Chapter 14

Working with Interlock Objects

Introduction

The Interlock object establishes conditional control over one or more other objects. Based on the results of some conditional checks, a series of commands can control other objects.

This chapter describes how to:

- add an Interlock object
- edit an Interlock object
- add sources to an Interlock object
- delete sources from an Interlock object
- add action table entries to an Interlock object
- delete action table entries from an Interlock object
- command an Interlock object
- delete an Interlock object

Key Concepts

Interlock Object

The Interlock object establishes conditional control over one or more other objects. It consists of IF conditional statements, True command statements, and False command statements. Through these statements, the user specifies a set of conditional checks. Based on the results of those checks, a series of commands can control a collection of one or more objects.

For example, the Interlock object is used to place a Variable Air Volume (VAV) controller in the occupied mode whenever the main fan is on and in the occupied mode.

The attributes of the Interlock object have to work together as well as with other objects in order for the object to function properly.

The Source and Logic attributes determine the condition and the Action Table defines the course of action (commands) to take based on those conditions. For information about building an Interlock application, refer to *Appendix D: Building an Interlock Application (LIT-6892340)* in this manual.

Attributes

The values of an object's attributes determine how the object operates. The Interlock object attributes described below are listed in the order they appear on the screen. Entry requirements for these attributes are in Table 14-4.

For additional information about the Interlock object and its attributes, refer to the *Object Dictionary*.

Object Name

Identifies the object on the user interface.

Description

Provides optional information to further describe the object.

Object Type

Indicates the kind of object, such as Schedule, N2 Analog Input, or Interlock.

Object Category

Determines the general classification of an object to help define user access capability and message routing.

Enabled

Indicates if the object is active and executing an operational condition.

Commands Priority

Determines the order by importance for all commands set.

States Text

Indicates the text that appears for the Present Value.

Source

Contains data pertaining to an object being referenced which is used as input into the logic expression. It helps determine if the condition is true or false. Table 14-1 identifies the information needed for the source.

Table 14-1: Source Information

Options	Description
Object Name	Name of the source object
Attribute	Varies with the object. The default is Present Value.
Relation	Equal, Not Equal, Greater Than, Less Than, Greater or Equal, Less or Equal
Value	The value used in the relation varies according to the object. True or False.
Differential	Accounts for variations in the value. Required if the value is analog.

Logic

Specifies the Boolean (AND/OR) logic used in combination with the Source input to deliver a True or False statement. Options include:

- Match All - Every condition must be true.
- Match Any - One or more of the conditions must be true.
- Complex - Use Logic Equation attribute for complex logic.

Logic Equation

When the Logic attribute is set to Complex, this attribute contains a logic equation.

Use the logic equation to define the relationship between the master conditions using logic operators and parentheses for determining precedence.

Valid characters in the Logic Equation string are shown in Table 14-2.

Table 14-2: Logic Equation Characters

Character	Description
*	AND operator
+	OR operator
(	Open parenthesis (for grouping)
)	Close parenthesis (for grouping)
Numbers	Master condition numbers
Spaces	Spaces are allowed for readability

The following is a sample Logic Equation string:

((1+2)*(3+4))+(6*7)

This sample equation says that master condition ((1 or 2) and (3 or 4)) or (6 and 7) results in a True execution.

Action Table - True

List commands issued when the Interlock object's Present Value goes to a True state. This attribute identifies the object to receive the commands, the amount of time each command waits to be sent after a change in condition, and the command to be issued from those made available upon entering the Command ID field.

Action Table - False

Lists commands issued when the Interlock object's Present Value goes to a False state. This attribute identifies the same parameters as the Action Table - True attribute.

Example

Figures 14-1 through 14-4 show screens from a sample completed Interlock object. This sample object uses the Logic Equation attribute.

