Chapter 34

Working with Event Enrollment Objects

Introduction

The Event Enrollment object monitors the value of a single attribute in another object in the same or another device, and reports events based on changes in the attribute's value. For example, the Event Enrollment object can monitor the temperature value from a room thermostat and report an event if the temperature falls below a low limit parameter value.

Note: The Event Enrollment object is not VT100 configurable. You must use Project Builder to configure the Event Enrollment object.

This chapter describes how to:

- add an Event Enrollment object
- edit an Event Enrollment object
- command an Event Enrollment object
- delete an Event Enrollment object
- edit Event Parameters - examples

Key Concepts

Event Enrollment Object

Unlike the Analog Alarm objects and Multistate Alarm objects in the N30 Supervisory Controller, Event Enrollment objects are compliant with BACnet™ protocol. The Event Enrollment object's attributes contain information for generating events. The object is configured to trigger an event when the value of the user-defined referenced attribute changes and meets the specified criteria. When an event occurs, a notification message is sent to the user-defined recipients. Notification message recipients are devices defined in the Notification Class object referenced by the Event Enrollment object.

See the *Event Enrollment/BACnet Event Enrollment* chapter *(LIT-694160)* of the *Object Dictionary* or the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) Standard 135-1995 for information on this object and the BACnet communication standard.

Attributes

The values of an object's attributes determine how the object operates. The Event Enrollment object attributes are described below.

Object Name

Identifies the object on the user interface.

Description

Provides optional information to further describe the object.

Object Type

Indicates membership in a particular object type class. In this case, the object type is Event Enrollment.

Object Property Reference

Designates the particular object and attribute referenced by the Event Enrollment object. The condition specified by the Event Type is applied to the referenced attribute to determine the Event State. The Object Property Reference (also referred to as Input Reference) uses one of the syntax options shown in Table 34-1.

Table 34-1: Object Property Reference Syntax

Object Property Reference Type	Format	Example
Full Reference with Array Index	<Device ID>.<Object ID>.<Attribute (Array)>	B7F3N01.Programming.AV{1} .Priority Array[8]
Full Reference without Array Index[1]	<Device ID>.<Object ID>.<Attribute>	B7F3N01.Programming.AV{1} .Present Value
Functional Name with Array Index	<Object ID>.<Attribute (Array)>	Test AV.Priority Array[8]
Functional Name without Array Index[2]	<Object ID>.<Attribute>	Test AV.Present Value
BACnet Syntax with Array Index	#<Device ID>:(#<class>:<instance>).#<Attribute (Array)>	#32:(#2:65001).#87[8]
BACnet Syntax without Array Index	#<Device ID>:(#<class>:<instance>).#<Attribute>	#32:(#2:65001).#85

1 Used for object references in another N30 device.

2 Used for object references in the same N30 device.

Event Type

Indicates the type of event analysis used to detect events that change the Event State and report to recipient devices. Table 34-2 describes each event type. See the *Editing Event Parameters - Examples* section of this chapter.

Table 34-2: Event Types

Event Type	Description
Change of Bitstring	Generates an off-normal transition when the value of the referenced property is equal to one of the user-defined Bitstring Values (List Elements after applying the Bitmask) and the values are equal for the amount of seconds defined by the Time Delay attribute. The Bitmask defines the bits important for monitoring.
Change of State	Generates an off-normal transition when the value of the referenced property is equal to one of the values in the List of Values (List Elements) and the values are equal for the number of seconds defined by the Time Delay attribute.
Change of Value	Generates a normal transition when the value of a referenced property changes by an amount equal to or greater than the referenced property increment (Change of Value [COV] Increment) for the amount of seconds defined by the Time Delay attribute.
Command Failure	Generates an off-normal transition if the values of the referenced property and the Feedback Reference are not equal for a time greater than the number of seconds defined by the Time Delay attribute.
Floating Limit	Generates a transition to high or low limit alarm if the value of the referenced property is higher or lower than the range of values determined by the current value of the Setpoint Reference, High Limit, Low Limit, and Deadband for a time greater than the number of seconds defined by the Time Delay attribute.
Out of Range	Generates a transition to high or low limit alarm if the value of the referenced property is higher or lower than the range of values defined by the High Limit and Low Limit for a time greater than the number of seconds defined by the Time Delay attribute.

Event Parameter

Provides the parameter values required to detect the specified Event Type in the referenced object.

Event Enable

Defines three flags that determine if notifications are enabled for To Off Normal, To Fault, and To Normal transitions.

Notify Type

Defines the notifications generated by the event analysis specified by Event Type as Event or Alarm types. Both types generate event notifications.

Notification Class

References a Notification Class object in the device containing the Event Enrollment object. The Notification Class object specifies the handling, reporting, and acknowledgement characteristics for one or more Event Enrollment objects.

Alarm Message Text

Designates the optional user-defined text that is included in event notification.

For additional information about the Event Enrollment object and its attributes, refer to the *Event Enrollment/BACnet Event Enrollment* chapter *(LIT-694160)* of the *Object Dictionary*.

Detailed Procedures

Notes: The Event Enrollment object is not VT100 configurable. You must use Project Builder to configure the Event Enrollment object.

Before performing the following procedures, start Project Builder and open or create the project in which you want to add an Event Enrollment object. Refer to the *Getting Started* chapter *(LIT-693215)* of *Project Builder User's Guide*.

Adding an Event Enrollment Object

Note: You must use Project Builder to add the Event Enrollment object. You can only add the Event Enrollment object to other objects.

For instructions on adding an Event Enrollment object, refer to the *Working with Objects and the M-View Screen* chapter *(LIT-693230)* of *Project Builder User's Guide.*

Editing an Event Enrollment Object

To edit an Event Enrollment object:

1. Double-click the row head of the Event Enrollment object, or with the Event Enrollment object selected, select Edit Object on the Edit menu. The M-View Edit Attributes dialog box appears (Figure 34-1).

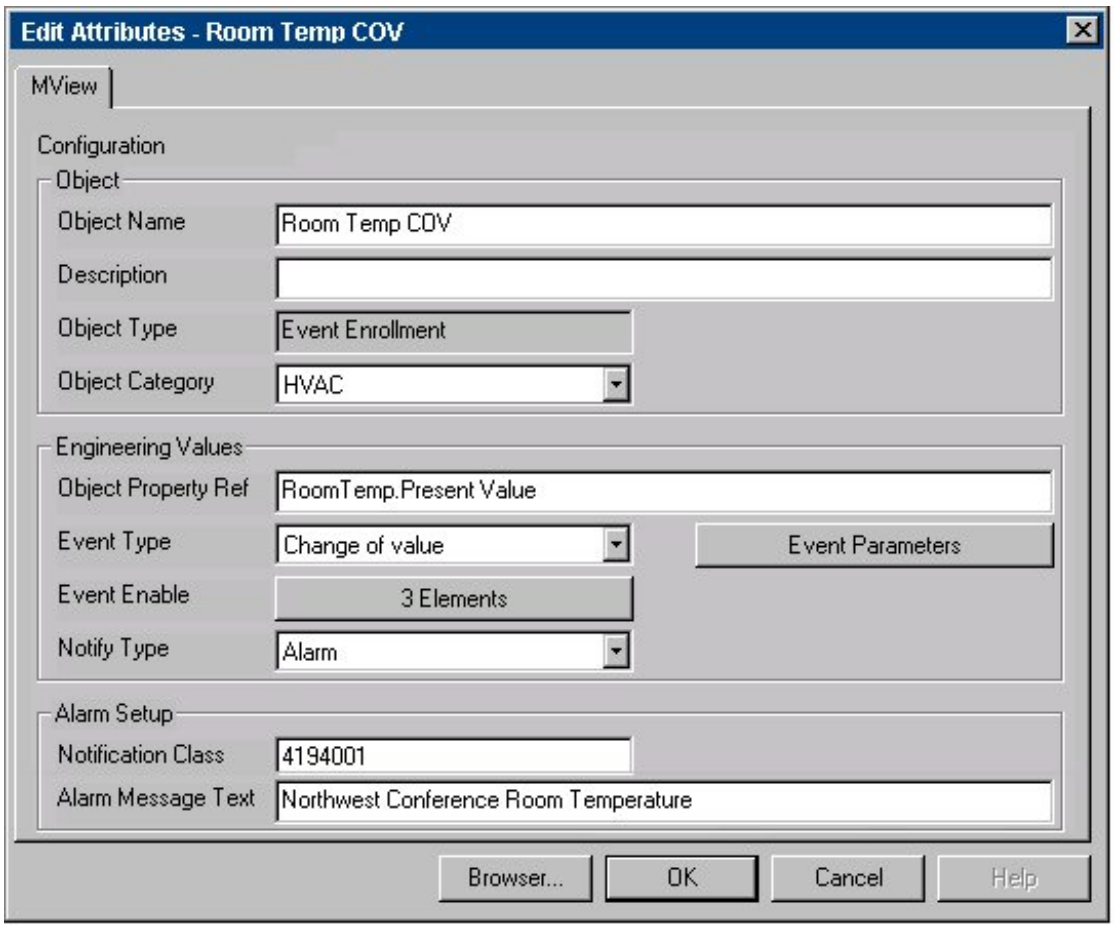
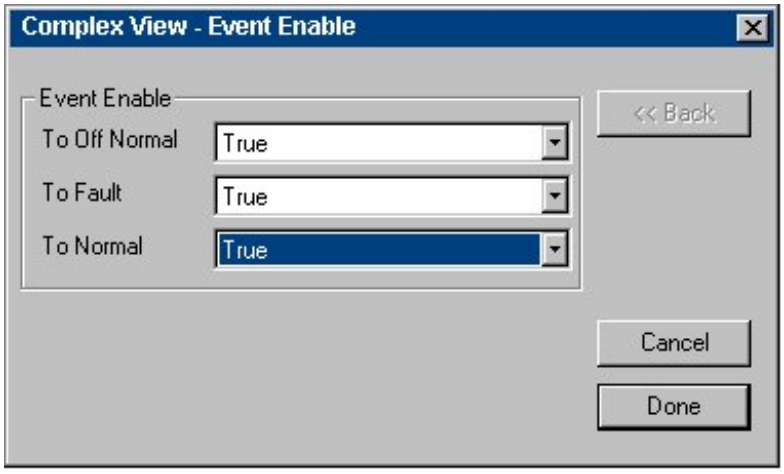


