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Rev AA

ARIES®-SLX
Configuration Tool

User's Guide

EXPORT INFORMATION (USA):
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This document contains technical data subject to the EAR.

Kidde
Fire Systems

FOREWORD

Note: This Manual, P/N 06-237492-001, is to be used by qualified and factory-trained personnel, knowledgeable of NFPA standards and all local codes in effect.

This Manual is intended to clearly and accurately describe how to use the ARIES®-SLX Configuration Tool (ACT-SLX).

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TERMS AND ABBREVIATIONS

AAM	Addressable AlarmLine Module
AC	Alternating Current
ACT	ARIES Configuration Tool
ACT-SLX	ARIES-SLX Configuration Tool
AHJ	Authority Having Jurisdiction
AI	Addressable Input (Monitor Module)
ASM	Addressable Signal Module
AO	Addressable Output
ATM	Annunciator Terminal Module
AUX	Auxiliary
bpm	beats per minute
CD	Compact Disc
CTLCO	Cyclical Time Limit Cutoff Interval
EOC	Event Output Control
FM	Factory Mutual
GAO	General Alarm Outputs
HSD	High-Sensitivity Smoke Detector
HSSD	High-Sensitivity Smoke Detector
I/O	Inputs/Outputs
IRI	Industrial Risk Insurers
ITLCO	Initial Time Limit Cutoff Interval
MHz	Mega Hertz
NAC	Notification Appliance Circuit
NIC	Network Interface Card
NFPA	National Fire Protection Association
PALM	PEGAsys Addressable Loop Module
PAS	Positive Alarm Sequence
PC	Personal Computer
RAM	Random Access Memory
RDCM	Remote Display Control Module
RRM	Remote Releasing Module
SLC	Signaling Line Circuit
SUPV	Supervisory
UL	Underwriters Laboratory
Vdc	Volts (Direct Current)

NOTICE TO USERS, INSTALLERS, AUTHORITY HAVING JURISDICTION AND ALL OTHER INVOLVED PARTIES			
This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below:			
Program Feature or Option	**Permitted in UL 864 (Y/N)**	**Possible Settings**	**Settings Permitted in UL 864**
Ionization Detectors reporting as supervisory initiating devices	No	0.5 – 1.5% per foot	Report as alarm initiating devices only
Photoelectric Detectors reporting as supervisory initiating devices	No	0.5 – 3.5% per foot (PSD-7152 detector) or 0.9 - 3.5% per foot (DS-PS detector)	Report as alarm initiating devices only
Delay Operator D()	Yes	1 - 3600 seconds	1 - 60 seconds
Abort switches may be set up to operate within Delay, D(), operators.	Yes	1. Reset to initial delay setting. Resume countdown for entire delay period. 2. Count down to 10 seconds and hold. Resume countdown at 10 seconds. 3. Hold at time remaining. Resume countdown at remaining time period. 4. Same as #2, except disable abort function if countdown timer has started. 5. Special New York City operation.	#2 only
Delayed off premises trouble transmissions for AC power loss.	Yes	0 – 12 hours	0 – 3 hours
Monitor module acting as a silence switch.	Yes	May be used as a stand alone initiating device, or may be used with visible indication that shows when outputs are silenced.	Must have visible indication at monitor module that outputs have been silenced.
Monitor module acting as an acknowledge switch.	Yes	May be used as a stand alone initiating device, or may be used with a display that shows when events are being acknowledged.	Must have visible display at monitor module that shows what is being acknowledged.
PALM reporting as supervisory device	No	N/A	Report as alarm initiating device only.
Configuring a control unit that is part of a network system as non-resettable via the network.	No	Resettable or Non-resettable via the network (section 2-7.8)	If configured for non-resettable, the control unit must be in a different group and must be configured to not 'log All Events'
Network Setting Network Reset Event	No	'Check' to enable remote Reset. No 'Check' to disable remote Reset.	'Check' to enable remote Reset.

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CHAPTER 1
GENERAL INFORMATION

1-1 INTRODUCTION

Versions of configuration tools, Kidde® ARIES®-SLX Configuration Tool (ACT-SLX) and ARIES Configuration Tool (ACT), are deployed within an application called the "Configuration Software Launcher". This launcher provides the user with one point of access to any version of ACT-SLX and ACT.

ACT-SLX and ACT are Microsoft® Windows®-based applications that are used to create specific applications for ARIES-SLX and ARIES control units respectively. They enable the user to create a complete system configuration, including details for initiating devices, output control and display messages. Details on how to select the appropriate application from within the Configuration Software Launcher are provided in section 1-4.

This manual guides the user on how to set up and configure an ARIES-SLX control unit using ACT-SLX software.

1-2 PC REQUIREMENTS

Minimum computer requirements for ACT-SLX are listed below. System requirements vary between operating systems. Refer to the appropriate section.

For computers with Windows 7 or 8.1 installed:

- 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor
- 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit)

For computers with Windows XP installed:

- 300 MHz or faster Pentium-compatible CPU
- 128 MB (RAM) or more

Note: Administrator privileges for the PC are required in order to install the Configuration Software Launcher and Configuration Software.

1-3 INSTALLING THE CONFIGURATION SOFTWARE LAUNCHER AND THE ACT-SLX SOFTWARE

1. Download the configuration software from the Distributor Extranet on **www.kiddefiresystems.com** and save it to a location on your computer.
2. Unzip the downloaded file.
3. Run the file "setup.msi" to start the Setup Wizard.
4. After the Setup Wizard is finished processing, the Setup Wizard Welcome Screen displays.

   Note: The version that is shown in Figure 1-1 (v1.0.5.4) is the version of Launcher, not the version of the ACT-SLX software.

5. Select the **<Next>** button to proceed to the next screen.

Figure 1-1. Setup Wizard Welcome Screen

6. The Ready to Install the Program screen displays (Figure 1-2). Setup automatically defaults to place the program in the C: drive. Click on the <Install> button to continue with installation.

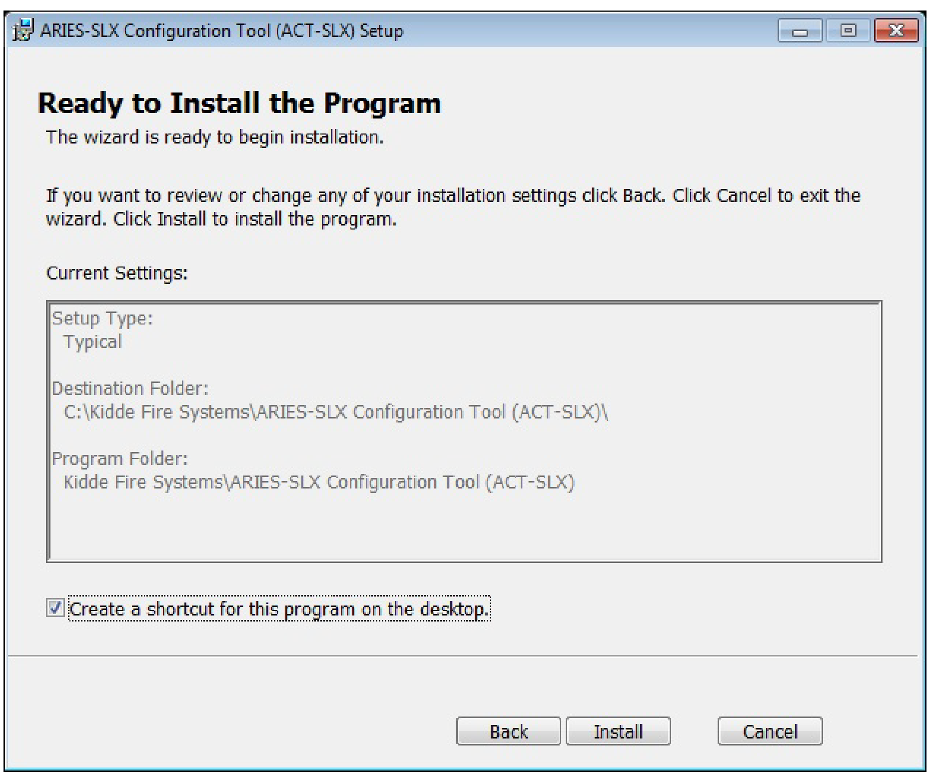

Figure 1-2. Ready to Install Screen

A progress bar displays as the software is being installed.

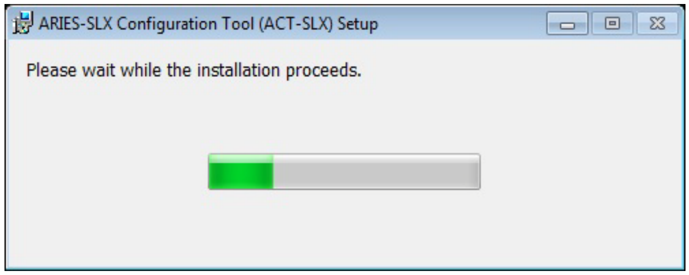

Figure 1-3. Installation Progress Bar

7. The Setup Wizard Complete screen displays (Figure 1-4). Setup of ACT-SLX is complete. If you have rebooted the computer after installing ACT-SLX software previously, there is no need to reboot now. You can select “Launch the Configuration Software Launcher for the ARIES-SLX Configuration Tool (ACT-SLX)” radio button to start the software, then select <Finish>.

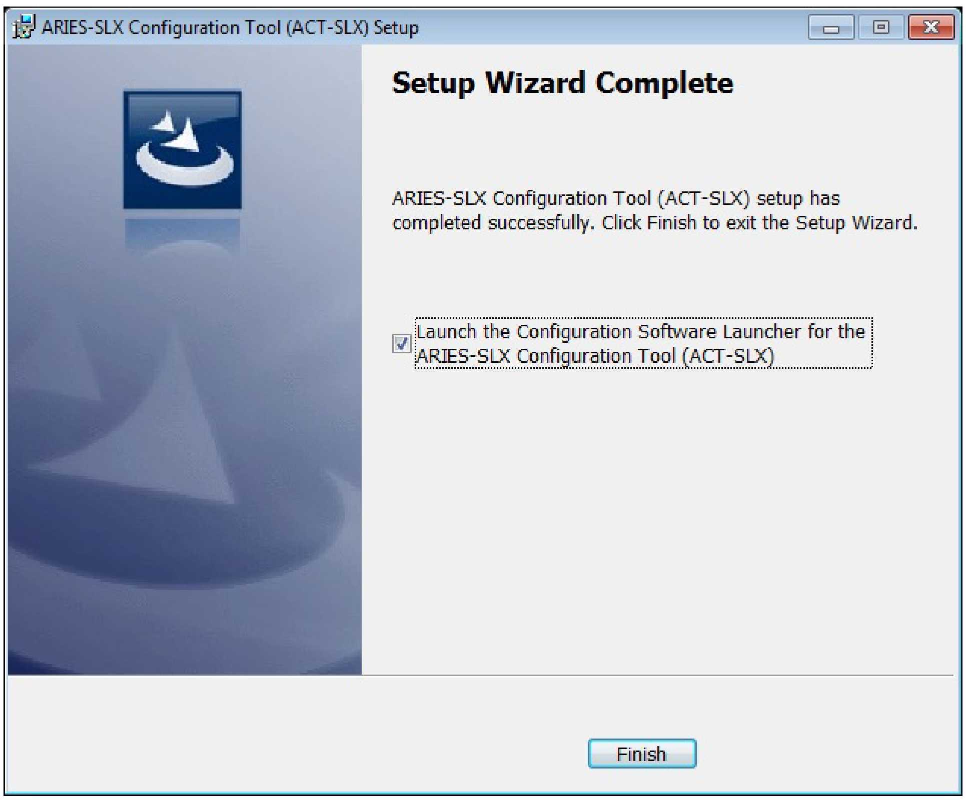

Figure 1-4. Setup Wizard Complete Screen

8. If you have not installed ACT-SLX software previously, please follow the prompts to reboot.

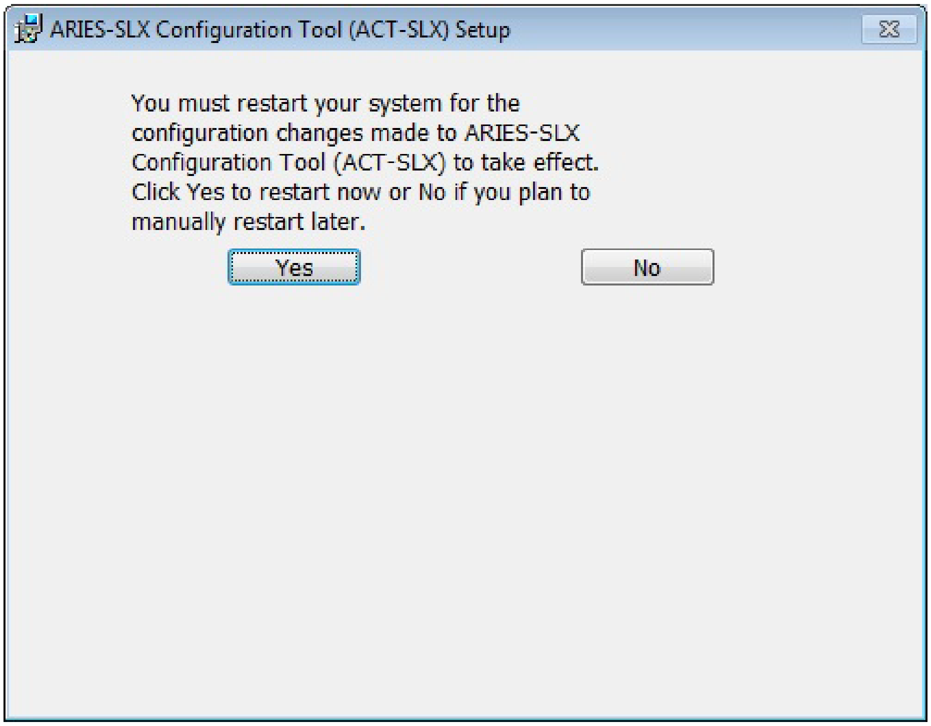

Figure 1-5. Optional Reboot Prompt

1-4 STARTING ACT-SLX

1. From the desktop, double-click the Kidde ACT-SLX icon (the icon displays on the desktop if "Yes" was selected during the installation process when prompted for "Create a shortcut for the program on the desktop?").
2. Alternatively, from the Start menu, select "All Programs". Then, select the "Kidde Fire Systems" folder. Select the "Kidde ARIES-SLX Configuration Tool" folder. Select "Launch Kidde ARIES-SLX Configuration Tool".

   The following screen will display before ACT-SLX starts. This screen allows the user to launch previously-released configuration software versions, enabling communication to older versions of the panel.

   - Select the desired Control Unit and associated firmware version for the Main Controller Board (MCB) and SLC firmware on the MCB. Click <OK> to launch the configuration tool for the specific Control Unit and MCB/SLC firmware versions. For example, selecting ARIES-SLX MCB_200/SLC_116 – ACT-SLX_200.exe and clicking <OK> launches the ACT-SLX Configuration Tool for ARIES-SLX control units that have MCB firmware version 2.0.0 and SLC firmware version 1.1.6 (for SLCs located on the MCB).
3. Click <Documentation> to access technical manuals and user guides for the specific control unit and MCB/SLC firmware versions.

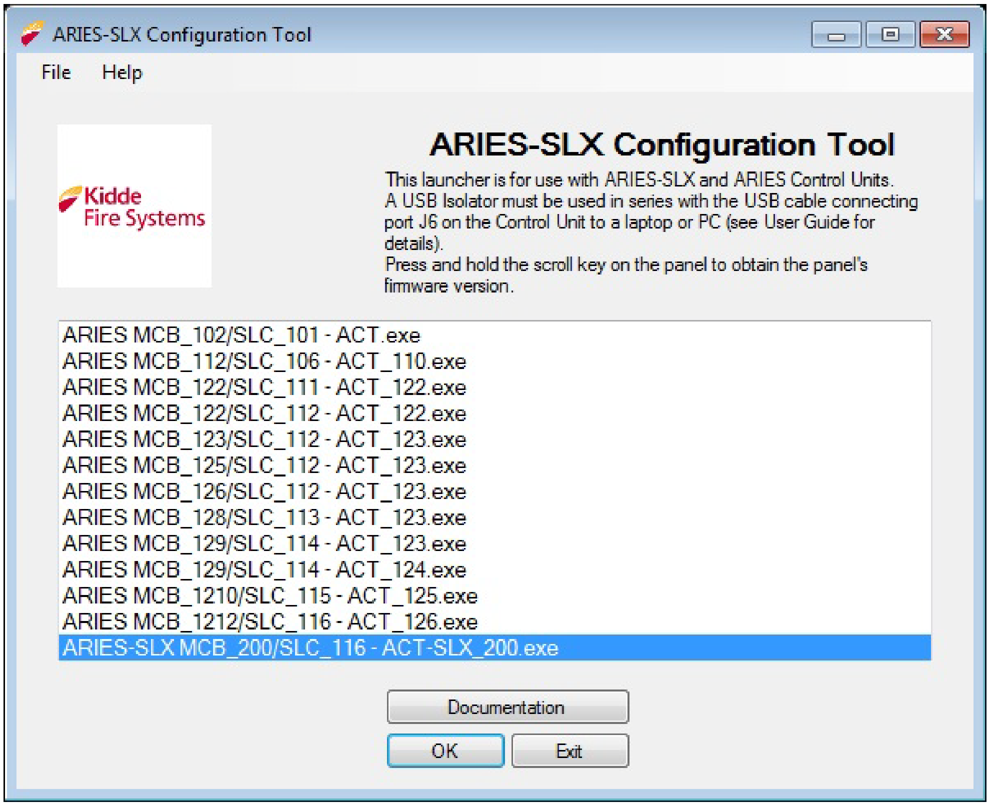

Figure 1-6. Select Firmware Version Screen

The ACT-SLX Welcome Screen displays next:

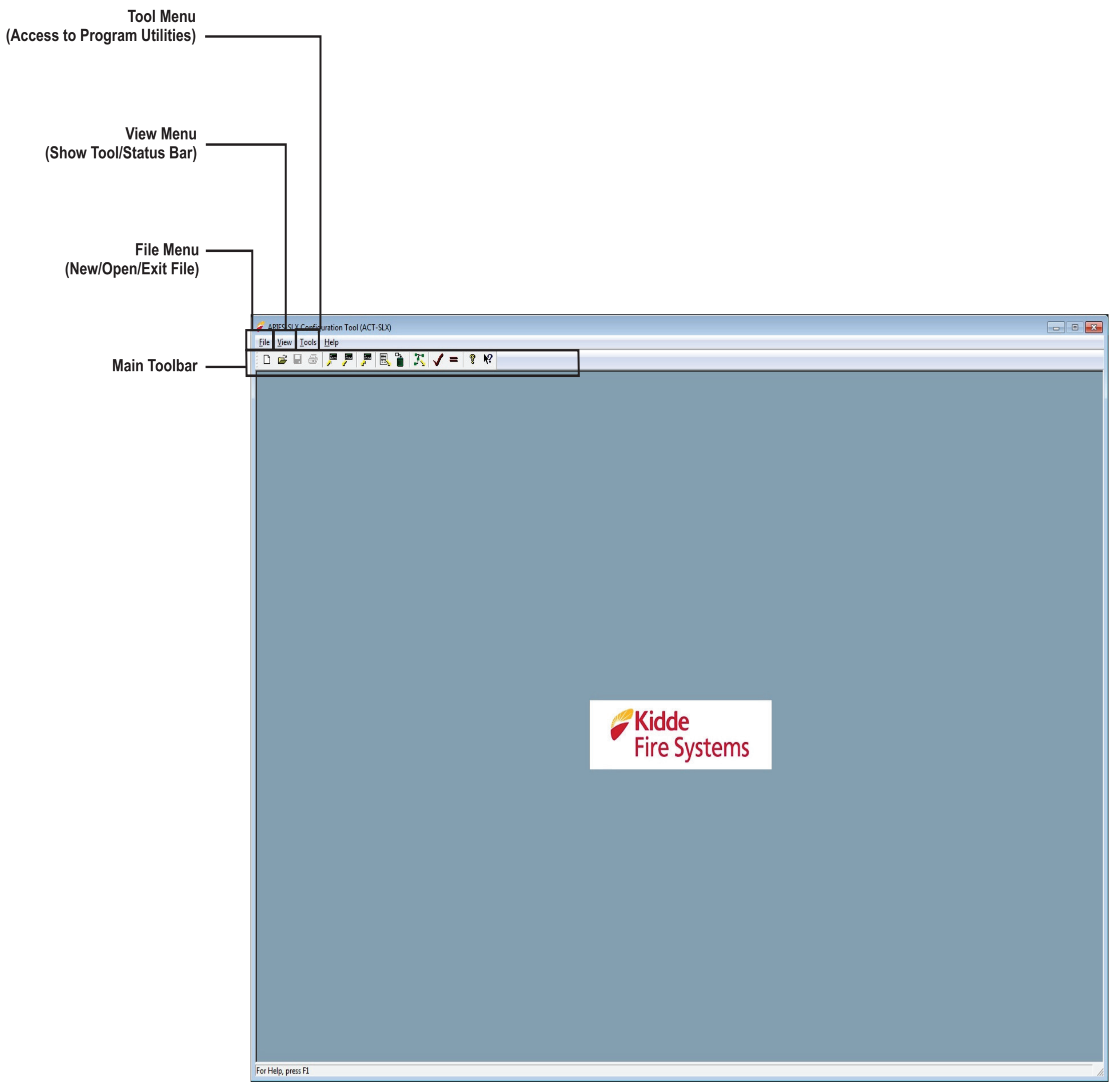

Figure 1-7. Main Screen

Figure 1-8 defines each of the icons located on the toolbar on the Main Screen (Figure 1-7). The operation of the toolbar icons is described in Chapter 4.

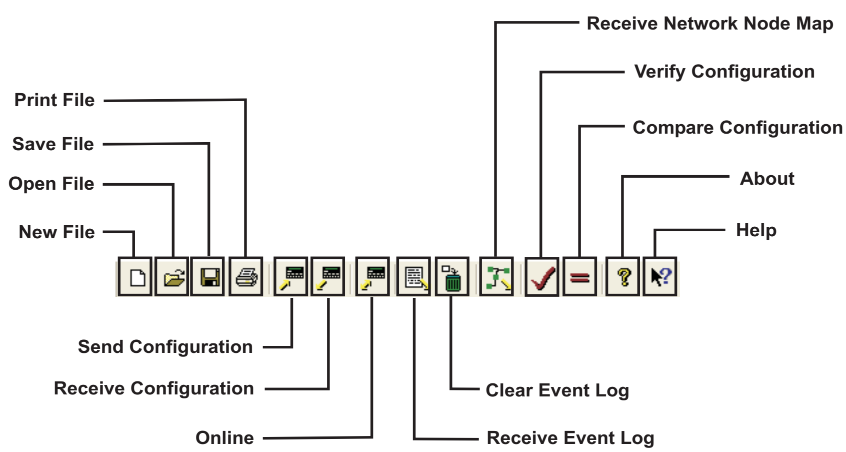

Figure 1-8. Toolbar Icon Definitions

1-5 INSTALLING THE USB DRIVER FOR CONNECTION TO CONTROL UNIT

The computer with ACT-SLX installed cannot communicate via USB with the control unit until a USB driver has been installed. Instructions to install a USB driver are listed below. For proper installation, the computer must be equipped with Microsoft Windows XP, 7, or 8.1.

Note: If you've installed a prior version of the driver, perform the steps in the section entitled: "Section 1-5.3, *Uninstalling the Prior Version of the USB Driver*". Then proceed with this section below.

Note: If you're running Windows 8.1, you should perform the steps in the section entitled: "Section 1-5.5, *Digital Signature Check on Windows 8.1*", then proceed with this section below.

1-5.1 Installing USB Drivers for ACT-SLX on Microsoft Windows XP, 7, or 8.1

1. With the ACT-SLX software installed on your computer, use Windows Explorer to locate the USB driver by browsing to the location where the ACT-SLX software was installed. Example: C:\Kidde Fire Systems\ARIES-SLX Configuration Tool (ACT-SLX)\Data\Drivers
2. Locate the compressed USB driver file that has a name which corresponds to your computer hardware and operating system. For example, the "SLIC_WIN8_64" driver is for a 64-bit computer running Windows 8.1.
3. Extract the contents of the compressed driver file to a temporary folder that you create. For example: C:\Temp\SLIC. **Make a note of the folder location for later use.**

Note: It is recommended that all devices attached to your computer are installed properly (i.e. no yellow exclamation marks are next to any devices in Device Manager).

4. Power on the ARIES-SLX control unit and, after 30 seconds, connect it to your computer using an USB A-to-B type cable.
5. Windows may attempt to automatically install the driver but will not be successful. When it fails or, if it does not attempt to automatically install the driver, open the Device Manager.
6. In Device Manager, locate the entry under "Other devices" entitled "Unknown device". If there are multiple such entries, follow the instructions in the next step to find the correct one. Otherwise, skip the next two steps.
7. To identify the correct "Unknown device", right-click on the device, and select "Properties". Click on the "Details" tab and from "Property", select "Hardware IDs".The correct device will have the following value: "USB\VID_045B&PID_0020&REV_0100"
8. If you cannot find an entry that has the proper values (specified in the prior step), then either you have: 1) a prior version of the driver installed, or 2) you should unplug, reboot your computer, and replug the USB cable and see if the entry shows up. If the latter doesn't work: perform the steps in the section entitled: "Section 1-5.3, *Uninstalling the Prior Version of the USB Driver*", and then restart this section.
9. With the correct "Unknown device" identified, right-click on it, and select "Properties".
10. Select the Driver tab, and click "Update Driver...".
11. An "Update Driver Software" screen opens. Click "Browse my computer for driver software".
12. Click the <Browse> button and go to the location that the extracted USB driver file was saved to in Step 3. Click <Next>.
13. Windows will prompt you to proceed. Click "Install this driver software anyway".

14. At the end of the installation, you should see a prompt indicating that "Windows has successfully updated your driver software". Click <Close> to close Device Manager. If installation fails, please consult Kidde Technical Support.
15. Reboot your computer after installing the driver.
16. To validate that the drivers are installed properly, perform the steps in the section entitled: "Section 1-5.2, *Verifying the Installation of the USB Drivers*".

1-5.2 Verifying the Installation of the USB Drivers

1. With the ARIES-SLX control unit powered on and connected to your computer with the USB cable, open Device Manager.
2. Expand the "Ports (COM & LPT)" entry.
3. If you see a "SLIC (COM##)" entry without a yellow exclamation point, the driver is installed properly. Skip the following steps.
4. If you don't see a "SLIC (COM##)" entry, expand the "Other devices" entry to see if there is an "Unknown device" entry. If there is not, remove the USB cable and reboot your computer. After rebooting, reconnect the USB cable, open Device Manager, and see if either "SLIC (COM##)" or "Unknown device" appears. If it does not appear, you likely have a prior version of the driver installed. Follow the instructions in the section entitled "Section 1-5.3, *Uninstalling the Prior Version of the USB Driver*".
5. If you see an "Unknown Device" entry under "Other devices," follow the steps in the section entitled "Section 1-5.1, *Installing USB Drivers for ACT-SLX on Microsoft Windows XP, 7, or 8.1*", and then repeat this section.
6. If you see a "SLIC (COM##)" entry with a yellow exclamation mark next to it, then the driver isn't installed properly. **A yellow exclamation mark indicates an error with the driver installation**. Follow the instructions in the sections entitled: "Section 1-5.4, *Uninstalling the USB Driver*", "Section 1-5.1, *Installing USB Drivers for ACT-SLX on Microsoft Windows XP, 7, or 8.1*", and then repeat this section.

WARNING

The following steps must be followed precisely and in order. It is recommended that a Computer Specialist perform or be available while these steps are being performed. If you have any questions, please contact Kidde Fire Systems Technical Support.

1-5.3 Uninstalling the Prior Version of the USB Driver

1. Using Windows Explorer, locate all temporary folders created to receive the decompressed USB driver files. Remove these folders and the driver files they contain.
2. Disconnect the USB cable between the control unit and your computer.
3. Open a command prompt with Administrator privileges.
4. Type "set devmgr_show_nonpresent_devices=1", and hit enter.
5. Type "start devmgmt.msc", and hit enter. This will open Device Manager.
6. Inside Device Manager select "View>Show Hidden Devices".
7. Locate the "Ports (COM & LPT)" item, and expand it.
8. You will see quite a few entries. For each entry that contains "SLIC Driver (COM##)," follow the instructions in the next step.
9. Select the entry, right-click it, and select <Uninstall>. Check the box that says "Delete the driver software for this device.", and click <OK>. The driver is now uninstalled.
10. Reboot your computer and follow the instructions in the section entitled: "Section 1-5.1, *Installing USB Drivers for ACT-SLX on Microsoft Windows XP, 7, or 8.1*".

1-5.4 Uninstalling the USB Driver

1. With your computer connected to the control unit using the USB cable, open the Device Manager.
2. Locate "Ports (COM & LPT)", and expand it.
3. Locate the "SLIC (COM##)" entry and right-click on it.
4. Select "Uninstall".
5. If you can't locate the entry, select each entry under "Ports (COM & LPT)" one at a time, right-click each, and select "Properties".
6. Click on the "Details" tab, then select "Hardware IDs" from the Property pulldown menu.
7. The correct value for the SLIC USB driver is: "USB\VID_045B&PID_0020&REV_0100"
8. When you find the port with the correct Hardware ID, click on the "Driver" tab, and click the "Uninstall" button.
9. When the dialog box appears, check the box that says "Delete the driver software for this device.", and click <OK>. The driver is now uninstalled. Close Device Manager.

1-5.5 Digital Signature Check on Windows 8.1

Note: Windows 8 is not supported. Please install the update to Windows 8.1, and then continue with this section.

1. While holding the "Shift" key down, click "Restart".
2. Once your computer has rebooted, select "Troubleshoot", then "Advanced Options", and "Startup Settings".
3. Finally, click on "Restart".
4. After the computer restarts, select option 7.
5. If you performed this section, after leaving another section, go back and repeat the steps in that other section.

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CHAPTER 2
CREATING A SYSTEM APPLICATION

2-1 INTRODUCTION

The tasks required to create an ACT-SLX application are as follows:

- Assign an address and define the operating characteristics for each device on the signaling-line circuit (SLC).
- Define the operating characteristics for each on-board output circuit.
- Identify and assign an address to all associated peripheral components such as Remote Display and Control Modules (RDCM) and Annunciator Terminal Modules (ATM).
- Indicate whether or not an Intelligent Interface Module (IIM) will be used
- Assign a network node address and define the operating characteristics of the control unit in a networked system (if applicable).
- Create the required initiating device to output circuit/device relationships via Event Output Control (EOC). These relationships must be created for all initiating devices and outputs associated with each ARIES®-SLX system. In addition, all inter control unit initiating device to output circuit/device relationships for networked systems must be defined in the EOC of the affected control units. EOC configuration is described in Chapter 3.

Note: All alarm events must be annunciated by public-mode notification.

The following requirements apply to special extinguishing systems:

- The pre-alarm state must be annunciated by distinctive public mode notification.
- The pre-release state must be annunciated by public mode notification different from the pre-alarm state public notification mode.
- The release state must be annunciated by public mode notification different from both the pre-alarm state and the pre-release public notification modes.

Each task is invoked via a tab-control selection. Figure 2-1 gives a definition of the tabs and the paragraph numbers in which information for each tab can be found.

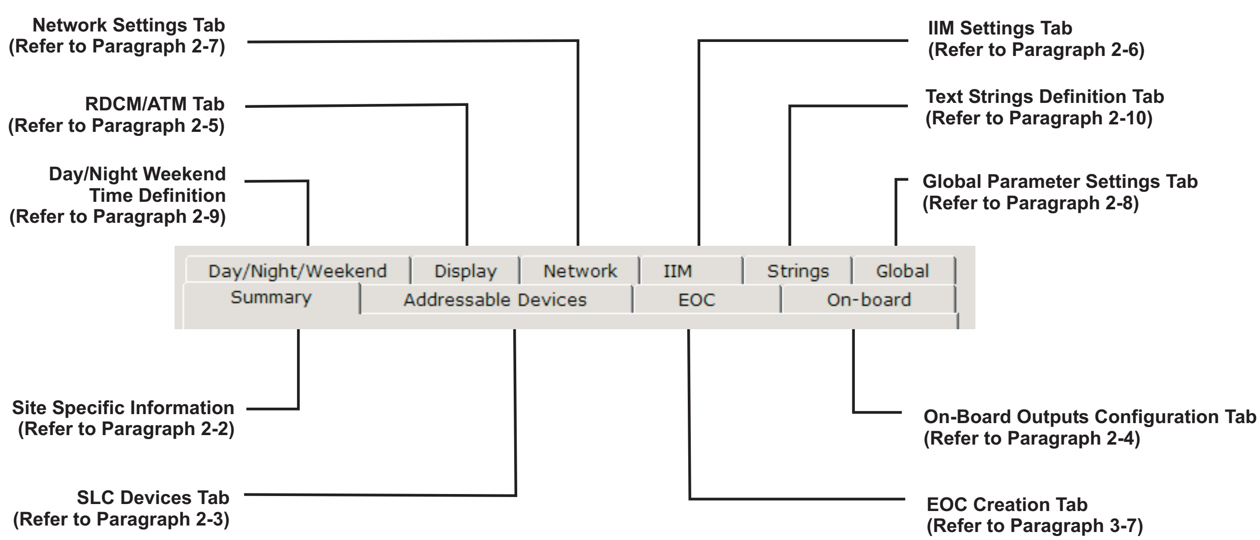

Figure 2-1. Definition of Tabs

2-1.1 Before You Begin - Version Compatibility

The configuration software version must match the control unit software version in the first two digits. For example, if the control unit version is 1.2.0, the configuration software version must be 1.2.*x* where '*x*' is 0 to 9. It is possible to open files saved with an older version of the program.

Note: It is not possible to communicate with or open saved configuration files for a control unit version that is newer than the configuration software version.

ACT-SLX software is currently at version 2.0.0.

2-2 CREATE A NEW FILE OR OPEN AN EXISTING FILE (SUMMARY TAB)

- To create a new file: Select **File>New** or select the New File Icon on the toolbar ( ); Figure 2-2 displays.
- To open an existing file: Select **File>Open** or select the Open File Icon on the toolbar ( ). Select a file and click on **<Open>**; Figure 2-2 displays.

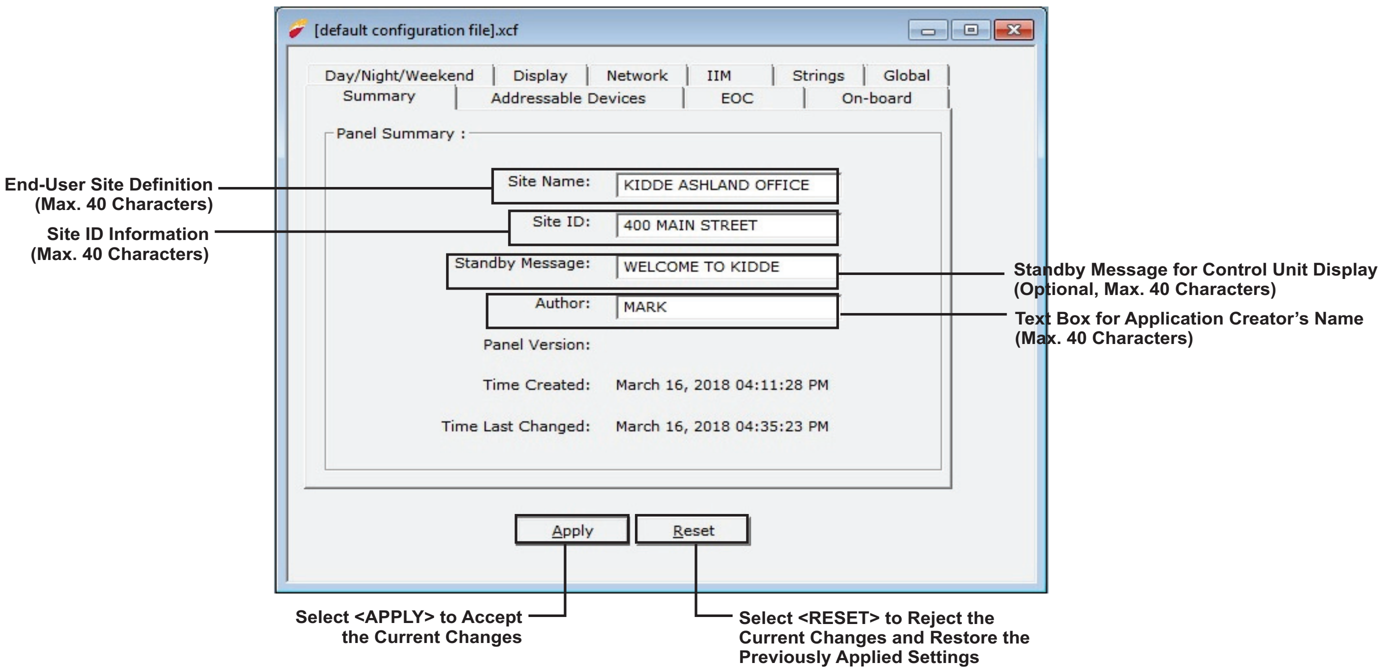

Figure 2-2. Summary Screen

2-3 CONFIGURING SLC DEVICES (ADDRESSABLE DEVICES TAB)

1. Select the "Addressable Devices" tab; Figure 2-3 displays.

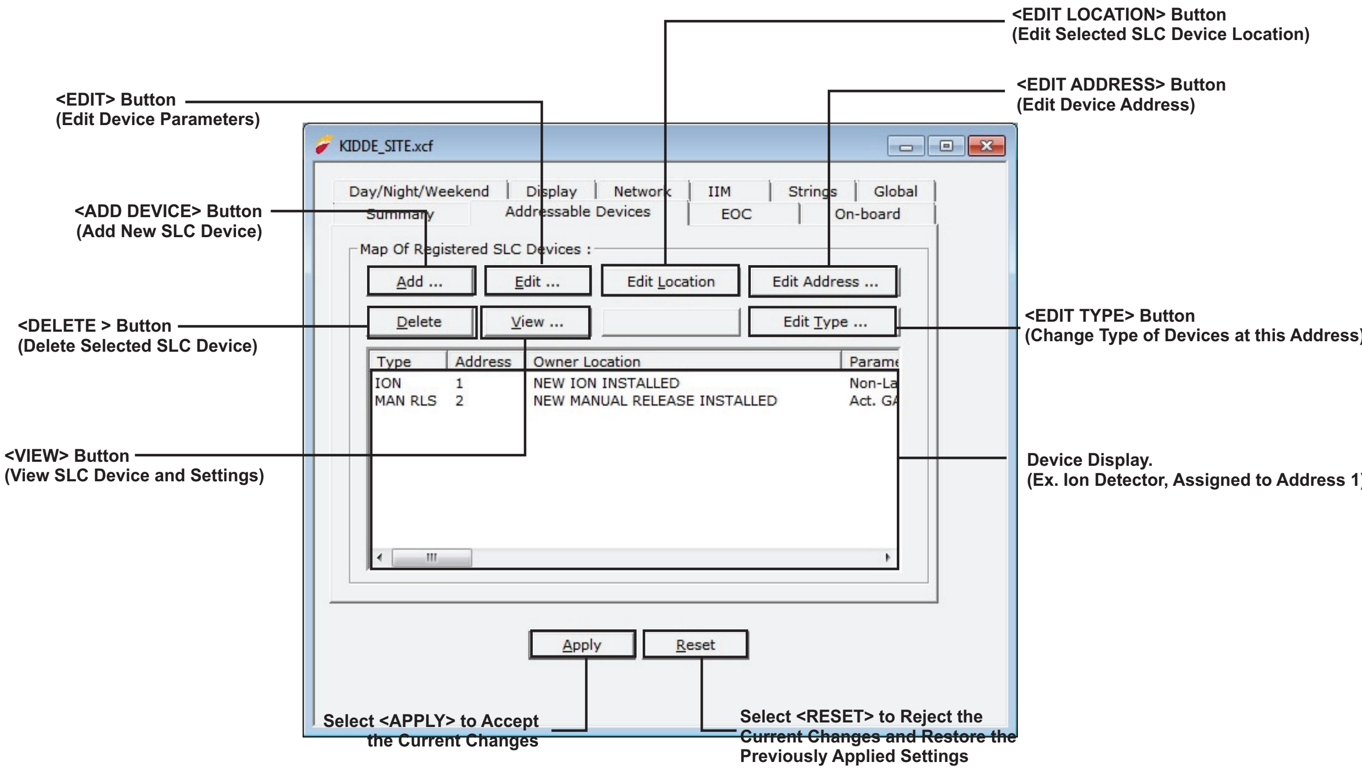

Figure 2-3. Addressable Devices Screen

2. Select the **<Add Devices>** button; Figure 2-4 displays.

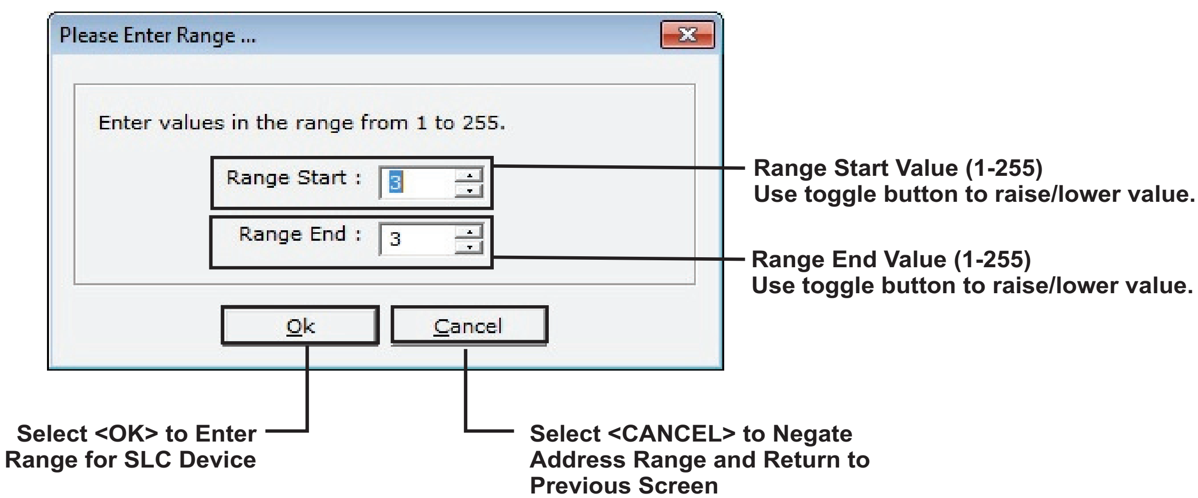

Figure 2-4. SLC Address Box Screen

3. Enter the starting and ending device address(es), then select **<OK>**. Figure 2-5 displays showing the list of SLC devices.

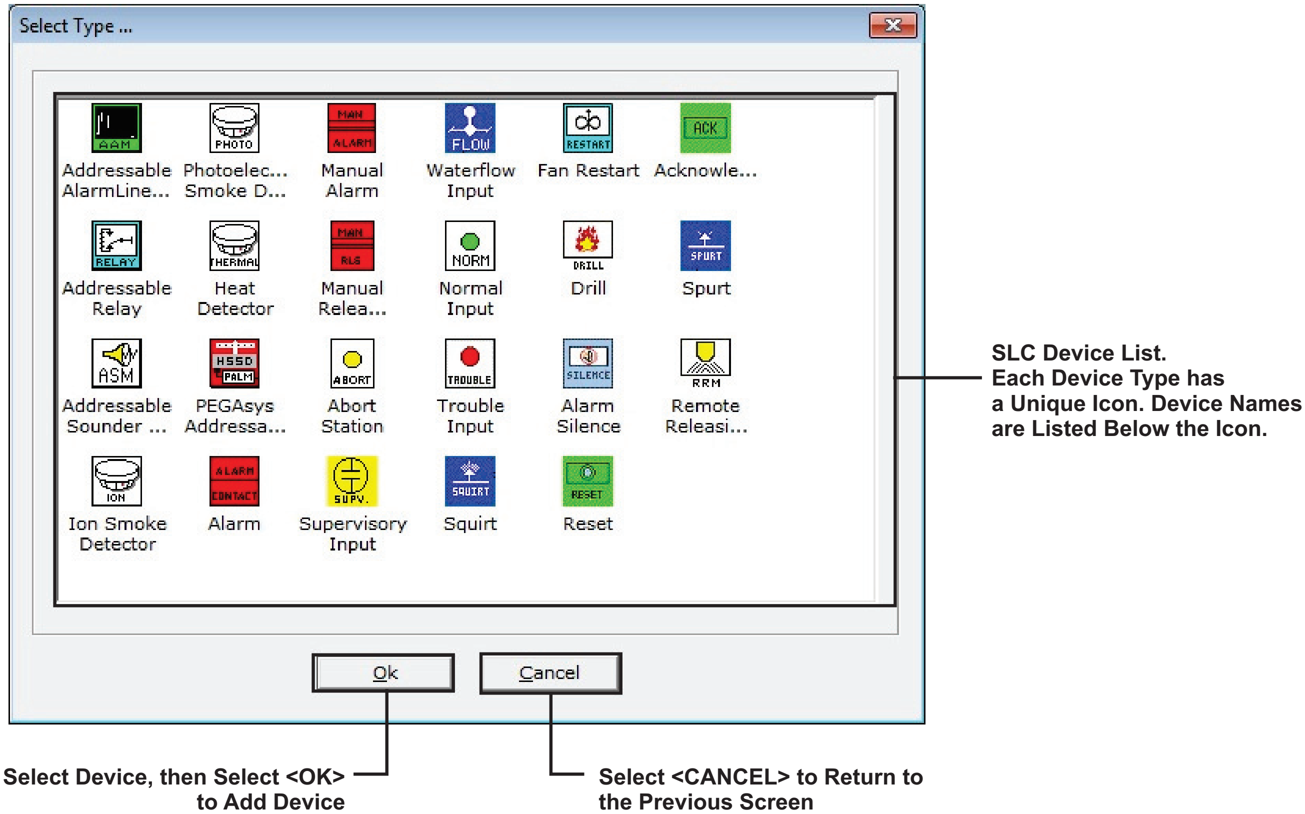

Figure 2-5. SLC Device List

4. Select the appropriate device by either highlighting the icon of the device, then selecting **<OK>**, or double-clicking on the icon. The appropriate screen for that device displays. Paragraphs 2-3.1 through 2-3.21 give detailed information about each device. See Table 2-7 for an explanation of the configurable parameters found in the SLC device screens.