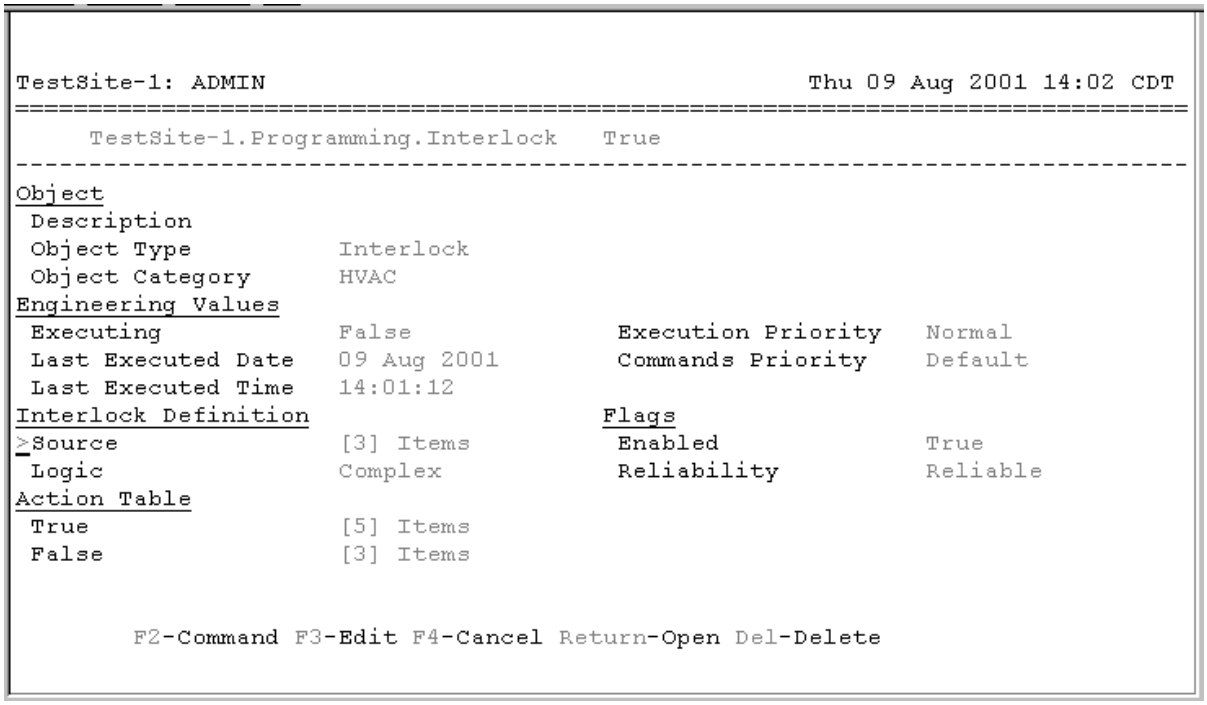

Figure 14-1: Completed Interlock Object - Focus Screen

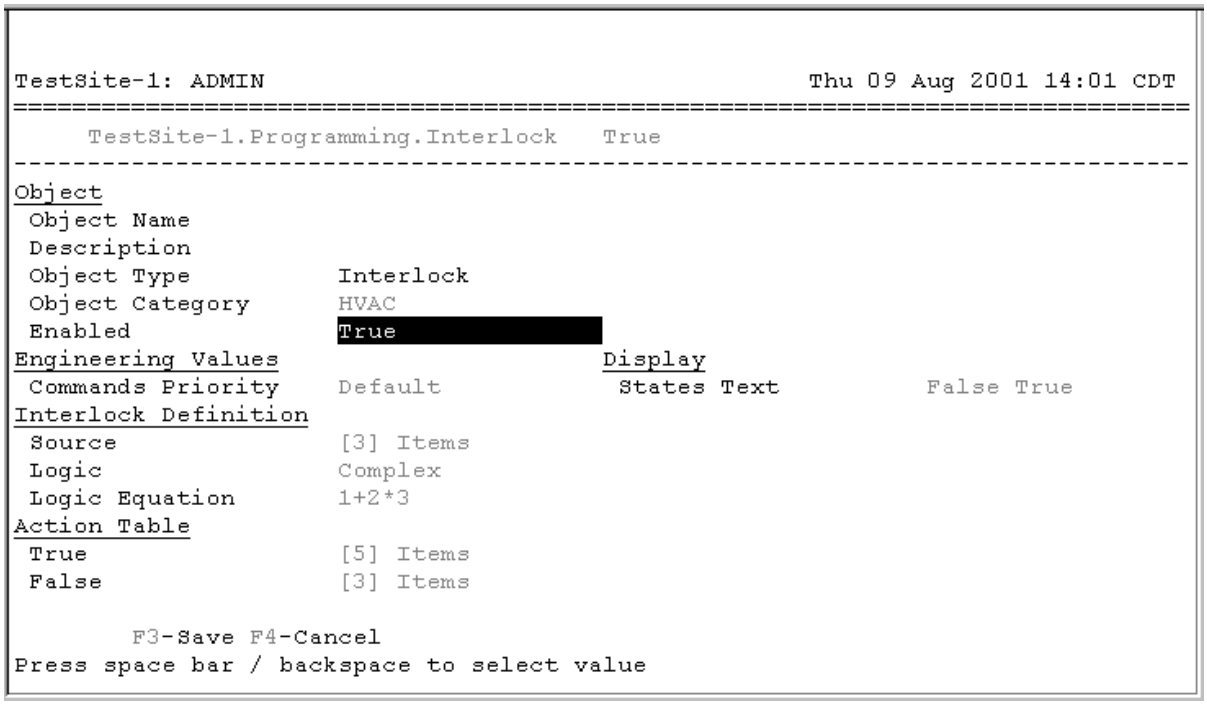

Figure 14-2: Completed Interlock Object - Edit Screen

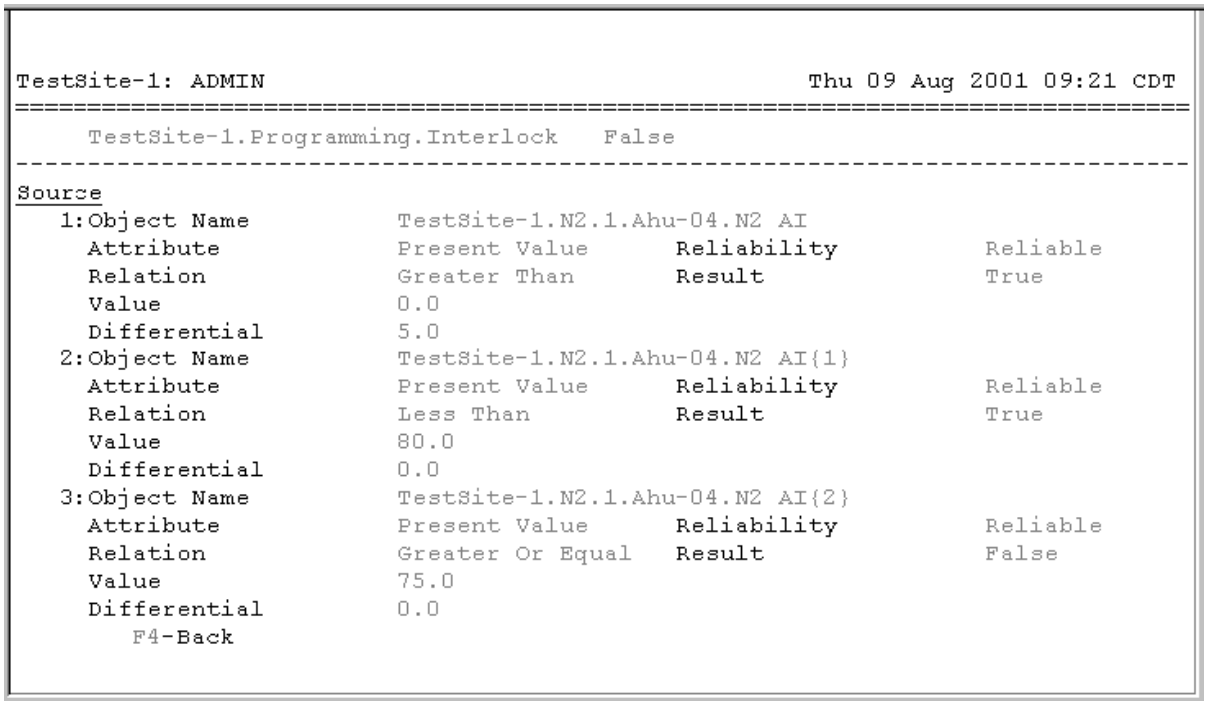

Figure 14-3: Completed Interlock Object - Source

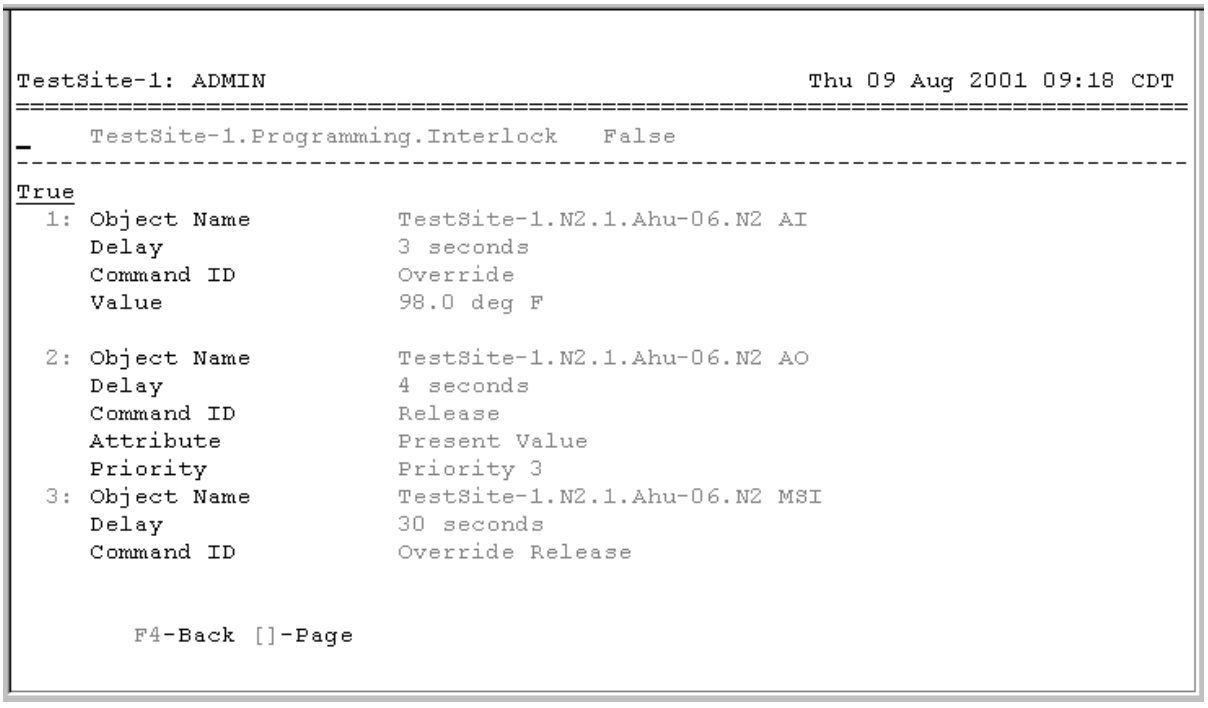

Figure 14-4: Completed Interlock Object - Action Table - True

Procedure Overview

Table 14-3: Working with Interlock Objects

To Do This	Follow These Steps:
Add an Interlock Object	Browse to and highlight the Programming container. Press the F3 (Add) key. Select Interlock and press Enter. Fill in the fields using Table 14-4. Move the cursor to Source. Press Enter. Type in the object name. Press Tab to move to the next field. Use the Spacebar and Backspace key to cycle through the list until the desired option appears. Press the F3 (Add Item) key to add a blank entry. Press the F4 (Back) key to return to the previous screen. Move the cursor to Logic. Fill in the field using Table 14-4. If necessary, move the cursor to Logic Equation and fill in the field. Move the cursor to True under Action Table. Press Enter. Type in an object name. Press Tab to move to the next field. Fill in the remaining fields. Press the F3 (Add Item) key to add a blank entry. Press the F4 (Back) key to return to the previous screen. Move the cursor to the next field (False). Press Enter. Type in an object name. Press Tab to move to the next field. Fill in the remaining fields. Press the F3 (Add Item) key to add a blank entry. Press the F4 (Back) key to return to the previous screen. Press the F3 (Save) key. