordinator (DTC).
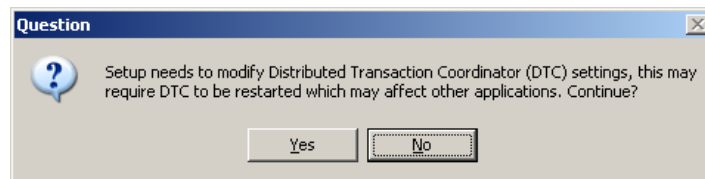
9. Click **OK** to the message about the MSDTC restart.
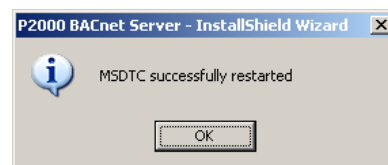
10. Click **Finish**.
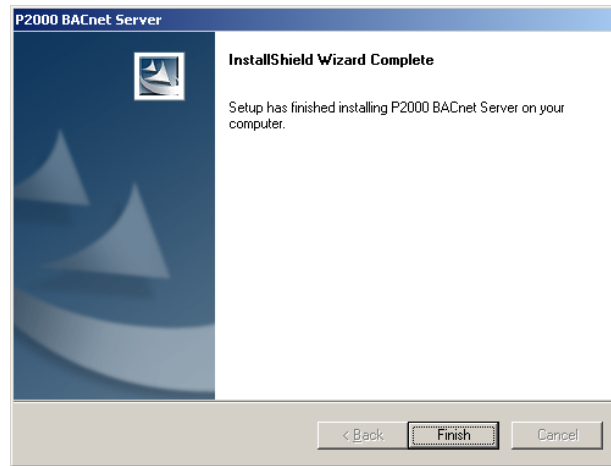
OBJECT REFERENCE

Host Device Object

The Host Device Object is a standard BACnet Device Object with additional properties. It represents the P2000 Server and system wide settings. The Host Device Object accepts writes to Invoke Global Access to unlock all doors in the system.

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Alarm History	Unsigned			1 to 525600 (1 min to 365 days)
APDU Segment Timeout	Unsigned	B		
APDU Timeout	Unsigned	B		
Application Software Version	String	BK		
Audit History	Unsigned			1 to 525600 (1 min to 365 days)
Audit Item Name	String	IN		Internal use only
Audit Notification Class	Unsigned			Instance of Notification Class
Comms Server	String	K		
Database Server	String			
Daylight Savings Status	Boolean	B		True (1) or False (0)

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Description	String	WN	Null	Not written to by P2000
Device Address Binding	List	B		
Error Log Type	String	IN		Internal use only
Firmware Revision	String	B		
Host Event Notification Class	Unsigned			Instance of Notification Class
Host Log Notification Class	Unsigned			Instance of Notification Class
Host Logic Notification Class	Unsigned			Instance of Notification Class
Invoke Global Access	Boolean	WZ		0 – Open all doors or 1 – Return all doors to normal.
Local Date	Date	B		
Local Time	Time	B		
Max APDU Length Accepted	Unsigned	B		
Model Name	String	B	P2000 BACnet	
Number of APDU Retries	Unsigned	B		
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by the Object Engine
Object List	Array	B		
Object Name	String	BC		<computer name> PEGASYS
Object Type	Enumeration	B	HOST CLASS (314)	
P2000 Event Name	String	IN		Internal use only
PMI Refresh		F		
Protocol Conformance Class	Unsigned (1..6)	B	3	
Protocol Object Types Supported	Enumeration	B		
Protocol Revision	Unsigned	B	1	
Protocol Services Supported	Enumeration	B		
Protocol Version	Unsigned	B	1	

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Query Filter String	String	C		
Segmentation Supported	Enumeration	B		
System Status	Enumeration	BDF		Operational (0), Non Operational (4)
Time Synchronization Recipients	List	BI		
Transaction History	Unsigned			1 to 525600 (1 min to 365 days)
Trigger Code	Unsigned	IN		Internal use only
Trigger Text String	String	IN		Internal use only
Trigger Value	Unsigned	IN		Internal use only
User Name	String	IN		Internal use only
UTC Offset	Integer	B		
Vendor Name	String	B	Cardkey	
Visitor Time	Unsigned	C		1 to 80 hours
Vendor Identifier	Unsigned	B	71	

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Alarm History	P2000 requirement. How long Alarm History is maintained in minutes. From P2000 Site configuration.
APDU Segment Timeout	BACnet requirement. Indicates the amount of time in milliseconds between retransmissions of an APDU segment. This value is nonzero if Number of APDU Retries is nonzero. The APDU Segment Timeout property is present if segmentation of any kind is supported.
	In order to achieve reliable communication, the values of the APDU Segment Timeout attributes of the Host Device Objects of all intercommunicating devices should contain the same value.
APDU Timeout	BACnet requirement. Indicates the amount of time in milliseconds between retransmissions of an APDU requiring acknowledgement for which no acknowledgement has been received. This value is nonzero if Number of APDU Retries is nonzero.
	In order to achieve reliable communication, the values of the APDU Timeout attributes of the Host Device Objects of all intercommunicating devices should contain the same value.
Application Software Version	BACnet requirement. Identifies the version of the P2000 software installed on the host.
Audit History	P2000 requirement. How long Audit History is maintained in minutes. From P2000 Site configuration.

12/3/08

Attribute Name	Definition
Audit Item Name	P2000 requirement. Internal use only.
Audit Notification Class	P2000 requirement. Instance number of Notification Class for sending Audit Event messages.
Comms Server	P2000 requirement. Name of computer running communication services. From P2000 Site configuration.
Database Server	P2000 requirement. Name of computer running database engine.
Daylight Savings Status	BACnet requirement. Indicates if daylight saving time is in effect (True) or not (False).
Description	Metasys system requirement. This is a string of printable characters.
Device Address Binding	BACnet requirement. This is a list of BACnet Object Identifiers of a Host Device Object and a BACnet device address in the form of a BACnet Address. Entries in the list identify the actual device addresses that are used when the remote device is accessed via a BACnet service request. The list may be empty if no device identifier-device address bindings are currently known to the device.
Error Log Type	P2000 requirement. Internal use only.
Firmware Revision	BACnet requirement. Identifies the version of the P2000 software installed on the host.
Host Event Notification Class	P2000 requirement. Instance number of Notification Class for sending Host Event messages.
Host Log Notification Class	P2000 requirement. Instance number of Notification Class for sending Host Log messages.
Host Logic Notification Class	P2000 requirement. Instance number of Notification Class for sending Host Logic messages.
Invoke Global Access	P2000 requirement. This unlocks every door in the P2000 system if set (True) or normal operation if reset (False).
Local Date	BACnet requirement. This indicates the date.
Local Time	BACnet requirement. This indicates the time of day.
Max APDU Length Accepted	BACnet requirement. The maximum number of octets contained in a single, indivisible application layer protocol unit. Underlying data link technology constrains the value of this attribute.
Model Name	BACnet requirement. Set to "PEGASYS 2000 BACnet."
Number of APDU Retries	BACnet requirement. Indicates the maximum number of times that an APDU is retransmitted. The default value is 3. If this device does not perform retries, then this property is zero. If the value of this property is greater than zero, a nonzero value is placed in the Host Device Object APDU Timeout property.
Object Category	Metasys system requirement. Set to Security Category (2).
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object List	BACnet requirement. This is an array of object identifiers, one for each object in the device accessible by BACnet services.
Object Name	BACnet requirement. Set to "<computer name> PEGASYS."
Object Type	BACnet requirement. Identifies the type of this object. Set to HOST CLASS (314).

Attribute Name	Definition
P2000 Event Name	P2000 requirement. Internal use only.
PMI Refresh	Metasys system requirement.
Protocol Conformance Class	BACnet requirement. This integer indicates that the device supports a specific set of standardized protocol services and object types. While the Protocol Conformance Class indicates the minimum set of standardized services, object types, and properties required to claim a particular level of conformance, implementation often supports additional services, object types, and properties. Protocol Services Supported and Protocol Object Types Supported describe the set of all such standardized services and object types.
Protocol Object Types Supported	BACnet requirement. Indicates which standardized object types the device's protocol implementation supports. Protocol Conformance Class reflects the minimum set of object types, but an implementation often supports additional standard and non-standard object types with their own set of properties
Protocol Revision	BACnet requirement. Indicates the minor revision level of the BACnet standard. This starts at 1 and increases for each subsequent release. If Protocol Version attribute changes, this number reverts to zero. Annex K records changes to the values for Protocol Version and Protocol Revision. This attribute is required for all devices with BACnet Protocol Version 1, Protocol Revision 1 and above. If this attribute is not present, the device is Protocol Version 1, Protocol Revision 0.
Protocol Services Supported	BACnet requirement. Indicates which standardized protocol services the device's protocol implementation supports. Protocol Conformance Class reflects the minimum set of services, but an implementation often supports additional standardized services.
Protocol Version	BACnet requirement. Represents the BACnet protocol supported by the device. Initial releases are Version 1, subsequent releases increase the number by one.
Query Filter String	Metasys requirement. From P2000 Site configuration.
Segmentation Supported	BACnet requirement. Indicates if the BACnet device supports segmentation of messages and (if so) if it supports segmented transmission, reception, or both.
System Status	BACnet requirement. Reflects the current state of the P2000 Server.
Time Synchronization Recipients	BACnet requirement. This is used to control the restrictions placed on a device's use of the Time Synchronization service. If the list is of length zero, a device is prohibited from automatically sending a Time Synchronization request. If the list is of length one or more, a device automatically sends a Time Synchronization request but only to the devices or addresses listed. If it is present, this property is writeable. If the PICS indicates that this device is a Time Master, then Time Synchronization Recipients is present.
Transaction History	P2000 requirement. How long Transaction History is maintained in minutes. From P2000 Site configuration.
Trigger Code	P2000 requirement. Internal use only.
Trigger Text String	P2000 requirement. Internal use only.
Trigger Value	P2000 requirement. Internal use only.
User Name	P2000 requirement. Internal use only.

Attribute Name	Definition
UTC Offset	BACnet requirement. Indicates the number of minutes offset between local standard time and Universal Time Coordinated (UTC). The Time Zones to the west of the zero degree meridian are positive and those to the east are negative. Subtract the value of the UTC Offset from the UTC received in the UTC Time Synchronization service requests to calculate the correct local standard time.
Vendor Name	BACnet requirement.
Visitor Time	P2000 requirement. Default Visitor Badge Valid time in hours. From P2000 Site configuration.
Vendor Identifier	BACnet requirement. This is a unique ASHRAE vendor ID code that distinguishes proprietary extensions to the protocol.

Counter Object

The P2000 Counter Object is a custom object. It represents a single P2000 Counter Object.

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Description	String	W	Null	Not written to by P2000
Device Name	String			
Object Category	Enumeration		Security Category (2)	
Object Identifier	Enumeration	B		
Object Name	String	BC		<counter name> <Partition>
Object Type	Enumeration	B	COUNTER CLASS (317)	
Partition	String	K		
PMI Refresh		F		
Present Value	Signed	DF		-2147483648 to 2147483647
Query Filter String	String	C		

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Description	Metasys system requirement. This is a string of printable characters.
Device Name	Metasys system requirement. The name of the host device.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2).
Object Identifier	BACnet requirement. Set by Object Engine. A unique numeric code that identifies the object.

Attribute Name	Definition
Object Name	BACnet requirement. A character string that represents the name of the counter.
Object Type	BACnet requirement. A value that indicates membership in a particular object class.
Partition	P2000 requirement. Partition that owns this counter.
PMI Refresh	Metasys system requirement.
Present Value	P2000 requirement. This indicates the present value of the counter.
Query Filter String	Metasys requirement. From P2000 Site configuration.

Panel Object

The P2000 Panel Object is a custom BACnet Object. It represents a panel as configured in P2000. There will be one Panel Object for every panel configured in P2000. Although the Panel Object contains attributes for intrinsic reporting, they are not used in this version of P2000.

Status Relationships

The status of the panel relates to the system status in the relationship shown as follows:

Panel Status	Present Value	Reliability
Up	Up	No Fault Detected
Down	Down	Unreliable Other

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Acked Transitions	Bit String	B		To-Offnormal, To-Fault, To-Normal
Alt IP Address	String	C		
Alt is Dialup	Boolean	C		True (1) or False (0)
Description	String	W	Null	Not written to by P2000
Event Enable	Bit String	WB		To-Offnormal, To-Fault, To-Normal
Firmware Revision	String	B		Starting in P2000 version 2.1, it will be exactly the same as the application software version.
Input Report Delay	Unsigned	C		0 to 60 seconds
Loop Number	Unsigned	CK		
Model Name	String	B		
Network Timeout	Unsigned	C		

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Notification Class	Unsigned	B		Instance of Notification Class
Notify Type	Enumeration	WB		Alarm or Event
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by Object Engine
Object Name	String	BN		
Object Type	Enumeration	B	PANEL CLASS (315)	
Out of Service	Boolean	B		True (1) or False (0)
Output Delay	Unsigned	C		0 to 60 seconds
Panel Event Notification Class	Unsigned			Instance of Notification Class
Panel Hardware Notification Class	Unsigned			Instance of Notification Class
Partition	String	CD		
PMI Refresh		F		
Present Value	Unsigned	BDRF		1 - Up, 2 - Down
Pri IP Address	String	CK		
Pri Preferred	Boolean	C		True (1) or False (0)
Pri Valid	Boolean	C		True (1) or False (0)
Public	Boolean	CK		True (1) or False (0)
Query Filter String	String	C		
Reliability	Enumeration	B		No Fault Detected, Disabled, Unreliable Other
Status Flags	Bit String	BF		In Alarm (always False), Fault (True if Reliability is Unreliable Other), Overridden (always False), Out of Service (True if Out of Service is True)
Time Delay	Unsigned	BC	0	
Unit Number	Unsigned	CK		1 to 16

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Acked Transitions	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Alt IP Address	P2000 requirement. Alternate IP address of panel (redundant path).
Alt is Dialup	P2000 requirement. True if alternate IP address is dialup.