2-3.1 Addressable AlarmLine™ Module (AAM) Screen

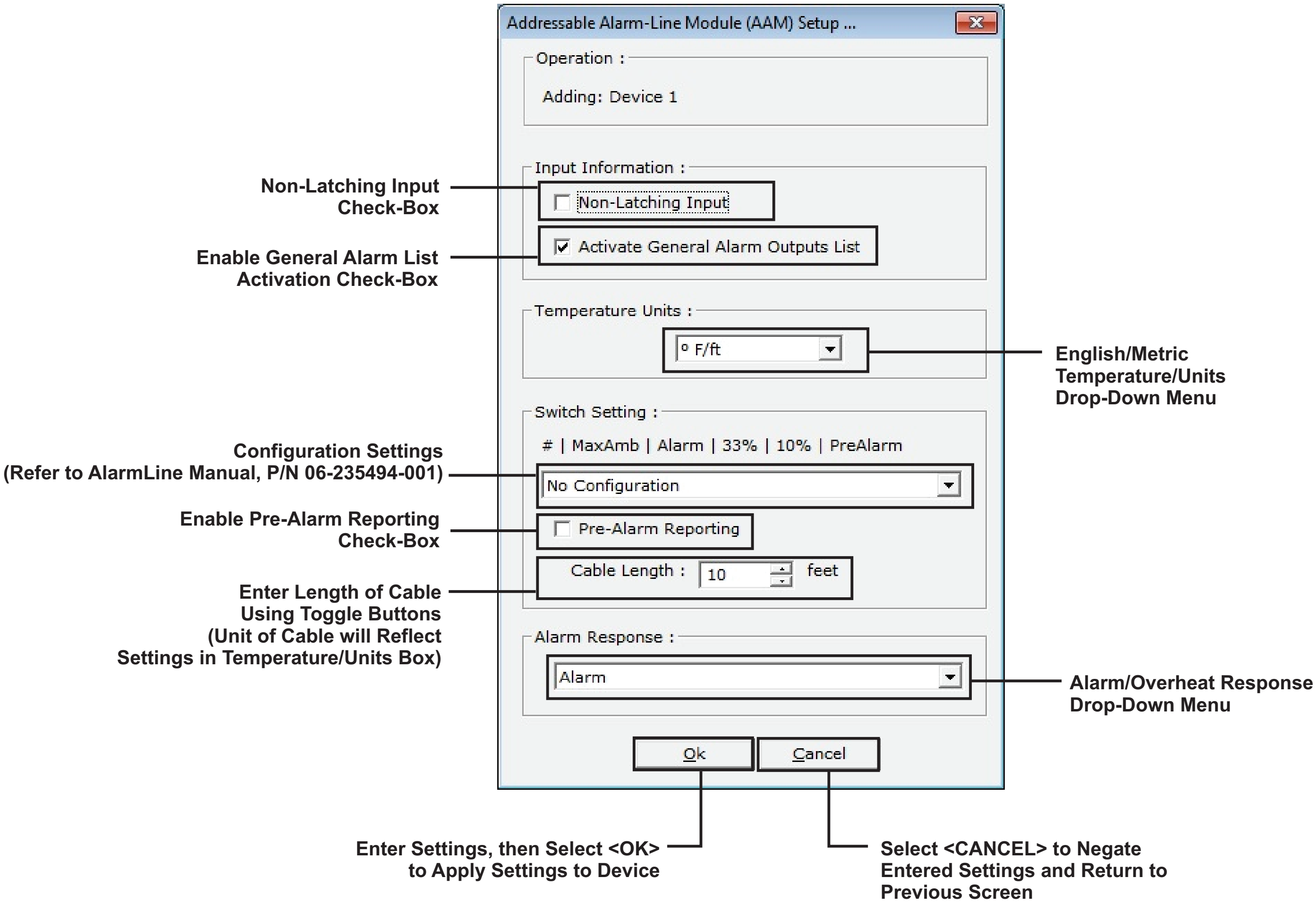

Figure 2-6. Addressable AlarmLine Module Screen

Note: The AAM initiates an “Overheat” message on the control unit display when it is configured for an "Overheat" response. The control unit buzzer sounds, but no LEDs illuminate.

2-3.2 Addressable Relay (AO) Screen

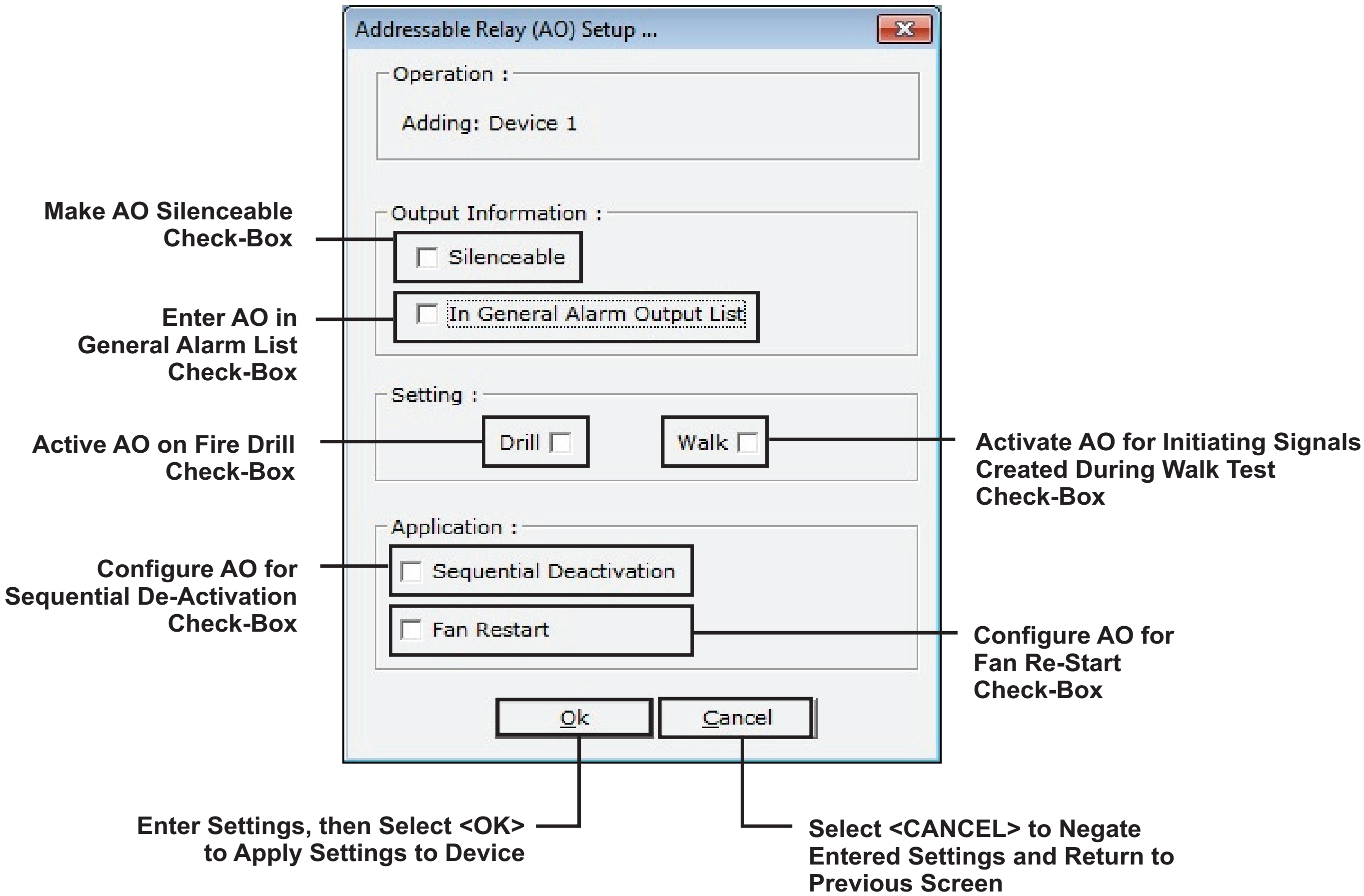

Figure 2-7. Addressable Relay (AO) Screen

Note: Multiple AOs configured for "Sequential De-Activation" have a delay of up to 15 seconds between successive de-activations. The delay interval is set in the "Globals" tab. Up to 16 AOs can be programmed for sequential de-activation.

An AO configured for "Fan Re-Start" only de-activates after the ARIES-SLX Control Unit is reset following an alarm condition and after an AI Monitor Module configured for "Fan Re-Start" is activated.

2-3.3 Addressable Signal Module Screen

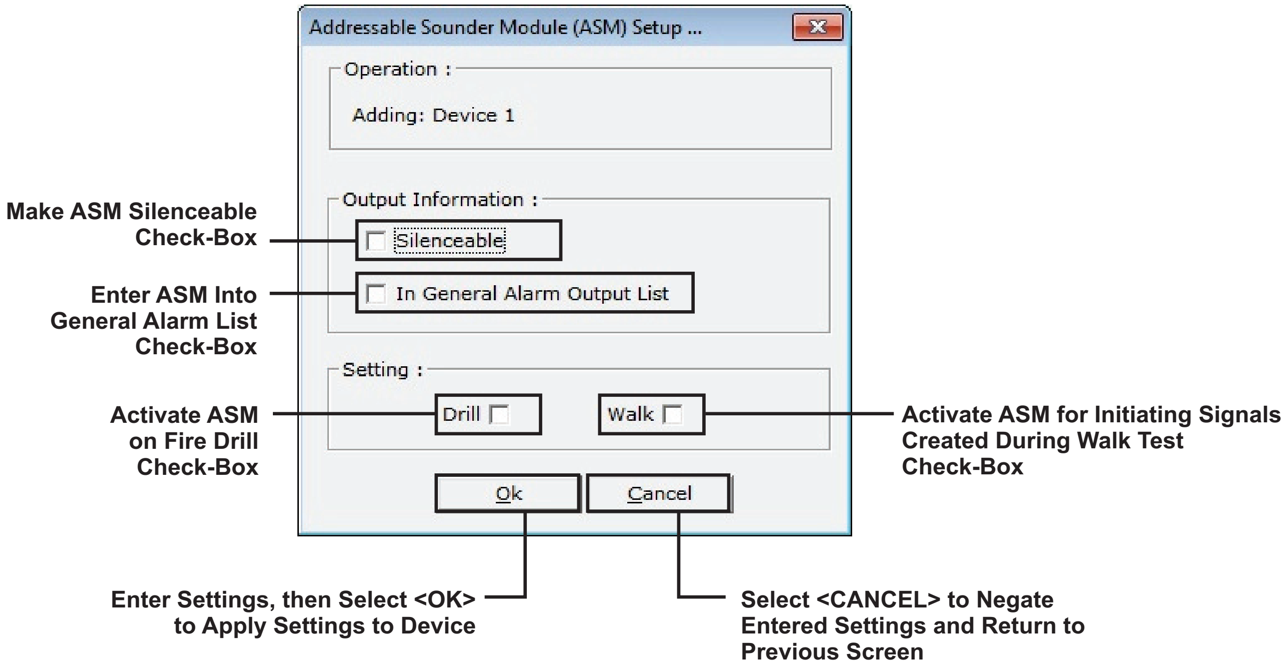

Figure 2-8. Addressable Signal Module (ASM) Screen

2-3.4 Model CPD-7052 Ionization Smoke Detector Screen

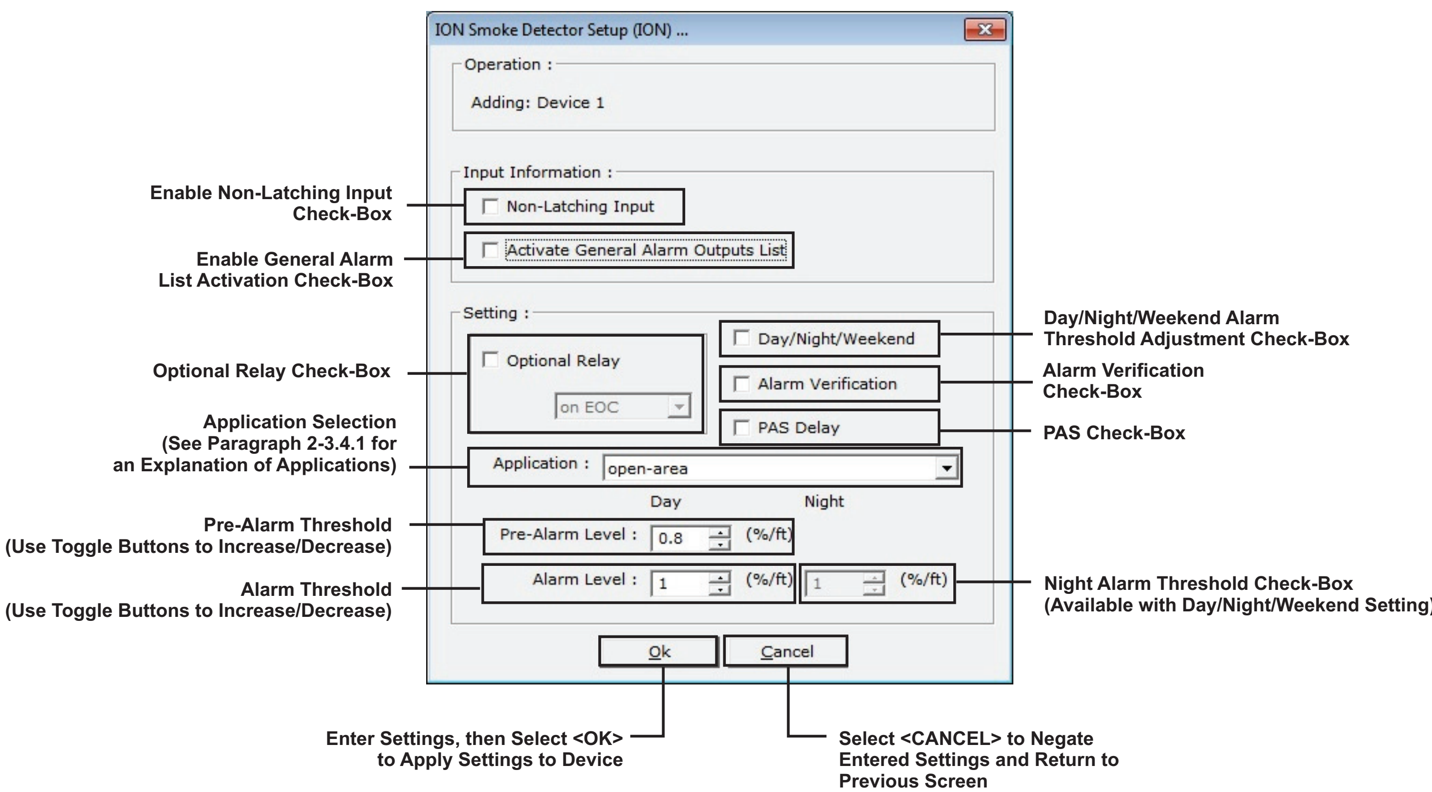

Figure 2-9. Module CPD-7052 Ionization Smoke Detector Screen

2-3.4.1 APPLICATION DEFINITIONS VIA DROP-DOWN MENU

- **Open-area.** The CPD-7052 ionization detector is UL Listed and FM Approved for alarm reporting anywhere within the obscuration range of 0.5 to 1.5 percent per foot when used for an open-area application. Alarm thresholds can be set in 0.1 percent-per-foot increments. A pre-alarm threshold can also be set anywhere within the obscuration range of 0.5 to 1.4 percent per foot, but must be less than the detector's alarm threshold.
- **In-Duct.** The In-Duct setting refers to detector placement in an air duct. The pre-alarm/alarm ranges for this special application are listed in Table 2-1.
- **DH-2000.** The DH-2000 setting refers to detector placement in a DH-2000 Duct Housing with associated sampling tubes to monitor the air in either a supply- or return-air duct. The pre-alarm/alarm ranges for this special application are listed in Table 2-1.

Table 2-1. Model CPD-7052 Ionization Smoke Detector Pre-Alarm/Alarm Ranges

Application	Pre-Alarm/Alarm Range (%/foot)
In-Duct	0.5 - 1.0
DH-2000	0.5 - 1.0

- **Day/Night/Weekend Setting.** Ionization detectors can be automatically programmed to change alarm thresholds by time of day if they are configured for day/night/weekend operation. The night alarm thresholds must be less than or equal to the corresponding day thresholds.
- **Supervisory Service (Open-Area).** The ionization detector can also be programmed to report a supervisory condition anywhere within the obscuration range of 0.5 to 1.5 percent per foot when used in an open-area application. Supervisory alarm thresholds can be set in 0.1 percent-per-foot increments.
- **Supervisory Service (DH-2000/In-Duct).** The DH-2000/In-Duct range refers to detector placement in a DH-2000 Duct Housing with associated sampling tubes to monitor the air in either a supply- or return-air duct or to detector placement directly in an air duct. The supervisory alarm range for these special applications is 0.5 to 1.0 percent per foot.

Table 2-2. CPD-7052 Ionization Detector Supervisory Alarm Range

Application	Alarm Range (%/foot)
Open-Area	0.5 - 1.5
DH-2000/In-Duct	0.5 - 1.0

2-3.5 Model PSD-7152 Photoelectric Smoke Detector Screen

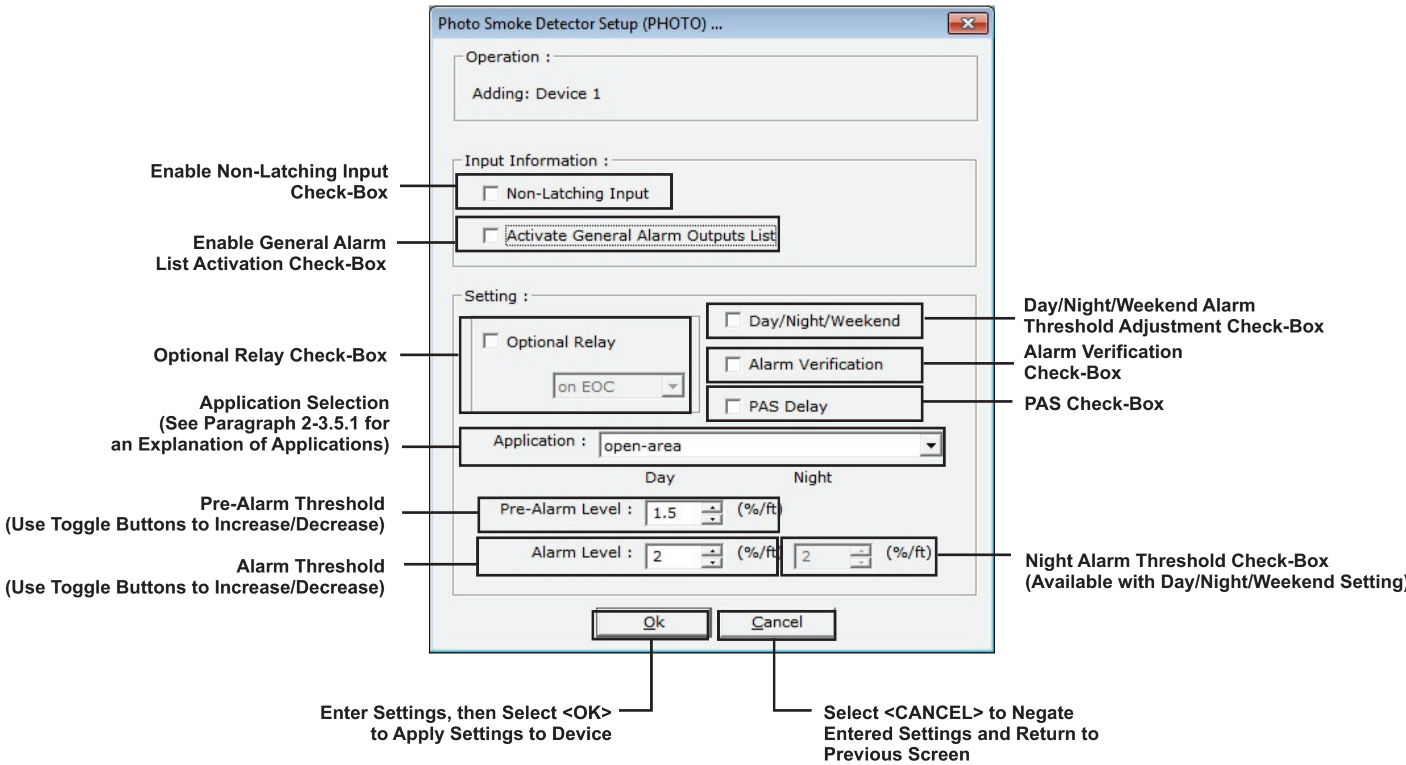

Figure 2-10. Model PSD-7152 Photoelectric Smoke Detector Screen

2-3.5.1 APPLICATION DEFINITIONS VIA DROP-DOWN MENU

- **Open Area.** The PSD-7152 photoelectric detector is UL Listed and FM Approved for alarm reporting anywhere within the obscuration range of 0.5 to 3.5 percent per foot when used for an open-area application. Alarm thresholds can be set in 0.1 percent-per-foot increments. A pre-alarm threshold can also be set anywhere within the obscuration range of 0.2 to 3.4 percent per foot, but must be less than the detector's alarm threshold.
- **In-Duct.** The In-Duct setting refers to detector placement in an air duct. The pre-alarm/alarm ranges for this special application are listed in Table 2-3.
- **DH-2000.** The DH-2000 setting refers to detector placement in a DH-2000 Duct Housing with associated sampling tubes to monitor the air in either a supply- or return-air duct. The pre-alarm/alarm ranges for this special application are listed in Table 2-3.

Table 2-3. Model PSD-7152 Photoelectric Smoke Detector Pre-Alarm/Alarm Range

Application	Pre-Alarm Range (%/ft.)	Alarm Range (%/ft.)
In-Duct	0.2 - 1.9	0.5 - 2.0
DH-2000	0.2 -1.9	0.5 - 2.0

- **Day/Night/Weekend Setting.** PSD-7152 photoelectric detectors can be automatically programmed to change alarm thresholds by time of day if they are configured for day/night/weekend operation. The night alarm thresholds must be less than or equal to the corresponding day thresholds.

- **Supervisory Service (Open-Area).** The PSD-7152 photoelectric detector can also be programmed to report a supervisory condition anywhere within the obscuration range of 0.5 to 3.5 percent per foot when used in an open-area application. Supervisory alarm thresholds can be set in 0.1 percent-per-foot increments.
- **Supervisory Service (DH-2000/In-Duct).** The DH-2000/In-Duct range refers to detector placement in a DH-2000 Duct Housing with associated sampling tubes to monitor the air in either a supply- or return-air duct or to detector placement directly in an air duct. The supervisory-alarm range for this special application is 0.5 to 2.0 percent per foot.

Table 2-4. PSD-7152 Photoelectric Smoke Detector Supervisory Alarm Range

Application	Supervisory Alarm Range
Open-Area	0.5-3.5
DH-2000/In-Duct	0.5-2.0

2-3.6 Model DS-PS Photoelectric Smoke Detector Screen

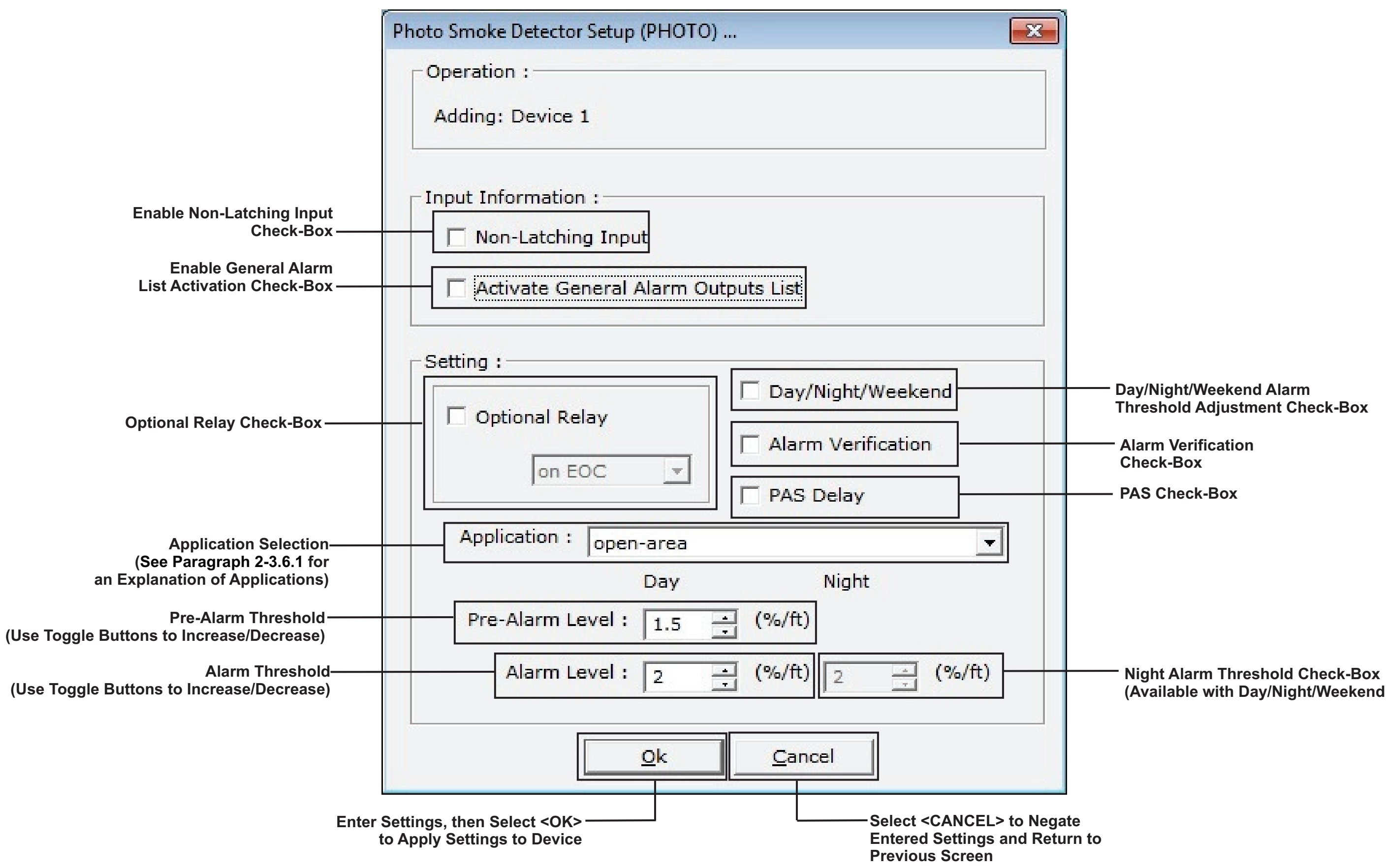

Figure 2-11. Model DS-PS Smoke Detector Screen

2-3.6.1 APPLICATION DEFINITIONS VIA DROP-DOWN MENU

- **open-area.** The DS-PS photoelectric detector is UL Listed and FM Approved for alarm reporting anywhere within the obscuration range of 0.9-3.5 percent per foot when used for an open-area application. Alarm thresholds can be set in 0.1 percent-per-foot increments. Alarm default value is 2.0 percent per foot.
  A Pre-Alarm threshold can also be set anywhere within the obscuration range of 0.7 to 3.4 percent per foot, but must be less than the detector's alarm threshold. Pre-Alarm default value is 1.5 percent per foot.
- **in-duct.** The In-Duct setting refers to detector placement in an air duct. 0.7 to 1.9 percent per foot is recommended for In-Duct use.

Table 2-5. DS-PS Photoelectric Smoke Detector Pre-Alarm, Alarm, Night Ranges

Application	Pre-Alarm Range (%/foot)	Alarm Range (%/foot)	Night Range (%/foot)
Open Area	0.7 to 3.4	0.9 to 3.5	0.9 to 3.5
In-Duct	0.7 to 1.9	0.9 to 2.0	0.9 to 2.0
Supervisory Service (Open-Area)	0.7 to 3.4	0.9 to 3.5	0.9 to 3.5
Supervisory Service (In-Duct)	0.7 to 1.9	0.9 to 2.0	0.9 to 2.0

- **Day/Night/Weekend Setting.** Photoelectric detectors can be automatically programmed to change alarm thresholds by time of day if they are configured for day/night/weekend operation. The night alarm thresholds must be less than or equal to the corresponding day thresholds.
- **Supervisory Service (Open-Area or In-Duct).** The photoelectric detector can also be programmed to report a supervisory condition anywhere within the obscuration range of 0.9 to 3.5 percent per foot when used in an open-area application. Supervisory alarm thresholds can be set in 0.1 percent-per-foot increments.

Note: If the installer enters a pre-alarm below 0.7% or alarm below 0.9%, the following prompt appears:

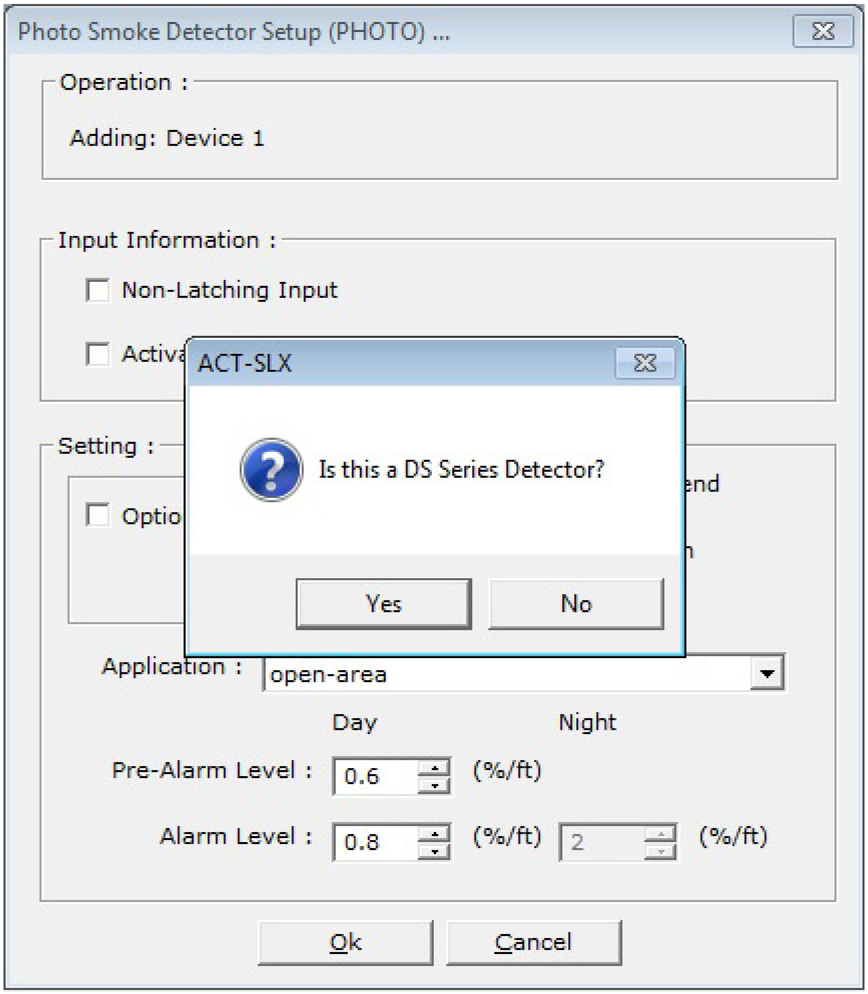

Figure 2-12. DS-PS Photoelectric Smoke Detector Screen with prompt

- Answering <**Yes**> cancels the edit dialog and sets the threshold to the lowest possible setting (for DS Series detector use).
- Answering <**No**> allows the setting and keeps the configuration edit dialog box open (for legacy detector use).

2-3.7 Model THD-7252 Heat Detector Screen

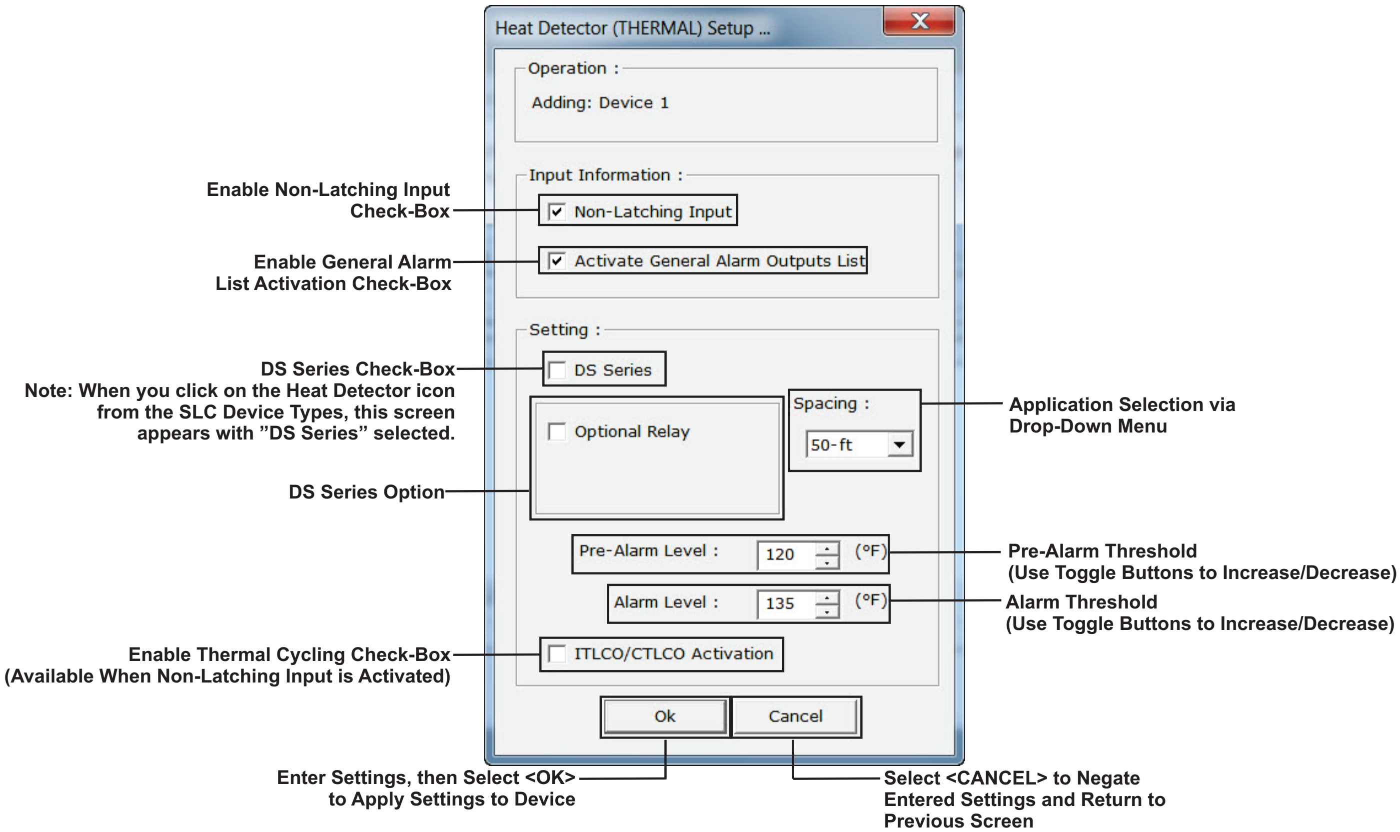

Figure 2-13. Model THD-7252 Heat Detector Screen

The THD-7252 thermal detector is UL Listed and FM Approved for alarm reporting anywhere in the range of 135°F to 155°F when used with a 50-foot spacing, or anywhere in the range of 135°F to 145°F when used with a 70-foot spacing. Alarm thresholds can be set in 1°F increments. Alarm default value is 135°F. A pre-alarm threshold can also be set anywhere within the temperature range of 80°F to 135°F, but must be less than the detector's alarm threshold. Pre-alarm default value is 120°F.

The pre-alarm/alarm ranges for the Model THD-7252 are listed in Table 2-6.

Table 2-6. THD-7252 Thermal Detector Pre-Alarm/Alarm Ranges

Spacing (ft.)	Pre-Alarm Range (°F)	Alarm Range (°F)
50	80-135	135-155
70	80-135	135-145

2-3.8 Model DS-HFS Heat Detector Screen

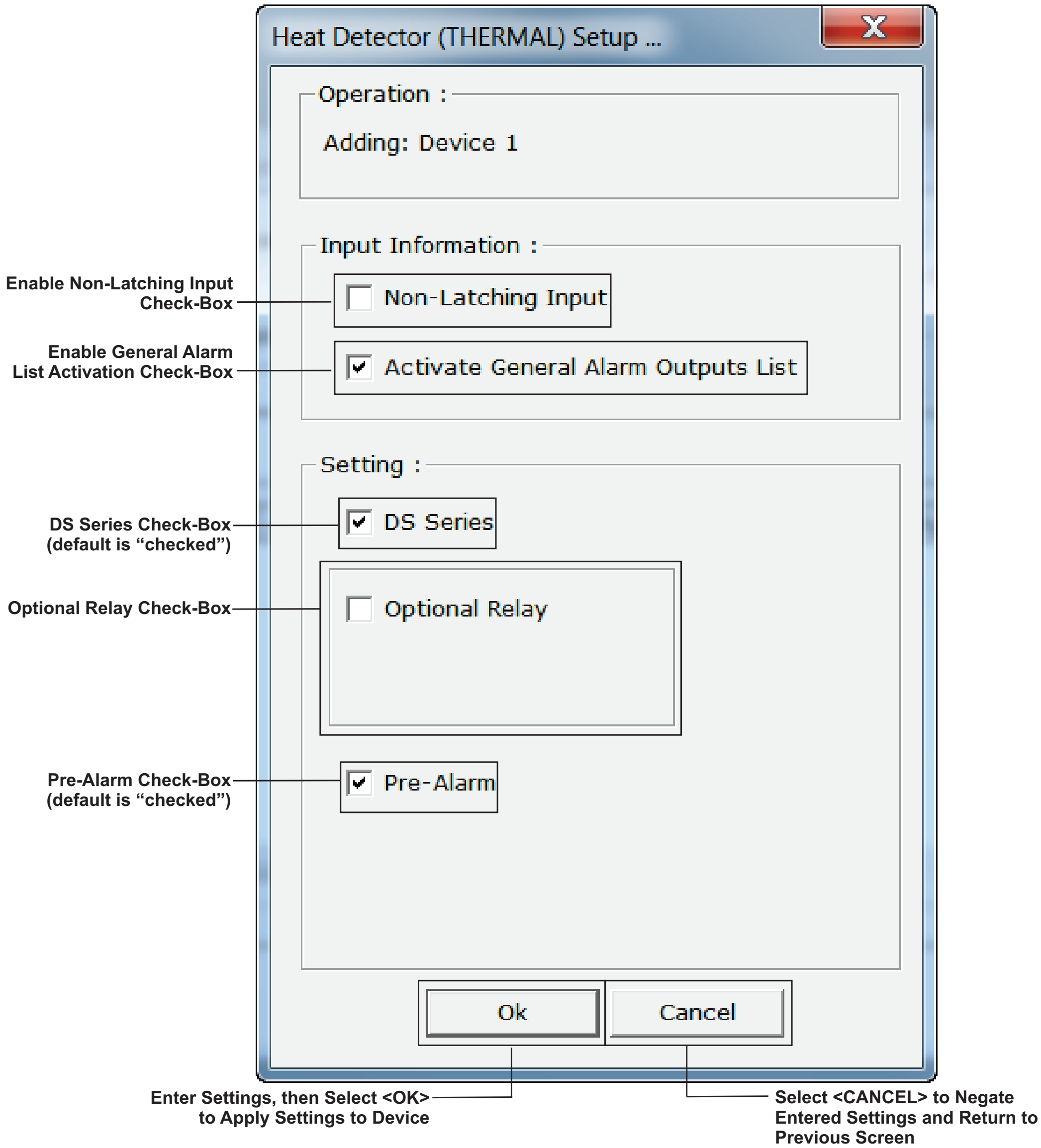

Figure 2-14. Model DS-HFS Heat Detector Screen

- The DS-HFS thermal detector is UL Listed and FM Approved for alarm reporting at 135°F. The DS-HFS does NOT have a configurable Alarm threshold.
- The Alarm value is 135°F at 50 feet spacing. Spacing at 70 feet is not permitted for a DS-HFS detector.
- If Pre-Alarm is checked, the Pre-Alarm value is set to 110°F.

2-3.9 Heat Detector Thermal Cycling

A heat detector is configurable for thermal cycling as shown in Figure 2-15. Non-Latching Input checkbox must be checked. The first alarm signal from a heat detector is used to activate control unit-based outputs for a user-configurable period of time known as the Initial Time Limit Cutoff Interval (ITLCO). The outputs silence or de-energize upon expiration of the ITLCO interval. The outputs reactivate using the ITLCO time cycle if the system has not been reset and at least one heat detector remains in the alarm state. If no heat detectors are in the alarm state when the ITLCO time expires, the programmed outputs shall deactivate. If a heat detector subsequently registers a temperature in excess of its alarm-threshold and the system has not yet been reset, the outputs reactivate. The reactivated outputs silence or deactivate again after the expiration of a second user-configurable period of time known as the Cyclical Time Limit Cutoff (CTLCO).

The outputs only cycle and reactivate if the temperature at a heat detector subsequently exceeds the detector's alarm threshold after the outputs silence or de-activate. All subsequent reactivation occur for the CTLCO duration.

Valid entries for the ITLCO and CTLCO time periods are 0 to 180 seconds or 0 to 180 minutes, configurable in either 1-second or 1-minute increments, respectively. These time periods are specified in the screens that configure the various control unit-based outputs.

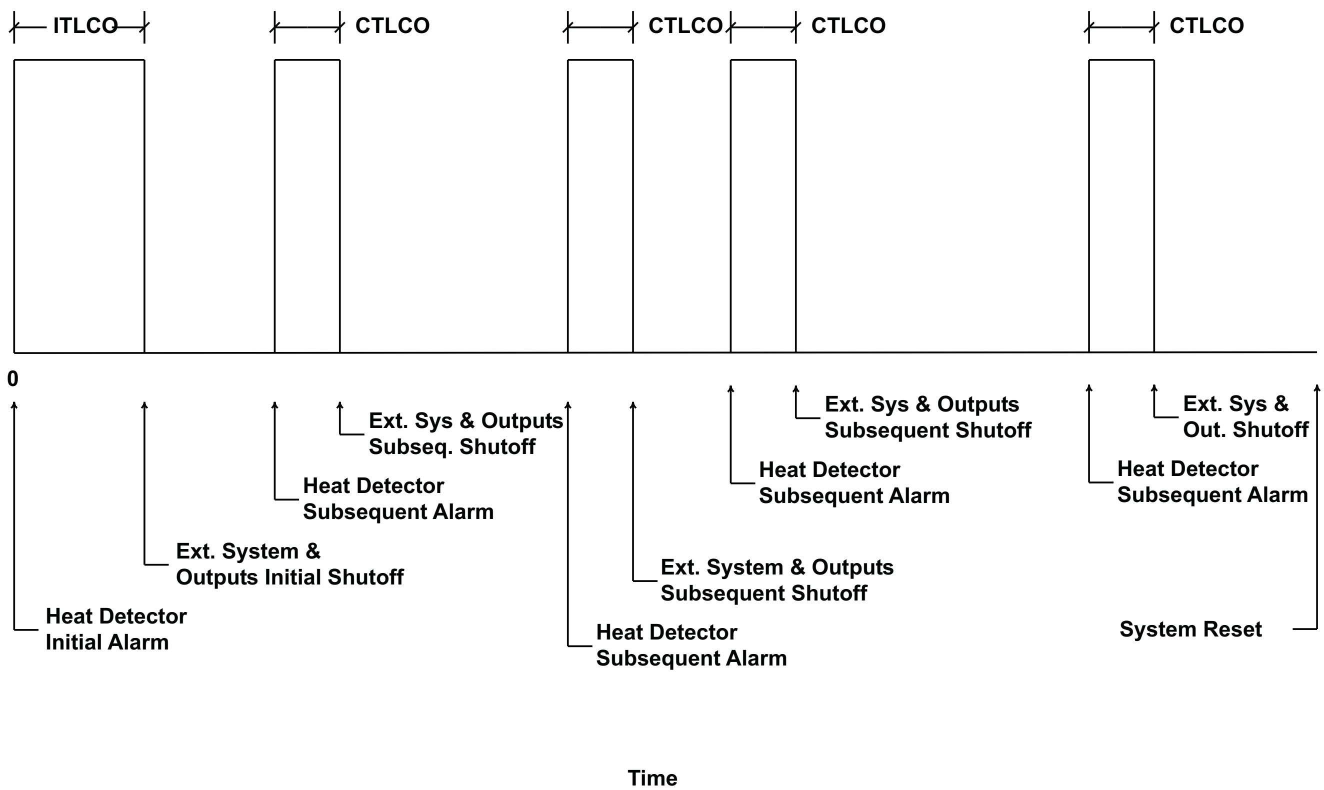

Figure 2-15. Typical Thermal Cycling System

2-3.10 PEGAsys Addressable Loop Module (PALM) Screen

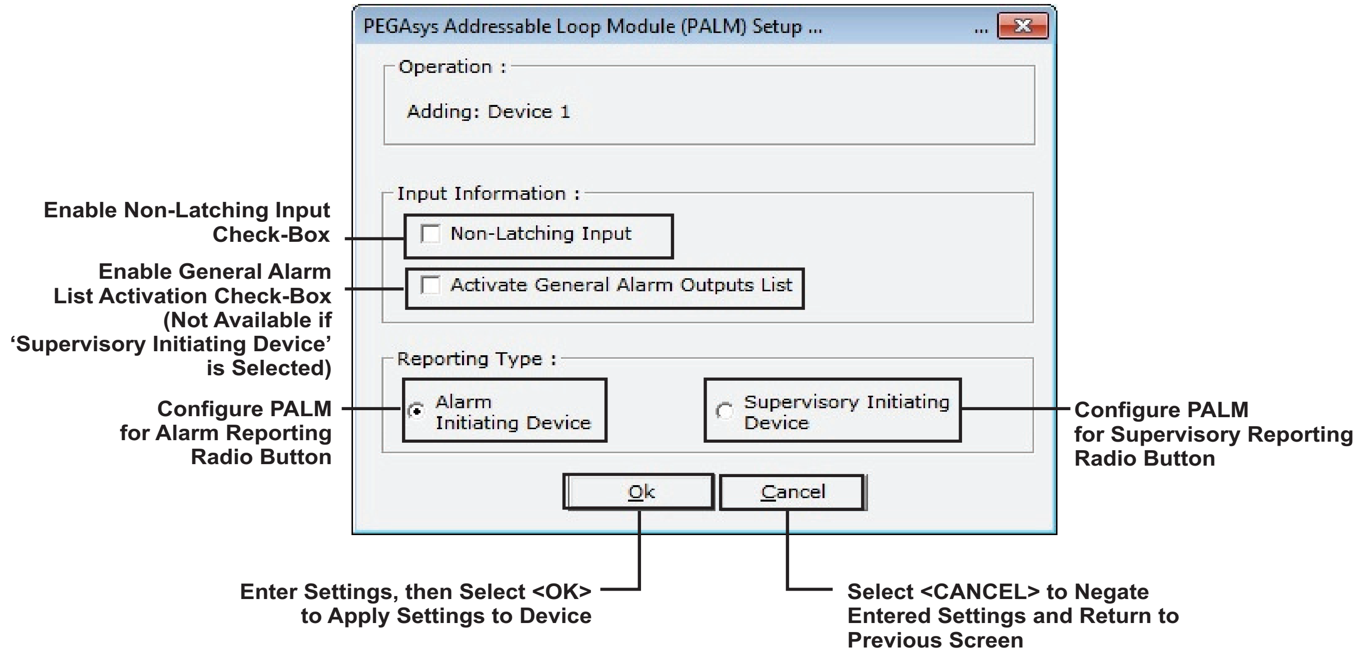

Figure 2-16. PALM Screen

2-3.11 Alarm Initiating (AI) Contact Screen

The screen to configure an Alarm Initiating (AI) Monitor Module that is monitoring an unpowered contact for alarm purposes is shown below:

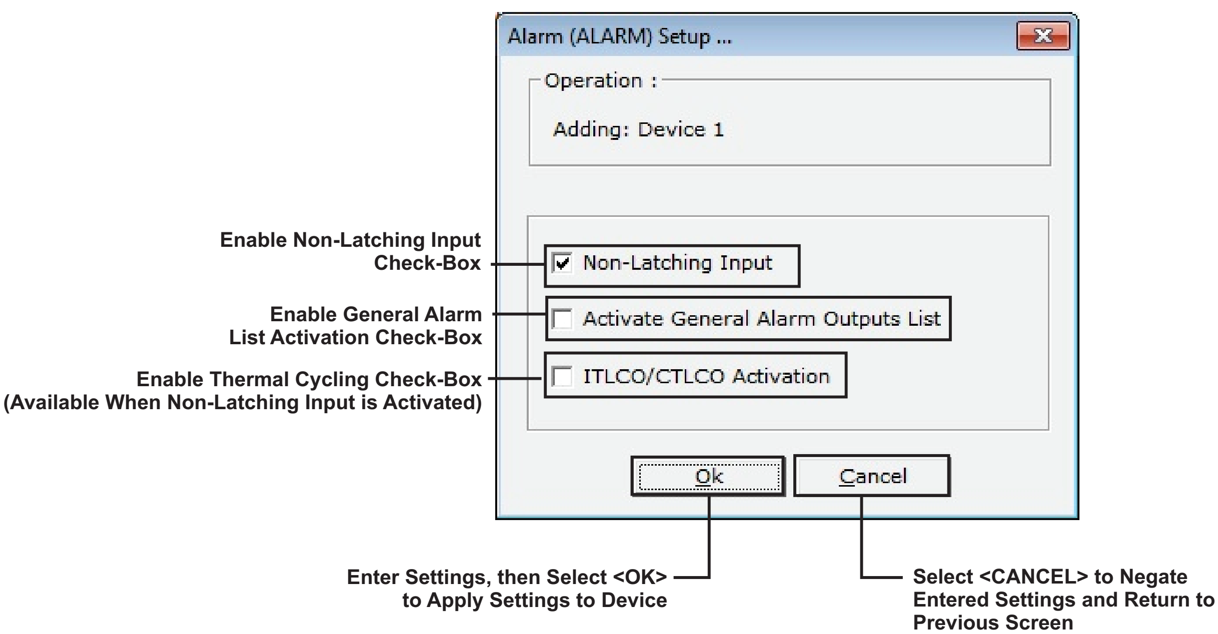

Figure 2-17. Alarm Contact Screen

Note: The unpowered alarm contact can be either normally-open or normally-closed. Order P/N 70-4X70X8-001 for normally-open contacts and P/N 70-4X70X8-002 for normally-closed contacts.