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Edit an Interlock Object	Browse to and highlight an Interlock object. Press Enter to open the object. Press the F3 (Edit) key. Edit the fields using Table 14-4. Press the F3 (Save) key. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Add Sources to an Interlock Object	Browse to and highlight an Interlock object. Press Enter to open the object. Press the F3 (Edit) key. Move the cursor to Source. Press Enter. Press the F3 (Add Item) key to add a blank entry. Type in an object name. Press Tab to move to the next field. Use the Spacebar and Backspace key to cycle through the list until the desired option appears. Press the F3 (Add Item) key to add a blank entry. Press the F4 (Back) key to return to the previous screen. Press the F3 (Save) key to save the changes. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Delete Sources from an Interlock Object	Browse to and highlight an Interlock object. Press Enter to open the object. Press the F3 (Edit) key. Move the cursor to Source. Press Enter. Highlight the source to be deleted. Press the F2 (Del Item) key. Press the F4 (Back) key to return to the previous screen. Press the F3 (Save) key to save the changes. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Add Action Table Entries to an Interlock Object	Browse to and highlight an Interlock object. Press Enter to open the object. Press the F3 (Edit) key. Move the cursor to True or False under Action Table. Press Enter. Press the F3 (Add Item) key to add a blank entry. Type in an object name. Press Tab to move to the next field. Fill in the remaining fields. Press the F3 (Add Item) key to add a blank entry. Press the F4 (Back) key to return to the previous screen. Press the F3 (Save) key to save the changes. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.

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To Do This (Cont.)	Follow These Steps:
Delete Action Table Entries from an Interlock Object	Browse to and highlight an Interlock object. Press Enter to open the object. Press the F3 (Edit) key. Move the cursor to True or False under Action Table. Press Enter. Highlight the Action Table value to be deleted. Press the F2 (Del Item) key. Press the F4 (Back) key to return to the previous screen. Press the F3 (Save) key to save the changes. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. Press any key to continue. Press the F4 (Cancel) key to return to the container hierarchy.
Command an Interlock Object	Browse to and highlight an Interlock object. Press the F2 (Command) key. Use the Spacebar and the Backspace key to cycle through the list until the desired command appears. Press Enter.
Delete an Interlock Object	Browse to and highlight an Interlock object. Press Enter to open the object. Press the Delete key. Press the Tab key to confirm the deletion.

Detailed Procedures

Adding an Interlock Object

To add an Interlock object:

1. Browse to and highlight the Programming container.
2. Press the F3 (Add) key. The Add Object list appears.
3. Select Interlock and press Enter. The Interlock object attribute screen appears (Figure 14-5).