Attribute Name	Definition
Description	Metasys system requirement. This is a string of printable characters.
Event Enable	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Firmware Revision	BACnet requirement. Version string returned from the panel.
Input Report Delay	P2000 requirement. Number of seconds that an input must be set before generating an alarm.
Loop Number	P2000 requirement. Loop number of panel (serial panels only).
Model Name	BACnet requirement. The model of the panel.
Network Timeout	P2000 requirement. Network timeout setting for the panel in seconds.
Notification Class	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Notify Type	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2).
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object Name	BACnet requirement. Panel name as configured in P2000.
Object Type	BACnet requirement. PANEL CLASS (315).
Out of Service	BACnet requirement. Indicates whether (True) or not (False) the terminal is not in service.
Output Delay	P2000 requirement. Number of seconds delay before setting an output.
Panel Event Notification Class	P2000 requirement. Instance of Notification Class used to report Panel Event messages.
Panel Hardware Notification Class	P2000 requirement Instance of Notification Class used to report Panel Hardware status messages.
Partition	P2000 requirement. Partition that owns this panel.
PMI Refresh	Metasys system requirement.
Present Value	BACnet requirement. This indicates the logical state of the output. INACTIVE (0) or ACTIVE (1)
Pri IP Address	P2000 requirement. Primary IP address of panel.
Pri Preferred	P2000 requirement. True if Primary IP address is preferred communication path.
Pri Valid	P2000 requirement. True if P2000 currently using Primary IP Address. False if P2000 currently using Alt IP Address.
Public	P2000 requirement. True if panel visible to other partitions.
Query Filter String	P2000 requirement. From panel configuration.
Reliability	BACnet requirement. Indicates if the Present Value is reliable or not, and why.
Status Flags	BACnet requirement. Represents four Boolean flags that indicate the general health of an object. Three flags are associated with the values of other attributes of the object. To determine a more complete status of the object, read these flags.
Time Delay	BACnet requirement. Report delay in seconds from panel.
Unit Number	P2000 requirement. Unit number of panel (serial panels only).

Terminal Object

The P2000 Terminal Object is a custom object with attributes similar to the BACnet Multistate Output Object and additional attributes. It represents configured terminals in P2000. For every configured terminal, there will be three Terminal Objects. One object represents the Reader Terminal attributes, one represents the Input Terminal attributes, and the third represents the Output Terminal attributes. Although the Terminal Object contains the attributes for intrinsic reporting, they are not used in this version of P2000.

Status Relationships

The status of the terminal and the parent panel, the present value of the object, and the reliability of the object interrelate in the manner shown in the following table:

Terminal Status	Parent Panel Status	Present Value	Reliability
Unknown	Up	Up	Unreliable Other
Up	Up	Up	No Fault Detected
Down	Up	Down	No Fault Detected
Disabled	Up	Up	Disabled
<don't care>	Down	Up	Unreliable Other

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Acked Transitions	Bit String	B		To-Offnormal, To-Fault, To-Normal
Description	String	W	Null	Not written to by P2000
Device Name	String			
Event Enable	Bit String	WB		To-Offnormal, To-Fault, To-Normal
Event State	Enumeration	B	Normal	
Notification Class	Unsigned	B		Instance of Notification Class
Notify Type	Enumeration	WB	Event	Alarm or Event
Number of States	Unsigned	B	2	
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by the Object Engine
Object Name	String	BC		<terminal name> <Rdr, In, or Out> Term
Object Type	Enumeration	B	TERM CLASS (316)	
Out of Service	Boolean	B		True (1) or False (0)
Output Stat Enabled	Boolean	C		True (1) or False (0)
Parent Panel	String	CP		

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Partition	String	CK		
PMI Refresh		F		
Present Value	Unsigned	BDRF		1 - Up, 2 - Down
Present Value Text	String	RF		
Priority Array	Array	B		(Empty array)
Public	Boolean	CK		True (1) or False (0)
Query Filter String	String	C		
Reliability	Enumeration	B		No Fault Detected, Disabled, Unreliable Other
Relinquish Default	Unsigned	B	Up (1)	Up (1)
State Text	Array	B		Up, Down
Status Flags	Bit String	BF		In Alarm (always False), Fault (True if Reliability is Unreliable Other), Overridden (always False), Out of Service (True if disabled)
Strike Stat Enabled	Boolean	C		True (1) or False (0)
Terminal Enable	Boolean	CK		True (1) or False(0)
Terminal Type	Enumeration	CK		Reader (0), Input (1), or Output (2)
Time Delay	Unsigned	BC	0	

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Acked Transitions	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Description	Metasys system requirement. This is a string of printable characters.
Device Name	Metasys system requirement. Name of the panel that contains this terminal.
Event Enable	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Event State	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Notification Class	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Notify Type	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Number of States	BACnet requirement. Defines the number of states possible for Present Value.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2).

Attribute Name	Definition
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object Name	BACnet requirement. Based upon the terminal name as configured in P2000 as <terminal name> <Rdr, In, or Out> Term.
Object Type	BACnet requirement. A value that indicates the object type class. Set to TERM CLASS (316).
Out of Service	BACnet requirement. Indicates whether (True) or not (False) the terminal is not in service.
Output Stat Enabled	P2000 requirement. True if the terminal should send Output status messages to P2000 Server.
Parent Panel	P2000 requirement. Name of the panel to which this terminal is attached.
Partition	P2000 requirement. The partition that owns this terminal.
PMI Refresh	Metasys system requirement
Present Value	BACnet requirement. This indicates the logical state of the output. INACTIVE (0) or ACTIVE (1)
Present Value Text	P2000 requirement. Text of the Present Value state. "Active" or "Inactive"
Priority Array	BACnet requirement. Not used in this version of P2000.
Public	P2000 requirement. True if terminal visible to other partitions.
Query Filter String	Metasys requirement. From terminal configuration.
Reliability	BACnet requirement. Indicates if the Present Value is reliable or not, and why.
Relinquish Default	BACnet requirement. Not used in this version of P2000.
State Text	BACnet requirement. This is an array of character strings representing descriptions of all possible states of Present Value. The number of descriptions matches the number of states found in Number of States. As an integer, Present Value serves as an index to the array.
Status Flags	BACnet requirement. Represents four Boolean flags that indicate the general health of an object. Three flags are associated with the values of other attributes of the object. To determine a more complete status of the object, read these flags.
Strike Stat Enabled	P2000 requirement. True if terminal should send door strike messages to P2000 Server.
Term Index	Unsigned
Terminal Enable	P2000 requirement. True if terminal enabled.
Terminal Type	P2000 requirement. Indicates type of terminal.
Time Delay	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.

Reader Object

The P2000 Reader Object is a custom object with attributes similar to the BACnet Multistate Output Object with additional attributes. This object represents the Reader attributes for the corresponding reader terminal in P2000. Although this object has intrinsic reporting attributes, they are not used in this version of P2000. The Reader Object accepts writes to Present Value to unlock or override doors.

Status Relationships

The status of the reader and parent panel, the present value of the object, and the reliability of the object interrelate in the manner shown below:

Reader Status	Parent Panel Status	Present Value	Reliability
Unknown	Up	Locked Closed	Unreliable Other
Locked Closed	Up	Locked Closed	No Fault Detected
Unlocked Closed	Up	Unlocked Closed	No Fault Detected
Locked Open	Up	Locked Open	No Fault Detected
Unlocked Open	Up	Unlocked Open	No Fault Detected
Held Open	Up	Held Open	No Fault Detected
Forced Open	Up	Forced Open	No Fault Detected
Down	Up	Down	No Fault Detected
Disabled	Up	Locked Closed	Disabled
<don't care>	Down	Locked Closed	Unreliable Other

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Access Deny Notification Class	Unsigned			Instance of Notification Class
Access Grant Notification Class	Unsigned			Instance of Notification Class
Access Mode	Enumeration	CK		Local (0), Shared (1), or Central (2)
Access Time	Unsigned	CK		
Acked Transitions	Bit String	B		To-Offnormal, To-Fault, To-Normal
Action Interlock Enable	Boolean	C	True (1)	True (1) or False(0)
Badge Number	String	IN		Internal use only
Badge Trace	Boolean	IN		Internal use only
Barcode Attachment	String	IN		Internal use only
Card Trace Notification Class	Unsigned			Instance of Notification Class
Description	String	W	Null	Not written to by P2000
Device Name	String			
Direction	Enumeration	IN		Internal use only
Event Enable	Bit String	WB		To-Offnormal, To-Fault, To-Normal
Event State	Enumeration	B	Normal	
Facility Code	Unsigned	IN		Internal use only
First Name	String	IN		Internal use only
Function Key	Unsigned	IN		Internal use only
Issue Level	Unsigned	IN		Internal use only

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Last Name	String	IN		Internal use only
Mode Request	Unsigned	W		13 - Unlock for Unlock Time, Write 12 - Unlock for access time, Write 11 - Return to normal (cancel timed unlock)
Notification Class	Unsigned	B		Instance of Notification Class
Notify Type	Enumeration	WB	Event	Alarm or Event
Number of States	Unsigned	B	4	
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by the Object Engine
Object Name	String	BC		Reader <terminal name>
Object Type	Enumeration	B	READER CLASS (318)	
Out of Service	Boolean	B		True (1) or False (0)
Override Enable	Boolean	C		True (1) or False (0)
Override Tz	String	CK		
Parent Terminal	String	CQ		
Partition	String	CK		
Pin Code Tz	String	C		
PMI Refresh		F		
Present Value	Unsigned	WZBDRF		1 - Locked Closed, 2 - Unlocked Closed, 3 - Locked Open, 4 - Unlocked Open, Write, 5 - Held Open, 6 - Forced Open
Present Value Text	String	RF		
Priority Array	Array	B		(Empty array)
Public	Boolean	CK		True (1) or False (0)
Query Filter String	String	C		
Reliability	Enumeration	B		No Fault Detected, Disabled, Unreliable Other
Relinquish Default	Unsigned	B		1 (Locked Closed)
Shunt Time	Unsigned	CK		0 to 255 seconds
State Text	Array	B		Locked Closed, Unlocked Closed, Locked Open, Unlocked Open
Status Flags	Bit String	BF		In Alarm (always False), Fault (True if Reliability is Unreliable Other), Overridden (always False), Out of Service (True if Out of Service is True)
T&A Access Notification Class	Unsigned			Instance of Notification Class
Term Tz	String	CK		
Time Delay	Unsigned	BC	0	

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Timed Override	Unsigned	IN		Internal use only
Unlock Time	Unsigned	W		0 to 1440 minutes

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute,
E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value
Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability,
V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Access Deny Notification Class	P2000 requirement. Instance of Notification Class used to send Access Deny messages.
Access Grant Notification Class	P2000 requirement. Instance of Notification Class used to send Access Grant messages.
Access Mode	P2000 requirement. Indicates the configured access mode: Local, Shared, or Central.
Access Time	P2000 requirement. The access time in seconds.
Acked Transitions	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Action Interlock Enable	P2000 requirement. Enables Action Interlocks from this Reader if set to True (1).
Badge Number	P2000 requirement. Internal use only.
Badge Trace	P2000 requirement. Internal use only.
Barcode Attachment	P2000 requirement. Internal use only.
Card Trace Notification Class	P2000 requirement. Instance of Notification Class used to send Card Trace messages.
Description	Metasys system requirement. This is a string of printable characters.
Device Name	Metasys system requirement. Name of the panel that contains this terminal.
Direction	P2000 requirement. Internal use only.
Event Enable	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Event State	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Facility Code	P2000 requirement. Internal use only.
First Name	P2000 requirement. Internal use only.
Function Key	P2000 requirement. Internal use only.
Issue Level	P2000 requirement. Internal use only.
Last Name	P2000 requirement. Internal use only.
Notification Class	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.
Notify Type	BACnet requirement. For intrinsic reporting. Not used in this version of P2000.

Attribute Name	Definition
Number of States	BACnet requirement. Defines the number of states possible for Present Value.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2).
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object Name	BACnet requirement. Based upon the terminal name as configured in P2000 as Reader <terminal name>.
Object Type	BACnet requirement. A value that indicates the object type class. Set to READER CLASS (319).
Out of Service	BACnet requirement. Indicates whether (True) or not (False) the output or process the object represents is not in service).
Override Enable	P2000 requirement. True if Cardholder Override is enabled.
Override Tz	P2000 requirement. Timezone during which the reader is overridden.
Parent Terminal	P2000 requirement. Name of the terminal to which this reader is attached.
Partition	P2000 requirement. The partition that owns this terminal.
Pin Code Tz	P2000 requirement. Timezone during which pin codes are disabled.
PMI Refresh	Metasys system requirement.
Present Value	BACnet requirement. This indicates the state of the reader. The state of the reader is one of 4 states: Locked Closed, Unlocked Closed, Locked Open, or Unlocked Open. Current version of P2000 will only report Locked Closed or Unlocked Closed.
Present Value Text	P2000 requirement. Text string of the Present Value.
Priority Array	BACnet requirement. Not used in this version of P2000.
Public	P2000 requirement. True if reader is visible to other partitions.
Query Filter String	P2000 requirement. From terminal configuration.
Reliability	BACnet requirement. Indicates if the Present Value is reliable or not, and why.
Relinquish Default	BACnet requirement. Not used in this version of P2000.
Shunt Time	P2000 requirement. The shunt time in seconds.
State Text	BACnet requirement. This is an array of character strings representing descriptions of all possible states of Present Value. The number of descriptions matches the number of states found in Number of States. As an integer, Present Value serves as an index to the array.
Status Flags	BACnet requirement. Represents four Boolean flags that indicate the general health of an object. Three flags are associated with the values of other attributes of the object. To determine a more complete status of the object, read these flags.
T&A Access Notification Class	P2000 requirement. Instance of Notification Class used to send T&A messages. Not used by this version of P2000.
Term Tz	P2000 requirement. Time zone during which the reader is enabled.
Time Delay	BACnet requirement. Not used in this version of P2000.
Timed Override	P2000 requirement. Internal use only.
Unlock Time	P2000 requirement. Time in minutes to unlock the door (see Present Value).

Input Point Object

The P2000 Input Point Object is a standard BACnet Life Safety Device Object with Fault/Reliability attributes. This object represents a configured input point object in P2000. The Input Point Object uses intrinsic reporting for event notification.