2-3.12 Manual Alarm Station Screen

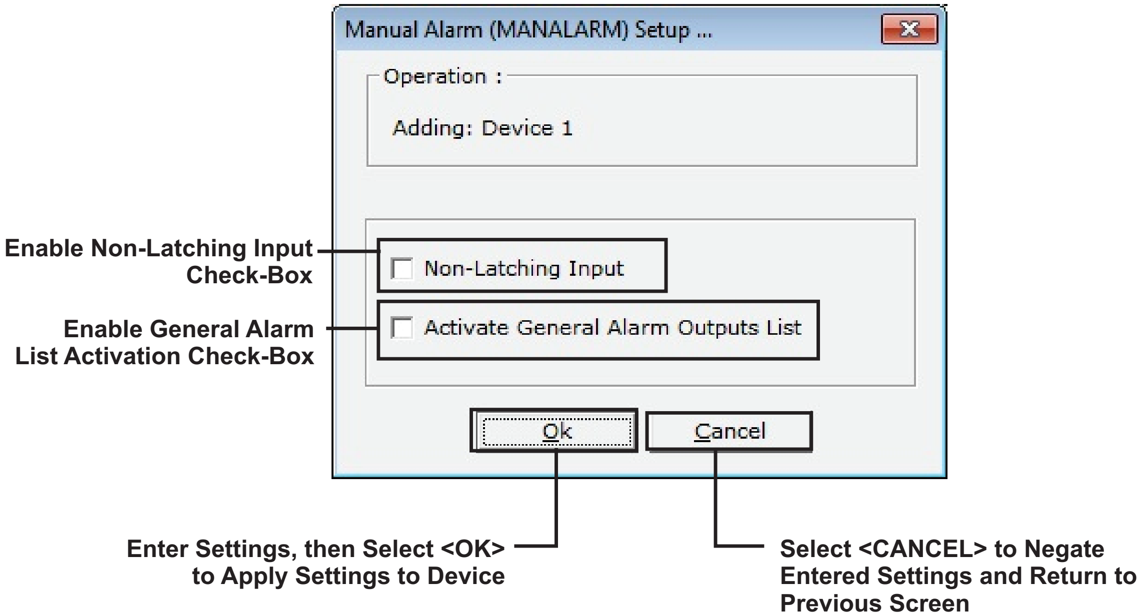

Figure 2-18. Manual Alarm Station Screen

Note: Address all manual-alarm stations within the range of 1 to 32 (if possible).

2-3.13 Manual Release Station Screen

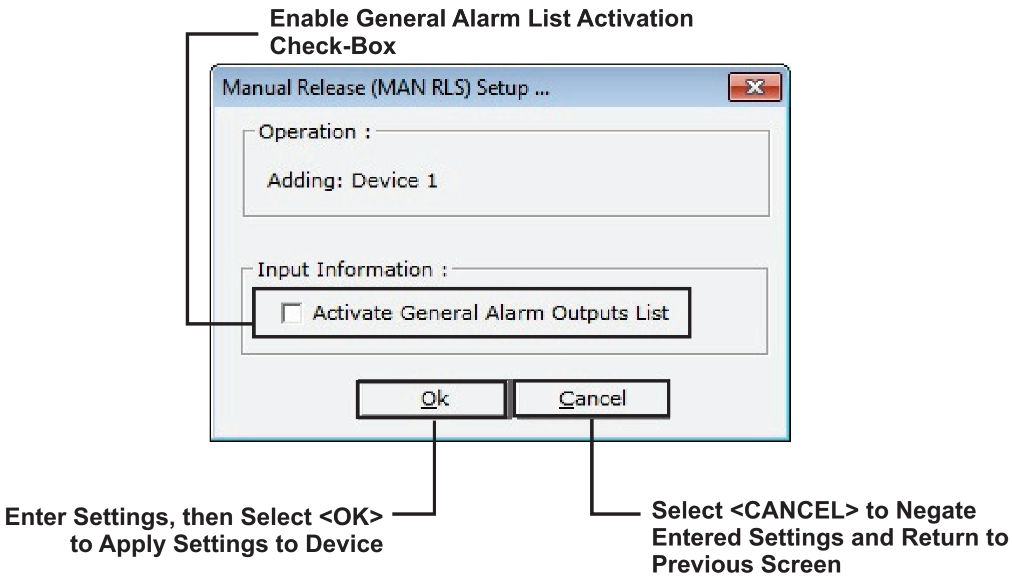

Figure 2-19. Manual Release Station Screen

Note: Address all manual-release stations within the range of 1 to 32 (if possible).

2-3.14 Abort Station Screen

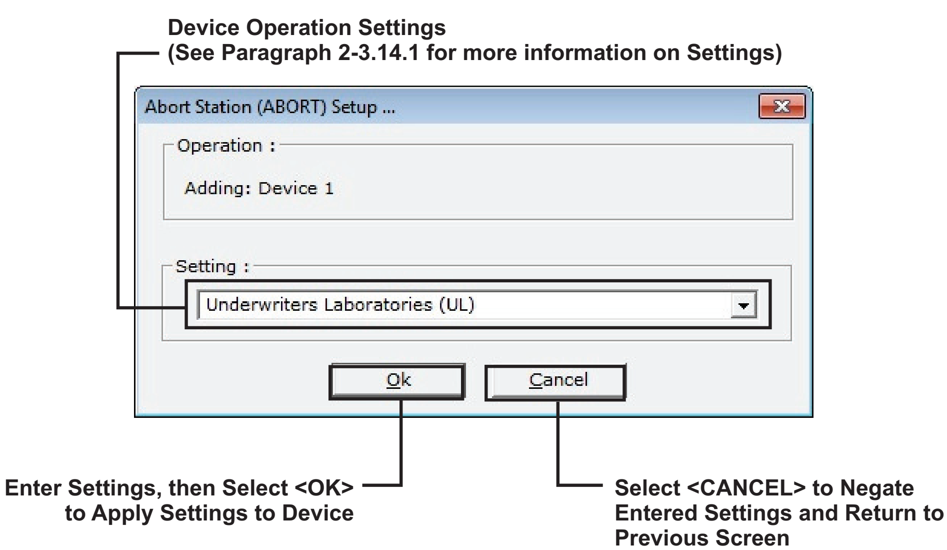

Figure 2-20. Abort Station Screen

Note: Address all abort stations within the range of 1 to 32 (if possible).

The unpowered abort switch can be either normally-open or normally-closed. Order P/N 70-4X70X8-001 for normally-open contacts and P/N 70-4X70X8-002 for normally-closed contacts.

2-3.14.1 ABORT STATION SETTING DEFINITIONS

An AI Monitor Module configured as an abort station can be programmed to operate in any of the following ways:

- **Reset to Full Time Delay (Non-UL Listed)**
  The countdown timer restores to the full delay period after the abort station is activated. The timer resumes the full countdown if the abort station is de-activated. The timer restores to the full delay period if the abort station is re-activated with any time remaining in the countdown. A system reset is required to clear the countdown timer.

Note: The following abort-station operations are available, and are to be utilized at the discretion of, and with the approval of, the applicable Authority Having Jurisdiction.

- **Underwriters Laboratories Style**
  The countdown timer continues to count down after the abort station is activated, and halts with 10-seconds remaining. The timer resumes the countdown from 10 seconds if the abort station is de-activated. The timer restores to 10 seconds if the abort station is activated or re-activated with less than 10 seconds remaining in the countdown. A system reset is required to clear the countdown timer.
- **New York City (Not UL Listed)**
  The countdown timer restores to the full delay period, plus 90 seconds, after the abort station is activated. The timer resumes the countdown from the full delay period, plus the 90 seconds, if the abort station is de-activated. The timer restores to the full delay period plus 90 seconds if the abort station is re-activated with any time remaining in the countdown. A system reset is required to clear the countdown timer.

Note: EOC programming is required to implement the New York City abort station operation. Refer to Appendix B.

- **Freeze and Hold at Time Remaining (Non-UL Listed)**
  The countdown timer halts at the time remaining to expiration after the abort station is activated. The timer resumes the countdown at the time remaining to expiration if the abort station is de-activated. The timer again halts at the time remaining to expiration if the abort station is re-activated with any time remaining in the countdown. A system reset is required to clear the countdown timer.
- **Industrial Risk Insurers (Non-UL Listed)**
  This option functions in a similar manner to the Underwriters Laboratories style, except that countdown timer interruption is not allowed after the countdown timer has begun to count down.

2-3.15 Supervisory Screen

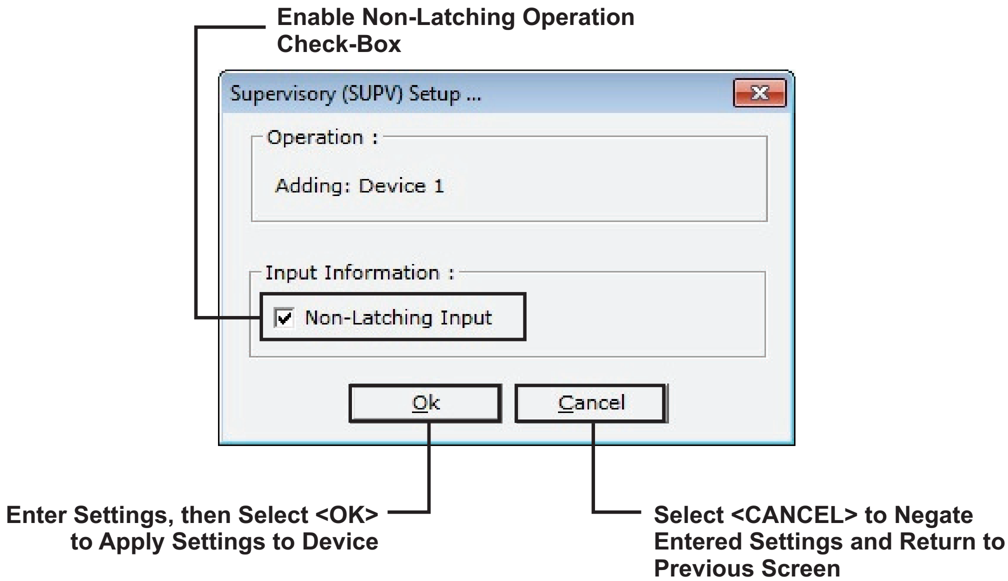

Figure 2-21. Supervisory Screen

Note: The unpowered supervisory switch can be either normally-open or normally-closed. Order P/N 70-4X70X8-001 for normally-open contacts and P/N 70-4X70X8-002 for normally-closed contacts.

2-3.16 Waterflow Screen

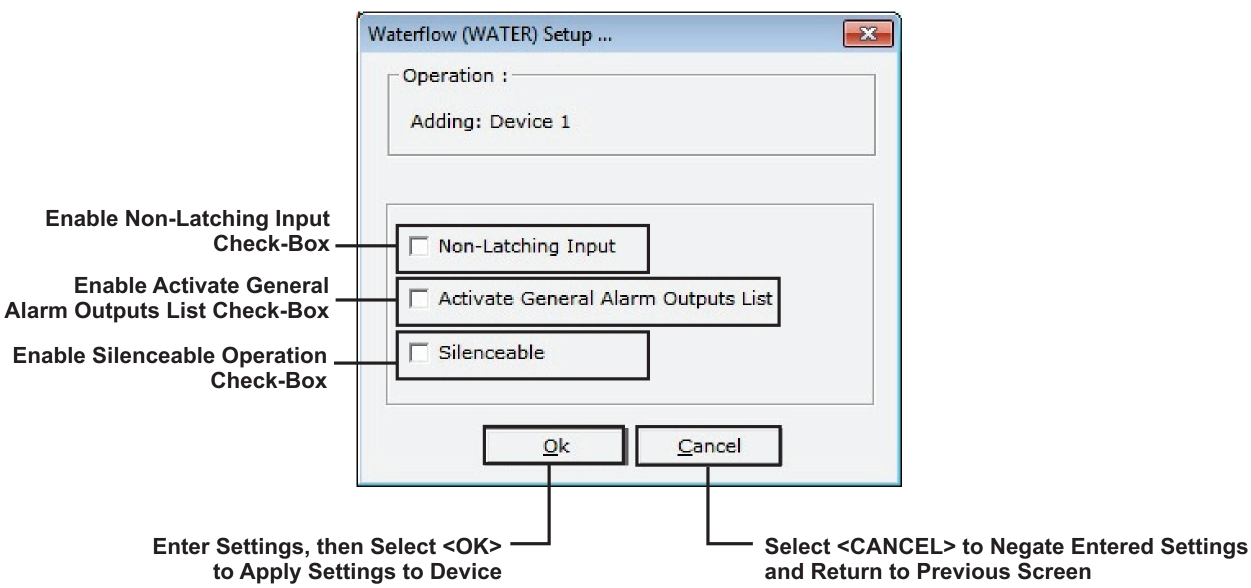

Figure 2-22. Waterflow Screen

Note: The unpowered waterflow contact can be either normally-open or normally-closed. Order P/N 70-4X70X8-001 for normally-open contacts and P/N 70-4X70X8-002 for normally-closed contacts.

2-3.17 Squirt Device Screen

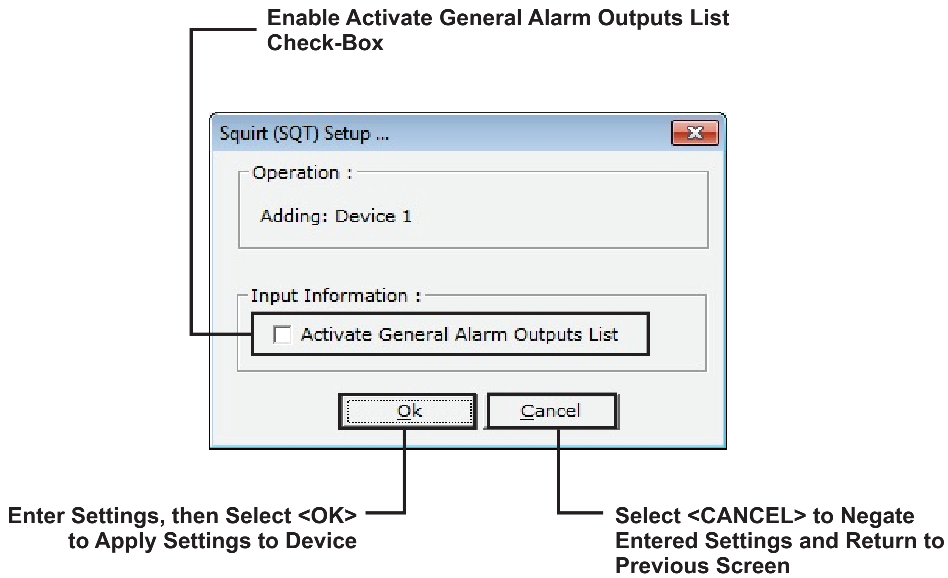

Figure 2-23. Squirt Device Screen

A Squirt Device is a manually-operated switch that is used to reactivate an extinguishing system after it is automatically deactivated following the expiration of the initial-time-limit-cutoff interval (ITLCO). The extinguishing system will reactivate when the squirt switch is operated and remain active as long as the user maintains the squirt switch in the active position. The extinguishing system will de-energize when the operation of the squirt device ceases.

The unpowered squirt device must be a normally-open, dead-man type switch. Order P/N 70-4X70X8-001 for normally-open contacts.

2-3.18 Spurt Device Screen

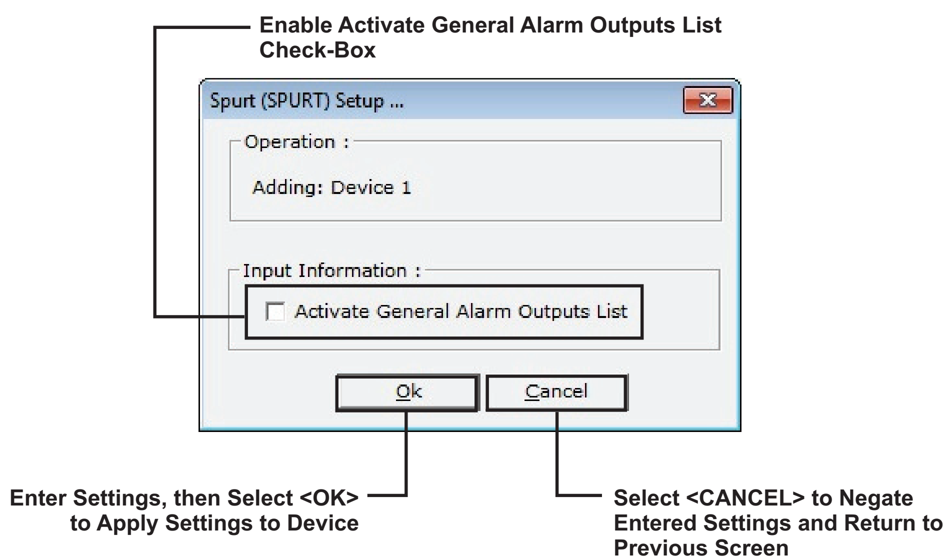

Figure 2-24. Spurt Device Screen

A Spurt Device is a manually-operated switch which is similar in functionality to a manual-release station with the exception that its associated extinguishing system will de-energize when the Spurt Device is released. The unpowered spurt device must be a normally-open, dead-man type switch. Order P/N 70-4X70X8-001 for normally-open contacts.

2-3.19 Remote Releasing Module Screen

This section is divided into three parts:

- Configuring an RRM with an **Actuator** releasing device
- Configuring an RRM with an **Initiator** releasing device
- Configuring an RRM with a **Solenoid** releasing device

Figure 2-25, Figure 2-26, Figure 2-27 and Figure 2-28 illustrate how to configure the Remote-Releasing Module.

2-3.19.1 CONFIGURING THE RRM WITH AN ACTUATOR RELEASING DEVICE

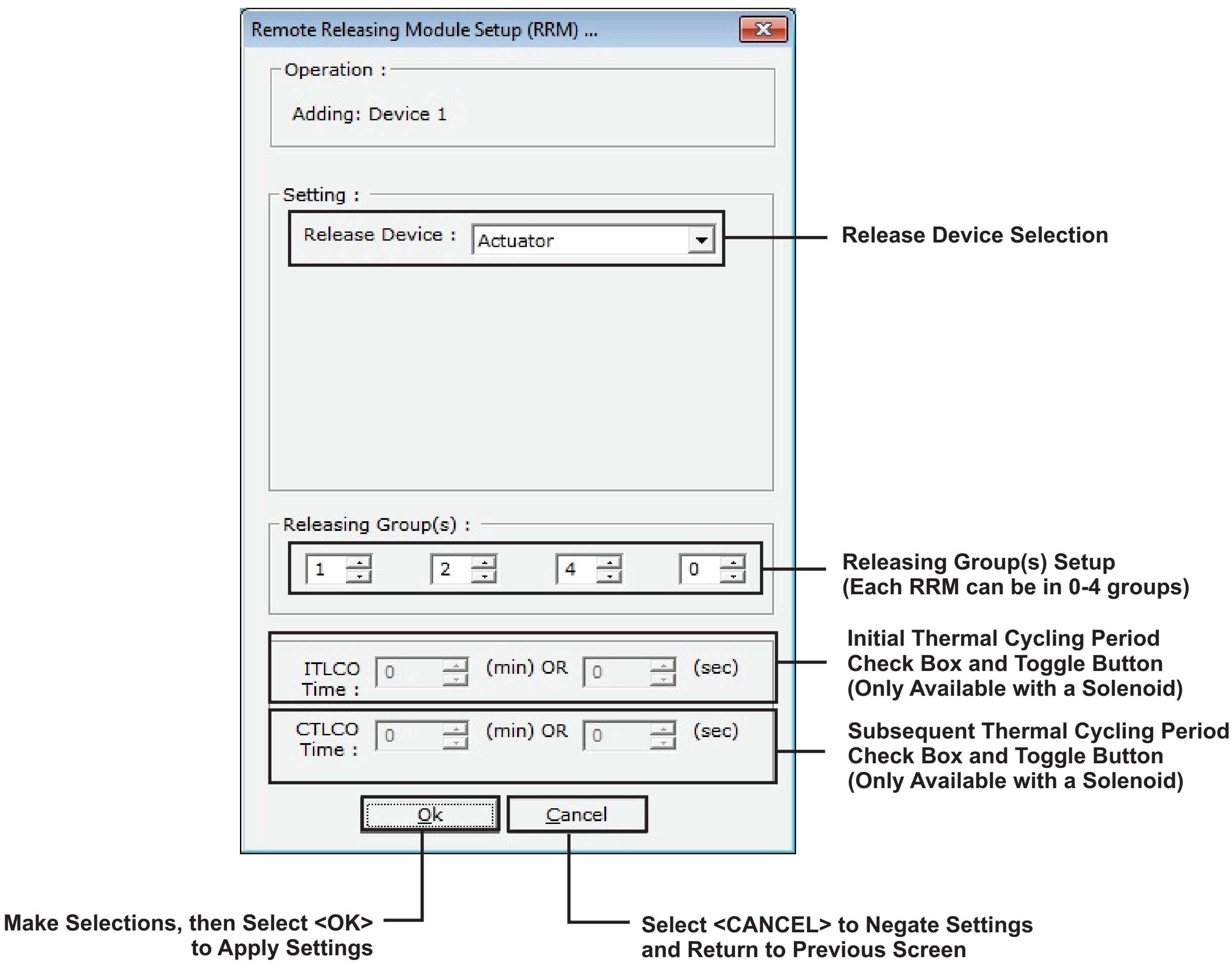

Figure 2-25. Remote Releasing Module Screen (Using an Actuator as a Releasing Device)

1. In the “Releasing Device” dropdown menu, select “Actuator”.
2. If required, use the “Releasing Group(s)” menu to add the RRM to up to 4 groups.

2-3.19.2 CONFIGURING THE RRM WITH AN INITIATOR RELEASING DEVICE

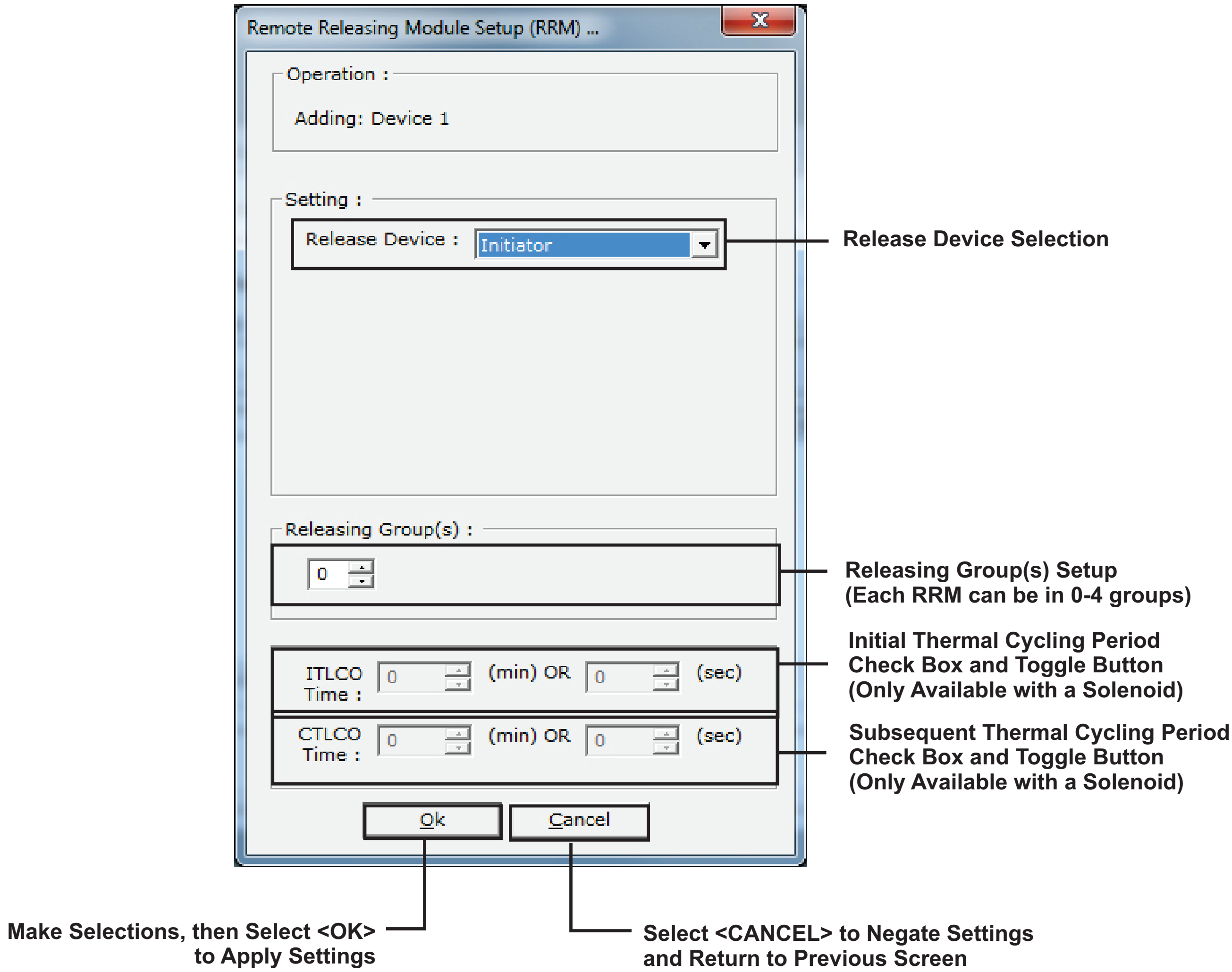

Figure 2-26. Remote Releasing Module Screen (Using an Initiator as a Releasing Device)

1. In the “Releasing Device” dropdown menu, select “Initiator”.
2. If required, use the “Releasing Group(s)” menu to add the RRM to up to 4 groups.

2-3.19.3 CONFIGURING AN RRM WITH A SOLENOID RELEASING DEVICE

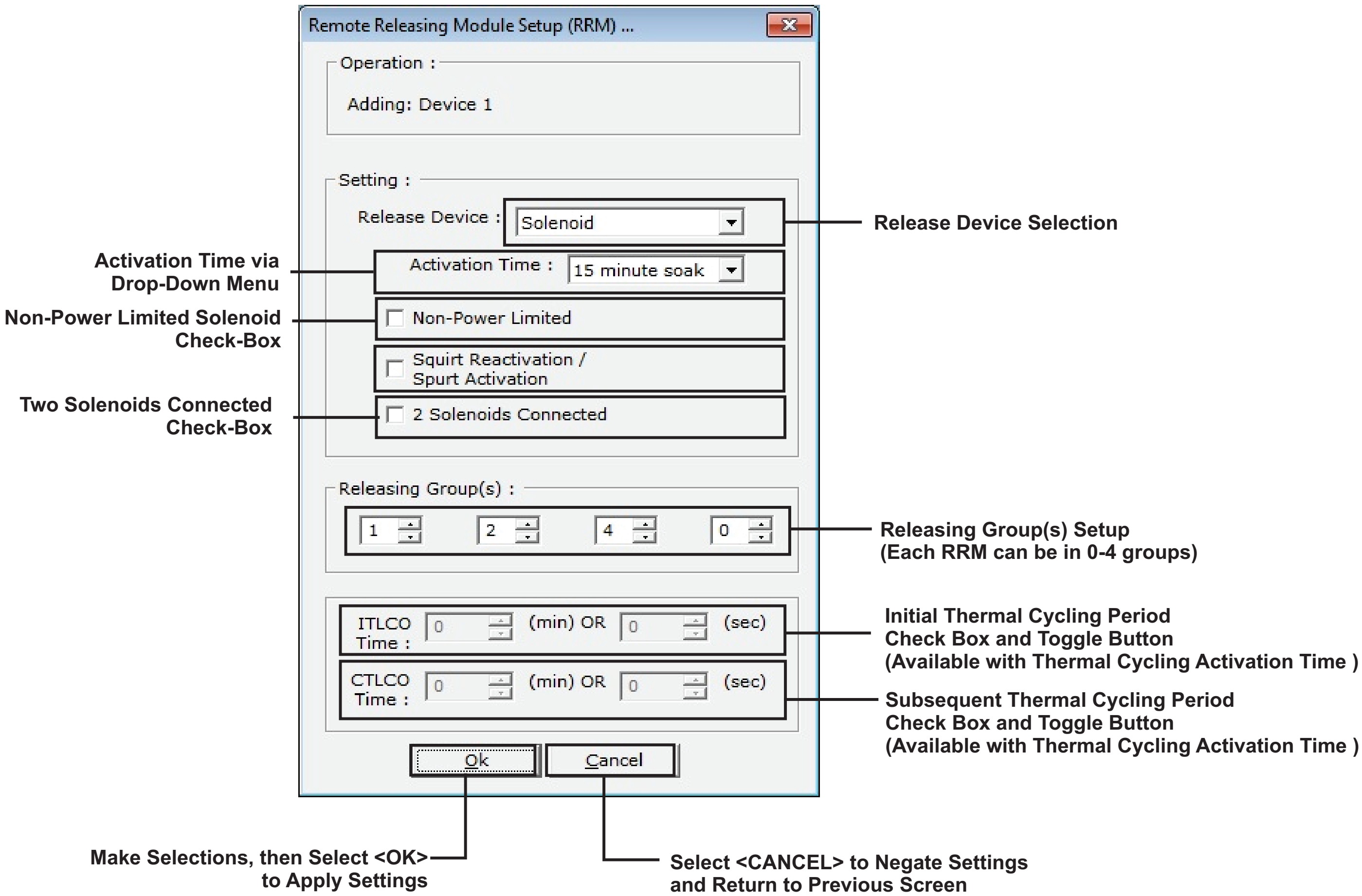

Figure 2-27. Remote Releasing Module Screen
(Using a Solenoid as a Releasing Device and Multiple Groups)

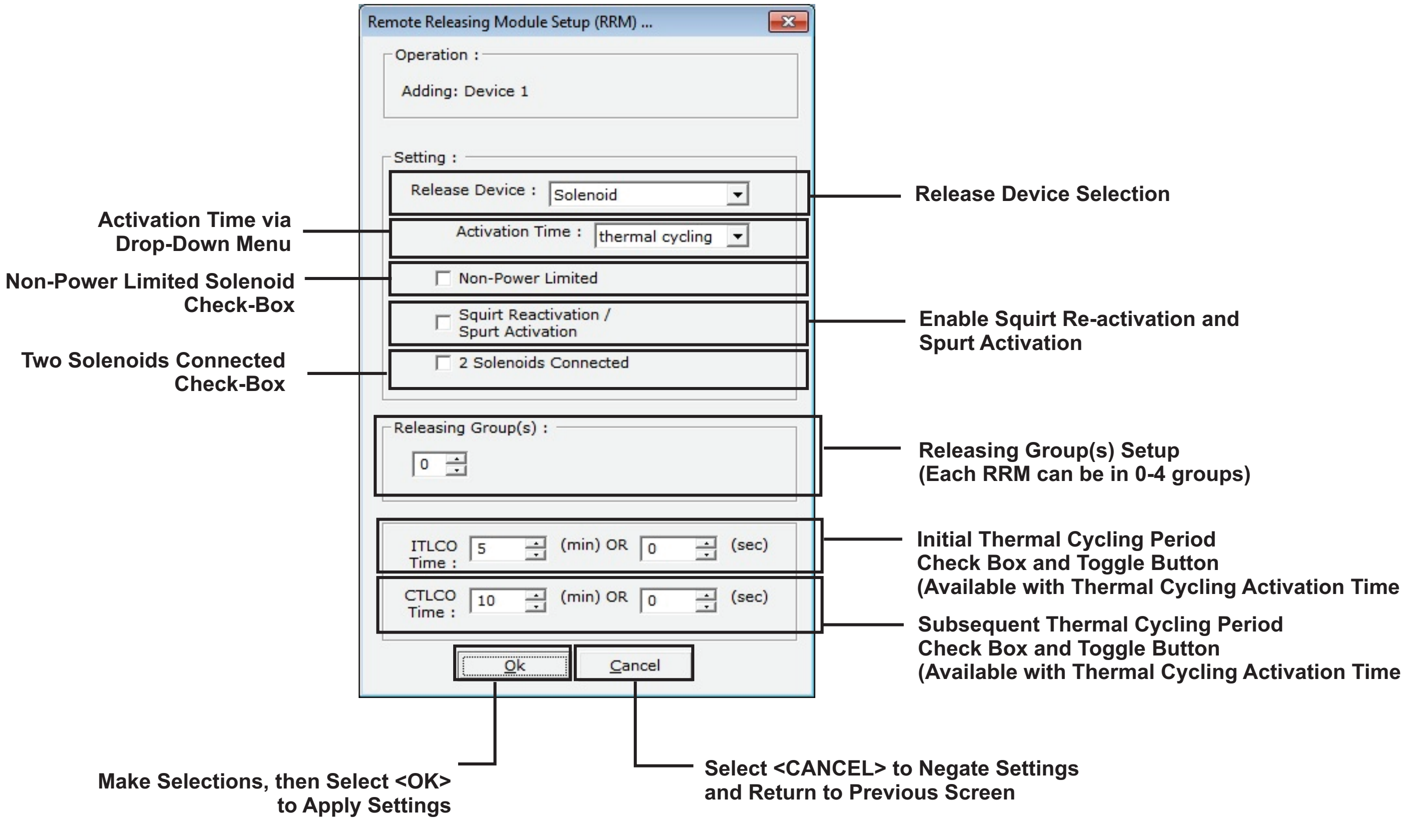

Figure 2-28. Remote Releasing Module Screen
(Using a Solenoid as a Releasing Device and Thermal Cycling)

1. In the "Releasing Device" Selection drop-down menu, select "Solenoid".
2. In the "Activation-Time" Drop-Down Menu, choose one of the following to apply to solenoid-activated discharge valves:
   - 90 seconds
   - 10 minutes
   - 15 minutes
   - Continuous activation (i.e., on until reset).
   - Thermal Cycling
3. If applicable, select "Non-Power Limited" and/or "Two Solenoids Connected".
4. If required, use the "Releasing Group(s)" menu to add the RRM to up to 4 groups.
   A maximum of 16 RRMs may be placed in each group.
5. If applicable, the release circuit is configurable for thermal cycling according to the alarm or non-alarm states of its associated automatic heat detectors. Refer to Paragraph 2-3.6 for a description of thermal cycling via a Model THD-7252 Heat Detector. A thermal-cycling release circuit is configured by selecting "Thermal Cycling" from the Activation Time drop-down menu.

Note: The cyclical release-circuit activation is overridden by an alarm signal from any associated alarm-initiating device other than a heat detector configured for thermal cycling. The release circuit then latches into the activated state and remains activated until it is deactivated by another alarm condition or until the control unit is reset.

2-3.20 Other SLC Initiating Devices

The following SLC initiating devices do not have specific screens to further define functionality. They are all represented by an AI Monitor Module that is monitoring an unpowered switch.

- **Normal Device.** A normal device momentarily reports via the ARIES-SLX display and is a Non-Latching initiating device. Point-specific outputs can be assigned to a normal device in the EOC section of the configuration program. The unpowered normal device can be either normally-open or normally-closed. Use P/N 70-4X70X8-001 for normally-open contacts and P/N 70-4X70X8-002 for normally-closed contacts.
- **Trouble Input.** A trouble input creates a trouble condition and is a Non-Latching initiating device. Point-specific outputs can be assigned to the trouble input in the EOC section of the configuration program. The unpowered trouble input can be either normally-open or normally-closed. Use P/N 70-4X70X8-001 for normally-open contacts and P/N 70-4070X8-002 for normally-closed contacts.
- **Fan Restart.** A fan-restart point is used to de-activate specific addressable relays (i.e., AOs) after the control unit has been reset. The AOs must be configured for fan-restart operation. The unpowered fan-restart switch must be a Non-Latching, normally-open contact. Use P/N 70-4X70X8-001 to monitor the fan-restart switch.
- **Drill.** A drill switch is used to initiate a fire drill via an external, field-installed switch. The fire drill begins when the drill switch is activated, and stops when the drill switch is de-activated. The unpowered drill switch must be a latching, normally-open contact. Use P/N 70-4X70X8-001 to monitor the drill switch.
- **Alarm Silence.** An alarm silence switch is used to duplicate the functionality of the control unit's alarm silence switch via an external, field installed switch. The alarm silence switch de-activates silenceable outputs when the alarm silence switch is activated, and re-activates silenced outputs when the alarm silence switch is de-activated. The unpowered alarm silence switch must be a Non-Latching, normally-open contact. Use P/N 70-4X70X8-001 to monitor the alarm silence switch.

Note: This feature does not meet UL requirements unless there is a visible display at the alarm silence switch to indicate that the alarms are silenced.

- **Reset.** A reset switch is used to duplicate the functionality of the control unit's reset switch via an external, field installed switch. The unpowered reset switch must be a Non-Latching, normally-open contact. Use P/N 70-4X70X8-001 to monitor the reset switch.
- **Acknowledge.** An acknowledge switch is used to duplicate the functionality of the control unit's acknowledge switch via an external, field installed switch. The unpowered acknowledge switch must be a Non-Latching, normally-open contact. Use P/N 70-4X70X8-001 to monitor the acknowledge switch.

Note: This feature does not meet UL requirements unless there is a visible display at the acknowledge switch that indicates what is being acknowledged.

Table 2-7. Configurable Parameters

Alarm Initiating Device	A device such as a smoke detector or manual station configured to create an alarm condition in the system when it activates.
Alarm Verification	Alarm verification allows a fire alarm system to delay an evacuation signal from being generated as the result of an alarm report from a smoke detector. The fire alarm system waits for a second alarm report from the smoke detector that issued the initial alarm report or from any other alarm-initiating device before it generates the evacuation signal. The fire alarm system resumes normal operations if it does not receive a second alarm report within the alarm confirmation time period. See Chapter 6 of NFPA 72, National Fire Alarm Code, 2002 Edition, for details.
Day/Night/Weekend	The periods of time during which smoke detector sensitivities can be automatically adjusted by the control unit. Day and night periods are defined in the Globals Tab.
Drill	A manually initiated test of the system's notification appliance circuits. The test can be initiated via the control-unit's Test sub-menu or via a monitor module configured as a drill switch.
Fan Restart	A switch connected to a monitor module designed to de-energize control modules that do not resume normal operation after a system reset. The monitor module and control modules must be configured for fan-restart operation. The control modules only de-energize and resume normal operation after the fan restart switch is activated.
General Alarm List	The set of outputs that are activated by any alarm initiating device.
Non-Latching Input	Some SmartOne® alarm initiating devices can be configured for Non-Latching operation. Non-Latching operation refers to the special way that "Alarm-Off" messages from initiating devices are processed by the ARIES-SLX Control Unit. Each SmartOne alarm initiating device transmits an "Alarm-On" message when, in the case of an automatic initiating device, it detects a fire signature in excess of its configured threshold value, and, in the case of an AI Monitor Module for a normally-open contact, it detects a contact closure from the switch that it is monitoring. The SmartOne automatic alarm-initiating devices and monitor modules also transmit "Alarm-Off" messages when the detected fire signature drops below the configured threshold value and when the contact closure is removed, respectively. The ARIES-SLX Control Unit always displays every "Alarm-On" message, but does not display an "Alarm-Off" message unless the alarm-initiating device is configured for Non-Latching operation. Each "Alarm-Off" message from a Non-Latching initiating device is treated as a system event that requires operator intervention. Use Non-Latching alarm initiating devices to prevent an inadvertent release of an extinguishing system as the result of a transitory event that can mimic a fire signature such as an air conditioning-system leak or the initial start-up of a heating system in the fall. The real or mimic fire signatures that trigger a countdown to release for an extinguishing system must be present for the entire countdown-delay period in order to release the extinguishing system when Non-Latching alarm-initiating devices are used. The extinguishing system release aborts if a Non-Latching initiating device reports an "Alarm-Off" message prior to the expiration of the countdown timer.

Table 2-7. Configurable Parameters

PAS	Positive Alarm Sequence (i.e., PAS) allows a fire-alarm system to delay an evacuation signal from being generated as the result of an alarm report from a smoke detector. The operator must acknowledge the initial alarm report within 15 seconds of its receipt, or the normal evacuation signals activate. Personnel have a user-programmable period of up to 3 minutes to investigate the nature of the alarm and reset the system if they acknowledge the initial alarm within 15 seconds. The evacuation signal activates if the system is not reset during the investigation period. The fire-alarm system also generates the evacuation signal if a second smoke detector configured for PAS or any other initiating device transmits an alarm signal during either the initial-acknowledgement period or the investigation period. The fire-alarm system resumes normal operations if it is reset within the investigation period. See Chapter 6 of NFPA 72, National Fire Alarm Code, 2002 Edition, for details.
Pre-Alarm Reporting	The Pre-Alarm State occurs when a SmartOne automatic initiating device such as a smoke detector senses a fire signature that is below its configured alarm threshold value but above a lower threshold value called the “pre-alarm” threshold.
Sequential Deactivation	A method of scheduling the de-activations of control modules that have been activated as the result of an alarm condition. The system can be programmed to insert a delay of up to 15 seconds between the de-activation times of control modules that resume normal operations following either a system reset or a fan-restart command. The control modules must be configured for sequential deactivation and the delay period is defined in the Globals Tab. Up to 16 control modules can be programmed for sequential deactivation.
Silenceable	An output that changes its state of activation upon commands issued by the control unit's SILENCE Switch. The output de-energizes if an alarm condition exists and if it is activated when the SILENCE Switch is pressed, and re-activates if the alarm condition still exists and it is de-energized when the SILENCE Switch is pressed.
Walk Test	A test mode in which the control unit responds to alarm-initiating signals by pulsing designated notification-appliance circuits for one second and recording the alarm-initiating device's alarm report in the Walk Test Log. This is referred to as a normal walk test. The alarm-initiating devices must be activated for Walk Test via the control unit's Test sub-menu, and the NACs must be configured for Walk Test activation. A Silence Walk Test does not activate the NACs, but records each alarm-initiating device's alarm report in the Walk Test Log.

2-3.21 Assigning SLC-Device Locations

The following screen displays after each SLC device is assigned an address, a device type and has its functionality further defined via an auxiliary screen (if applicable).

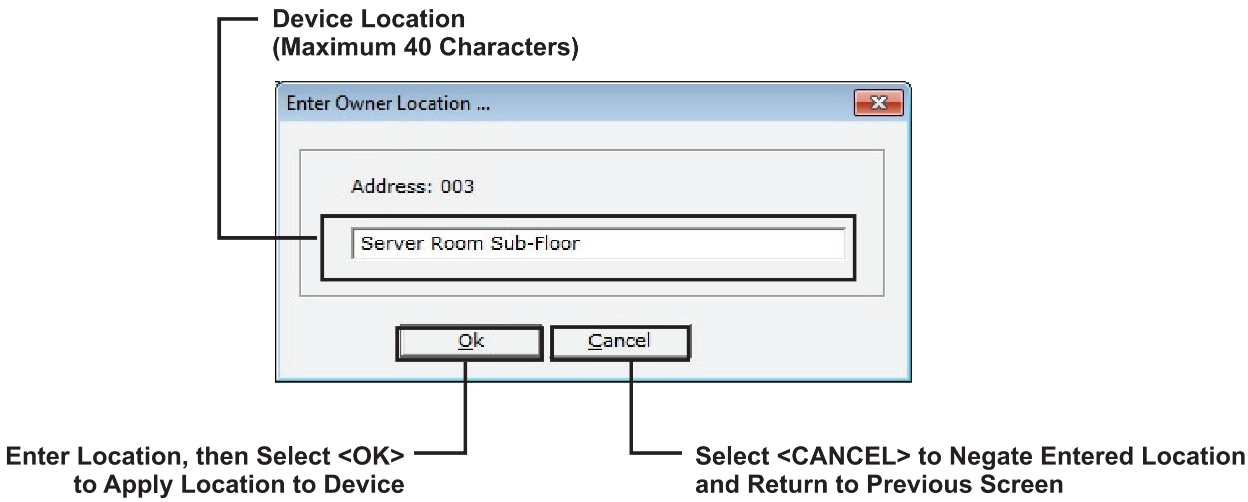

Figure 2-29. Location Entry Box

Note: Forty alphanumeric characters can be entered for each device location.

The **<Ctrl> + <C>** and **<Ctrl> + <V**> keyboard shortcuts are available for copying and pasting owner locations for initiating devices in a common room or area.

2-3.22 Delete Single/Multiple SLC Device(s)

To delete one or more SLC device(s), select the device in the Addressable Devices tab (you can select multiple device using by holding down the <**CTRL**> button on the keyboard and clicking on the devices to delete) and click the <**Delete**> button.

2-3.23 Editing Device Parameters for a Single or Multiple SLC Device(s)

Follow the applicable procedure to edit a single or multiple SLC devices

2-3.23.1 EDITING A SINGLE SLC DEVICE

1. Select the device to edit in the Addressable Devices tab.
2. Click the **<Edit>** button.
3. The applicable screen displays with the parameters for the device. Change the parameters as required and click the **<OK>** button.

2-3.23.2 EDITING MULTIPLE SLC DEVICES

1. Select the devices to edit in the Addressable Devices tab by holding down the **<Ctrl>** button and selecting the necessary SLC devices.
2. Click the **<Edit>** button. The following screen displays.