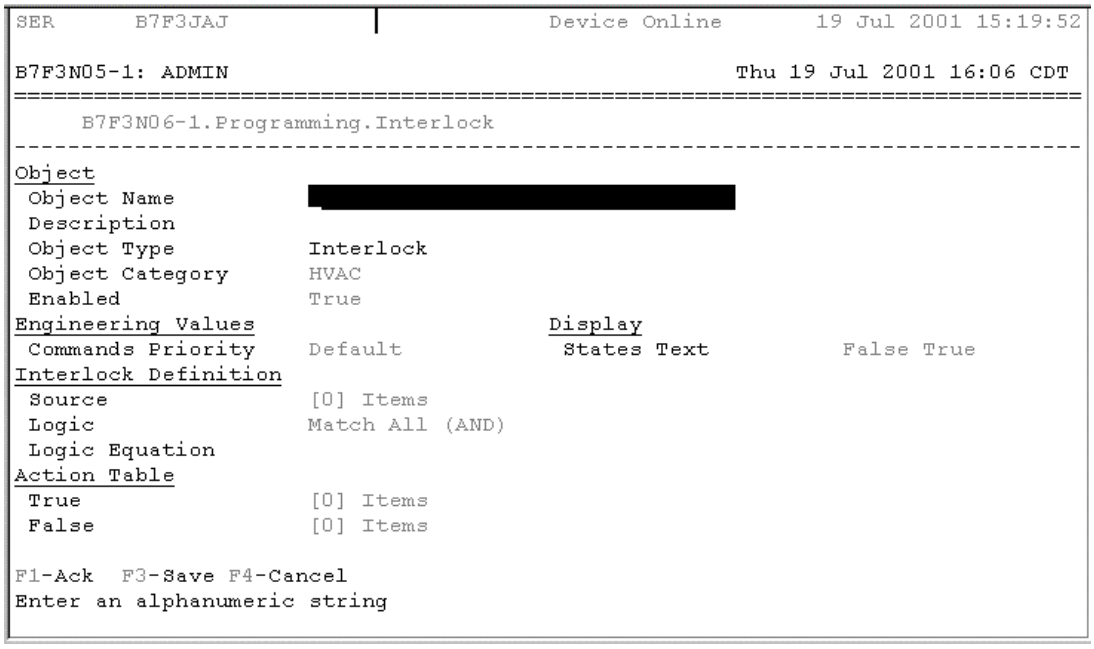

Figure 14-5: Interlock Object Attribute Screen

4. Fill in the fields using Table 14-4.

Table 14-4: Attribute Entry Requirements

Screen Area	Attribute	Required	Default	Options/Range
Object	Object Name	No	Blank	Maximum 32 characters Invalid characters: @ . ? * $ # : ' [ ]. If not completed, the system assigns a name.
	Description	No	Blank	Maximum 40 characters
	Object Type	Yes	Interlock	The default is preset and cannot be changed.
	Object Category	Yes	HVAC	Use the Spacebar and the Backspace key to view and select options: HVAC, Fire, Security, Services, Administrative.
	Enabled	Yes	True	Use the Spacebar and the Backspace key to view and select options: True, False.
Engineering Values	Commands Priority	Yes	Default	Use the Spacebar and the Backspace key to view and select option. Refer to *Write Priority Enumeration Set* in *Appendix A: Object Enumeration Sets* of the *Object Dictionary (LIT-694980)*.
Display	States Text	Yes	False True	Use the Spacebar and the Backspace key to view and select options. Refer to *States Text* in *Appendix A: Object Enumeration Sets* of the *Object Dictionary (LIT-694980)*.
Interlock Definition	Source	Yes	0 items	List of source objects used for input into the logic expression.
	Logic	Yes	Match All	Use the Spacebar and the Backspace key to view and select options. **Match All**: All of the source conditions must be true. **Match Any**: One or more of the source conditions must be true. **Complex**: Use the Logic Equation attribute for complex logic.
	Logic Equation	No		Define the relationship between the master conditions using logic operators and parentheses for determining precedence.
Action Table	True	Yes	0 items	Object Name Delay Command ID Parameters (varies according to the command)
	False	Yes	0 items	Object Name Delay Command ID Parameters (varies according to the command)