Status Relationships

The status of the input, parent terminal, and parent panel, the present value of the object, and the reliability of the object interrelate in the manner shown below:

Input Status	Parent Terminal Status	Parent Panel Status	Present Value	Reliability
Unknown	Up	Up	Quiet	Unreliable Other
Reset	Up	Up	Quiet	No Fault Detected
Set	UP	Up	Alarm	No Fault Detected
Short	UP	Up	Fault	Shorted Loop
Open	Up	Up	Fault	Open Loop
Disabled	Up	Up	Quiet	Disabled
<don't care>	Down, Unknown, or Disabled	Up	Quiet	Unreliable Other
<don't care>	<don't care>	Down	Quiet	Unreliable Other

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Acked Transitions	Bit String	B		To-Offnormal, To-Fault, To-Normal
Alarm Values	List	B		Alarm
Description	String	W	Null	Not written to by P2000
Device Name	String			
Display Alarm	Boolean	CK		True (1) or False (0)
Event Enable	Bit String	WB		To-Offnormal, To-Fault, To-Normal
Event State	Enumeration	B		Normal, Fault, Offnormal
Event Time Stamps	Array	B		
Fault Values	List	B		Fault-Alarm
Mode	Enumeration	WBC		Enabled, Disabled
Notification Class	Unsigned	B		Instance of Notification Class
Notify Type	Enumeration	WB		Alarm or Event
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by the Object Engine
Object Name	String	BC		

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Object Type	Enumeration	B	SECURITY BI CLASS (323)	
Operation Required	Enumeration	B		None
Out of Service	Boolean	B		True (1) or False (0)
Parent Terminal	String	CKQ		
Partition	String	CK		
PMI Refresh		F		
Point Number	Unsigned	CK		1-25
Present Value	Unsigned	BDRF		Quiet (0), Alarm (2), Fault (3), Fault-Alarm (5)
Present Value Text	String	RF		Quiet, Alarm, Short, Open
Priority	Unsigned8	CK		0-255
Public	Boolean	CK		True if this input is visible from other partitions
Query Filter String	String	C		
Reliability	Enumeration	B		No Fault Detected, Open Loop, Shorted Loop, Unreliable Other (if parent terminal is down or offline)
Silenced	Enumeration	B	Unsilenced	
Soft Input	Boolean	CK		True (1) or False (0)
Status Flags	Enumeration	B		In Alarm (True if Event State is not Normal), Fault (True if Reliability is not No Fault Detected), Overridden (always False), Out of Service (True if Out of Service is True)
Supervised	Boolean	C		True (1) or False (0)
Suppression Tz	String	CK		
Time Delay	Unsigned	BC	0	

∗A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Data Type
Acked Transitions	BACnet requirement. For intrinsic reporting. Conveys three flags that separately indicate the receipt of acknowledgments for To-Offnormal, To-Fault, and To-Normal events. These flags clear upon the occurrence of the corresponding event and set under any of these conditions: ■ upon receipt of the corresponding acknowledgement; ■ upon the occurrence of the event if the corresponding flag is not set in Event Enable (event notifications are not generated for this condition and thus no acknowledgement is expected); ■ upon the occurrence of the event if the corresponding flag is set in Event Enable and the corresponding flag in Ack Required of the Notification Class Object implicitly referenced by the Notification Class attribute of this object is not set (no acknowledgement is expected).
Alarm Values	BACnet requirement. Specifies any states the Present Value must equal before a To-Offnormal event generates. If the object supports intrinsic reporting, this attribute is required. A To-Offnormal event generates under these conditions: ■ the To-Offnormal flag is enabled in the Event Enable property, and ■ Present Value equals at least one of the values in the Alarm Values list, and ■ Present Value remains equal to the same value for a minimum period of time, specified by Time Delay. New events may generate upon a Mode change. Once equal, Present Value must not equal any of the states in the Alarm Values property and not equal to any of the states in Fault Values, before a To-Normal event generates under these conditions: ■ the To-Normal flag is enabled in Event Enable, and ■ Present Value remains not equal to any of the states in Alarm Values, and ■ Present Value remains not equal to any of the states in Fault Values, and ■ Present Value remains equal to the same value for a minimum period of time, specified by Time Delay. New events may generate upon a Mode change.
Description	Metasys system requirement. This is a string of printable characters.
Device Name	Metasys system requirement. Name of panel that contains this input
Display Alarm	P2000 requirement. True if input status changes should be handled as an alarm.
Event Enable	BACnet requirement. For intrinsic reporting. Conveys three flags that separately enable and disable reporting of To-Offnormal, To-Fault, and To-Normal events based on Present Value and Mode changes.
Event State	BACnet requirement. For intrinsic reporting. This is included to determine if the object has an active event state associated with it. This attribute indicates the event state of the object.
Event Time Stamps	BACnet requirement. For intrinsic reporting. Conveys the times of the last event notifications for To-Offnormal, To-Fault, and To-Normal events, respectively. Time stamps of type Time or Date have FF in each octet. Sequence number time stamps are 0 if no event notification of that type has generated since the object was created.
Fault Values	BACnet requirement. Specifies any states Present Value must equal before a To-Fault event generates. A To-Fault event generates under these conditions: ■ the To-Fault flag is enabled in Event Enable, and ■ Present Value equals at least one of the values in the Fault Values list. New events may generate upon a Mode change.

Attribute Name	Data Type
Mode	BACnet requirement. True if the input point is enabled.
Notification Class	BACnet requirement. For intrinsic reporting. Specifies the notification class used when handling and generating event notification for P2000 Input Point. This attribute implicitly refers to a Notification Class object that has a Notification Class attribute with the same value.
Notify Type	BACnet requirement. For intrinsic reporting. Conveys if the notifications generated by the object are Events or Alarms.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2).
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object Name	BACnet requirement. Input point name.
Object Type	BACnet requirement. The object type class. Set to SECURITY BI CLASS (323).
Operation Required	BACnet requirement. Not used in this version of P2000.
Out of Service	BACnet requirement. Indicates whether (True) or not (False) the inputs or process the object represents are not in service.
Parent Terminal	P2000 requirement. Name of the terminal to which this output is attached.
Partition	P2000 requirement. The partition that owns this input.
PMI Refresh	Metasys system requirement.
Point Number	P2000 requirement. The point number as configured in P2000.
Present Value	BACnet requirement. Reflects the state of the P2000 Input Point Object.
Present Value Text	P2000 requirement. Text string of the Present Value.
Priority	P2000 requirement. The configured priority for alarms generated by this input point.
Public	P2000 requirement. True if this input point visible to other partitions.
Query Filter String	P2000 requirement. From input point configuration.
Reliability	BACnet requirement. Provides an indication if the Present Value or the operation of the physical inputs in question are reliable or not, and why.
Silenced	BACnet requirement. Not used in this version of P2000.
Soft Input	P2000 requirement. True if this input point is a virtual point with no actual hardware input.
Status Flags	BACnet requirement. Represents four Boolean flags that indicate the general health of the object. Three of the flags are associated with the values of other properties of this object. To determine a more detailed status of the object, read the properties linked to these flags.
Supervised	P2000 requirement. True if this input is a 4-state input point. If False, this is a 2-state input point.
Suppression Tz	P2000 requirement. Name of timezone during which this input point is suppressed.
Time Delay	BACnet requirement. Not used in this version of P2000.

Output Point Object

The P2000 Output Point Object is the standard BACnet Binary Output Object with additional attributes. It represents a configured Output Point in P2000. The Output Point Object uses intrinsic reporting for event notification and accepts writes to Present Value to Activate/Deactivate output points.

Status Relationships

The status of the input, parent terminal, and parent panel, the present value of the object, and the reliability of the object interrelate in the manner shown as follows:

Input Status	Parent Terminal Status	Parent Panel Status	Present Value	Reliability
Unknown	Up	Up	Inactive	Unreliable Other
Reset	Up	Up	Inactive	No Fault Detected
Set	Up	Up	Active	No Fault Detected
<don't care>	Down, Unknown, or Disabled	Up	Inactive	Unreliable Other
<don't care>	<don't care>	Down	Inactive	Unreliable Other

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Acked Transitions	Bit String	B		To-Offnormal, To-Fault, To-Normal
Active Text	String	B	Active	Active
Description	String	W	Null	Not written to by P2000
Device Name	String			
Event Enable	Bit String	WB		To-Offnormal, To-Fault, To-Normal
Event State	Enumeration	B		Normal
Feedback Value	Enumeration	B	Inactive	
Inactive Text	String	B	Inactive	Inactive
Notification Class	Unsigned	B		Instance of Notification Class
Notify Type	Enumeration	B	Event	Event
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by the Object Engine
Object Name	String	BC		
Object Type	Enumeration	B	SECURITY BO CLASS (324)	
Out of Service	Boolean	B		True (1) or False (0)
Parent Terminal	String	CKQ		
Partition	String	CK		

Attribute Name	Data Type	Flags*	Default Value	Options/Range
PMI Refresh		F		
Point Number	Unsigned	CK		1-16
Polarity	Enumeration	B		Normal, Reverse
Present Value	Enumeration	WBDRF		Active (1), Inactive (0)
Present Value Text	String	RF		Active, Inactive
Priority Array	Array	B		Empty array
Public	Boolean	CK		True (1) or False (0)
Query Filter String	String	C		
Reliability	Enumeration	B		No Fault Detected, Unreliable Other
Relinquish Default	Enumeration	B	Inactive	Inactive
Status Flags	Enumeration	B		In Alarm (always False), Fault (True if Reliability is not No Fault Detected), Overridden (always False), Out of Service (True if Out of Service is True)
Time Delay	Unsigned	BC	0	

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Acked Transitions	BACnet requirement. For intrinsic reporting. Conveys three flags that separately indicate the receipt of acknowledgments for To-Offnormal, To-Fault, and To-Normal events. Transitions to High Limit and Low Limit Event States are considered to be Offnormal events. These flags clear upon the occurrence of the corresponding event and set under any of these conditions: ■ upon receipt of the corresponding acknowledgement; ■ upon the occurrence of the event if the corresponding flag is not set in the Event Enable attribute (meaning event notifications are not generated for this condition and thus no acknowledgement is expected); ■ upon the occurrence of the event if the corresponding flag is set in the Event Enable attribute and the corresponding flag in the Ack Required attribute of the Notification Class Object implicitly referenced by the Notification Class attribute of this object is not set (meaning no acknowledgement is expected).
Active Text	BACnet requirement. The text used by Present Value Text when the output is active.
Description	Metasys system requirement. This is a string of printable characters.
Device Name	BACnet requirement. Name of the panel that contains this output.
Event Enable	BACnet requirement. For intrinsic reporting. Conveys three flags that separately enable and disable reporting of To-Offnormal, To-Fault, and To-Normal events.

Attribute Name	Definition
Event State	BACnet requirement. For intrinsic reporting. Provides a way to determine if the object has an active event state associated with it.
Feedback Value	BACnet requirement. Not used in this version of P2000.
Inactive Text	BACnet requirement. The text used by Present Value Text when the output is inactive.
Notification Class	BACnet requirement. For intrinsic reporting. Specifies the notification class used when handling and generating event notifications for the object. This attribute implicitly refers to the BACnet Notification Class Object that has a Notification Class attribute of the same value.
Notify Type	BACnet requirement. For intrinsic reporting. Conveys if the notifications generated by the object are Events or Alarms. Always set to Events in this version of P2000.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2).
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object Name	Metasys system requirement. Output point name.
Object Type	BACnet requirement. The object type class. Set to SECURITY BO CLASS (324).
Out of Service	BACnet requirement. Indicates if the physical output that the object represents is not in service.
Parent Terminal	P2000 requirement. Name of terminal to which this output is attached.
Partition	P2000 requirement. The partition that owns this output.
PMI Refresh	Metasys system requirement.
Point Number	P2000 requirement. The configured point number.
Polarity	BACnet requirement. Indicates the relationship between the physical state of the output and the logical state represented by Present Value. If the Polarity attribute is Normal, then the Active state of the Present Value attribute is also the Active or On state of the physical output. If the Polarity attribute is Reverse, then the Active state of the Present Value attribute is in the Inactive or Off state of the physical output.
Present Value	BACnet requirement. This indicates the logical state of the Binary output. The relationship between Present Value and the state of the output is determined by Polarity.
Present Value Text	P2000 requirement. Text string of Present Value.
Priority Array	BACnet requirement. Not used in this version of P2000.
Public	P2000 requirement. True if this output point visible to other partitions.
Query Filter String	P2000 requirement. From output point configuration.
Reliability	BACnet requirement. Indicates if the Present Value is reliable or not, and why.
Relinquish Default	BACnet requirement. Not used in this version of P2000.
Status Flags	BACnet requirement. Represents four Boolean flags that indicate the general health of an object. Three flags are associated with the values of other attributes of the object. To determine a more complete status of the object, read these flags.
Time Delay	BACnet requirement. Not used in this version of P2000.

Notification Class Object

The P2000 Notification Class Object is the standard BACnet Notification Class Object. It provides support for holding lists of alarm and event destinations. One Notification Class instance exists for each category of event/alarm in each device.

Event Categories

The P2000 event categories allow for BACnet enrollments for the desired event category. P2000 divides transactions into the event categories shown below:

Category	Sent by these Objects	Events or Alarms
Access Grant	Reader objects	Events
Access Deny	Reader Objects	Events
Audit	Host Device Objects	Events
Card Trace	Reader Objects	Events
Host Event	Host Device Objects	Events
Host Log	Host Device Objects	Events
Input Status	Input Point Objects	Events and Alarms
Output Status	Output Point Objects	Events
Panel Event	Panel Objects	Events (Future Use)
Panel Hardware Status	Panel Objects	Events
Security Logic	Host Device Objects	Events (Future Use)
T&A Access	Reader Objects	Events (Future Use)

Attributes

Attribute Name	Data Type	Flags*	Default Value	Options/Range
Ack Required	Bit String	B		True, True, True if Input Point, otherwise False, False, False
Description	String	W	Null	Not written to by P2000
Device Name	String			
Notification Class	Unsigned	B		
Object Category	Enumeration		Security Category (2)	
Object Identifier	BACnet Object ID	B		Set by the Object Engine
Object Name	String	BC		<event category> Notification
Object Type	Enumeration	B	Notification Class	
PMI Refresh		F		
Priority	Array	B		TBD
Recipient List	List	WB		

*A - Save Attribute when Archived, B - BACnet Required Attribute, C - Configurable, D - Default Attribute, E - Execute on Write, F - Person Machine Interface (PMI), I - Internal Attribute, K - Key Attribute, N - Value Not Required, O - Optional Attribute, Q - Input from Other Objects, R - Association to Reliability, V - Redirect Default Value to Attribute, W - Writeable, Z - Priority on Write

Attribute Definitions

Attribute Name	Definition
Ack Required	BACnet requirement. Conveys three separate flags that represent whether acknowledgement is required in notifications generated for To-Offnormal, To-Fault, and To-Normal event transitions, respectively.
Description	Metasys system requirement. This is a string of printable characters.
Device Name	Metasys system requirement. Name of the device that contains this notification class.
Notification Class	BACnet requirement. Instance number.
Object Category	Metasys system requirement. Always set to SECURITY CATEGORY (2)
Object Identifier	BACnet requirement. A unique numeric code used to identify the object.
Object Name	BACnet requirement. A character string that represents the name of the object.
Object Type	BACnet requirement. A value that indicates membership in a particular object type class.
PMI Refresh	Metasys system requirement.
Priority	BACnet requirement. Convey the priority to be used for event notifications for To-Offnormal, To-Fault, and To-Normal events, respectively. A lower number indicates a higher priority.
Recipient List	BACnet requirement. Conveys a list of one or more recipient destinations to which notifications are sent when event-initiating objects using this class detect the occurrence of an event. The destinations themselves define a structure of parameters.