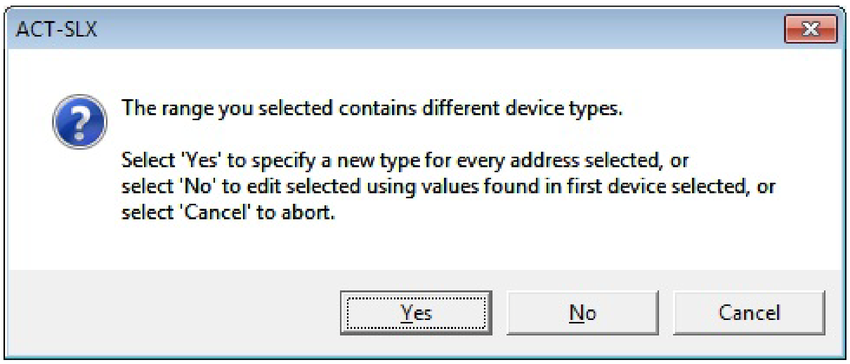

Figure 2-30. Multiple Device Edit Screen

3. To specify a new type for all selected devices, click the <Yes> button; to change all of the selected devices to the type of the first device selected, click the <No> button. To cancel, click the <Cancel> button.
4. The applicable screen displays with the parameters for the device. Change the parameters as required and click the **<OK>** button.

2-3.24 Editing the Address of an SLC Device

1. Select the applicable device in the Addressable Devices tab.
2. Click the **<Edit Address>** button. The following screen displays.

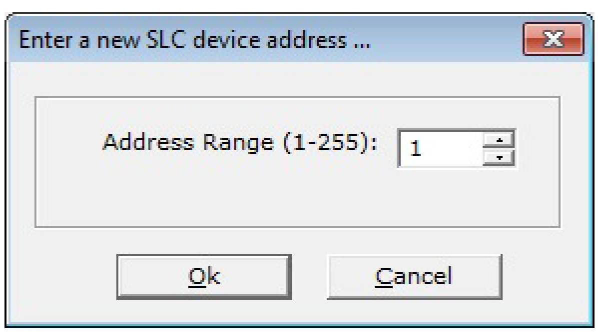

Figure 2-31. Edit Address Screen

3. Enter the new address using the keyboard or toggle buttons. Click **<OK>** to apply the new address.

2-3.25 Edit the Type of an SLC Device

1. Select the applicable device in the Addressable Devices tab. The SLC Device List displays, see Figure 2-5.
2. Select the appropriate device by either highlighting the icon of the device, then selecting **<OK>**, or double-clicking on the icon.

2-4 CONFIGURING CONTROL UNIT-BASED OUTPUTS (ON-BOARD TAB)

1. Select the "On-Board" tab. Figure 2-32 displays.

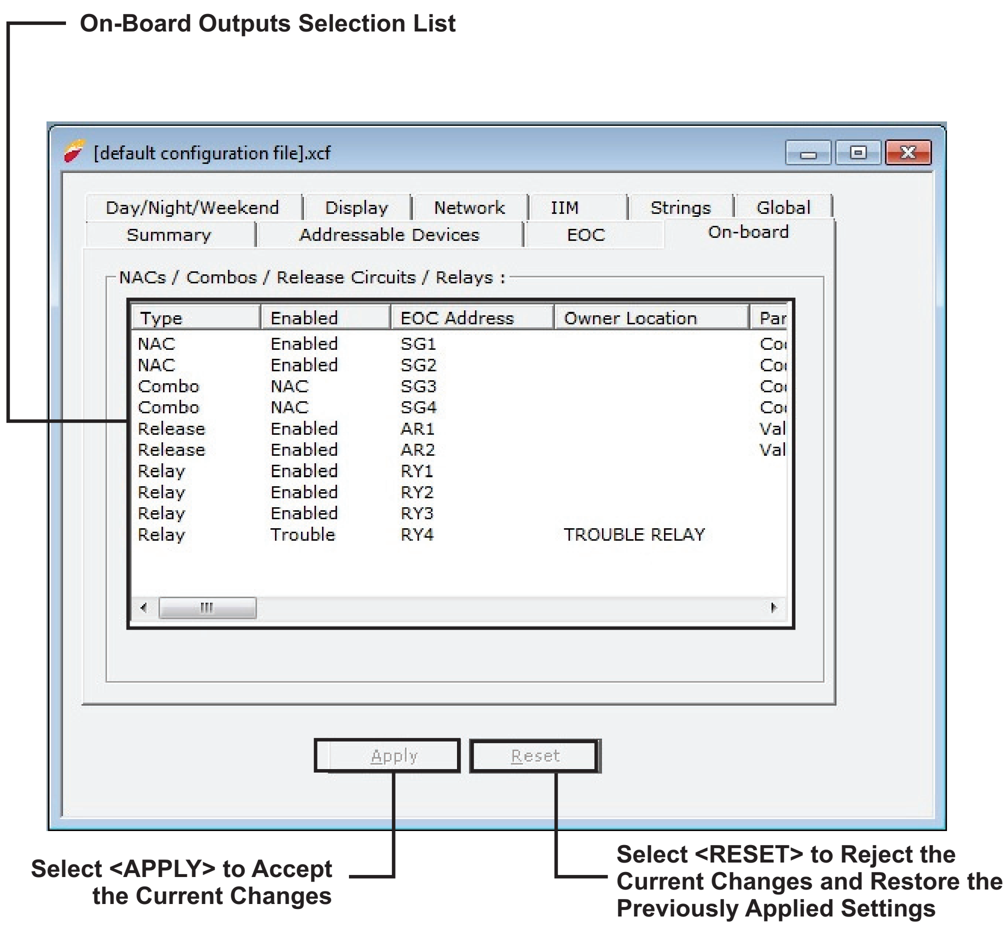

Figure 2-32. Control Unit-Based Outputs Screen

2. Select the circuit by double-clicking on the circuit name in the type column. Figure 2-33 displays.

   Circuit types are as follows:

   – **NAC.** Notification Appliance Circuit.
   – **Combo.** Combination circuits.
   – **Release.** Release Circuits
   – **Relay.** Relay Circuits.

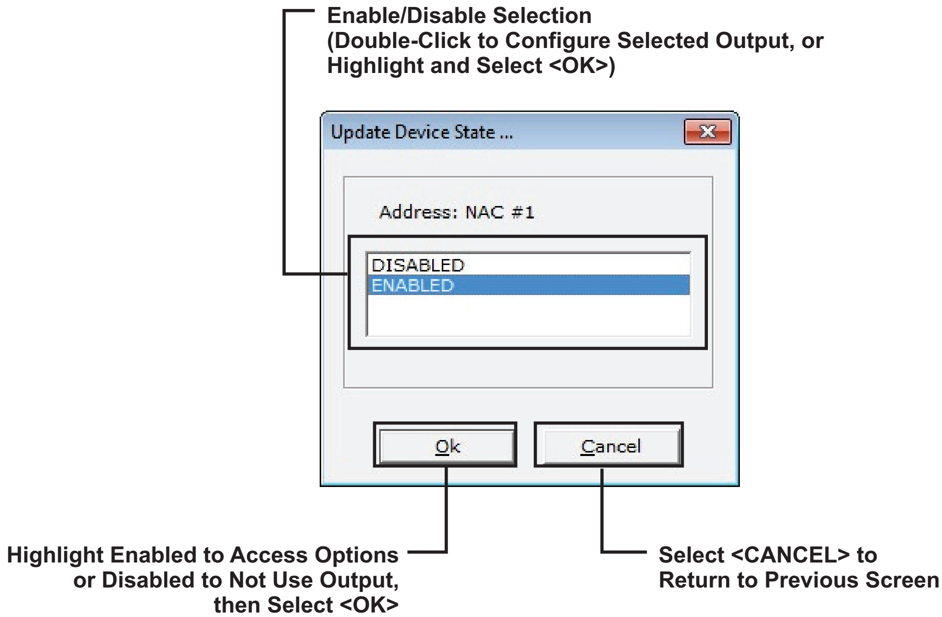

Figure 2-33. Access Options Screen for Control Unit-Based Outputs

3. Select either “Enabled” or “Disabled”, then select **<OK>**. The appropriate circuit screen displays for NACs, Combos, Release or Relays when the “Enabled” option is selected (see Paragraph 2-4.1 through Paragraph 2-4.2). The output is not used if the “Disabled” option is selected. End-of-line resistors are not required for disabled outputs.

2-4.1 Notification Appliance Circuits (NAC) Screen

Figure 2-34 illustrates how to configure a control unit-based Notification Appliance Circuit (NAC).

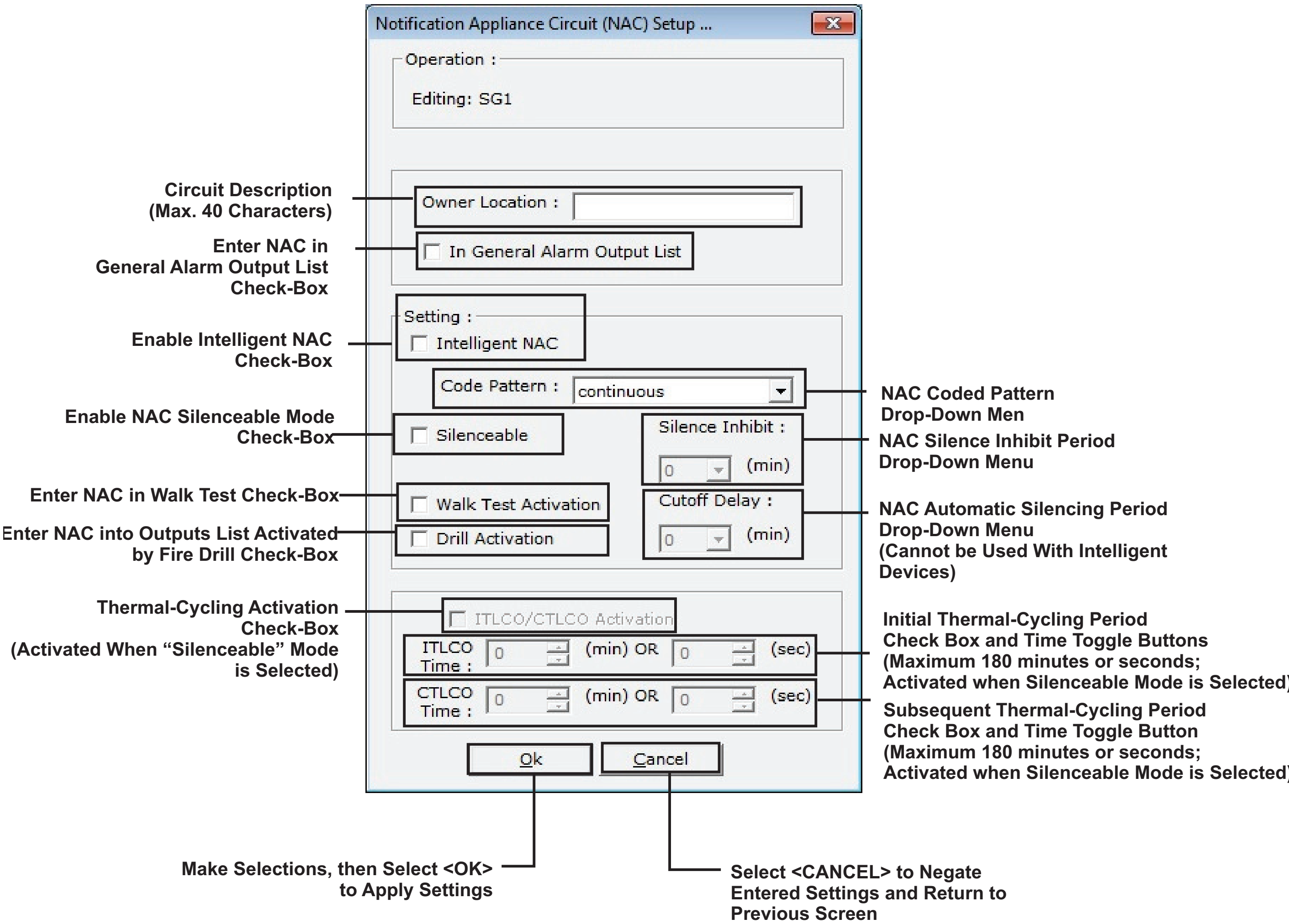

Figure 2-34. NAC Screen (Conventional NAC Selected)

Check the "Intelligent-NAC" Box to use the built-in synchronization features of the following series of notification appliances:

- Wheelock® MT Series Multi-Tone Horns and Horn/Strobes
- Wheelock NS Series Horn/Strobes (see Note)
- Wheelock NH Series Horns (see Note)
- Wheelock RSS(P) Series Strobes
- Exceder Series Horns, Strobes, and Horn/Strobes (Xenon flashtube models only)

NOTE: Wheelock NS Series Horn/Strobes and Wheelock NH Series Horns cannot be programmed for synchronization.

Horn/strobe combination devices utilizing the appropriate synch protocol have the option to use silenceable horns and non-silenceable strobes. Refer to the horn/strobe manufacturer’s installation sheet for details.

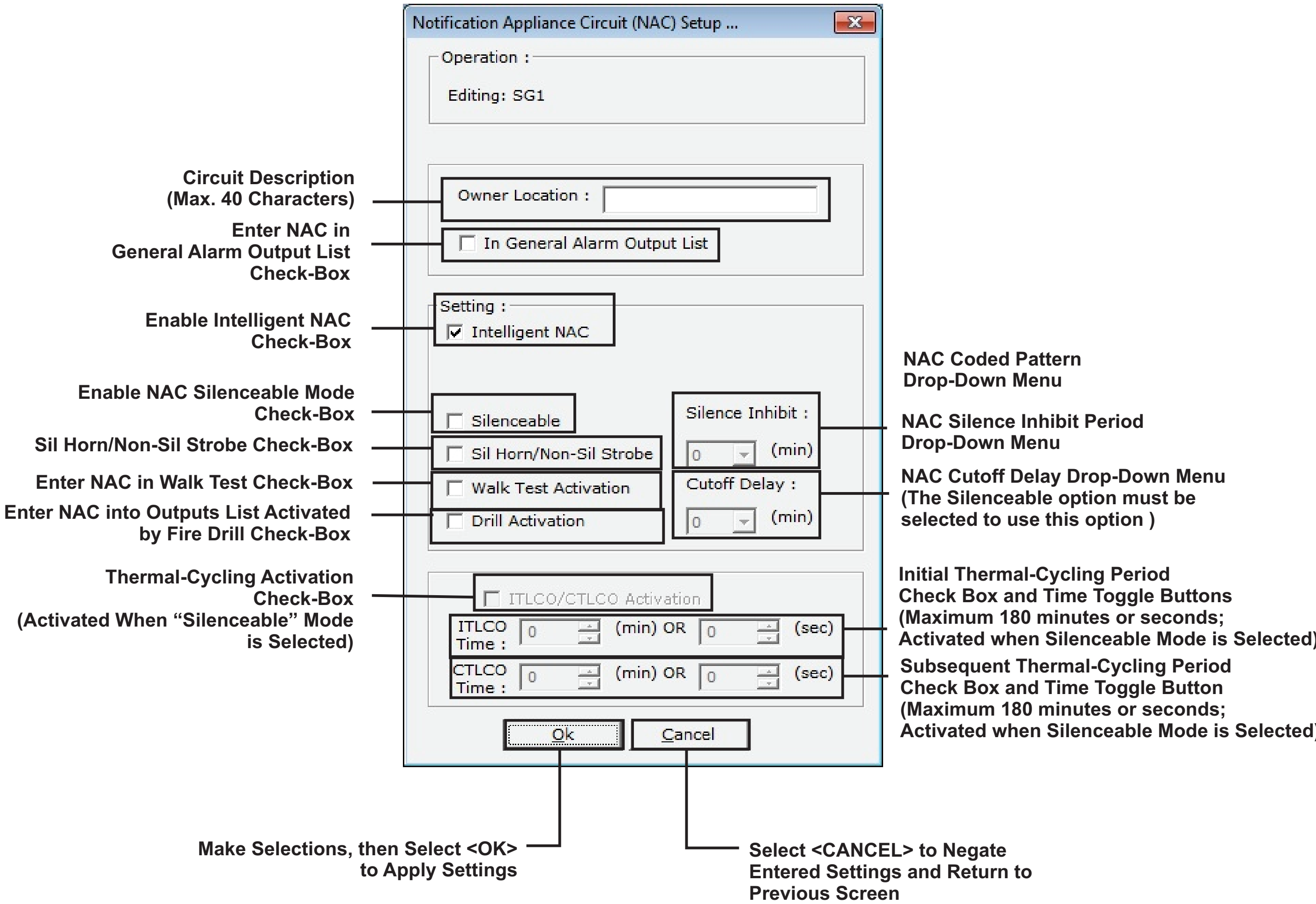

Figure 2-35. NAC Screen (Intelligent NAC Selected)

- Check the "Sil Horn/Non-Sil Strobe" Box to use the silenceable horn or non-silenceable strobe features. This option is only available if the “Intelligent NAC” box is checked.

  Note: Wheelock NS Series Horn/Strobes and Wheelock NH Series Horns cannot be programmed for synchronization.

  Horn/strobe combination devices utilizing the appropriate synch protocol have the option to use silenceable horns and non-silenceable strobes. Refer to the horn/strobe manufacturer’s installation sheet for details.

- The "Silenceable" field must be checked to activate the following optional selections:
  - **Silence Inhibit.** A NAC is non-silenceable for the period of time specified in the "Silence-Inhibit" Drop-Down Menu. Valid entries for the "Silence-Inhibit" time period are 1, 3 and 5 minutes.
  - **Cutoff Delay.** A NAC automatically silences after the period of time specified in the "Cutoff-Delay" Drop-Down Menu. Valid entries for the "Cutoff-Delay" time period are 5, 10 and 15 minutes.

  Note: A NAC configured for Cutoff Delay turns off and remain off until a new alarm event causes it to resound. The NAC cannot be manually resounded via the Silence Key on the display.

- **Thermal Cycling.** A NAC is configurable for thermal cycling according to the alarm or non-alarm states of its associated heat detectors. Refer to Paragraph 2-3.6 for a description of thermal cycling via Model THD-7252 Heat Detectors.
  The cyclical NAC activation is overridden by an alarm signal from any associated alarm-initiating device other than a heat detector configured for thermal cycling. The NAC then latches into the activated state, and remain activated until it is subsequently silenced, deactivated by another alarm condition or the control unit is reset.
- The following coded patterns can be selected from the "Code-Pattern" Drop-Down Menu (Cannot be used with Intelligent Notification Appliances):
  - 60 beats per minute (bpm)
  - 120 bpm
  - Temporal per ANSI S3.41
  - Steady (i.e., non-coded).

2-4.2 Combination Circuits Screen

Figure 2-36 displays when the "Combo" option is selected.

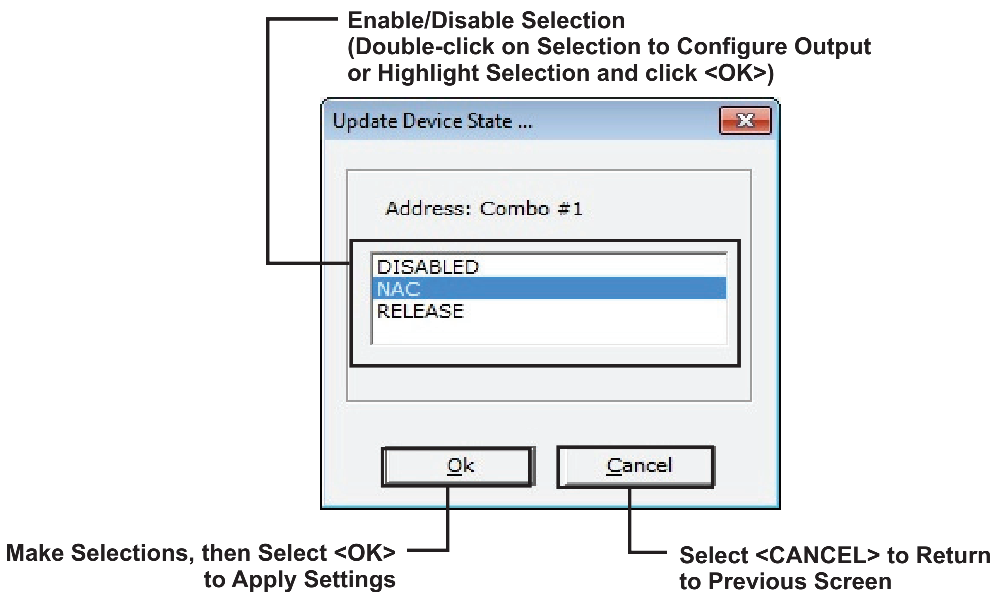

Figure 2-36. Combo Box for Combination Circuits

Combo circuits can only drive solenoids when configured as a Release circuit.

1. Either double-click on the desired output type, or select output type, then select **<OK>**. The appropriate screen displays when either “NAC” or “Release” is selected. Configure the combination circuit as directed in Paragraphs 2-4.1 (if the “NAC” option is selected) or Paragraph 2-4.3 (if the “Release” option is selected). The output is not used if the “Disabled” option is selected.

2-4.3 Release Circuit Screen

Figure 2-37 illustrates how to configure a control unit-based release circuit.

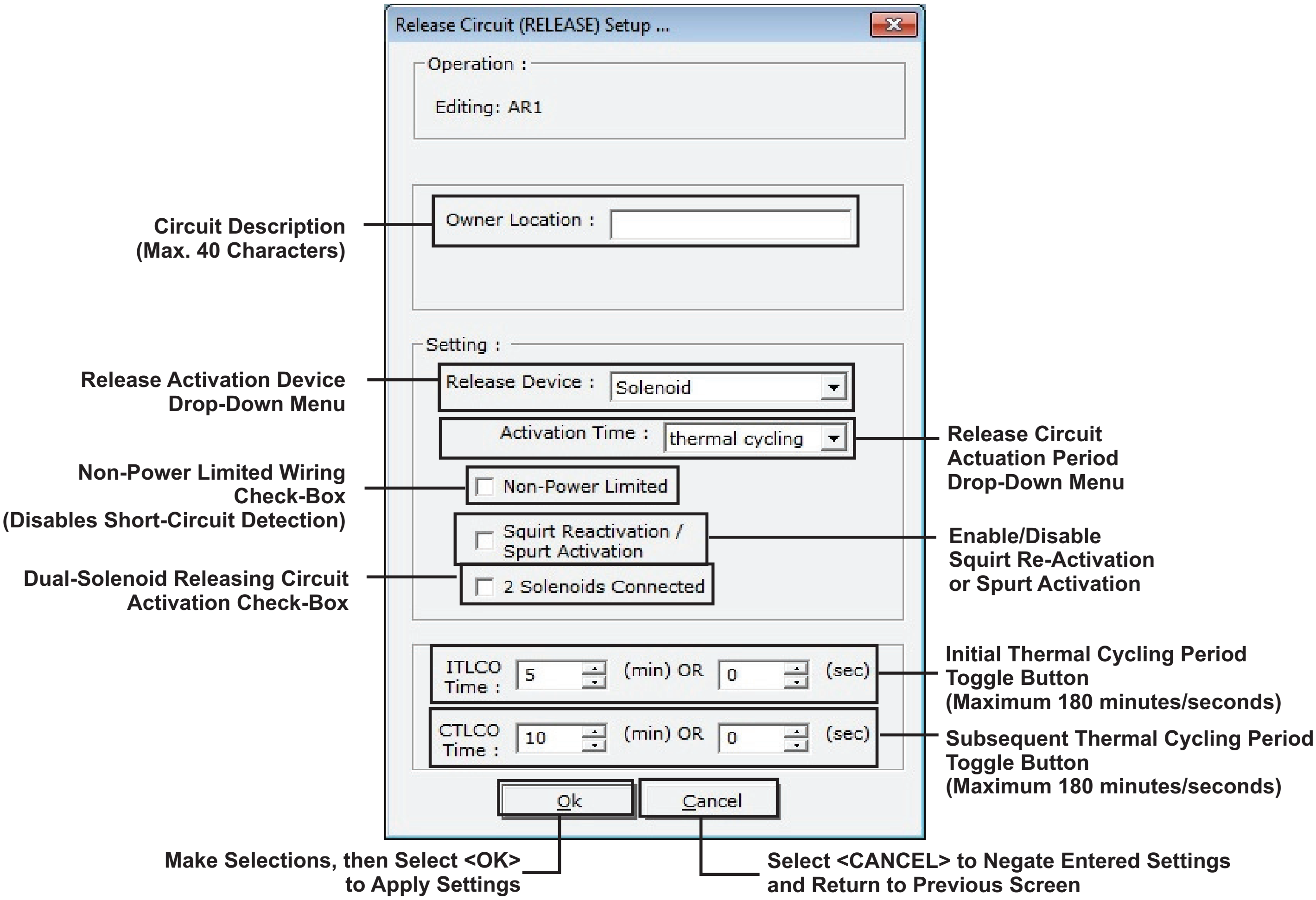

Figure 2-37. Release Circuit Screen

- Use the "Releasing-Devices" drop-down menu to select either **Initiator**, **Actuator** or **Solenoid**-activated discharge valves. The fixed activation times in the "Activation-Time" Drop-Down Menu apply to solenoid-activated discharge valves and can be any of the following:
  - 90 seconds
  - 10 minutes
  - 15 minutes
  - Continuous activation (i.e., on until reset).
  - Thermal cycling
- A release circuit is configurable for thermal cycling according to the alarm or non-alarm states of its associated automatic heat detectors. Refer to Paragraph 2-3.6 for a description of thermal cycling via a Model THD-7252 Heat Detector. A thermal-cycling release circuit is configured by selecting “Thermal Cycling” from the Activation Time drop-down menu.
- The cyclical release-circuit activation is overridden by an alarm signal from any associated alarm-initiating device other than a heat detector configured for thermal cycling. The release circuit then latches into the activated state and remains activated until it is deactivated by another alarm condition or until the control unit is reset.

2-4.4 Form-C Relays Screen

Figure 2-38 illustrates how to configure a programmable control unit-based relay.

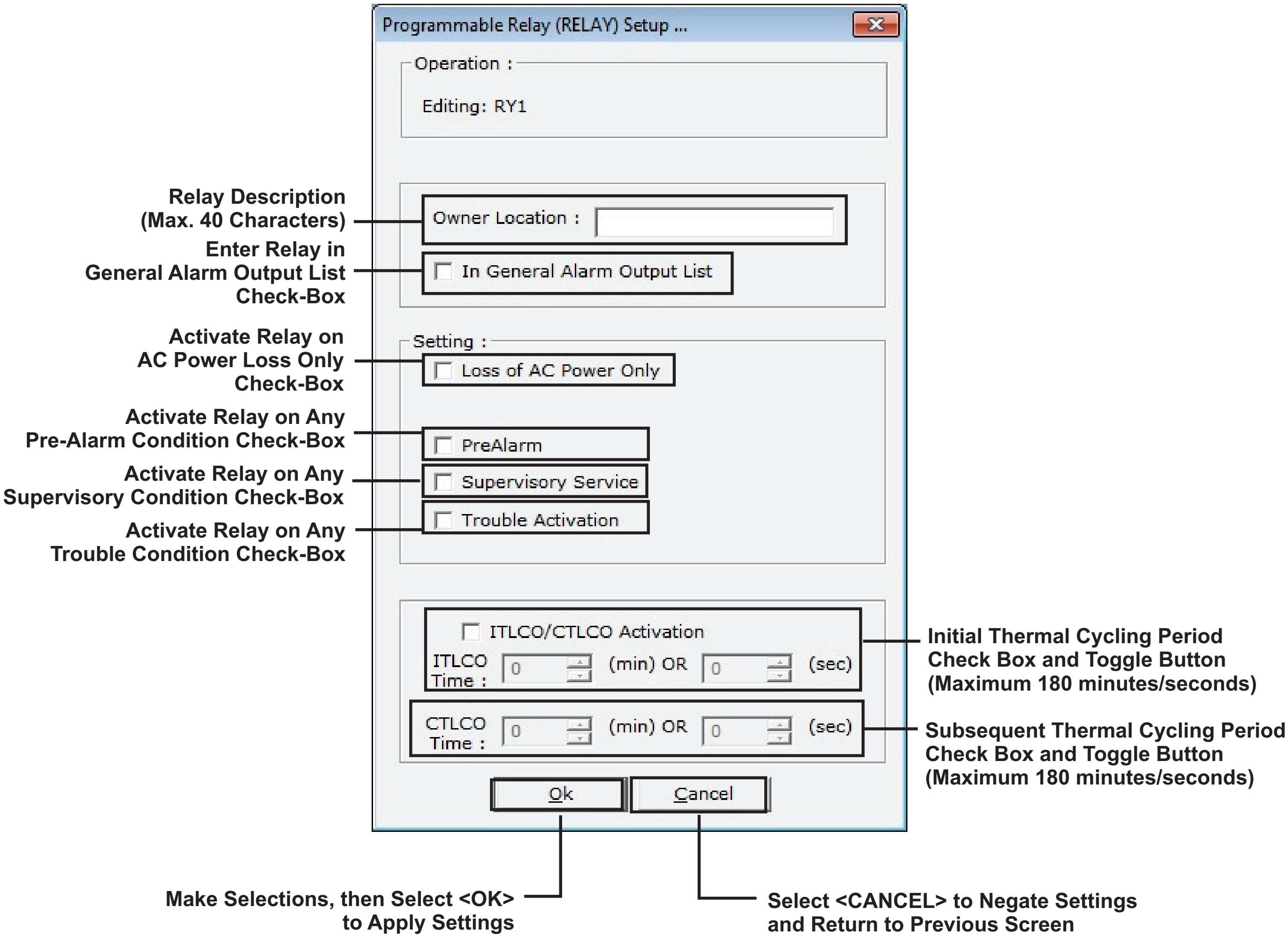

Figure 2-38. Programmable Relay Screen

- A relay configured to activate on "Loss of AC Power only" activates 150 seconds after the loss of AC power. It de-activates immediately when AC power is restored.
- A programmable relay is configurable for thermal cycling according to the alarm or non-alarm states of its associated automatic heat detectors. Refer to Paragraph 2-3.6 for a description of thermal cycling via a Model THD-7252 Heat Detector.
- The cyclical programmable-relay activation is overridden by an alarm signal from any associated alarm-initiating device other than a heat detector configured for thermal cycling. The relay then latches into the activated state and remains activated until it is deactivated by another alarm condition or until the control unit is reset.

2-5 CONFIGURING PERIPHERAL COMPONENTS (DISPLAY TAB)

Select the "Display" Tab; Figure 2-39 displays.

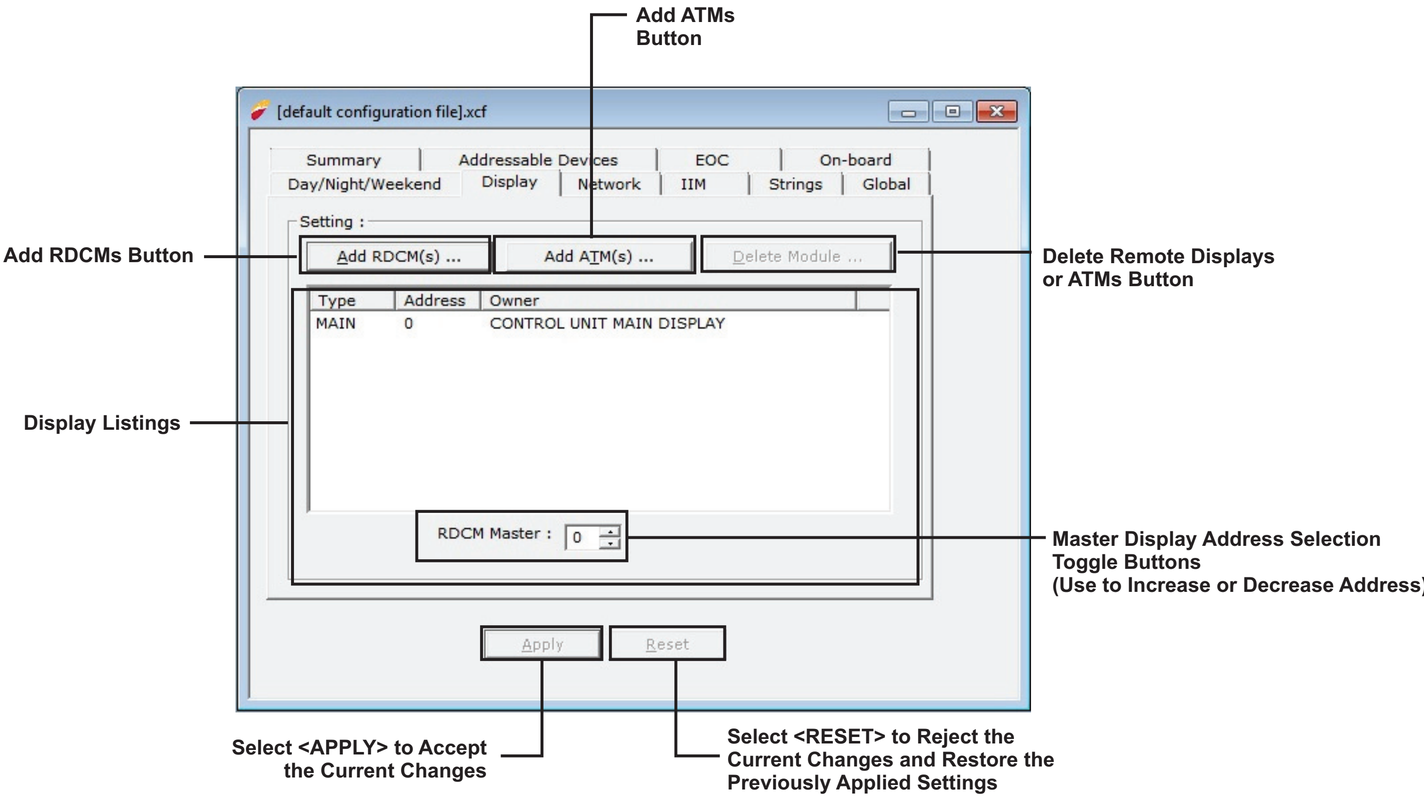

Figure 2-39. Peripheral-Devices Main Configuration Screen

2-5.1 Add RDCM or ATM

1. Select either the **<Add RDCM(s)>** or **<Add ATM(s)>**. Figure 2-40 displays.

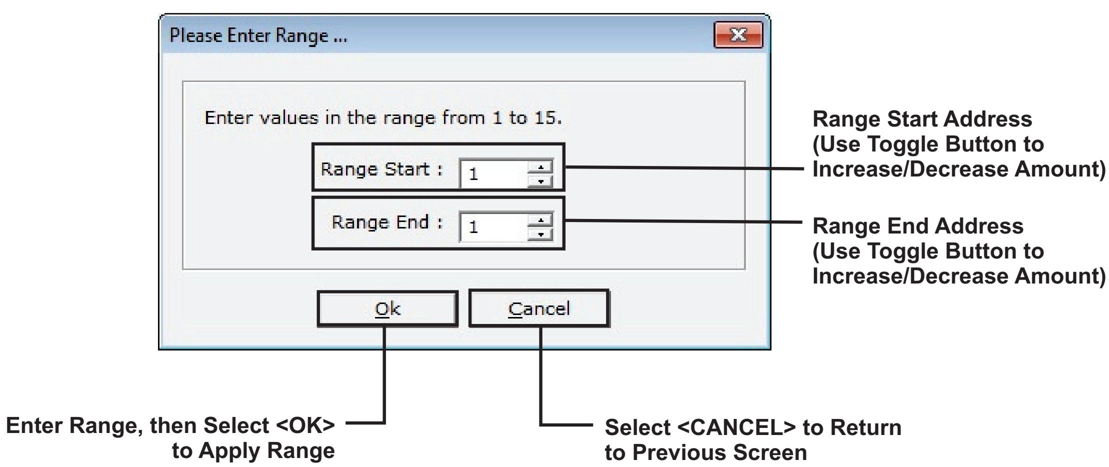

Figure 2-40. Peripheral-Devices Address-Range Selection

2. Enter the range of either RDCM(s) or ATM(s) being used, then click <OK>. Figure 2-41 displays (if ATM is being used, the dialogue in the screen reflects ATM).

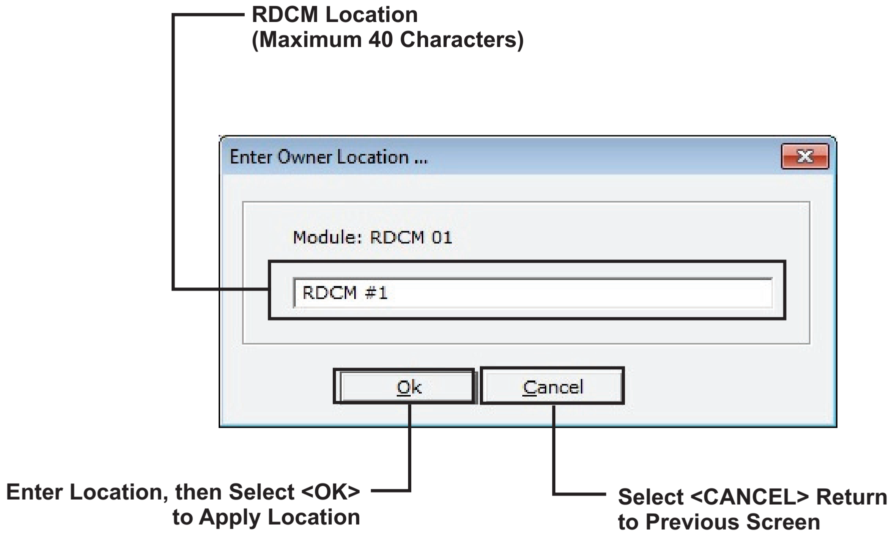

Figure 2-41. RDCM Location Screen

3. Enter the location of the RDCM or ATM, then select **<OK>**.

2-5.2 Delete Module

1. Highlight the device in the listings area of the Display Screen (Figure 2-39).
2. Select **<DELETE MODULE>**.

2-5.3 Creating an RDCM Master

Ordinarily the ARIES-SLX control unit is the master user interface. Operator intervention via the Master RDCM always takes priority over operator-control commands issued from any other user interface, including the ARIES-SLX.

To make an RDCM Master:

1. On the Display Screen, enter the number of the RDCM to be master.
2. Select **<APPLY>**.

2-6 ENTERING AN INTELLIGENT INTERFACE MODULE (IIM TAB)

Select the "IIM" tab; Figure 2-42 displays:

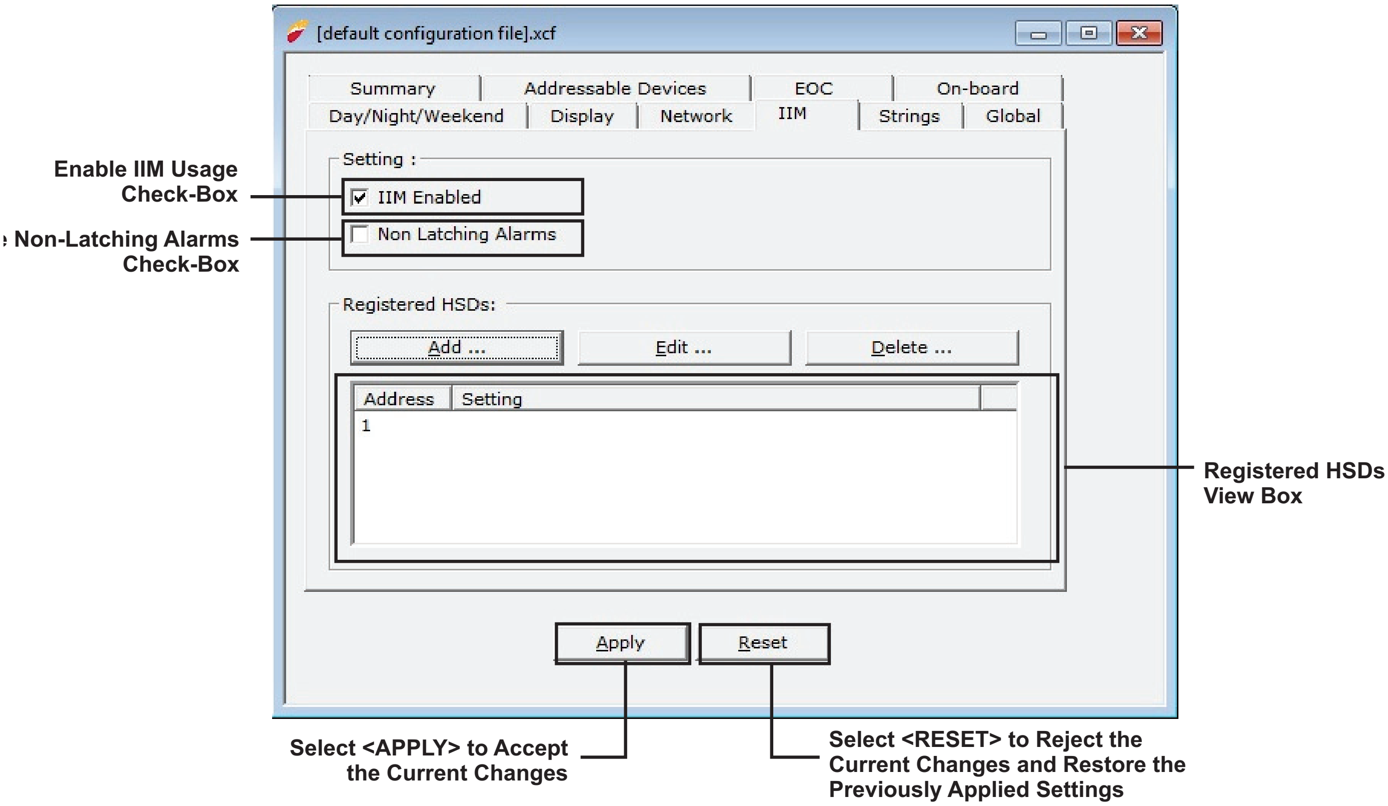

Figure 2-42. IIM Specification Screen

1. Check the 'IIM Enabled' checkbox.
2. Click 'Add' and enter the range of HSSD addresses to be registered (from 1 to 127).
3. Select 'Non-Latching Alarms' if applicable.
4. Click 'Apply' to enter the IIM and its settings into the system configuration. The IIM tab registry reflects the newly added HSSD configuration settings.

- Settings for a particular HSSD may be edited by selecting the desired HSSD in the IIM tab registry and clicking <Edit>. Select <Apply> when done.
- A particular HSSD may be deleted by selecting the desired HSSD in the IIM tab registry and clicking <Delete>. Select <Apply> when done.

2-7 NETWORKING (NETWORK TAB)

Multiple ARIES-SLX Systems can be networked together to form a larger, integrated system for common event reporting, operator control, and outputs activation. A peer-to-peer network of up to thirty-two (32) ARIES-SLX Control Units can be created. That network is then capable of performing the following fire-alarm and/or suppression system operations on a network-wide basis:

- Event initiation
- Protected-premises local and/or remote event annunciation
- Occupant notification via audible and visible signaling appliances
- Process/equipment control to activate safety procedures
- Fire extinguishing system release
- Off-premises transmissions to central station or fire department via third-party digital communicator and programmable relays.

Every control unit on the network supervises its own initiating devices and output circuits and manages the input-point to output-circuit operations specific to its local protected area(s). These operations occur without regard to inter control unit communications, lack of network communications due to catastrophic fault, or irrespective of the condition of any other control unit in the network.

A separate application file must be created via ACT-SLX for each control unit in the network.

2-7.1 Communications

Every control unit is capable of communicating with every other control unit in the network. The method of communication is peer-to-peer via a token-passing protocol to ensure that only one control unit is broadcasting at any time. Network Interface Cards (NIC) permit the integration of two or more control units into a networked system.

Network messages and broadcasts are transmitted over either single- or dual-channel communications connections. Dual-channel connections offer a redundant communications path that allows all network broadcasting and inter-control-unit functionality to continue with an open- or short-circuit fault or ground fault on one of the channels. Any fault in either a single- or dual-channel communications channel creates a network trouble condition.

2-7.2 Network Event Processing

Networked control units are programmed to listen to messages from other nodes but are not configured to identify where to send messages. Thus, a node can be programmed to process events as follows:

- Locally (i.e., in the control unit of origin only)
- Selectively from a subset of networked control units
- Globally from all control units in the network.

Processing of network events extends to all ancillary equipment such as Remote Display Control Modules (RDCMs) and Annunciator Terminal Modules (ATMs) associated with a designated subset of control units when selective event broadcasting is chosen. Network event processing extends to all such equipment associated with every control unit when the network is configured for global-event broadcasting.

The configuration of event processing is accomplished by the Group parameter and the ‘Log All Network Events’ parameter described in later sections.

The default operation for event broadcast is globally to all control units in the network.

2-7.3 Operator Control

Operator intervention to acknowledge events, silence notification appliances and perform resets is configurable to operate:

- Locally in the control unit of origin only
- Selectively in a subset of the networked control units
- Globally in all control units in the network.

Operator intervention capability extends to all ancillary equipment such as Remote Display Control Modules (RDCMs) and Annunciator Terminal Modules (ATMs) associated with a designated subset of control units when selective operator control is used. It extends to all such equipment associated with every control unit when the network is configured for global operator control.

The configuration of acknowledge button processing is accomplished by the Group parameter and the ‘Log All Network Events’ parameter described in Paragraph 2-7.7. The configuration of silence button processing is accomplished by the Group parameter and the ‘Network Silence Event’ parameter described in Paragraph 2-7.7. The configuration of reset button processing is accomplished by the Group parameter and the ‘Network Reset Event’ parameter described in Paragraph 2-7.7.

The default operation for operator control is globally to all control units in the network.

2-7.4 Event Recording

Each control unit is configurable to record events as follows:

- Locally from its directly-monitored peripheral devices and output circuits only
- Selectively from a subset of networked control units
- Globally from all control units in the network.

The default operation for event recording is globally from all control units in the network.

2-7.5 Event Output Control (EOC)

A control unit within a network shall only have the capability of defining output control and subsequently activating the outputs that are physically a part of the control unit. However, the output control can be based on inputs that reside on other control units within the network. These inputs can be:

- Local SLC based and IIM based detectors and inputs
- Selected from a subset of networked control units' SLC- and IIM-based detectors and inputs
- Global from all networked control units' SLC- and IIM-based detectors and inputs.

Configuring networked EOC is accomplished using EOC programming, the Group 'Log All Network Events' and (to a limited extent) the 'Network Reset Event' as well as 'Network Silence Event' parameters described in Paragraph 2-7.7.

The default operation for event-output control is global from all control units in the network.

Note: Only alarms originating on the local control unit and configured to activate the General Alarm List Outputs activate the General Alarm List Outputs.

2-7.6 Network Groups

The network group concept is used to create autonomous sub-networks within the overall set of networked control units. These groups may be programmed to respond selectively as separate entities in terms of event reporting, event output control, acknowledgment of events, alarm silencing, and system resets. There are 32 possible groupings, numbered 0 to 31. By default, all control units in the network have no pre-assigned group number.

A sub-network group operates as described below when it is assigned a non-zero group number. Each control unit in a group is able to:

- Display and log all events that take place in any control unit in the group
- Process an event-acknowledgment command from any control unit in the group for any event that occurs in the group when the acknowledge button is pressed on any control unit in the group
- Process an alarm-silence command from any control unit in the group and de-energize any silenceable outputs on the control unit
- Process a reset command from any control unit in the group once all activated initiating devices have been cleared of their alarm condition(s)
- Execute local output-activation commands based on events from any or all other control units in the group

A network is configured for global operations when no network sub-groups are defined.