Figure 34-1: M-View Edit Attributes Dialog Box

2. Edit the parameters using Table 34-3. Refer to the *Event Enrollment/BACnet Event Enrollment chapter (LIT-694160)* of the *Object Dictionary*.

Table 34-3: Editing Event Enrollment Object Attributes

To Edit This Attribute	Do This
Object Name	Type a name for this Event Enrollment object (optional).
Description	Type a description for this Event Enrollment object (optional).
Object Type	This attribute cannot be edited. Object Type is Event Enrollment.
Object Category	Select the desired category for this Event Enrollment object from the drop-down menu. Default is HVAC.
Object Property Ref	Type the Object Property Reference in the box according to the syntax in Table 34-1.
Event Type	Select the desired Event Type for this Event Enrollment object from the drop-down menu. The options are Change of Bitstring, Change of State, Change of Value, Command Failure, Floating Limit, and Out of Range.
Event Parameters	Click the Event Parameters button. Depending on the Event Type selected, a corresponding dialog box appears. Edit the parameters in the dialog box and click Done to save your changes and return to the M-View Edit Attributes dialog box. Refer to the *Editing Event Parameters - Examples* section in this chapter for examples on how to edit the parameters for each Event Type. Note: Clicking Cancel or Back returns you to the previous dialog box without saving your changes.
Event Enable	Click the Event Enable button. The Event Enable Dialog Box appears.  Select True or False for the To Off Normal, To Fault, and To Normal attributes. Click Done.
Notify Type	Select Event or Alarm as the Notify Type for this Event Enrollment object.
Notification Class	Type the Object Identifier (Object ID) of the Notification Class object from which you are routing alarms.
Alarm Message Text	Type the desired text of the alarm message for event notification (optional).

3. Click OK to save your changes and return to Project Builder.

Commanding an Event Enrollment Object

You can command an Event Enrollment object using the M-Series Workstation or the VT100. The Event Enrollment object must be online.

Using the M-Series Workstation

To command an Event Enrollment object using the M-Series Workstation:

1. In M-Explorer, select the Event Enrollment object.
2. On the Actions menu, click Inspect. The M-Inspector dialog box appears (Figure 34-2).

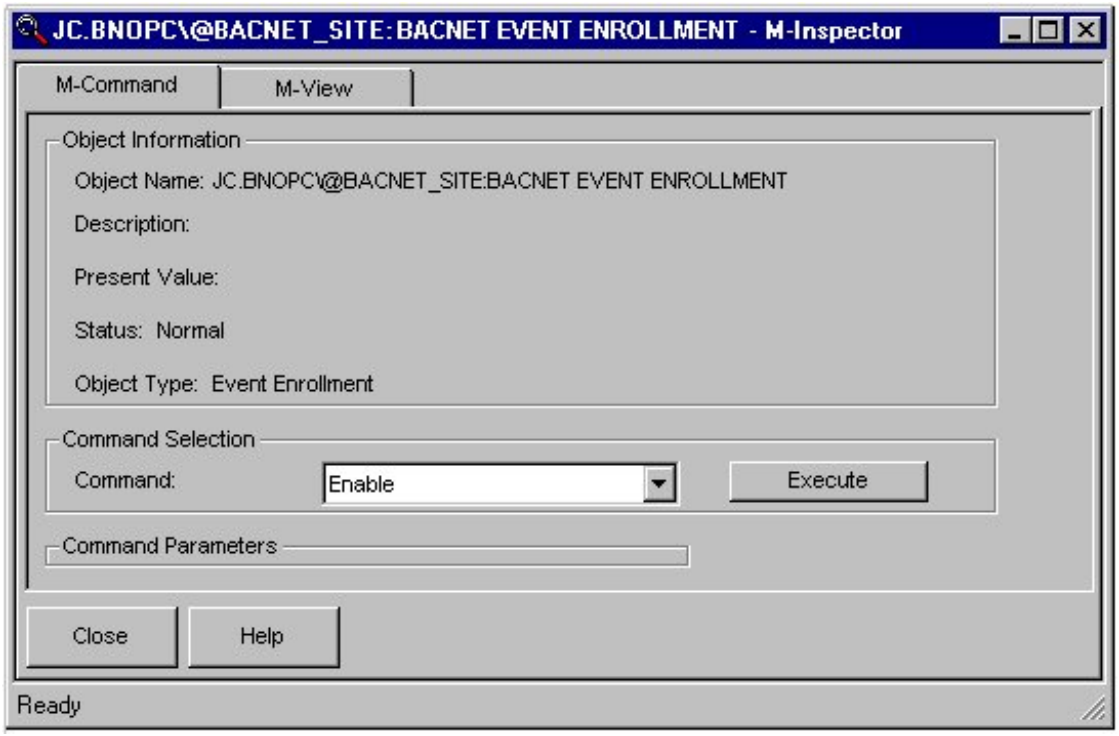


Figure 34-2: M-Inspector Dialog Box - M-Command Tab

3. Click the M-Command tab.
4. Select Enable or Disable in the Command drop-down menu.
5. Click Execute.
6. Click Close.

Using the VT100

To command an Event Enrollment object using the VT100:

1. Browse to and highlight the Event Enrollment object.
2. Press the F2 (Command) key. The command field appears.
3. Use the Spacebar and the Backspace key to select the desired command. The Event Enrollment object supports the commands in Table 34-4.

Table 34-4: Supported Commands

Command	Description
Enable	The Event Enrollment object processes new values from the referenced attribute (Object Property Reference).
Disable	The Event Enrollment object ignores new values from the referenced attribute (Object Property Reference).

4. Press Enter.

Deleting an Event Enrollment Object

You can delete an Event Enrollment object using Project Builder or the VT100.

Using Project Builder

For instructions on deleting an Event Enrollment object using Project Builder, refer to the *Working with Objects and the M-View Screen* chapter *(LIT-693230)* of *Project Builder User's Guide.*

Using the VT100

To delete an Event Enrollment object using the VT100:

1. Browse to and highlight the Event Enrollment object.
2. Press Enter to open the object.
3. Press the Delete key.
4. Press the Tab key to confirm the deletion.

Editing Event Parameters - Examples

This section provides examples for editing the Event Parameters of each Event Type. For all other attributes, follow the instructions in the *Editing an Event Enrollment Object* section in this chapter.