P2000 SETUP

P2000 requires minor configuration steps to get its BACnet Interface functional. The only required setup steps consist of the following:

- Adding entries to the External IPs application for all BACnet devices that will communicate with P2000. See "Setting Up External IPs" on page 32.

- Entering the IP address of the computer running the BACnet Service onto the BACNet tab of the Edit Site Parameters dialog box. See "Setting Up BACnet Site Options" on page 33.

If the P2000 system is registered for the BACnet option, the BACnet communication (BACnet Service) will start automatically when the host starts up. Note that BACnet Service can be started and stopped using the P2000 Service Control feature, just like the other P2000 communication services. Refer to "Starting and Stopping Service Control" in the *P2000AE Software User Manual*.

Setting Up External IPs

Here you will define a computer or device to accept messages from external devices. You can also define a computer or device from which the P2000 system will not accept external messages (using the Allow option). If the P2000 system receives an external message from a source that is not configured, the P2000 software will log an error message and not process the message.

➤ **To Set Up External IPs:**

1. From the P2000 Main menu, select **Config>System**. The System Configuration window appears.

2. Click the plus (+) sign next to the root **Site Parameters** icon to display default system parameters.

3. Click the **External IPs** icon and click the **Add** button. The External IP Edit dialog box appears.
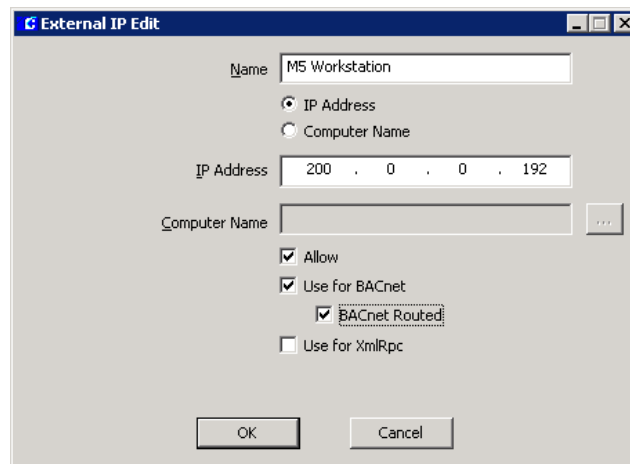
4. Enter a descriptive **Name** of the external device.

5. Select either **IP Address** or **Computer Name**.

6. If you select IP Address, enter the **IP Address** of the computer or device from which to accept messages. Use this option for a device that is not a Windows computer.

7. If you select Computer Name, enter the Windows **Computer Name** from which to accept messages, or click the **Browse** button [...] to find a computer by name on your network.

8. If you select the **Allow** check box, the P2000 software will allow communication with this device. If you do not select the Allow check box, the P2000 system will deny communication with this device and will not log any error messages for this device.

NOTE

Since the BACnet protocol includes broadcast messages that are sent to all BACnet devices on the network, the P2000 software may generate a lot of error messages about rejecting messages from unknown BACnet

devices. Since these error messages can cause a significant slowdown in the processing of other messages, add these devices as a BACnet device but DO NOT select the Allow option.

9. Select the **Use for BACnet** check box.

10. Select the **BACnet Routed** check box to send certain messages directly to the device instead of broadcasting them. If this check box is not selected, certain messages will be broadcasted between this device and the P2000 Server. If this device is connected on the other side of a network router, but the check box is not selected, the device will not see broadcasted messages.

11. Select the **Use for XmlRpc** check box if this device uses the XmlRpc protocol.

12. Click **OK** to save the settings and return to the System Configuration window.

Setting Up BACnet Site Options

BACnet Site options allow you to configure many system wide settings, defining various parameters of the BACnet Interface.

➤ **To Edit BACnet Site Parameters:**

1. From the System Configuration window, select **Site Parameters** and click **Edit**. The Edit Site Parameters dialog box opens at the **General** tab.

2. Select the **BACNet** tab and enter the information on each field according to your system requirements. (See "BACnet Site Field Definitions" on page 34 for detailed information.)

3. When you have entered all the information, click **OK** to save the settings and return to the System Configuration window.

BACnet Site Field Definitions

Query String	This is a 64 character string that is used to set the Query String attribute for the Host Device Object, Counter Objects, and Notification Class Objects. This value is used in the Metasys M3/M5 Workstation software.
Priority Values	This is the BACnet priority level used when sending the corresponding event or alarm.
IP Address	Enter the IP Address of the BACnet Server to be used for BACnet broadcast messages. If the address is 0.0.0.0, the BACnet interface will use the address of the first network interface card (NIC). This setting is only important on computers with more than one NIC.
IP Port	This is a BACnet protocol addressing parameter. The default value is 47808. This may need to be changed if your existing BACnet devices are using different values.
Network Address	This is also a BACnet protocol addressing parameter. The default value is 1001. This may need to be changed if your existing BACnet devices are using different values.
Internal Address	This should only need to be changed if there is another P2000 server on the same network. If needed, set this value to be unique to every P2000 server on the network.

Configuring Hardware Components for BACnet Interface (Legacy Panels)

When configuring Panels, Terminals, Input Points, and Output Points, described in "Chapter 2: Configuring the System" of the *P2000AE Software User Manual*, you may enter a Query String value. This is a 64 character text field that will be used in the QueryFilterString property of Event Notification messages.

NOTE

The instructions in this section describe how to define panels, terminals, input points, and output points as BACnet objects for legacy panels (e.g. CK721, CK720, etc.). For CK722 controllers, follow the instructions in "Enabling BACnet Objects for CK722 Controllers" on page 36.

➤ **To Define a Panel, Terminal, Input Point, and Output Point as BACnet Objects for Legacy Panels:**

1. Select **Config>System** from the P2000 menu bar. The System Configuration window appears.
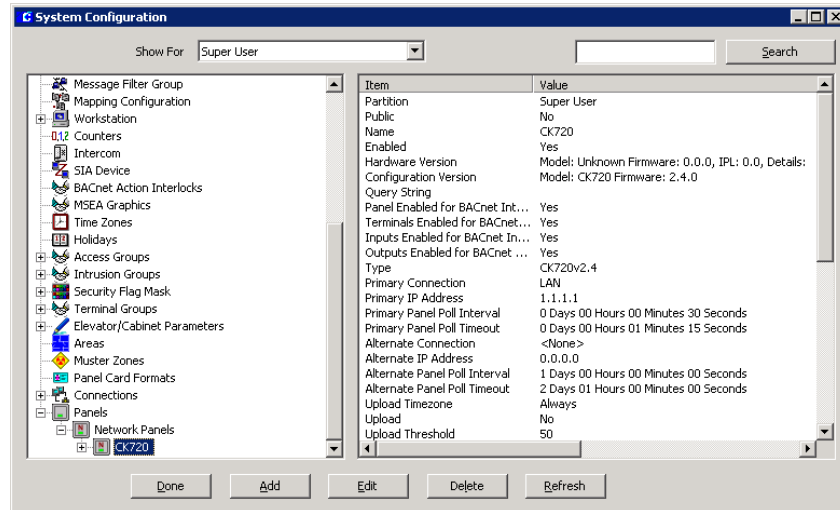
2. Select a panel to configure for BACnet from the **Panels** directory.

3. Click **Edit**. The Edit Panel window appears.
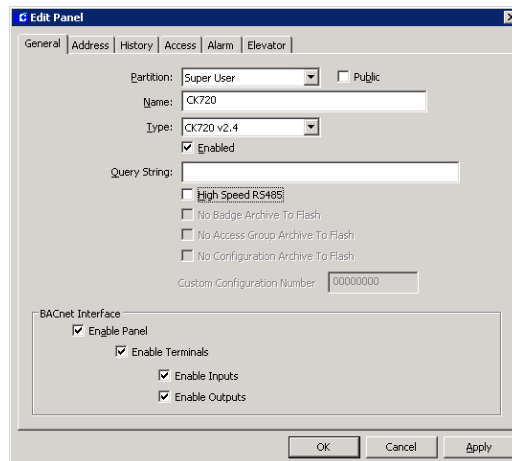
4. Select one or more check boxes in the BACnet Interface area to define the panel, terminals, input points and/or output points as BACnet objects.

5. Click **OK**.

6. Repeat steps 2 through 5 for each panel and its associated terminals, input points and output points you wish to configure for BACnet.

Enabling BACnet Objects for CK722 Controllers

This section describes how to use the P2000 host's Message Data Configuration application to enable CK722 controller BACnet objects, so they can be monitored and controlled from M3/M5 workstations. By default, BACnet objects defined for CK722 controllers will *not* be visible from M3/M5 workstations until they are enabled from the P2000 host.

➤ **To Enable BACnet Objects for CK722 Controllers:**

1. From the P2000 Main menu bar, select **Config>Message Data Configuration**. The Message Data Configuration window appears.

   All CK722 controllers defined in the P2000 Software Configuration Tool and downloaded to the P2000 host software appear under the CK722 Device item in the navigation tree.

2. Click the Plus sign (+) next to **CK722 Device** in the navigation tree to view the CK722 controllers defined in the system.
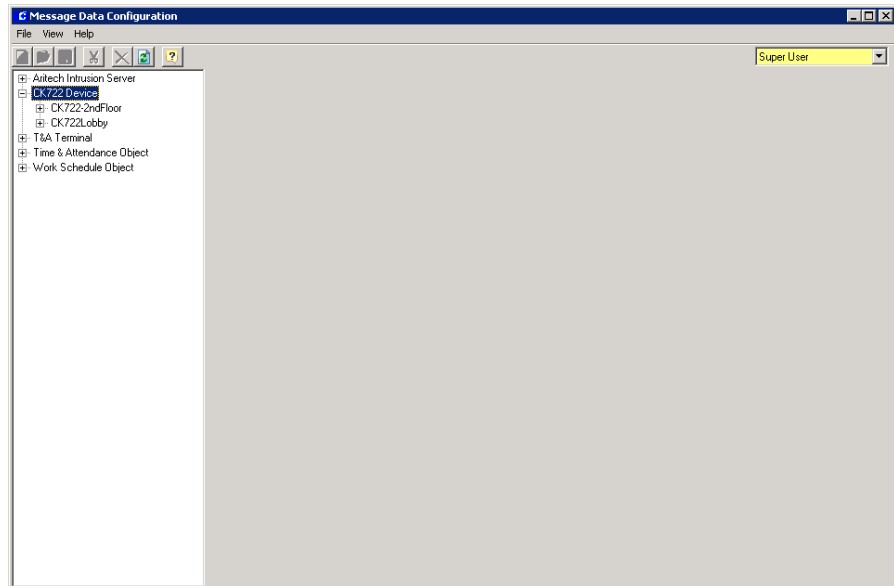
3. Click the Plus sign (+) next to a CK722 controller definition in the navigation tree to view a list of the selected controller's objects.

4. Select the controller in the navigation tree. The **General** tab appears for the selected controller.

5. Click **Edit** on the Message Data Configuration window's toolbar.
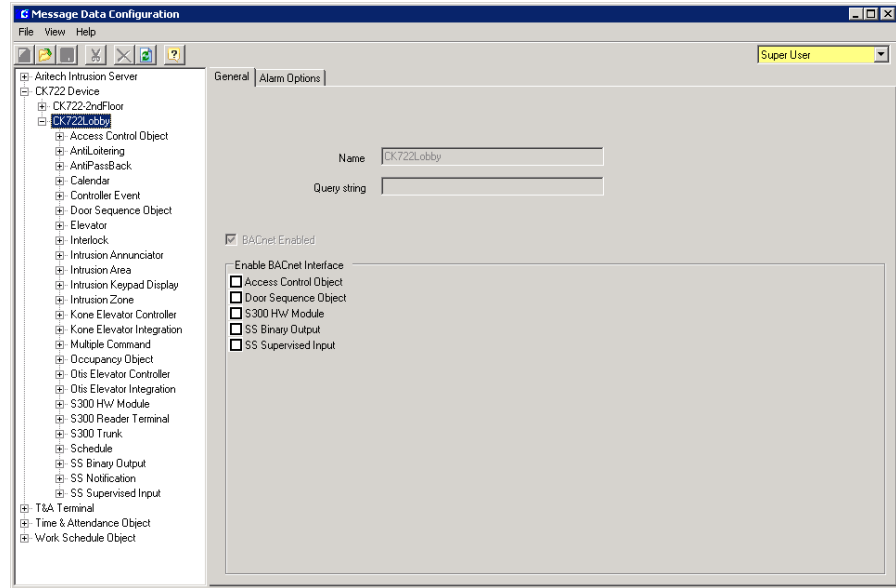
6. In the **Enable BACnet Interface** box on the **General** tab, select the object(s) you wish to make visible from M3/M5 workstations.

NOTE

If you select an object in the Enable BACnet Interface box, by default, every one of those objects defined for the selected controller will be visible from an M3/M5 workstation.

---

7. Click **Save**.

8. Restart the BACnet Service on the P2000 BACnet Server. Refer to the Microsoft documentation for information on restarting services.

NOTE

If you do not restart the BACnet Service on the P2000 BACnet Server after editing, the changes to the Message Data Configuration application will not be applied when viewing P2000 objects from the M3 or M5 workstation.

BACnet Panel Devices

All panel-related objects are placed under a single P2000 device. There are no BACnet panel devices. All panels, terminals, input points and output points are BACnet objects and contribute to the 7200 BACnet object limit enforced by the P2000.

Panel Object
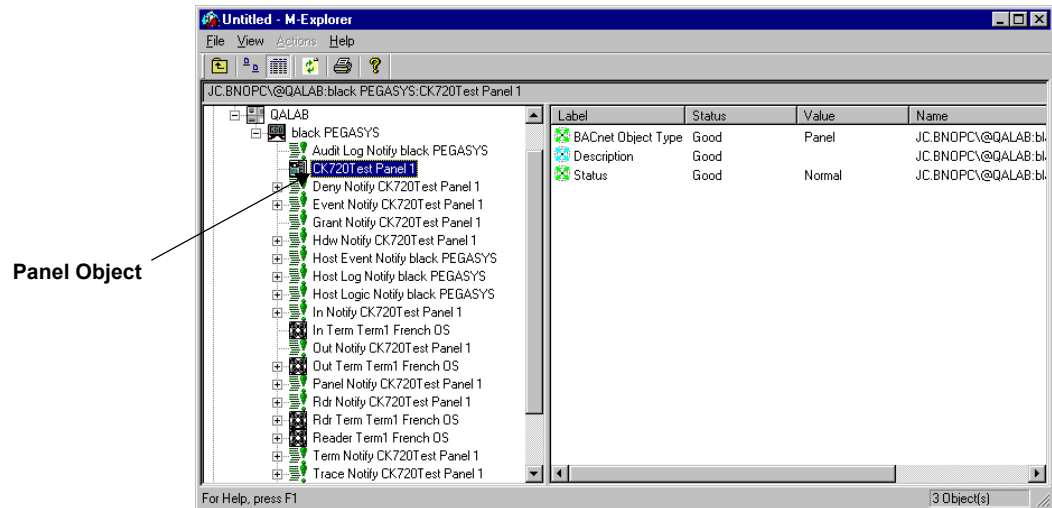
Care should be exercised to keep the number of BACnet objects reasonably low, otherwise system performance can be adversely affected. Enabling one item can account for multiple BACnet objects. For example, if the **Enable Terminals** check box is enabled, all the terminals and all the BACnet objects associated with each terminal will be enabled, contributing to the total number of BACnet objects.