2-7.7 Network Group 0

Group 0 can be used to create a 'master' type controlling node in the control unit network. Depending on how many masters are needed, one or more control units in the network should be assigned to Network Group 0 and 'Log All Network Events' should be enabled. Disable 'Network Silence Event' and 'Network Reset Event' on the master node(s) unless the master node(s) can be reset by non-master nodes. All non-master nodes should be assigned group numbers and 'Network Silence Event' and 'Network Reset Event' enabled. 'Log All Network Events' should be disabled on the non-master nodes.

The master control unit is capable of the following interactions with all sub-groups in a selectively-signaling network:

- Displaying and logging all network events from all network groups
- Issuing acknowledge, silence, and reset commands to all control units in all network groups
- Activating its outputs upon any initiating event from all control units in all network groups

Figure 2-43 shows the possible interactions among the various members of a selectively-signaling networked system with groupings and with one control unit designated as the master control unit.

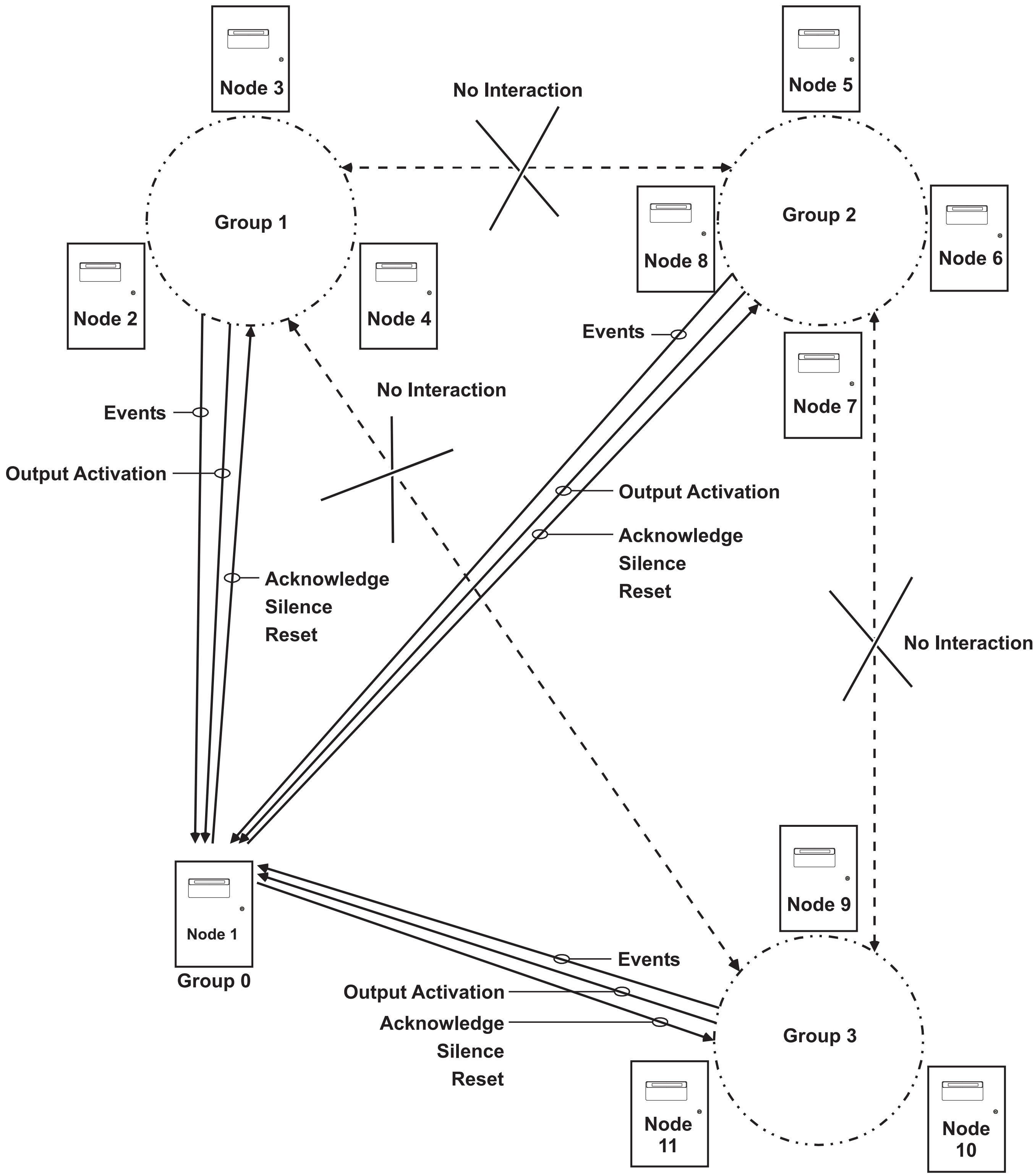

Figure 2-43. Typical Network with Groups and Master Node in Group 0

2-7.8 Network Settings

Select the "Network" tab to define the operating characteristics of each control unit in the network; Figure 2-44 displays:

Node Number - sets the unique identifier to each panel on the network. Valid settings are 1-32. A value of “0” disables networking on this node.

Channel - sets the communication channel(s) that the control unit uses to communicate. The entire network should use the same channel configuration.

Time Synch Period – the periodic interval where the time and date on all nodes is synchronized. The time is entered in seconds. Valid settings are 0 (for disabled) or any value from 10 minutes (600 seconds) to 32767 seconds

Network Reset Event – defines whether or not a control unit can be reset remotely by another node on the network.

Network Silence Event – defines whether or not a control unit can be silenced remotely by another node on the network.

Log All Network Events – defines whether or not a control unit processes events and key presses from any remote node on the network. If this parameter is not set, the control unit only processes events from nodes in the same group.

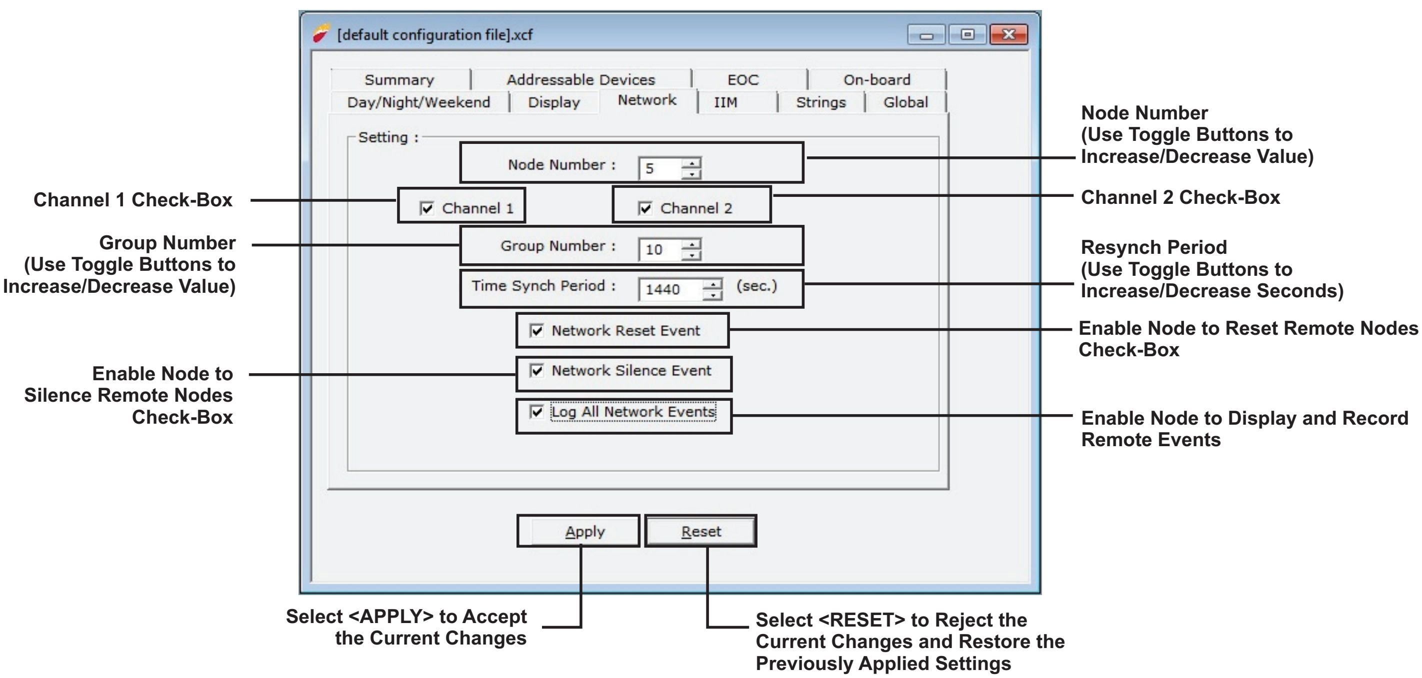

Figure 2-44. Network Node Settings

2-8 GLOBAL SETTINGS (GLOBAL TAB)

Select the "Global" tab; Figure 2-45 displays.

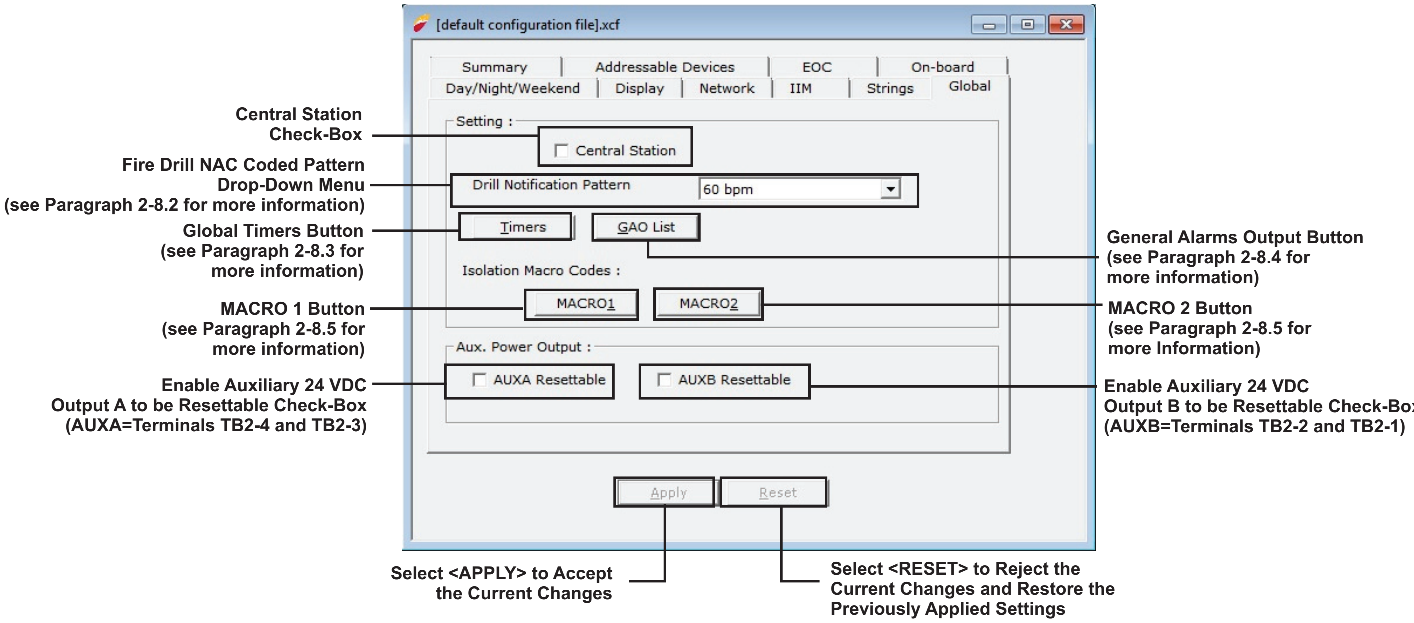

Figure 2-45. Global Settings Screen

2-8.1 Central Station

The operations of the programmable relays default to the following off-normal states when the Central Station option is selected:

Programmable Relay No.	Off-Normal State
1	Alarm
2	Supervisory

The transmission of a loss of AC-power trouble signal to the central station can be delayed for up to 12 hours when the Central Station option is enabled.

2-8.2 Drill Notification Pattern

The following coded patterns can be selected from the "Drill Notification Pattern" drop-down menu (cannot be used for intelligent NACS):

- 60 beats per minute (bpm)
- 120 bpm
- Temporal per ANSI S3.41
- Steady (i.e., non-coded).

All control unit based NACs programmed for a coded drill signal utilizes the pattern that is selected from this drop-down menu.

Note: The same drill notification pattern should be used for all control units in a networked system.

2-8.3 Timers

1. Select the **<Timers>** button; Figure 2-46 displays.

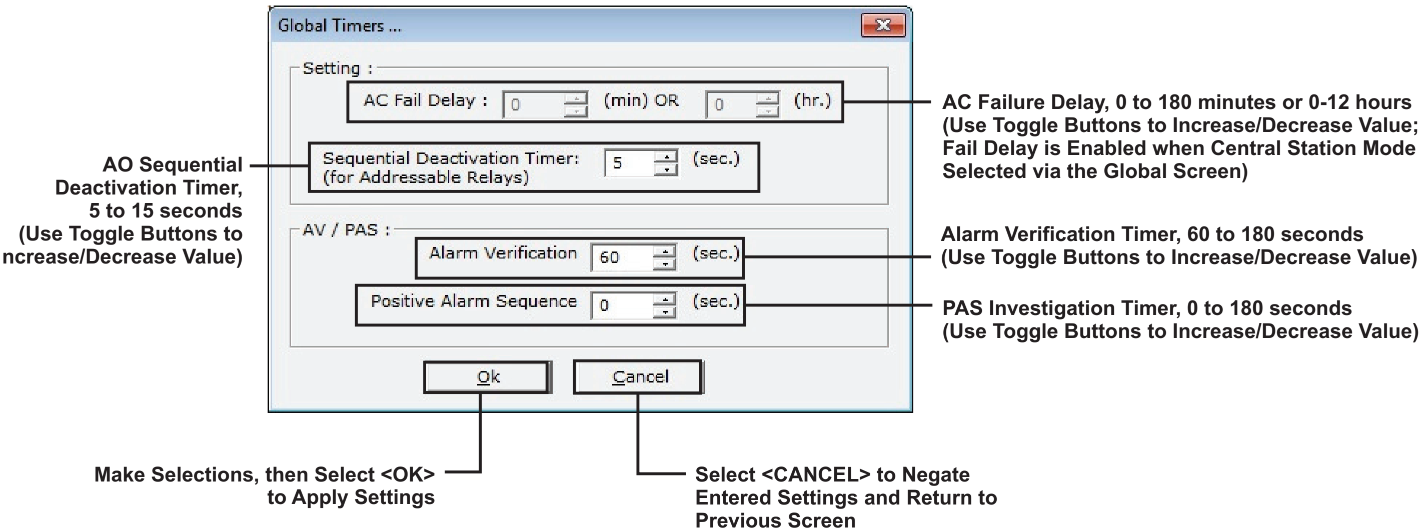

Figure 2-46. Global Timers Screen

The timing options on this screen are:

- **AC Fail Delay.**

  The off-premises transmission of an AC-power failure to a central station via the trouble relay can be delayed by selecting the "Central Station" option on the Global Tab. The delay period is programmable from 0 to 180 minutes or from 0 to 12 hours in one-unit increments.

- **Sequential Deactivation Timer.**

  A delay from 5 to 15 seconds can be inserted between successive deactivations of AOs configured for "Sequential Deactivation". Refer to Paragraph 2-3.2.

- **Alarm Verification Timer**

Note: Do not use alarm verification for special extinguishing system applications.

The period of time (after an initial alarm report) that a smoke detector attempts to verify that the smoke signature at its location actually exceeds its alarm threshold can be programmed to confirm that the initial alarm report was valid. The alarm verification period is programmable from 60 to 180 seconds in one-second increments.

Note: Use the same global timers for all control units in a networked system.

- **Positive Alarm Sequence (PAS) Timer**

Note: Do not use PAS for special extinguishing system applications.

The PAS investigation period can be programmed from 0 to 180 seconds in one-second increments. The initial PAS alarm report must be acknowledged within 15 seconds to activate the investigation period.

Note: Use the same global timers for all control units in a networked system.

2-8.4 General Alarm Outputs (GAO) List Screen

The General Alarm Outputs (GAO) list can be viewed by selecting the **<GAO List>** button. Figure 2-47 displays.

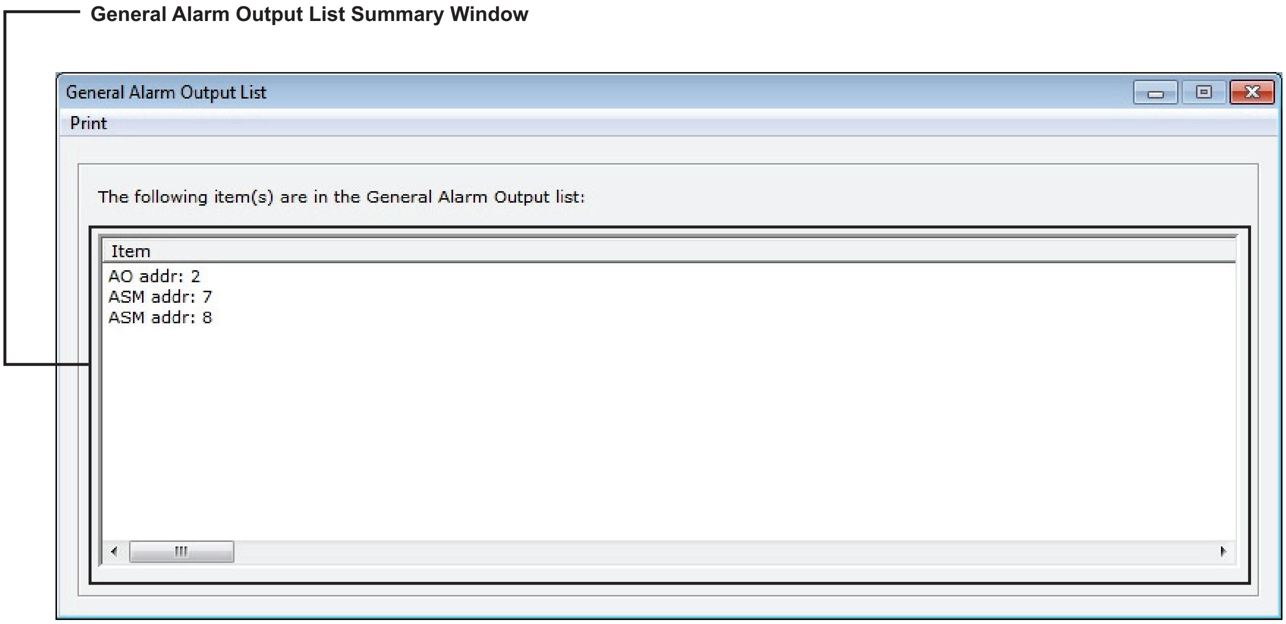

Figure 2-47. Typical General Alarm Outputs List Screen

2-8.5 Isolation Macros

Two lists of initiating devices and/or output control devices/circuits can be created which can be isolated via a single menu selection. The list of inputs and/or outputs to be isolated are assigned to isolation macros that are created when either the “Macro 1” or “Macro 2” button is selected. The “Macro 1” button creates one list of isolation commands and the “Macro 2” button creates a second list that is independent of the first. Each macro can process up to ten separate isolation commands. The specific isolation commands are executed when either the "Isolation Macro 1" or "Isolation Macro 2" menu option is selected. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001 for more information.

The isolation lists can include any of the following initiating devices, control modules or control unit based outputs individually or by address range:

- Automatic initiating devices
- Monitor modules
- Control modules
- Releasing circuits
- Notification-appliance circuits
- Combination notification appliance/releasing circuits
- Programmable relays
- HSSDs reporting via an IIM.
- Isolate the control unit from the network

Selecting the **<MACRO1>** button creates one list of isolation commands; selecting the **<MACRO2>** button creates a second list. Figure 2-48 displays.

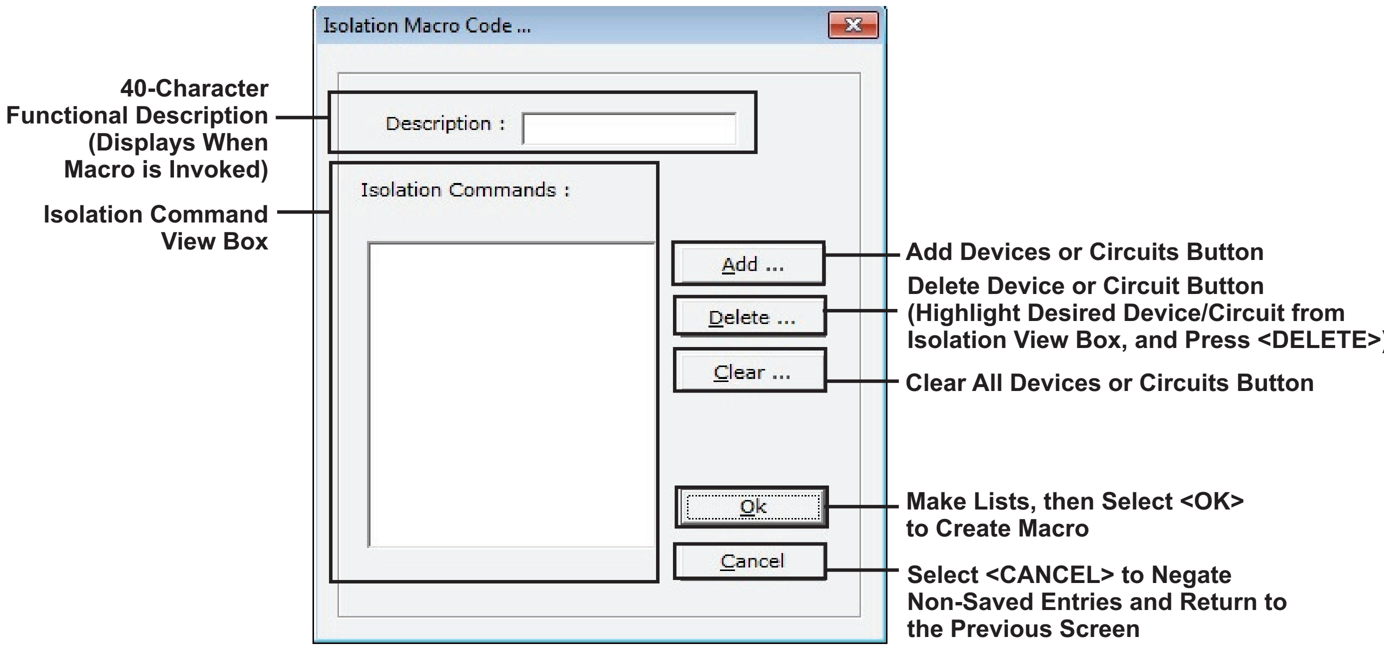

Figure 2-48. Typical MACRO Screen

1. Select the **<Add>** button. Choose the initiating devices and/or output devices/ circuits from the list shown in Figure 2-49.

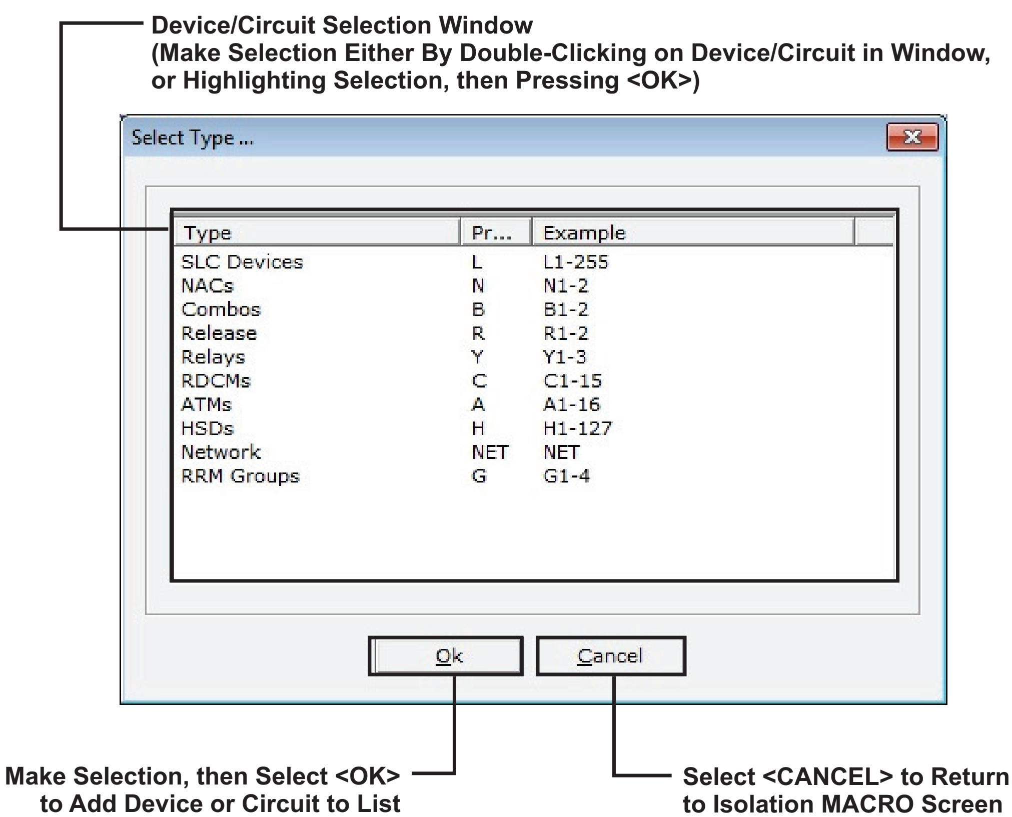

Figure 2-49. List of Selections for MACROs Screen

2. Select a device by either double-clicking on the device name or by highlighting the device name, and selecting **<OK>**. Figure 2-50 displays.

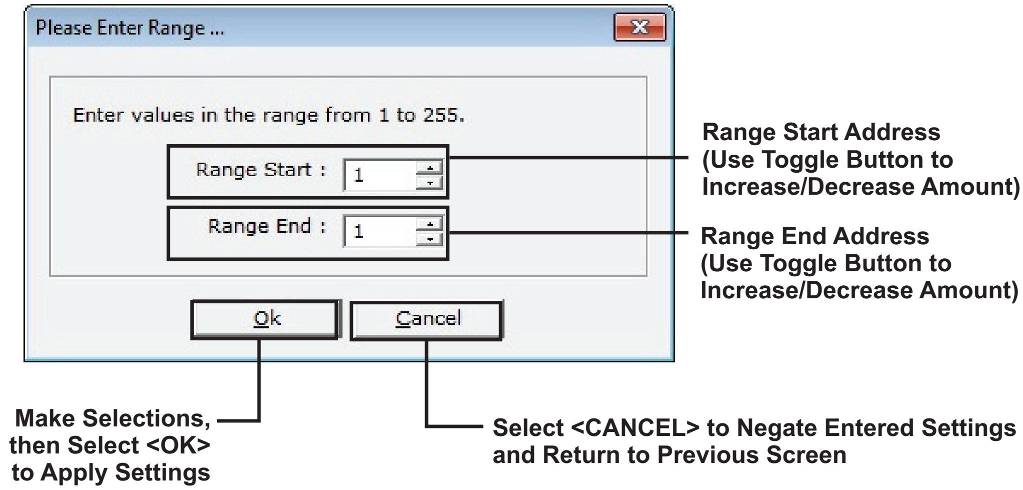

Figure 2-50. Device Range Definition for MACROs Screen

3. Enter the range of devices and/or circuits to be added. Select **<OK>** when complete.

2-9 DAY/NIGHT/WEEKEND TIME DEFINITION TAB

Select "Day/Night/Weekend" to determine the times that smoke detectors configured for day/ night/ weekend operation adjusts alarm thresholds. Figure 2-51 displays:

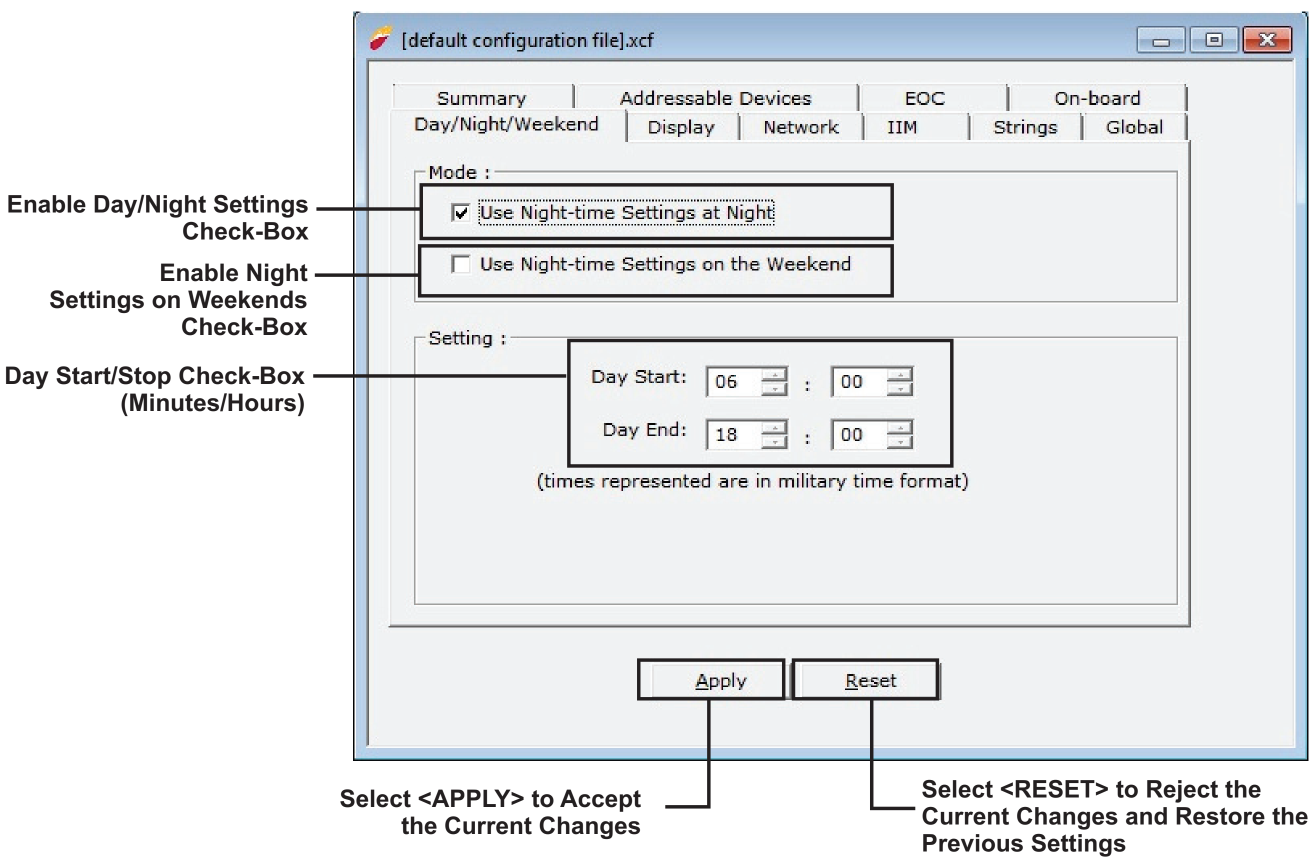

Figure 2-51. Day/Night Time Definition Tab

2-10 STRINGS (STRINGS TAB)

A string is an alphanumeric text output that is activated by an event output control (EOC) execution statement (refer to Chapter 3 for information on EOC). The text in the string can be up to 40 alphanumeric characters in length, and displays on the second line of the control unit's display in lieu of the normal event message that would ordinarily be displayed as a result of the system event. The string variable is placed on the output side of the EOC statement, like any other physical or virtual output.

String variables are defined in the Strings tab, as shown in Figure 2-52. To enter a string:

1. Double-click on the string variable name.
2. Enter the alphanumeric text in the screen that displays.
3. Select **<OK>** to assign the text to the string variable.
4. Enter the string in the EOC statement, as required. See Chapter 3 for more information on EOC statements.

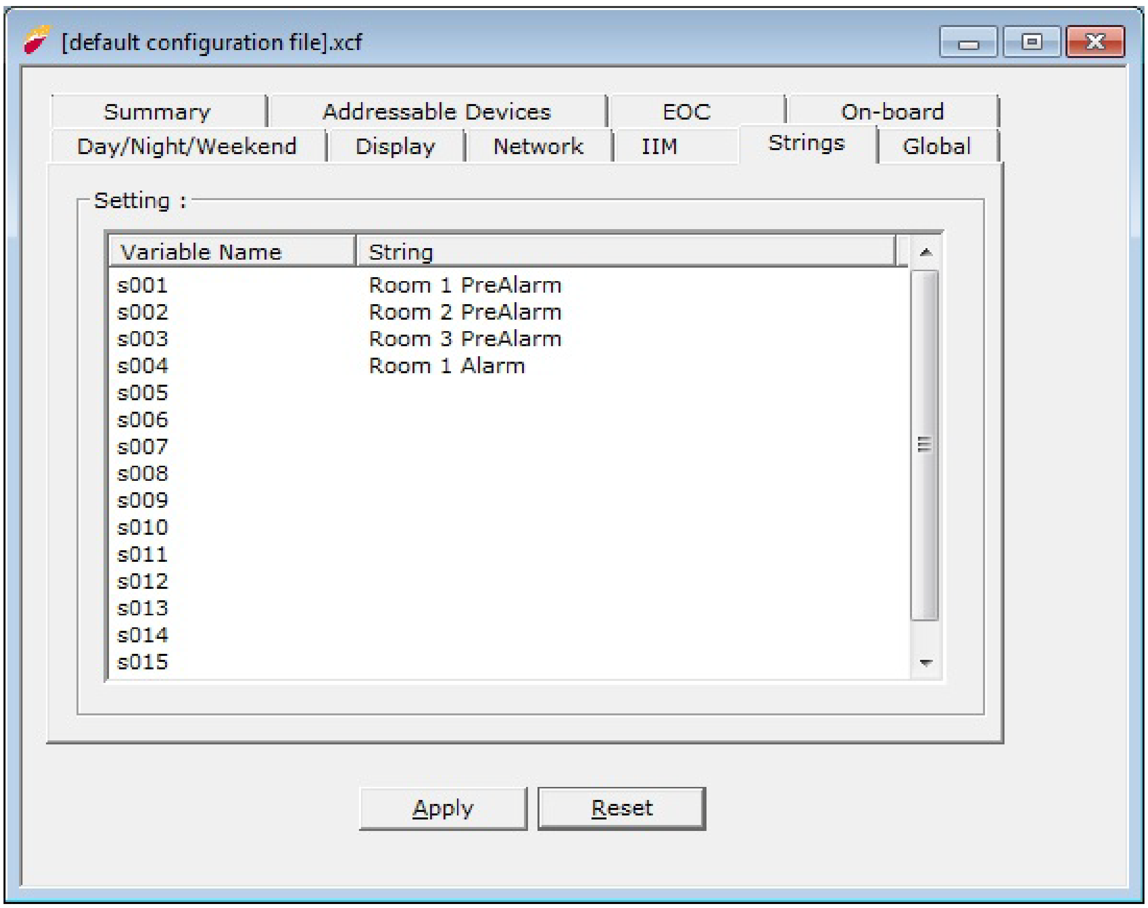

Figure 2-52. Strings Tab

The 16 possible strings are prioritized for display by the string's number (i.e., String #16 is the highest priority and String #1 is the lowest priority). The active string with the highest string number is the only string displayed on the second line of the display. A string becomes inactive via a subsequent "NOT" operator, via the subsequent clearing of the non-latching initiating condition that triggered it, or via a system reset.

The next highest priority string that is active is displayed whenever a currently-displayed string is deactivated by a subsequent EOC statement (by using NSx on the right-hand side of an EOC line), or by the clearing of the initiating condition that triggered it.

CHAPTER 3
EVENT OUTPUT CONTROL (EOC)

3-1 INTRODUCTION

The procedures in Chapter 2 discussed defining the scope of a specific application and assigning operating characteristics and functionality to SLC-based initiating and control devices and to control unit based output circuits. Chapter 3 discusses how to create the operating sequence (i.e., the initiating point to output device/circuit relationships) for an ARIES®-SLX system.

3-1.1 Event Output Control

Event Output Control (EOC) is the set of instructions that is executed in response to point specific alarm, supervisory, or trouble events. The objective is to trigger physical outputs (i.e., notification appliance circuits, release circuits and control modules) as the result of one or more initiating event(s) in accordance with the approved sequence of operations.

The general form of an EOC instruction is “expression=designated outputs”.

If the expression is True, or non-zero, then activate “designated outputs”.

An expression can be a simple argument (see Paragraph 3-2.1) or a compound argument (see Paragraph 3-2.2).

3-2 CONSTRUCTING ARGUMENTS

The constituents (i.e., variables) of the "expression" are of two general types:

- Independent variables that consist of physical initiating devices (automatic detectors or monitor modules). The types of physical initiating devices that are supported were discussed in Chapter 2.
- Dependent variables (i.e., Counting Identifiers or State Variables) that assume values during program execution. Dependent variables are incremented or change state as the result of some prior independent variable activation. They are placeholders either for the arguments that incremented them or for the execution of a specific EOC command.

Table 3-1 summaries the types of initiating devices and their effects on the system's physical and virtual outputs.

Table 3-1. Initiating Devices

Initiating Device			**Physical Outputs**		**Virtual Outputs**	
Device Type	**Event Created**	**Latching Initiating Device**	**Latching***	**Non-Latching****	**Logical Counting Identifier** (Ix)**	**State Variable* (Cx)**
Ion. Det.	Pre-Alarm	No	No	Yes	Yes	Yes
Ion. Det.	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
Ion. Det.	Supv.	Prog (Y/N)	No	Yes	Yes	Yes
Photo. Det.	Pre-Alarm	No	No	Yes	Yes	Yes
Photo. Det.	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
Photo. Det.	Supv.	Prog (Y/N)	No	Yes	Yes	Yes

Table 3-1. Initiating Devices

Initiating Device			Physical Outputs		Virtual Outputs	
Device Type	**Event Created**	**Latching Initiating Device**	**Latching***	**Non-Latching****	**Logical Counting Identifier** (Ix)**	**State Variable* (Cx)**
Heat Det.	Pre-Alarm	No	No	Yes	Yes	Yes
Heat Det.	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
Heat Det.	Cycling	No	No	Yes	Yes	Yes
CPDI Duct Det.	Pre-Alarm	No	No	Yes	Yes	Yes
CPDI Duct Det.	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
CPDI Duct Det.	Supv.	Prog (Y/N)	No	Yes	Yes	Yes
PSDI Duct Det.	Pre-Alarm	No	No	Yes	Yes	Yes
PSDI Duct Det.	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
PSDI Duct Det.	Supv.	Prog (Y/N)	No	Yes	Yes	Yes
HSD with PALM/ AIM	Pre-Alarm	No	No	Yes	Yes	Yes
HSD with PALM/ AIM	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
HSD with PALM/ AIM	Supv.	Prog (Y/N)	No	Yes	Yes	Yes
Manual Station	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
Manual Release	Alarm	Yes	Yes	No	Yes	Yes
Alarm Contact	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
Abort Station	Abort	No	No	Yes	Yes	Yes
Waterflow Switch	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
Supv. Switch	Supv.	Prog (Y/N)	No	Yes	Yes	Yes
Normal	None	No	No	Yes	Yes	Yes
Trouble	Trouble	No	No	Yes	Yes	Yes
AAM	Pre-Alarm	No	No	Yes	Yes	Yes
AAM	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
AAM	Overheat	No	No	Yes	Yes	Yes
HSD (Level 1) via IIM	Pre-Alarm	No	No	Yes	Yes	Yes
HSD (Level 2) via IIM	Pre-Alarm	No	No	Yes	Yes	Yes
HSD (Level 3) via IIM	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
HSD (Level 4) via IIM	Alarm	Prog (Y/N)	Yes	No	Yes	Yes
* Does not track initiating devices. ** Tracks initiating devices.						

3-2.1 Simple Argument

A simple argument consists of a single independent or dependent variable. The physical initiating devices are represented by their SLC addresses. The designator "HSD" prefixes HSSD addresses when an IIM is used to network AnaLASER®-II or ORION XT smoke detectors.

3-2.2 Compound Arguments

A compound argument consists of a combination of two or more simple arguments. Both independent and dependent variables can be combined in a compound argument.

The combining operators used to create compound arguments are shown in Table 3-2.

Table 3-2. Combining Operators for Initiating Arguments

Operator	Symbol
And	*
Or	+
THRU	#

Each simple argument component of a compound argument constructed with "OR" or "THRU" Operators is capable of causing execution (or re-execution) of a particular EOC instruction. The 'OR' and '#' operators actually perform addition operations with the result being the sum of all terms that are active. This type of EOC instruction is executable or re-executable until all the simple argument components become true if the initiating devices are programmed for latching operation. Virtual outputs are capable of triggering the activation of physical outputs in another EOC statement when they change their value. They are also capable of continuously re-activating these outputs when they subsequently change their value again if the outputs have been de-activated or silenced.

All simple argument components of a compound argument constructed with "AND" Operators must be true for the compound argument to be true.

The truth or falsehood of a compound argument follows the rules ordinary Algebra. More than one type of combining operator can be used to construct a particular compound argument. The hierarchy for operator execution is as follows:

- “THRU” operators
- Compound arguments in parenthesis
- “Not” operators
- “And” operators
- “Or” operators

Note: The "THRU" operator is the most tightly bound, even more than parentheses (i.e., one cannot code 3#(…) or (…)#4 in an EOC line).

Compound arguments are evaluated sequentially from left to right on an EOC statement when all operators are of equal hierarchy.

3-2.2.1 "AND" OPERATOR

In previous versions of the control unit, the '*' "AND" operator was strictly a logical operator resulting in a TRUE (1) or FALSE (0) value.

The "AND" operator has been modified and enhanced to provide support for resounding. The result of the 'X*Y' operation shall be the value of the greater of the two factors as long as both factors are non-zero. If more than two factors are involved, the factors are read and processed from left to right. For example,

1#10=I1

20#30=I2

50#60=C3

I1*I2*C3=SG1,I4

If detector 1 activates, detectors 25 and 26 activate and device 52 activates, then SG1 turns ON and I4 is set to 2. I2 is the greatest of the 3 non-zero variables.

Subsequently if detector 5 alarms, only the outputs of line 1 are processed, and I1 is set to 2. The result of line 4 remains equal to 2, so SG1 does not reactivate if it has been silenced.

If an additional device from the range 50#60 activates, the C3 variable remains TRUE (equal to 1), so the right hand side of line 4 again does not get processed.

Should another detector from 1#10 or 20#30 alarm, then line 4 result, and I4, becomes 3 and SG1 re-activates if it had been silenced.

When there's no change in state on the left hand side of the equation, the right hand side does not get processed. In order to assure processing of every change of state, additional 'C' variables and extra lines of EOC are necessary.

The 'C' variables are limited to values of 0(FALSE) or 1(TRUE), while I variables are set to values representing the result of evaluating the left hand side. These concepts along with the new AND definition are used to provide support for resounding crossed-zone applications.

Refer to the following example, using non-latching initiating devices:

1. 1#10=I1,C1
2. 20#30=I2,C2
3. 50#60=I3,C3
4. NI1=NC1 $ necessary to set C1 to zero when I1 goes to zero
5. NI2=NC2 $ necessary to set C2 to zero when I2 goes to zero
6. NI3=NC3 $ necessary to set C3 to zero when I3 goes to zero
7. I1*C2*C3=SG1,I4
8. C1*I2*C3=SG1,I5
9. C1*C2*I3=SG1,I6

Since the C variables can only be 0 or 1, lines 7, 8 and 9 result in the value of I1, I2 and I3 respectively, when all three are non-zero. Therefore, any changes of state in the three ranges are processed and SG1 resounded whenever necessary.

3-3 OUTPUTS

An output can be a physical output or a virtual output.

3-3.1 Physical Outputs

Physical outputs can be any of the following types:

- **Control Unit-Based Circuits**. The types of outputs that are supported, with symbolic representations, are listed in Table 3-3.

Table 3-3. Control Unit-Based Outputs

Output Type	Symbolic Representation
Release Circuit No. 1	AR1
Release Circuit No. 2	AR2
NAC No. 1	SG1
NAC No. 2	SG2
Combo Number 1:	
Release Circuit	AR3
NAC	SG3
Combo Number 2:	
Release Circuit	AR4
NAC	SG4
Programmable Relay No. 1	RY1
Programmable Relay No. 2	RY2
Programmable Relay No. 3	RY3

- **SLC-Based Modules.** The types of modules that are supported are as follows:
  - Addressable Control Modules (AOs)
  - Addressable Signal Modules (ASMs)

Note: Each SLC-based module is referenced by its three-digit signaling line circuit address.

- **Remote, ATM Series Driver Modules.** A specific ATM output is referenced as follows:

  AM*y:z*

  where:

  y is the module address, 1 to 16

  z is the specific output, 1 to 32.

Refer to Table 3-1 for how physical outputs track or do not track the activation states of their associated initiating devices.

3-3.2 Virtual Outputs

Virtual outputs consist of State Variable and Counting Identifiers. Counting Identifiers(Ix) follow the result of evaluating the left hand side of the EOC equation which can include being set to zero. Saved Variables (C) are zeroed ONLY at reset and system initialization or when a subsequent “NOT” operation is executed to reset them.

3-3.2.1 COUNTING IDENTIFIERS (IX)

A Counting Identifier, symbolized by Ix, is initially activated by the execution of a specific EOC statement. The Counting Identifier becomes a placeholder for the argument that activated it. It can then be used as a substitute for its triggering argument in a subsequent EOC statement to activate additional physical outputs or to operate on other dependent variables. It can also be used as a substitute for its triggering argument in an EOC function (see Paragraph 3-6). Counting Identifiers assume the initiating device type identities of the arguments that activated them and track the activation or non-activation states of their associated initiating device type arguments as shown in Table 3-1.

The values assigned to a Counting Identifier depend upon the type of argument that activated it. It assumes the value of a counter when it is associated with a compound argument constructed with "OR" or "THRU" Operators. It assumes the value of “One” (“TRUE) or “Zero” (“FALSE”) when it is associated with a simple argument, with an argument constructed exclusively with State Variables (see Paragraph 3-3.2.2) or with an argument constructed exclusively with the Initiating Event Counting Function (see Paragraph 3-6.15).

Consider the following example of the use of a Counting Identifier as a substitute for a set of 100 alarm initiating devices addressed from 1 to 100, and therefore used as a counter:

1#100=I1 (3-1)

The value of I could range anywhere from 0 to 100 depending upon the number of concurrent and active alarm initiating events that occur within the set of 100 alarm initiating devices. Equation 3-1 represents a common application for a Counting Identifier where it triggers the initial activation and subsequent resounding of a notification appliance circuit via a statement like the following upon the receipt of one or more alarm initiating events:

I1=SG1 (3-2)

Any subsequent alarm increments the Counting Identifier, which creates the ability to resound notification appliance circuit SG1 if silenced.