Change of Bitstring - Example

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-3 shows an example of an Event Enrollment object that references an Analog Value object named SetpointAV that generates an off-normal transition when the value of its Status Flags attribute changes. The Status Flags attribute uses a bitstring data type with 4 elements (bits). Refer to Table 1 in *About the Object Dictionary (LIT-694010)* for data type descriptions.

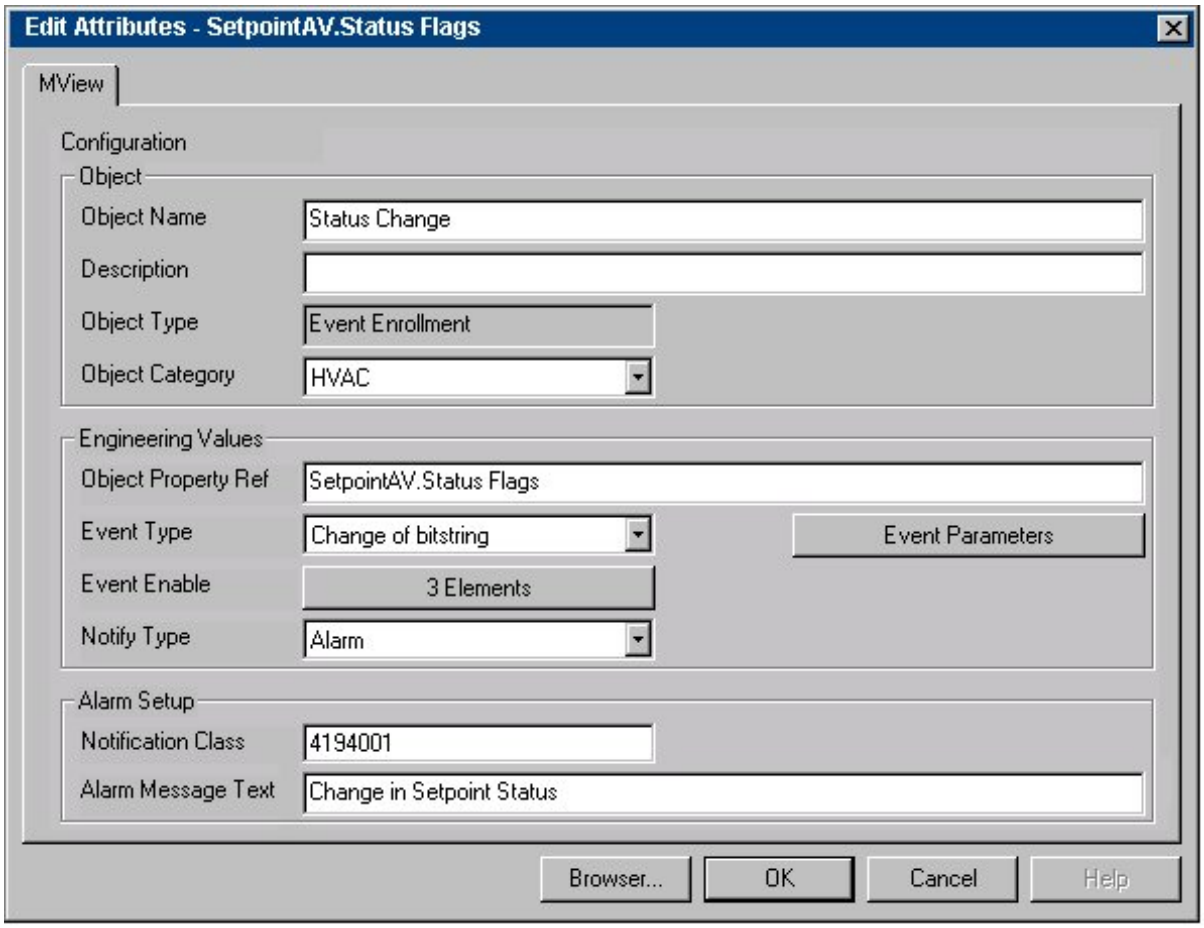


Figure 34-3: M-View Edit Attributes Dialog Box - Change of Bitstring Example

2. Select Change of bitstring in the Event Type drop-down menu.
3. Click the Event Parameters button. The Change of Bitstring Event Parameters dialog box appears (Figure 34-4).

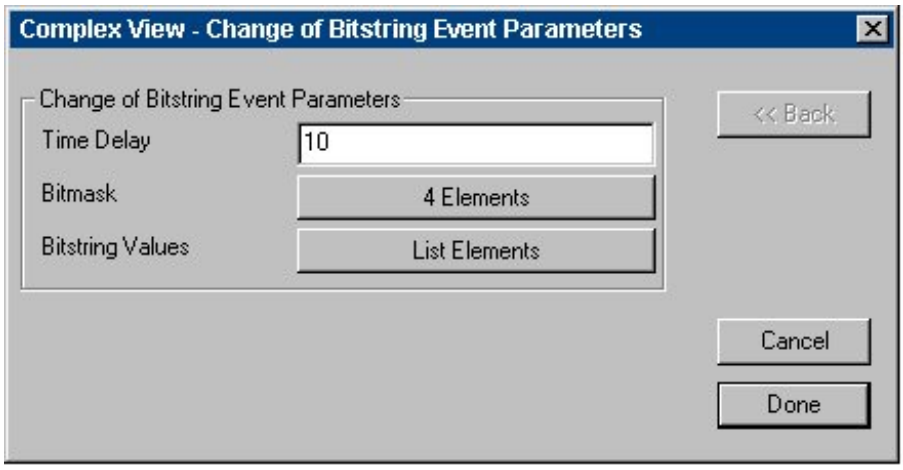


Figure 34-4: Change of Bitstring Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event after a value change.

5. Click the 4 Elements button. The Bitmask dialog box appears (Figure 34-5).

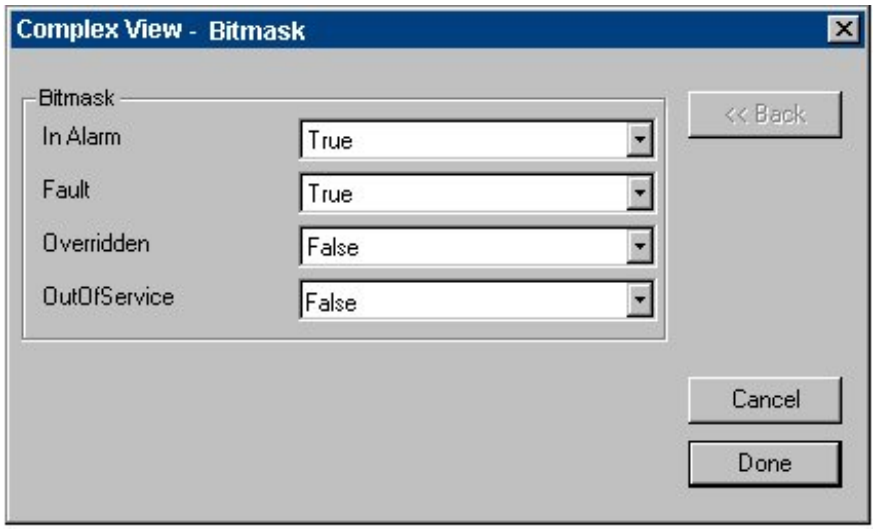


Figure 34-5: Bitmask Dialog Box

6. Select True or False for each element in the Bitmask.

Note: Only elements with a value of True in the Bitmask are included in the event analysis and generate alarms.

7. Click Done to save changes and return to the Change of Bitstring Event Parameters dialog box (Figure 34-4).

8. Click the List Elements button. The Bitstring Values dialog box appears (Figure 34-6).

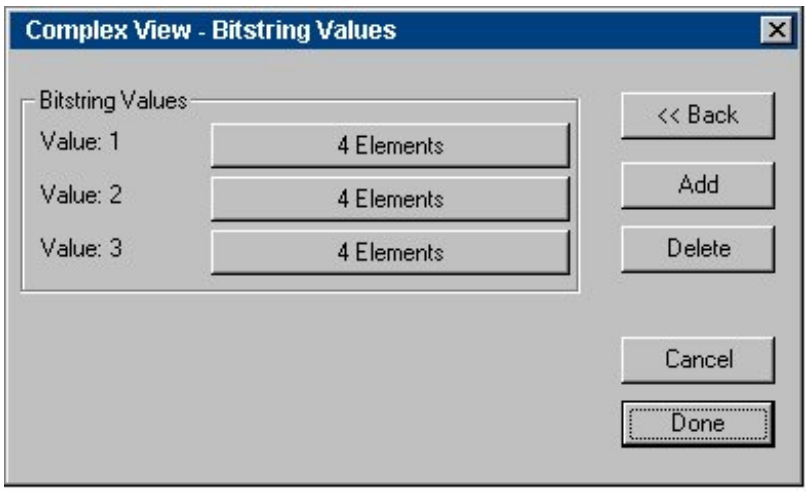


Figure 34-6: Bitstring Values Dialog Box

9. Click the Add or Delete button to add or delete Bitstring Values.

Note: One value is required for each set of elements' values that is required to generate an event. Use the Bitmask to exclude elements that are not involved in any event.