NOTE

To disable any terminals, input points or output points for specific panels, you will have to manually disable them using the Edit Panel dialog or the Message Data Configuration window (CK722 controllers only).
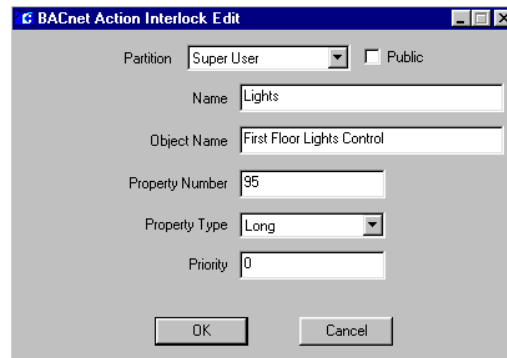
Setting Up BACnet Action Interlocks

You must define Action Interlocks for P2000 to initiate actions in BACnet devices. Here you define the BACnet Object and properties that will be written to by an Action Interlock. A typical use of an Action Interlock includes turning on lights and air conditioning in an entity's office when he/she is granted access at a door.

➤ **To Set Up BACnet Action Interlocks:**

1. From the P2000 Main menu, select **Config>System**. The System Configuration window appears.

2. Click the **BACnet Action Interlocks** icon and click the **Add** button. The BACnet Action Interlock Edit dialog box appears.

3. If this is a partitioned system, select the **Partition** that will have access to this action interlock information, and select **Public** if you wish the action interlock to be visible to all partitions.

4. Enter a descriptive **Name** of the BACnet Action Interlock.

5. Enter the **Object Name** of the BACnet Object to write to.

6. Enter the **Property Number** of the BACnet property to write to.

7. From the **Property Type** drop-down list, select the data type of the property.

8. Enter the BACnet **Priority** used when writing the property. If you enter 0, a non-prioritized write will be used.

9. Click **OK** to save the settings and return to the System Configuration window.

Action Interlock Operation

Once the Action Interlocks have been configured, they will be available for assignment to badge identifiers through Access Profiles in the Entity Management window. The object property defined in the Action Interlock will be written with the value associated with the badge identifier. Each badge identifier can be configured to activate up to two Action Interlocks that will be triggered when that badge identifier is granted access.

➤ **To Assign Action Interlocks to a Badge Identifier:**

1. From the P2000 Main menu, select **Access>Entity Management** to display the Entity Management window.

2. Select an entity from the list and click the **Edit** icon.

3. Click the **Access Profiles** tab.

4. From the list box on the left side of the window, select the Access Profile that will include the action interlocks.

5. Click the local site tab.

6. Click the **Action Interlock** tab. If this is an Enterprise system, refer to the *P2000AE Software User Manual* for additional information when assigning access privileges to Enterprise badge identifiers.

7. From the first **Action Interlock** drop-down list, select the Action Interlock that will be written when the badge identifier is granted access.

8. Enter the **Value** to write to the first Action Interlock when the badge identifier is granted access. This value will be converted into the correct data type to match the Action Interlock configuration.

9. From the second **Action Interlock** drop-down list, select the Action Interlock that will be written when the badge identifier is granted access.

10. Enter the **Value** to write to the second Action Interlock when the badge identifier is granted access. This value will be converted into the correct data type to match the Action Interlock configuration.

11. After you define the Action Interlocks, click the **Save** icon to save the Access Profile, and proceed to assign the Access Profile to the badge identifier. Refer to the *P2000AE Software User Manual* for instructions.

M3/M5 SETUP

M3/M5 workstations need only minor configuration changes to allow basic communication with the P2000 system. However, adding P2000 items to M-Graphics screens will require additional time, and that will depend on how extensively you use M-Graphics.

Each of the following items will need to be repeated on every M3/M5 workstation in your system.

General Guidelines for Configuring P2000 and Metasys Workstations over Routers

Use this section as a guide when configuring a Metasys M5 or M3 workstation across a router. It is assumed that you are familiar with the standard installation procedures detailed in the other sections of this manual.

A BBMD (Broadband Management Device) is included within the P2000 software to support an M3 or M5 workstation across a router. Previous versions did not

support this configuration and required that an N30 controller (or other device) serve as the BBMD device.

As BACnet is a non-routable protocol, special consideration must be given to specific requirements relating to the P2000, the router, and the Metasys workstation.

Figure 2 illustrates an M5 / M3 workstation configured to operate with a P2000 Security Management System across a router. CK721 and CK722 controllers used to monitor alarm and control entry points are connected to the P2000 Server. Alarms, valid card reads, output point (relays) status, etc., are sent to the Metasys workstation where the changes in the attributes of the P2000 Objects are detected.
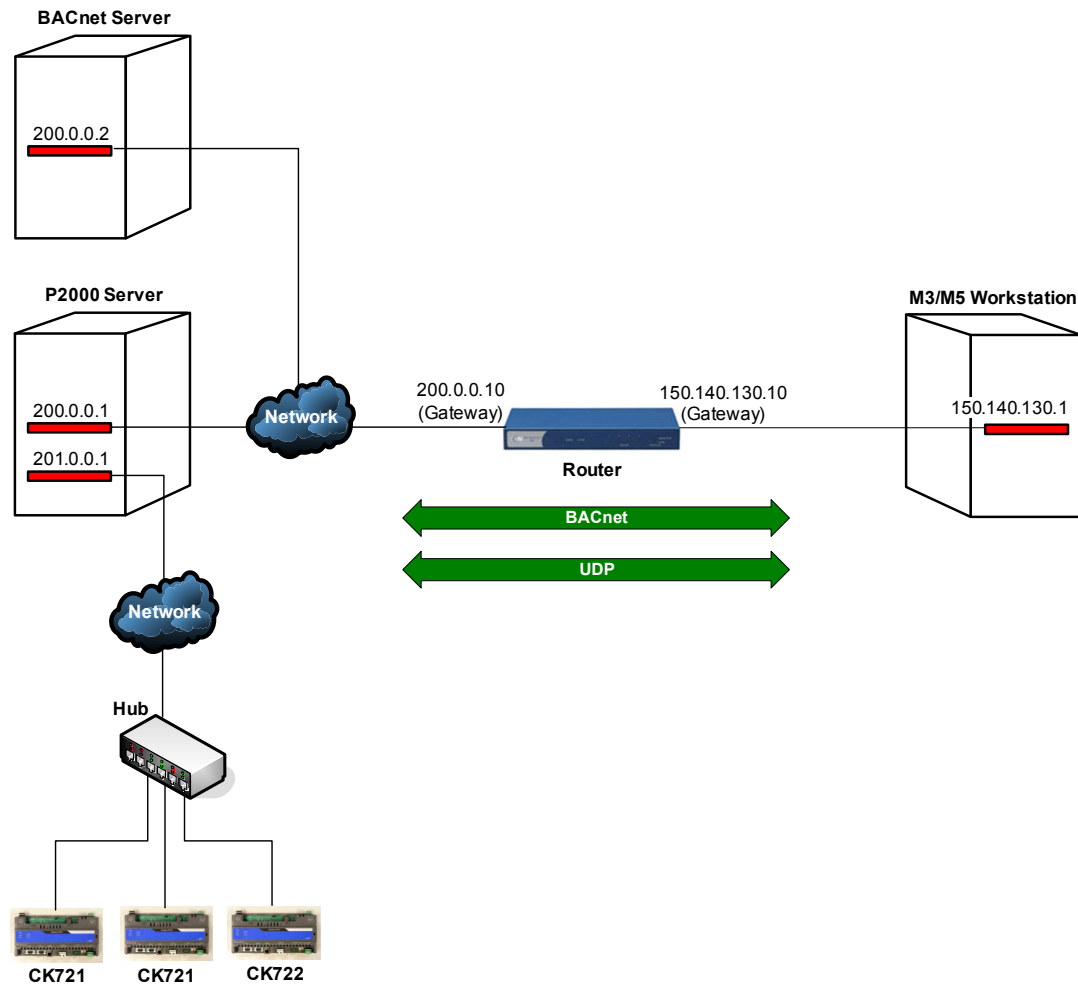
Figure 2: Metasys Workstations Configured Over a Router

Prior to loading the Metasys M5 or M3 workstation software, the basic network operation between systems must be verified. Make sure that both systems can ping one another by IP address across the router. Once this level of operation is established, the M5 or M3 software may be loaded per the associated Metasys installation documentation.

Configuration Considerations

This section describes the considerations for configuring the M5 Workstation, the router and the P2000 Server.

M5 Workstation

- If the network used does not support name resolution, an alternate method to resolve computer names, by the use of aliases, must be used (such as the Lmhosts file).

- Product Libraries must be loaded into the M5 workstation. The P2000 Product Libraries may be found on the P2000 Server Applications and Services CD (refer to "Prod Lib Installation" on page 61).

NOTE

For installations where the number of panels exceeds 64, re-install the Product Libraries using the P2000 Server Applications and Services CD (version 4.1 or higher) in each M3/M5 workstation to ensure proper system functionality.

- Using the **SHOP** button in Site Book, define the P2000 BACnet Server IP address situated across the router. (For specifics on Site Book configuration relative to the P2000, refer to "Verification of Metasys-P2000 Integration Using the Metasys Site Book Application" on page 44.) The Site Book window is shown below.
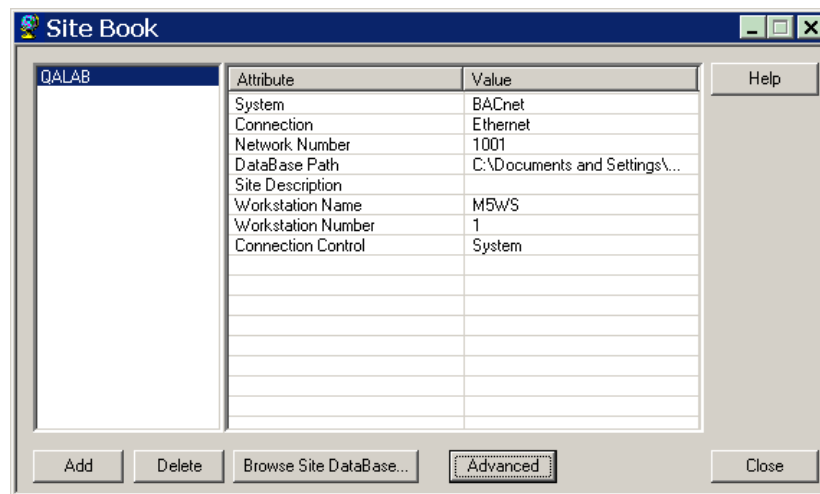
The previous screen capture shows the initial screen that appears when Site Book is launched.

Note the **Advanced** button. Selecting the **Advanced** button will augment the screen with additional information. Included in the enhanced display will be the **SHOP** button as shown in the following screen capture.
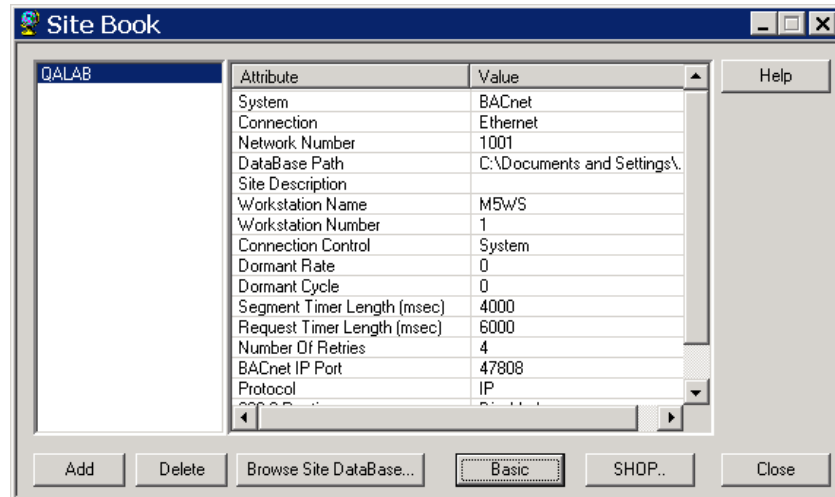
Note that in the enhanced page, the **Advanced** button changed to **Basic** and that the **SHOP** button is now available.

■ When you click the **SHOP** button, the following window appears.

Add the IP address of the P2000 BACnet Server and deselect the **Broadcast** check box. Once complete, save and exit the window.
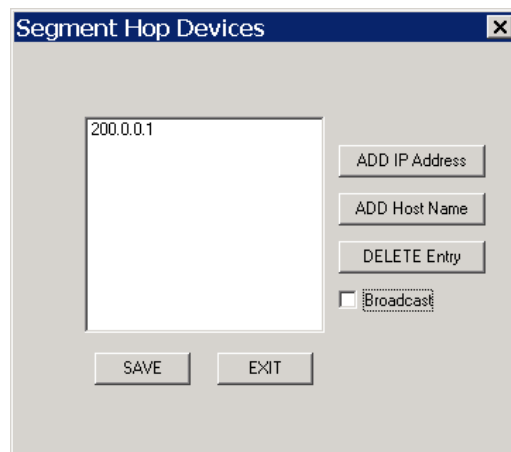
Router

■ The router must be configured *not* to filter out UDP protocol. In cases where UDP filtering is a requirement, the router must be configured *not* to filter out UDP specifically on port 47808.

P2000 Server

■ When configuring the External IPs at the P2000 Server on the External IP Edit window, you are given a choice to define the Metasys workstation by either IP address or by name. If the Metasys workstation is to be located

across a router, it must be defined by IP Address as depicted below (there is no name resolution across the router). Make sure the **Use for BACnet** and **BACnet Routed** check boxes are selected.
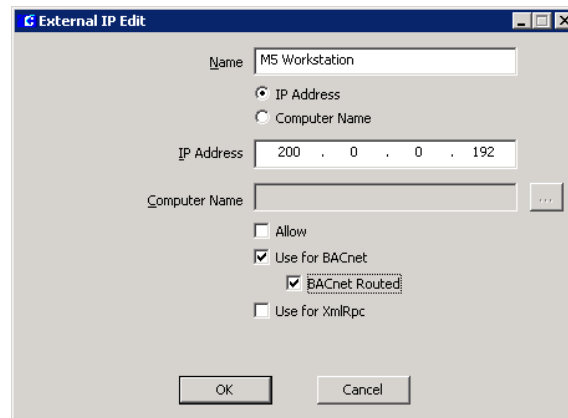
Verification of Metasys-P2000 Integration Using the Metasys Site Book Application

Use this section as a guide to verify the operation of the Metasys – P2000 interface with the M5 Site Book application. (Refer to "Updating Site Database" on page 61 for details.) It is assumed that you are familiar with the standard installation procedures detailed in the other sections of this manual.