Now consider the following example of the use of a Counting Identifier as a substitute for the activation of two groups of alarm initiating devices, one in the address range 1 to 50 and the other in the address range 51 to 100:

(1#50)*(51#100)=I1 (3-3)

The value of I1 shall be “zero”’, “one”, or more depending on how may detectors in the ranges of (1#50) and (51#100) are in alarm. **This equation is not sufficient to handle resounding, please refer to section 3-2.2.1 for proper programming.** Equation 3-3 represents a common application for a Counting Identifier where it triggers the activation of a Delay Function (see Paragraph 3-6.3 or Paragraph 3-6.4) for subsequent activation of outputs:

D(I1,30)=AR1 (3-4)

The output AR1 is not activated by the Delay Function in Equation 3-4 if I1 becomes "Zero" prior to the expiration of the 30-second delay period. I1 returns to “Zero” if and when there are no longer detectors in alarm in the range (1#50) or the range 51#100.

It is good practice to use a separate Counting Identifier as a substitute for one and only one expression. A Counting Identifier being used as a counter and activated and incremented by multiple expressions is separately and independently incremented by each expression.

Increments for the Counting Identifier triggered by different expressions are not cumulative. A Counting Identifier’s current value is determined by the value assigned to it on the most recently executed EOC command. Likewise, the truth or falsehood assigned to a Counting Identifier is the value assigned to it on the most recently executed EOC command. It is a dangerous practice to use a Counting Identifier as a logical variable for two or more expressions, particularly where fire extinguishing systems and critical process control interlocks are concerned.

All Counting Identifiers are re-initialized either to zero or "FALSE" upon a system reset.

3-3.2.2 STATE VARIABLE (CX)

A State Variable, symbolized by Cx, is a binary, true or false variable that is initialized to the "FALSE" (equals 0) value upon EOC file upload. It can be subsequently set to the "TRUE" (equals 1) value by the execution of a particular EOC statement. Like the Non-Saved Identifier, the State Variable becomes a placeholder for the argument that activated it. Accordingly, it can then be used as a substitute for its triggering argument in a subsequent EOC statement to activate additional physical outputs or to operate on other dependent variables. It can also be used as a substitute for its triggering argument in an EOC function (see Paragraph 3-6).

State Variables assume the initiating device type identities of the arguments that activated them, but do not track the activation or non-activation states of their associated initiating device type arguments as shown in Table 3-1. A State Variable, once activated and assigned a "TRUE" value, can only be re-assigned to its initial "FALSE" value by the subsequent execution of another EOC statement that re-initializes it to "FALSE" via the “Not” Operator (see Paragraph 3-5) or a successful system reset operation.

Do not use State Variables as counters to be associated with a compound argument constructed with "OR" or "THRU" Operators. They do not count, but only become “TRUE” (1).

Consider the following example of the use of a State Variable as a substitute for the activation of two alarm initiating devices anywhere in the address range 1 to 100 (see Paragraph 3-6.15 for a description of the Initiating Event Counting Function):

(1#100)>1=C1 (3-5)

The value of C1 is either "TRUE" or "FALSE" depending upon the truth or falsehood of the left hand side of Equation 3-5. The equation represents a common application for a State Variable where it triggers the activation of a Delay Function (see Paragraph 3-6.3 or Paragraph 3-6.4) for subsequent activation of outputs:

D(C1,30)=AR1 (3-6)

The output AR1 is activated unconditionally by the Delay Function in Equation 3-6 unless the State Variable C1 is re-initialized to "FALSE" by the execution of a subsequent EOC statement with an output "NC1" prior to the expiration of the 30-second delay period. See Paragraph 3-5 for a description of the "NOT" Operator.

All State Variables are re-initialized to "FALSE" upon a system reset.

WARNING **The "C" state variable cannot be used for activating silenceable outputs. The "C" state variable is not a counting variable and, therefore, will not reactivate or resound silenceable outputs on subsequent alarms after the control unit or system has been silenced.**

The following examples show correct and incorrect methods for activating silenceable outputs on a single node and a networked system:

Single Node Silenceable Output Activation:	
Correct Method: 1#10=I1 I1=SG1	**Incorrect Method**: 1#10=C1 C1=SG1
Remote Node Silenceable Output Activation:	
Correct Method: Node 1 EOC Code: 1#10=SG1 Node 2 EOC Code: F1:1#10=SG1	**Incorrect Method**: Node 1 EOC Code: 1#10=SG1,C1 Node 2 EOC Code: F1:C1=SG1

3-4 MULTIPLE OUTPUTS

A simple output consists of the activation or de-activation of one physical or virtual output. A compound output consists of the activation or de-activation (or some combination of both operations) of two or more physical or virtual outputs.

The operators used to create compound outputs are listed in Table 3-4.

Table 3-4. Combining Operators for Outputs

Operator	Symbol
And	,
THRU	#

Outputs activated by alarm events latch into the activated state regardless of whether the initiating device is configured for latching or Non-Latching operation, except when they are programmed for thermal cycling or time limit cutout operation. Outputs activated by either supervisory or trouble events follow the activation state of the initiating device or fault condition that activated them (i.e., they de-activate when the initiating device restores or the fault condition is corrected).

Exception: Cyclical alarm outputs are only activated for the ITLCO and CTLCO periods as discussed in Paragraph 2-3.9.

3-5 THE "NOT" OPERATOR

Physical outputs can be deactivated with the "NOT" (N) Operator triggered subsequently by the execution of another EOC statement. An activated (i.e., set to "TRUE") State Variable (Cx) can also be de-activated (i.e., re-initialized to "FALSE") by the "NOT" (N) Operator. A Counting Identifier (Ix), when used as a counter, can only be incremented in an EOC statement. It can never decrement, and therefore cannot be used with the "NOT" Operator as a negated virtual output.

The "NOT" Operator can be used in an argument where it checks for the absence of an initiating signal from a physical device or for the falsehood of a Counting Identifier (Ix) or a State Variable (Cx).

3-6 FUNCTIONS

An EOC Function activates outputs for a particular set of initiating conditions, delays execution of outputs for a certain period of time, modifies automatic initiating device thresholds, or alters outputs in a specific way when an argument activates. The following EOC functions are available:

3-6.1 Alarm Threshold Adjustment Function (Smoke Detectors Only)

The Alarm Threshold Adjustment Function changes the alarm thresholds of one group (*exp2*) of smoke detectors as the result of an alarm signal from any smoke detector in a second group (*arg1*) of detectors. The format of this function is:

exp1=x.y=Aarg2

where:

exp1 is an alarm initiating event or a combination of alarm initiating events

x.y is the new alarm threshold in percent per foot obscuration

arg2 is the range of smoke detectors whose alarm thresholds are to be adjusted

The adjusted alarm thresholds revert to programmed, standby thresholds upon system reset, or when *exp1* is a non-latching initiating device(s) or a Counting Identifier that subsequently goes false.

3-6.2 Pre-Alarm Threshold Adjustment Function (Smoke Detectors Only)

The Pre-Alarm Threshold Adjustment Function changes the pre-alarm thresholds of one group (*arg2*) of smoke detectors as the result of a pre-alarm signal from any smoke detector in a second group (*exp1*) of detectors. The format of this function is:

exp1=x.y=P*arg2*

where:

exp1 is a pre-alarm initiating event or a combination of pre-alarm initiating events

x.y is the new pre-alarm threshold in percent-per-foot obscuration

arg2 is the range of smoke detectors whose pre-alarm thresholds are to be adjusted

The adjusted pre-alarm thresholds revert to programmed, standby thresholds upon system reset or when *exp1* subsequently goes false.

3-6.3 Delayed Output Activation Function

The Delayed Output Activation Function delays the activation of *outputs* being activated by an alarm initiating condition (*arg*) for a specified period of time (*delay*). The format of this function is:

D(exp,delay)= outputs

where:

exp is an initiating event or a combination of initiating events

delay is the delay in seconds before outputs are activated

Note: The control unit automatically adds 3 seconds to the period of time specified in the *delay* parameter.

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

The Delayed Output Activation Function tracks the validity of the expression (exp) and interrupt its countdown, reset the delay period, and perform no actions if the argument becomes either “Zero” (in the case of a Counting Identifier), or “FALSE” (in the case of a State Variable or of an explicit argument).

An alarm argument latches the physical outputs associated with the Delayed Output Activation Function when the time delay period expires. Virtual Outputs and all other physical outputs not activated by alarm initiating events track the validity of the expression, and either will be “Zero” or "FALSE" in the case of Virtual Outputs or de-energize in the case of physical outputs if the argument becomes either non-incremental (e.g., in the case of tracking non-latching supervisory events) or "FALSE" (e.g., in the case of an explicit simple or compound trouble argument.

3-6.4 Delayed Output Activation Function (with Abort Interruption)

The Delayed Output Activation Function with Abort Interruption delays the activation of *outputs* being activated by an alarm initiating condition (*exp*) for a specified period of time (*delay*). The activation of any abort switch (*abort addresses*) interrupt the countdown delay and prevent outputs activation while the abort switch is active (see Paragraph 2-3.14.1 for exception when IRI Abort Option is selected). The format of this function is:

D(exp, delay, abort addresses)=outputs

where:

exp is an alarm initiating event or a combination of alarm initiating events

delay is the delay in seconds before outputs are activated

Note: The control unit automatically adds 3 seconds to the period of time specified in the *delay* parameter.

abort addresses is the comma delimited list of abort switch addresses

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

The Delayed Output Activation Function (with Abort Interruption) tracks the validity of the expression (*exp*) and interrupt its countdown, reset the delay period, and perform no actions if the expression becomes "FALSE".

The activation of any abort switch in the abort-switch list prior to the expiration of the countdown timer interrupts the count down of the timer in accordance with the operating characteristics of the abort switch. Refer to Paragraph 2-3.14.1 for abort-switch operating characteristics).

Note: Countdown timer interruption is not allowed after the countdown timer has begun to count down if the IRI option is selected.

All outputs associated with the Delayed Output Activation Function (with Abort Interruption) latch upon expiration of the time delay period.

3-6.5 Trouble Function for Initiating Devices

The Trouble Function for Initiating Devices activates *outputs* when a trouble condition occurs as defined in *exp*.

T(exp)=outputs

where:

exp is a trouble report from an initiating device or a combination of trouble reports from initiating devices

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

The Trouble Function for Initiating Devices tracks the validity of the expression (*exp*) and de-energizes its associated outputs if the expression becomes "FALSE".

3-6.6 General Trouble Function

The General Trouble Function activates *outputs* when any system trouble condition occurs.

GT=outputs

where:

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

The General Trouble Function tracks the Trouble State of the control unit and de-energizes its associated outputs when the Trouble State clears.

3-6.7 General Supervisory Function

The General Supervisory Function activates *outputs* when any system supervisory condition occurs.

GS=outputs

where:

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

The General Supervisory Function tracks the Supervisory State of the control unit and de-energizes its associated outputs when the Supervisory State clears.

3-6.8 Pre-Alarm Function for Initiating Devices

The Pre-Alarm Function for Initiating Devices activates *outputs* when a pre-alarm condition occurs as defined in *exp*.

P(exp)=outputs

where:

exp is an pre-alarm initiating event or a combination of pre-alarm initiating events. (These are Level-2 Pre-Alarm events for AnaLASER®-II or ORION XTs reporting via the IIM.)

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

The Pre-Alarm Function for Initiating Devices tracks the validity of the expression (*exp*) and de-energizes its associated outputs if the expression becomes "FALSE".

3-6.9 Warning Function for AnaLASER-II or ORION XTs reporting via the IIM

The Warning Function for AnaLASER or ORION XTs reporting via the IIM activates *outputs* when a Level-1 Pre-Alarm condition occurs as defined in *arg*.

W(arg)=outputs

where:

arg is an AnaLASER-II/ORION XT Level-1 Pre-Alarm initiating event or a combination of AnaLASER-II/ORION XT Level-1 Pre-Alarm initiating events

outputs are SLC-based modules, control unit-based circuits or virtual outputs.

The Warning Function for AnaLASER-IIs or ORION XTs reporting via the IIM tracks the validity of the argument (*arg*) and de-energizes its associated outputs if the argument becomes either non-incremental (e.g, in the case of tracking warning signals from HSSDs) or "false" (e.g., in the case of an explicit compound argument representing an HSSD warning event).

3-6.10 Level-2 Alarm Function for AnaLASER-II or ORION XTs reporting via the IIM

The Level-2 Alarm Function for AnaLASER-II or ORION XTs reporting via the IIM activates *outputs* when a Level-2 Alarm condition occurs as defined in *arg*.

X(arg)=outputs

where:

arg is an AnaLASER-II/ORION XT Level-2 Alarm initiating event or a combination of AnaLASER-II/ORION XT Level-2 Alarm initiating events

outputs are SLC-based modules, control unit-based circuits or virtual outputs.

The Level-2 Alarm Function for AnaLASER-II or ORION XT reporting via the IIM latches the physical outputs associated with it. Virtual outputs track the validity of the argument and are non-incremental or "false" in the case of Non-Latching Identifiers if the argument becomes either non-incremental (e.g., in the case of tracking non-latching HSSDs) or "false" (e.g., in the case of an explicit simple or compound argument or a Non-Latching Identifier substituting for a non-latching, compound HSSD Level-2 alarm event).

3-6.11 Notification Appliance Pattern Change Function to 60 BPM

This function changes a NAC's signal pattern to 60 beats per minute.

SGx/60

where:

SGx is a control unit-based notification appliance circuit.

An alarm event or an irrevocable event such as the expiration of a delayed-alarm output activation function (with abort interruption) latches the associated notification appliance circuit to 60 BPM via the Notification Appliance Pattern Change Function. The NAC in all other cases tracks the validity of the argument and de-energize if the argument becomes either non-incremental (e.g., in the case of tracking non-latching supervisory events) or "FALSE" (e.g., in the case of an explicit simple or compound argument or a Virtual Output substituting for a compound trouble argument).

Exception: Cyclical alarm outputs are activated only for the ITLCO and CTLCO periods as discussed in Paragraph 2-3.9.

Note: Do not use this function for Intelligent NACs.

3-6.12 Notification Appliance Pattern Change Function to 120 BPM

This function changes a NAC's signal pattern to 120 beats per minute.

SGx/120

where:

SGx is a control unit-based notification appliance circuit.

An alarm event or an irrevocable event such as the expiration of a delayed-alarm output activation function (with abort interruption) latches the associated notification appliance circuit to 120 BPM via the Notification Appliance Pattern Change Function. The NAC in all other cases tracks the validity of the argument and de-energize if the argument becomes either non-incremental (e.g., in the case of tracking non-latching supervisory events) or "FALSE" (e.g., in the case of an explicit simple or compound argument or a Virtual Output substituting for a compound trouble argument).

Exception: Cyclical alarm outputs are activated only for the ITLCO and CTLCO periods as discussed in Paragraph 2-3.9.

Note: Do not use this function for Intelligent NACs.

3-6.13 Notification Appliance Pattern Change Function to Temporal Coding

This function changes a NAC's signal pattern to the temporal code.

SGx/T

where:

SGx is a control unit-based notification appliance circuit.

An alarm event or an irrevocable event such as the expiration of a delayed-alarm output activation function (with abort interruption) latches the associated notification appliance circuit to temporal coding via the Notification Appliance Pattern Change Function. The NAC in all other cases tracks the validity of the argument and de-energize if the argument becomes either non-incremental (e.g., in the case of tracking non-latching supervisory events) or "FALSE" (e.g., in the case of an explicit simple or compound argument or a Virtual Output substituting for a compound trouble argument).

Exception: Cyclical alarm outputs are only activated for the ITLCO and CTLCO periods as discussed in Paragraph 2-3.9.

Note: Do not use this function for Intelligent NACs.

3-6.14 Notification Appliance Pattern Change Function to Continuous Output

This function changes a NAC's signal pattern to a steady (i.e., non-coded) output.

SGx/C

where:

SGx is a control unit-based notification appliance circuit.

An alarm event or an irrevocable event such as the expiration of a delayed-alarm output activation function (with abort interruption) latches the associated notification appliance circuit to continuous output via the Notification Appliance Pattern Change Function. The NAC in all other cases tracks the validity of the argument and de-energize if the argument becomes either non-incremental (e.g., in the case of tracking non-latching supervisory events) or "FALSE" (e.g., in the case of an explicit simple or compound argument or a Virtual Output substituting for a compound trouble argument).

Exception: Cyclical alarm outputs are only activated for the ITLCO and CTLCO periods as discussed in Paragraph 2-3.9.

Note: Do not use this function for Intelligent NACs.

3-6.15 Initiating Event Counting Function

A special EOC Function is the Counting Function for Initiating Devices and Counting Variables (>*n*) whose general form is illustrated below. Outputs activate when the number of single or combinations of alarm initiating events as defined in *exp* exceeds *n*.

(exp)>n=outputs

where:

exp is an initiating event, a combination of initiating events, or a virtual output.

n is the number of initiating events required to activate the outputs.

outputs are SLC-based modules, control unit-based circuits, a string or virtual outputs.

Note: The above initiating expression, i.e., (*exp)>n*, can be used with other simple arguments and the "OR" and "AND" Operators discussed in Paragraph 3-2.2 to create compound arguments. It can also be used as all or part of the arguments described in Paragraph 3-6.1 through Paragraph 3-6.5. Refer to Table 3-5 for special requirements when creating compound arguments with the Initiating Event Counting Function.

An alarm argument latches the physical outputs associated with the Initiating Event Counting Function when the designated count is exceeded.

3-7 CONSTRUCTING ARGUMENTS FOR INITIATING EVENTS FROM REMOTE, NETWORKED CONTROL UNITS

Arguments that consist of initiating events from remote, networked control units must be prefixed with the letter F, the network node number, and a colon (i.e., :).

3-7.1 Remote-Node Simple Arguments

A remote-node simple argument consists of the network-node prefix and the three-digit SLC address of the initiating device on the remote node. For example, a simple argument using the initiating device at Address 21 on Node 3 would be referenced in any other node as follows:

- F3:021

The designator "HSD" prefixes HSSD addresses when an IIM is used for the remote node.

3-7.2 Remote-Node Compound Arguments

A remote-node compound argument consists of a combination of two or more simple arguments. However, there is one instance where it is not necessary to prefix all the simple arguments with the letter F, the network node number, and a colon. The "THRU" Combining Operator should be used as follows to reference all initiating points at addresses 1 through 20 on Node 2 in any other node:

- F2:1#20.

All other compound arguments that reference remote-node initiating devices require that all the remote-node initiating devices be prefixed with the letter F, the network node number, and a colon. For example, references to initiating points 8, 12, and 15 on Node 1 would be entered in any other node as follows:

- F1:8+F1:12+F1:15.
- F1:8*F1:12*F1:15.

A complete summary of EOC operators and functions, with specific examples of usage, is presented in Table 3-5.

3-7.3 Remote State Variable (Fy:Cx)

The Cx State Variables described above can be used across networked control units. The proper usage of this feature is an operator ‘Fy:Cx’, where ‘y’ is a valid node number and ‘x’ is a valid ‘C’ variable number used on the ‘y’ node. These network state variables are processed the same way non-networked state variables are processed by the control unit. Whenever the state variable changes on the originating node, a network message is generated with the new value, “TRUE” or “FALSE”, of the variable. When control units receive the C variable network messages, the local EOC is processed.

‘Fy:Cx’ cannot be used on the right hand side of EOC equations. Control units cannot change state variables originating on other nodes. Networked state variables are read only.

Note: There is no verification between control unit configurations, so it is imperative that the EOC programs for different nodes sharing state variables are manually and thoroughly reviewed to be sure there are no errors.

WARNING **The “C” state variable cannot be used for activating silenceable outputs across a network. Refer to Section 3-3.2.2 for further information and EOC code examples.**

Table 3-5. EOC Operators and Functions

Operator or Function	Symbol or General Form	Typical Examples	Description
"AND" for Initiating Devices and/or Initiating Conditions	* (i.e., "multiplication" symbol)	1*3	1 and 3 **Note:** Arguments may be enclosed within parentheses if used with other operators (e.g., "+" or "#") in a compound conditional activation statement. Arguments in parenthesis are evaluated first. For example: (1*3)+10=SG1 This statement translates to "Turn on SG1 if 1 and 3 activate or if 10 activates".
"OR" for Initiating Devices and/or Initiating Conditions	+ (i.e., "addition" symbol)	10+12	10 or 12 **Note:** Arguments may be enclosed within parentheses if used with other operators (e.g., "*" or "#") in a compound conditional activation statement. Arguments in parenthesis are evaluated first. For example: (1+3)*10=SG1 This statement translates to "Turn on SG1 if 1 or 3 activates and if 10 also activates".
"THRU" for Initiating Devices, Counting Identifiers and Outputs	# (i.e., "pound" symbol)	1#20	Any initiating device 1 through 20. **Note:** Arguments for initiating devices may be enclosed within parentheses if used with other operators (e.g., "*" or "+") in a compound conditional activation statement. Arguments in parenthesis are evaluated first. For example: (1#20)+50=SG1#SG4 This statement translates to "Turn on SG1 and SG4 if any address 1 through 20 activates or if address 50 activates".
Execution	= (i.e., "equal" symbol)	45=SG1	Turn on SG1 if initiating device 45 activates.
"AND" for Outputs	, (i.e., comma)	4=AR1,SG1	Turn on AR1 and SG1 if initiating device 4 activates.

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Alarm Threshold Adjustment (smoke detectors only)	*exp1=x.y=Aarg2* where: *exp1* is an alarm initiating event or combination of alarm initiating events *x.y* is the new alarm threshold for each detector in *arg2*. *arg2* is the range of smoke detectors whose alarm thresholds are to be adjusted.	1#20=1.0=A21#40	Change the alarm threshold to 1.0% per foot for each detector in the address range 21 through 40 if any detector in the address range 1 through 20 reports an alarm. **Note:** The alarm initiating condition (i.e., *exp1*) and the adjusted smoke detector range (i.e., *arg2*) can be any valid simple or compound arguments using multiple operators or types of operators. Commas are required to delimit the simple or compound outputs for alarm threshold adjustment. For example: 1+10#20=1.0=A2,1.0=A21#30 This statement translates to "Change the alarm threshold to 1.0% per foot for the detector at address 2 and for each detector in the address range 21 through 30 if the detector at address 1 or any detector in the address range 10 through 20 reports an alarm".
Delayed Output Activation	*D(exp,delay)= outputs* where: *exp* is an initiating event or combination of initiating events *delay* is the delay is seconds before outputs are activated (max. 300 seconds) *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs	D(2*3,30)=RY1	Turn on RY1 after a 30-second delay if both initiating devices 2 and 3 activate. **Note:** Parentheses as shown are required. The initiating condition (i.e., *exp*) for the delay operator can be any valid simple or compound argument using one or more operator types such as "+", "#", or ">n". EOC continuously loops back to the initial program statement and rerun entirely until the last activated delayed output activation statement has successfully executed.

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Counting Identifier (Max. 255 identifiers)	*Ix* where: *x* is any number from 1 to 255	5#10=I1 I1=RY1,RY3	Counting Identifier I1 increments its current value and cause execution or re-execution of any subsequent statement using it as a conditional input trigger if any initiating device 5 through 10 activates. Counting Identifiers must be assigned to specific initiating expressions before they can trigger outputs in subsequent execution statements. Relay 1 and Relay 3 activates if any initiating device in the address range 5 to 10 activates. **Note:** Use one Counting Identifier for each unique initiating expression. Counting Identifiers cannot be used with the NOT Operator on the output side of an EOC statement.
NOT	N	1*N2=SG1 (1) 5=NSG1,SG4 (2)	Checks for the absence of an initiating signal in a conditional execution statement as in Example (1). Turns off previously activated outputs in a conditional execution statement as in Example (2). **Note:** The negated initiating condition can be any valid simple or compound argument using multiple operators or types of operators. Parentheses are required to delimit the argument. For example on the left side: N(1+5) is equivalent to N1+N5.

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Pre-Alarm Threshold Adjustment (smoke detectors only)	*exp1=x.y=Parg2* where: *exp1* is a pre-alarm initiating event or combination of pre-alarm initiating events *x.y* is the new pre-alarm threshold for each detector in *arg2* *arg2* is the range of smoke detectors whose pre-alarm thresholds are to be adjusted	1#20=1.0=P21#40	Change the pre-alarm threshold to 1.0% per foot for each detector in the address range 21 through 40 if any detector in the address range 1 through 20 reports a pre-alarm condition. **Note:** The initiating condition (i.e., *exp1*) and the adjusted smoke detector range (i.e., *arg2*) can be any valid expression using multiple operators or types of operators. Parentheses are required to delimit the simple or compound outputs for pre-alarm threshold adjustment. For example: 1+10#20=1.0=P2,1.0=P21#30 This statement translates to "Change the pre-alarm threshold to 1.0% per foot for the detector at address 2 and for each detector in the address range 21 through 30 if the detector at address 1 or any detector in the address range 10 through 20 reports a pre-alarm condition".
State Variable (Max. 255 Variables)	*Cx* where: *x* is any number from 1 to 255	5#10=C1 C1=RY1,RY3,NC1	State Variable C1 is "TRUE" and causes execution of any subsequent statement using it as a conditional input trigger if any initiating device 5 through 10 activates. All State Variables are initially "FALSE" until changed to "TRUE" by the execution of a program statement. A State Variable can be re-initialized to "FALSE" by the NOT Operator during the execution of a subsequent program statement. Relays 1 and 3 activate and C1 is re-initialized to “FALSE” in this example. **Note:** Use oneState Variable for each unique system state condition.

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Delayed Output Activation (with Abort Interruption)	*D(exp,delay,abort addresses)=outputs* where: *exp* is an alarm initiating event or a combination of alarm initiating events *delay* is the delay is seconds before outputs are activated (max. 300 seconds) *addresses* is the comma delimited list of abort switch addresses (including remote) *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs	D(2*3,30,9,10)= AR1,SG1	Turn on AR1 and SG1 after a 30-second delay if both initiating devices 2 and 3 activate. Interrupt the countdown if either 9 or 10 activate before the expiration of the time delay. **Note:** Parentheses as shown are required. Counting Identifiers and State Variable can be used for the delay function's initiating condition. The initiating condition (i.e., *exp*) for the delay function can be a compound argument using the "+", "#", or ">n" Operators. Do not use the "+" or "#" Operators in the Abort Field. EOC continuously loops back to the initial program statement and rerun entirely until the last activated delayed output activation statement has successfully executed.
Counting Zone for Initiating Devices	*(exp)>n=outputs* where: *exp* is an initiating event or a combination of initiating events *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs Ni is the threshold above which the function activates	(5#15)>1=SG1	Turn on SG1 if more than one of the alarm initiating devices in the address range 5 through 15 activates. **Note:** Parentheses as shown are required. The alarm initiating condition (i.e., *exp*) for the Counting Zone Function can be any valid simple or compound argument using one or more operator types such as "+" or "*". The Counting Zone Function can be combined with other operators (e.g., "+" or "#") to create a compound conditional activation statement. For example: I1+(5#15)>1=AR1 Counting zone operations should be enclosed in parenthesis, for clarity, but it is not necessary. For example: ((5#15)>1)+I1=AR1 The above statements are equivalent, and translate to "Turn on AR1 if Counting Identifier I1 becomes “TRUE” or if any two initiating devices in the address range 5 through 15 activate".

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Notification Appliance Pattern Change to 60 BPM	*SGx/60* where: *SGx* is a control unit-based notification appliance circuit.	1#20=SG1/60	Turn on SG1 with a 60 BPM pattern (and override the current pattern, if activated) when any device in the address range 1 through 20 activates. **Note**: Do not use this function for Intelligent NACs.
Notification Appliance Pattern Change to 120 BPM	*SGx/120* where: *SGx* is a control unit-based notification appliance circuit.	1#20=SG1/120	Turn on SG1 with a 120 BPM pattern (and override the current pattern, if activated) when any device in the address range 1 through 20 activates. **Note**: Do not use this function for Intelligent NACs.
Notification Appliance Pattern Change to Temporal Coding	*SGx/T* where: *SGx* is a control unit-based notification appliance circuit.	1#20=SG1/T	Turn on SG1 with the temporal pattern (and override the current pattern, if activated) when any device in the address range 1 through 20 activates. **Note**: Do not use this function for Intelligent NACs.
Notification Appliance Pattern Change to Continuous Output	*SGx/C* where: *SGx* is a control unit-based notification appliance circuit.	1#20=SG1/C	Turn on SG1 with a continuous output (and override the current pattern, if activated) when any device in the address range 1 through 20 activates. **Note**: Do not use this function for Intelligent NACs.
Trouble for Initiating Devices	*T(exp)=outputs* where: *exp* is a trouble report or a combination of trouble reports from initiating devices *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs	T(1#20)=100	Activate Addressable Output (AO) 100 if any initiating device in the address range 1 through 20 issues a trouble report. **Note:** Parentheses as shown are required. The initiating condition (i.e., *exp*) for the Trouble Operator can be any valid simple or compound argument using one or more operator types such as "+", "#", or "*" Do not use the Trouble for Initiating Devices Function for an AI Monitor Module programmed as a trouble initiating device.
General Trouble	*GT=outputs* where: *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs	GT=100	Activate Addressable Output (AO) 100 if any system trouble event occurs.

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
General Supervisory	*GS=outputs* where: *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs	GS=100	Activate Addressable Output (AO) 100 if any system supervisory event occurs.
Pre-Alarm	*P(exp)=outputs* where: *exp* is a pre-alarm initiating event or a combination of pre-alarm initiating events *outputs* are SLC-based modules, control unit-based circuits, a string or virtual outputs	P(1#20)=SG1	Activate SG1 if any initiating device in the address range 1 through 20 issues a pre-alarm report. **Note:** Parentheses as shown are required. The initiating condition (i.e., *exp*) for the Pre-Alarm Function can be any valid simple or compound argument using one or more operator types such as "+", "#", or "*".
Mapping a Single Annunciator	AM*x:y*	GT=AM2:3 GS=NAM16:32	Annunciator circuit #3 on ATM module #2 becomes active when the General Trouble activates. Annunciator circuit #32 on ATM module #16 becomes active when the General Supervisory activates.
Mapping Annunciators	MAP *list*= AM*w:x*#AM*y:z*	MAP C2,GT,1#3=AM2:30#AM3:2$ maps C2 to AM2:30, GT to AM2:31, 1 to AM2:32, 2 to AM3:1, and 3 to AM3:2	These mapping lines would normally be at the end of an EOC program, but could appear anywhere, especially if one wanted to find out the intermediate value of a Counting Identifier or State Variable (possibly for EOC debugging purposes). Single annunicator setting continues to be done as before.

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Warning for AnaLASER-II/ORION XTs Reporting via IIM	*W(arg)=outputs* where: *arg* is an AnaLASER-II/ORION XT Level-1 Pre-Alarm initiating event or a combination of AnaLASER-II/ORION XT Level-1 pre-alarm initiating events *outputs* are SLC-based modules, control unit-based circuits or virtual outputs	W(HSD001#HSD005)=SG1	Activate SG1 if any AnaLASER-II/ ORION XT in the address range 1 through 5 issues a warning report. (This is a Pre-Alarm Level 1 for AnaLASER-II/ORION XTs). **Note:** Parentheses as shown are required. The initiating condition (i.e., *arg*) for the Warning Function can be any valid simple or compound argument using one or more operator types such as "+", "#", or "*".
Alarm Level 2 for AnaLASER-II/ORION XTs Reporting via IIM	*X(arg)=outputs* where: *arg* is an AnaLASER-II/ORION XT Level-2 Alarm initiating event or a combination of AnaLASER-II/ORION XT Level-2 Alarm initiating events *outputs* are SLC-based modules, control unit-based circuits or virtual outputs	X(HSD001#HSD005)=SG1	Activate SG1 if any AnaLASER-II/ ORION XT in the address range 1 through 5 issues a high-level-alarm report. (This is an Alarm Level 2 for AnaLASER-II/ORION XTs). **Note:** Parentheses as shown are required. The initiating condition (i.e., *arg*) for the Level-2 Alarm Function can be any valid simple or compound argument using one or more operator types such as "+", "#", or "*".

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Remote Control Unit Initiating Event	Fx:arg=outputs where: *x* is the remote control unit node number from 1 to 32 *arg* is an alarm-initiating event or a combination of alarm-initiating events from the remote control unit of the following generalized types: start address#end address or, The "OR" Operator (+) cannot be used to construct a compound argument as shown above. The "OR" Operator creates separate terms that must be prefixed with Fx:. *outputs* are outputs activated by the F5:1#50=SG1 F3:7*10=AR1 Control unit that received the remote initiating event(s)	F5:001#50=SG1 F5:2 = SG1 F3:007*F3:10=AR1	Activate SG1 if any initiating device in the address range 1 through 50 on Node No. 5 issues an alarm report. Activate AR1 if initiating devices at addresses 7 and 10 on Node No. 3 both issue an alarm report. Note: Do not use the parenthesis to reference a remote control unit initiating event or compound events unless these events are being “anded” with initiating devices or an identifier in the local control unit. (F1:5#15)*I1=AR1 The above statement translates to “Turn on AR1 if Non-Latching Identifier I1 is the local system increments and if any initiating device in the address range 5 through 15 on Node No. 1 activates.
Networked Saved Stage Variable (Max. 255 Variables for each node)	Fy:Cx Where: *x* is any number from 1 to 255 and *y* is any number from 1 to 32	F15:C1=RY1,RY3	If the State Variable C1 defined on node 15 becomes "TRUE", then RY1 and RY2 shall activate. **Note**: A networked State Variable cannot be changed and as such cannot be used on the right hand side of EOC equations.
Network General Supervisory	Fy:GS	F8:G5 = SG2	
Network General Trouble	Fy:GT	F9: GT = SG1	

Table 3-5. EOC Operators and Functions (Continued)

Operator or Function	Symbol or General Form	Typical Examples	Description
Comment	$	$ General Alarm Condition or (any of the above) $ comment	Used to indicate a non-operational program line or end of statement on a line. **Note:** Use the minimum number of comment lines to properly document the flow and logic of the EOC application. Each comment line counts toward the limit of 256 EOC lines, and slightly extends the time required to execute the specific application.
RRM Grouping Activation	RGx Where: RG is the release group in which RRM's are assigned to via the configuration software x is the group number between 1 and 4	100*200=RG1	Activate Release Group 1 when addresses 100 and 200 report an alarm condition.

3-8 CREATING EVENT OUTPUT CONTROL (EOC TAB)

The section of the program that stores EOC execution statements is invoked when the "EOC" tab is selected; Figure 3-1 displays.

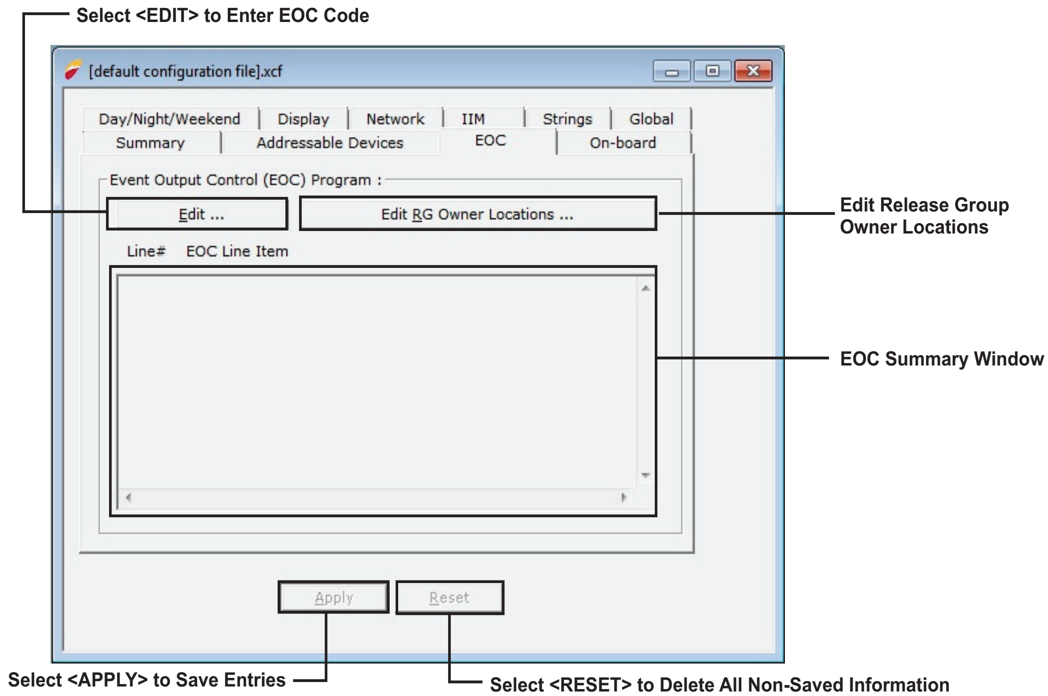

Figure 3-1. EOC Creation Screen

1. Enter EOC execution statements in free-form format just as if using a standard word processing program. It is not necessary to create line numbers for EOC statements. Figure 3-2 shows EOC code that has been entered via the program's free-form text editor.

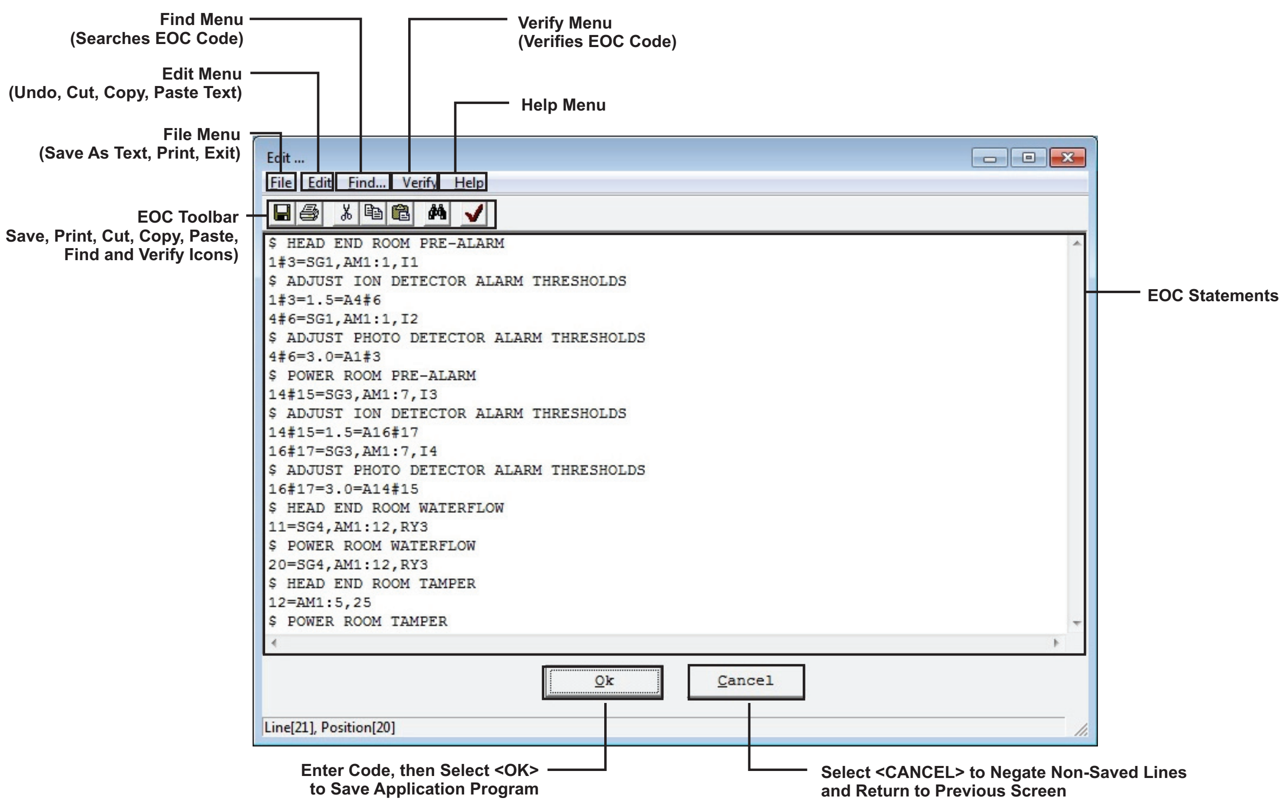

Figure 3-2. EOC Text Editor Screen

2. Select **<OK>**. Figure 3-3 shows the saved EOC code after **<APPLY>** has been selected. If the program detects an undefined SLC device or a syntax error, Figure 3-4 displays when exiting the EOC tab. Edit the EOC code as necessary to remove all errors and warnings.

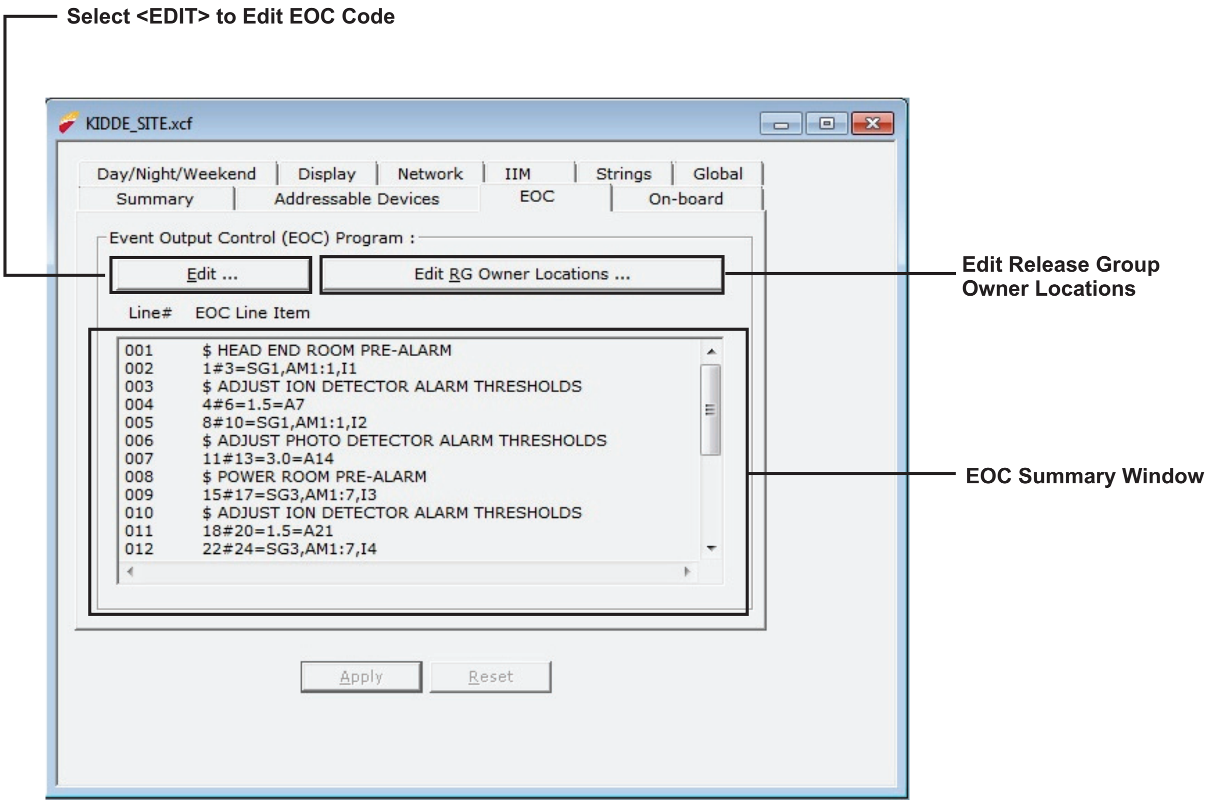

Figure 3-3. Saved EOC Code Screen

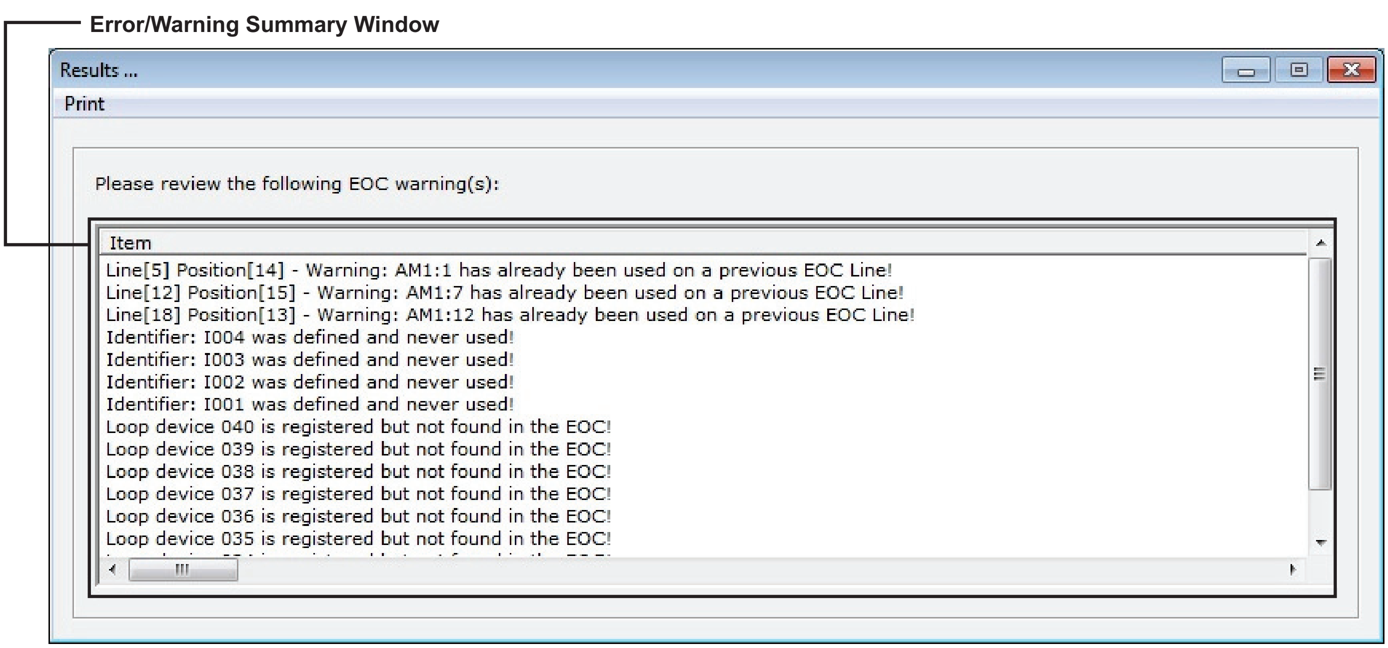

Figure 3-4. EOC Error and/Warning Screen

3-9 STRUCTURING EVENT OUTPUT CONTROL

In general, one EOC statement needs to be written for each input-to-output operating sequence required for the specific application. Up to 256 EOC statements can be used for any application, and an EOC statement can have up to 128 characters. Use the following guidelines to construct an EOC application:

1. Arrange the sequence of EOC statements from the start to the end of the application according to the following event priority:
   - Alarm
   - Supervisory
   - Trouble

   Note: All alarm events must be annunciated by public mode notification.
2. Put the most likely to be executed statements at the start of the prioritized segments above. This means that statements with simple arguments or compound arguments constructed with either "OR" (+) or "THRU" (#) Operators should be entered first in each prioritized segment.
3. Use a separate Counting Identifier or State Variable for each compound argument that is used on more than one EOC statement.
4. Never use a Counting Identifier to trigger outputs unless it has been defined first in a prior EOC statement.
5. If possible, activate physical and virtual outputs in the same EOC statement to keep the number of statements to as few as possible.
6. Write the pre-release, release, and post-release EOC statements on consecutive lines for each special extinguishing system. A separate pre-release statement is typically required because release outputs are not activated until after the expiration of a time delay. Enter these statements in ascending order according to the more progressively serious alarm condition (i.e., write the pre-alarm statement first, the pre-release statement second, and the release statement third).