10. Click the 4 Elements button to display the values. The Bitstring Values - 4 Elements dialog box appears showing the 4 elements (Figure 34-7).

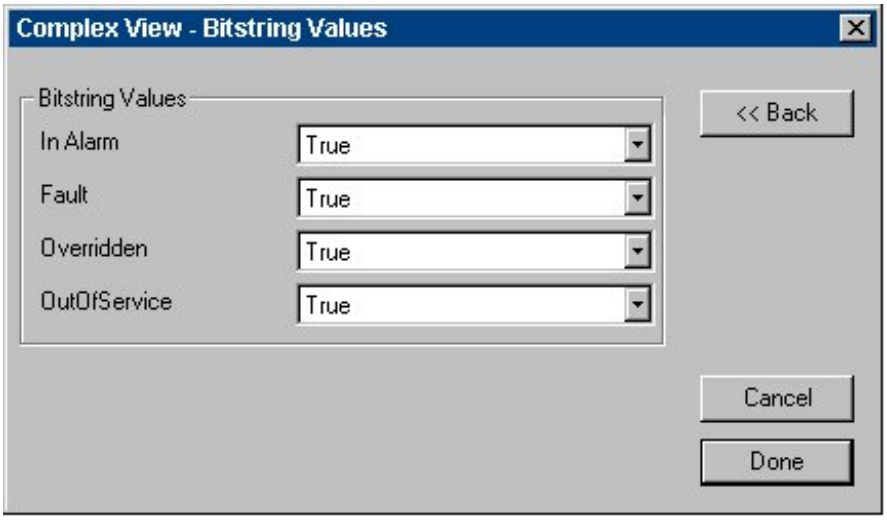


Figure 34-7: Bitstring Values - 4 Elements Dialog Box

11. Select True or False for each bitstring value.

Note: An event generates when the actual value of the attribute is equal to this set of bit values.

12. Click Done to save changes and return to the Bitstring Values dialog box (Figure 34-6).

13. Click Done to save changes and return to the Change of Bitstring Event Parameters dialog box (Figure 34-4).
14. Click Done to save changes and return to the M-View Edit Attributes dialog box (Figure 34-3).
15. Click OK to save changes and return to Project Builder.

Change of State - Example

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-8 shows an example of a Multistate Value object named FeedbackMV that generates an off-normal transition when the value of its Reliability attribute changes. The Reliability attribute uses the enumerated data type.

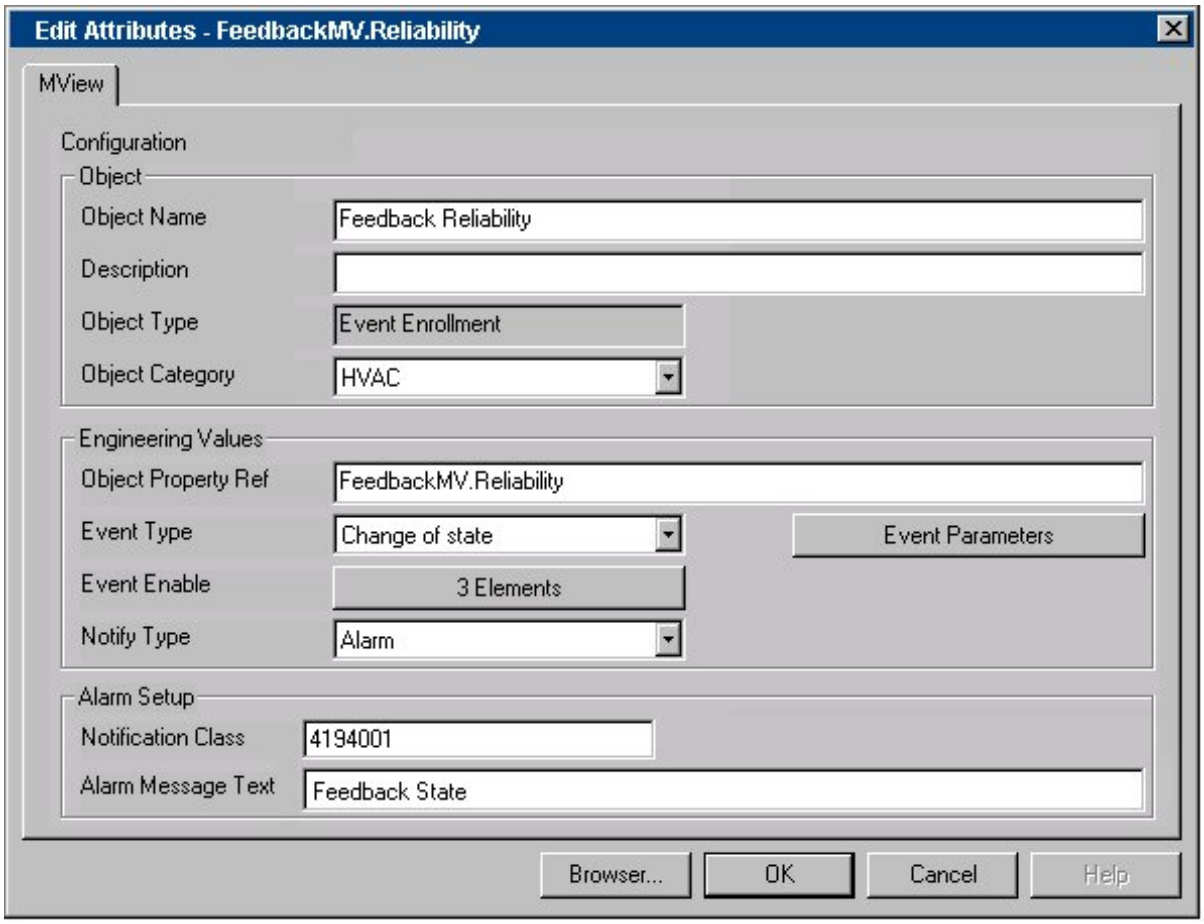


Figure 34-8: M-View Edit Attributes Dialog Box - Change of State Example

2. Select Change of state in the Event Type drop-down menu.
3. Click the Event Parameters button. The Change of State Event Parameters dialog box appears (Figure 34-9).

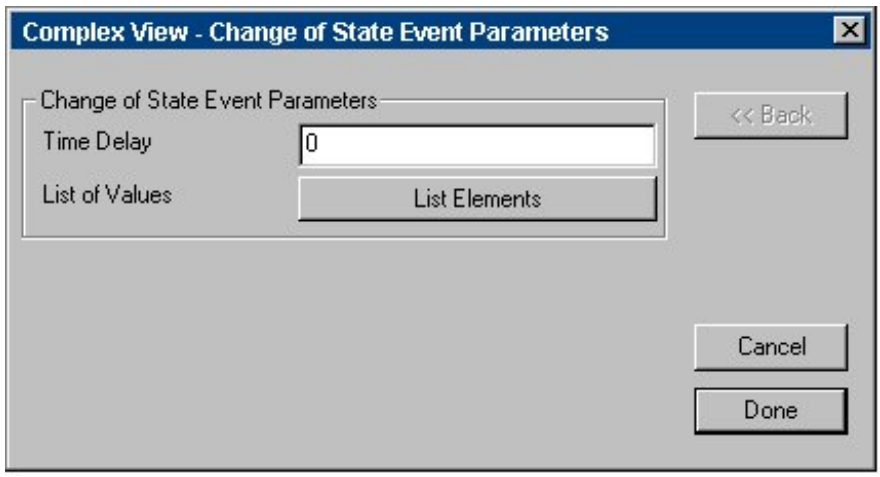


Figure 34-9: Change of State Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event after a value change.
5. Click the List Elements button. The List of Values dialog box appears (Figure 34-10).