5. Move the cursor to Source.
6. Press Enter. The Interlock object Source list appears (Figure 14-6).

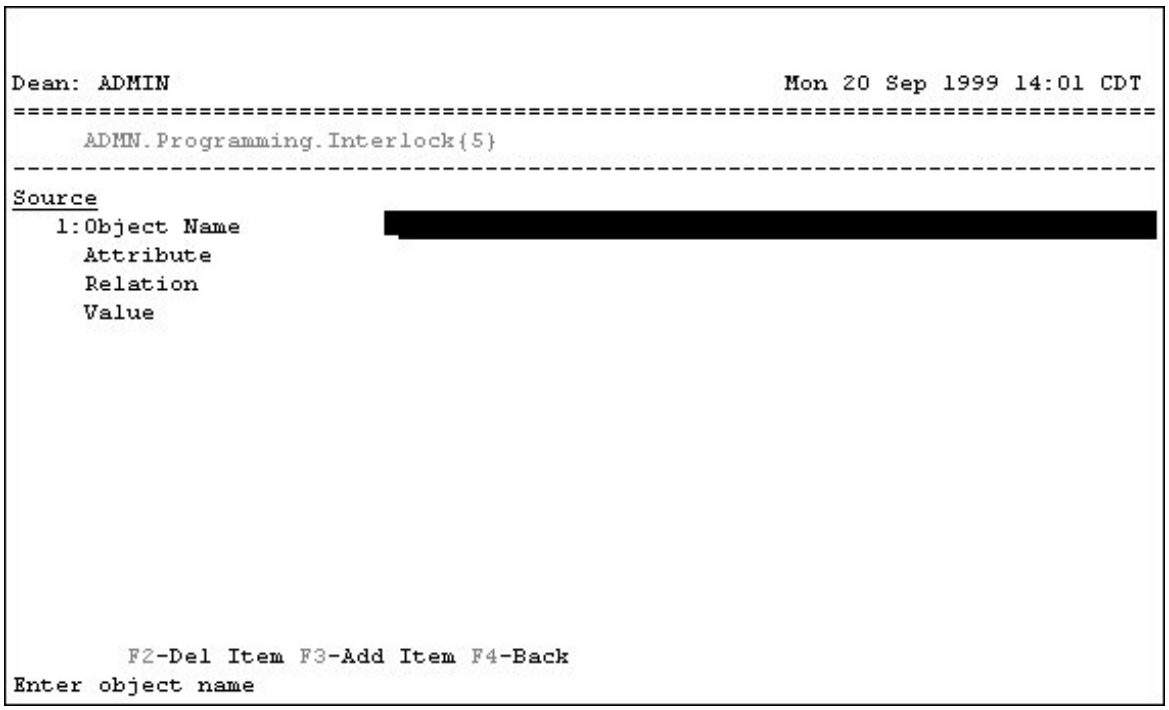

Figure 14-6: Interlock Object Source List

7. Type in an object name.
8. Press Tab to move to the next field.
9. Use the Spacebar and Backspace key to cycle through the list until the desired option appears.
10. Repeat Steps 8 and 9 for the other fields.
11. Press the F3 (Add Item) key to add a blank entry.
12. Repeat Steps 7 through 11 for each new source to be added.
13. Press the F4 (Back) key to return to the previous screen.
14. Move the cursor to Logic.
15. Fill in the field according to Table 14-4.
16. If the Logic field is set to Complex, move the cursor to Logic Equation and fill in the field.
17. Move the cursor to True under Action Table.
18. Press Enter. The True list appears (Figure 14-7).