   Note: The following requirements apply to special extinguishing systems:
   - The pre-alarm state must be annunciated by distinctive public mode notification.
   - The pre-release state must be annunciated by public mode notification different from the pre-alarm state public notification mode.
   - The release state must be annunciated by public mode notification different from both the pre-alarm state and pre-release state public notification modes.
7. The manual release station(s) for a special extinguishing system must appear in the arguments of the pre-alarm, pre-release, and release statements for the system if required interlocks such as door closures, airflow shutoff, and power down procedures are distributed throughout these three alarm stages.
8. Place the least likely to be executed statements at the end of the prioritized segments in 1). For example, open area smoke detectors are more likely to activate before duct detectors because of the high smoke dilution factors associated with duct detection. Therefore statements associated with duct detectors should be entered after the statements associated with open area detectors and after any special extinguishing system execution statements.
9. Add in remote alarm-initiating events from other networked control units according to the guidelines 2) through 7), but add them after the control unit's local events. Arrange remote alarm-initiating events in ascending order by network node number.
10. It is recommended that the terms involved in contiguous "ANDing" be limited to only one term that can have a value of more than 1, and the rest limited to logical "TRUE" or "FALSE" only. For example, 'I1 * NI2 * N(10#40)' is good but '10#40 * I3' is not. Refer to Paragraph 3-2.2.1 for more information.

11. Outputs should be dedicated to a single notification or function type and should, therefore, not be shared by alarm and non-alarm notifications.
12. When configuring a system for ITLCO/CTLCO cycling, program the ITLCO/CTLCO inputs and outputs on a dedicated line(s) of EOC. Do not include other non-ITLCO/CTLCO inputs or outputs on the same line of EOC.
13. When using the “AND” operator with ITLCO/CTLCO inputs, the “AND” condition is required to get the cycling started— both conditions of the “AND” must be true. However, the cycling will continue if either of the “AND” conditions becomes false and at least one ITLCO/CTLCO input remains active.
14. Squirt and Spurt inputs and outputs should always be programmed on a dedicated line(s) of EOC code. Do not include other non-Squirt/Spurt inputs or outputs on the same line of EOC.

3-10 EVENT OUTPUT CONTROL EXAMPLES

Table 3-6 illustrates specific example of event output control. This is a two-zone waterless suppression system with associated pre-action sprinkler systems. Refer to Appendix A for the sequence of operation and device/circuit configuration associated with this application.

Table 3-6. EOC, Example 1

$ Head End Room Pre-Alarm
1#3=SG1,AM1:1,I1, C1
NI1=NC1
1#3=1.5=A4#6
4#6=SG1,AM1:1,I2, C2
NI2=NC2
4#6=3.0=A1#3
$ Power Room Pre-Alarm
14#15=SG3,AM1:4,I3, C3
NI3=NC3
14#15=1.5=A16#17
16#17=SG3,AM1:4,I4, C4
NI4=NC4
16#17=3.0=A14#15
$ Head End Room Waterflow
11=SG2,AM1:6,RY3
$ Power Room Waterflow
20=SG4,AM1:12,RY3
$ Head Room Tamper
12=AM1:5,25
$ Power Room Tamper
21=AM1:11,25
$ Head End Room Low Pressure
13=AM1:4
$ Power Room Low Pressure
22=AM1:10

Table 3-6. EOC, Example 1

$ Pre-Action System Low Air
26=AM1:13
$ Head End Room Pre-Release
I1*C2 + 7 + 8=SG1/120,23
C1*I2 + 7 + 8=SG1/120,23
$ Head End Room Release
D(I1*I2,30,9,10)+7+8=NSG1,NAM1:1,AR1,SG2,24,RY2,AM1:3
9+10=AM1:2
$ Power Room Pre-Release
I3*C4 + 7 + 8=SG3/120,23
C3*I4 + 7 + 8=SG3/120,23
$ Power Room Release
D(I3*I4,30,19)+18=NSG3,NAM1:7,AR2,SG4,24,RY2,AM1:8
19=AM1:8

Table 3-7 is an example of a networked fire-alarm system monitoring three school buildings. The sequence of operations for all three buildings is shown in Appendix A. The details are shown in Table 3-6 and Table 3-7 for the first building. The specifics for Buildings No. 2 and 3 are similar.

Table 3-7. EOC, Example 2

$ Building No. 2 Smoke Detectors
F2:001#15=SG4,S1
$ Building No. 2 Manual Stations
F2:016#23=SG4,S2
$ Building No. 2 Waterflow
F2:024#27=SG4,S002
$ Building No. 2 Kitchen Hood
F2:028=SG4,S4
$ Building No. 3 Smoke Detectors
F3:001#15=SG4,S006
$ Building No. 3 Manual Stations
F3:016#23=SG4,S7
$ Building No. 3 Waterflow
F3:024#27=SG4,S8
$ Building No. 3 Kitchen Hood
F3:28=SG4,S9
$ Building No. 2 Supervisory
F2:29#32=S5
$ Building No. 3 Supervisory
F3:029#32=S10

3-11 ADDITIONAL EVENT OUTPUT CONTROL EXAMPLES

The examples in this section illustrate special EOC topics of interest.

3-11.1 Limited Water Supply

A four-zone deluge sprinkler system is being designed according to the following water supply constraints:

Active Zone	Allowable Subsequent Zone Activation	Disallowable Subsequent Zone Activation
1	2	3 and 4
2	1 or 3	4
3	2 or 4	1
4	3	1 and 2

No more than two deluge sprinkler zones can be active concurrently. Figure 3-5 illustrates the application.

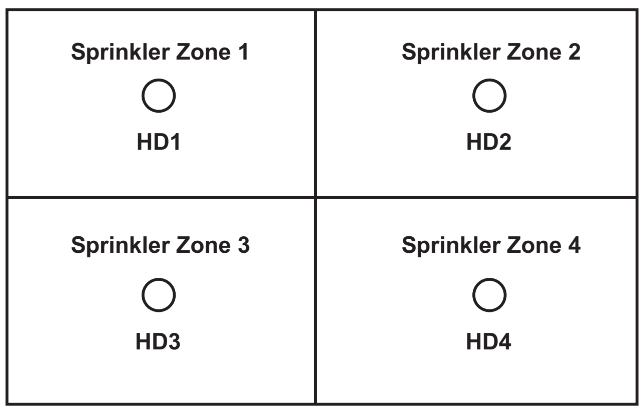

Figure 3-5. Limited Water Supply

State Variable are used in the code that follows to signify the activation of each zone and to apply the required constraints:

```
1*NC3*NC4*NC5=AR1,C1
2*NC4*NC5=AR2,C2
3*NC1*NC5=AR3,C3
4*NC1*NC2*NC5=AR4,C4
C1*(C2+C3+C4)=C5
C2*(C1+C3+C4)=C5
C3*(C1+C2+C4)=C5
C4*(C1+C2+C3)=C5
```

3-11.2 NAC that Tracks AnaLASER-II or ORION XT Alarm State

The system shown in Figure 3-6 is to be designed according to the following criteria:

- Activate NAC if either one of AnaLASER-II or ORION XTs alarm
- Deactivate NAC if all alarmed HSSDs issue alarm off reports
- Latch the NAC into the active state if any spot type smoke detector alarms.

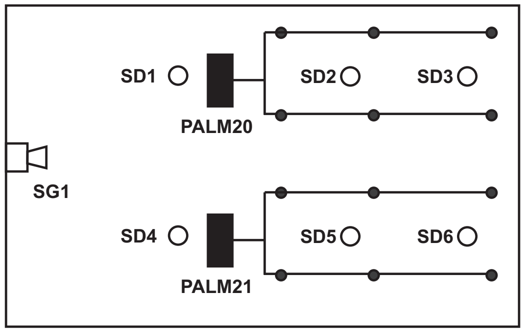

Figure 3-6. Tracking NAC

The EOC code required to accomplish this design requirement is shown below:

```
20+21=SG1
N20*N21*NC1=NSG1
1#6=SG1,C1
```

3-11.3 External Maintenance Bypass Switch Example

An end user wants to provide service personnel with a simplistic way to prevent the activation of notification appliances during facility maintenance periods. The user wants to use a externally mounted switch to accomplish this requirement. The necessary sequence of operation is as follows:

- The NAC shall activate if an automatic detector alarms and the maintenance bypass switch has not been activated
- The NAC shall not activate if an automatic detector alarms subsequently to the activation of the maintenance bypass switch
- The NAC shall deactivate if the maintenance bypass switch is activated subsequently to an automatic detector alarm.

The AI monitor module for the maintenance bypass switch is configured as a non-latching supervisory initiating device. Figure 3-7 illustrates the application.

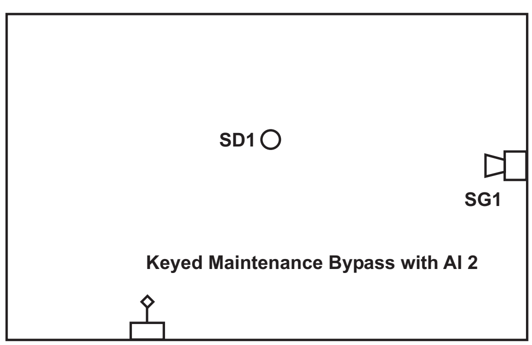

Figure 3-7. Maintenance Bypass Switch

The required lines of EOC code are as follows:

```
1*N2=SG1
1*2=NSG1
```

CHAPTER 4
COMMUNICATIONS TO CONTROL UNIT

4-1 INTRODUCTION

An application created via the procedures described in Chapters 2 and 3 must be uploaded to the ARIES®-SLX Control Unit to establish a working fire protection system. The utility programs in the Tools Menu are used to communicate with the ARIES-SLX Control Unit. Figure 4-1 shows the selections in the Tools Menu.

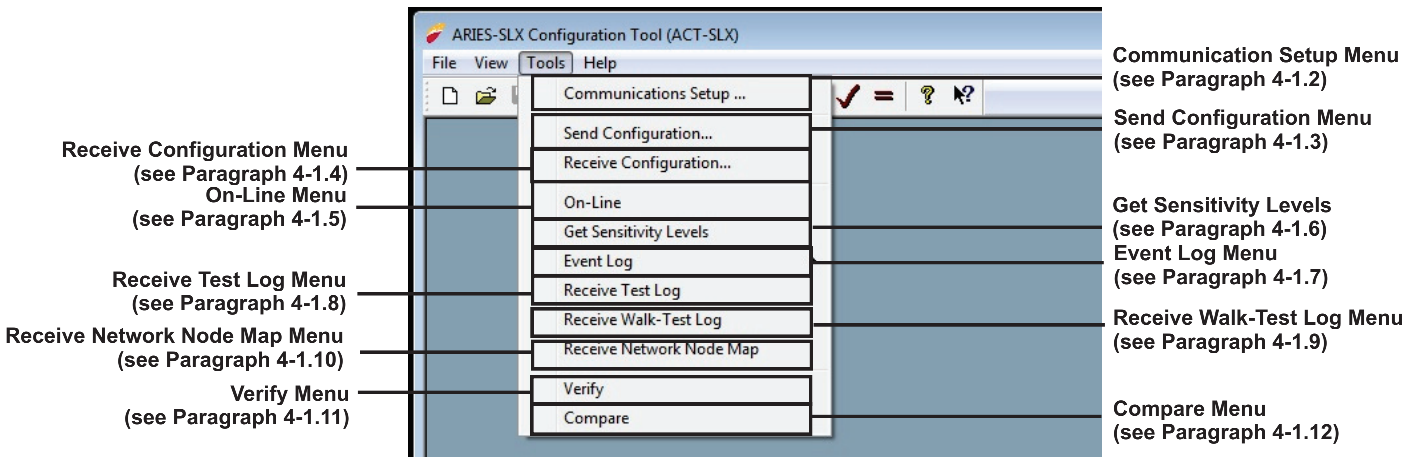

Figure 4-1. Tools Menu

Most of the utilities in the Tools Menu can also be accessed via the toolbar on the main screen. Figure 4-2 defines each of the icons.

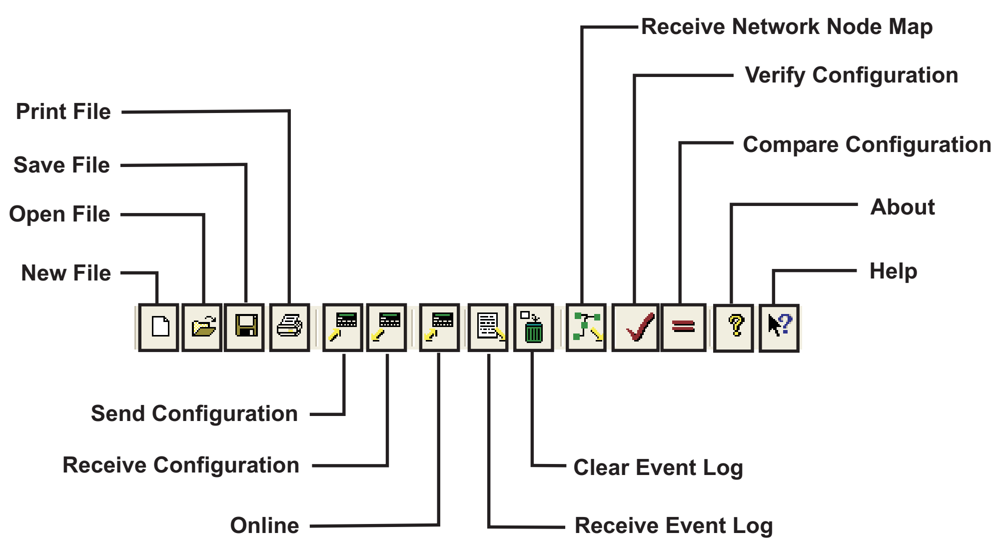

Figure 4-2. ACT-SLX Main Toolbar

4-1.1 Hardware Connections

Use either a laptop or desktop computer to upload the applications program to the ARIES-SLX Control Unit. The computer must have a USB or RS232 communications port.

Set the serial-port baud rate to 9600, and use communications cable P/N 74-100016-003, to communicate with the ARIES-SLX Control Unit via the computer's serial port.

Use a standard USB communications cable to connect to the ARIES-SLX Control Unit via the computer's USB port.

Note: When using the USB port, the ground fault circuitry is not functional. The USB port is to be used to download configurations and operating system software only. It is not intended to be used on a permanent basis. Do not connect or disconnect the USB cable while the control unit is powering up on system startup or initializing after a new configuration upload.

A USB Isolator must be used in series with the USB cable when connecting to port J6 as shown in Figure 4-3. This connection is typically used when sending or receiving information between the panel and a PC running the panel configuration software.

Kidde Fire Systems has tested and recommends the USB Isolator P/N 10000071.

Figure 4-3 illustrates a typical control unit-to-laptop configuration.

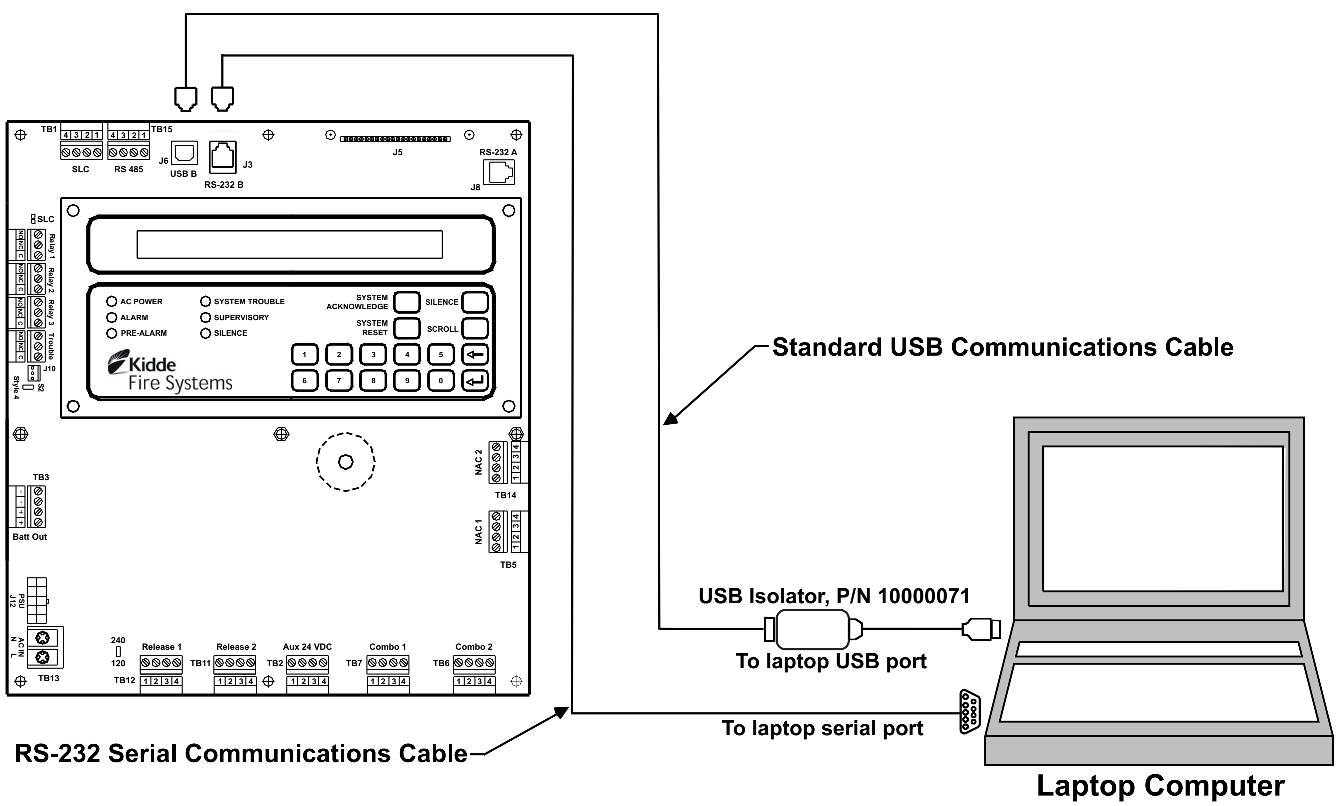

Figure 4-3. Hardware Connection from ARIES-SLX Control Unit to Laptop Computer

4-1.2 Communications Setup

Select **Tools>Communication Setup** from the main screen to define options when selecting a RS-232 serial port on the computer to transfer data to the ARIES-SLX Control Unit. Figure 4-4 displays.

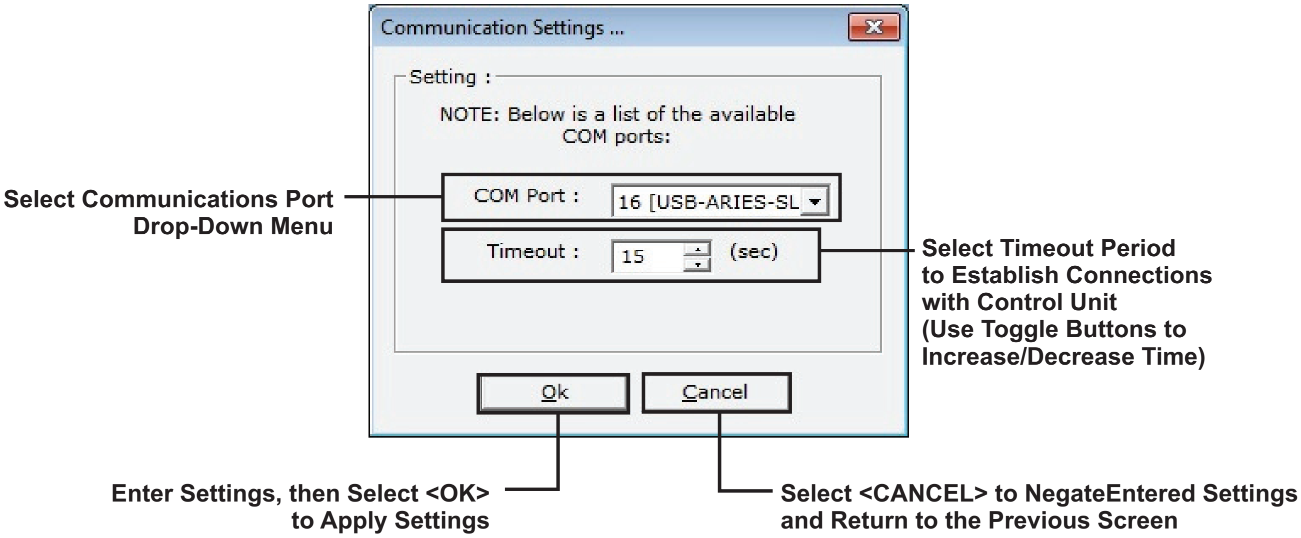

Figure 4-4. Communications Settings

4-1.3 Sending a Configuration

Select **Tools>Send Configuration** to send a particular application that was created via the methodology described in Chapter 2 and Chapter 3 to the ARIES-SLX Control Unit. The ARIES-SLX Control Unit then assumes the responsibility of monitoring the SLC and other peripheral devices that have been specified in the application file, and carries out the instructions that are encoded in the EOC statements. Alternatively, select the Send Configuration Icon ( ).

If only one configuration file is open, the password prompt (Figure 4-7) is displayed; if more than one configuration file is open, the select configuration dialog box (Figure 4-5) is displayed and the appropriate configuration file to upload must be selected.

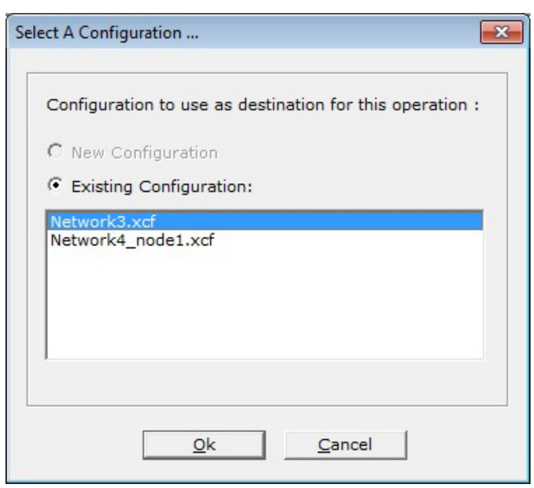

Figure 4-5. Select Send Configuration

After ACT-SLX retrieves the node map for **Network Installations**, the selection dialog box (Figure 4-6) is displayed.

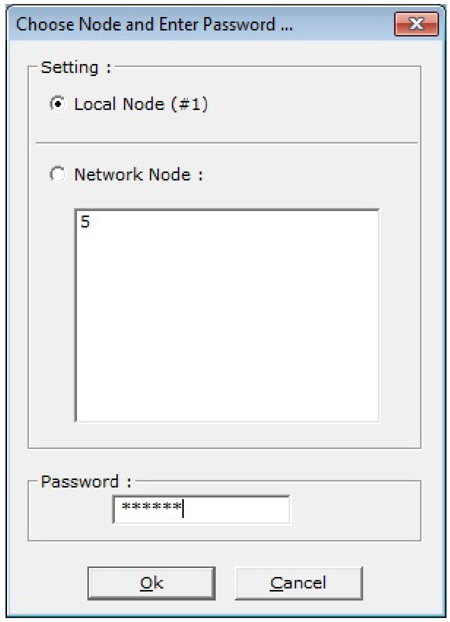

Figure 4-6. Select Node and Enter Password - Send Configuration

1. Select a remote or locally connected node as follows:

   Note: A configuration can be sent to a remote node via the directly-connected control unit.

2. Select the correct node that matches the selected configuration file and enter the password for that node to initiate the upload. (Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords.)

3. Select <**OK**>. In response, the progression of the configuration upload from the control unit is displayed (Figure 4-8). After the upload is complete, Figure 4-9 displays.

   Note: When sending/receiving configurations to/from remote networked control units, the time to complete the operation is considerably longer than a direct upload/download. When a networked node is executing a local upload or download with ACT-SLX, it does not communicate on the network. Network communication troubles annunciate on other nodes during the process.

Following selection of the configuration file, ACT-SLX immediately displays the password prompt (Figure 4-7) for **Single Control Unit** installations.

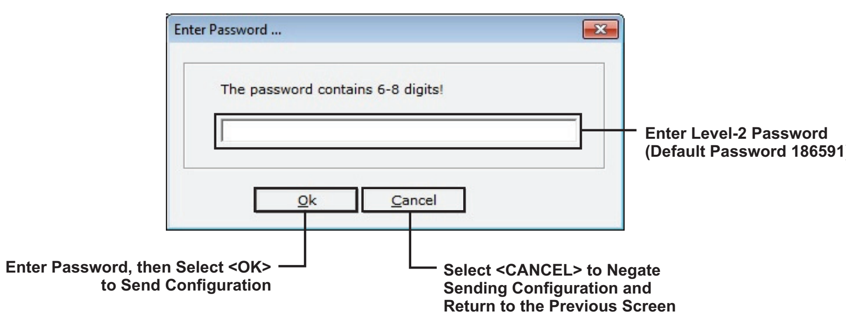

Figure 4-7. Send Configuration Password

4. Enter the password. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords.

5. Select **<OK>**. In response, the progression of the configuration upload to the control unit is displayed (Figure 4-8). After the upload is completed, a notification (Figure 4-9) is displayed.

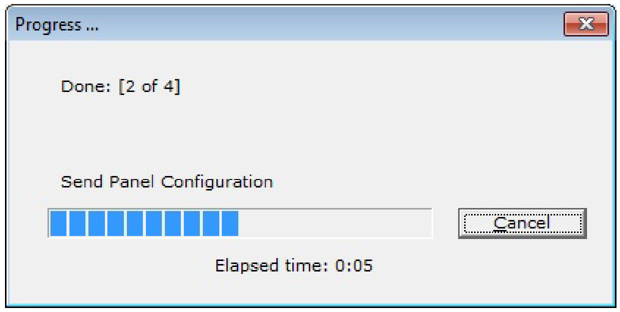

Figure 4-8. Send Configuration Progress

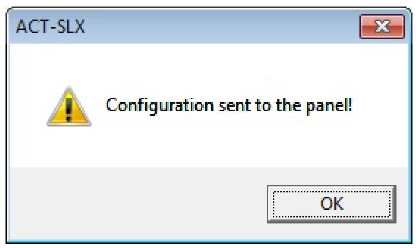

Figure 4-9. Send Configuration Complete

4-1.4 Receive a Configuration

Select **Tools>Receive Configuration** to retrieve a particular application from a ARIES-SLX Control Unit for review, analysis and/or modification as necessary. Alternatively, select the Receive Configuration Icon (). In response, the prompt shown in Figure 4-12 is displayed.

Receiving a configuration is similar to sending. Selecting 'Receive Configuration' results in a prompt (Figure 4-10) to select a file in which to store the configuration data

Note: A configuration file must be open before the process can proceed.

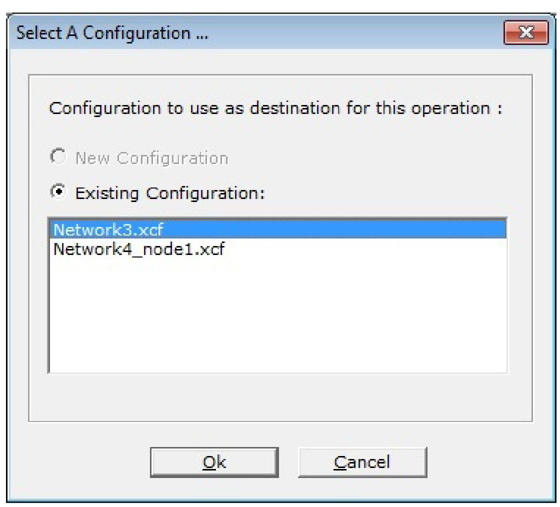

Figure 4-10. Select Receive Configuration

After ACT-SLX retrieves the node map for **Network Installations,** the selection dialog box (Figure 4-11) is displayed.

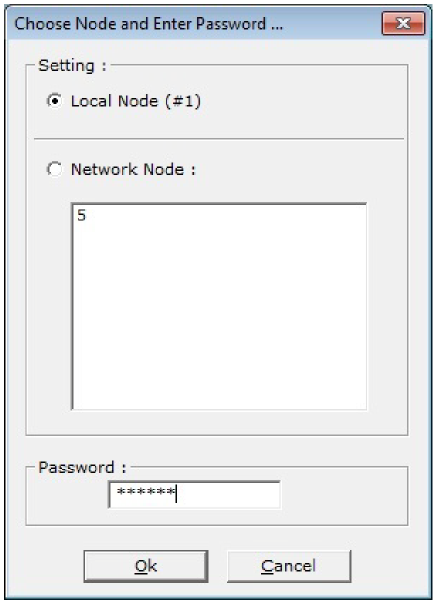

Figure 4-11. Select Node and Enter Password - Receive Configuration

1. Select a remote or locally connected node as follows:

   Note: A configuration can be received from a remote node via the directly connected control unit.

2. Select the correct node that matches the selected configuration file and enter the password for that node to initiate the download. (Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords.)
3. Select <**OK**>. In response, the progression of the configuration download from the control unit is displayed (Figure 4-13). After the download is completed, a notification (Figure 4-14) is displayed.

   Note: When sending/receiving configurations to/from remote networked control units, the time to complete the operation is considerably longer than a direct upload/download. When a networked node is executing a local upload or download with ACT-SLX, it does not communicate on the network. Network communication troubles annunciate on other nodes during the process.

Following selection of the configuration file, ACT-SLX immediately displays the password prompt (Figure 4-12) for **Single Control Unit** installations.

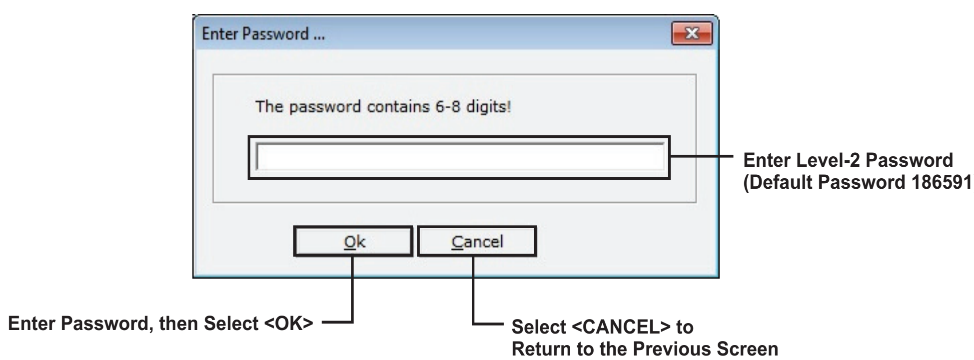

Figure 4-12. Receive Configuration Password

1. Enter the password. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords.

2. Select **<OK>**. In response, the progression of the configuration download (Figure 4-13) is displayed. After the download has finished, a notification (Figure 4-14) is displayed.

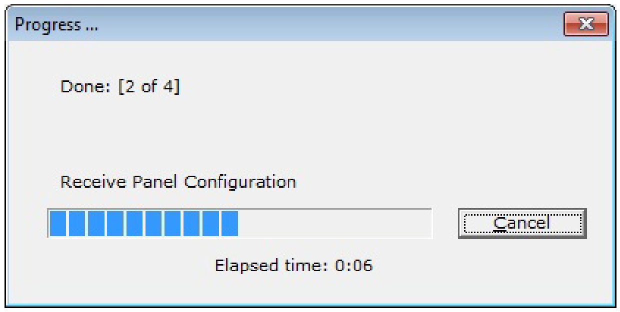

Figure 4-13. Receive Configuration Progress

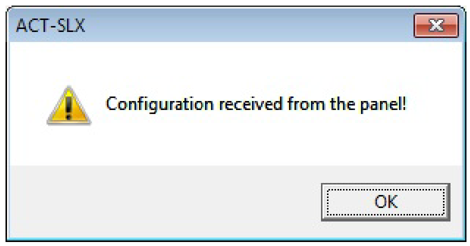

Figure 4-14. Receive Configuration Complete

4-1.5 Online

Select **Tools>Online** to connect ACT-SLX to the control unit via terminal-emulation mode. The control unit can then be run as if it were being accessed via its keypad/display. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for information on navigating the control unit menus.

After ACT-SLX initially retrieves the node map for **Network Installations**, select a remote or locally connected node using the dialog similar to the preceding dialog. In response, the node's online status (Figure 4-15) is displayed.

Note: Menus can be accessed just as if ACT-SLX was connected directly to the selected node. Setting of Network configuration items is prohibited when the menu of a remote node is accessed.

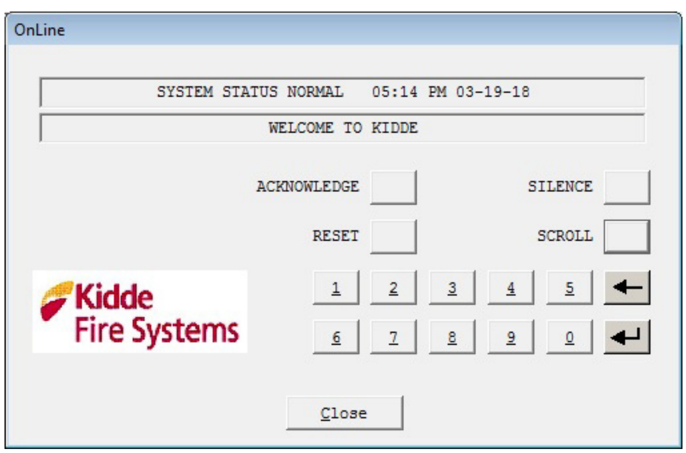

Figure 4-15. Online Screen

Note: Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for a complete explanation of display messages and for guidance in navigating through the control unit.

4-1.6 Get Sensitivity Levels

Select **Tools>Get Sensitivity Levels** to retrieve the current reading of photos, ions, thermals, etc. from the control unit. The results are populated in the 'sensitivity levels' dialog.

4-1.6.1 RETRIEVE SENSITIVITY LEVELS

1. Select **Tools>Get Sensitivity Levels.** The selection dialog box (Figure 4-16) is displayed.

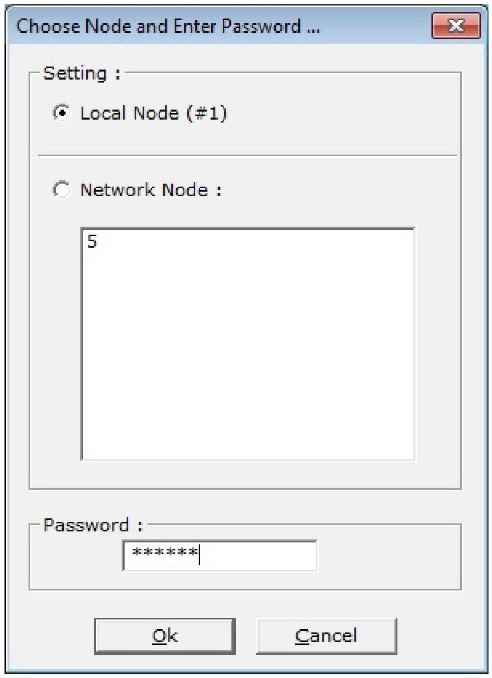

Figure 4-16. Select Node and Enter Password - Get Sensitivity Levels

2. Select the node to retrieve the sensitivity levels from and password for that node to initiate the retrieval.
3. Select **<OK>**. Enter the range of sensitivity desired.
4. Select **<OK>**. The following 'Sensitivity Levels' dialog is displayed. In response, the Sensitivity Levels' dialog announcing the retrieval of the sensitivity levels (Figure 4-17) is displayed. After the query has finished, the sensitivity levels (Figure 4-18) are displayed. Within the 'Sensitivity Levels' screen, there are two menu options: **Save As** and **Print**.
   - Select "Save As" to save the test log as a .txt file.
   - Select "Print" to print the test log to a printer.

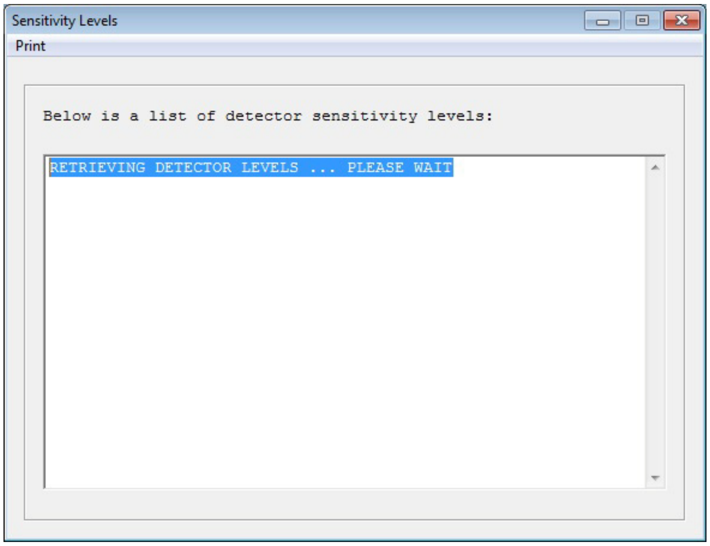

Figure 4-17. Retrieving Sensitivity Levels

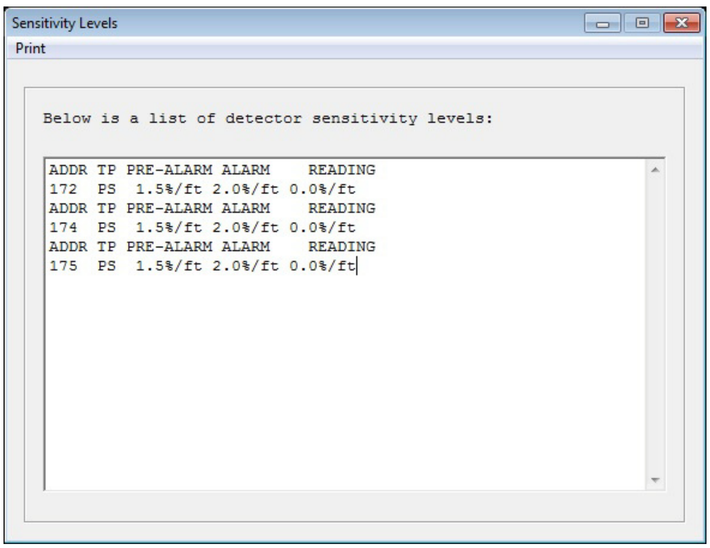

Figure 4-18. Displayed Sensitivity Levels

4-1.7 Event Log

Select **Tools>Event Log** to transfer the contents of the log of system events to a text file. There are three options: Clear, Receive and Open Log File.

4-1.7.1 CLEAR EVENT LOG

1. Select **Tools>Event Log>Clear** to remove all currently recorded events from the system event log. In response, a password request (Figure 4-20) is displayed.
2. After ACT-SLX retrieves the node map for **Network Installations,** select a remote or locally connected node.

   Note: An event log can be cleared from a remote node via the directly connected control unit.

   After the node map is retrieved, the selection dialog box (Figure 4-19) is displayed.

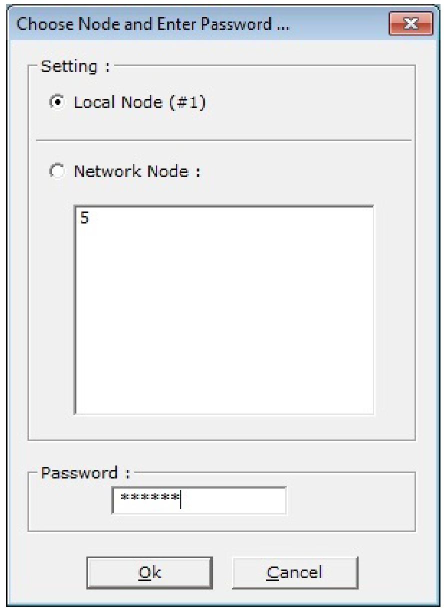

Figure 4-19. Select Node and Enter Password - Clear Event Log

3. Select the desired node and enter the installer level password for that node to clear the event log on that node.

   Following selection of the Clear Event Log option, ACT-SLX immediately displays the password prompt (Figure 4-20) for **Single Control Unit** installations.

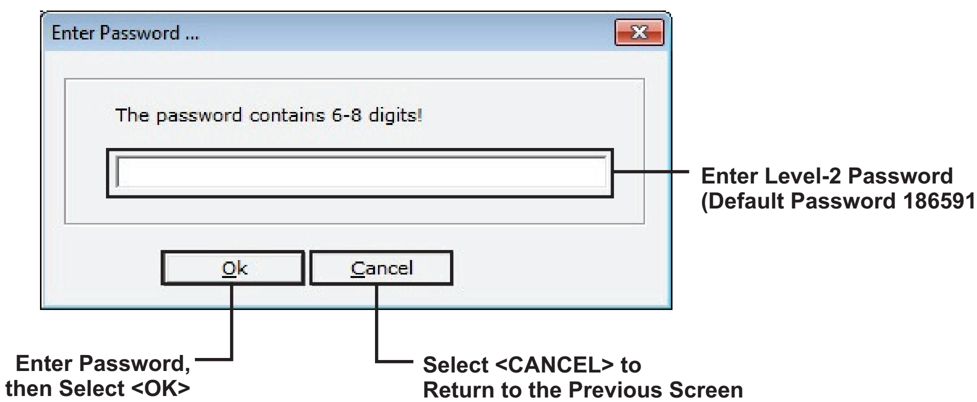

Figure 4-20. Enter Password

4. Enter the password. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords.
5. Select **<OK>**. In response, a prompt asks to confirm clearing the event log (Figure 4-21). If **<Yes>** is selected, the progression of the clearance procedure is displayed (Figure 4-22). After the event log has been cleared, a notification (Figure 4-23) is displayed.

Note: If the control unit is in alarm, trouble or supervisory condition, clearing the event log is aborted and a notification (Figure 4-24) is displayed.

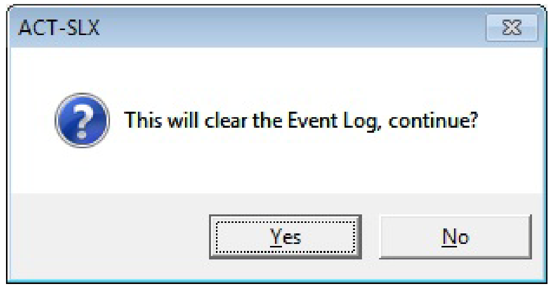

Figure 4-21. Confirm Clear Event Log Prompt

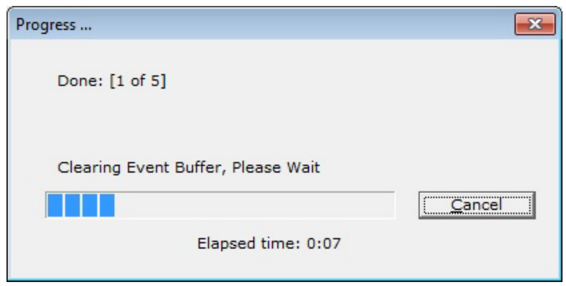

Figure 4-22. Clear Event Log Progression

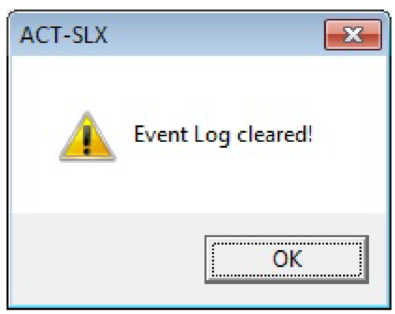

Figure 4-23. Clear Event Log Complete

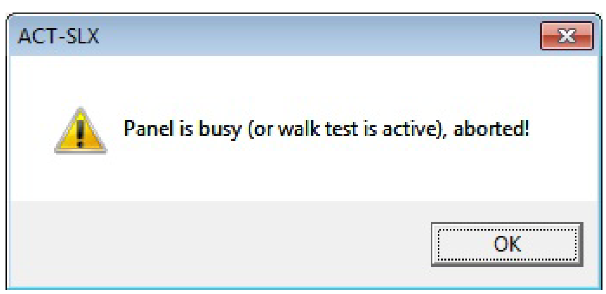

Figure 4-24. Clear Event Log Abort

4-1.7.2 RECEIVE EVENT LOG

1. Select **Tools>Event Log>Receive** to copy the entire contents of the system event log to a text file or a range of system events within the log based on occurrence dates. In response, a the prompt shown in Figure 4-25 is displayed.

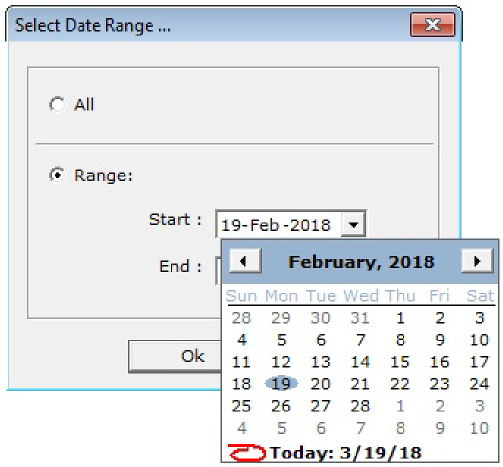

Figure 4-25. Event Log Date Range

2. Select either the "All" or "Range" radio button. If "Range" is selected, enter the range of dates to receive. Select **<OK>**. In response, the prompt for a password (Figure 4-26) is displayed.

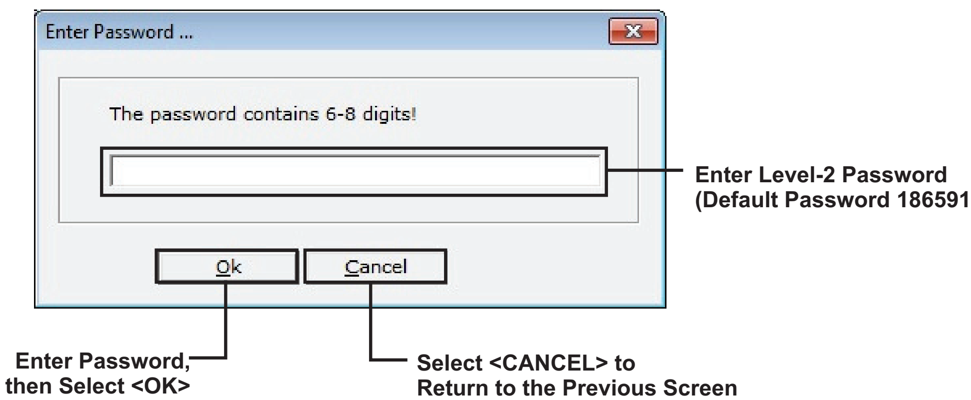

Figure 4-26. Enter Password

3. For single unit installations, enter the password. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords.
4. After ACT-SLX retrieves the node map for **Network Installations**, select a remote or the locally connected node.

   Note: An even log can be downloaded from a remote node via the directly connected control unit.

   After the node map is retrieved, the selection dialog box (Figure 4-27) is displayed.