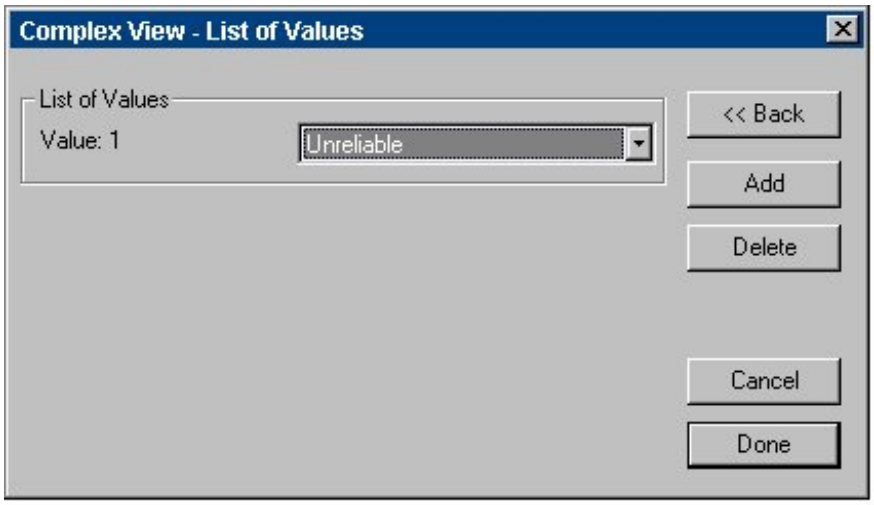


Figure 34-10: List of Values Dialog Box

6. Click Add or Delete to add or delete values.

Note: One value is required for each attribute status that is required to generate an event.

7. Select the desired status for each value.

Note: An event generates when the actual status of the attribute is equal to this status.

8. Click Done to save changes and return to the Change of State Event Parameters dialog box (Figure 34-9).

9. Click Done to save changes and return to the M-View Edit Attributes dialog box (Figure 34-1).
10. Click OK to save changes and return to Project Builder.

Change of Value - Example 1

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-11 shows an example of an Analog Input object named RoomTemp that generates a normal transition when the value of its Present Value attribute changes by a specified amount. The Present Value attribute uses the analog (Float) data type.

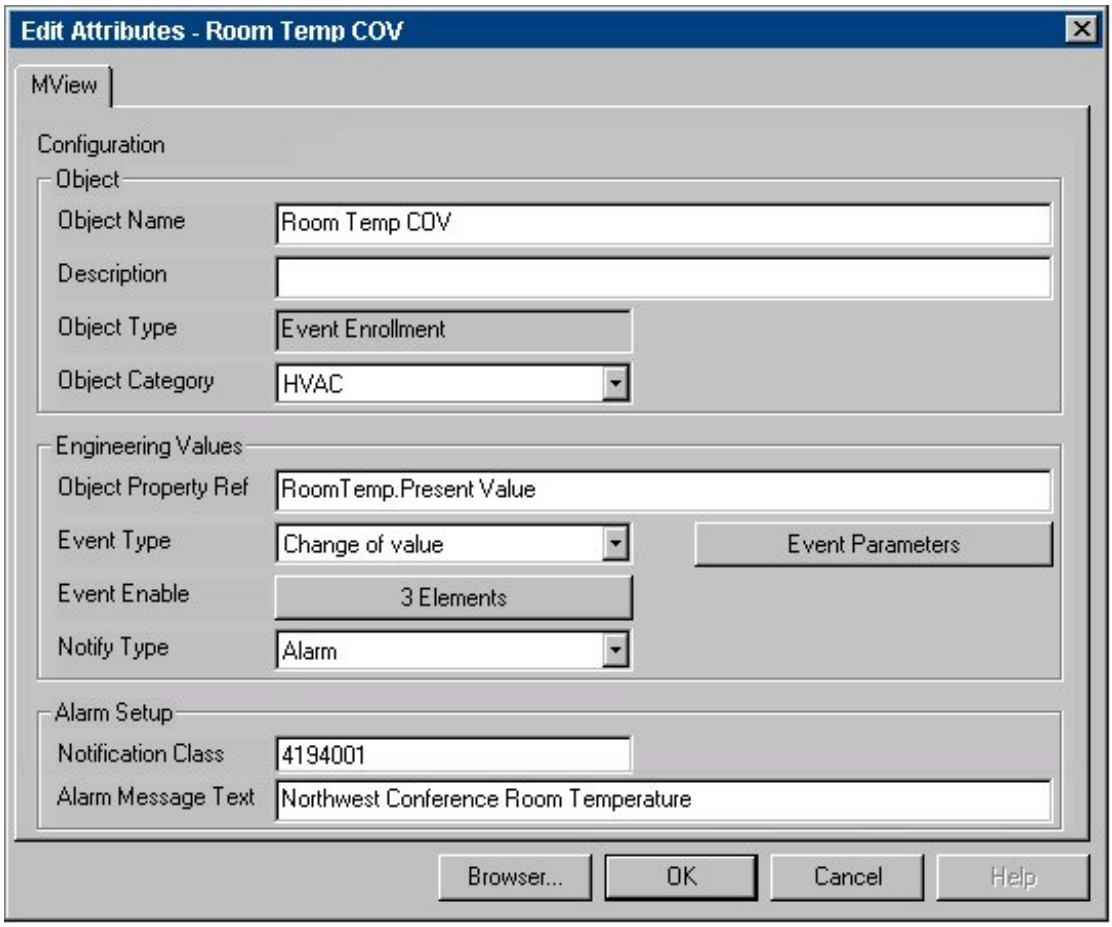


Figure 34-11: M-View Edit Attributes Dialog Box - Change of Value Example 1

2. Select Change of value in the Event Type drop-down menu.
3. Click the Event Parameters button. The Change of Value Event Parameters dialog box appears (Figure 34-12).

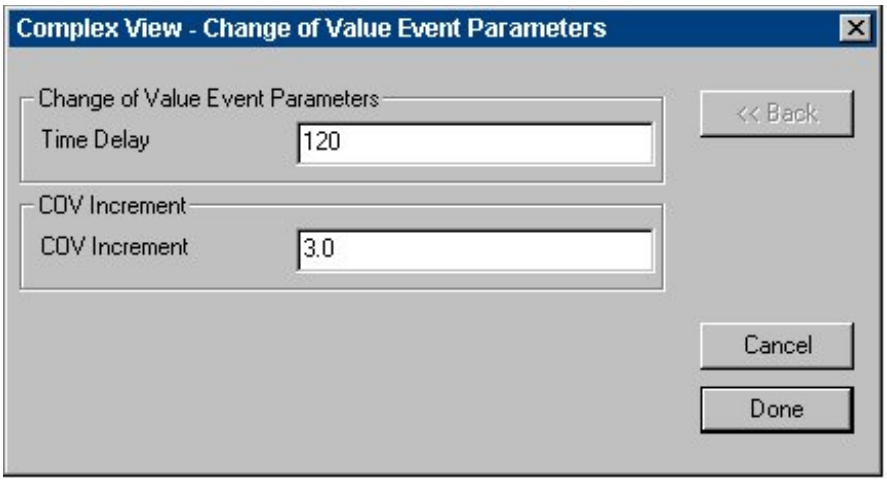


Figure 34-12: Change of Value Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event after a value change.
5. Type the desired value in the COV Increment box that you want the attribute to change before generating an alarm.

Note: In this example, an event is generated 120 seconds after the room temperature changes 3.0 degrees.

6. Click Done to save change and return to the M-View Edit Attributes dialog box (Figure 34-11).
7. Click OK to save changes and return to Project Builder.

Change of Value - Example 2

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-13 shows an example of an Analog Value object named FeedbackAV that generates a normal transition when the value of its Status Flags attribute changes. The Status Flags attribute uses a bitstring data type with 4 elements (bits). See Figure 34-14.