The purpose of using the Site Book application is to allow the registration of P2000 Objects in the Metasys M5 system. Successful operation of the P2000 system with respect to Site Book can be confirmed by the completion of the following sequence:

- Addition of a Site to the Site Book database

- Successful browsing of a site

- Successful addition of P2000 Objects into the Site Book database

- Displaying the P2000 Objects in the Site Book database

Prior to starting the procedure, confirm that both the P2000 Server, the P2000 BACnet Server, and the M5 workstation can communicate to one another over the network. It is recommended that each system ping each other by IP address and by name. (In the case where the systems are separated by a router, it will not be possible to ping by name.) It is assumed that you are familiar with the section "General Guidelines for Configuring P2000 and Metasys Workstations over Routers" on page 40.

Launching the Site Book Application and Adding a Site

1. To launch the Site Book application, at the M5 workstation go to **Start**>**Programs**>**Johnson Control**s>**BACnet OPC**>**Sitebook**. The Site Book window appears.
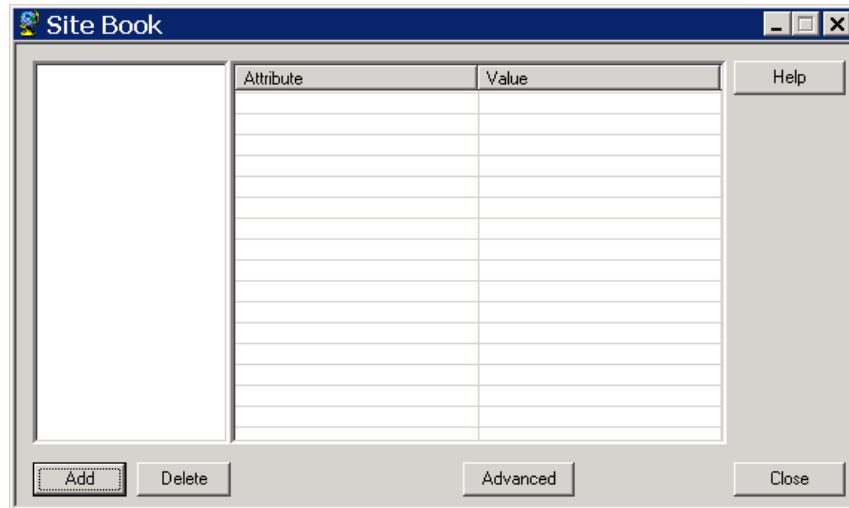
2. Click the **Add** button.

3. Choose a connection type according to your installation and click **OK**.
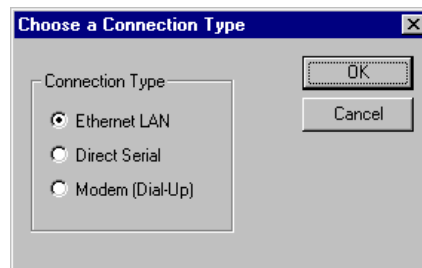
4. Enter the name of the site and click **OK**. This is the only entry required. The Network Number and BACnet IP port are given values.
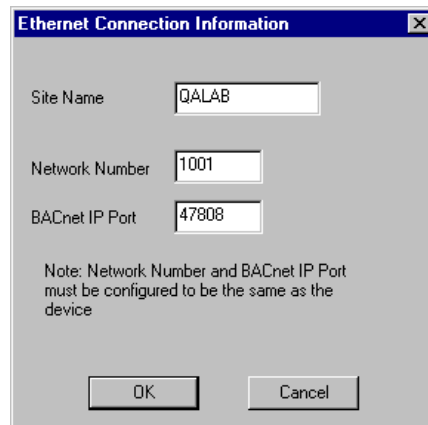
Browsing the Site

Once the name of the site has been entered, it will appear on the listing. To browse the site, simply click the **Browse Site DataBase** on the Site Book dialog followed by the **Browse Devices** button. The screen will update as shown in the following screen capture.
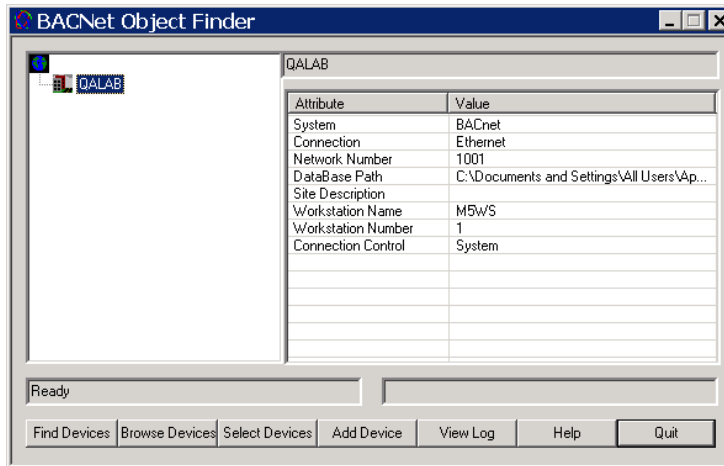
Adding P2000 Objects

NOTE

Each added P2000 Object must exactly match the way in which it was defined in the P2000 Server. This includes letter case, spaces, etc. Failure to enter the names correctly will result in the Site Book not finding the added object. The following example describes how to add a Host Object.

Adding a Host Object

Before performing the following steps, check how the name was defined at the server in order to enter it correctly. To do so, go to the P2000 Server, right-click on **My Computer**, select **Properties** and then the **Computer Name** tab. The full computer name will be displayed.

1. On the BACnet Object Finder window, click the **Add Device** button.

2. In the **Enter Name** field, enter the name of the P2000 Host object. It must match the name of the P2000 Server *exactly as it is defined at the server*.

3. After the correct server name has been entered, type PEGASYS in upper case letters. The two entries must be separated by a space.
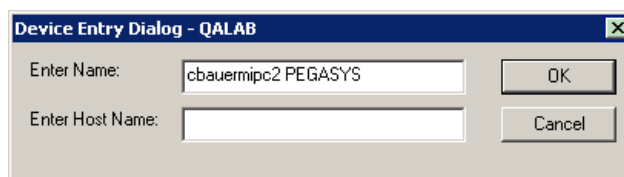
4.   Click **OK**.

The newly defined host object will be displayed in the BACNet Object Finder window.
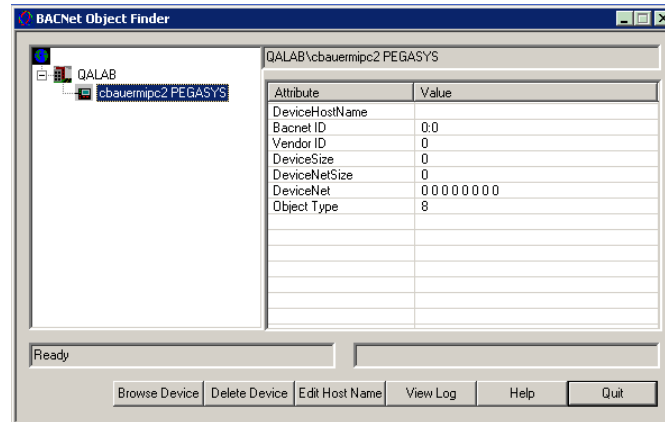
Displaying the P2000 Objects in the Site Book Database

A final step in confirming the P2000 - Site Book operation is to observe the P2000 Objects in the Site Book database.

1.   Select one of the added P2000 Host Objects (in our example it is the *cbauermipc2 PEGASYS* Host Object).

2.   Click the **Browse Device** button. As Site Book is browsing for the device, the elongated field, located above the Help button, will quickly display the names of each associated object detected.

3.   Upon completion of the browse operation, click on the + to expand the Host Object. All of the related objects should now be visible as shown in the following screen capture.
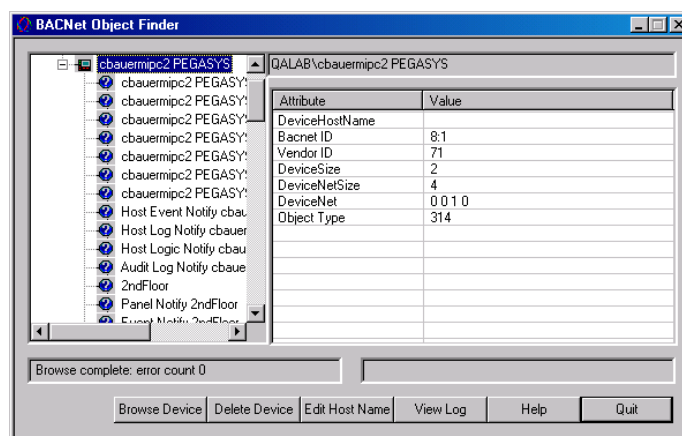
4.   Select any of the displayed objects to see the associated values.

Verification of Metasys-P2000 Integration Using the Metasys M-Explorer Application

After the P2000 host has been defined using the Site Book application, P2000 Objects can be viewed along with their associated attributes using M-Explorer.

This section assumes that you have already read and followed these:

- "Prod Lib Installation" on page 61

- "Updating Site Database" on page 61

- "M-Explorer Browse Mode Setup" on page 61

Verifying the operation of the P2000 Interface with M-Explore requires the following operations:

- Confirmation that the site entered in Site Book appears on the M-Explorer tree.

- Confirmation of the presence of P2000 Objects under the site name.

- Verification of the ability to browse a P2000 Object and view its attributes.

- Verification that any change in a state of an attribute belonging to a P2000 Object can be detected and viewed in M-Explorer.

NOTE

While the information contained herein relates to the M3 software, the exact same procedures may be used for an M5 workstation.

Confirming the Entry of a Site

1. Go to **Start>Programs>Johnson Controls>M3 Workstation** to open the M3 Program Manager.
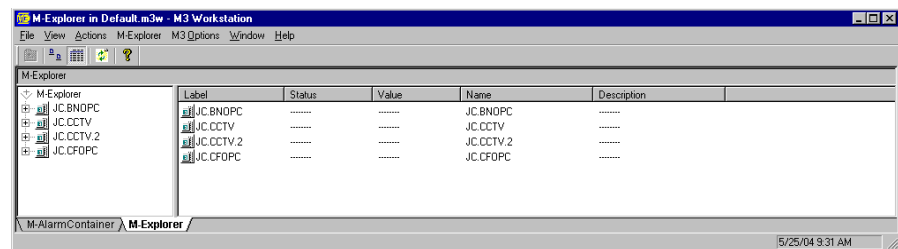
2. Click the **JC.BNOPC** entry on the left side of the screen. The screen will refresh, and after a few seconds, the site will be listed on the screen as shown below.
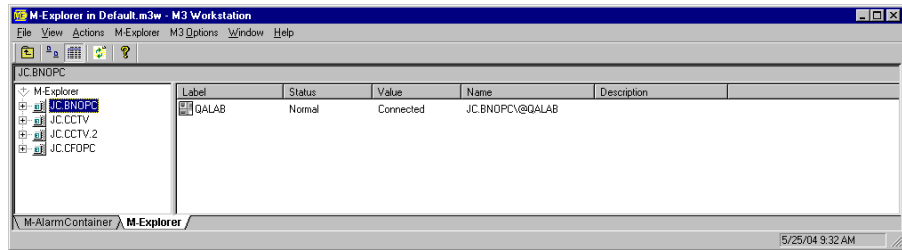
Confirmation of P2000 Objects Within a Site

1. Click on the icon corresponding to the site (in the example below, the **QALAB** icon).The status of the site will be displayed.
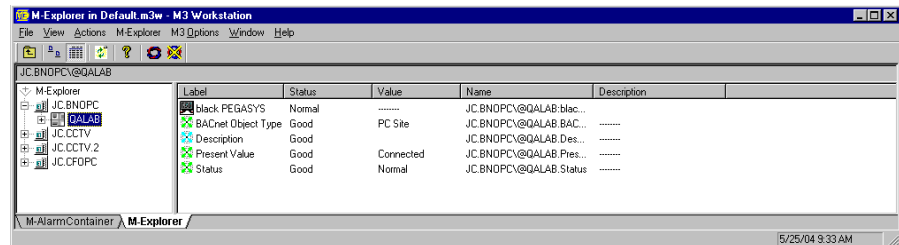
Note that the **Status** of the site is "Normal" and that the **Present Value** is "Connected". The screen will also display other elements of the site such as the Host Object ("black PEGASYS" in the example). Observe that all items listed return either "Normal" or "Good" status.

2. Expand the icon corresponding to the site (in the example below, the **QALAB** icon). The individual listings for the Host Object that was defined under the Site Book application will be shown.
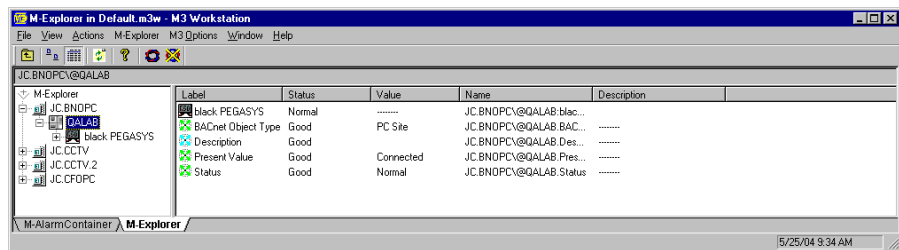
Viewing P2000 Object Attributes

Clicking on a Host Object will display a list of all the various related objects.

In the following example, the name of the Host Object is "black PEGASYS". Click on the **black PEGASYS** icon to display other objects related to the host along with their associated attributes.

In a properly operating system, all of the objects related to a Host Object display a status that is "Normal" or "Good". In addition, a value of each item is listed. Input point objects have a value of "Quiet" when in a secured state. When the input point becomes active, the value will change to "Alarm". In the case of a Reader Object, the value of a locked door is a "1." This changes to "2" when the door is unlocked. Note that doors are labeled as "Reader."

Confirming Change of States in Input and Reader Attributes

To confirm the operation of the P2000-Metasys interface, monitor the M3 or M5 screen and watch the value of an input point, reader, or output point change. Below is the most common method of confirming a reader status:

1. Select a reader that is currently in the secured mode from the list.

2. From the P2000 Main menu, go to **Control**>**Door Control** and proceed to manually unlock the selected door for the reader.