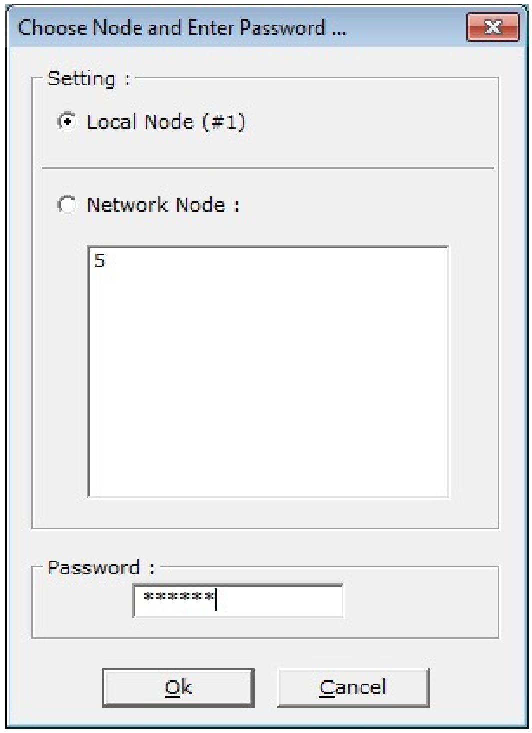

Figure 4-27. Select Node and Enter Password - Receive Event Log

5. Select the desired node and enter the password for that node.
6. Select <**OK**> to download the event log from that node. In response, the progression of the download (Figure 4-28) is displayed. When it is complete, the Event Log Retrieved Confirmation Screen displays (Figure 4-29).

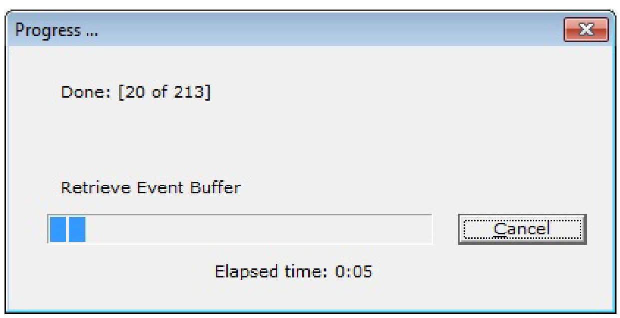

Figure 4-28. Receive Event Log Progression Screen

Figure 4-29. Event Log Received Confirmation Screen

7. Select **<OK>**. In response, the event log (Figure 4-30) is displayed. Within the Event log, there are four menu options: **Open**, **Save**, **Save As** and **Print**.
   - Select "Open" to open an existing saved event log

   Note: Do not select "Open" to retrieve an existing event log before saving or printing the current retrieved event log.

   - Select "Save" to save the event log as a .log file
   - Select "Save As" to save the event log as a .txt file
   - Select "Print" to print the event log to a printer.

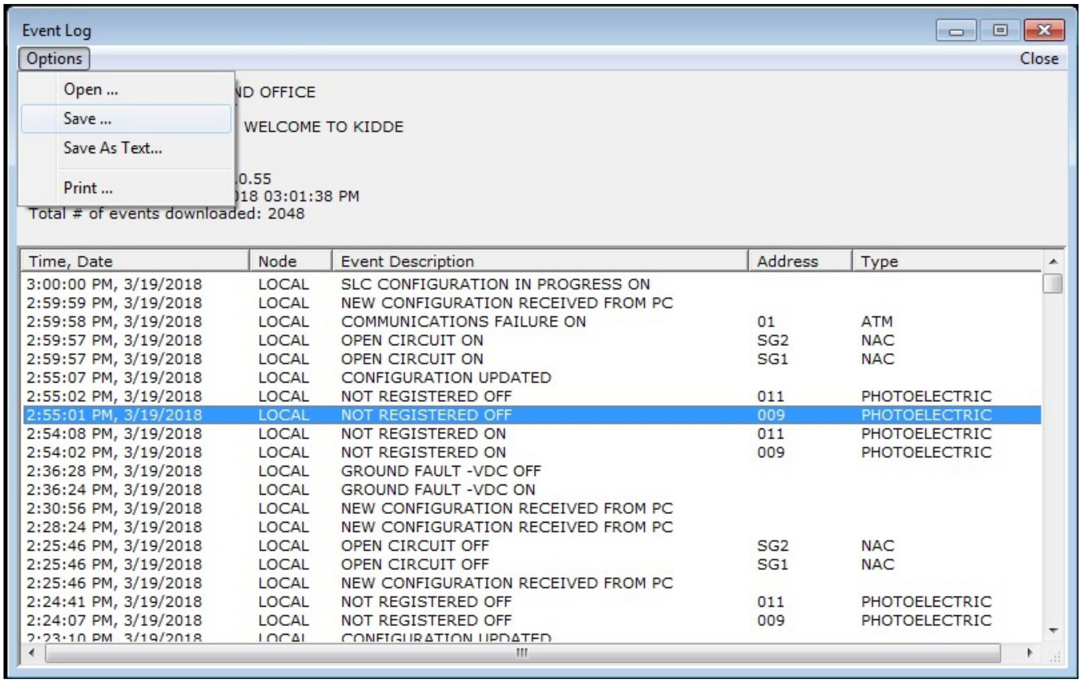

Figure 4-30. Event Log Screen

4-1.7.3 VIEW EVENT LOG

Select **Tools>Event Log>Open Log File** to view a previously downloaded event log offline. All event log options are available when viewing previously downloaded event logs offline.

4-1.8 Receive Test Log

1. Select **Tools>Receive Test Log** to copy the contents of the most recent log of initiating device test events to a text file. In response, the prompt for a password (Figure 4-32) is displayed.

   ACT-SLX retrieves the node map for **Network Installations** and the user can select a remote node or the locally connected node.

   Note: The test log can be received from a remote node via the directly connected control unit.

   After the node map is retrieved, the selection dialog box (Figure 4-31) is displayed.

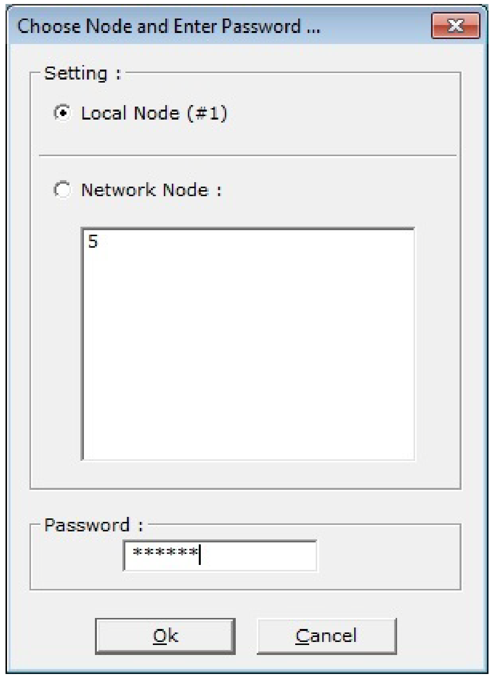

Figure 4-31. Select Node and Enter Password - Receive Test Log

2. Select the desired node, enter the password for that node, then select <**OK**> to download the test log from that node.

   Following selection of the Test Log option, ACT-SLX immediately displays the password prompt (Figure 4-32) for **Single Control Unit** installations.

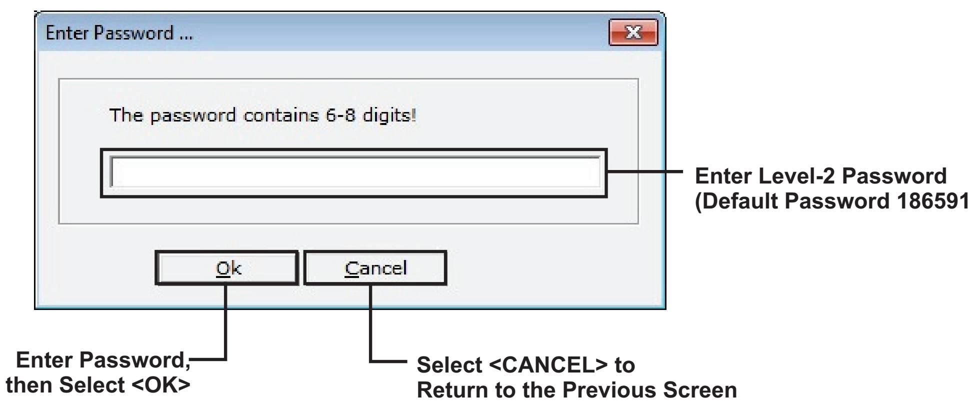

Figure 4-32. Enter Password

3. Enter the password. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords and for a description of the initiating devices test.
4. Select **<OK>**. In response, progression of the test log download (Figure 4-33) is displayed. When download is complete, the test log (Figure 4-34) is displayed. Within the test log, there are two menu options: **Save As** and **Print**.
   - Select "Save As" to save the test log as a .txt file.
   - Select "Print" to print the test log to a printer.

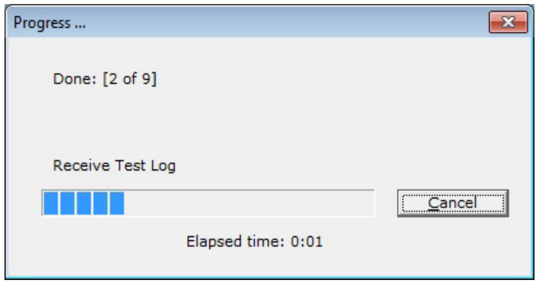

Figure 4-33. Receive Test Log Progress

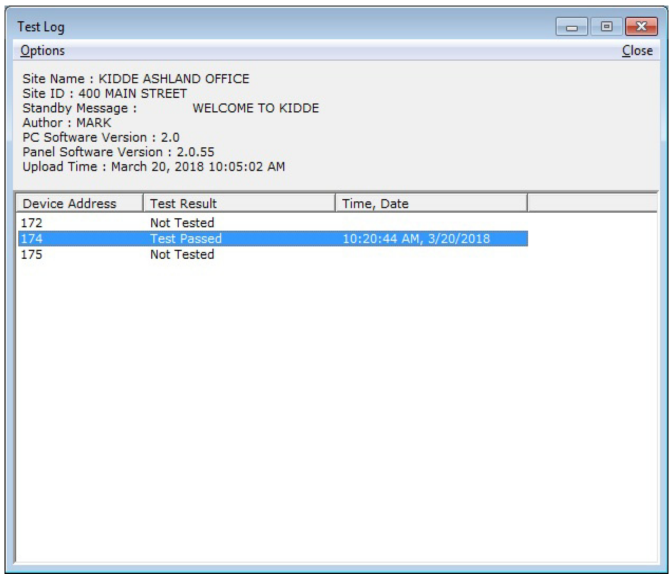

Figure 4-34. Test Log Screen

4-1.9 Receive Walk Test Log

1. Select Tools-> Verify to check syntax of the EOC code and verify that device and circuit addresses are used properly. In response, the prompt for a password (Figure 4-35) is displayed.

   ACT-SLX retrieves the node map for **Network Installations** and the user can select a remote node or the locally connected node.

   Note: The walk test log can be received from a remote node via the directly connected control unit.

   After the node map is retrieved, the selection dialog box (Figure 4-36) is displayed.

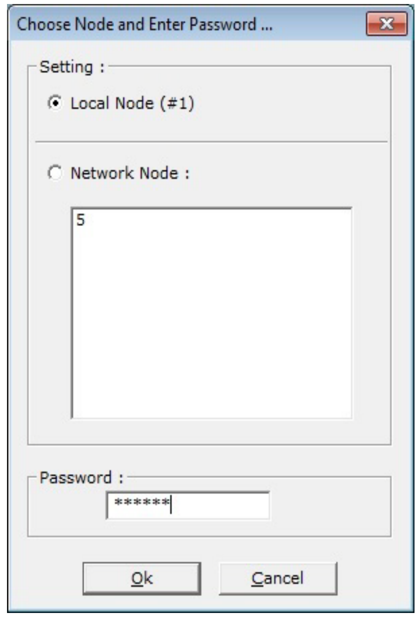

Figure 4-35. Select Node and Enter Password - Receive Walk Test Log

2. Select the desired node and enter the password for that node to download the test log from that node.

   Following selection of the Walk Test Log option, ACT-SLX immediately displays the password prompt (Figure 4-36) for **Single Control Unit** installations.

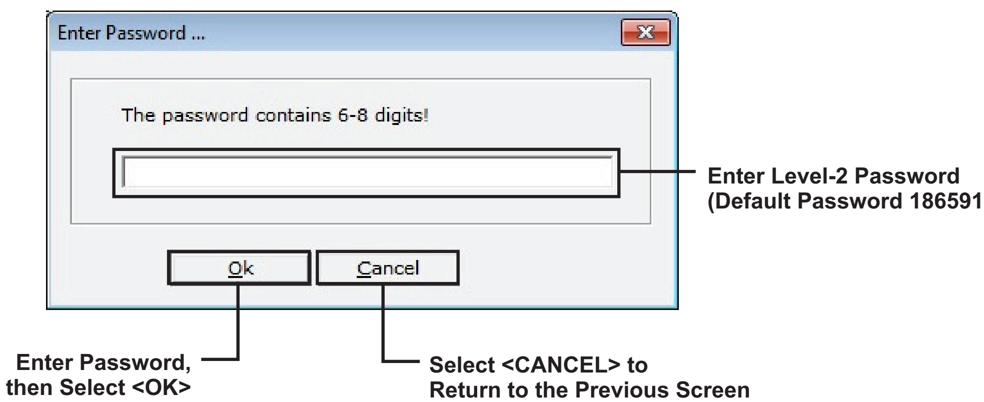

Figure 4-36. Enter Password Screen

3. Enter the password. Refer to the *ARIES-SLX Installation, Operation and Maintenance Manual*, P/N 06-237491-001, for an explanation on setting passwords and for the Walk Test procedure.
4. Select **<OK>**. In response, progression of the walk test log reception (Figure 4-37) is displayed. When it is complete, the walk test log (Figure 4-38) is displayed. Within the Walk Test log, there are two menu options: **Save As** and **Print**.
   - Select “Save As” to save the walk test log as a .txt file.
   - Select” Print” to print the walk test log to a printer.

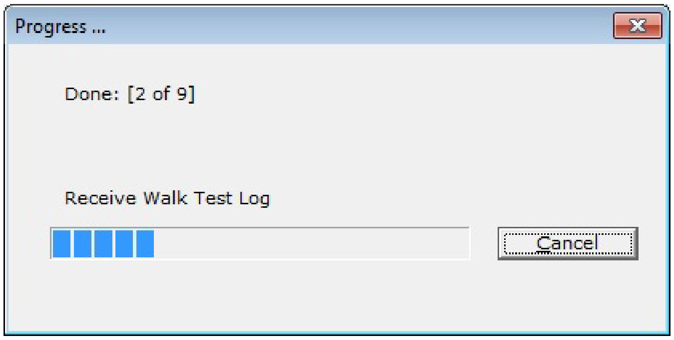

Figure 4-37. Receive Walk Test Log Progress

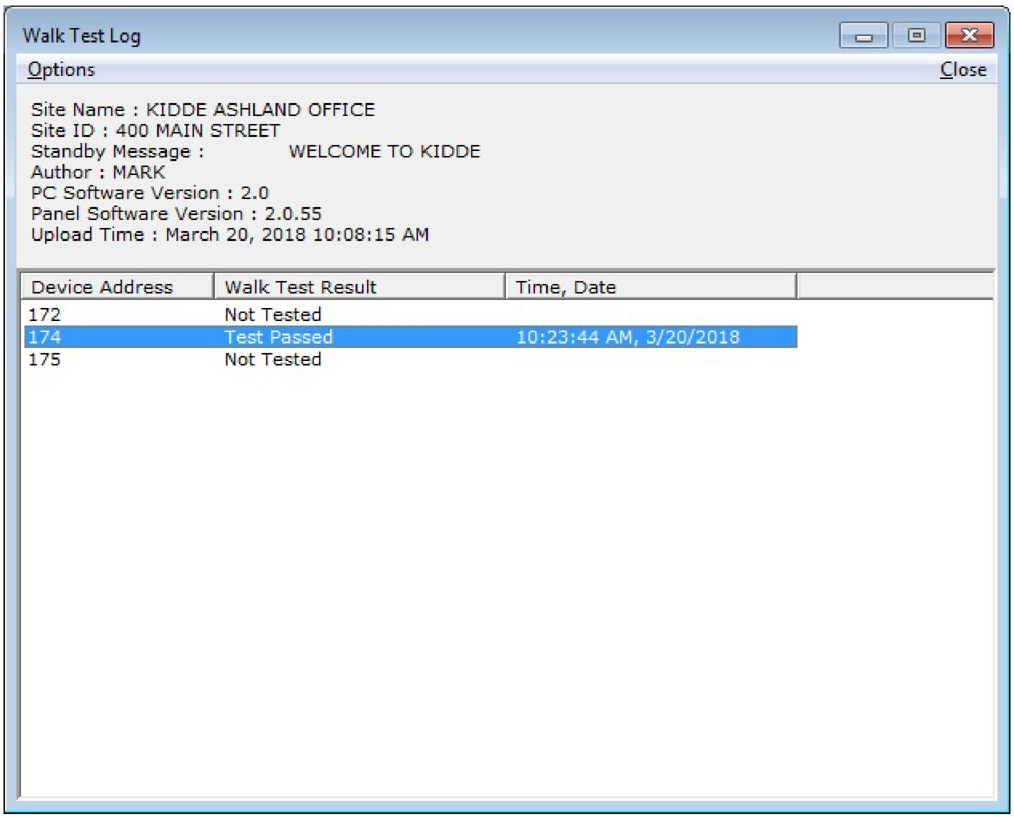

Figure 4-38. Walk Test Log

4-1.10 Receive Network Node Map

The node map (Figure 4-39) is retrieved when Receive Network Node Map option is selected. The node map is presented as a series of check boxes which are used to indicate the control units that are active on the network.

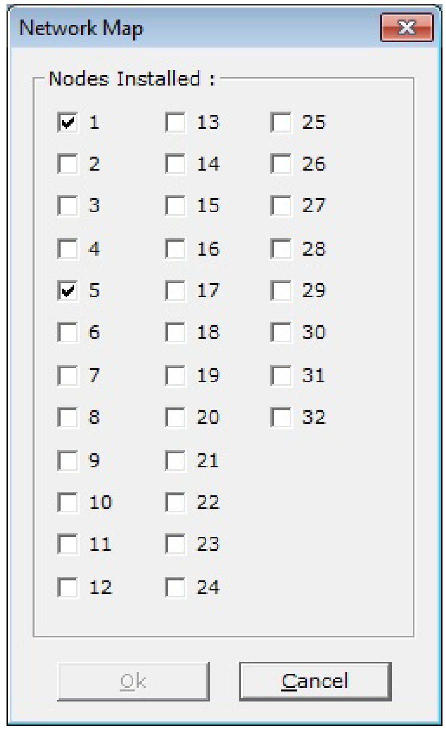

Figure 4-39. Node Map

4-1.11 Verify

Select **Tools>Verify** to check the syntax of EOC code and to check for unregistered SLC addresses. Alternatively, select the Verify Icon from the toolbar ( ). In response, the verification summary (Figure 4-40) is displayed.

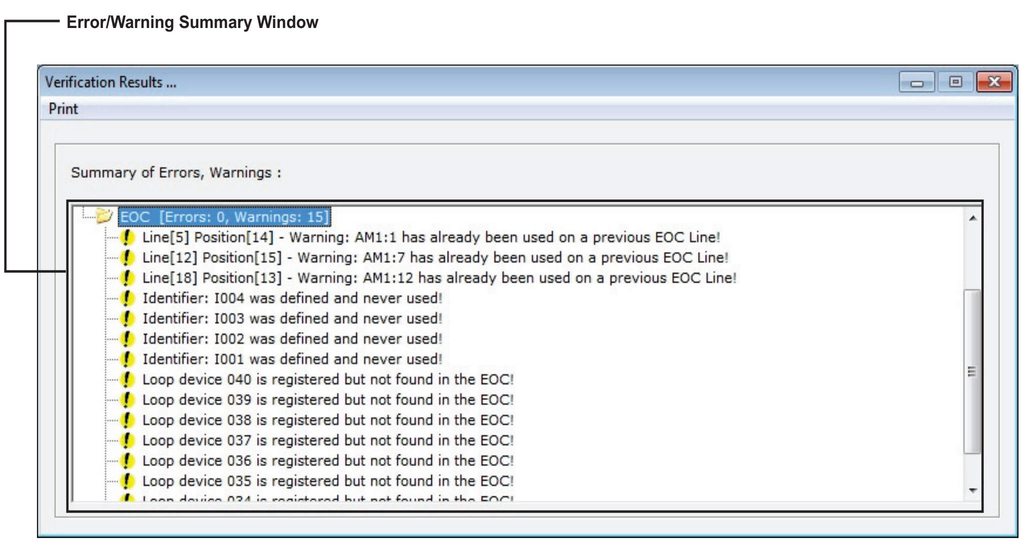

Figure 4-40. Verification Summary

Note: Remove errors and warnings where possible. For help removing as many as possible, contact Kidde Technical Support.

4-1.12 Compare

Select **Tools>Compare** to compare two different configuration files. Both files must be open to compare them. Alternatively, select the Compare Icon ( ) from the toolbar. An example of the comparison results is shown in Figure 4-41.

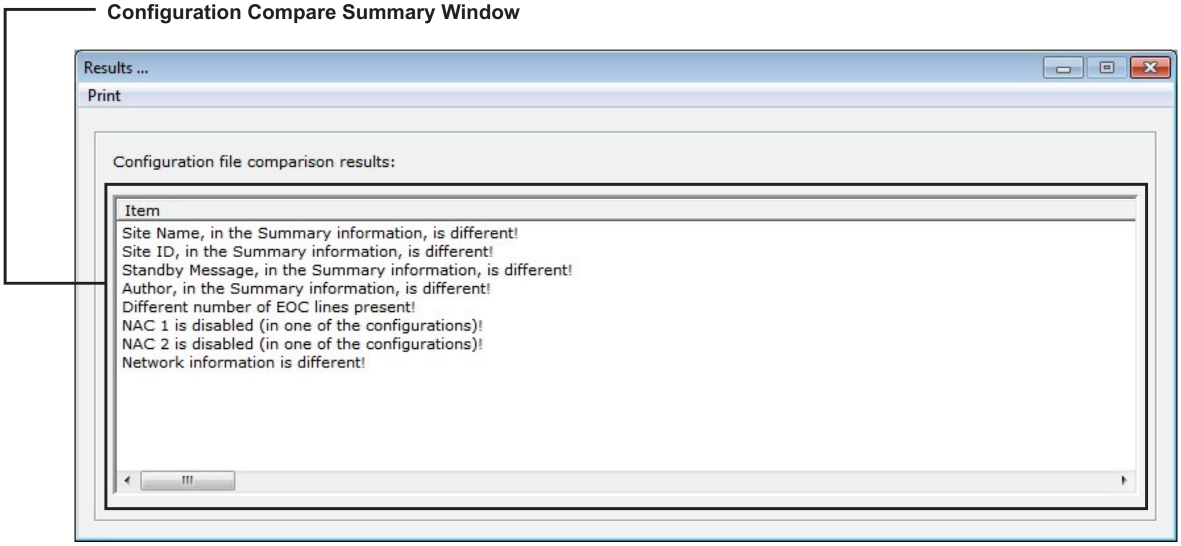

Figure 4-41. Configuration Compare

APPENDIX A
SYSTEM EXAMPLE

A-1 INTRODUCTION

This appendix is intended to provide an example of a typical system and sequence of operation.

Sequence of Operation

	Room-of-Origin Alarms/Actions	Activate / De-Activate Horns @ 60 BPM	Activate / De-Activate Horns @ 120 BPM	Activate / De-Activate Temporal-Coded Horns	Activate / De-Activate Strobes	Activate Waterless Extinguishing System	Interrupt Impending Water-less System Discharge	Open Pre-Action-Sprinkler Valve	Activate / De-Activate Smoke-Detector LED	Activate / De-Activate Abort-Station LED	Activate / De-Activate Release LED	Activate / De-Activate Low-Pressure LED	Activate / De-Activate Tamper LED	Activate / De-Activate Waterflow LED	**Facility Equipment Interlocks**	HVAC Shutdown	Power Shutoff	Activate / De-Activate Low-Air LED	Activate / De-Activate Trouble LED	**Off-Premises Reports**	Major Alarm to Central Station	Critical Alarm to Central Station	Waterflow Alarm to Central Station
Waterflow Switch																							A
Head-End Room (Zone 1)				A	A									A									
Power Room (Zone 2)				A	A									A									
Sprinkler Tamper Switch																							
Head-End Room (Zone 1)													A										
Power Room (Zone 2)													A										
One Area Smoke Detector																							
Head-End Room (Zone 1)		A							A												A		
Power Room (Zone 2)		A							A												A		
Two Area Smoke Detectors Alarm (Immediate Response)																							
Head-End Room (Zone 1)		D	A													A							
Power Room (Zone 2)		D	A													A							
Two Area Smoke Detectors (30-Sec. Delayed Response)																							
Head-End Room (Zone 1)			D	A	A	A		A	D	D	A						A					A	
Power Room (Zone 2)			D	A	A	A		A	D	D	A						A					A	
Manual Station (Immediate Response)																							
Head-End Room (Zone 1)		D	D	A	A	A		A	D	D	A					A	A					A	
Power Room (Zone 2)		D	D	A	A	A		A	D	D	A					A	A					A	
Abort Station																							
Head-End Room (Zone 1)							A			A													
Power Room (Zone 2)							A			A													
Auxiliary Supervisory																							
Low FM-200 Pressure Sw.																							
Head-End Room (Zone 1)												A											
Power Room (Zone 2)												A											
Low Air (Pre-Action Sys)																		A					
Trouble																							
Any Condition																			A				
Control-Unit Outputs																							
NAC 1		Z-1	Z-1																				
NAC 2				Z-1	Z-1																		
Combo 1		Z-2	Z-2																				
Combo 2				Z-2	Z-2																		
Release 1						Z-1		Z-1															
Release 2						Z-2		Z-2															
Relay 1																					X		
Relay 2																						X	
Relay 3																							X
Trouble Relay																							
SLC Outputs																							
AO																X	X						
ATM Outputs																							
Output No. 1									Z-1														
Output No. 2										Z-1													
Output No. 3											Z-1												
Output No. 4												Z-1											
Output No. 5													Z-1										
Output No. 6														Z-1									
Output No. 7									Z-2														
Output No. 8										Z-2													
Output No. 9											Z-2												
Output No. 10												Z-2											
Output No. 11													Z-2										
Output No. 12														Z-2									
Output No. 13																		X					

A = Activate Output
D = De-Activate Output

Figure A-1. Example of Sequence of Operation

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System Outline

Signaling-Line-Circuit Configuration

Application									Initiating and Control Points														Alarm / Supervisory / Trouble Outputs							Associated Releasing-Zone							Execution Statements
N	Addr.	Owner Location	Type	App'n	Pre-Alm (Level 1)	Pre-Alm (Level 2)	Alarm (Level 1)	Alarm (Level 2)	Verify	PAS	D/N	L/N-L	ITLCO (sec / min)	CTLCO (sec / min)	Gen Alarm	Drill	Sil.	Walk	Seq. De-Act	Fan Re-Start	Group Alm/Sup/Tr	Gen. Alm	Pt. Sp. Outputs	Gr. Sp. Outputs	Gen. Tbl.	Gen. Supv.	Iden.	Release Zone	Rel. Zn. Pre-Alm	Rel. Zn. Pre-Rel	Counting	Crossed Group	Iden.	Rel. Zn. Release	Iden.	Concurrent Rel. Zn.	$ Head-End-Room Pre-Alarm
																																					001#003=SG1,AM1:1,I001
																																					001#003=004#006A=1.5
																																					004#006=SG1,AM1:1,I002
---	1	Head-End-Room Photo	Photo	Open-Area	-----	1.5	2.0	3.0	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-1A	-----	-----	ATM-1	-----	-----	I001	1	Yes	Yes	No	AI-1B	-----	Yes	-----	Z-1 Pre-Action	004#006=001#003A=3.0
---	2	Head-End-Room Photo	Photo	Open-Area	-----	1.5	2.0	3.0	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-1A	-----	-----	ATM-1	-----	-----	I001	1	Yes	Yes	No	AI-1B	-----	Yes	-----	Z-1 Pre-Action	$ Power-Room Pre-Alarm
---	3	Head-End-Room Photo	Photo	Open-Area	-----	1.5	2.0	3.0	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-1A	-----	-----	ATM-1	-----	-----	I001	1	Yes	Yes	No	AI-1B	-----	Yes	-----	Z-1 Pre-Action	014#015=SG3,AM1:7,I003
---	4	Head-End-Room Ion	Ion	Open-Area	-----	0.8	1.0	1.5	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-1B	-----	-----	ATM-1	-----	-----	I002	1	Yes	Yes	No	A!-1A	-----	Yes	-----	Z-1 Pre-Action	014#015=016#017A=1.5
---	5	Head-End-Room Ion	Ion	Open-Area	-----	0.8	1.0	1.5	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-1B	-----	-----	ATM-1	-----	-----	I002	1	Yes	Yes	No	A!-1A	-----	Yes	-----	Z-1 Pre-Action	016#017=SG3,AM1:7,I004
---	6	Head-End-Room Ion	Ion	Open-Area	-----	0.8	1.0	1.5	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-1B	-----	-----	ATM-1	-----	-----	I002	1	Yes	Yes	No	A!-1A	-----	Yes	-----	Z-1 Pre-Action	016#017=014#015A=3.0
---	7	Head-End-Room Man Rel	AI	Man. Rel	-----	-----	-----	-----	-----	-----	-----	L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	No	No	-----	-----	-----	Yes	-----	Z-1 Pre-Action	$ Head-End-Room Waterflow
---	8	Head-End-Room Man Rel	AI	Man. Rel	-----	-----	-----	-----	-----	-----	-----	L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	No	No	-----	-----	-----	Yes	-----	Z-1 Pre-Action	011=SG2,AM1:6,RY3
---	9	Head-End-Room Abort	AI	Abort/UL/30 sec	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	-----	ATM-2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	$ Power-Room Waterflow
---	10	Head-End-Room Abort	AI	Abort/UL/30 sec	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	-----	ATM-2	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	020=SG4,AM1:12,RY3
---	11	Head-End-Room Waterflow	AI	Waterflow	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-6	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	$ Head-End-Room Tamper
---	12	Head-End-Room Tamper	AI	Supervisory	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-5	-----	-----	Y	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	012=AM1:5,025
---	13	Head-End-Room Low Press	AI	Trouble	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-4	-----	Y	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	$ Power-Room Tamper
---	14	Power-Room Photo	Photo	Open-Area	-----	1.5	2.0	3.0	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-2A	-----	-----	ATM-7	-----	-----	I003	2	Yes	Yes	No	AI-2B	-----	Yes	-----	Z-2 Pre-Action	021=AM1:11,025
---	15	Power-Room Photo	Photo	Open-Area	-----	1.5	2.0	3.0	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-2A	-----	-----	ATM-7	-----	-----	I003	2	Yes	Yes	No	AI-2B	-----	Yes	-----	Z-2 Pre-Action	$ Head-End-Room Low Pressure
---	16	Power-Room Ion	Ion	Open-Area	-----	0.8	1.0	1.5	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-2B	-----	-----	ATM-7	-----	-----	I004	2	Yes	Yes	No	AI-2A	-----	Yes	-----	Z-2 Pre-Action	013=AM1:4
---	17	Power-Room Ion	Ion	Open-Area	-----	0.8	1.0	1.5	No	No	No	N-L	-----	-----	Y	-----	-----	-----	-----	-----	AI-2B	-----	-----	ATM-7	-----	-----	I004	2	Yes	Yes	No	AI-2A	-----	Yes	-----	Z-2 Pre-Action	$ Power-Room Low Pressure
---	18	Power-Room Man Rel	AI	Man. Rel	-----	-----	-----	-----	-----	-----	-----	L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	No	No	-----	-----	-----	Yes	-----	Z-2 Pre-Action	022=AM1:10
---	19	Power-Room Abort	AI	Abort/UL/30 sec	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	-----	ATM-8	-----	-----	-----	2	No	No	-----	-----	-----	-----	-----	-----	$ Pre-Action-System Low Air
---	20	Power-Room Waterflow	AI	Waterflow	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-12	-----	-----	-----	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	026=AM1:13
---	21	Power-Room Tamper	AI	Supervisory	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-11	-----	-----	Y	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	$ Head-End-Room Pre-Release
---	22	Power-Room Low Press	AI	Trouble	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-10	-----	Y	-----	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	(I001*I002)+007+008=SG1/120,023
---	23	HVAC Shutdown	AO	-----	-----	-----	-----	-----	-----	-----	-----	L	-----	-----	N	-----	-----	-----	-----	-----	-----	N	-----	-----	-----	-----	-----	1 and 2	-----	-----	Yes	-----	-----	-----	-----	-----	$ Head-End-Room Release
---	24	Power Shutdown	AO	-----	-----	-----	-----	-----	-----	-----	-----	L	-----	-----	N	-----	-----	-----	-----	-----	-----	N	-----	-----	-----	-----	-----	1 and 2	-----	-----	-----	-----	-----	Yes	-----	-----	**D(I001*I002,30,009,010)+007+008=NSG1,NAM1:1,AR1,SG2,024,RY2,AM1:3**
---	25	Supervisory to Central Station	AO	-----	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	N	-----	-----	-----	Y	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	009+010=AM1:2
---	26	Pre-Action Low Air	AI	Trouble	-----	-----	-----	-----	-----	-----	-----	N-L	-----	-----	N	-----	-----	-----	-----	-----	-----	-----	ATM-13	-----	Y	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	$ Power-Room Pre-Release
																																					(I003*I004)+018=SG3/120,023
																																					$ Power-Room Release
																																					D(I003*I004,30,019)+018=NSG3,NAM1:7,AR2,SG4,024,RY2,AM1:8
																																					019=AM1:8

APPENDIX B
NEW YORK CITY ABORT SEQUENCE

B-1 INTRODUCTION

The following EOC program examples demonstrate typical methods of supporting the unique N.Y.C. suppression system abort sequence. Use of these sample programs negates the need for any external equipment to control the notification appliances.

B-2 GENERAL DISCUSSION

This discussion is based on a typical single suppression zone, as illustrated in Figure B-1. The room contains: six smoke detectors, one manual release station, one abort station, one power shutdown and one HVAC shutdown.

B-2.1 Sequence of Operation for 3 NAC solution

- Any detector–Activate the bell.
- Second smoke detector alarm–Turn off bell, turn on horn (pulsing), turn on strobe (steady), begin (30 second) discharge delay, shut down power, shut down HVAC.
- When timer counts down–Discharge agent, turn on strobes (steady) and horn/ strobe (steady).
- Abort Active–Turn off horn, turn off strobe, turn on bell and add 90 seconds to initial time delay.

B-2.2 System Configuration for 3 NAC solution

The configuration of the system depicted in Figure B-1 contains the following hardware with assigned addresses:

- Six Smoke Detectors (1 through 6)
- One Abort Station (7)
- One Manual Release Station (8)
- One Bell (SG1)
- One Horn Circuit (SG2)
- Two Strobes on one circuit (SG3)
- Two Release Devices on one circuit (AR1)

B-2.3 Sample Programs for N.Y.C. Abort Sequence

Note: When using N.Y.C. Abort, all initiating devices must be set to the default of latching. Non-Latching must not be used or improper operation of this sequence results.

Sample Program 1:

```
$ EOC program for NYC Abort, using one NAC (SG2, a Horn)

1+2+3#4=I3                      $ check for any NYC Aborts going Active (make your changes
                                  to the left of the equals sign)
11+12+13#14=C5                  $ check Manual Release Pulls going Active (make your
                                  changes to the left of the equals sign)
101+102+103#255=C1,I1           $ First Alarm: check for any alarms going Active (make
                                  your changes to the left of the equals sign)
                                $ also on any of the above 3 lines, possibly set any
                                  Output(s), at the end, if desired

$ Copy the following lines exactly as is, with no modifications:

NC5*I1>1=C2,NC1                 $ Second Alarm State reached; stop signaling the First
                                  Alarm
NC5*I3=C3,C6                    $ start the Aborting State (if any Abort is Active)
NI3=NC3                         $ stop the Aborting State (if all Aborts are Inactive)
C5=NC3                          $ stop the Aborting State (if Release has happened)
C6*NC3*NI1=NC6                  $ if stopping the Aborting State and NO Alarms are Active,
                                  then same as Abort has never happened
D(NC5*NC6*C2,30)+C5=C5,AR2      $ Release in 30 seconds, if an Abort has never happened
D(NC5*C6*C2*NC3,90)=C4          $ after 90 seconds, then Re-signal the Second Alarm State
                                  (Pre-Release)
C3=NC4                          $ stop signaling the First Alarm State or Second Alarm
                                  State, if presently aborting
D(NC5*C6*C2*NC3,120)+C5=C5,AR2  $ Release in 120 seconds, as long as no more Aborts go
                                  Active

$ now handle the NAC signaling
NC5*C3=NSG2                     $ stop signaling the First Alarm State and/or Second Alarm
                                  State, if presently aborting
NC5*NC6*NC2*C1=SG2/60           $ signal First Alarm, if an Abort has never happened
NC5*NC3*NC4*C6=SG2/60           $ signal First Alarm, if not presently aborting, but if an
                                  Abort has previously happened
NC5*NC6*C2=SG2/120              $ signal Second Alarm (Pre-Release) while doing 30 second
                                  countdown, if an Abort has never happened
NC5*C4=SG2/120                  $ signal Second Alarm (Pre-Release), after the 90 second
                                  countdown, if an Abort previously happened
C5=AR2,SG2/C                    $ signal that the Release has happened
$
```

Sample Program 2:

```
$ EOC program for NYC Abort, using two NACs (SG1, a Bell; and SG2, a Horn)

1+2+3#4=I3                      $ check for any NYC Aborts going Active (make your changes
                                  to the left of the equals sign)
11+12+13#14=C5                  $ check Manual Release Pulls going Active (make your
                                  changes to the left of the equals sign)
101+102+103#255=C1,I1           $ First Alarm: check for any alarms going Active (make
                                  your changes to the left of the equals sign)
                                $ also on any of the above 3 lines, possibly set any
                                  Output(s), at the end, if desired

$ Copy the following lines exactly as is, with no modifications:

NC5*I1>1=C2,NC1                 $ Second Alarm State reached; stop signaling the First
                                  Alarm
NC5*I3=C3,C6                    $ start the Aborting State (if any Abort is Active)
NI3=NC3                         $ stop the Aborting State (if all Aborts are Inactive)
C5=NC3                          $ stop the Aborting State (if Release has happened)
C6*NC3*NI1=NC6                  $ if stopping the Aborting State and NO Alarms are Active,
                                  then same as Abort has never happened
D(NC5*NC6*C2,30)+C5=C5,AR2      $ Release in 30 seconds, if an Abort has never happened
D(NC5*C6*C2*NC3,90)=C4          $ after 90 seconds, then Re-signal the Second Alarm State
                                  (Pre-Release)
C3=NC4                          $ stop signaling the First Alarm State or Second Alarm
                                  State, if presently aborting
D(NC5*C6*C2*NC3,120)+C5=C5,AR2  $ Release in 120 seconds, as long as no more Aborts go
                                  Active

$ now handle the NAC signaling
NC5*C3=NSG1,NSG2                $ stop signaling the First Alarm State and/or Second Alarm
                                  State, if presently aborting
NC5*NC6*NC2*C1=SG1/C            $ signal First Alarm, if an Abort has never happened
NC5*NC3*NC4*C6=SG1/C            $ signal First Alarm, if not presently aborting, but if an
                                  Abort has previously happened
NC5*NC6*C2=NSG1,SG2/60          $ signal Second Alarm (Pre-Release), while doing 30 second
                                  countdown, if an Abort has never happened
NC5*C4=NSG1,SG2/60              $ signal Second Alarm (Pre-Release), after the 90 second
                                  countdown, if an Abort previously happened
C5=AR2,NSG1,SG2/C               $ signal that the Release has happened
$
```

Sample Program 3:

```
$ EOC program for NYC Abort, using two NACs (SG2, a Horn; and SG3 a Strobe)

1+2+3#4=I3                      $ check for any NYC Aborts going Active (make your changes
                                  to the left of the equals sign)
11+12+13#14=C5                  $ check Manual Release Pulls going Active (make your
                                  changes to the left of the equals sign)
101+102+103#255=C1,I1           $ First Alarm: check for any alarms going Active (make
                                  your changes to the left of the equals sign)
                                $ also on any of the above 3 lines, possibly set any
                                  Output(s), at the end, if desired

$ Copy the following lines exactly as is, with no modifications:

NC5*I1>1=C2,NC1                 $ Second Alarm State reached; stop signaling the First
                                  Alarm
NC5*I3=C3,C6                    $ start the Aborting State (if any Abort is Active)
NI3=NC3                         $ stop the Aborting State (if all Aborts are Inactive)
C5=NC3                          $ stop the Aborting State (if Release has happened)
C6*NC3*NI1=NC6                  $ if stopping the Aborting State and NO Alarms are Active,
                                  then same as Abort has never happened
D(NC5*NC6*C2,30)+C5=C5,AR2      $ Release in 30 seconds, if an Abort has never happened
D(NC5*C6*C2*NC3,90)=C4          $ after 90 seconds, then Re-signal the Second Alarm State
                                  (Pre-Release)
C3=NC4                          $ stop signaling the First Alarm State or Second Alarm
                                  State, if presently aborting
D(NC5*C6*C2*NC3,120)+C5=C5,AR2  $ Release in 120 seconds, as long as no more Aborts go
                                  Active

$ now handle the NAC signaling
NC5*C3=NSG2,NSG3                $ stop signaling the First Alarm State and/or Second Alarm
                                  State, if presently aborting
NC5*NC6*NC2*C1=SG2/60           $ signal First Alarm, if an Abort has never happened
NC5*NC3*NC4*C6=SG2/60           $ signal First Alarm, if not presently aborting, but if an
                                  Abort has previously happened
NC5*NC6*C2=SG2/120,SG3/C        $ signal Second Alarm (Pre-Release), while doing 30 second
                                  countdown, if an Abort has never happened
NC5*C4=SG2/120,SG3/C            $ signal Second Alarm (Pre-Release), after the 90 second
                                  countdown, if an Abort previously happened
C5=AR2,SG2/C,SG3/C              $ signal that the Release has happened
$
```

Sample Program 4:

```
$ EOC program for NYC Abort, using three NACs (SG1, a Bell; SG2, a Horn; and SG3 a Strobe)

1+2+3#4=I3                      $ check for any NYC Aborts going Active (make your changes
                                  to the left of the equals sign)
11+12+13#14=C5                  $ check Manual Release Pulls going Active (make your
                                  changes to the left of the equals sign)
101+102+103#255=C1,I1           $ First Alarm: check for any alarms going Active (make
                                  your changes to the left of the equals sign)
                                $ also on any of the above 3 lines, possibly set any
                                  Output(s), at the end, if desired

$ Copy the following lines exactly as is, with no modifications:

NC5*I1>1=C2,NC1                 $ Second Alarm State reached; stop signaling the First
                                  Alarm
NC5*I3=C3,C6                    $ start the Aborting State (if any Abort is Active)
NI3=NC3                         $ stop the Aborting State (if all Aborts are Inactive)
C5=NC3                          $ stop the Aborting State (if Release has happened)
C6*NC3*NI1=NC6                  $ if stopping the Aborting State and NO Alarms are Active,
                                  then same as Abort has never happened
D(NC5*NC6*C2,30)+C5=C5,AR2      $ Release in 30 seconds, if an Abort has never happened
D(NC5*C6*C2*NC3,90)=C4          $ after 90 seconds, then Re-signal the Second Alarm State
                                  (Pre-Release)
C3=NC4                          $ stop signaling the First Alarm State or Second Alarm
                                  State, if presently aborting
D(NC5*C6*C2*NC3,120)+C5=C5,AR2  $ Release in 120 seconds, as long as no more Aborts go
                                  Active

$ now handle the NAC signaling
NC5*C3=NSG1,NSG2,NSG3           $ stop signaling the First Alarm State and/or Second Alarm
                                  State, if presently aborting
NC5*NC6*NC2*C1=SG1/C            $ signal First Alarm, if an Abort has never happened
NC5*NC3*NC4*C6=SG1/C            $ signal First Alarm, if not presently aborting, but if an
                                  Abort has previously happened
NC5*NC6*C2=NSG1,SG2/60,SG3/C    $ signal Second Alarm (Pre-Release), while doing 30 second
                                  countdown, if an Abort has never happened
NC5*C4=NSG1,SG2/60,SG3/C        $ signal Second Alarm (Pre-Release), after the 90 second
                                  countdown, if an Abort previously happened
C5=AR2,NSG1,SG2/C,SG3/C         $ signal that the Release has happened
$
```

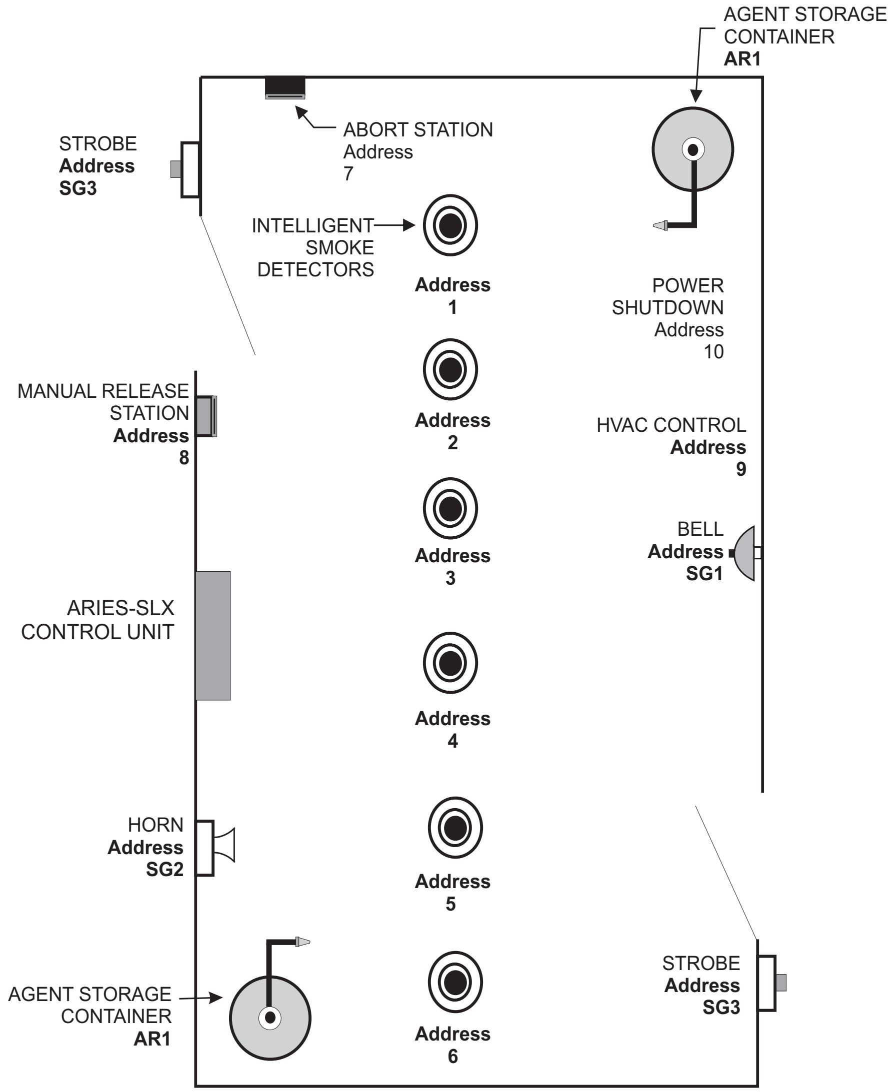

Figure B-1. New York City Installation

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