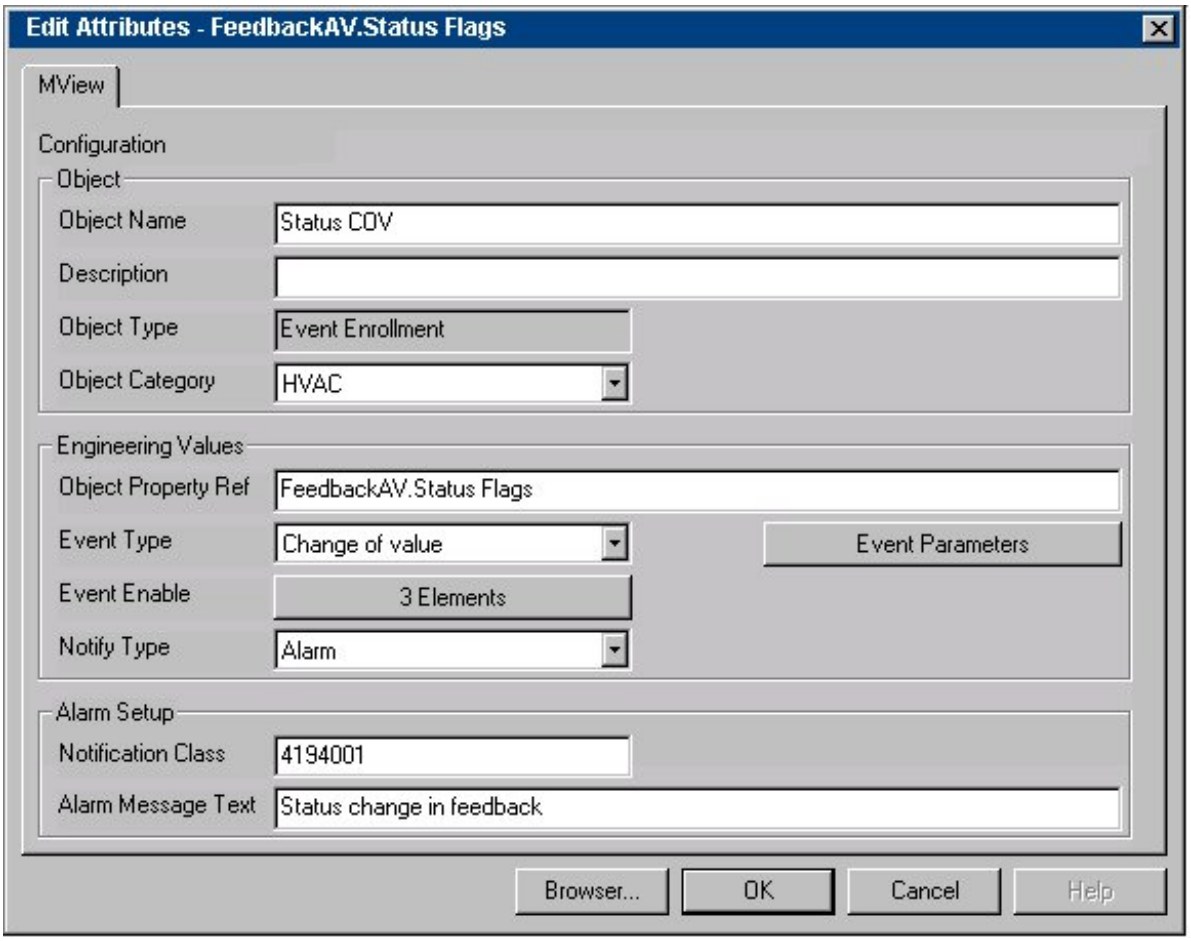


Figure 34-13: M-View Edit Attributes Dialog Box - Change of Value Example 2

2. Select Change of value in the Event Type drop-down menu.
3. Click the Event Parameters button. The Change of Value Event Parameters dialog box appears (Figure 34-14).

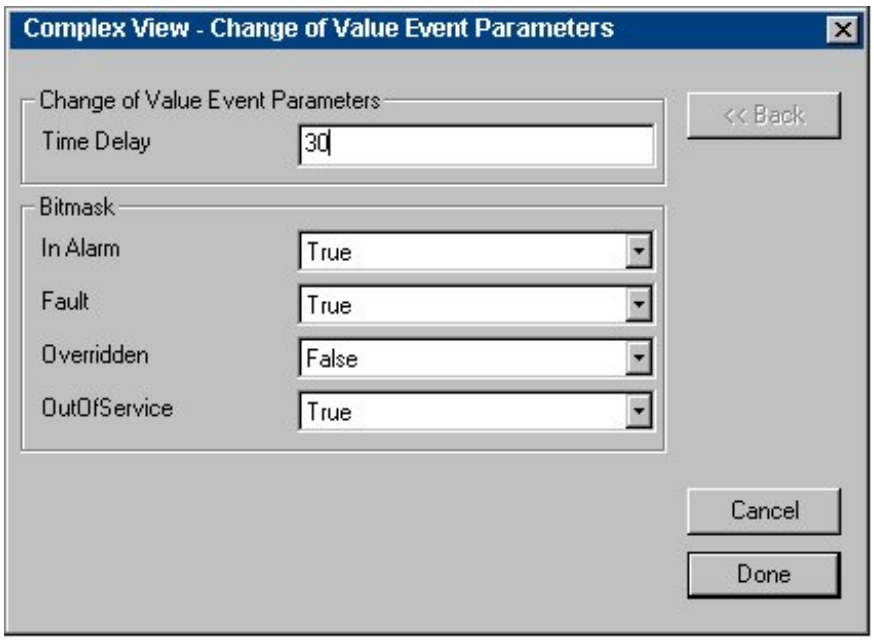


Figure 34-14: Change of Value Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event after a value change.
5. Select True or False for each value.

Notes: When the value is True, any change of value generates an event.

In this example, an event is generated 30 seconds after the InAlarm, Fault, or OutOfService changes state. Any changes to the Overridden value is ignored.

6. Click Done to save changes and return to the M-View Edit Attributes dialog box (Figure 34-13).
7. Click OK to save changes and return to Project Builder.

Command Failure - Example

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-15 shows an example of a Binary Value object named N30.Programming.BV that generates an offnormal transition when a command to its Present Value attribute fails. Failure is determined by the value of the feedback reference Fan4.PresentValue.