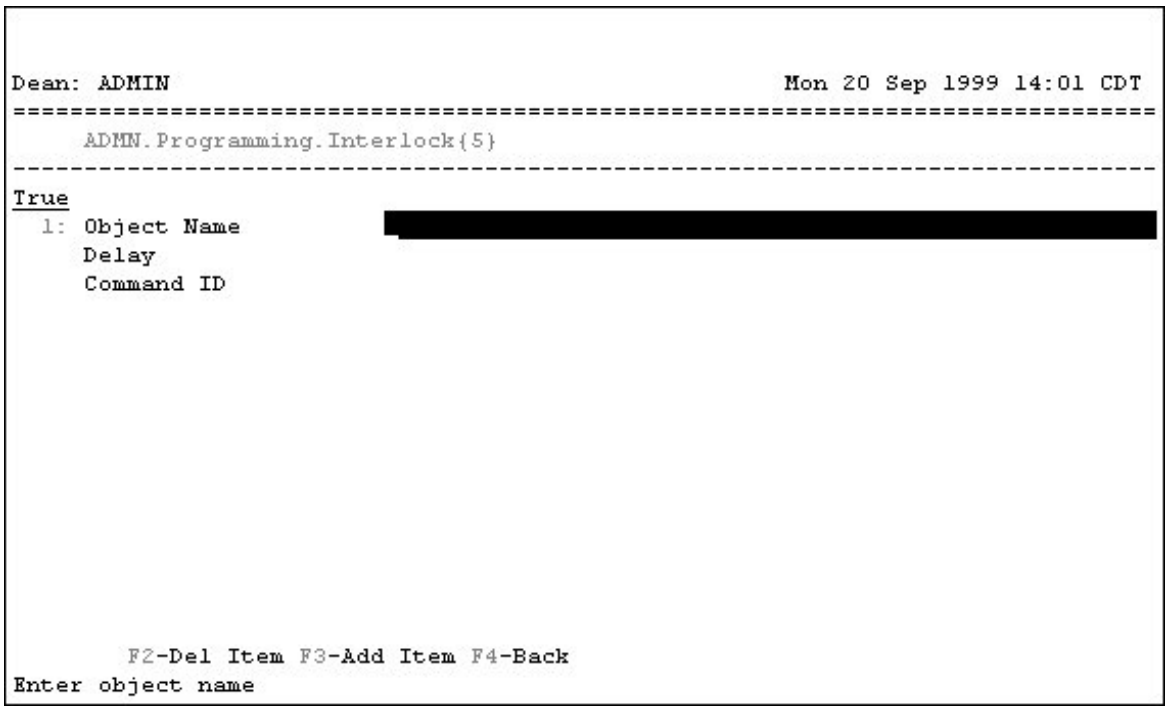

Figure 14-7: Interlock Object True List

19. Type in an object name.
20. Press Tab to move to the next field.
21. Fill in the remaining fields.
22. Press the F3 (Add Item) key to add a blank entry.
23. Repeat Steps 19 through 22 for each Action Table (True) value to be added.
24. Press the F4 (Back) key to return to the previous screen.
25. Move the cursor to the next field (False).
26. Press Enter. The False list appears (Figure 14-8).

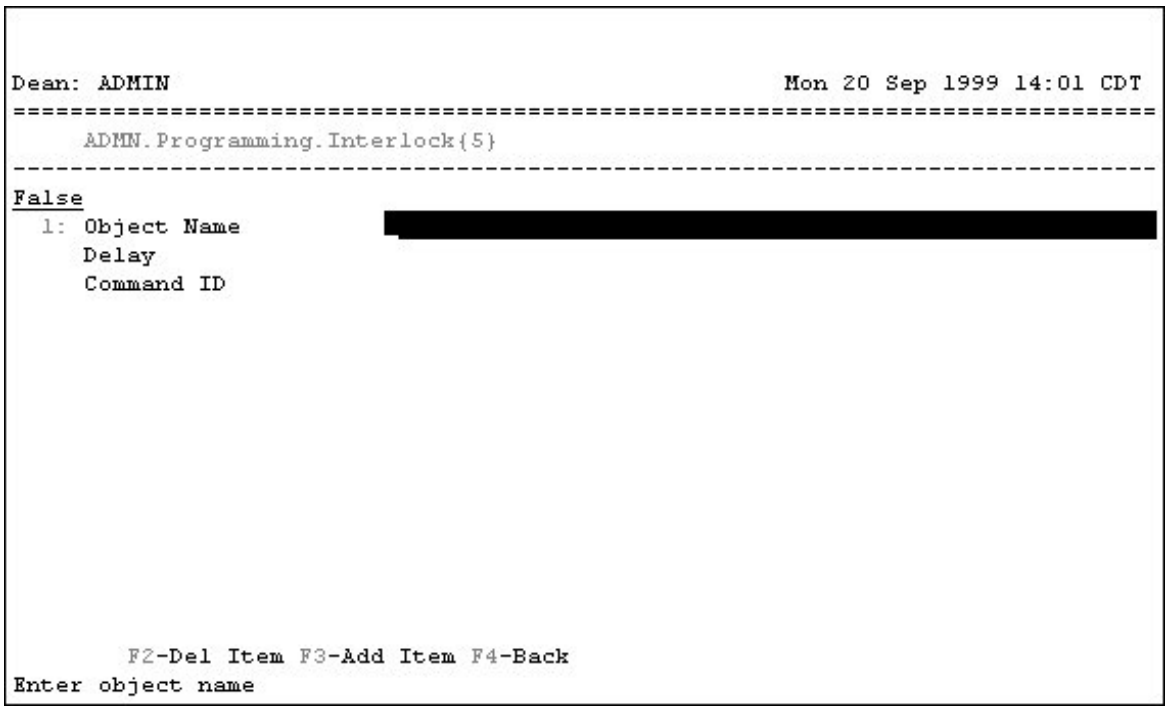

Figure 14-8: Interlock Object False List

27. Type in an object name.
28. Press Tab to move to the next field.
29. Fill in the remaining fields.
30. Press the F3 (Add Item) key to add a blank entry.
31. Repeat Steps 27 through 30 for each Action Table (False) value to be added.
32. Press the F4 (Back) key to return to the previous screen.
33. Press the F3 (Save) key.
34. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 35.
35. Press any key to continue.
36. Press the F4 (Cancel) key to return to the container hierarchy.

Editing an Interlock Object

To edit an Interlock object:

Note: To delete or add Sources or Action Table values, refer to the appropriate sections of this chapter.

1. Browse to and highlight an Interlock object.
2. Press Enter to open the object.

Note: Additional attributes appear. Refer to the *Object Dictionary* for more information.