3. Verify that when the door is unlocked (either manually, by a badge identifier read, or by activation of an egress button), the value changes from "1" to "2".

This process can also be used to confirm operation of a particular output point. In the case of an output point, the value will change from "0" (reset state) to "1" (set state).

To confirm operation of an input point, monitor the value of a selected input point, then force the input point into an alarm condition. The value of the monitored input point should change from "Quiet" to "Alarm".

See "Object Reference" on page 7 for a comprehensive listing of all P2000 Objects and their attributes.

Verification of Metasys-P2000 Integration Using the Metasys M-Alarm Application

After the P2000 host objects have been confirmed using the M-Explorer application, alarms generated by the CK720, CK721, or CK722 controllers as well as the acknowledgments can be routed to the M5 workstation and displayed using the M-Alarm application.

Please read and follow the instructions in "Notification Recipient Setup" on page 61. Failure to set up the Notification Recipients, which is performed using M-Explorer, will result in the inability of the M5 workstation to detect alarms.

Verifying the operation of the P2000 Interface with M-Alarm requires that the following operations be successfully performed and observed:

- Confirmation that an alarm generated at a CK720, CK721, or CK722 controller can be detected at the M5 workstation.

- Confirmation that an active P2000 alarm can be acknowledged from the M5 workstation. In addition, the acknowledgement of an alarm at the M5 also acknowledges and silences the audible beep at the P2000 Server.

- Returning an active alarm to a secured state is detected and displayed at the M5 workstation.
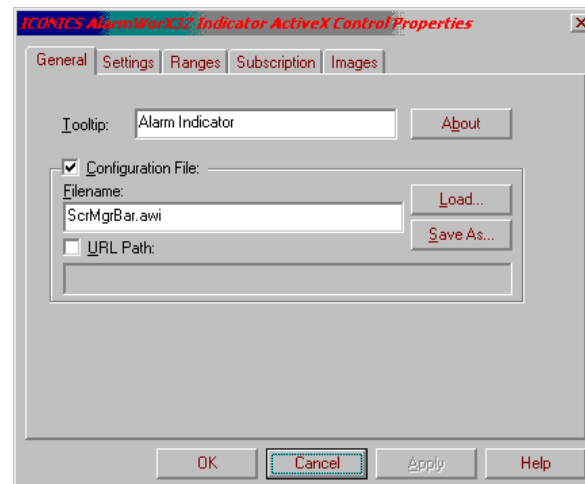
Configuring M5 Workstation and P2000 Object Subscriptions

Upon completion of the M5 software installation, the M5 Screen Manager appears on the desktop.
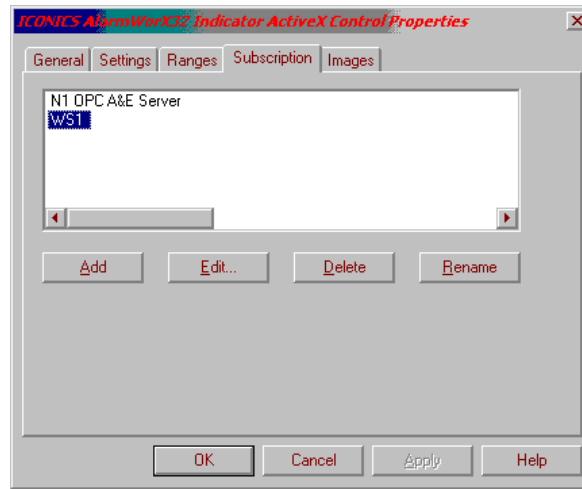
1. To begin configuring the subscriptions, right-click on the **Alarm Indicator** icon and select **Properties**.
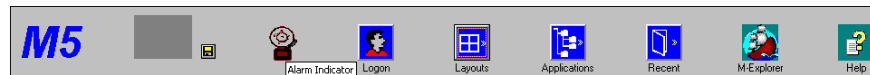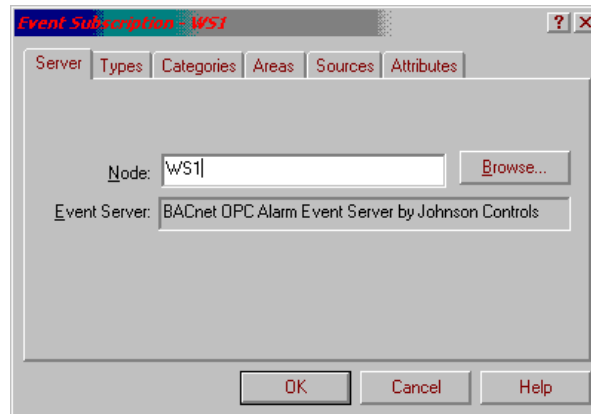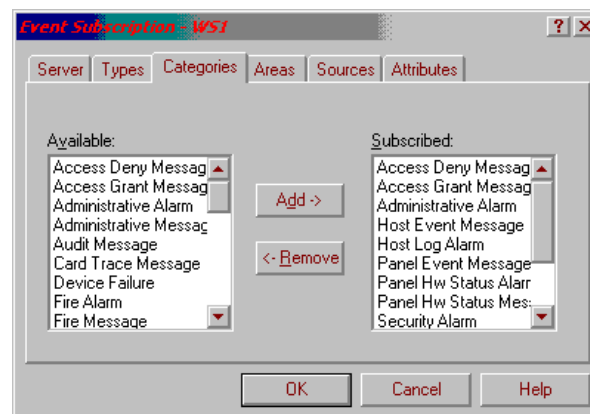

The following window opens:

2. Select the **Subscription** tab.

3. Select a subscription option and click **Edit**.
4. On the **Server** tab, in the **Node** field, enter the name of the M5 workstation. You can also browse the list of available computers on the network and select the appropriate entry.


5. Select the **Categories** tab.

Listed on this tab will be all of the available message items that can be subscribed to report to the M5 workstation. Subscribe all of the P2000-related items by selecting them individually and clicking the **Add** button. The selected item will then appear on the **Subscribed** pane.

6. When you complete the subscription procedure, click **OK** to store your selections.

7. To launch the M-Alarm Viewer, go to **Start**>**Programs**>**Johnson Controls>M-Alarm>Viewer**.

8. From the M-Alarm Viewer window's menu bar, select **File**>**n30 bacnet regular view**.
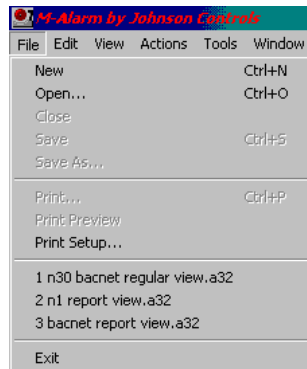
The initial screen that results from the launching of the n30 bacnet regular view file is shown below.
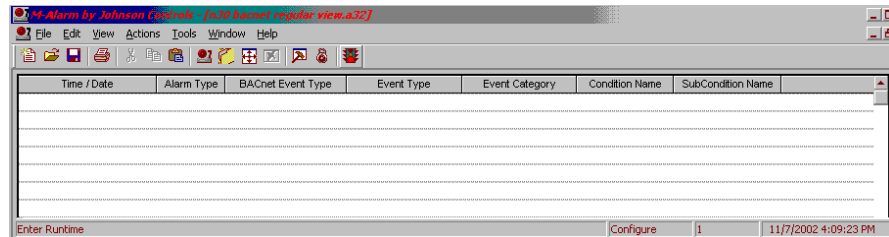
9. Activate the Run Time mode by clicking on the traffic light icon. The screen will change and appear as depicted below. The Run Time mode may also be activated by pressing the <Ctrl+U> keys on your keyboard.
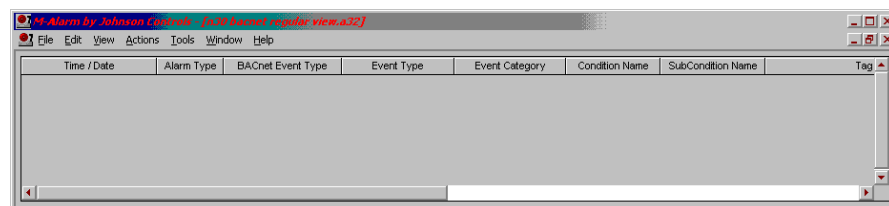

10. Once the Run Time mode has been enabled, the system is now ready to accept alarms from the P2000 system. Select an input point that was defined in the P2000 database and manually cause it to go into an alarm state. Upon detection, the P2000 system will display the active alarm in the Alarm Monitor screen. At the same time, (there may be a slight delay of a few

seconds, due to network traffic) the alarm will appear on the M-Alarm screen and alternately flash between red and yellow. The column labeled **BACnet Event Type** will display "Input Set." There will also be an audible tone. The following screen appears:
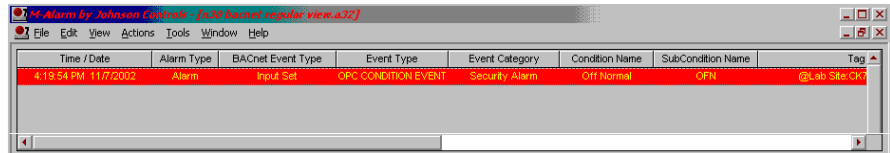
11. To acknowledge the alarm from the M5 workstation, right-click on the alarm being displayed and observe that the following dialog box appears.
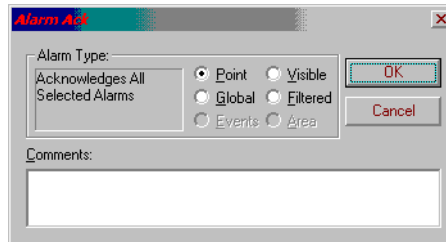
12. Select the **Point** radio button and click **OK**. Immediately upon making the selection, the displayed alarm will change to a different color as indicated in the following table. In addition, "BACnet Event Type" will change to "Input Secure" and the audible tone will be silenced. Immediately upon the acknowledgment of the alarm, at the M5, the audible tone at the P2000 will also be silenced and its alarm monitor screen will reflect the change of the alarm's state.

Alarm/Acknowledge State	Definition	Bacnet Event Type Display
Alarm Active	Alternate Red/Yellow	Input Set
Alarm Acknowledged but Unsecured	Green	Input Set
Alarm Secured but not Acknowledged	Alternate Red/Yellow	Input Secure
Alarm Secured	No Display	No Display

13. Complete the confirmation of the Metasys – P2000 Interface and M-Alarm by testing a number of input points in this manner.

Verification of Metasys-P2000 Integration Using the Metasys M-Graphics Application

M-Graphics is an optional application that provides you with the tools to develop your own graphics display. Use this section as a guide to verifying the operation of the Metasys-P2000 Interface with the M-Graphics application. It is assumed that you have implemented the installation information from page 1-44 to page 1-51 of this manual.

Verification of the Metasys-P2000 Interface relative to M-Graphics requires that the icon be added to the graphics editor. The icon is then linked to a P2000 Object using the Property Inspector tool within the M-Graphics application. Finally, the graphics editor is put into a "runtime" mode. While the editor is in the "runtime" mode, the value of the P2000 Object (a door or input point for the purpose of this example) will display the current status. When the status of the object is altered, its displayed value will change on the graphics screen. In addition, the capability of the M-Graphics to send commands to the P2000 Server should also be tested. This may be confirmed by performing a simple operation, such as unlocking a door that has been defined in the P2000 database using a graphic icon at the M5 workstation.

Verification Procedure

1. Go to **Start**>**Programs**>**Johnson Controls**>**M-Graphics** to launch the M-Graphics application.

2. To add an icon, click the icon for Process Point, located in the lower toolbar. The icon will be displayed as **686** encased in a box.
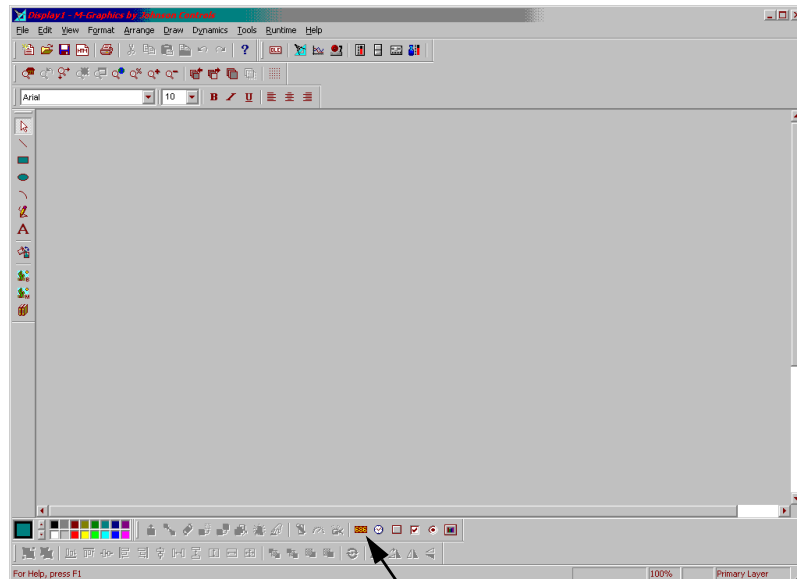

Process Point icon

3. Upon selection, place the mouse cursor anywhere in the blank graphic editor area and left-click the mouse. The Property Inspector window will open.
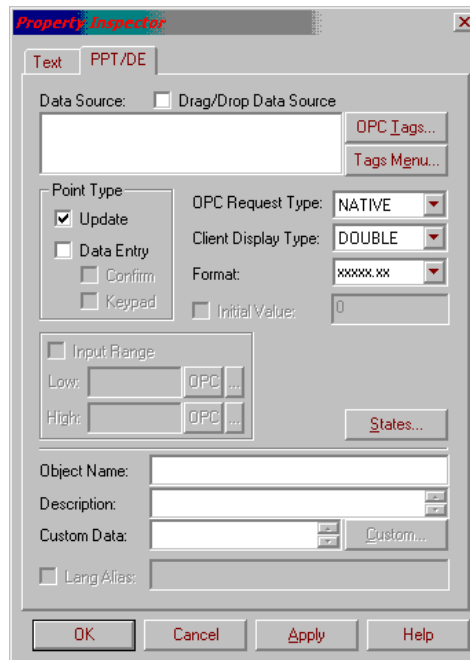
4. Click the **OPC Tags** button.