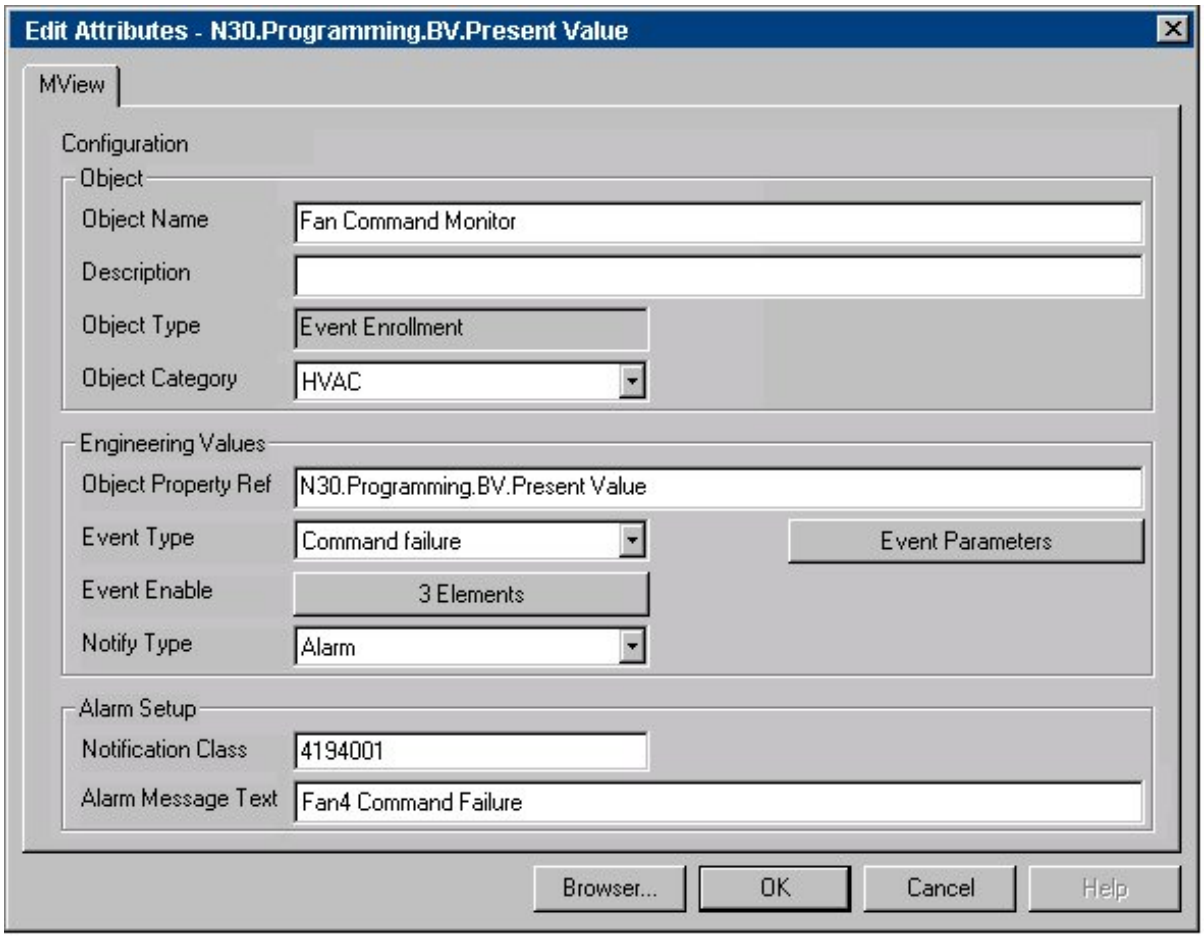


Figure 34-15: M-View Edit Attributes Dialog Box - Command Failure Example

2. Select Command Failure in the Event Type drop-down menu.
3. Click the Event Parameters button. The Command Failure Event Parameters dialog box appears (Figure 34-16).

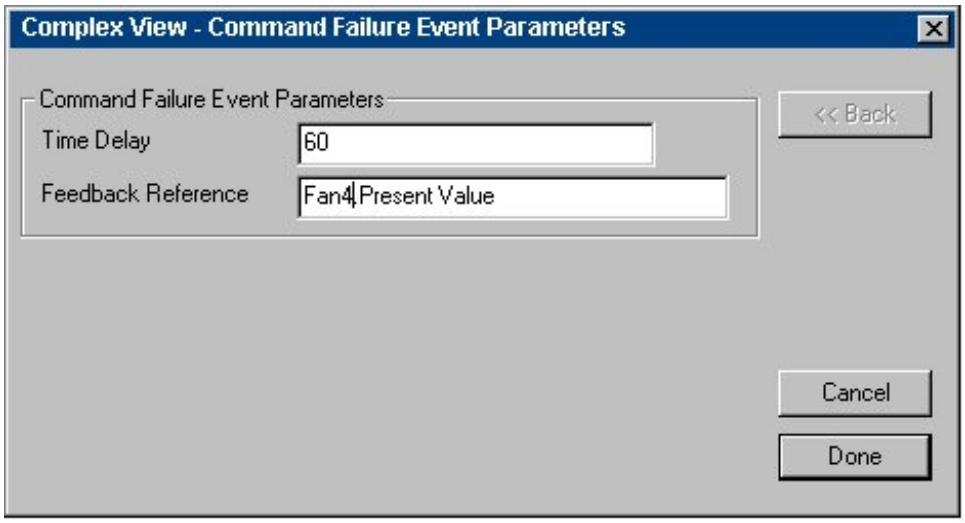


Figure 34-16: Command Failure Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event. An event generates after a command has been issued and the feedback value does not change.
5. Type the reference for the attribute used to confirm the command execution in the Feedback Reference box.

Note: The referenced command attribute and the referenced feedback attribute must be of the same data type.

6. Click Done to save changes and return to the M-View Edit Attributes dialog box (Figure 34-15).
7. Click OK to save changes and return to Project Builder.

Floating Limit - Example

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-17 shows an example of an Analog Input object named RoomTemp that transitions to high or low limit alarm when the value of its Present Value attribute exceeds the configured floating limit values.

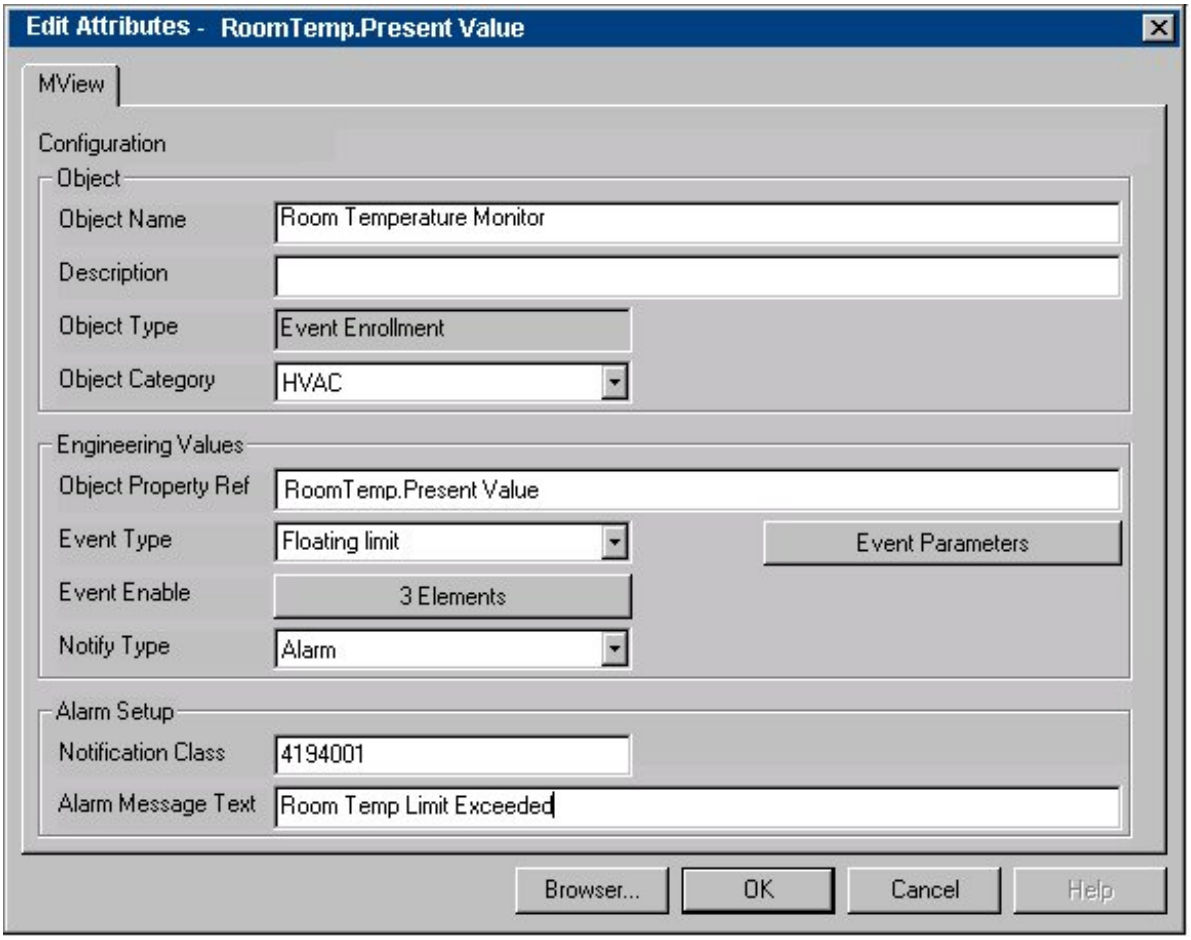


Figure 34-17: M-View Edit Attributes Dialog Box - Floating Limit Example

2. Select Floating limit in the Event Type drop-down menu.
3. Click the Event Parameters button. The Floating Limit Event Parameters dialog box appears (Figure 34-18).