3. Press the F3 (Edit) key. The Interlock object attribute screen appears (Figure 14-5).
4. Edit the fields using Table 14-4.
5. Press the F3 (Save) key.
6. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 7.
7. Press any key to continue.
8. Press the F4 (Cancel) key to return to the container hierarchy.

Adding Sources to an Interlock Object

To add sources to an Interlock object:

1. Browse to and highlight an Interlock object.
2. Press Enter to open the object. The Interlock object attribute screen appears (Figure 14-5).
3. Press the F3 (Edit) key.
4. Move the cursor to Source.
5. Press Enter. The Interlock object Source list appears (Figure 14-6).
6. Press the F3 (Add Item) key to add a blank entry.
7. Type in an object name.
8. Press Tab to move to the next field.
9. Use the Spacebar and Backspace key to cycle through the list until the desired option appears.
10. Repeat Steps 8 and 9 for the other fields.
11. Press the F3 (Add Item) key to add a blank entry.
12. Repeat Steps 7 through 11 for each source to be added.

13. Press the F4 (Back) key to return to the previous screen.
14. Press the F3 (Save) key to save the changes.
15. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 16.
16. Press any key to continue.
17. Press the F4 (Cancel) key to return to the container hierarchy.

Deleting Sources from an Interlock Object

To delete sources from an Interlock object:

1. Browse to and highlight an Interlock object.
2. Press Enter to open the object. The Interlock object attribute screen appears (Figure 14-5).
3. Press the F3 (Edit) key.
4. Move the cursor to Source.
5. Press Enter. The Interlock object Source list appears (Figure 14-6).
6. Highlight the source to be deleted.
7. Press the F2 (Del Item) key.
8. Repeat Steps 6 and 7 for each source to be deleted.
9. Press the F4 (Back) key to return to the previous screen.
10. Press the F3 (Save) key to save the changes.
11. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 12.
12. Press any key to continue.
13. Press the F4 (Cancel) key to return to the container hierarchy.

Adding Action Table Entries to an Interlock Object

To add Action Table entries from an Interlock object:

1. Browse to and highlight an Interlock object.
2. Press Enter to open the object. The Interlock object attribute screen appears (Figure 14-5).
3. Press the F3 (Edit) key.
4. Move the cursor to True or False under Action Table.

5. Press Enter. The Interlock object True or False list appears.
6. Press the F3 (Add Item) key to add a blank entry.
7. Type in an object name.
8. Press Tab to move to the next field.
9. Fill in the remaining fields.
10. Press the F3 (Add Item) key to add a blank entry.
11. Repeat Steps 7 through 10 for each Action Table value to be added.
12. Press the F4 (Back) key to return to the previous screen.
13. Press the F3 (Save) key to save the changes.
14. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 15.
15. Press any key to continue.
16. Press the F4 (Cancel) key to return to the container hierarchy.

Deleting Action Table Entries from an Interlock Object

To delete Action Table entries from an Interlock object:

1. Browse to and highlight an Interlock object.
2. Press Enter to open the object. The Interlock object attribute screen appears (Figure 14-5).
3. Press the F3 (Edit) key.
4. Move the cursor to True or False under Action Table.
5. Press Enter. The True or False list appears.
6. Highlight the Action Table value to be deleted.
7. Press the F2 (Del Item) key.
8. Repeat Steps 6 and 7 for each Action Table value to be deleted.
9. Press the F4 (Back) key to return to the previous screen.
10. Press the F3 (Save) key to save the changes.
11. Check the User Assistance area of the screen to verify if the save was successful or if there were errors. If errors were detected, correct them and resave the entries. Once the save is successful, continue with Step 12.
12. Press the any key to continue.
13. Press the F4 (Cancel) key to return to the container hierarchy.

Commanding an Interlock Object

To command an Interlock object:

1. Browse to and highlight an Interlock object.
2. Press the F2 (Command) key. The Command field appears.
3. Use the Spacebar and the Backspace key to cycle through the list until the desired command appears. The Interlock object supports the commands described Table 14-5.

Table 14-5: Supported Commands

Command	Description
Re-Command	Reissues the commands for the current state.
Override	Updates the Present Value at Command Priority Operator Override. Choose True to send the commands in the True Action Table or False to send the commands in the False Action Table.
Override Release	Releases Command Priority Operator Override from Present Value.
Release	Releases the identified command priority from the specified, writeable attribute, and allows it to be controlled by the next highest priority.
Release All	Releases Command Priorities 3 through 15 from the specified, writeable attribute. Command Priorities 1 and 2 remain.
Enable	Ensures that the object reacts to any changes it missed while it was disabled.
Disable	Locks out all outputs and prevents the Interlock functionality.

4. If the desired command appears with additional parameters below it, press the Tab key to highlight the field and either type in the necessary information or use the Spacebar and Backspace key to cycle through the list of options.
5. Press Enter.

Deleting an Interlock Object

To delete an Interlock object:

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