5. Expand each of the following from the tree:

■ Network Neighborhood

■ Microsoft Windows Network

■ Workgroup Name (as defined in the Network Configuration)

■ The M5 (or M3) workstation (as it is named)

■ Data Access

■ JC.BNOPC.2

■ Site (The name of the site as defined in Site Book)

■ Host
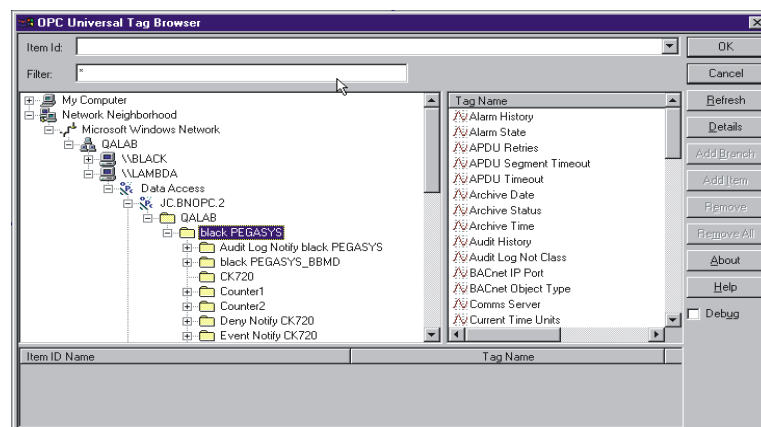
In this example procedure, a Reader Object will be used to illustrate the operation. Select one of the readers from the list of objects (be careful not to confuse Readers with Reader Terminals). For legacy panels, readers will be displayed in the listing as "Reader" followed by the name of the reader as defined in the P2000 database. For example, a reader defined as "Front Door" will appear in the objects listing as "Reader Front Door."

NOTE

CK722 controller objects associated with a door, such as an Access Control object, Door Sequence object, etc., are displayed in the listing as "Reader" followed by the name of the object as defined in the P2000 Access Software Configuration Tool (SCT).
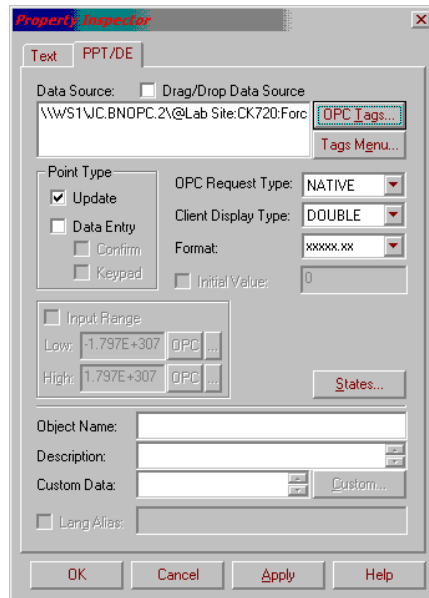
---

6. Under the **Tag Name**, select **Present Value**.

   The **Item Id** field at the top of the window will display the path containing the names of the workstation, site, controller, reader and the tag.
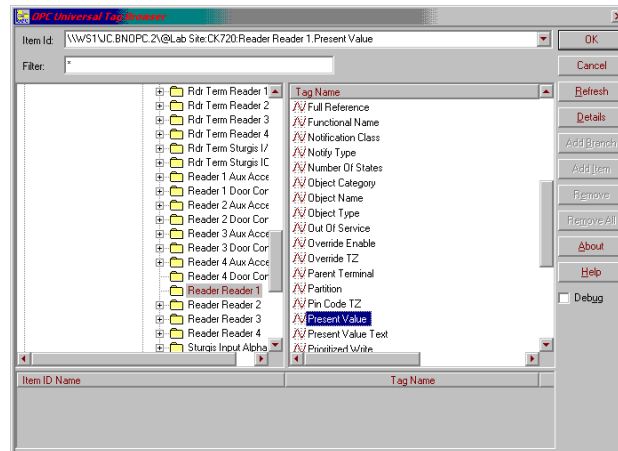
7. Click **OK** to return to the Property Inspector window.

8. The Property Inspector will also display the path as mentioned in step 6.

9. Close the Property Inspector window by clicking **OK**. Upon closing the Property Inspector window, question marks surrounded by red boxes will appear where the cursor was originally placed on the graphics editor screen.

10. From the menu bar, select **Runtime**. Upon making this selection, all of the surrounding toolbar icons will disappear, leaving only a numerical value displayed where the question marks were located. This value represents the current value of the object. In this example, the object is a Reader from a CK720 controller, so the value displayed will be "1.00". This is the value of a locked door.

11. At the P2000 Server, select **Control** from the top toolbar and manually unlock the selected door for the programmed access time. Each time the door is unlocked from the P2000 (or from a valid card read), the value displayed on the M5 workstation's M-Graphics screen should change from the original "1.00" to "2.00", then return to "1.00" when the access time expires. Confirm that this change occurs when the door is manually opened.

12. At the M5 workstation, select **Configure** from the menu bar to stop the "Runtime" mode and return to the "Edit mode".

13. Continue confirmation of this operation by repeating steps 2 to 12, this time substituting an Input Object in place of a Reader Object. Confirm that the initial secure value changes to the alarm value, when the input point goes into an active state, and returns to the original value when the input is secured again. Refer to the following table for the correct reader and Input Point Object values. For a comprehensive listing for all P2000 Object values for legacy controllers, see page 7. For information on objects for CK722 controllers, refer to the individual object manuals.

OBJECT	STATE	VALUE
Reader	Locked	1.00
	Unlocked (Received from P2000)	2.00
Input Point	Secure	0.00
	Active	2.00

### *Opening a Door Using M-Graphics*

The final stage in confirming the operation of the Metasys-P2000 interface with M-Graphics is the unlocking of a door from the M5 workstation. This is a simple procedure that uses a variation of the previous steps.

1. From the lower toolbar in the Metasys graphics editor, click the 'button' icon. After selecting this icon, place the mouse cursor anywhere on the graphics editor screen and click the mouse button. The Property Inspector window appears with two tabs.
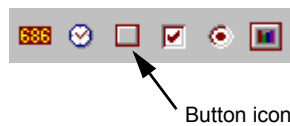

Button icon

2. Select the **Pick** tab. From the **Action** drop-down list, select **Download Value**.
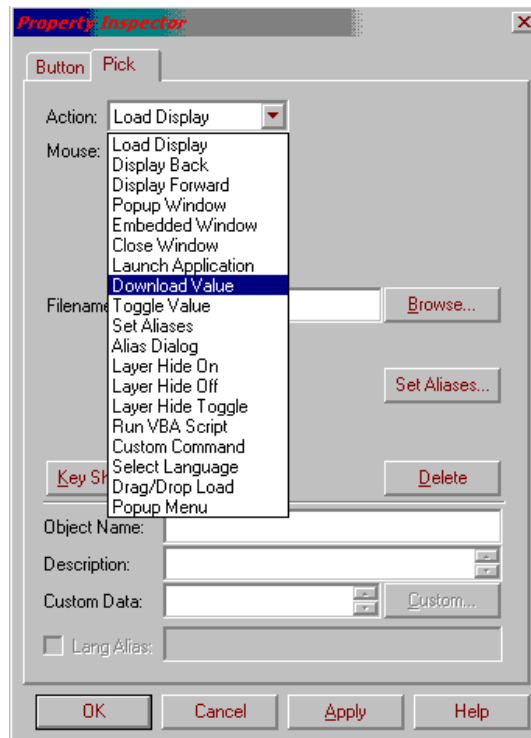
3. Click the **Tags Menu...** button to browse for a value for the **Data Source** field. Select **OPC Tags...** and, if the tree is not expanded, expand it as described in step 5 on page 56.

4. Select one of the readers, and then in the **Tag Name** field select **Mode Request**; click **OK**. The **Data Source** field in the Property Inspector window will display the correct path.

5. In the **Value (on up)** field enter 13. This is the attribute value that will be sent to the P2000 Server to unlock the door controlled by the selected reader (see the table on page 59). Click **OK** to close the Property Inspector window.
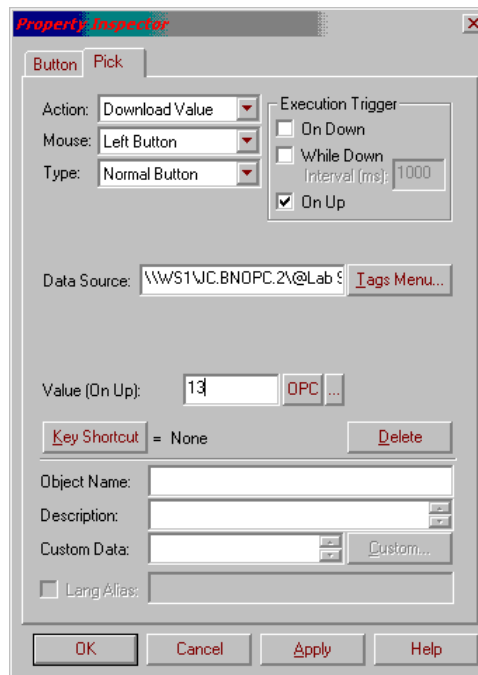
6. Note that after closing the Property Inspector, a button will be displayed where the mouse cursor was originally placed, The button will be labeled **Button** encased in small red boxes. Select **Runtime** from the top toolbar to enter the Runtime Mode. The red boxes surrounding the **Button** icon will be replaced by a solid square.

7. Click on the square icon representing the button. The door controlled by the selected reader should unlock for the programmed access time. Confirm that the door has unlocked.

   A simple method of confirming this is to monitor the System Status window of the P2000 Server. Open the Reader Terminal Status screen and observe that the correct reader icon changes states each time the **Button** is clicked at the M5 workstation.

8. Stop the Runtime mode by clicking **Configure** in the top toolbar, and exit the graphics editor.

Prod Lib Installation

The P2000 Product Libraries (Prod Libs) provide M3/M5 workstations with the details of the various BACnet Objects in P2000. The Prod Libs can be installed by running the **Prod Lib Setup** program contained on the P2000 Server Applications and Services CD (in the subdirectory named "ProdLibs").

Updating Site Database

The P2000 BACnet Device Objects need to be added to the M3/M5 workstation site database. Perform the following steps using the M3/M5 **Sitebook**:

NOTE
All names entered in Sitebook must be exact, including capitalization or BACnet communication will fail.

➤ **To add a new site entry or use an existing site entry if a valid one exists:**

1. Select the desired site entry and click **Browse Site Database**.

2. Select the desired site and click **Add Device** to add the P2000 Host Device. Its name is `<computer name> PEGASYS`.

3. After it is added, select it and click **Browse Device**. This will add all notification, counter, panel, terminal, input and output objects contained in the Host Device into the site database. When browsing is complete, Sitebook should display no errors found.

M-Explorer Browse Mode Setup

The M-Explorer configuration needs to be changed so it can properly browse the P2000 BACnet Objects. Open the **jc.bnopc.pcf** file with Notepad or another text editor. This file can be typically found in *Local Disk:\Program Files\Johnson Controls\M-Explorer* directory. Change the **BrowseSystem** setting to **OPC_BROWSE** (the default value is **NOAH_BROWSE**) and save the file.

Notification Recipient Setup

In order for a M3/M5 workstation to receive event and alarm messages from P2000, the M3/M5 must add itself to the recipient list for every event category on each device from which you want to receive messages. Using M-Explorer, find the Notification Class Object for the type of event/alarm message you want to receive. Tell M-Explorer to **Inspect** that object. From the command list, select the **Add Recipient** command. Fill in data values as appropriate and press the **Execute** button.

Security Settings

The default setting of M-Alarm is to allow anyone to acknowledge alarms whether they are logged on or not. Our recommendation is to change the M3/M5 security settings so only users who are logged on can acknowledge alarms. See M3/M5 documentation for details on changing this setting.

M-Graphics

The use of P2000 BACnet Objects in M-Graphics can vary from simple to very complex depending upon your needs and system layout. Consult the M3/M5 documentation for details on the use of M-Graphics.

To help get you started, the sections below will address the most common items that need to be displayed in M-Graphics. For more information, see "Verification of Metasys-P2000 Integration Using the Metasys M-Graphics Application" on page 54.

Door Status

Use the following attributes from the appropriate Reader Object:

Object Name	name of door
Present Value	1 = Locked, 2 = Unlocked
Present Value Text	"Locked Closed" or "Unlocked Closed"

If Forced Door/Propped Door soft alarms are turned on in P2000 and you want to display them on your graphic, use the following attributes from the appropriate Input Object:

Present Value	0 = Quiet, 2 = Alarm

NOTE
Soft alarms do not apply to CK722 controllers.

NOTE
For more information on soft alarms, refer to the P2000 Software User Manual, under "Configure Soft Alarms."

Controlling Doors

Write the following values to the Present Value attribute for the appropriate Reader Object:

11	Cancel override and return to normal operation
12	Override (unlock) door for its programmed access time
13	Override door for the number of minutes specified in the Unlock Time attribute.

Input Point Status

Use the following attributes from the appropriate Input Object:

Object Name	name of input point
Present Value	0 = Quiet, 2 = Alarm, 3 = Fault
Present Value Text	"Quiet", "Alarm" or "Fault"

Output Point Status

Use the following attributes from the appropriate Output Object:

Object Name	name of output point
Present Value	0 = inactive, 1 = active
Present Value Text	"Inactive" or "Active"

Controlling Output Points

Write the following values to the Present Value attribute for the appropriate Output Object.

0	Set Inactive
1	Set Active

TROUBLESHOOTING

Duplicate Object Name Errors

P2000 may report errors about Duplicate Object Names when the BACnet Service is started. The error message will give the name of the object that caused the error. This is caused when the name of one object is the same as another object. All terminals, input points, and output points must be unique from each other. An example is when an input point and an output point have the same name.

To correct the error, rename the object specified in the error message.

Msg Rejected Errors

P2000 will report a Msg Rejected error when BACnet receives a message from an IP Address that does not correspond to a configured BACnet Device. The error message will contain the IP Address of the device that sent the message.

To correct the error, add a BACnet Device for the IP Address specified in the error message. If this device has no reason to communicate with the P2000 BACnet Interface, clear the **Allow** check box.

Action Interlock Errors

When you use Action Interlocks, you may see one of the following error messages:

- ActionInterlock OpenConnection error

- WriteAttributeWait error

- Error writing object

All these errors indicate a failure to write to the object defined in the Action Interlock dialog box. Most likely, the problem is due to incorrect values in the Action Interlock definition. Verify the Object Name, Property Number, and Property Type in the Action Interlock dialog box in the P2000 System. Note that the Object Name must match exactly the name of the object, including the case.

If the Action Interlock is defined correctly, then there is a BACnet communication problem between the P2000 Server and the device containing the object. Verify basic network connectivity using the "ping" command on the P2000 Server to ping the IP address of the device. If you can't ping the device, then most likely there is a routing problem that is blocking the BACnet broadcast messages between the device and the P2000 Server. Refer to the BACnet Communication Troubleshooting section of your M3/M5 documentation.