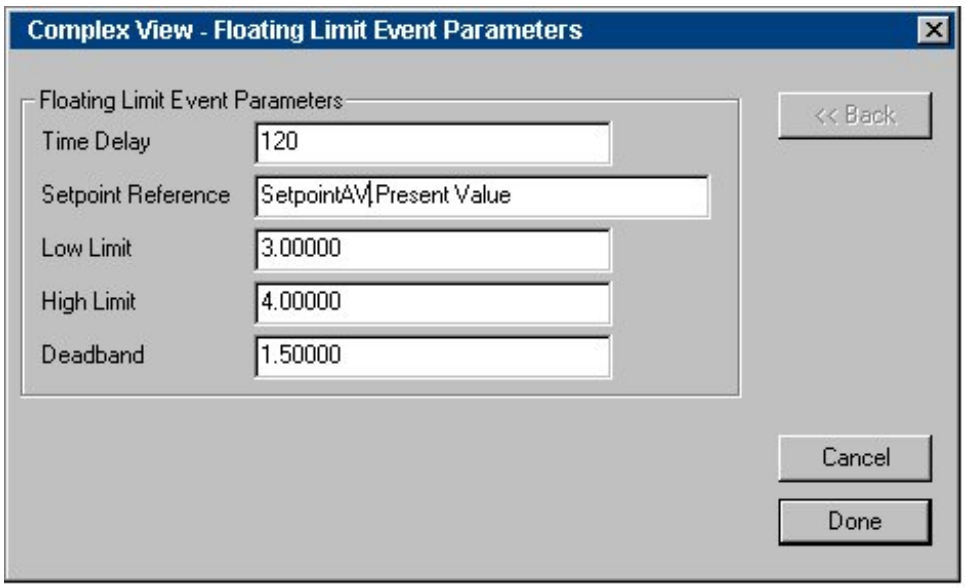


Figure 34-18: Floating Limit Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event after a value change.
5. Type the reference for the attribute that provides the value used as a setpoint reference value in the Setpoint Reference box.
6. Type the lowest amount (in degrees) that the temperature can fall below the referenced setpoint value before generating a low limit alarm in the Low Limit box.
7. Type the highest amount (in degrees) that the temperature can rise above the referenced setpoint value before generating a high limit alarm in the High Limit box.
8. Type the amount of change (in degrees) from the limit value required for the attribute to return to normal in the Deadband box.

Notes: In this example, the Present Value attribute is in alarm when it is 4 degrees above or 3 degrees below the reference setpoint. The Present Value attribute returns to normal when it is 2.5 degrees above or 1.5 degrees below the reference setpoint.

The Deadband value is considered when the temperature returns from a high or low limit state to a normal state. Use this feature to reduce toggling between the high or low limit state and a normal state when the temperature remains near the high or low limit.

9. Click Done to save changes and return to the M-View Edit Attributes dialog box (Figure 34-17).

10. Click OK to save changes and return to Project Builder.

Out of Range - Example

1. Edit the parameters of the M-View Edit Attributes dialog box using Table 34-3. Figure 34-19 shows an example of an Analog Input object named RoomTemp that transitions to high or low limit alarm when the value of its Present Value attribute goes out of the user-defined range.

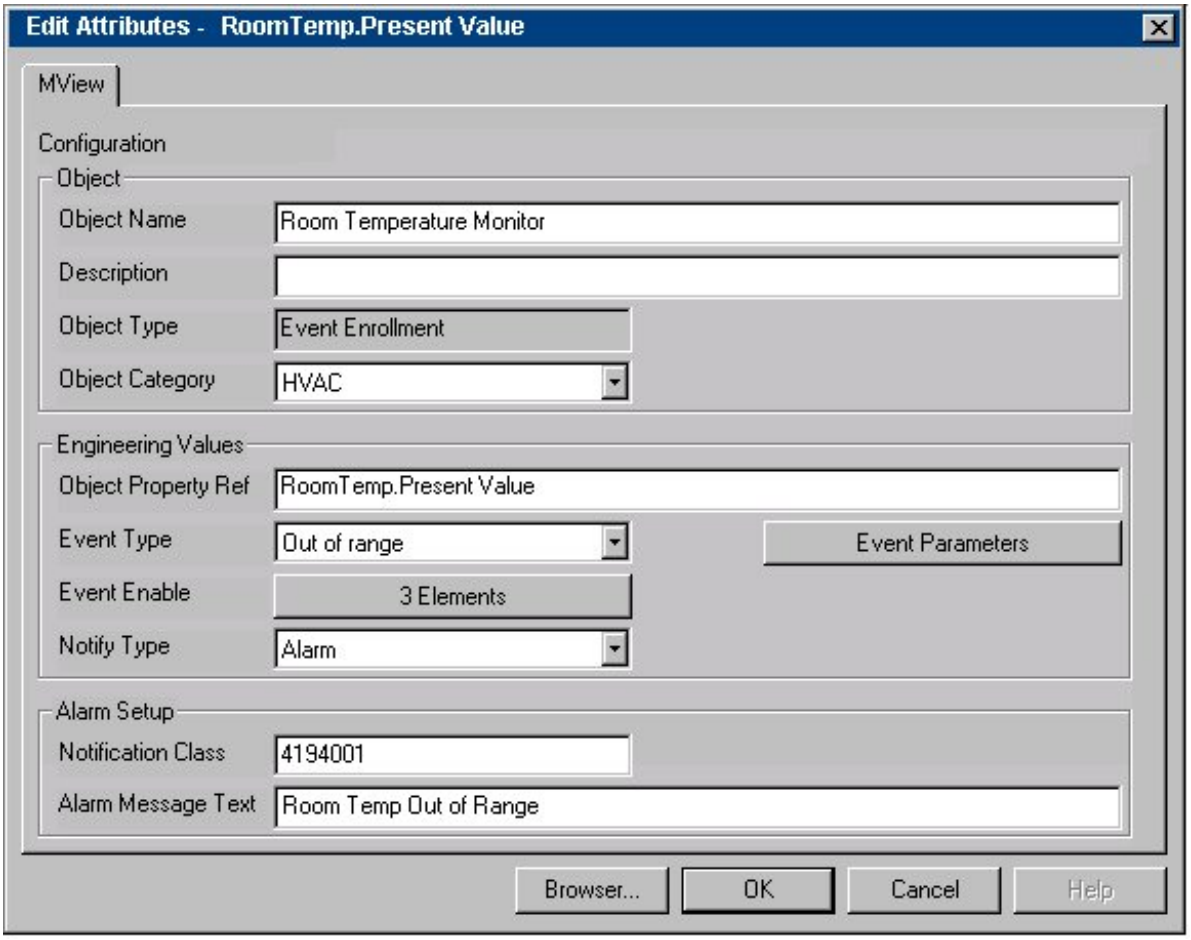


Figure 34-19: M-View Edit Attributes Dialog Box - Out of Range Example

2. Select Out of range in the Event Type drop-down menu.
3. Click the Event Parameters button. The Out of Range Event Parameters dialog box appears (Figure 34-20).

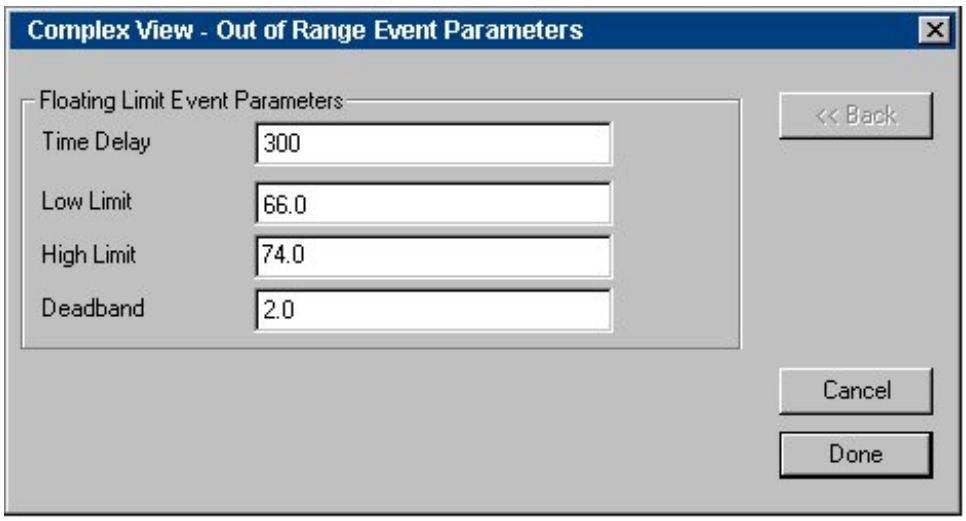


Figure 34-20: Out of Range Event Parameters Dialog Box

4. Type the desired amount of time (in seconds) in the Time Delay box that you want to wait before generating an event after a value change.
5. Type the value (in degrees) for the low end of the range in the Low Limit box.
6. Type the value (in degrees) for the high end of the range in the High Limit box.
7. Type the amount of change (in degrees) from the limit value required for the attribute to return to normal in the Deadband box.

Note: In this example, the Present Value attribute is in alarm outside of the range of 66.0 to 74.0 and returns to normal when it is inside the range of 68.0 to 72.0.

8. Click Done to save changes and return to the M-View Edit Attributes dialog box (Figure 34-19).
9. Click OK to save changes and return to Project Builder.